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Working Paper 08/85
May 2008

Economics Working Paper Series

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

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* We would like to thank Eckhard Plinke and the bank Sarasin & Cie in Basle for providing their assessment data, Kenneth R. French, Ulrich Oberndorfer, and Michael Schröder for their helpful comments, as well as Eveline Schwegler for her untiring commitment during data analysis.

The Effect of CSR on Stock Performance: New Evidence for the USA and Europe

Abstract

This paper provides new empirical evidence for the effect of corporate social responsibility (CSR) on corporate financial performance. In contrast to former studies, we examine two different regions, namely the USA and Europe. Our econometric analysis shows that environmental and social activities of a firm compared with other firms within the industry are valued by financial markets in both regions. However, the respective positive effects on average monthly stock returns between 2003 and 2006 appear to be more robust in the USA and, in addition, to be nonlinear. Our analysis furthermore points to biased parameter estimations if incorrectly specified econometric models are applied: The seemingly significantly negative effect of environmental and social performance of the industry to which a firm belongs vanishes if the explanation of stock performance is based on the Fama-French three-factor or the Carhart four-factor models instead of the simple Capital Asset Pricing Model.

Keywords:

Corporate social responsibility, Environmental performance, Financial performance, Asset pricing models.

JEL:

Q56, M14, G12, Q01.

1. Introduction

Knowledge about the effect of corporate environmental performance on corporate financial performance contributes to the debate about whether managers systematically miss profit opportunities if they decide against the protection of the natural environment (e.g., King and Lenox, 2002). This debate has been going on for a while in the corresponding literature (e.g., Hart and Ahuja, 1996, King and Lenox, 2001, Guenster et al., 2006). Furthermore, an understanding of this relationship is also interesting for environmental policy: If a positive effect of corporate environmental performance really exists, it can be argued that traditional mandatory command and control regulations as well as market based instruments – such as green taxes – should be relaxed (e.g., Khanna, 2001). Instead, these regulations could be supplemented or even substituted by information-based instruments, namely by improving the flow of information with respect to this effect (e.g., Telle, 2006). Just like other non-mandatory approaches in environmental policy – such as voluntary green management measures – these regulations can be thought to be more cost-efficient because they leave firms the flexibility to choose the cheapest pollution abatement strategy and reduce governments' enforcement costs (e.g., Alberini and Segerson, 2002).

These conclusions do not only apply for the effect of corporate environmental, but also corporate social activities on corporate financial performance. In this respect, the terms "corporate social performance" or, alternatively, "corporate social responsibility" (CSR) are often used synonymously and comprise both social as well as environmental measures (e.g., Waddock and Graves, 1997, Orlitzky, 2001, Orlitzky et al., 2003). According to the popular definition of McWilliams and Siegel (2001), CSR are "actions that appear to further some social good, beyond the interest of the firm and what is required by law". Another definition of CSR emphasizes – besides the avoidance of distributional conflicts – "actions which reduce the extent of externalized costs" (Heal, 2005).

Due to the inconclusiveness of theory, the effect of CSR on corporate financial performance in general and on stock performance in particular is ultimately an empirical question. Against this background, we provide new empirical evidence for this issue. As an indicator for CSR, we use environmental and social activities of a firm compared with other firms in the same industry. In line with only few former studies (e.g., King and Lenox, 2001, Ziegler et al., 2007a), we additionally consider sector specific influences by incorporating environmental and social performance of the industry to which a firm belongs. As an indicator for corporate financial performance, we use stock performance which is measured by the average monthly stock returns between 2003 and 2006. Due to this specific dependent variable, our final cross-sectional regressions have to be based on the estimation of asset pricing models since financial economics suggests the use of corresponding factors to explain average stock returns.

Our main contribution to the literature considering the effect of CSR on corporate financial performance is two-fold: First of all, we examine this relationship in two different regions, namely the USA and Europe. In this respect, we are particularly able to incorporate the same CSR indicators for both regions. Therefore, we can analyze whether potential CSR impacts are interregional or whether regional differences arise, for example, due to different market developments. Secondly, we apply different asset pricing models for the explanation of stock performance, i.e., the three-factor model according to Fama and French (1993) and particularly the four-factor model according to Carhart (1997) besides the simple Capital Asset Pricing Model (CAPM). While the corresponding factors for these models are publicly available for the US and some other specific stock markets, they have to be calculated for the entire European stock market. This is obviously the reason why such multifactor models have not often been applied for this region yet. Based on these asset pricing models, we are additionally able to compare the explanatory power of the corresponding estimated corporate beta parameters alone for average stock returns over time in the USA and in Europe.

The remainder of the paper is structured as follows: Section 2 briefly provides some theoretical background. In the third section we review the empirical literature regarding the relationship between CSR and corporate financial performance. Section 4 discusses our different two-stage econometric approaches. In the fifth section the used data and variables are described. Section 6 reports the empirical results and the final section discusses our results and concludes.

2. Theoretical background

Overall, current theory concerning the effects of CSR on corporate financial performance is ambiguous (e.g., Waddock and Graves, 1997, Guenster et al., 2006). In other words, positive and negative as well as neutral impacts are discussed. Arguments for a negative influence can be based on neoclassical microeconomics. According to this, it is mainly emphasized that the operating costs of corporate environmental (e.g., Telle, 2006) or social activities outweigh their financial benefits (due to cost reductions through, for example, energy savings, waste reduction, or recycling) such that the underlying principle of shareholder wealth maximization is hurt. It is argued that CSR demands significant portions of corporate financial resources, although the benefits of CSR are often in a distant future if any benefits occur. As a consequence, CSR can lead to reduced profits, decreased firm values, or competitive disadvantage besides lower shareholder returns such that already Friedman (1970) argues that there is no role for CSR.

This neoclassical argumentation is supported by corporate governance theory (e.g., Shleifer and Vishny, 1997, Tirole, 2006). According to a rather narrow definition, corporate governance comprises all measures – such as optimal incentive or control structures – which assure that investors get an adequate return for their investments. Only if corporate governance structures are properly installed, management will find and choose the profit-maximizing path. According to this, it is argued that, for example, the consideration of goals of other groups – such as the general public – as motivation for corporate environmental and social activities unnecessarily enlarges the latitude of management which is misused for maximizing the utility of managers such that the risk of counterproductive measures with respect to shareholder wealth and competitiveness increases. In other words, investors have to reckon with lower returns on their investments if the respective corporations deviate from the optimal path due to excessive environmental or social activities (e.g., Wall, 1995, Heinkel et al., 2001, Beltratti, 2005). In contrast, investors in purely profit-maximizing firms with a lower intensity of CSR can expect higher investment returns. However, it is likely that both types of corporations, i.e., firms with a higher and firms with a lower intensity, can coexist if costs for CSR are not excessive and if, for example, many investors consider corporate environmental or social activities in their investments (e.g., Arx, 2007).

Unlike Friedman (1970) as discussed above, however, positive effects of CSR on corporate financial performance can also be based on neoclassical microeconomics by emphasizing the role of CSR in reducing the extent of externalized costs. Friedman (1970) assumes that the government defines property rights such that no external effects exist. In this view, corporate environmental and social activities that benefit shareholders are purely profit-maximization while respective measures not benefiting investors are theft from shareholders. In contrast, Heal (2005) argues that the government does not fully resolve all problems with external effects and that the competitive markets are not efficient. Therefore, CSR can substitute missing markets if external effects arise from them and can reduce conflicts between firms and stakeholder groups such as the government, the general public, non-governmental organizations, competitors, employees, or clients. As a consequence, it can be argued that the reduction of these conflicts increases corporate profits or corporate financial performance at least in the long term which also makes firms with a high intensity of CSR more attractive to investors.

This stakeholder argument is strengthened in the strategic management literature (e.g., Waddock and Graves, 1997, Barnett and Salomon, 2006, Curran and Moran, 2007). Stakeholder theory suggests that management has to satisfy several groups who have some interest or "stake" in a firm and can influence its outcome (e.g., McWilliams et al., 2006). Regarding corporate financial performance, it can therefore be worthwhile to engage in CSR because otherwise these stakeholders could withdraw the support for the firm. For example, if a firm enjoys a good reputation due to an excellent association with its employees as an element of CSR, it can increase its employee retention rate and additionally attract highly skilled and thus more productive employees. Furthermore, the compliance with environmental regulations can lead to good relationships with government which could be beneficial for corporate legislative and political lobbying. Finally, a minimum of corporate environmental activities and the avoidance of child labor in the full value-added chain of the products can reduce risk due to, for example, aggressive campaigns of non-governmental organizations.

These arguments from stakeholder theory can be embedded in the resource-based view of the firm (e.g., Barney, 1991) which suggests that competitive advantage evolves from internal capabilities which are valuable, rare, and difficult to imitate or substitute (e.g., Russo and Fouts, 1997, Klassen and Whybark, 1999, King and Lenox, 2001, McWilliams et al., 2006). In this respect, stakeholder management can be considered an important organizational capability or resource. A good reputation due to corporate environmental activities such as the certification of environmental management according to ISO 14001 as an element of CSR is a further example for an intangible resource. This could particularly lead to higher sales among customers who are sensitive to such issues and therefore to increased corporate profits or corporate financial performance. In this respect, new technologies which are installed due to proactive corporate environmental activities are an example for a tangible or physical resource if these technologies can be capitalized and not easily imitated by competitors.

Based on this discussion of positive and negative effects of CSR, it can also be argued that there are many converse corporate environmental and social factors such that it is likely that no significant effect exists (e.g., Waddock and Graves, 1997, Elsayed and Paton, 2005). For example, McWilliams and Siegel (2001) show within a model with two firms which produce identical products except that one firm adds an additional social attribute or feature to the product which is valued by the market that in equilibrium the overall effect of CSR is neutral (see also McWilliams et al., 2006). In this respect, MacKey et al. (2007) outline in a theoretical decision making model comprising the supply of and demand for CSR when such environmental or social activities improve, reduce, or have no impact on the market value.

As a consequence, the effect of CSR on corporate financial performance in general and on stock performance in particular is ultimately an empirical question. In this respect, we argue that the direction and strength of the impacts can depend on specific regions, for example, due to different governmental policy. Therefore, the comparison of these effects in the USA and Europe by applying the same CSR indicators for both regions seems to be fruitful. Regarding the measurement of corporate financial performance, the use of forward looking average stock returns is theoretically attractive. According to the efficient market hypothesis, stock prices reflect all publicly available information about the future financial performance of firms. In compliance with the well-known dividend discount model a stock price therefore equals the discounted expected future stream of dividends paid to the shareholders. In contrast to the use of accounting data based indicators such as return on assets or return on sales, our approach has the advantage that the focus is not on the past realized but on the future expected financial performance (e.g., Miller and Modigliani, 1961).

3. Empirical literature review

The relationship between CSR and corporate financial performance can be empirically analyzed with three methodological approaches, namely portfolio analyses, event studies, and longer-term (micro-) econometric approaches. Portfolio analyses in this field typically compare the risk-adjusted stock returns of portfolios that consist of corporations with a higher environmental or social performance and portfolios that consist of stock corporations with a lower environmental or social performance. Recent studies are mostly based on the estimation of alphas within multifactor models such as the Carhart four-factor model (e.g., Derwall et al., 2005, Bauer et al., 2005, 2007, Kempf and Osthoff, 2007). Portfolio analyses consider either existing funds or virtual funds constructed by the researcher. While portfolio analyses are able to examine the benefits of embedding CSR into investment decisions, they have some drawbacks: For example, the stock performance of existing funds depends strongly on the ability of the fund management. Furthermore, one main weakness of portfolio analyses for both existing and virtual funds is that only the average financial performance of all corporations whose stock are included in the portfolios is considered (e.g., Wagner, 2001). Consequently, the identification of isolated causal effects of CSR on corporate financial performance needs more sophisticated econometric approaches.

In this respect, event studies examine the mean stock returns for corporations experiencing a specific event (i.e., new information) and therefore aim to measure the effect on the value of a corporation (e.g., MacKinlay, 1997, Kothari and Warner, 2006). Event studies were developed and particularly applied in financial economics and accounting, for example, to examine the effect of mergers and acquisitions. However, a growing number of CSR related event studies is available in the meantime (e.g., Hamilton, 1995, Klassen and McLaughlin, 1996, Konar and Cohen, 1997, Posnikoff, 1997, Khanna et al., 1998, Dasgupta et al., 2001, Gupta and Goldar, 2005, Curran and Moran, 2007). The corresponding events often refer to positive or negative news about specific components of CSR such as information about toxic emissions or the disinvestment of corporations from South Africa during the apartheid regime. However, the events can also refer to news on broader CSR indicators such as information about the inclusion in a stock index which rely on high corporate environmental and social performance. If the main basic conditions for the application of event studies are given, for example, that capital markets are sufficiently efficient to react to events, one salient aspect of these approaches is that the causality of the relationship between CSR and stock performance is rather clear (e.g., Heal, 2005). However, one main weakness of event studies – besides the common analysis of only short-run effects of CSR related events – is that the application of such studies in general depends on unexpected events.

Indeed, CSR rather refers to long-term corporate activities and thus can seldom exclusively be characterized by unexpected positive or negative events. As a consequence, longer-term econometric approaches have received increasing attention for a while. These studies apply – in the same way as portfolio analyses and event studies – very different indicators for CSR. They additionally use different indicators for corporate financial performance. Due to the theoretical attractiveness as discussed above, some of these studies (e.g., Filbeck and Gorman, 2004, Ziegler et al., 2007a) also use stock returns as they are exclusively considered in portfolio analyses and event studies. In contrast, most other studies (e.g., Hart and Ahuja, 1996, Waddock and Graves, 1997, Russo and Fouts, 1997, McWilliams and Siegel, 2000, Dowell et al., 2000, Konar and Cohen, 2001, King and Lenox, 2001, 2002, Salama, 2005, Elsayed and Paton, 2005, Telle, 2006, Guenster et al., 2006) also apply accounting data based indicators for corporate financial performance such as Tobin's Q, return on assets, return on sales, or return on equity.

Concerning our broad measurement of CSR, we consider both corporate environmental and social activities. In contrast, many former studies neglect the social dimension of CSR by using one-dimensional and rather narrow indicators such as emissions of pollutants (e.g., Hart and Ahuja, 1996, Konar and Cohen, 2001, King and Lenox 2001, 2002, Telle, 2006). However, such emission data, for example, based on the Toxics Release Inventory (TRI), seem to be a weak indicator for CSR in general because they only give information about a single constituent of corporate environmental performance. Other econometric analyses use more general CSR indicators which, however, only refer to the environmental dimension (e.g., Russo and Fouts, 1997, Dowell et al., 2000, Filbeck and Gorman, 2004, Salama, 2005, Elsayed and Paton, 2005, Guenster et al., 2006). Studies which also incorporate both CSR dimensions such as Waddock and Graves (1997), McWilliams and Siegel (2000), and Ziegler et al. (2007a) are exceptions in this respect. Furthermore, our study disentangles – such as King and Lenox (2001) and Ziegler et al. (2007a) – firm and sector specific influences and therefore additionally analyzes industry environmental and social performance.

4. Econometric approach

Our study applies cross-sectional regressions of average stock returns over time on CSR. To explain such stock performance, we include – according to financial economics – some control variables which are received by time-series regressions of asset pricing models. The estimated corporate beta parameters from this first stage are then – in addition to the main interesting CSR variables – incorporated in the final cross-sectional regressions.

4.1. Time-series regressions of asset pricing models

So far, the main asset pricing model for estimating stock returns is the one-factor model based on the market model (e.g., Sharpe, 1963) and the CAPM (e.g., Lintner, 1965, Fama and French, 2004, Perold, 2004). This model can be formulated for a corporation or stock i in month t (i = 1,…,N; t = 1,…,T) as

$$r^e_{it} = \alpha_i^{CAPM} + \beta_i^{CAPM} r^e_{mt} + \varepsilon_{it}$$

with the excess returns $r^e_{it} = r_{it}-r_{ft}$ and $r^e_{mt} = r_{mt}-r_{ft}$. In this approach, r_{it} and r_{mt} are the (continuous) stock returns for corporation i and the market at the end of month t, r_{ft} is the risk-free interest rate at the beginning of month t, and ε_{it} is the disturbance term with $E(\varepsilon_{it}) = 0$

and (unknown) $var(\varepsilon_{it}) = \sigma_\varepsilon^2$. Finally, α_i^{CAPM} and β_i^{CAPM} are further unknown parameters which are estimated by ordinary least squares (OLS). The idea is that the estimated market-beta parameters $est(\beta_i^{CAPM})$ capture the non-diversifiable risk of each corporation which can be used in the final cross-sectional regressions to explain average stock returns over time.

Based on the "anomalies" discussion which questions the validity of the CAPM (e.g., Banz, 1981, DeBondt and Thaler, 1985, Fama and French, 1992), Fama and French (1993) developed a three-factor model which includes – besides the excess returns r_{mt}-r_{ft} of the market – two additional factors with respect to size and value to explain the excess returns r_{it}-r_{ft}:

$$r^e_{it} = \alpha_i^{FF} + \beta_{i1}^{FF} r^e_{mt} + \beta_{i2}^{FF} SMB_t + \beta_{i3}^{FF} HML_t + \varepsilon_{it}$$

In this model SMB_t is (at the end of month t) the difference between the returns for portfolios comprising stocks of "small" corporations and portfolios comprising stocks of "big" corporations. HML_t is (at the end of month t) the difference between the returns for portfolios comprising stocks of corporations with a "high" book-to-market equity and portfolios comprising stocks of corporations with a "low" book-to-market equity. The main unknown parameters are now α_i^{FF}, β_{i1}^{FF}, β_{i2}^{FF}, and β_{i3}^{FF}. Many studies show that this three-factor model has more explanatory power than the one-factor model based on the CAPM, for example, Fama and French (1993, 1996) for the US, Berkowitz and Qiu (2001) for the Canadian, Hussain et al. (2002) for the British, and Ziegler et al. (2007b) for the German stock market.

Almost at the same time, however, a broad discussion about another factor, namely the momentum factor, began (e.g., Jagadeesh and Titman, 1993, Rouwenhorst, 1998, Jagadeesh and Titman, 2001). As a consequence, the following four-factor model of Carhart (1997) which additionally includes this factor – besides the three Fama-French factors – is in the meantime, due to the highest explanatory power, the most common asset pricing model for applications in financial economics (e.g., L'Her et al., 2004, Bollen and Busse, 2005) and particularly, as discussed above, for portfolio analyses on the relationship between CSR and stock performance:

$$r^e_{it} = \alpha_i^{CAR} + \beta_{i1}^{CAR}\, r^e_{mt} + \beta_{i2}^{CAR}\, SMB_t + \beta_{i3}^{CAR}\, HML_t + \beta_{i4}^{CAR}\, MOM_t + \varepsilon_{it}$$

In this model MOM_t is (at the end of month t) the difference between the returns for portfolios comprising stocks of "winners" in the past and portfolios comprising stocks of "losers" in the past. The main unknown parameters are now α_i^{CAR}, β_{i1}^{CAR}, β_{i2}^{CAR}, β_{i3}^{CAR}, and β_{i4}^{CAR}.

4.2. Final cross-sectional regressions

The final cross-sectional regressions with the average monthly stock returns $\bar{r}_i$ between 2003 and 2006 for corporation i as dependent variables incorporate – besides the main interesting CSR variables (including environmental and social performance of the industry to which a firm belongs), subsumed in the (column) vector CSR_i – the estimated beta parameters from the time-series regressions of the several asset pricing models in the first stage as explanatory variables. In other words, these regressions either comprise $est(\beta_i^{CAPM})$ or $est(\beta_{i1}^{FF})$, $est(\beta_{i2}^{FF})$, and $est(\beta_{i3}^{FF})$, or $est(\beta_{i1}^{CAR})$, $est(\beta_{i2}^{CAR})$, $est(\beta_{i3}^{CAR})$, and $est(\beta_{i4}^{CAR})$ such that the following three estimation equations arise (ζ_i are the respective disturbance terms):

$$\bar{r}_i = \gamma + \delta' \, CSR_i + \eta \, est(\beta_i^{CAPM}) + \zeta_i$$

$$\bar{r}_i = \gamma + \delta' \, CSR_i + \eta_1 \, est(\beta_{i1}^{FF}) + \eta_2 \, est(\beta_{i2}^{FF}) + \eta_3 \, est(\beta_{i3}^{FF}) + \zeta_i$$

$$\bar{r}_i = \gamma + \delta' \, CSR_i + \eta_1 \, est(\beta_{i1}^{CAR}) + \eta_2 \, est(\beta_{i2}^{CAR}) + \eta_3 \, est(\beta_{i3}^{CAR}) + \eta_4 \, est(\beta_{i4}^{CAR}) + \zeta_i$$

The (robust OLS) estimation of the respective parameters (or parameter vectors) leads to $est(\gamma)$, $est(\delta)$, and $est(\eta)$ in the first approach based on the CAPM, to $est(\gamma)$, $est(\delta)$, $est(\eta_1)$, $est(\eta_2)$, and $est(\eta_3)$ in the second approach based on the Fama-French three-factor model, and to $est(\gamma)$, $est(\delta)$, $est(\eta_1)$, $est(\eta_2)$, $est(\eta_3)$, and $est(\eta_4)$ in the third approach based on the Carhart four-factor model. As the estimated beta parameters can be theoretically considered as risk factors, the corresponding estimates est(η), est(η_1), est(η_2), est(η_3), and est(η_4) in the final cross-sectional regressions are expected to be positive.

In this respect, it should be noted that the cross-sectional regressions for the European stock market additionally include nine country dummies as further explanatory variables to control for possible regional differences regarding the average stock returns over time, for example, due to different governmental policy, market developments, or economic growth. The corresponding variables Fin_i, Fra_i, Ger_i, Ita_i, Net_i, Spa_i, Swe, Swi_i, and UK_i take the value one if corporation i stems from Finland, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, and the United Kingdom, respectively. The final cross-sectional regressions additionally comprise corporations from Austria, Belgium, Denmark, Greece, Ireland, Norway, and Portugal. Due to the small number of firms from these countries, the corresponding dummy variables are not included in the regressions, but serve as summarized omitted reference category for the other country dummies. All calculations for this paper were performed with the software package STATA.

5. Data and variables

5.1. CSR data and variables

Concerning the CSR variables, we use data from the Swiss bank Sarasin & Cie in Basle. Reliably beginning in 2001/2002, this bank has assessed environmental and social activities for 317 corporations in the USA and 720 European corporations quoted on different stock exchanges over time. While most of these corporations are large, some of them have a very low market capitalization. The latter firms were only assessed due to their sustainability profile (from the perspective of Sarasin). However, the problem is that such diverse firms which belong to very different sectors cannot be reliably compared regarding the effect of CSR on stock performance. Therefore, we only examine those assessed firms which were member of the Morgan Stanley Capital International (MSCI) Europe Index or the MSCI USA Index at least once over the period between 1996 and 2006. This period was chosen because we had only access to financial data for these 11 years (see section 5.2.). As a consequence, the number of corporations reduces to 212 in the USA and 419 in Europe.

Indeed, the corresponding necessary financial data and the exclusively used assessments for 2002 are only available for N = 175 US and N = 281 European corporations which are finally considered in our empirical analysis. In this respect, it should be noted that only those corporations are examined whose financial data are available for all 132 months over the entire period between 1996 and 2006. The reason for this is that the number T of observations should be large for the time-series regressions of asset pricing models. In other words, if we had additionally incorporated corporations whose financial data are only available for a lower number of months, the corresponding estimations of the beta parameters would be less reliable. Furthermore, we incorporate lagged explanatory variables by using the 2002 assessments and the average monthly stock returns between 2003 and 2006 as dependent variables in the final cross-sectional regressions.

In its assessments Sarasin combines environmental and social risk indicators in a two-dimensional rating and therefore considers both activities of a firm compared with other firms in the same industry as well as environmental and social performance of the industry to which a firm belongs. These two ratings are ultimately used to determine whether a corporation is suitable for Sarasin's sustainable investment funds and portfolios or not. The first rating indicates how successfully firms manage the industry specific risks. Concerning the environmental dimension of this rating, all measures of a corporation to reduce environmental risks in the full value-added chain of the products (pre-production, production, use of products or services) are assessed. Furthermore, environmental strategies and management systems are considered. Specifically, Sarasin uses sub-criteria which are proposed by the

World Business Council for Sustainable Development (WBCSD). These environmental sub-criteria are energy intensity, use of renewable energies, material intensity, toxicity, revalorisation, durability, and service intensity.

Concerning the social dimension of the first rating, it is assessed how well a firm manages its internal and external conflict potential, i.e., requirements of different stakeholder groups. The following groups are considered as stakeholders: Employees, suppliers, investors, the general public as well as – regarding the market – customers and competitors. Key elements for the assessment are the social strategy and social management systems of firms. As social sub-criteria Sarasin considers health risks, participation, wealth creation, and distribution and knowledge creation regarding their effects on stakeholder groups. These single social and environmental sub-criteria – which are assessed on a five-stage scale, respectively – are then aggregated to the first broad rating. It should be noted that the relevance of the several environmental sub-criteria differs between sectors with respect to the value-added chain of the products whereas the relevance of the several social sub-criteria differs between sectors with respect to the importance of the individual stakeholder groups. As a consequence, the final aggregation is based on different weightings.

The second industry specific rating refers to the assessment of the environmental and social impacts and risks which are particular for this sector. In this assessment, not only the direct effects of producing the products and services, but also indirect influences along the product chain as well as lifecycle considerations are included. Regarding the environmental dimension, two main sub-criteria are considered, namely resource consumption and emissions. According to these criteria, for example, primary industries such as chemicals, energy, energy suppliers, metal production, mining, paper, and cement all belong to industries with higher environmental risks with respect to the substantial direct impact of those industries on the environment.

Regarding the social dimension, Sarasin distinguishes between internal conflict potential (e.g., downsizing or inadequate working conditions) and external conflict potential which comprises, for example, health risks caused by products and productions methods, concentration of economic power, corruption, and ethical conflicts. While each of these single environmental and social industry specific sub-criteria is again independently assessed on a five-stage scale, the several sub-criteria are finally – based on different weightings – aggregated to the second broad rating. Both aggregated broad ratings are also based on a five-stage scale and therefore – in the same way as the single sub-criteria – coded with the integers from one to five. In this respect, the number one designates the worst and the number five the best assessment.

In the following, $Corp_i$ symbolizes the corresponding ordinal variable for the environmental and social activities of a firm i compared with other firms in the same industry and $Indu_i$ symbolizes the ordinal variable for environmental and social performance of the industry to which a firm i belongs. Since it is not certain that these ratings are equidistant in each case, i.e., that the distance between two numbers is always identical, we also examine dummy variables based on these ordinal variables. However, preliminary investigations showed that the incorporation of overall eight single dummies lead to ambiguous estimation results, obviously because the effects of these variables are not linear (the estimation results are available on request).

Therefore, we analyze two alternative aggregated dummy variables for both ratings in more detail. The dummies $Corp54_i$ or $Indu54_i$ take the value one if $Corp_i$ or $Indu_i$ take the values five or four, respectively. Furthermore, the dummies $Corp543_i$ or $Indu543_i$ take the value one if $Corp_i$ or $Indu_i$ take the values five, four, or three, respectively. As a consequence, the vector CSR_i in the final cross-sectional regressions always comprise exactly one pair of the variables $Corp_i$ and $Indu_i$, $Corp54_i$ and $Indu54_i$, or $Corp543_i$ and $Indu543_i$. Table 1 reports the corresponding frequencies for the distribution of the values of $Corp_i$ and $Indu_i$ for the N = 175 US and the N = 281 European corporations. In this respect, the relative frequencies (in %) for the values of $Corp_i$ refer to the respective values of $Indu_i$ in the columns.

5.2. Financial variables

As aforementioned, we had access to financial data on total return indexes (which contain both stock prices and cash flows to the investor), market values, and book values (in US $, respectively) for the period between 1996 and 2006. These data stem from the Thomson Financial Datastream database. All monthly stock returns r_{it} (in %) for both the US and European corporations in the empirical analysis were calculated with these total return indexes. The time-series regressions in the first stage of the econometric analysis additionally require the inclusion of a risk-free interest rate for the calculation of excess returns. In this respect, we used the monthly return of one-month US Treasury Bills. Furthermore, the time-series regressions additionally require the inclusion of the monthly excess stock returns r^e_{mt} for the market. For the USA we directly used the corresponding data (in %) from the homepage of Kenneth R. French (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/ data_library.html). The calculation of the monthly returns r_{mt} of a European stock market portfolio (in %) is based on the total return indexes of the MSCI Europe (in US $).

In the same way as r^e_{mt}, the factors SMB_t, HML_t, and MOM_t for the US stock market were directly extracted from the homepage of Kenneth R. French. In contrast, these factors are not publicly available for the entire European stock market and thus had to be constructed. The basis for this calculation were 917 European corporations which were member of the MSCI Europe at least once over the complete period between 1996 and 2006. Regarding SMB_t and HML_t, corporations were ranked each year on their market capitalization in June and independently on their ratio between the published book value for the last year and the market value in December of the last year. Then the median of the market capitalizations as well as the 30% and 70% percentiles of the book-to-market equity were calculated such that six portfolios could be constructed from these three values. In each June over time the corporations were allocated anew to one of these six portfolios and stay there from July for the next 12 months.

The construction of these portfolios only comprises those corporations with corresponding available data for June of the respective year and additionally with positive book values for the last year. Furthermore, stock return data and market value data for the next 12 months had to be available. The resulting times-series of the value-weighted returns of these six stock portfolios (between July 1997 and June 2006) were the basis for the final calculations of SMB_t which is the (weighted) difference between the returns of "small" corporations and "big" corporations as well as HML_t which is the (weighted) difference between the returns for corporations with a "high" book-to-market equity and corporations with a "low" book-to-market equity (according to the procedure of Fama and French, 1993).

Concerning MOM_t, corporations were ranked in each month t-1 on their market capitalization and independently on their average stock returns between the months t-12 and t-2. Then the median of the market capitalizations as well as the 30% and 70% percentiles of the average stock returns were calculated leading to six portfolios based on these three values. The firms were allocated anew in each month t-1 over time to one of these six portfolios. Their construction only incorporates those corporations with available market values for this and the next month and additionally with available stock returns for the next month t and for each month between t-12 and t-2. The resulting times-series of the value-weighted returns of four stock portfolios (between February 1997 and December 2006) with respect to the bottom and top 30% of the past average returns were the basis of the final calculations of MOM_t which is the (weighted) difference between the returns of "winners" and "losers" in the past (according to the procedure described on the homepage of Kenneth R. French). Table 2 reports descriptive statistics (mean, standard deviation, minimum, maximum) for the average monthly stock returns between 2003 and 2006 as well as for the estimated corporate beta parameters from the times-series regressions of the different asset pricing models. It shows, for example, that the mean average stock return for European corporations (2.34%) is noticeably higher than the mean for US corporations (1.27%) in this specific period.

6. Results

Table 3 reports the mutual correlation coefficients of $\bar{r}_i$ and the CSR variables (including industry environmental and social performance). In this respect, Spearman's rank correlation coefficients instead of Pearson's correlation coefficients were applied when the ordinal variables $Corp_i$ and $Indu_i$ are concerned. The main results in this table are the positive coefficients between stock performance and the different corporate activities variables as well as the negative coefficients between the average stock returns and the industry environmental and social performance variables. Concerning the latter, however, they are not significantly different from zero for Europe. In contrast, the respective correlation coefficients are strongly different from zero at the 5% significance level for the USA. Furthermore, the correlation coefficients between the average stock returns and $Corp_i$ are different from zero at the 10% significance level for both the USA and Europe as well as the coefficients between stock performance and $Corp543_i$ for the USA and between stock performance and $Corp54_i$ for Europe are different from zero at the 5% significance level.

Table 4 reports the mutual Pearson's correlation coefficients of $\bar{r}_i$ and the estimated corporate beta parameters from the time-series regressions of the several asset pricing models. The main results in this table are the positive correlation coefficients between the average stock returns and the different estimated beta parameters. The only exception is the negative correlation coefficient between stock performance and est(β_{i4}^{CAR}) for the USA which is in addition different from zero at the 5% significance level. In contrast, the correlation coefficients between the average stock returns and the other estimated beta parameters in this region are clearly positive and different from zero at the 1% significance level. Regarding Europe, the respective correlation coefficients are without exception positive and only insignificantly different from zero for est(β_i^{CAPM}) and est(β_i^{FF}).

However, it should be noted that the results in Table 3 and Table 4 only indicate univariate relationships. Therefore, Table 5 and Table 6 report the estimation results of our econometric analysis. The corresponding econometric models incorporate – besides the main interesting CSR variables (including industry environmental and social performance) – the estimated beta parameters from the time-series regressions of the several asset pricing models as financial control variables to explain the average monthly stock returns between 2003 and 2006. While Table 5 refers to the USA, Table 6 reports the estimation results for Europe. In both cases the cross-sectional regressions according to equations (1), (4), and (7) are based on the CAPM, according to equations (2), (5), and (8) are based on the Fama-French three-factor model, and according to equations (3), (6), and (9) are based on the Carhart four-factor model. Furthermore, the respective final regressions according to the first three equations (1), (2), and (3) incorporate the ordinal variables $Corp_i$ and $Indu_i$, while the remaining regressions either include both dummies $Corp54_i$ and $Indu54_i$ or both dummies $Corp543_i$ and $Indu543_i$.

According to Table 5, the ordinal variable $Corp_i$ has a positive effect (at the 5% significance level) when the estimated corporate beta parameters from the multifactor models are included as control variables. This impact remains significantly positive for the dummy variable $Corp543_i$. In contrast, the latter effect has a higher significance level on the basis of the CAPM and the parameter of $Corp_i$ is not even significantly different from zero in this case. However, it appears that the estimation results based on the CAPM are less reliable because the estimated beta parameters est(β_{i2}^{FF}) and est(β_{i2}^{CAR}) from the multifactor models – besides est(β_{i1}^{CAPM}), est(β_{i1}^{FF}), or est(β_{i1}^{CAR}) – have a high explanatory power. Therefore, corporate environmental and social activities obviously matter for the average monthly stock returns between 2003 and 2006 in the USA even when the effect is insignificant for the dummy $Corp54_i$. This latter result points to possible non-linear effects with respect to the intensity of these measures.

Concerning the impact of industry environmental and social performance for the US stock market, the estimation results are different. The ordinal variable $Indu_i$ as well as the corresponding dummy variables $Indu54_i$ and $Indu543_i$ have a negative effect on stock performance (at the 1% significance level) when the estimated beta parameters from the CAPM are incorporated. However, these effects become insignificant on the basis of the Fama-French three-factor or the Carhart four-factor models. Due to the high explanatory power of some estimated corporate beta parameters from the multifactor models as discussed above, the estimation results based on the CAPM are overall obviously not reliable, but a typical example for biased parameter estimations due to omitted explanatory variables.

According to Table 6, this problem holds true for the effect of $Indu543_i$ in Europe, although to a smaller extent. While this variable has a negative influence on average stock returns (however, only at the 10% significance level) based on the CAPM, this effect again becomes insignificant on the basis of both multifactor models. The impacts of $Indu_i$ and $Indu54_i$ are already insignificant, irrespective of the underlying asset pricing models. In the same way, no significant effects of $Corp_i$ and $Corp543_i$ arise. In contrast, $Corp54_i$ has a positive effect on stock performance (at the 5% significance level) based on the CAPM as well as on both multifactor models. Therefore, only single positive effects on average monthly stock returns between 2003 and 2006 appear to be existent in Europe, but no linear effects of an increasing intensity of corporate environmental and social activities.

These estimation results are robust in different ways: For example, it should be noted that corporations were ranked each year on their market capitalization in June and on their book-to-market equity in December of the last year for the calculation of SMB_t and HML_t in Europe as discussed above. In this respect, we used the book values which were published in June each year in the Thomson Financial Datastream database to ensure that the values for the last year are actually considered. However, it is also possible that these values are influenced by new developments during the current year. Therefore, we additionally considered the book-to-market equity based on the published book and market values in December last year in a further analysis. Finally, we also examined the published book and market values in June from the Thomson Financial Datastream. Indeed, the estimation results based on these calculations (which are available on request) are not systematically different from the results as discussed above.

Furthermore, the estimation results in this paper are in principle based on the 2002 assessments of CSR (including industry environmental and social performance). However, it should be noted that many corporations were assessed for the first time by Sarasin after 2002. For these firms we incorporated the corresponding first assessments in our empirical analysis. This procedure seems to be justified because the assessments have an extremely low variability over time for the respective corporations. We nevertheless excluded in a further analysis those firms with new assessments, i.e., with first assessments after 2004. However, we continued to include firms with first assessments in 2003 or 2004. This procedure of extending assessments for two years is common in empirical analyses of the relationship between CSR and corporate financial performance to avoid very small samples (e.g., Derwall et al., 2005). Indeed, the corresponding estimation results (which are available on request) are again qualitatively fully in line with the results as discussed above.

7. Discussion and conclusions

This paper provides new empirical evidence for the effect of CSR (which is measured by environmental and social activities of a firm compared with other firms within the industry and additionally considers environmental and social performance of the industry to which a firm belongs) on average monthly stock returns between 2003 and 2006. In contrast to former studies, it examines two different regions, namely the USA and Europe. Our two-stage econometric analysis shows that corporate environmental and social activities matter for the explanation of stock performance in both regions. However, this impact is obviously not linear for an increasing intensity of these measures. Compared with Europe, the positive effect furthermore appears to be more robust for the USA because the ordinal CSR variable $Corp_i$ here has a positive impact. In contrast, the industry environmental and social performance has neither a robust positive nor a robust negative influence on the average monthly stock returns between 2003 and 2006 for any region.

According to these results, the stock markets – and particularly the US stock market – obviously rewarded investments in stocks of corporations with a high intensity of environmental and social activities compared with other firms within the industry. In other words, investors who applied a buy-and-hold strategy would have increased their portfolio value by investing in such stocks. Regarding the management of a firm, these results imply that such measures could be increased since they obviously do not lead to worse financial performance. The results furthermore support the advocates of information-based regulations by improving the flow of the respective information. However, the question is whether the discussed positive effect is robust for alternative measurements of CSR, for example, based on assessments from other rating agencies or based on quantitative indicators such as emissions, and alternative measurements of corporate financial performance, for example, based on accounting data based indicators. Such studies would be interesting in the future. Another field for further research would be the econometric analysis of alternative periods to examine whether the consideration of the period between 2003 and 2006 produces specific estimation results.

Irrespective of such future research, our study supports the incorporation of more flexible asset pricing models: On the basis of the simple CAPM, industry environmental and social performance has a significantly negative impact on stock performance in the USA. However, the significance of this effect disappears if estimated corporate beta parameters from the Fama-French three-factor or the Carhart four-factor models are included as additional control variables. This result (in line with, e.g., McWilliams and Siegel, 2000) points to the problem of misleading conclusions regarding the effect of CSR on corporate financial performance if misspecified econometric models are applied due to omitted explanatory variables such that biased parameter estimations occur.

To strengthen our argument of incorporating multifactor models, we now refrain from considering the CSR variables (including industry environmental and social performance) and instead exclusively examine the estimated corporate beta parameters from the time-series regressions of the several asset pricing models to explain the average monthly stock returns between 2003 and 2006. Table 7 reports the corresponding estimation results. According to this table, the estimated beta parameter est(β_{i1}^{CAPM}) from the CAPM alone has only small explanatory power on the US stock market and almost no explanatory power on the European stock market. Furthermore, the estimated beta parameters est(β_{i2}^{FF}) and est(β_{i2}^{CAR}) – and to a smaller extent est(β_{i3}^{FF}) and est(β_{i3}^{CAR}) – in the USA as well as the estimated beta parameters est(β_{i2}^{FF}), est(β_{i3}^{FF}), est(β_{i2}^{CAR}), est(β_{i3}^{CAR}), and est(β_{i4}^{CAR}) in Europe are significantly different from zero. In particular, these parameter estimates are positive as it could be expected when these variables are interpreted as risk factors. Therefore, we conclude that the estimated beta parameters from the multifactor models alone have high explanatory power for the average monthly stock returns between 2003 and 2006 in the USA and in Europe.

In the future, it would be interesting to analyze further multifactor models which have been recently developed in financial economics, but are not widely applied, particularly with respect to the European stock market. For example, Al-Horani et al. (2003) consider a research and development factor besides the three Fama-French risk factors and Pastor and Stambaugh (2003) examine a liquidity factor besides the four Carhart risk factors. Most recently, Chen and Zhang (2007) develop a neoclassical three-factor model which includes investment and productivity risk factors motivated from general equilibrium theory. Regarding financial economics, it can be analyzed whether further factors beyond the four factors according to Carhart (1997) have explanatory power for average stock returns over time in different regions. These factors can then be included as additional financial control variables in the analysis of the effect of CSR on stock performance to check the robustness of the estimation results in our study.

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Appendix

Table 1: Absolute frequencies and relative frequencies (in % regarding the columns) for the values of the ordinal variables $Corp_i$ and $Indu_i$

USA						
$Indu_i$ / $Corp_i$	5	4	3	2	1	Total
5	1 (12.50%)	0 (0.00%)	6 (7.14%)	1 (2.17%)	0 (0.00%)	8 (4.57%)
4	0 (0.00%)	1 (3.70%)	10 (11.90%)	4 (8.70%)	1 (10.00%)	16 (9.14%)
3	4 (50.00%)	7 (25.93%)	26 (30.95%)	22 (47.83%)	6 (60.00%)	65 (37.14%)
2	3 (37.50%)	12 (44.44%)	38 (45.24%)	16 (34.78%)	2 (20.00%)	71 (40.57%)
1	0 (0.00%)	7 (25.93%)	4 (4.76%)	3 (6.52%)	1 (10.00%)	15 (8.57%)
Total	8 (100.00%)	27 (100.00%)	84 (100.00%)	46 (100.00%)	10 (100.00%)	175 (100.00%)
Europe						
$Indu_i$ / $Corp_i$	5	4	3	2	1	Total
5	0 (0.00%)	2 (4.00%)	6 (5.36%)	6 (7.06%)	2 (7.41%)	16 (5.69%)
4	2 (28.57%)	11 (22.00%)	19 (16.96%)	23 (27.06%)	11 (40.74%)	66 (23.49%)
3	4 (57.14%)	23 (46.00%)	49 (43.75%)	41 (48.24%)	10 (37.04%)	127 (45.20%)
2	1 (14.29%)	10 (20.00%)	30 (26.79%)	14 (16.47%)	4 (14.81%)	59 (21.00%)
1	0 (0.00%)	4 (8.00%)	8 (7.14%)	1 (1.18%)	0 (0.00%)	13 (4.63%)
Total	7 (100.00%)	50 (100.00%)	112 (100.00%)	85 (100.00)	27 (100.00)	281 (100.00%)

Note:
The number one designates the worst and the number five the best assessment for both ordinal variables $Corp_i$ and $Indu_i$, respectively.

Table 2: Descriptive statistics for financial variables (dependent and explanatory variables in the final cross-sectional regressions), N = 175 for the USA and N = 281 for Europe

USA				
Variable	Mean	Stand. dev.	Minimum	Maximum
$\bar{r}_i$	1.27	0.93	-1.96	5.28
est(β_i^{CAPM})	0.93	0.61	-0.30	3.02
est(β_{i1}^{FF})	1.09	0.50	-0.07	3.03
est(β_{i2}^{FF})	-0.06	0.41	-1.04	1.40
est(β_{i3}^{FF})	0.31	0.70	-2.12	2.37
est(β_{i1}^{CAR})	1.05	0.45	-0.09	2.87
est(β_{i2}^{CAR})	-0.04	0.42	-1.03	1.49
est(β_{i3}^{CAR})	0.29	0.70	-2.19	2.29
est(β_{i4}^{CAR})	-0.09	0.24	-1.13	0.48
Europe				
Variable	Mean	Stand. dev.	Minimum	Maximum
$\bar{r}_i$	2.34	1.20	-8.84	6.95
est(β_i^{CAPM})	1.01	0.47	0.13	2.79
est(β_{i1}^{FF})	1.03	0.48	0.10	2.77
est(β_{i2}^{FF})	0.49	0.60	-1.82	2.77
est(β_{i3}^{FF})	0.17	0.60	-2.26	1.77
est(β_{i1}^{CAR})	1.00	0.43	0.18	2.59
est(β_{i2}^{CAR})	0.46	0.59	-1.85	2.75
est(β_{i3}^{CAR})	0.17	0.60	-2.26	1.76
est(β_{i4}^{CAR})	-0.09	0.25	-1.17	0.51

Table 3: Mutual correlation coefficients between the average monthly stock returns from 2003 to 2006 and the different CSR variables (including industry environmental and social performance), N = 175 for the USA and N = 281 for Europe

USA							
	$\bar{r}_i$	$Corp_i$	$Indu_i$	$Corp54_i$	$Indu54_i$	$Corp543_i$	$Indu543_i$
$\bar{r}_i$	1.00						
$Corp_i$	0.13*	1.00					
$Indu_i$	-0.16**	-0.14*	1.00				
$Corp54_i$	0.05	0.64***	-0.01	1.00			
$Indu54_i$	-0.19**	-0.19**	0.74***	-0.12	1.00		
$Corp543_i$	0.17**	0.92***	-0.16**	0.39***	-0.14*	1.00	
$Indu543_i$	-0.18**	-0.08	0.87***	0.06	0.34***	-0.14*	1.00

Europe							
	$\bar{r}_i$	$Corp_i$	$Indu_i$	$Corp54_i$	$Indu54_i$	$Corp543_i$	$Indu543_i$
$\bar{r}_i$	1.00						
$Corp_i$	0.10*	1.00					
$Indu_i$	-0.07	-0.16***	1.00				
$Corp54_i$	0.15**	0.84***	-0.14**	1.00			
$Indu54_i$	-0.07	-0.03	0.73***	-0.03	1.00		
$Corp543_i$	0.02	0.80***	-0.12**	0.38***	-0.01	1.00	
$Indu543_i$	-0.09	-0.19***	0.89***	-0.15**	0.41***	-0.16***	1.00

Note:
** (**, ***) means that the correlation coefficient is different from zero at the 10% (5%, 1%) significance level, respectively.*

Table 4: Mutual correlation coefficients between the average monthly stock returns from 2003 to 2006 and the financial control variables in the final cross-sectional regressions, N = 175 for the USA and N = 281 for Europe

USA									
	$\bar{r}_i$	est(β_i^{CAPM})	est(β_{i1}^{FF})	est(β_{i2}^{FF})	est(β_{i3}^{FF})	est(β_{i1}^{CAR})	est(β_{i2}^{CAR})	est(β_{i3}^{CAR})	est(β_{i4}^{CAR})
$\bar{r}_i$	1.00								
est(β_i^{CAPM})	0.22***	1.00							
est(β_{i1}^{FF})	0.35***	0.86***	1.00						
est(β_{i2}^{FF})	0.46***	0.31***	0.38***	1.00					
est(β_{i3}^{FF})	0.24***	-0.48***	0.03	0.27***	1.00				
est(β_{i1}^{CAR})	0.35***	0.84***	0.98***	0.38***	0.02	1.00			
est(β_{i2}^{CAR})	0.46***	0.36***	0.44***	0.99***	0.27***	0.41***	1.00		
est(β_{i3}^{CAR})	0.23***	-0.51***	-0.01	0.26***	1.00***	-0.00	0.24***	1.00	
est(β_{i4}^{CAR})	-0.15**	-0.44***	-0.52***	-0.17**	-0.03	-0.35***	-0.30***	0.05	1.00

Europe									
	$\bar{r}_i$	est(β_i^{CAPM})	est(β_{i1}^{FF})	est(β_{i2}^{FF})	est(β_{i3}^{FF})	est(β_{i1}^{CAR})	est(β_{i2}^{CAR})	est(β_{i2}^{CAR})	est(β_{i2}^{CAR})
$\bar{r}_i$	1.00								
est(β_i^{CAPM})	0.06	1.00							
est(β_{i1}^{FF})	0.09	1.00***	1.00						
est(β_{i2}^{FF})	0.34***	0.18***	0.23***	1.00					
est(β_{i3}^{FF})	0.16***	-0.40***	-0.37***	0.08	1.00				
est(β_{i1}^{CAR})	0.13**	0.98***	0.98***	0.22***	-0.39***	1.00			
est(β_{i2}^{CAR})	0.36***	0.12**	0.18***	0.99***	0.09	0.18***	1.00		
est(β_{i3}^{CAR})	0.16***	-0.40***	-0.38***	0.08	1.00***	-0.39***	0.09	1.00	
est(β_{i4}^{CAR})	0.14**	-0.55***	-0.55***	-0.17***	0.12**	-0.39***	-0.07	0.13**	1.00

Note:
** (**, ***) means that the correlation coefficient is different from zero at the 10% (5%, 1%) significance level, respectively.*

Table 5: OLS parameter estimates in the final cross-sectional regressions for the USA, dependent variable: average monthly stock returns between 2003 and 2006, nine different model specifications, N = 175

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Corp_i$	0.09	0.11**	0.11**	--	--	--	--	--	--
$Indu_i$	-0.21***	-0.06	-0.06	--	--	--	--	--	--
$Corp54_i$	--	--	--	-0.03	0.08	0.09	--	--	--
$Indu54_i$	--	--	--	-0.41***	-0.21	-0.21	--	--	--
$Corp543_i$	--	--	--	--	--	--	0.25*	0.25**	0.26**
$Indu543_i$	--	--	--	--	--	--	-0.48***	-0.21	-0.21
$est(\beta_i^{CAPM})$	0.37**	--	--	0.33**	--	--	0.44***		--
$est(\beta_{i1}^{FF})$	--	0.42***	--	--	0.39***	--	--	0.47***	--
$est(\beta_{i2}^{FF})$	--	0.70***	--	--	0.73***	--	--	0.69***	--
$est(\beta_{i3}^{FF})$	--	0.19	--	--	0.20*	--	--	0.16	--
$est(\beta_{i1}^{CAR})$	--	--	0.46***	--	--	0.43***	--	--	0.51***
$est(\beta_{i2}^{CAR})$	--	--	0.70***	--	--	0.73***	--	--	0.68***
$est(\beta_{i3}^{CAR})$	--	--	0.20	--	--	0.20*	--	--	0.16
$est(\beta_{i4}^{CAR})$	--	--	0.09	--	--	0.09	--	--	0.07
Constant	1.27***	0.69**	0.65**	1.05***	0.85***	0.83***	1.05***	0.77***	0.73***
R^2	0.10	0.28	0.28	0.08	0.27	0.28	0.13	0.30	0.30
F-Value	5.16***	17.82***	14.63***	3.62**	16.77***	13.74***	6.89***	18.79***	15.45***

Note:
** (**, ***) means that the appropriate parameter is different from zero or – regarding the F-test – that all explanatory variables together have an effect at the 10% (5%, 1%) significance level, respectively.*

Table 6: OLS parameter estimates in the final cross-sectional regressions for Europe, dependent variable: average monthly stock returns between 2003 and 2006, nine different model specifications, N = 281

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Corp_i$	0.09	0.08	0.07	--	--	--	--	--	--
$Indu_i$	-0.09	0.05	0.03	--	--	--	--	--	--
$Corp54_i$	--	--	--	0.31^{**}	0.28^{**}	0.29^{**}	--	--	--
$Indu54_i$	--	--	--	-0.20	0.13	0.10	--	--	--
$Corp543_i$	--	--	--	--	--	--	-0.09	-0.09	-0.13
$Indu543_i$	--	--	--	--	--	--	-0.30^{*}	-0.12	-0.16
$est(\beta_i^{CAPM})$	0.23	--	--	0.23	--	--	0.25	--	--
$est(\beta_{i1}^{FF})$	--	0.19	--	--	0.19	--	--	0.25	--
$est(\beta_{i2}^{FF})$	--	0.58^{***}	--	--	0.58^{***}	--	--	0.54^{***}	--
$est(\beta_{i3}^{FF})$	--	0.34^{**}	--	--	0.34^{**}	--	--	0.33^{**}	--
$est(\beta_{i1}^{CAR})$	--	--	0.63^{**}	--	--	0.65^{**}	--	--	0.71^{**}
$est(\beta_{i2}^{CAR})$	--	--	0.59^{***}	--	--	0.59^{***}	--	--	0.55^{***}
$est(\beta_{i3}^{CAR})$	--	--	0.40^{**}	--	--	0.40^{**}	--	--	0.40^{**}
$est(\beta_{i4}^{CAR})$	--	--	0.88	--	--	0.90^{*}	--	--	0.92
Fin_i	-0.01	-0.06	-0.12	-0.05	-0.08	-0.16	0.01	-0.01	-0.08
Fra_i	-0.90^{***}	-0.69^{***}	-0.53^{**}	-0.86^{***}	-0.66^{***}	-0.49^{*}	-0.96^{***}	-0.78^{***}	-0.62^{***}
Ger_i	-0.34	-0.32	-0.19	-0.30	-0.31	-0.17	-0.38	-0.39	-0.25
Ita_i	-0.53^{*}	-0.56^{**}	-0.54^{*}	-0.54^{*}	-0.59^{**}	-0.55^{**}	-0.68^{**}	-0.73^{***}	-0.72^{**}
Net_i	-1.15^{***}	-0.97^{**}	-0.78^{**}	-1.15^{***}	-0.98^{***}	-0.79^{**}	-1.14^{***}	-0.98^{***}	-0.78^{**}
Spa_i	-0.35	-0.17	-0.24	-0.32	-0.17	-0.22	-0.49^{*}	-0.28	-0.36
Swe_i	-0.24	-0.30	-0.02	-0.34	-0.32	-0.06	-0.12	-0.20	0.10
Swi_i	-0.38	-0.47^{*}	-0.34	-0.36	-0.43	-0.30	-0.36	-0.44	-0.30
UK_i	-0.77^{***}	-0.73^{***}	-0.43^{*}	-0.74^{***}	-0.71^{***}	-0.40^{*}	-0.78^{***}	-0.72^{***}	-0.41^{*}
Constant	2.63^{***}	1.92^{***}	1.48^{***}	2.60^{***}	2.19^{***}	1.65^{***}	2.91^{***}	2.44^{***}	1.94^{***}
R^2	0.10	0.20	0.24	0.10	0.21	0.25	0.10	0.20	0.24
F-Value	2.84^{***}	4.07^{***}	4.26^{***}	3.08^{***}	4.14^{***}	4.54^{***}	2.77^{***}	4.05^{***}	4.27^{***}

Note:
** (**, ***) means that the appropriate parameter is different from zero or – regarding the F-test – that all explanatory variables together have an effect at the 10% (5%, 1%) significance level, respectively.*

Table 7: OLS parameter estimates in the final cross-sectional regressions, dependent variable: average monthly stock returns between 2003 and 2006, explanatory variables: exclusively financial variables (estimated beta parameters from the time-series regressions of the several asset pricing models in the first stage), N = 175 for the USA and N = 281 for Europe

USA			
Explanatory variables	(1)	(2)	(3)
est(β_i^{CAPM})	0.34**	--	--
est(β_{i1}^{FF})	--	0.40***	--
est(β_{i2}^{FF})	--	0.77***	--
est(β_{i3}^{FF})	--	0.20*	--
est(β_{i1}^{CAR})	--	--	0.43***
est(β_{i2}^{CAR})	--	--	0.76***
est(β_{i3}^{CAR})	--	--	0.20*
est(β_{i4}^{CAR})	--	--	0.07
Constant	0.95***	0.81***	0.79***
R^2	0.05	0.27	0.27
F-value	4.65**	28.47***	21.08***
Europe			
Explanatory variables	(1)	(2)	(3)
est(β_i^{CAPM})	0.15	--	--
est(β_{i1}^{FF})	--	0.20	--
est(β_{i2}^{FF})	--	0.63***	--
est(β_{i3}^{FF})	--	0.33**	--
est(β_{i1}^{CAR})	--	--	0.65**
est(β_{i2}^{CAR})	--	--	0.65***
est(β_{i3}^{CAR})	--	--	0.39***
est(β_{i4}^{CAR})	--	--	1.09**
Constant	2.19***	1.78***	1.42***
R^2	0.00	0.14	0.21
F-value	0.98	10.03***	9.33***

Note:
** (**, ***) means that the appropriate parameter is different from zero or – regarding the F-test – that all explanatory variables together have an effect at the 10% (5%, 1%) significance level, respectively.*

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