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ABSTRACT

This paper sheds new light on the much debated issue of how corporations can do well and do good by focusing on the multidimensional nature of corporate social responsibility and acknowledging model uncertainty. Model averaging, a formal statistical framework which explicitly accounts for specification uncertainty, is introduced in the literature and applied to a unique database matching the economic and environmental and social performance of 461 large European firms. Hereby the composition of profitability-linked corporate social responsibility is unveiled and reveals the importance of good business behavior with customers and suppliers. Strong and novel support is also brought to the coexistence of corporate policies monotonically related to economic performance (human resources) and policies with optimal level (environment), hence reconciling competing theories. Implications for business and further research are discussed.

KEY WORDS**:** corporate social responsibility; firm performance; model averaging**;** model uncertainty; multidimensionality.

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INTRODUCTION

According to the European Commission (2001), a ‘socially responsible’ firm not only fulfills legal expectations, but goes also beyond compliance and invests more into human capital, environment and relationships with its stakeholders. Corporate Social Responsibility (CSR) is thus defined as a private provision of public good. Decades of active academic debate cover the ground between such a definition and Friedman’s famous article title, back in 1970: *‘The social responsibility of business is to increase profits’* (Friedman, 1970, p.32). Most research focused on the argument along which a firm providing public good might neither be sacrificing profits nor, as put by Friedman, doing ‘*hypocritical window dressing’*, but rather creating value on the long run.

A large corpus of empirical literature thus investigated the link between firm performance and CSR. Even though *doing good* does not appear to prevent from *doing well*, recent reviews (Orlitzky, Schmidt and Rynes, 2003; Margolis and Walsh, 2003; Portney, 2008; Margolis, Elfenbein and Walsh, 2009) highlight the lack of consensus on the doing good *and* doing well drivers. In their meta-analysis of 167 studies, Margolis *et al.* (2009) report that 58% found a non significant relationship, 27% a positive and 2% a negative (no significance test for the remaining 13%). Such a controversy on the link between firm performance and CSR partly arises from the variety of theories tested and methods employed; model misspecification and omitted variables; and diversity of data used to grasp CSR (Forget, 2010). Typically, the CSR literature encounters several dimensions of *model uncertainty*, namely theory, data and specification uncertainty (Doppelhofer and Weeks, 2009). Based on Draper (1995), Doppelhofer (2007) highlights that ignoring model uncertainty generally results in biased parameter estimates, overconfident standard errors and misleading inference.

This paper sets out to tackle this issue in a formal statistical framework that explicitly accounts for the specification uncertainty of CSR. In particular, based on Carroll (1979) and Wood (1991), CSR is analyzed as a multidimensional construct and accordingly disaggregated in a set of possible explanatory variables, each representing a distinct category of corporate policies. Namely, environmental policy, good business behavior with customers and suppliers, implication in local communities, human resources management and governance are considered. However, most theoretical work on the link between financial performance and CSR focus either on CSR as a whole (e.g. Cespa and Cestone, 2007) or specific CSR dimension (e.g. governance in Gompers, Ishii and Metrick, 2003), with contradictory effects and diverging implications between dimensional theories. Theoretical guidance is thus lacking on the relative importance and combined effects of multiple CSR dimensions to explain financial performance. Brock and Durlauf (2001) refer to this as open-endedness: theories are likely to be non mutually exclusive.

Hereby the postulate is made that the lack of consensus observed in the literature on how corporations can do well and do good arises from both the necessity to acknowledge model uncertainty in this debate and the need to account for the multidimensional nature of CSR.

In order to do so, model averaging is introduced in the CSR literature and CSR disaggregated into multiple corporate policies. Model averaging was designed to specifically address model uncertainty by simultaneously weighing evidence for multiple models depicting alternative working hypotheses (Doppelhoffer, 2007). It has been extensively used in growth economics (Sala-i-Martin *et al.,* 2004) and macroeconomic forecasts (on UK inflation Garrat *et al.*, 2003; on GDP Koop and

Potter, 2004; on exchange rate Wright, 2008). It also proved to be a powerful tool in monetary policy evaluation (Levin and Williams, 2003; Brock and Durlauf, 2007) and finance (on the determinants of currency crises Crespo-Cuaresma and Slacik, 2009; on multi-assets volatility Pesaran, Schleicher and Zaffaroni, 2009). Other fields of applications include trade flows (Eicher, Henn and Papageorgiou, 2010), labour economics (Tobias and Li, 2004) and health economics (Jackson, Thompson and Sharples, 2009).

The model averaging approach implemented in this paper is based on information-theoretic based model averaging and thick modelling (Kapetanios, Labhard and Price, 2008; Pesaran *et al.*, 2009). In particular, corrected Akaike model averaging (AICc MA) and Schwarz Bayesian Information Criteria model averaging (SIC MA) are discussed and applied, shedding new light on the literature on the link between firm performance and CSR.

The database used matches the economic performance of 461 large European firms over the 1998-2007 period with CSR measures provided by the non-financial rating agency Vigeo. Model averaging brings novel and robust results on the doing well and doing good debate. Main finding is the unveiling of the composition of profitably-linked CSR. Indeed, this composition is heterogeneous, with different CSR dimensions having different importance. In particular, good business behavior with customers and suppliers appear crucial. Results also provide strong evidence of the coexistence of corporate policies monotonically linked to economic performance and policies with optimal levels, hence reconciling competing theories.

The remainder of the paper is organized as follows. Section 2 details the empirical framework and the input of model averaging in the doing good and doing well theoretical and empirical debate. Section 3 presents data. Section 4 displays results and discusses main findings. Section 5 concludes.

METHODOLOGY

Empirical Framework

Following previous literature (Orlitzky *et al.*, 2003; Margolis *et al.*, 2009), the basic model used to estimate the link between firm performance and CSR is as follows:

$$Base\ Model:\ FP_{it} = \alpha + \beta_1 CSR_{it} + \beta_2 RISK_{it} + \beta_3 LEVERAGE_{it} + \beta_4 SIZE_{it} + \beta_5 R\&D_{it} + \gamma_j\ INDUSTRY_j + \delta_k\ COUNTRY_k + \theta_t\ YEAR_t + \varepsilon_{it} \qquad (1)$$

with *i* the number of firms and *t* the year of observation.

FP_{it} is the financial performance of firm, measured in this paper either by returns on assets (ROA) or returns on capital employed (ROCE).

CSR_{it} is a global CSR measure (here the global Vigeo rating). $RISK_{it}$ is a solvability ratio and is incorporated to capture the fact that the more stable a firm, the likelier it engages in CSR. $SIZE_{it}$ is a size control measured by the logarithm of its net sales. Larger firms are indeed more likely to encounter major pollutions of environmental hazards (Konar and Cohen, 1997), to have larger resources devoted to social investments and to be more exposed to social pressure external pressure to commit to CSR. $R\&D_{it}$ is research and development intensity. Based on a large corpus of theoretical literature linking research and development to long term economic performance, Waddock and Graves (1997) and later on McWilliams and Siegel (2000) highlight its importance as a control variable. Risk, firm size and R&D intensity are expected to have positive estimates. $LEVERAGE_{it}$ is the financial leverage (debt-to-equity ratio) and provides a good indicator of management risk tolerance, which can impact decision making and arbitrage between short and long term performance (Waddock and Graves, 1997). As such it is expected to negatively impact ROCE and ROA. Industry dummies (*j*) are introduced as industrial processes, scale savings, associated pollution levels, stakeholders activism, exposure and financial risks are sector specific (Margolis *et al.*, 2009). Country (*k*) is also controlled for as regulations, social demand and stakeholders' pressure vary between European countries. *Year* dummies account for the evolution over the studied period of CSR regulation, public awareness and firm involvement. Finally $\boldsymbol{\varepsilon_{it}}$ is the time variant error term of firm *i* at year *t*.

To estimate the basis model, Rogers (1993)'s estimators based on clusters (firms) are used instead of standard OLS to account for dependent and non-identically distributed error terms. Indeed, data is considered cross-sectional whereas firms count in average three observations and both White's test and Breusch-Pagan's test show some heteroscedasticity in the data.

Focusing on the estimation of Base Model would only add another standard empirical analysis to the large and inconclusive body of literature on the link between firm performance and CSR. This paper postulates that the lack of consensus observed in this literature arises from two related needs: first, the need to account for the multidimensional nature of CSR; and second, the need to acknowledge model uncertainty in this debate.

CSR and Economic Performance: a Multidimensional Puzzle

As early as 1979, Carroll defines CSR as a multidimensional construct encompassing a firm's efforts to fulfill legal, economic, ethical and discretionary responsibilities. CSR indeed encompasses highly diversified actions. Mirroring this complexity, Margolis *et al.* (2009) identify nine measurements used by researchers to account for CSR, including charitable contributions, environmental performance, revealed misdeeds or self reported social performance. However, the multidimensional nature of CSR has little been directly taken into account in the literature, for theoretical and empirical issues now presented.

First, theory lacks to back up empirical research and predict the joint effects and relative importance of CSR dimensions for economic performance. Indeed, theoretical frameworks either apply to an aggregated measure of CSR considered as a global provision of public good (e.g. Bagnoli and Watts, 2003; Baron, 2009) or to a specific CSR dimension (e.g. environment in Porter and Van der Linde, 1995; governance in Gompers *et al.*, 2003). Yet, little work aims at understanding the potential synergies and relative importance of CSR dimensions. An exception is Cavaco and Crifo (2010)'s study that formalizes CSR decisions as a multi-task agency problem with moral hazard. The authors show that the impact of CSR on financial performance depends on the degree of complementarity or substitutability between the different CSR tasks.

Second, as CSR policies are part of a company strategy, chosen and implemented by the same firm managers, they are likely to show at least dome degree of multicollinearity. This multicollinearity prevents from including several CSR dimensions at once in regressions. Among analysis succeeding to do so, Hillman and Keim (2001) distinguish direct stakeholders management, positively related to financial performance, from social issues, negatively linked. Brammer, Brooks and Pavelin (2006) observe that environment and local community involvement appear negatively correlated with financial performance, whereas human resources are weakly positively linked. Cavaco and Crifo (2010) build clusters of CSR practices, use panel data and a supermodularity approach. They observe the existence of a complementarity premium on specific CSR dimensions (human resources and business behavior towards customers and suppliers), while other practices are relative substitutes (environment and business behaviors).

Thirdly, the structure of the relationship between financial performance and CSR is also the focus of an increasing debate. Whereas most literature investigated a monotonic relationship, Barnett and Salomon (2006) made a strong case of a hump-shape relationship instead, thus unveiling the existence of an optimal level of CSR to be reached. This paper tests for curvilinear versus monotonic relationships between the different CSR dimensions and financial performance. Indeed, CSR dimensions are here introduced as three-level factors (bellow average / average / above average). The effect of being above sectoral average on one CSR dimension is thus separately estimated from the effect of being bellow sectoral average. This paper hence identifies different link structures for different CSR dimensions.

This paper argues that the literature on the link between financial performance and CSR typically encounters an issue of model uncertainty. Following Doppelhofer and Weeks (2009), this model uncertainty arises in our context from theory, data and specification uncertainty. The firm manager has to select the adequate corporate strategies to ensure profits among competing and overlapping theories, in a typical open-endedness case of economic theories (Brock and Durlauf, 2001): one theory being true does not imply that another one is wrong. Indeed, differentiating products based on environmental attributes might create a market opportunity (Porter and Van der Linde, 1995) while generating a perquisite for managers who like the accolades of environmentalists, creating agency costs (Baron, Harjoto and Jo, 2009). Model uncertainty is thus acknowledged in this paper by using model averaging as detailed in the next section.

Introduction of Model Averaging in the Doing Well and Doing Good Debate

This section limits itself to discussing the properties relevant to this paper. For a comprehensive discussion, the reader is referred to Pesaran *et al.* (2009) and Kapetanios *et al.* (2008).

Let us start with a set of models. This set is denoted $M = \bigcup_{i=1}^{m} M_i$ where M_i is the *i*-th of the *m* models considered. In this paper, this space of models M consists of all the possible subsets of candidate regressors that have been suggested by the distinct theories summarized in previous section. Our interest is a parameter Δ. The Bayesian framework provides a probability distribution for Δ given M and the observed data D. The relevant information data set at time *t* is denoted D_t. The probability distribution $pr(\Delta|D_t, M)$ of the parameter of interest over the space of models considered is given by:

$$pr(\Delta|D_t, M) = \sum_{i=1}^{m} pr(\Delta|M_i, D_t) pr(M_i|D_t) \quad (2)$$

where $pr(\Delta|M_i, D_t)$ is the conditional probability distribution of Δ given a model M_i and the data D_t. It can easily be obtained from standard model specific analysis. $pr(M_i|D_t)$ is the posterior probability of Mi, that is the conditional probability of the model M_i being the true model given the data D_t.

In the Bayesian Model Averaging (BAM) framework, weights used to combine the models under consideration are their respective posterior probabilities $pr(M_i|D_t)$. This approach requires specifications of the prior probability of model M_i and has been the focus of a large corpus of literature.

An alternative to BAM consists in approximating the weights $pr(M_i|D_t)$ by information criteria weights, such as Akaike weights or Schwartz weigths (Pesaran *et al.*, 2009). This approach is developed in Kapetanios *et al.* (2008) as the information theoretic Model Averaging, building on the influential work of Burnham and Anderson (1998). Applications are expanding and include growth economics (Wagner and Hlouskova, 2009), finance (Hansen, 2008), tourism development (Wan and Zhang, 2009), health economics (Claeskens, Croux and van Kerckhoven, 2006) and environmental economics (Layton and Lee, 2006).

A first weighting scheme proposed in the literature is based on Akaike's information criteria (1973, 1974), known as AIC. AIC is defined as:

$$AIC = 2k - 2\ln(L) \qquad (3)$$

AIC has two components: the negative loglikelihood –ln (L), which measures lack of model fit to the observed data, and a bias correction factor, which increases as a function of the number of model parameters k. More technically, this criteria is an extension of the log-likelihood theory and is based on the Kullback–Leibler information, which can be conceptualized as a 'distance' between full reality and a model. Difference in AIC between two models can thus be analyzed as an estimate of the difference between the Kullback–Leibler distance for the two models. For in-depth analysis of AIC's theory, uses and limits, see Sakamoto, Ishiguro and Kitagawa (1986), Bozdogan (1987) and Konishi and Kitagawa (2007).

AIC has been criticized for its propensity at over-fitting models, meaning that it tends to select too many variables. Sugiura (1978) and Hurvich and Tsai (1989, 1995) hence introduced the corrected AIC (AICc), which is AIC with a second order correction for small size samples:

$$AIC_c = AIC + (2(k+1)(k+2))/(n-k-2) \quad (4)$$

with k the number of model parameters and n the number of observations. As n increases, AICc converges to AIC and is asymptotically efficient in both regression and times series. For linear regression, AICc has better bias properties than does AIC. Burnham and Anderson (2004) thus advocate employing AICc regardless of sample size, which is done in this paper. The reader can refer to McQuarrie and Tsai (1998) for further comparisons of AIC and AICc with several competitor criteria for linear regression problems.

Difference between information criteria φ_i is used to rank models. Following Burnham and Anderson (2002), the likelihood of the model M_i given the data is equivalent to $\exp(-\frac{1}{2}\varphi_i)$. Model likelihoods are normalized to sum up to 1 and referred to as Akaike weights. Akaike weight w_i for model M_i writes:

$$w_i = \exp(-\varphi_i/2) / \sum_{r=1}^{P} \exp(-\varphi_r / 2) \quad (5)$$

where $\sum_{i=1}^{m} w_i = 1$. w_i can be interpreted as the probability of selecting model *i* as being the best if analyses were repeated using independent samples from the same population (Burnham and Anderson, 2002). This paper implements the use of corrected Akaike weights, based on AICc.

Let us now go back to our parameter of interest Δ. Following Burnham and Anderson (2002), the averaged estimate $\hat{\hat{\Delta}}$ of Δ is provided by

$$\hat{\hat{\Delta}} = \sum_{i=1}^{m} w_i \, \hat{\Delta}_i \qquad (6)$$

with Δ_i the parameter of interest in model M_i, $\hat{\Delta}_i$ is the estimate of Δ_i in model M_i. Δ unconditional standard error is given by:

$$\widehat{se}\left(\hat{\hat{\Delta}}\right) = \sum_{i=1}^{m} w_i \sqrt{\widehat{var}\left(\hat{\Delta}_i\right) + \left(\hat{\Delta}_i - \hat{\hat{\Delta}}\right)^2} \qquad (7)$$

The second weighting scheme considered in this paper is based on the frequently used Schwarz Bayesian Information Criteria (Schwarz, 1978), further on SIC, defined as:

$$SIC = -2\ln(L) + p\log(n) \qquad (8)$$

Baltagi (2001) points out that SIC is consistent, meaning that as the sample goes to infinity, the probability that it will choose the correct model from a finite number of models goes to 1. A drawback of this property is that in small samples, SIC tends to select underfitting models. Consequently model selection based on SIC tends not to pick up enough variables in the 'best' models. Hereby SIC based model averaging tends to bias downwards variable weights.

This paper considers both approaches to information-theoretic model averaging: the corrected Akaike weights model averaging (AICc MA) and the SIC weights model averaging (SIC MA).

Other weighting schemes have been discussed in the model averaging literature. Hjort and Claeskens (2003) discussed the Focused Information Criterion. Hansen (2007) proposed Mallows model averaging (MMA). Wagner and Hlouskova (2009) compare AIC MA, SIC MA and MMA; and further introduce, for any given weighting scheme, the so-called inclusion weight as the classical counterpart of the Bayesian posterior inclusion probability of a variable.

A last refinement used is this paper is the combination of information-theoretic model averaging with thick modelling. As detailed in Pesaran *et al.* (2009), thick modelling consists in applying model averaging not to all of the models but only to a given number of top performing models. Individual models are here ranked according to the AICc or SIC criteria. The space of models M under consideration for model averaging is thus reduced to the top performing M' space of models (say the top 25%). Thick modelling has been proposed, among others, by Granger and Jeon (2004). Applications include Stock and Watson (1999)'s in the context of macroeconomic time series and Aiolfi, Favero and Primiceri (2001)'s on forecasts of excess returns.

This paper implements both thick modelling and AICc MA and SIB MA tools to account for model uncertainty in the CSR literature. Such an approach has also been shown to succeed in limiting the multicollinearity issue previously discussed. For instance, Buckland *et al.* (1997) used multimodel inference with predictors correlated up to 94%, which exceeds correlation between CSR dimensions (62% in our data). Calcagno and de Mazancourt (2010) also found that BIC variable selection successfully distinguishes the effects of variables correlated at 70%. The proposed methodology can thus help bypass the multicollinearity issue inherent to CSR dimensions.

Finally, as highlighted by Doppelhofer (2007), the use of model averaging was limited until recent developments in computing power and statistical methods. AICc MA is first applied as a benchmark to the Base Model set of variables with global CSR. As year, industry and country controls are kept in all models, the model population counts $2^5 = 32$ possible models based on 5 variables (global CSR, Risk, Leverage, Size and R&D) and all are considered. In a second step, global CSR is disaggregated into five CSR dimensions (Environment, Business behavior towards clients and customers, Community involvement, Human resources and Governance). The new model population counts $2^{4+5} = 512$ models and model averaging combined with thick modelling is done on the top 100 models based on AICc and SIC rankings. Model fitting and subsequent MA is done thanks to the R / java *glmulti* package (Calcagno and de Mazancourt, 2010)

DATA

Two sources of data are matched in this paper. CSR data is provided by the leading European extra-financial rating agency Vigeo and financial data comes from the database Orbis (Bureau Von Dijk). The database obtained is a non cylindrical panel. Firm is the primary stratification level with 1 to 8 observations per firm (3 observations in average) over the 1998 – 2007 time period. The sample contains 1577 observations on 461 large European listed firms (restricted to 622 observations on 207 firms by the availability of data on research and development expenses) belonging to 13 different countries and 13 industrial sectors.

Vigeo measures extra-financial performance and provides firm ratings based on disclosed information, dialog with the firm and international or European reference frameworks. CSR ratings are five-level categorical variables indicating whether the firm is worst-in-class (5%); underperforms its sector (25%); is in the sectoral average (40%); proactive (25%); or best-in-class (5%).

This paper uses Vigeo data along five CSR dimensions: *Environment* (integration of environmental issues into corporate policy, product manufacturing, distribution, use and disposal); *Governance* (balanced power within the board of directors, respect of shareholders' rights, remuneration of key executives and directors, audit and internal controls); *Customers & Suppliers* (respect of business integrity, including sustainable and transparent relationships with customers and suppliers); *Community Involvement* (integration of the firm's impacts on local communities and responsible societal behavior) and *Human Resources* (proactive human resources corporate policy, including career development, continuous improvement of labour relations, quality of working condition). Weak multicollinearity between the ratings is assessed by variance inflation factors (VIF) ranging from 1.12 to 2.19 (see Table 1).

At first this paper postulates that all five CSR dimensions equally matter. Consequently, a *Global CSR* rating is calculated as their arithmetic mean as usually done on such data in this literature (e.g. Hillman and Keim, 2001). Second, CSR dimensions are considered as such. For the purpose of this paper, ratings are transformed into three-level categorical factors: *Worst* (bellow average; 30%); Average (40%); and *Best* (above average; 30%).

Financial measures are given in 2005 USD. Financial performance is measured by two accounting-based ratios: return on assets (ROA) and return on capital employed

(ROCE). ROA is the operating income divided by total assets. As such, it measures firm efficiency in generating income from its assets and thus indicates firm profitability, financial leverage put aside. ROCE is the net operating profit after tax divided by capital employed. It thus provides to shareholders a comparison of earnings with capital invested in the firm.

Descriptive statistics can be found in Table 1.For a complete description of the variables and data, the reader can refer to the Data Appendix.

(Place Table 1 about here)

RESULTS

Results Robustness

This section focuses on control estimates to ensure result robustness. First, it compares as a benchmark Base Model estimates with AICc MA results on global CSR. Then both AICc MA and SIB MA are used with disaggregated CSR on top 100 performing models. Averaged estimates are compared across both methods and financial performance measures (ROA and ROCE). Analyses are also conducted on both a restricted sample (with R&D control) and the full sample (without R&D control).

Table 2 and Table 3 present OLS results (with Roger’s correction of p-values) and AICc MA results for respectively ROA and ROE. Both methods highlight the same controls as on the one hand significant for OLS and on the other hand important for MA. When significant, control parameters estimated by OLS are of expected signs. In both samples and for both financial performance measures the control estimates are (but for the R&D intensity control for ROCE in full sample) in line with previous literature. The inclusion or not of the R&D variable little biases the estimations.

(Place Table 2 about here)

(Place Table 3 about here)

CSR is then disaggregated into five dimensions. Tables 4 and 6 respectively present AICc MA results for ROA and ROCE and can be compared with tables 5 and 7 displaying SIC MA results. As SIC tends in small samples to underfit models, SIC MA results provide insights on which variables most matter to explain financial performance. For both ROA and ROCE and on both samples, AICc MA results for control variables are consistent in terms of estimate signs, estimate values and variable importance (Tables 4 and 6). This consistency supports result robustness.

Finally, to ensure MA result robustness and significance of the calculated variable weights, a permutation test (also called randomization test) is also built and conducted. Test results give us a probability equivalent to a p-value. 1000 permutations were used to compute the test, meaning the smallest possible p-value obtained is 0.001.

(Place Table 4 about here)

(Place Table 5 about here)

(Place Table 6 about here)

(Place Table 7 about here)

CSR Dimensions Do Not Equally Matter to Do Well and Do Good

Let us now focus on CSR estimates. Results obtained with the Global CSR measure support the existence of a positive link with financial performance. Indeed, global CSR rating parameter is estimated to be positive and significant at the 5% level for ROA (1.20) and at 1% for ROCE (2.11) with standard OLS on the restricted sample only. The global CSR averaged estimate is also positive (0.25 to 0.59 for ROA in Table 2, 0.40 to 1.37 for ROCE in Table 3) but CSR importance (as measured by Akaike's weight) only exceeds 0.50 for the restricted sample. However, further results obtained by using CSR dimensions show that this positive relationship hides divergent effects of the multiple dimensions that CSR encompasses.

To explain ROA, CSR dimensions that stand out as important variables with AICc MA are Human resources (weight 0.57 to 0.69, Table 4) and more weakly Environment (weight 0.42, Table 4) on the restricted sample. On the full sample, Customers and Suppliers stands out (weight 0.85, Table 4), weakly followed by Environment (weight 0.2, Table 4). With SIC MA, only Human Resources on the restricted sample and Customers and Suppliers on the full sample are not drown back to null weight (Table 5). To explain ROCE, Customers and Suppliers (weight 0.40 to 0.41, Table 6) stand out as the important variable both on the restricted and the full samples, weekly followed by Environment (weight 0.40, Table 6), particularly on the full sample. Human Resources comes third with a weaker effect than observed for ROA. SIC MA once again proves very selective but Customers and Suppliers dimension is the only CSR dimension kept.

A main finding of the paper is that all CSR dimensions do not equally matter to do well and do good. A hierarchy clearly stands out between CSR dimensions, robust and consistent across various samples. This hierarchy is dominated the Customers and Suppliers dimension, followed by the Human Resources and, in a lesser extent, the Environment dimension. Let us know focus on averaged estimates obtained for each of these CSR dimensions.

Good Business Behaviors with Customers and Suppliers Are Core

The Customers and Suppliers CSR dimension relates to respect of business integrity, including sustainable and transparent relationships with customers and suppliers. This paper shows that performance along this dimension heavily weights in the composition of profitably-linked CSR. AICc MA and SIC MA both conclude that having a low performance on this CSR dimension is negatively linked with financial performance. However, a high level is positively linked with financial performance on the restricted sample (implying a monotonic relationship) but negatively linked on the full sample (implying a hump-shaped relationship). Differences between the samples are essentially twofold. First, firms of the restricted samples have communicated their R&D expenses, likely implying an increased transparency. Second, firms of the restricted sample have significantly higher global CSR rating than other firms. Little difference is observed in terms of industry, year or country distributions between full and restricted samples.

Few studies have previously focused on those business relationships, likely because they appear as one of the most business-as-usual axis among all CSR policies. Findings are in line with Jones (1995)'s, who shows that companies involved in repeated transactions with stakeholders on the basis of trust and cooperation are motivated to be honest, trustworthy and ethical because the returns to such behavior are high. Moreover, the Customers and Suppliers dimension might capture part of the synergies suggested in previous literature between advertisement, not controlled for in this paper, reputation and CSR. For instance, Kanter (1999) shows that strategic philanthropy backs up firm reputation, enhances consumer loyalty and develops valuable social relations; while Fisman, Heal and Nair (2007) find that firms outperforming both in financial performance and CSR share a strong advertising and communication policy. Disentangling consumer relationships, supplier relationships and advertisement effects would thus be an interesting path for further research.

Coexistence of CSR Policies With and Without Optimal Level

The second major finding of this paper is the coexistence of CSR policies monotonically linked to profitability and of CSR policies with optimal levels.

On the one hand, a monotonic relationship is found between the Human Resources CSR dimension and both financial measure (except for ROA on full sample). This dimension here refers to a proactive human resources corporate policy, including career development, continuous improvement of labour relations and quality of working condition Being worst-in-class is thus found to be negatively linked with financial performance whereas being best-in-class in positively related. This finding is in line with previous works showing that human resources policies can help recruiting motivated employees with team work values, securing firm survival and long-term performance (Brekke and Nyborg, 2008) and reducing costly employee turnover

(Portney, 2008). Empirically, similar findings are made by Galbreath (2006) who studies employee treatment in 38 top Australian firms; Jones and Murrell (2001) who focus on the stock returns of the 51 firms included in the 'Working mother' list; and Brammer *et al.* (2006), who use the stock returns on the UK market.

On the other hand, a curvilinear relationship between financial performance and the Environment dimension is found on all samples, for both financial performance measures and with both methods. The Environment dimension here encompasses the integration of environmental issues into corporate policy, product manufacturing, distribution, use and disposal.

This finding is a major step in the CSR literature as it reconciliates divergent studies such as Derwall *et al.* (2005), who find a positive link between corporate environmental policies and financial performance, and Brammer *et al.* (2006)'s, who found a negative link. This paper results are thus in line with Barnett and Salomon (2006), who made a strong case for this curvilinear relationship. However, this paper also shows that the structure of the relationship between economic performance and CSR depends on the dimensions considered.

Implications for Further Research and Corporations Seeking to Do Well and Do Good

Clearly, this paper results do not imply that to succeed in doing well and doing good a firm should heavily invest on its business behavior towards its customers and suppliers, improve its human resources policies, cut down its environmental performance and drop all policies regarding its community involvement and governance. Indeed, causality between CSR dimensions and financial performance and complementarities between CSR dimensions are still left unexplored in this paper and ought to be the focus of further work. For instance, being proactive in environmental policies might be costly at year *t* and only possible for firms with good cash-flows. However, this environmental policy will be communicated to customers if the firm is performing on business behaviors with consumers. Communication to customers might hence increase their willingness to pay for the firms product at year *t+1*, improving sales. Supporting the existence of interactions between CSR dimensions, Cavaco and Crifo (2010) found complementarities between good business behaviors and proactive human resources policy, but substitutability between the latter and environmental performance.

However, this study strongly advocates the acknowledgement of model uncertainty in further research on how to do well and do good. It supports that CSR heterogeneously impacts corporations' performance depending on its composition, and that this composition bears an optimum. CSR does not come as a bundle to be blindly promoted but rather encompasses multiple dimensions with various effects on profitability. As such corporations should carefully select which CSR policy mix to implement, with special care to their customers and suppliers satisfaction, which is shown in this study to stay at the core of economic performance.

CONCLUSION

This paper contributes to the question of how corporations profitably provide public good by focusing on the multidimensional nature of corporate social responsibility

(CSR). Model uncertainty is highlighted as a key issue at the base of the absence of strong consensus in the literature linking CSR to financial performance. To account for both the multidimensional nature of CSR and model uncertainty, model averaging is introduced. This powerful tool unveils the composition of corporate policies that matter for profitability. Good business behaviors with customers and suppliers dominate this composition. Strong evidence is also provided on the co-existence of policies with optimal level for financial performance and monotonic policies. In particular, a monotonic relationship is found for human resources management and a hump-shaped relationship for environmental policies, supporting the existence of an optimal level of environmental performance to be reached by corporations.

This research opens a new path to better analyze drivers of how firms can do well and do good. However, further work taking into account temporality and causality is needed before providing reliable CSR strategy advice to organizations seeking to profitably adhere to the principles of CSR.

Table 1. Descriptive Statistics

Variable	Obs.	Mean	SD.	Min.	Max.	VIF
Aggregated CSR	1578	2.94	3.04	1.17	4.83	
Human resources rating	1578	3.03	0.91	1.00	5.00	1.59
Best	516	4.12	0.32	4.00	5.00	
Worst	484	1.91	0.27	1.00	2.00	
Corporate governance rating	1578	2.97	0.92	1.00	5.00	1.14
Best	463	4.13	0.34	4.00	5.00	
Worst	498	1.86	0.35	1.00	2.00	
Customers & suppliers rating	1578	3.05	0.89	1.00	5.00	1.59
Best	534	4.10	0.30	4.00	5.00	
Worst	472	1.93	0.26	1.00	2.00	
Community involvement rating	1578	3.07	0.95	1.00	5.00	1.46
Best	556	4.17	0.37	4.00	5.00	
Worst	498	1.93	0.26	1.00	2.00	
Environment rating	1578	3.06	0.91	1.00	5.00	1.65
Best	517	4.17	0.38	4.00	5.00	
Worst	475	1.92	0.28	1.00	2.00	
ROA	1577	7.86	6.81	-21.29	34.80	
ROCE	1566	14.75	11.40	-77.47	98.41	
Risk (Solvency ratio)	1578	35.54	15.86	-12.66	82.72	
Financial Leverage (Debt to equity ratio)	1578	0.79	0.99	-2.85	7.48	
R & D intensity	622	5.04	6.51	0.00	71.55	
Size (Ln(sales))	1578	15.76	1.43	6.77	19.55	

Table 2. Comparison of Single Regression and AICc Model Averaging Results with Global CSR for ROA

	OLS (Roger's correction) (i)						AICc MA (ii)					
Dependent	Restricted sample (with R&D)			Full sample (without R&D)			Restricted sample (with R&D)			Full sample (without R&D)		
Global CSR	1.20	**	(0.56)	0.29		(0.36)	0.59	++	(0.40)	0.25		(0.13)
Risk	0.20	***	(0.04)	0.14	***	(0.02)	0.21	+++	(0.00)	0.22	+++	(0.00)
Financial leverage	-0.67	*	(0.36)	-0.46	**	(0.22)	-0.09		(0.04)	-0.81	++	(0.16)
Size	0.56		(0.36)	0.25		(0.29)	1.07		(0.10)	0.32		(0.08)
R&D intensity	-0.03		(0.11)			No	0.10		(0.01)			No
R^2	39.45			24.83			No			No		
F-statistic	9.46	***		7.13	***		No			No		
Observations	622			1577			622			1577		
No. firms	207			461			207			461		
No. models	1			1			32			16		

NOTE:

(i) For OLS, figures in brackets are standard errors. P-values are corrected with Roger's estimator. *p<0.10;**p<0.05; ***p<0.01.

(ii) For AICc MA, estimates are the averaged parameter estimates ($\hat{\hat{\Delta}}$ in equation (6)) produced by model averaging. Figures in brackets are the unconditional variance ($\widehat{se}\left(\hat{\hat{\Delta}}\right)$ in equation (7)). Weight significance is obtained by permutation test: + p<0.10; ++ p<0.05; +++ p<0.01.

Table 3. Comparison of Single Regression and AICc Model Averaging Results with Global CSR for ROCE

	OLS (Roger's correction) (i)						AICc MA (ii)					
Dependent	Restricted sample (with R&D)			Full sample (without R&D)			Restricted sample (with R&D)			Full sample (without R&D)		
Global CSR	2.11	***	(0.86)	0.60		(0.46)	1.37	+++	(1.03)	0.40		(0.13)
Risk	0.10		(0.06)	0.03		(0.03)	0.05	++	(0.00)	0.15	+++	(0.00)
Financial leverage	-2.56	***	(0.82)	-2.09	***	(0.44)	-2.69	+++	(0.48)	-3.24	+++	(0.47)
Size	0.37		(0.68)	-0.19		(0.35)	0.89		(0.33)	-0.22		(0.13)
R&D intensity	-0.04		(0.16)	No			0.08		(0.02)	No		
R^2	32.29			16.36			No			No		
F-statistic	6.88	***		8.00	***		No			No		
Observations	618			1566			618			1566		
No. firms	206			457			206			457		
No.models	1			1			32			16		

NOTE:

(i) For OLS, figures in brackets are standard errors. P-values are corrected with Roger's estimator. *p<0.10;**p<0.05; ***p<0.01.

(ii) For AICc MA, estimates are the averaged parameter estimates ($\hat{\bar{\Delta}}$ in equation (6)) produced by model averaging. Figures in brackets are the unconditional variance ($\widehat{se}\left(\hat{\bar{\Delta}}\right)$ in equation (7)). Weight significance is obtained by permutation test: + p<0.10; ++ p<0.05; +++ p<0.01.

Table 4. AICc Model Averaging Results on 100 ROA Best Models with CSR Dimensions

		Restricted sample with R&D				Restricted sample without R&D				Full sample without R&D			
Dependent :		Estimate	Uncond. Var.	No. Models	Weight	Estimate	Uncond. Var.	No. Models	Weight	Estimate	Uncond. Var.	No. Models	Weight
Human Resources	Best	0.48	0.50	50	0.57++	0.57	0.57	55	0.69++	-0.15	0.09	44	0.22
	Worst	-0.76	0.82	50	0.57++	-1.01	0.93	55	0.69++	-0.15	0.09	44	0.22
Customers & Suppliers	Best	0.07	0.07	43	0.26	0.06	0.06	49	0.24	-0.17	0.31	55	0.85++
	Worst	-0.33	0.33	43	0.26	-0.29	0.28	49	0.24	-1.35	0.58	55	0.85++
Governance	Best	0.08	0.03	40	0.11	0.08	0.03	40	0.11	0.03	0.01	42	0.10
	Worst	0.03	0.02	40	0.11	0.03	0.01	40	0.11	0.01	0.00	42	0.10
Environment	Best	-0.63	0.75	45	0.42	-0.64	0.77	45	0.42	-0.33	0.28	46	0.32++
	Worst	-0.32	0.39	45	0.42	-0.30	0.37	45	0.42	-0.21	0.15	46	0.32++
Community Involvement	Best	-0.04	0.02	38	0.09	-0.05	0.02	42	0.10	-0.13	0.07	44	0.20
	Worst	-0.04	0.01	38	0.09	-0.04	0.02	42	0.10	-0.15	0.08	44	0.20
Risk		0.21	0.00	100	1.00+++	0.21	0.00	100	1.00+++	0.22	0.00	100	1.00+++
Financial Leverage		-0.11	0.05	44	0.28+	-0.13	0.07	48	0.32+	-0.87	0.15	62	0.94++
Size		1.13	0.09	100	1.00+++	1.17	0.10	58	1.00+++	0.33	0.08	51	0.71+
R&D intensity		0.10	0.01	35	0.60	No				No			
Observations		622				622				1577			

NOTE:

"*Estimate*" is the averaged parameter estimate ($\hat{\bar{\Delta}}$ in equation (6)) produced by model averaging. "*Uncond. Var*" is the unconditional variance ($\widehat{se}\left(\hat{\bar{\Delta}}\right)$ in equation (7)). "*No. models*" is the number of models in which a variable is present. "*Weight"* refers to Akaike's weights (equation (5)).

Weight significance is obtained by permutation test: + $p<0.10$; ++ $p<0.05$; +++ $p<0.01$.

Table 5. SIC Model Averaging on 100 ROA Best Models with CSR Dimensions

		Restricted sample with R&D				Full sample without R&D			
Dependent :		Estimate	Uncond. Var.	No. Models	Weight	Estimate	Uncond. Var.	No. Models	Weight
Human Resources	Best	0.04	0.01	41	0.07	-0.00	0.00	41	0.01++
	Worst	-0.09	0.03	41	0.07	-0.01	0.00	41	0.01++
Customers & Suppliers	Best	0.00	0.00	32	0.02+	-0.02	0.01	44	0.13+++
	Worst	-0.02	0.00	32	0.02+	-0.22	0.15	44	0.13+++
Governance	Best	0.00	0.00	23	0.00	0.00	0.00	40	0.00
	Worst	0.00	0.00	23	0.00	-0.00	0.00	40	0.00
Environment	Best	-0.02	0.00	33	0.02++	-0.01	0.00	42	0.01++
	Worst	-0.02	0.00	33	0.02++	-0.00	0.00	42	0.01++
Community Involvement	Best	-0.00	0.00	26	0.00	-0.00	0.00	41	0.01
	Worst	-0.00	0.00	26	0.00	-0.01	0.00	41	0.01
Risk		0.21	0.00	100	1.00+++	0.22	0.00	100	1.00+++
Financial Leverage		-0.02	0.00	43	0.06	-0.54	0.27	51	0.59+++
Size		1.23	0.08	70	1.00+++	0.17	0.06	48	0.35++
R&D intensity		0.06	0.00	39	0.35+++	No			
Observations		622				1577			

NOTE:

"*Estimate*" is the averaged parameter estimate ($\hat{\hat{\Delta}}$ in equation (6)) produced by model averaging. "*Uncond. Var*" is the unconditional variance ($\widehat{se}\left(\hat{\hat{\Delta}}\right)$ in equation (7)).
"*No. models*" is the number of models in which a variable is present. "*Weight*" refers to Akaike's weights (equation (5)).
Weight significance is obtained by permutation test: + p<0.10;++ p<0.05; +++ p<0.01.

Table 6. AICc Model Averaging on 100 ROCE Best Models with CSR Dimensions

Dependent :		Restricted sample with R&D				Restricted sample without R&D				Full sample without R&D			
		Estimate	Uncond. Var.	No. Models	Weight	Estimate	Uncond. Var.	No. Models	Weight	Estimate	Uncond. Var.	No. Models	Weight
Human Resources	Best	0.03	0.08	34	0.22+	0.03	0.12	45	0.28+	0.12	0.10	44	0.16
	Worst	-0.39	0.50	34	0.22+	-0.53	0.79	45	0.28+	-0.10	0.09	44	0.16
Customers & Suppliers	Best	0.27	0.41	46	0.41+	0.24	0.38	47	0.40+	-0.46	0.91	51	0.66+
	Worst	-0.84	1.49	46	0.41+	-0.80	1.42	47	0.40+	-1.76	2.47	51	0.66+
Governance	Best	0.12	0.08	28	0.11	0.13	0.09	38	0.12	-0.05	0.04	42	0.10
	Worst	0.09	0.06	28	0.11	0.09	0.06	38	0.12	0.01	0.01	42	0.10
Environment	Best	-0.40	0.52	36	0.23	-0.39	0.50	40	0.23	-0.88	1.54	47	0.40
	Worst	-0.24	0.02	36	0.23	-0.24	0.31	40	0.23	-0.42	0.63	47	0.40
Community Involvement	Best	0.01	0.04	31	0.15	0.01	0.06	44	0.19	-0.02	0.03	43	0.13
	Worst	-0.22	0.20	31	0.15	-0.28	0.31	44	0.19	-0.11	0.07	43	0.13
Risk		0.04	0.00	54	0.61+++	0.05	0.00	50	0.69+++	0.15	0.00	64	0.99+++
Financial Leverage		-2.69	0.47	100	1.00+++	-2.66	0.50	98	1.00+++	-3.28	0.47	100	1.00+++
Size		1.16	0.25	80	0.94	1.22	0.24	59	0.96	-0.18	0.10	47	0.36+
R&D intensity		0.12	0.02	44	0.53	No				No			
Observations		618				618				1566			

NOTE:

"*Estimate*" is the averaged parameter estimate ($\hat{\bar{\Delta}}$ in equation (6)) produced by model averaging. "*Uncond. Var*" is the unconditional variance ($\widehat{se}\left(\hat{\bar{\Delta}}\right)$ in equation (7)). "*No. models*" is the number of models in which a variable is present. "*Weight*" refers to Akaike's weights (equation (5)).

Weight significance is obtained by permutation test: + p<0.10; ++ p<0.05; +++ p<0.01.

Table 7. SIC Model Averaging on 100 ROCE Best Models with CSR Dimensions

Dependent :		Restricted sample with R&D Estimate	Uncond. Var.	No. Models	Weight	Full sample without R&D Estimate	Uncond. Var.	No. Models	Weight
Human Resources	Best	0.01	0.00	28	0.02++	-0.00	0.00	35	0.00
	Worst	-0.04	0.00	28	0.02++	-0.00	0.00	35	0.00
Customers & Suppliers	Best	0.03	0.00	35	0.04+++	-0.03	0.00	40	0.03+
	Worst	-0.09	0.03	35	0.04+++	-0.08	0.03	40	0.03+
Governance	Best	0.01	0.00	20	0.00	-0.00	0.00	32	0.00
	Worst	0.00	0.00	20	0.00	0.00	0.00	32	0.00
Environment	Best	-0.01	0.00	26	0.01	-0.01	0.00	38	0.01
	Worst	-0.02	0.00	26	0.01	-0.02	0.00	38	0.01
Community	Best	0.01	0.00	26	0.01++	-0.00	0.00	34	0.00
Involvement	Worst	-0.03	0.00	26	0.01++	-0.00	0.00	34	0.00
Risk		0.02	0.00	49	0.27+++	0.15	0.00	64	0.97+++
Financial Leverage		-2.89	0.43	93	0.99+++	-3.23	0.48	100	1.00+++
Size		1.22	0.27	63	0.91++	-0.03	0.00	46	0.07
R&D intensity		0.07	0.01	35	0.29	No			
Observations		618				1566			

NOTE:

"*Estimate*" is the averaged parameter estimate ($\hat{\bar{\Delta}}$ in equation (6)) produced by model averaging. "*Uncond. Var*" is the unconditional variance ($\widehat{se}\left(\hat{\bar{\Delta}}\right)$ in equation (7)).
"*No. models*" is the number of models in which a variable is present. "*Weight"* refers to Akaike's weights (equation (5)).
Weight significance is obtained by permutation test: + p<0.10; ++ p<0.05; +++ p<0.01.

DATA APPENDICE

Corporate Social Responsibility Data

Vigeo ratings on five CSR dimensions are used in this paper: environmental policy rating (Environment), corporate governance (Governance), human resources management (human resources), involvement in local communities (Community involvement) and business behaviors towards customers and suppliers (Customers & suppliers).

Vigeo identifies CSR issues by sector and, for each CSR dimension, specific criteria are selected and weighted according to: CSR type and impact on sectoral stakeholders; stakeholders' impact exposure; and finally sectoral risks if the impact is not correctly managed.

Vigeo then rates firm performance on CSR dimensions in terms of leadership, implementation and results. A final score is calculated by firm for each dimension on a 0 (minimum) to 100 (maximum) scale.

For firms to be comparable across sectors, firm scores are benchmarked against their sector average score. The resulting rating is provided on a five-level scale: 'worst-in-class' (5%), 'below sector average' (25%), 'in the sectoral average' (40%), 'proactive' (25%) and 'best-in-class' (5%). For the purpose of this paper, those ratings are quantified into a three-level scale: worst (bellow sectoral average; 30%); average (40%); best (above sectoral average).

As Vigeo systematically rates the DJ Stoxx 600 firms (largest listed European firms), there is no bias selection in data. Academic work based on Vigeo's data is still scarce (Van de Velde *et al.*, 2005; Cavaco and Crifo, 2010) and promising, notably because it allows researchers to study the European market whereas most previous studies focused on the United States market.

Financial Data

Financial performance and control variables data come from the Bureau Von Dijk's Orbis global database, which is sourced from many different providers. All financial measures are given in 2005 United States dollars and observations with unconsolidated accounting data and more than one subsidiary were not kept. Control for outliers is done by winsorizing at the 2% and 98 % levels ROA and ROCE.

In full sample (not restricted to R&D intensity data availability), firms belong to 17 different countries and 14 industrial sectors (see Table A1).

Pearson correlation coefficients can be found in Table A2.

(Place Table A1 about here)

(Place Table A2 about here)

Table A1. Descriptive Statistics per Country Group and Industry (Full Sample)

Variable	ROA			ROCE			Global CSR rating		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Austria	12	8.21	2.97	12	14.16	3.82	12	2.49	0.56
Belgium	42	8.82	6.26	44	18.01	13.49	44	2.66	0.55
Denmark	25	10.14	7.62	25	15.68	9.59	25	2.82	0.91
Finland	42	10.67	7.44	42	19.09	12.95	42	3.29	0.66
France	430	6.64	6.52	416	12.87	9.51	416	3.11	0.62
Germany	189	6.80	6.77	191	13.25	10.13	191	3.14	0.61
Greece	9	10.01	7.16	9	14.05	9.14	9	2.11	0.62
Ireland	27	6.90	5.84	27	12.25	7.33	27	2.48	0.76
Italy	68	8.38	6.51	65	16.46	12.55	65	2.66	0.62
Luxembourg	11	5.64	8.35	11	9.71	11.67	11	3.13	0.75
Netherlands	126	6.16	5.85	126	11.91	10.95	126	3.14	0.57
Norway	17	12.65	9.93	18	20.43	14.27	18	3.06	0.45
Portugal	20	6.21	2.26	20	12.50	4.22	20	2.63	0.46
Spain	96	7.17	6.40	94	13.97	15.74	94	2.72	0.62
Sweden	52	8.61	7.41	55	16.86	12.58	55	2.92	0.61
Switzerland	70	9.91	6.07	71	16.08	8.84	71	2.80	0.72
UK	341	9.46	7.16	340	17.07	12.58	340	3.24	0.63
Car Industry	82	4.64	4.04	83	10.86	8.45	83	3.09	0.64
Trade	129	8.34	7.16	129	17.48	13.07	129	3.06	0.61
Consumer goods	287	10.94	6.91	285	18.99	10.96	285	3.04	0.68
Building	67	6.26	4.62	65	14.65	8.10	65	2.97	0.72
Energy	163	7.95	6.11	161	14.23	10.10	161	3.08	0.63
Equipment	84	7.62	5.99	83	15.86	13.52	83	3.04	0.67
Finance	58	7.53	6.00	58	12.47	7.92	58	3.09	0.66
Hotel industry	54	4.75	4.59	54	10.22	6.46	54	3.05	0.61
Agri-food	91	9.01	4.53	91	16.92	7.58	91	3.03	0.66
Intermediate	196	7.76	6.01	196	13.03	8.29	196	3.05	0.68
ITC	148	7.35	10.24	143	13.74	16.31	143	2.99	0.67
Media	43	7.79	7.26	39	14.47	10.08	39	2.91	0.66
Telecom	76	5.09	7.57	80	9.31	17.39	80	3.02	0.64
Transport	99	5.98	4.33	99	12.21	6.86	99	3.07	0.72

Table A2. Pearson Correlation Coefficients

	CSR	Human Resources	Governance	Customers & Suppliers	Community Involvement	Environment	ROA	ROCE	Risk.	Financial leverage	R&D intensity	Size
Global CSR	1.00											
Human Resources	0.76	1.00										
Governance	0.56	0.24	1.00									
Customers & Suppliers	0.76	0.49	0.32	1.00								
Community Involvement	0.73	0.45	0.24	0.44	1.00							
Environment	0.76	0.52	0.25	0.50	0.48	1.00						
ROA	0.01	0.01	0.03	0.04	-0.01	-0.01	1.00					
ROCE	-0.01	-0.00	0.05	-0.00	-0.01	-0.05	0.45	1.00				
Risk.	-0.06	-0.03	-0.07	-0.02	-0.08	-0.02	0.37	-0.01	1.00			
Financial leverage	0.00	-0.01	0.02	-0.01	0.02	-0.01	-0.27	-0.11	-0.55	1.00		
R&D intensity	-0.01	0.06	-0.09	0.01	0.02	0.01	0.03	-0.04	0.31	-0.09	1.00	
Size	0.34	0.23	0.16	0.21	0.33	0.28	-0.09	-0.02	-0.33	0.03	-0.22	1.00

REFERENCES

Aiolfi M, Favero C, Primiceri G. 2001. Recursive `thick' modeling of excess returns and portfolio allocation. Working paper, Bocconi University, Milan. Available at: http://finance.bi.no/~finance/seminar/Favero.pdf.

Akaike H. 1973. Information theory as an extension of the maximum likelihood principle. In *Second International Symposium on Information Theory*, Petrov BN, Csaki F (eds). Akademiai Kiado: Budapest.

Akaike H. 1974. A new look at the statistical model identification. *IEEE Transactions on Automatic Control* **19**(6): 716–723.

Avramov D. 2002. Stock return predictability and model uncertainty. *Journal of Financial Economics* **64**(3): 423-458.

Bagnoli M, Watts SG. 2003. Selling to socially responsible consumers: Competition and the private provision of public goods. *Journal of Economics and Management Strategy* **12**(3): 419-445.

Baltagi BH. 2001. *A Companion to Theoretical Econometrics*. Black- well Publishers: Oxford.

Barnett ML, Salomon RM. 2006. Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal* **27**(11): 1101-1156.

Baron DP. 2009. A positive theory of moral management, social pressure, and corporate social performance. *Journal of Economics and Management Strategy* **18**(1): 7-43.

Baron DP, Harjoto MA, Jo H. 2009. The economics and politics of corporate social performance. Working paper, Stanford University Graduate School of Business.

Bozdogan H. 1987. Model selection and Akaike's information criterion (AIC): The general theory and its analytical extensions. *Psychometrika* **52**(3): 345-370.

Brammer S, Brooks S, Pavelin S. 2006. Corporate social performance and stock returns: UK evidence from disaggregate measures. *Financial Management* **35**(3): 97–116.

Brekke KA, Nyborg K. 2008. Attracting responsible employees: Green production as labor market screening. *Resource and Energy Economics* **30**(4): 509-526.

Brock WA, Durlauf SN. 2001. What have we learned from a decade of empirical research on growth? Growth empirics and reality. *The World Bank Economic Review* **15**(2): 229-272.

Brock WA, Durlauf SN. 2007. Model uncertainty and policy evaluation: Some theory and empirics. *Journal of Econometrics* **136**(2): 629–664.

Burnham KP, Anderson DR. 1998. *Model Selection and Inference.* Springer-Verlag: Berlin.

Burnham KP, Anderson DR. 2002. *Model Selection and Multimodel Inference: a Practical Information-Theoretic Approach.* Springer-Verlag: New York (2d ed.).

Burnham KP, Anderson DR. 2004. Multimodel inference: Understanding AIC and BIC in model selection. *Sociological Methods Research* **33**(2): 261-304.

Calcagno V, de Mazancourt C. 2010. Glmulti: an R package for easy automated model selection with (generalized) linear models. *Journal of Statistical Software* **34**(12): 1-29.

Carroll AB. 1979. A three-dimensional conceptual model of corporate social performance. *Academy of Management Review* **4**(4): 497–505.

Cavaco S, Crifo P. 2010. The CSR-firm performance missing link: Complementarity between environmental, social and business behavior criteria? Working Paper, HAL-00504747. Available at: http://hal.archives-ouvertes.fr/hal-00504747/.

Claeskens G, Croux C, van Kerckhoven J. 2006. Variable selection for logistic regression using a prediction focussed information criterion. *Biometrics* **62**(4): 972-979.

Cespa G, Cestone G. 2007. Corporate social responsibility and managerial entrenchment. *Journal of Economic Management and Strategy* **16**(3): 741-771.

Crespo Cuaresma J, Slacik T. 2009. On the determinants of currency crises: The role of model uncertainty. *Journal of Macroeconomics* **31**(4): 621-632.

Davis, S., Haltiwanger, J., Jarmin, R. S., Lerner, J. and Miranda, J.: 2011, 'Private Equity and Employment', NBER Working Papers No 17399, National Bureau of Economic Research, available at: Inc, http://EconPapers.repec.org/RePEc:nbr:nberwo:17399.

Derwall J, Gunster N, Bauer R, Koedijk K. 2005. The eco-efficiency premium puzzle. *Financial Analysts Journal* **61**(2): 51–63.

Doppelhofer G. 2007. Model averaging. In *The New Palgrave Dictionary of Economics,* Blume L, Durlauf S (eds). Palgrave Macmillan: London (2nd ed).

Doppelhofer G, Weeks M. 2009. Jointness of growth determinants. *Journal of Applied Econometrics* **24**(2): 209-244.

Eicher ES, Henn CH, Papageorgiou C. 2010. Trade creation and diversion revisited: Accounting for model uncertainty and natural trading partner effects. *Journal of Applied Econometrics* (forthcoming). DOI: 10.1002/jae.1198

Fisman R, Heal G, Nair VB. 2007. Corporate social responsibility: Doing well by doing good? Working paper, Columbia University.

Forget VD. 2010. A survey of the literature on CSR and financial performance. In *Corporate Social Responsibility: From Compliance to Opportunity?*, Crifo P, Ponssard JP (eds). Editions de l'Ecole Polytechnique: Palaiseau, France.

Friedman M. 1970. The social responsibility of business is to increase its profits. *New York Times Magazine* **Sept. 13:** 32–33.

Galbreath J. 2006. Does primary stakeholder management positively affect the bottom line?: Some evidence from Australia. *Management Decision* **44**(8): 1106-1121.

Garratt A, Lee K, Pesaran MH, Shin Y. 2003. Forecast uncertainties in macroeconomic modelling: An application to the U.K. economy. *Journal of the American Statistical Association* **98**(464): 829-838.

Gompers PA, Ishii JL, Metrick A. 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* **118**(1): 107-155.

Granger C, Jeon Y. 2004. Thick modeling. *Economic Modeling* **21**(2): 323-343.

Hansen BE. 2007. Least squares model averaging. *Econometrica* **75**(4): 1175–1189.

Hansen BE. 2008. Least-squares forecast averaging. *Journal of Econometrics* **146**(2): 342-350.

Hillman AJ, Keim GD. 2001. Shareholder value, stakeholder management, and social issues: What's the bottom line? *Strategic Management Journal* **22**(2): 125–139.

Hjort NL, Claeskens G. 2003. Frequentist model average estimators. *Journal of the American Statistical Association* **98**(464): 879-899.

Hurvich CM, Tsai CL. 1989. Regression and time series model selection in small samples. *Biometrika* **76**(2): 297-307.

Hurvich CM, Tsai CL. 1995. Model selection for extended quasi-likelihood models in small samples. *Biometrics* **51**(3): 1077-1084.

Jackson CH, Thompson SG, Sharples LD. 2009. Accounting for uncertainty in health economic decision models by using model averaging. *Journal of the Royal Statistical Society* **172**(2): 383–404.

Jones TM. 1995. Instrumental stakeholder theory: A synthesis of ethics and economics. *Academy of Management Review* **20**(2): 404–437.

Kanter RM. 1999. From spare change to real change: the social sector as beta site for business innovation. *Harvard Business Review* **77**(3): 122-132.

Kapetanios G, Labhard V, Price S. 2008. Forecasting using bayesian and information-theoretic model averaging. *Journal of Business and Economic Statistics* **26**(1): 33-41.

Konar S, Cohen M. 1997. Information as regulation: The effect of community right to know laws on toxic emissions. *Journal of Environmental Economics and Management* **32**(1): 109–124.

Konishi S, Kitagawa G. 2007. *Information Criteria and Statistical Modeling.* Springer-Verlag: New York.

Koop G, Potter S. 2004. Forecasting in dynamic factor models using bayesian model averaging. *Econometrics Journal* **7**(2): 550-565.

Layton DF, Lee ST. 2006. Embracing model uncertainty: Strategies for response pooling and model averaging. *Environmental and Resource Economics* **34**(1): 51–85.

Levin AT, Williams JC. 2003. Robust monetary policy with competing reference models. *Journal of Monetary Economics* **50**(5): 945-975.

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

Margolis JD, Elfenbein H, Walsh A. 2009. Does it pay to be good... and does it matter? A meta-analysis and redirection of research on corporate social and financial performance. Working paper, Harvard University. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1866371.

McWilliams A, Siegel D. 2000. Corporate social responsibility and financial performance: Correlation or misspecification? *Strategic Management Journal* **21**(5): 603–609.

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

Pesaran MH, Schleicher C, Zaffaroni P. 2009. Model averaging in risk management with an application to futures markets. *Journal of Empirical Finance* **16**(2): 280-305.

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

Portney PR. 2008. The (not so) new corporate social responsibility: An empirical perspective. *Review of Environmental Economics and Policy* **2**(2): 261-275.

Rogers WH. 1993. Regression standard errors in clustered samples. *Stata Technical Bulletin* **13**: 19–23.

Sakamoto Y, Ishiguro M, Kitagawa G. 1986. *Akaike Information Criterion Statistics*. D. Reidel Publishing Company : Dordrecht/Tokyo.

Sala-i-Martin X, Doppelhofer G, Miller RM. 2004. Determinants of economic growth: A bayesian averaging of classical estimates (BACE) approach. *American Economic Review* **94**(4): 813-835.

Schwarz G. 1978. Estimating the dimension of a model. *Annals of Statistics* **6**(2): 461-464.

Stock J, Watson M. 1999. A comparison of linear and nonlinear univariate models for forecasting macroeconomic time series. In *Cointegration, Causality and Forecasting*. Engle R, White H (eds). Oxford University Press: Oxford.

Sugiura N. 1978. Further analysis of the data by Akaike's information criterion and the finite corrections. *Communications in Statistics, Theory and Methods* **7**(1): 13-26.

Tobias JL, Li M. 2004. Returns to schooling and bayesian model averaging: A union of two literatures. *Journal of Economic Surveys* **18**(2): 153-180.

Waddock SA, Graves SB. 1997. The corporate social performance-financial performance link. *Strategic Management Journal* **18**(4): 303–319.

Wagner M, Hlouskova, J. 2009. Growth regressions, principal components and frequentist model averaging. Working paper, Institute for Advanced Studies, Economics Series 236, Wien, Austria. Available at: http://www.eea-esem.com/files/papers/EEA-ESEM/2009/827/grpcma4.pdf.

Wan ATK, Zhang X. 2009. On the use of model averaging in tourism research. *Annals of Tourism Research* **36**: 525–532.

Wood DJ. 1991. Corporate social performance revisited. *Academy of Management Review* **16**(4): 691–718.

Wright JH. 2008. Bayesian model averaging and exchange rate forecasts. *Journal of Econometrics* **146**(2): 329-341.