Does Size matter?

A Higher Dimension Perspective of the Relationship between Financial and Social Performance

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ABSTRACT

We investigated the nature of the relationship between Corporate Social Responsibility (CSR) and Corporate Financial Performance (CFP), by introducing a further dimension that accounts for firm specific factors. We employed a latent specification of firm size as an empirical proxy for a firm's "current status" and considered potential endogeneity among CSR, CFP and firm size. We provide empirical evidence that on a three dimensional space, the previously reported U-shaped relation between CSR and CFP seems to be composed of relationships of differential magnitude and direction depending on firm size. The threshold at which the marginal impact of CSR on CFP turns positive is found to negatively depend on size. We therefore purport that firms should consider other firm-specific factors, such as size, alongside CSR investments in order to optimize CFP.

JEL codes: G30, G31, G32

Key words: *Corporate Social Responsibility (CSR), Firm Size, Corporate Financial Performance (CFP), Endogeneity, Asymmetric Relationship.*

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1. INTRODUCTION

This study investigates the contribution of size to the effectiveness of different levels of Corporate Social Responsibility (CSR) engagement with respect to Corporate Financial Performance (CFP) by exploring potential trifold endogeneity. Previous literature suggests that a positively regarded company should exhibit a higher value of intangible assets (Gardberg et al. 2006; Barnett 2007) or profit sustainability (Cohen et al.2011). However, CSR investments come at a cost, either in the form of excessive liabilities or as a decrease in other assets (Nurn and Tan 2010). The funds required to create and sustain a CSR profile are derived from other investments that might be more likely to create economic value (Branco and Rodrigues 2006). The question that arises is whether the value of these intangible assets is higher than their acquisition cost in order to enhance CFP and create value (Barney 1991; Bragdon and Marlin 1972; Moskowitz 1972; Vance 1975). Relevant literature provides a full spectrum of arguments that range from a nexus of positive (Freenman 1984) versus negative (Friedman 1970) to endogenous (Waddock and Graves 1997) or no relation between CSR and CFP (Makni et al. 2009), suggesting that it is an empirical issue (Ullmann 1985). More recently, Barnett (2007) and Barnett and Salomon (2012) argue that these conflicting results might be attributed to a non-linear relationship between CSR and CFP, caused by the ability of the firm to interact with its stakeholders. However, they employ a non-measurable latent context and therefore need to assume a structural form for the conditional mean of CFP, which does not allow for deeper investigation of the non-linearity and is prone to misspecification error.

This paper seeks to investigate the structure of the asymmetric link between CSR and CFP more thoroughly by exploring their interaction with size, which is adopted as an empirical proxy for visibility. We propose a structural model that explicitly models trifold endogeneity, whereby size

affects the degree of concavity in the asymmetric relationship between CSR and CFP. The model (a) recognizes that CSR and CFP might be asymmetrically linked, and (b) explicitly measures the effect of size on asymmetry. This is done by (i) estimating the level of CSR investment at which its impact on CFP turns positive (threshold value) and (ii) by ascertaining how company size changes that threshold value. Therefore, the model measures the expected profitability of CSR strategies with respect to differing firm size and provides an indication of an optimal strategy.

Our empirical analysis on a global sample of 7,307 firm-year observations from 1997 to 2012 using "Vigeo" CSR ratings suggests that CSR performance does exhibit a U-shaped link with CFP, but this is not consistent when a third dimension is considered, i.e. firm size. Medium and small firms exhibit lower CFP when their CSR performance is mediocre. In contrast, larger firms' CFP seems to non-monotonically increase upon greater CSR performance. Accordingly, we suggest that this U-shaped relation between CSR and CFP is observed across sample due to a differently shaped link across firm size levels. This becomes even more evident when market value is taken into consideration. More specifically the threshold point, i.e. where the marginal impact of CSR performance on CFP and market value turns positive, is found to inversely depend on firm size. We therefore purport that company size could bea major determinant of profitability and/or a CSR performance maximizing strategy. This is worthwhile to both academics and practitioners, because (i) it provides a further insight into the structure of the asymmetric link between CSR and CFP, which can be generalized further in order to test different or more factors that may affect its shape, (ii) it provides a framework that can assist in estimating the expected profitability of a CSR strategy with respect to the existing stage of the firm and thus indicate an optimal level of engagement, and (iii) it shows that CSR investments can mitigate the decreasing impact of larger size on CFP by exploring how they are linked across different levels of size.

2. THEORETICAL BACKGROUND AND HYPOTHESIS

2.1 Corporate Social Responsibility and Financial Performance

Initial interest focuses on the signs of the relationship between CSR and CFP and provides conflicting results in terms of both signs and market-stylized facts. Early literature (Anderson and Frankle 1980; Belkaoui 1976; Bowman 1978; Fry and Hock 1976; Preston 1978) reports a positive impact of CSR on CFP because the cost of CSR is outweighed by the benefits gained from enhanced employee morale and productivity (Solomon and Hanson 1985). Other studies (Aupperle et al. 1985; Freedman and Jaggi 1982; Ingram and Frazier 1980; Wright and Ferris1997) argue that costs associated with CSR are higher than benefits resulting inCFP reduction.

Brammer and Millington (2008) maintain that these contradictions arise because of non-linearity. They purport that the positive association between CSR and performance follows diminishing and decreasing returns. Consequently, if the scope of social responsibility participation strays beyond the management in addressing social concerns (e.g., with little or no impact in relation to stakeholders of the firm), the net effect is likely to be declining financial performance. They also argue that the correlation between CSR and performance is highest at the extremes, showing that financial performance is high at both very high and very low CSR levels.

Barnett (2007) argues that the U-shaped relationship depends on the firm's ability to "better meet" stakeholders' needs and thus capitalize on CSR investments, a concept referred to as Stakeholder Influence Capacity (SIC). Barnett and Salomon (2012) report that firms with low/high CSR exhibit higher CFP than firms with moderate CSR. This asymmetry, attributed to a latent concept (SIC), involves various aspects that are of relevance to our study. First, it recognizes that the intensity of the CSR-CFP link might depend on other factors. Second, it implicitly assumes

that there is an optimal level of CSR engagement that maximizes CFP.[1] This impact is not fully endogenously determined, hence there is an optimal strategy (i.e. CSR level), which depends on the firm's current status (i.e. SIC level). Extending on this, we maintain that the U-shaped link observed in two dimensions (CSR, CFP) might not be consistent across a third dimension.

Hypothesis 1: The link between CSR and CFP is asymmetric and depends on the firm's current status. Consequently, the optimal CSR strategy with respect to CFP depends on the current status of the firm.

2.2 Direction of the Relationship and Endogeneity

The argument that the link between CSR and CFP might be affected by the firm's current status is consistent with a significant part of the literature that focuses on the direction of the CSR-CFP relationship and links asymmetriesto potential endogeneity.[2] Early literature (Bragdon and Marlin 1972; Bowman and Haire 1975; Heinz 1976) reports that companies with higher CFP tend to invest more in CSR. This effect might be asymmetric (Bowman and Haire 1975), reverse (Hillman and Keim 2001; Orlitzky et al. 2003), synergetic (Waddock and Graves 1997) or even notably non-

[1] We assume that CSR is monotonically linked to CSR investment. Consequently, CSR ranking is conditional on CSR investment and therefore ranking is an adequate proxy for CSR engagement.

[2] Several approaches have been developed with regard to the direction of the relationship. The social impact hypothesis (Freeman 1984; Jones 1995) purports that a firm that better meets stakeholders' needs can expect increased CFP. According to the slack resource hypothesis (Waddock and Graves 1997), only a profitable firm can further invest in CSR. According to the trade-off hypothesis, increased CSR investments shrink investors' wealth and therefore result in limited performance. Furthermore, the managerial opportunism hypothesis (Weidenbaum and Vogt 1987; Willliamson 1967, 1985) suggests that firms only invest in CSR when they have no other valuable intangible assets. Finally, the positive (Allouche and Laroche 2005; Waddock and Graves 1997) and the negative (Friedman 1962, 1970) synergy hypotheses recognize that CSR and CFP might be endogenously determined.

existent (Makni et al.2009). The empirical findings are not entirely conclusive due to measurement difficulties (Higgins and Currie 2004), regional factors (Jackson and Apostolakou 2010) or industry-specific effects (Rowley and Berman 2000; Gray et al. 1995, 2001; Hackston and Milne 1996), which indicates that the link between CSR and CFP might ultimately be an empirical issue (Ullmann 1985).

Hypothesis 2: The direction of the relationship between CSR and CFP depends on how sensitive CFP is to CSR strategies. This sensitivity depends on both the firm's current status and market stylized factors.

2.3 Visibility and Size

Extending this idea, we maintain that visibility is a major aspect of SIC and employ an observable proxy for this trait. The rationale behind this approach is that it should be easier for higher-visibility firms to convey information to their stakeholders, and so their investing in intangible assets should yield higher returns. In contrast, their investment strategy should be affected to a greater degree by shifts in stakeholders' needs, as it is easier to associate them with "good" or "bad" practices.[3] Relevant literature (Gamerschlag et al. 2011; Brammer and Millington 2008; Udayasankar 2008; Perrini 2006; Husted and Allen 2007) links visibility to size and suggests that firms of larger size tend to more heavilyinvest in CSR, especially in the presence of an intrinsic value that increases their competitive advantage (Chih et al. 2010) or due to higher corporate reputation (Dierkes and Coppock 1978; Fombrun and Shanley 1990; Trotman and Bradley 1981). Other studies report that large firms are morelikely to be affected by CSR performance due to

[3]Our argumentby no means suggests that SIC is fully determined by visibility and/or that size can fully describe visibility. However, we endeavour to investigate the asymmetric link between CSR and CFP by capturing the impact of an observable variable. We choose size on account of its high correlation with visibility and thus SIC.

increased visibility (Watts and Zimmerman 1986), increased social pressure (Aguilera et al. 2007), or reduced size-related costs because of CSR disclosure (Adams et al.1998; Clarke and Gibson-Sweet 1999; Gray et al. 1995; Ness and Mirza 1991).Assuming that larger companies are linked to higher visibility, stakeholder involvement with and influence on company operations should be higher. Moreover, since any action by a larger company involves higher numbers of stakeholders, its impact on future operations is expected to be larger. Consequently, size becomes an integral part of the link between CSR and CFP and could act as an elasticity measure of their relationship, thus determining the profitability of a CSR strategy.[4]

Hypothesis 3: Size, as an observable proxy for the current status of the firm, affects the asymmetric link between CSR and CFP and therefore the sensitivity of CFP to CSR strategies.

Hypothesis 4: Size is endogenous to CSR and CFP and can therefore capture the sensitivity of the asymmetry between CSR and CFP due to market-stylized factors.

3. METHODOLOGY

3.1 Data

The dataset employed in this study consists of all the firms rated by "Vigeo", according to their CSR performance.[5] Vigeo offers a global coverage and we used all available information from

[4] Previous studies partially investigate potential endogeneity, suggesting that size might be endogenous to CFP (Surroca et al. 2010) or to CSR, symmetrically (Orlitzky 2001) or asymmetrically (Udayasankar 2008). However, no study investigates size as a determinant of the optimal CSR strategy or potential trifold endogeneity.

[5] Data has been provided by Vigeo: www.vigeo.com. CSR rating is corporate-specific and the final score depends on five parameters, namely Human Resources, Environment, Community Involvement/Business Behaviour, Corporate Governance, and Human Rights. This rating has been chosen over KLD ratings due to its global coverage.

1997 through 2012. We cleaned the data by dropping all observations reporting negative equity capital. In order to match financial with CSR information, only the most up-to-date annual ratings we reconsidered. All observations outside a 5σ-confidence interval we reconsidered outliers and thus omitted. This results in a pooled data set with a total of 7,307 firm-year observations. We split the sample into three broad regional categories, namely the United States (US), Europe (EU) and BRICS/Asia Pacific (BAP). In order to account for industry-specific effects, we defined broad sectors following the Datastream classification, which is also the source of corporate financial information.

3.2 Model

The proposed model can be summarized in the following system of simultaneous equations:

$$\begin{cases} ROE_{it} = \left(\alpha_0 + a_{0,p}\sum I_{pit}\right) + \alpha_1 SIZE_{it} + a_2^{'} CSR_{it} + \alpha_q \sum CV_{qit} + \varepsilon_{1t} & (1) \\ CSR_{it} = \left(\beta_0 + \beta_{0,p}\sum I_{pit}\right) + \beta_1 ROE_{it} + \beta_2 SIZE_{it} + \beta_q \sum CV_{qit} + \varepsilon_{2t} & (2) \\ SIZE_{it} = \left(\mu_0 + \mu_{0p}\sum I_{pit}\right) + \mu_1 ROE_{it} + \mu_2 CSR_{it} + \mu_q \sum CV_{qit} + \varepsilon_{3t} & (3) \end{cases}$$

where $A = (a_1, \dots, a_q)$, $B = (\beta_1, \dots, \beta_q)$, $\Gamma = (\gamma_0, \gamma_1)$, $M = (\mu_1, \dots, \mu_q)$ are vectors of parameters to be estimated, $i = 1,2, \dots, n$ refers to companies and t refers to time. $p = (Ind, C, Y)$isa vector of dummy variables indicating the industry, i.e. Ind, country, i.e. C, and year, i.e. Y, a firm i belongs to at time t.[6] $CSR_{it}$is the corporate social responsibility and is calculated as $\frac{1}{m}\sum_{m=1}^{5} H_{mit}$, where H is the score of the i-th firm at time t, for each CSR category m; Human

[6]We also considered industry, country, and time fixed effects, recognising that the link between size and visibility might follow cross-sectional and/or time trends. The vector $Ind = (U-T, M, F, R-F, S)$ consists of dummy variables indicating that a firm belongs to the Utilities-Transport, Media, Financial, Retail-Food or Services industry. C and Y vectors o dummies identifying the country each firm is based in, as well as the year data is collected.

Resources, Environment, Society, Corporate Governance and Human Rights.ROE_{it} is the return on equity, computed as net income over total equity and$SIZE_{it}$ is the natural logarithm of total assets.[7]

This model examines the following issues. Eq. (1) investigates a potential asymmetric impact of CSR on performance. Coefficient $a_2^{'}$ captures the impact of *CSR* on performance and is dissected into two regimes: high and low, according to Eq. (4) which is a logistic smooth transition function with a fixed smoothness parameter (i.e., equal to 1):

$$a_2' = a_2^{low}\left(\frac{1}{1+e^{\left(\frac{CSR_{it}-\{\gamma_0+\gamma_1 SIZE_{it}\}}{s_{it}}\right)}}\right) + a_2^{high}\left(1-\frac{1}{1+e^{\left(\frac{CSR_{it}-\{\gamma_0+\gamma_1 SIZE_{it}\}}{s_{it}}\right)}}\right) \qquad (4)$$

a_2^{low} (a_2^{high}) captures the marginal impact of *CSR* on *ROE*, when $CSR_{it} < s_{it}$ ($CSR_{it} > s_{it}$) (*Hypothesis 1*). A positive (negative) estimate would indicate an increasing (decreasing)*ROE* upon higher *CSR* ranking. s_{it} is a threshold value, which determines the *CSR* level that changes its marginal impact on performance. Depending on the estimates of the parameters, the threshold values_{it} might be constant across the sample i.e., γ_0, or might depend on *SIZE*, γ_1 (*Hypothesis 3*). The exponential function allows for a smooth asymmetric effect, the degree of which depends on the magnitude of *SIZE*. This allows for infinite variations of the shape of the relationship between CSR and CFP and as such this specification is less susceptible to misspecification

[7] Most studies (Bragdon and Marlin 1972; Heinz 1976; Moskowitz 1972; Parket and Eilbirt 1975; Vance 1975) use Return on Equity (*ROE*) to measure performance, as opposed to Tobin's Q and P/B ratio which measures market value. The reason for this is the marginal contribution of CSR investments on profits rather than on the cost of goodwill in terms of improvedsocial image and/or a stronger brand name.

error.[8]Furthermore, the latent character of *SIZE*, i.e., Eq. (2), implicitly assumes that other factors, ε_{2t}, not included in the vector $CV_{SIZE,i,t}$, can affect the shape of the relationship between CSR and CFP in a non-linear fashion, as in Eq. (4). This increases the generality of the threshold variable, e.g. *SIZE*, and its usability as an empirical proxy of the current status of the firm while reducing the omitted variable misspecification error. The specification in Eq. (4) can be easily expanded to accommodate more threshold variables and/or higher degree of asymmetry and thus account for a wider variety of firm-specific factors that better capture the current status of the firm.[9]

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8 The specification in Eq. (4) is flexible enough to allow a linear, e.g. monotonically increasing (decreasing) $a_2^{low} = a_2^{high} > 0$ ($a_2^{low} = a_2^{high} < 0$), or a non-linear, e.g. exponential growth (decay) $0 > a_2^{low} > a_2^{high}$ ($a_2^{low} < a_2^{high} < 0$) and logistic growth (decay) $0 > a_2^{high} > a_2^{low}$ ($a_2^{high} < a_2^{low} < 0$), relationship. It can also accommodate a concave, e.g. $a_2^{low} < 0$ and $a_2^{high} > 0$, and a convex, e.g. $a_2^{low} > 0$ and $a_2^{high} < 0$, shape. The logistic function, simply assumes exponential smoothing and it does not affect the fundamental shape of the relationship.

9 Extending the discussion in section 2.3, concerning the limitations of *SIZE* in measuring visibility and/or access to stakeholders, the inclusion of ε_{2t} adds a latent character to the threshold variable. This implies that factors not considered in Eq. (2) can also influence the shape of the relationship between CSR and CFP and therefore it implicitly assumes that it is not only size that affects this relationship, but other relevant factors(e.g. known ($CV_{SIZE,i,t}$) and unknown (ε_{2t}))through their impact on size. Consequently, this specification allows a threshold variableto be used as an empirical proxy for the current status of the firm.

However, if this is not sufficient or if it is too restrictive the model can be easily extended towards various directions. If more firm-specific factors need to be considered, Eq. (4) can be extended by allowing more variables to affect the threshold values, e.g. $s_{it} = \gamma_0 + \sum_{j=1}^{J} \gamma_j TV_{jit}$, where TV is a vector of threshold variables. Furthermore, if focus lies on the state of the relationship, e.g. high or low, rather than on the shape or the degree of the transition, a more stochastic approach could be selected. Instead of using a deterministic (e.g. size) or semi latent (e.g. endogenous specification with errors (ε_{2t})) variable, a completely unobservable (latent) variable with observable discrete states could be employed, where the transition from a_2^{low} to a_2^{high} follows a Markov switching framework. We opt for the

In Eq. (1) and Eq.(2) coefficients $a_2^{'}$ and β_1 investigate whether there is any endogenous relationship between *CSR* and *ROE* (*Hypothesis 2*). Coefficient β_2 captures the impact of *SIZE* on *CSR*. Eq. (3) examines potential endogeneity among CSR, CFP, and Size, as captured by coefficients μ_1 and μ_2 (*Hypothesis 4*).

In addition, we account for other effects on the endogenous variables by using $CV = \left(g, IntCov, \delta, CR, \frac{P}{S}, \frac{FA}{TA}, \frac{IA}{TA}\right)$, a set of control variables which stands for Growth, Interest Coverage Ratio, Total Debt Ratio, Current Ratio, Prices Sales Ratio, Fixed Assets over Total Assets, and Intangible Assets over Total Assets respectively. Each equation has a unique set of control variables, captured by a_q, β_q, μ_q .[10] The model is estimated using the Seemingly Unrelated Regression (SUR) method.

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specification in Eq. (4) because the empirical focus of this study lies in the decision making concerning the magnitude of CSR, which requires observable threshold variables and an explicit continuous description of the shape of the relationship under investigation. In contrast, a fully latent approach such as the Markov switching framework would be more appropriate in cases where the nature of the relationship between CSR and CFP is affected by unobservable factors, such as external shocks and/or market conditions. Finally, a greater number of regimens could be considered, should a higher degree of non-linearity be required.

[10] The first control variable used is growth (*g*). Growth is considered to be an integral part of CFP, as higher realized (Dechow et al. 2000; Easton 2004) or forecasted growth (Arnott and Asness 2003) is a measure of increased profitability. Smaller firms usually experience higher growth(Gupta 1969), while the link between CSR and growth depends on available investment opportunities (Branco and Rodrigues 2006). Furthermore, firms will prioritize financial stakeholder claims over social stakeholders (Artiach et al. 2010). Therefore, highly leveraged firms should be less likely to improve their CSR profiles, even though it would further decrease their tax liability. CSR, however, might contribute to sustainability of earnings and therefore reduce overall risk (Izzo and Magnanelli 2012). We controlledfor capital structure (debt ratio) in all three variables and allowed risk in the form of interest payments (*IntCov*) to be a determinant of CSR. We also controlled for liquidity (*CR*) and the perception of the market about the

4. EMPIRICAL RESULTS

4.1 Initial Observations

Table 1 presents the descriptive statistics for the full sample and the three sub-samples defined above. Advanced economies, namely the EU and the US, are found to invest a greater amount in intangible assets. Although the total investment in fixed assets is larger overall in developing economies such as BAP (BRICS and Asia Pacificis 0.3023) than in the EU and the US (0.2686 and 0.2974), the investment in intangible assets is more important in developed economies (EU 0.6604; US 0.6037; BAP 0.5723). This is consistent with CSR ranking across these regions. EU firms score higher on average (0.4291), followed by the US (0.3371) and BAP (0.2726) firms. This is a strong indication that real investments are more important in developing economies, whereas more mature markets tend to invest in intangible assets and inevitably on CSR.

Table 1 also provides insights on how investments in intangible assets are related to CFP and risk. Advanced economies exhibit higher *ROE* and *ROA* (*ROE* is 0.0631 in BAP, 0.1523 in EU and 0.1843 in US), mainly due to a long left tail in BAP (skewness = −3.5278). The statistics of market values complement this view. The US and EU exhibit higher price to book-value ratios (BAP 1.7513, EU 3.3874, US 3.6638), mainly due to a shorter right tail (skewness = 6.3587; kurtosis = 62.08 in BAP). The major difference between BAP and the other two might be related to a lower investment in intangible assets and might be due to higher risk in BAP. This is a first sign that CSR and CFP are likely to be linked but the direction of the relation cannot be clearly

quality of sales (*P/S* ratio). Finally, management might prioritize real investments (Chung et al. 1998) or intangible investments (Branco and Rodrigues 2006) depending on their marginal contribution to market value. (Mackey et al. 2007). We use the operational structure of the assets (*FA/TA*) to control for the impact of real investments on CFP and size, and the magnitude of the investments in Intangible Assets (*IA/TA*) as a determinant of CSR.

defined. There is a major difference observed in the levels of profitability and CSR between developing and developed economies which indicates that the two figures are correlated, but no safe conclusions can be drawn on whether more profitable firms are more likely to invest in CSR or whether CSR investments contribute to profit stability and thus to reduced risk.

Focusing on this, the basic risk statistics confirm the differences between BAP and the other two groups, indicating potential structural differences. BAP, the EU and the US appear to be progressively less risky with respect to market risk, so major differences are observed in the risk taking by individual entities. Specifically, firms in BAP exhibit considerably lower total debt ratios (0.5836) than their counterparts in the other two groups (EU: 0.6728, US: 0.6105), while also sustaining higher current ratios (BAP: 1.8479, EU: 1.6986, US: 1.5706). This increased risk-taking might be due to increased profitability and increased ability to cover interest payments (Interest Coverage Ratio = 0.0848 in BAP, 0.5253 in EU and 20.6298 in US) or might be due to lower market risk. Extending this idea, a considerable difference is observed between BAP and the other two groups; firms in advanced economies are more profitable, show greater investment in intangible assets, operate at higher risk levels and exhibit higher firm values. Again, CSR and CFP seem to be linked, and this is an attribute shared by risk-taking. However, it is yet not clear whether the lower overall risk allows greater investments in intangible assets, which increases profitability, or whether higher profitability is a major determinant of risk-taking and investments in intangible assets, or a potentially endogenous relationship.

Firm-size could probably provide deeper insight with regards to the link between CSR and CFP, capturing potential structural differences, or revealing size-related effects. Table 1 reveals that it is higher in the US (7.4426) than in the EU (7.2083) and in BAP (7.2011), which is consistent with profitability and market value. However, the dispersion measures (standard deviation, kurtosis,and

skewness) are comparable and indicate that there are no significant deviations across sample, and size is therefore unlikely to capture structural differences. Yet Table 2, where cross-correlations are presented, shows that size is highly correlated with investments in intangible assets (0.5130), CSR ranking (0.2799), borrowing levels (0.5052 with Debt Ratio) and profitability (-0.2306 with *ROA*). Although no safe conclusion can be drawn with regards to direction, this non-parametric empirical evidence indicates that size might indirectly affect CSR and CFP or their link, or that size might be determined endogenously.

This is further investigated in Figures 1-4 by measuring average market value (*MCAP* and *P/B* ratio) and profitability (*ROE* and *P/E* ratio) across firm size and CSR ranking. Each graph presents the relevant values for the full sample, as well as for the three sub-samples. The first notable observation in Figure 1 is that market value, measured by market capitalization, appears to increase almost monotonically across both size and CSR ranking. Considering that market valuation is external, this almost monotonic relation implies that larger firms have greater total market value as expected, but this value increases even further for firms scoring higher in CSR ranking. When judging retrospectively from a market-valuation perspective, this provides some empirical evidence that size might indeed be a good proxy for visibility, in the sense that larger companies can better capitalize on investing in intangible assets.

We then use size as a proxy for visibility and examine its impact on earnings (*ROE*), on the price investors are willing to pay for these earnings (*P/E* ratio), and on market valuation of the firm's net assets (*P/B* ratio) which indirectly accounts for the market valuation of intangible assets and of CSR investments. Figure 2 presents the average *ROE* across size and CSR ranking. The most notable observation is that CSR and *ROE* exhibit a U-shaped relationship, although this is not constant across size. For smaller firms, lower and higher ranking is linked with higher returns

while mediocre CSR performance exhibits the lowest return. In contrast, larger firms exhibit higher returns with improved CSR ranking. In between, higher and lower CSR ranking is consistently associated with higher *ROE*, but the cut-off point where better CSR ranking is translated into higher *ROE* decreases as size increases.

These differences become more apparent upon examination of the sub-samples. In BAP, *ROE* decreases with higher CSR ranking when the size of the firm is on the left end of the distribution, while higher CSR ranking has a clearly positive impact on returns in relatively larger firms. Inthe EU, the worst-performing firms seem to be those of medium size and medium or low CSR performance. In the US, the asymmetric effect of CSR on returns is more evident in smaller firms but larger firms seem to also benefit, almost in a monotonic fashion, from a higher CSR ranking. Two major conclusions can be drawn from this analysis. First, the relationship between CSR and CFP appears to indeed be asymmetric and non-monotonic but not for all firm sizes. It appears to follow a U-shaped pattern for smaller-sized firms while exhibiting a non-monotonically increasing pattern as size increases. Consequently, we purport that the U-shaped link reported by previous studies is non-monotonic across size and is observed in the tails of the size distribution. In other words, CFP seems to be affected more by CSR when size is relatively small or large, and the U-shape is therefore observed across size. Second, there is an overall U-shaped pattern which exhibits a decreasing significance across size, indicating that there is a notable size effect in the way CSR and CFP interact. The tip point of the U-shaped link decreases with larger size up to a point where CFP increases monotonically with CSR in firms of relatively higher size. Therefore, the U-shaped link is mainly observed in small firms while the effect of decreasing returns due to mediocre CSR performance (Barnett 2007; Barnett and Salomon 2012) becomes less significant and almost disappears in larger firms.

These two points become more apparent when we focus on market values. Investors appear to evaluate higher net assets (*P/B* ratio; Figure 3) or to be willing to pay more for earnings (*P/E* ratio, Figure 4) in the tails of size distribution. The link between CSR performance and market value differs significantly, from a clearly U-shaped (EU and US) or monotonically decreasing (BAP) link to a monotonically increasing link across different size levels. We thus maintain that size is a major determinant of the link between CSR and CFP.

4.2 Parametric Analysis

The previous section highlights several implications derived from non-parametric analysis, which could be summarized in the following principal concerns. Firm size appears to have an impact on how CSR performance and financial performance are linked. In other terms, size appears to be a determinant of CSR-strategy profitability, hence a determinant of the optimal CSR strategy with respect to profitability. We observe that the importance of a notable asymmetric relationship between CSR and CFP decreases across size to a monotonically increasing function. We hypothesize that this might be due to increased visibility (we use size as a proxy of visibility) that results in greater SIC. However, such a non-conditional approach cannot provide any solid evidence of the direction or the causality of this observation.[11]

[11] For instance, Figure 5 presents the average size across different levels of *ROE* and CSR performance and shows that size is inversely related to the former while it increases with the latter. Combination with previous findings, however, shows that the direction of causality is not so clear. Larger firms might invest more in CSR, but investing in CSR might conversely lead to larger size. More specifically, larger firms might on average earn less than smaller firms with high-growth potential, and higher profitability might either be linked to higher asset-concentration or, conversely, come at a reputational cost and therefore lead to smaller size. Furthermore, these three figures might be endogenously linked to one another, something that cannot be identified by a non-parametric approach.

We further pursue this task in this Section, aiming at measuring the direct and indirect impact of size on the CSR-CFP link, as well as potential endogeneity among them, in order to evaluate the contribution of size as a determinant of the optimal strategy selection, between increasing size and/or improving CSR profile in order to improve profitability.

4.2.1 Size and CSR-CFP Asymmetry

One of the major attributes of the model employed in this study is that it explicitly models a potentially asymmetric impact of CSR on CFP (measured by *ROE*), as well as that it allows for size to have a direct impact on *ROE* and how *ROE* is affected by CSR. The first column of Table 3 presents the estimation results for Eq. (1). A statistically significant long-term, cross-sectional average *ROE* value of 0.1745 is consistent with the non-parametric estimate for the full sample presented in Table 1 and appears to be consistently higher by 0.0593 only in the Retail-Food industry,failing to exhibit any significant deviation in all remaining sectors.

In addition, *ROE* appears to be asymmetrically affected by different levels of CSR performance. When CSR performance is low, it has a diminishing (−0.1388) impact on profitability, whereas high CSR performance significantly enhances (0.1266) *ROE*. This is consistent with previous literature (Barnett 2007; Barnett and Salomon 2012) that reports a U-shaped link between CSR and CFP. This study expands on this by measuring the threshold value of CSRat which its marginal contribution to *ROE* turns positive, as well as by investigating how this threshold value changes across size. An estimate of 0.4735 of γ_0 indicates that this is the level of CSR performance that is considered mediocre. Any level below this seems to have a diminishing impact on profitability and is where *ROE* reaches its lowest levels, thus, any level above this seems to increase profitability. This threshold value, however, does not remain stable across different levels of firm size. The estimate of γ_1 is negative (−0.0383) and shows that the cut-off point at which the impact

of CSR on CFP turns positive is lower for larger firms. This is consistent with previous studies (Gamerschlag et al. 2011; Brammer and Millington 2008; Udayasankar 2008; Perrini 2006; Husted and Allen 2007) arguing that larger firms have greater visibility and therefore exhibit higher SIC (Barnett 2007)so they can more easily capitalize on their investment in intangible assets through benefits such as improved CSR profiles. This study expands on this by measuring the impact of size on the asymmetric link between CSR and CFP, thus providing an estimate of the sensitivity of profitability to CSR investments.

These findings are confirmed or even magnified when focusing on market values (*P/B*) rather than on accounting measures of profitability (*ROE*). The first column of the second panel of Table 3 presents the estimates resulting from Eq. (1) when *P/B* is employed as the dependent variable. This variation of the initial model accounts for the market perspective of the impact of CSR performance on profitability. Differently stated, the use of *P/B* acts as an external (market) validation of the estimate of the impact of intangible investments on profitability, because it captures investors' perception of the impact itself and its reflection on their expectations and thus firm value. The long-term, cross-sectional mean is 2.6885 for the full sample and is consistent with the non-parametric estimate in Table 1. The Utilities and Retail-Food industries consistently exhibit higher *P/B* ratios, probably due to more inelastic demand. In accordance with previous findings, low CSR performance has diminishing (-0.0833) impact on *P/B* whereas high CSR performance significantly boosts (0.2122) market values. The threshold value is still comparable at 0.4501, falling by -0.0485 for every unit increase in size. These findings have three major implications. First, the U-shaped link observed between CFP and CSR can also be observed between CSR performance and market values. Second, this link is also asymmetric and its convexity also depends on size in a diminishing fashion. Finally, both the asymmetric relationship

and the diminishing effect of size are greater in magnitude when market values are considered. This is consistent with previously discussed findings, where a greater convexity is reported in *P/B* than in *ROE*, a convexity that changes at higher rate across size.

Hence, this first part of the parametric analysis suggests the following. Lower levels of CSR performance have a rather diminishing impact on CFP. There is a point of CSR performance up to which, increasing investments in CSR further reduce profitability. Instead, any CSR performance improvements beyond this point have a positive impact, resulting in a U-shaped relation. The threshold value of CSR performance inversely depends on firm size, with larger firms exhibiting higher financial performance associated with lower CSR performance. A potential explanation consistent with our analysis so far is that larger firms enjoy better visibility and thus better access to their stakeholders, and potentially greater SIC. They can better capitalize on their investments in intangible assets, such as CSR, and therefore even low or moderate CSR performance might have a beneficial impact on financial performance. This link among the three variables is magnified in investors' perceptions, resulting in a U-shaped link of greater magnitude between CSR and market values affected more by size.

4.2.2 Endogeneity and Optimal Strategy

The question that arises from the previous findings, i.e. identifying the link between CSR and CFP and its dependence on size, is how they can be used in making the optimal decision with regards to a CFP maximizing strategy. Managers might choose to control for size, for CSR performance, or both. So far, the analysis has provided some useful indications as to which strategy might be more financially rewarding but no safe conclusion can be made before examining potential endogeneity among the variables of interest. The second and third columns of Table 3 report the estimates of the parameters in equations (1) and (2) for the full sample.

The first notable observation is that CSR and CFP seem to be endogenously related. An estimate of 0.0215 for *ROE* indicates that firms with higher profitability are more likely to invest in CSR and thus achieve higher CSR performance. Our earlier discussion indicates that higher CSR performance might further boost *ROE*, but this holds true for larger firms only. In fact, higher CSR investments in smaller firms are associated with lower profitability. This is a first sign that higher CSR investments financed by increased earnings could be a reasonable strategic option with respect to CFP, but only when firm size is large. Consequently, size appears to be strongly associated with the endogenous relation between CSR and CFP and therefore the profitability of a CSR investment cannot be considered independently of the firm's current state/size.

The focus now shifts to how size is linked with CSR and CFP. An estimate of -0.1124associates larger firms with lower earnings (*ROE*). This correlation is strong, and higher-earning firms indeed appear to be smaller (the estimate of the direct impact of *ROE* on size is −0.2222). At the same time, an estimate of 0.1125 shows that larger firms are more likely to invest in CSR and are associated with higher CSR performance. This in turn can lead to larger size (the estimate of CSR impact on size is 2.4626), indicating that CSR and size are endogenous. This is a very strong indication that CSR investments might be a reasonable strategic decision for firms aspiring to grow in size. If they grow any further, the direct impact of size on *ROE* indicates that they should expect lower financial performance. However as discussed previously, larger firms who invest in CSR can also increase *ROE* which is an indication of an indirect size effect.

This is also consistent when market value is taken into consideration. Firms with high *P/B* ratio are more likely to invest in CSR (the estimate of *P/B* on CSR is 0.2603). This investment will lead to larger size (the estimate of CSR for size is 2.4523), which will in turn have a dual impact on market value. The direct impact is diminishing (the estimate of size on *P/B* is −0.0451), while larger

size reduces the threshold value (γ_1 is −0.0485) of CSR performance and therefore makes it easier for firms to capitalize on CSR investments and translate them into higher market value (the estimate of high CSR on *P/B* is 0.2122).

This reveals a spiral and endogenous relationship among the three variables. Larger and more profitable firms are more likely to invest in CSR, which is expected to further increase size. This effect has a strong impact on size, which in turn determines whether increased CSR investments will enhance CFP. From a strategic standpoint, CSR investments is the optimal decision with respect to CFP for firms that expect a negative impact of size on profitability due to their larger size. Further investments to increase size would not be a sensible option, since this would overall decrease the firm's profitability. However, increased investments in CSR would enhance size and then indirectly enhance performance, or at least would mitigate the negative direct impact of size on performance. In contrast, small firms with established CSR investments should aim at increasing size, especially if they are below the threshold value (i.e., CSR performance that determines whether CSR will have a positive or negative impact on ROE). They could, for example, increase the debt ratio and expect a direct positive impact (the estimate of *Debt Ratio* on *ROE* is 0.2999) or an indirect impact through higher size (the estimate of *Debt Ratio* on size is 0.9036) that will lead to a level above the threshold value and thus an indirect impact of CSR investments on *ROE*. Alternatively, they could further invest in CSR expecting an indirect increase in size that would decrease the threshold to a level that will allow the CSR investments to boost ROE. The optimal decision should depend on the current state of the firm.

4.2.3 Robustness Check

The practical implications of the model, with regard to the selection of the optimal profit-maximizing strategy, lie on the identification of the trifold endogeneity and of the direct and

indirect impact of size on the CSR-CFP link. One of the main findings is that the optimal strategy selection depends on the current state of the firm. The selection decision can be enhanced by employing more endogenous or control variables. This way the degree of endogeneity as well as the contribution of other factors to it can be assessed, leading to more informed decision-making. In this section we aim to test the ability of the current formulation of the model to capture market- and/or data-stylized factors by running several robustness tests.

First, the robustness of the employed financial performance measure is tested. In the previous section we have used both an accounting measure of profitability (*ROE*) and an indirect measure that accounts for external (market) valuation of the firm's (tangible as well as intangible) assets and consequently of the value of its equity capital (*P/B*). The results, presented in Table 3, are comparable and indicate that internal (*ROE*) and external (*P/B*) evaluation of performance exhibits similar links to CSR performance and size. We further test the robustness of these findings by considering another accounting (internal) measure of performance: the Return on Assets (*ROA*). This measure is expected to be highly correlated with *ROE*, yet it might be driven by different fundamentals (or by the same fundamentals in a different way) such as proportion of debt, taxation, and depreciation (investments in Fixed Assets, *FA/TA*, or Intangible Assets, *IA/TA*). The estimation results are presented in the last three columns of Table 3. Firms with higher *ROA* are found to be more likely to invest more in CSR (the estimate of *ROA* on CSR is 0.1137), which in turn might result in larger size (the estimate of CSR on size is 2.4704). The direct impact of size on *ROA* is rather diminishing (−0.0109), but it can be mitigated by higher (above the threshold value of 0.4658) CSR performance which is found to increase *ROA* (the estimate of high CSR on *ROA* is 0.1192). In contrast, when CSR performance is below the threshold value, *ROA* is even lower (the estimate of the low CSR on *ROA* is −0.1243). The threshold value seems to be inversely

(−0.0383) linked to size. These results are in accordance with *ROE* and *P/B* and support the robustness of the modelling and the parameter estimates.

Second, we test the adequacy of the model in capturing potentially differential degrees of endogeneity and/or indirect impact of size on the convexity of the CSR-CFP link by re-estimating the model in different market environments, namely in the three sub-samples: BRICS-Asia Pacific, EU and US. We employ *ROE* as a measure of performance for comparability reasons with the main empirical results discussed in earlier sections. Table 4 presents the estimation results of the model for the three sub-samples, which confirm the trifold endogeneity and the contribution of size. For example, *ROE* in EU is found to increase CSR performance (0.0181) which in turn leads to greater size (2.5580) and higher() financial performance (0.1145, lower is−0.1280) when CSR is greater (lower) than the threshold value (0.4681). Sizeappearsto be a determinant of the threshold value (−0.0365).

However, the major difference lies in the different measurement of the degree of convexity between CSR and CFP. In accordance with previous discussion of non-parametric statistics in Figures 2-4, the estimates of the degree of asymmetry vary in each market. Specifically, the threshold value (Table 4) is consistently lower in advanced economies (0.4812 in BAP, 0.4681 in EU and 0.4615 in US), indicating higher contribution of CSR on performance. Size is also found to significantly improve the profitability of CSR investments in advanced economies (−0.0102 in BAP, -0.0365 in EU and −0.0437 in US). This is also associated with higher asymmetries in the impact of CSR on CFP, also noted in Figures 2-3. The estimates of the impact of low and high CSR on CFP become more significant and more dispersed in advanced economies. For example, the estimate of *CSR-low* on *ROE* increases (in absolute value) from −0.0120 (−1.38) in BAP to −0.1280 (-2.62) in the EU and −0.2071 (-3.49) in the US. Moreover, the estimate of *CSR-high* on

ROE increases (in absolute value) from 0.0205 (1.39) in BAP to 0.1145 (2.55) in the EU and 0.3241 (3.22) in the US. These observations are in accordance with the non-parametric discussion in Section 3.1 and highlight the ability of the model to capture market-stylized facts, such as the degree of the CSR- CFP link, as well as the endogenous impact of size.

Furthermore, we tested the robustness of our findings with respect to three additional issues. First, we investigated whether the empirical results hold when another CSR rating (KLD) is applied. The rationale behind this is that a CSR rating is a signal to the market and as such the direction of this new piece of information (i.e., "good" or "bad" news) should be expected to comparably affect the financials of listed firms, especially *MCAP*. We re-estimated the model using the KLD rating. The purpose of this experiment was not to compare the strength of the signal of these two ratings or potential differences in the rating methodologies applied, but rather to see whether comparable market signals (e.g., better CSR performance) have a consistent impact on the trifold endogeneity reported in the previous section. Second, in the original estimation we introduce sector dummies to capture industry specific effects. Size and visibility might not be correlated the same way in different industries. We re-estimated the model without the sector dummies to test the robustness of the empirical findings with respect to the impact of size on the asymmetric link between CSR and CFP, independently of cross-sectional differences. This could enhance the generalisability of our findings. Third, we explored how firms with no CSR rating compare with their peers that get a positive or even "0" rating. The sample employed in the main analysis consists only of Vigeo rated firms. The rating can vary from 100% to 0%. However, a "0" score implies bad performance rather than no rating (e.g., no publicity). Consequently, no rating might lead to comparable, to "0" score, findings in the sense that no rating is perceived by the market as "bad" CSR performance. In contrast, no rating might de-link a firm from the

"responsibility" context and thus any "good" or "bad" practices might not be linked to size/visibility and/or CFP the same way a "zero" score would. For this purpose, we extend the sample to all firms of the S&P1500 index with valid observations, regardless of whether they have a KLD rating or not.

Figure 6 presents the estimation results employing a sample derived from the S&P1500 index using a KLD rating. The first column presents the results of the parametric analysis and aims at investigating whether the previous findings hold when a different CSR rating is applied. In this analysis all firms with no CSR rating get a "0" score. This is done in order to facilitate the regression analysis, but it does not distinguish between "0" and "no" rating. We investigated this further in the second column of Figure 6, where we conducted a non-parametric analysis. The first two graphs present the average *ROE* and *P/B* across different size and CSR rating levels. The last two graphs summarize the same information across a wider (i.e., small, medium and large) size of firms. In all four graphs we distinguished the impact of "0" from the impact of "no" rating.

The empirical findings presented in Figure 6 confirm that our previous findings are robust both in terms of alternative rating scores, as well as in terms of the inclusion of non-CSR-rated firms. In more detail, we confirm the asymmetric impact of CSR on CFP, with the threshold value being a diminishing function of size. The impact of a (relatively) low CSR rating on CFP is again found to be negative (CSR-low is −0.1615), while it increases (CSR-high is 0.2180) when CSR exceeds γ_0 (0.3044) for small firms. This threshold value decreases (γ_1 is −0.0473) in larger firms. The above estimation also confirms the trifold endogeneity, where more profitable firms are more likely to invest in CSR (0.0124) thus leading to larger size (3.7978). This confirms that CSR investments might be an efficient strategy in terms of CFP for large firms trying to mitigate the negative impact of size on profitability (−0.1367). Furthermore, a close examination of the four

graphs in the second column of Figure 6 reveals that "no" CSR rating tends to be comparable to a "0" rating. "No" CSR-rated firms exhibit higher average *ROE* and *P/B* than their 0-rated counterparts. *ROE* and *P/B* decrease until a specific level (threshold) of CSR and then they again begin to increase. The last two graphs show that this threshold value decreases in larger firms. This is an indication that a "no" rating is most probably perceived negatively and therefore the marginal impact of CSR tends to be positive, especially for larger firms. This should be a strong incentive for large firms to initiate CSR investments to improve CFP.

Finally, we tested the robustness of our analysis with respect to some recent developments referring to the marginal impact of Research and Development (R&D) activity on CFP and CSR. Relevant literature (Chan et al. 2001; Eberhart et al. 2004; Ehie and Olibe 2010) considers R&D expenditures as investments in intangible assets, which in turn contribute to differentiation and the development of competitive advantages and thus to longer term growth and profitability. We address this by including $\frac{IA}{TA}$ as a control variable. However, with respect to CSR more recent studies report that when R&D investments are explicitly taken into consideration, the marginal impact of CSR on CFP becomes insignificant (McWilliams and Spiegel 2000) or it is only significant in low innovation firms (Hull and Rothenberg 2008) while R&D investments are positively correlated with CSR, exhibiting strong industry effects (Robert and Jose 2010). Therefore, we explicitly differentiate the magnitude of R&D expenditure from the level of the investment in intangible assets, also accounting for industry fixed effects, in order to account for cross-sectional variations in innovation and differentiation.

The first row of the first panel of Figure 7 reports the average CSR performance across different firm size and R&D investment levels. CSR performance seems to be higher when firms' R&D expenditure is elevated, but the major increase seems to be highly associated with firms' size.

Therefore, we expect R&D investments to be weakly correlated with CSR performance (Robert and Jose 2010), but since size seems to have a stronger impact we do not expect this to significantly alter our empirical findings. This is confirmed in the second panel of Figure 7, which presents the estimation results of an enhanced version of our empirical model in equations (1) to (4). In both datasets, R&D investments appear to weakly increase CSR performance (0.0681 and t-stat 2.68 in Vigeo and 0.0263 and t-stat 2.05 in KLD), but size exhibits a notably stronger impact (0.1098 and t-stat 16.66 in Vigeo and 0.0983 and t-stat 15.52 in KLD). We attribute this to the link between size and visibility. Larger firms invest more in CSR, either due to available resources (Chih et al. 2010) or because they have a lack of differentiation/innovation in investment opportunities (Hull and Rothenberg 2008) and these investments tend to be improve their CSR performance due to higher visibility/exposure. This is consistent with our view that the larger scale of operations of larger size firms involves more stakeholders and thus it is more correlated with a higher SIC. Consequently, the inclusion of R&D investments in Eq. (2) neither diminishes the significance of our semi-latent proxy of the "current status" of the firm summarized by firm size nor challenges the endogeneity assumption between size and the link between CSR and CFP.

Furthermore, the second row of the first panel of Figure 7 reports the average ROE across R&D investments and CSR performance. ROE, in consistency with the literature (Chan et al. 2001; Eberhart et al. 2004; Ehie and Olibe 2010), is evidently positively correlated with R&D investments since it is higher on average upon higher R&D investments. However, contrary to McWilliams and Spiegel(2000), CSR consistently contributes to CFP albeit not at the same rate across different R&D investment levels. Therefore, we expect CSR performance to continue

having a significant impact on CFP, even after explicitly accounting for R&D investments.[12]This is confirmed in the second panel of Figure 7. The empirical results remain qualitatively highly comparable with the only difference being that upon the presence of R&D investments, the impact of size on the threshold value diminishes. In more detail, the marginal impact of CSR on CFP is positive (negative) when CSR performance is higher (lower) than a level which is negatively affected by size and now positively affected by the level of R&D investments. This means that larger firms still benefit more by their CSR performance probably due to higher visibility, but this effect is weaker. The threshold value is elevated upon the presence of significant R&D investments. Drawing on relevant literature (McWilliams and Spiegel 2000; Hull and Rothenberg 2008; Robert and Jose 2010) this could mean that firms with significant differentiation/innovation investment opportunities either need higher CSR performance levels to benefit from it and/or that CSR performance is more vital in low innovation firms. Practically, these estimation results show that large firms with low dependence on R&D investments enjoy a lower threshold of CSR

[12]We suggest an enhanced version of our empirical model presented in equations (1) to (4) that aims at testing the robustness of our findings with respect to two aspects. First, we introduce an explicit measure of the intensity of R&D investments as an explanatory variable in Eq. (1) and (2). This directly addresses the concerns about the marginal impact of CSR on CFP, as well as potential endogeneity between the two over the contribution of R&D investments. Second, we also recognise the fact that R&D investments might affect the way CSR interacts with CFP by allowing R&D to affect the level of the threshold variable, s_{it}, in Eq. (4). The rationale for this is that CSR investments might compete with other differentiation strategies and investments in intangible assets/creation of competitive advantage and therefore their marginal impact turns positive only after a significantly higher level of CSR performance and/or absence of other meaningful innovation strategies/investments. Therefore, we allow R&D to have an impact on the threshold value s_{it}, which captures the cut-off point when CSR performance has a positive or negative impact on CFP. This way, we account for cross-sectional variations in innovation and differentiation while suggesting a potential extension of our model that considers a different structural form and more firm specific factors.

performance to start benefiting from it in financial terms, while smaller and/or high intensity R&D firms need a higher Vigeo/KLD score for the marginal impact of CSR on CFP to turn positive. This most likely happens because there are other investment opportunities that are potentially more profitable and therefore in order for a CSR investment to be profitable, it needs to be developed as a competitive advantage thus a higher threshold value is observed. Second, they highlight the flexibility of the model to accommodate more threshold variables as well as the suitability of firm size as a semi-latent proxy for the "current status" of the firm, since the qualitative characteristics of the empirical findings do not significantly change after another threshold variable is added.

5. CONCLUSIONS AND FURTHER DISCUSSION

Recent literature related to the profitability of CSR strategies shifts the focus to the conditions that contribute to a positive marginal impact of CSR on CFP. Barnett (2007) and Barnett and Salomon (2012) argue that the link between CSR and CFP is U-shaped and it depends on the firm's ability to capitalize on CSR investments, a concept referred to as Stakeholder Influence Capacity (SIC). This is highly consistent with previous literature (Ullman 1985), which suggests that the profitability of CSR strategies is an empirical issue. SIC is unique per firm and therefore each firm should be expected to exhibit a different convexity of this asymmetric link.

By recognizing that the profitability and the suitability or intensity of CSR strategies depend on firm-specific factors, this concept manages to bridge the gap in a rather controversial branch of the literature that reports conflicting results with respect to the direction and signs of the link between CSR and CFP (Friedman1962, 1970; Willliamson 1967, 1985; Freeman 1984; Weidenbaum and Vogt 1987; Jones 1995; Waddock and Graves 1997; Allouche and Laroche 2005). However, previous literature (Barnett and Salomon 2012) deals with the fact that SIC is a latent concept by amending the functional form of the determinants of profitability (quadratic function) in order to

account for potential asymmetries in the link between CSR and CFP. Yet, this is rather restrictive in multiple ways. First, it imposes a functional form for the non-linearity between CSR and CFP that can only either accept or reject a U-shape. This approach is prone to misspecification error and does not allow for the asymmetric link to vary over market-stylized factors and/or time. Second, the imposed functional form does not allow endogeneity to have an impact on the degree of convexity or the existence of asymmetries at all. Third, the representation of firm-specific factors (e.g., SIC) in the functional form does not allow for further investigation of potential determinants, and therefore, limits generalisability.

This study addresses all these issues directly by introducing an observable variable, namely the firm size, as a determinant of potential asymmetries in the link between CSR and CFP. We propose an empirical model consisting of a system of equations which recognizes potential endogeneity between CSR performance, CFP, and size. Size is allowed to have both direct and indirect impact on financial performance, which accounts for differential profitability of CSR investments across different levels of firm size. Size is employed as a proxy for visibility and is hypothesized to be an indicator of better access to stakeholders (due to higher visibility) and thus of increased Stakeholder Influence Capacity.

This is both the major contribution and the limitation of our approach. The choice of a single variable, summarising a multidimensional concept (i.e., SIC) or multiple firm specific effects, is indeed rather restricting. However, we argue and provide some empirical evidence that succeeds in capturing cross-sectional and cross-regional stylized factors well and therefore this approach might be preferable over a pre-specified functional form. Moreover, our framework can be easily extended to accommodate criticisms concerning the choice of the observable variable or the modelling of potential asymmetries by amending the threshold variable (size), the number of

threshold variables (a hidden Markov-switching framework could also be applied), or the transition function. Overall, the proposed framework allows for a deeper investigation of what is the optimal decision with regard to profit maximization of a firm that can choose between altering the level of the threshold variable (size)and/or maximizing CSR performance.

The empirical findings contribute to the literature in multiple ways. First, they confirm that the relationship between CSR and financial performance is asymmetric, although we find out that this is not necessarily consistent in firms of comparable size. The impact of CSR on CFP varies from non-monotonically decreasing or U-shaped in smaller-sized firms to non-monotonically increasing in larger-sized firms. Therefore, the U-shaped relationship is observed across size. Second, our model proposes a way to measure the threshold value of CSR performance that distinguishes a decreasing from an increasing CSR impact on CFP, thus indicating whether a CSR engaging strategy can be expected to increase or decrease profitability. Third, our model suggests that the asymmetric impact of CSR on financial performance weakens with size and therefore larger firms can benefit more from CSR investments, probably thanks to higher visibility. Size appears to be inversely linked to the threshold value, indicating that larger firms need a lower CSR performance in order to increase CFP. Fourth, the analysis suggests a trifold endogeneity among CSR, CFP and size, and thus the optimal profit-maximizing strategy depends on how these variables interact and on the current size/state of the firm. Consequently, our empirical findings enrich the current thinking in the literature (Barnett 2007; Barnett and Salomon 2012) that by increasing CSR beyond a level (threshold),CFP will also increase. We postulate that this (threshold) level is not constant and a firm can achieve a higher financial performance by managing other dimensions/firm specific factors, such as size, alongside CSR.

This has practical implications for managers. First, we report that increasing size reduces the threshold value (level) of CSR performance that is required in order for CSR investments to have a positive marginal impact. We explain that this seems to be attributable to a spiral link among size, CSR, and CFP. This implies that CSR investments might be an efficient way to mitigate the limiting effect of increasing size on profitability. Larger companies tend to be less profitable per unit of allocated capital and they are found to be able to increase both profitability and size by investing in CSR. In contrast, smaller firms face an increased threshold value for CSR investments to have a positive marginal impact, probably due to asymmetrically higher unit costs. This indicates that they should first increase in size and visibility prior to expanding CSR investments. This would reduce the effort (threshold value) needed to increase CFP by improvements in CSR performance. Second, we also report that our framework is flexible enough to embed market stylized factors by using an observable variable (size). In combination with its generalising ability, this provides a handy tool that can be employed to assess how different firm-specific effects instead of/alongside size would affect the profitability of a new CSR investment or the expansion in a new market by conducting a cross-sectional/cross-regional peer analysis.

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Abbreviations

CSR Corporate social responsibility
CFP Corporate Financial Performance,
SIC Stakeholder Influence Capacity
ROE Return on Equity
ROA Return on Assets
US United States of America
EU Europe
BAP BRICS and Asia Pacific

Table 1. Descriptive Statistics

		ROE	CSR	SIZE	Growth	IntCov	Debt Ratio	Current Ratio	P/S	FA/TA	IA/TA	P/B	ROA
Full Sample	Mean	0.1456	0.3867	7.2557	0.0469	4.6170	0.6466	1.6944	2.0184	0.2796	0.6355	3.2001	0.0478
	Median	0.1270	0.3883	7.1748	0.0352	0.0549	0.6538	1.4394	1.1672	0.2043	0.6493	2.0111	0.0396
	Maximum	13.44	0.79	9.50	1.15	3485.65	1.00	49.94	301.03	3.08	1.18	239.14	1.16
	Minimum	-6.1405	0.0533	4.8840	0.0000	-5.3613	0.0058	-9.0916	-16.1169	0.0000	-2.3106	0.0423	-0.8905
	Std. Dev.	0.4265	0.1286	0.7450	0.0541	106.3708	0.2028	1.6756	4.8228	0.2632	0.2273	6.6450	0.0748
	Skewness	11.7206	0.3048	0.4770	5.5130	25.9753	-0.3274	12.3921	37.1777	1.4880	-1.0128	19.6994	-0.1820
	Kurtosis	348.13	2.33	3.21	73.61	688.83	2.58	253.85	2126.24	8.42	8.33	558.54	27.45
BAP	Mean	0.0631	0.2726	7.2011	0.0462	0.0848	0.5836	1.8479	2.0439	0.3023	0.5723	1.7513	0.0306
	Median	0.0655	0.2650	7.1228	0.0373	0.0028	0.5945	1.4830	0.8831	0.2575	0.5895	1.1936	0.0233
	Maximum	0.92	0.65	9.41	1.13	28.35	0.99	49.94	117.43	1.07	0.99	30.73	0.42
	Minimum	-1.7967	0.0533	5.7082	0.0000	-2.2589	0.0058	-0.2917	0.0304	0.0000	-0.7486	0.3022	-0.7035
	Std. Dev.	0.1720	0.1076	0.6107	0.0550	0.9582	0.2328	2.2696	5.1980	0.2402	0.2474	2.1130	0.0664
	Skewness	-3.5278	0.3728	0.6890	8.3623	24.9912	-0.1482	12.3516	14.0210	0.7726	-0.3667	6.3587	-1.4415
	Kurtosis	39.44	2.75	3.60	146.40	713.95	2.11	218.83	273.55	2.89	2.94	62.08	24.87
EU	Mean	0.1523	0.4291	7.2083	0.0465	0.5253	0.6728	1.6986	1.8899	0.2686	0.6604	3.3874	0.0473
	Median	0.1352	0.4433	7.1118	0.0356	0.0631	0.6729	1.4406	1.0706	0.1992	0.6703	2.1497	0.0386
	Maximum	13.44	0.79	9.50	1.15	252.86	1.00	42.15	301.03	3.08	1.09	239.14	1.16
	Minimum	-6.1405	0.0900	4.8840	0.0000	-2.6976	0.0352	-9.0916	-16.1169	0.0000	-2.3106	0.0650	-0.8905
	Std. Dev.	0.4259	0.1223	0.7916	0.0532	5.9271	0.1875	1.6491	5.1584	0.2575	0.2177	6.8536	0.0752
	Skewness	11.9269	0.3491	0.4684	5.7543	27.7573	-0.3234	11.8309	43.0422	1.8494	-1.4355	18.3123	0.1487
	Kurtosis	360.20	2.56	3.03	76.75	949.44	2.74	227.20	2452.11	12.23	13.22	490.56	31.23
US	Mean	0.1843	0.3371	7.4426	0.0485	20.6298	0.6105	1.5706	2.3998	0.2974	0.6037	3.6638	0.0620
	Median	0.1469	0.3317	7.3690	0.0314	0.0729	0.6057	1.3862	1.6863	0.1724	0.6071	2.3945	0.0559
	Maximum	12.29	0.60	9.36	0.58	3485.65	1.00	23.46	69.57	1.69	1.18	227.30	0.77
	Minimum	-5.8376	0.1183	6.1116	0.0000	-5.3613	0.0782	-2.1561	0.0182	0.0000	-0.4958	0.0423	-0.6502
	Std. Dev.	0.5361	0.0870	0.6480	0.0562	233.0454	0.2099	1.1668	3.1537	0.2932	0.2289	7.8915	0.0766
	Skewness	9.7718	0.2658	0.7249	2.9193	11.7462	-0.1614	7.0896	11.9623	0.9756	-0.4089	19.1519	-0.7043
	Kurtosis	224.17	2.69	3.44	17.10	141.47	2.33	106.39	233.41	3.06	2.99	481.44	19.93

Table 1 presents the descriptive statistics of all variables used in the estimation of the empirical model. The first panel presents the statistics for the full sample, while the following panels present the statistics for three sub-samples, namely BRICS-Asia Pacific (BAP), the Europe Union (EU) and the United States (US).

Table 2. Correlation Matrix

	ROE	*CSR*	*SIZE*	g	$IntCov$	δ	CR	*P/S*	*FA/TA*	*IA/TA*	*P/B*	*ROA*	*P/E*
ROE	1												
CSR	0.0221	1											
SIZE	-0.0720	0.2799	1										
g	0.0225	0.0448	-0.1837	1									
$IntCov$	0.0071	-0.0123	0.0466	0.0741	1								
δ	0.0422	0.1799	0.5052	-0.2165	-0.0443	1							
CR	-0.0302	-0.0893	-0.0795	-0.1935	-0.0227	-0.1961	1						
P/S	0.0227	-0.0735	-0.1352	0.0454	-0.0020	-0.2222	0.1376	1					
FA/TA	-0.0249	0.0166	-0.1430	0.5936	0.0558	-0.2184	-0.2812	0.0602	1				
IA/TA	0.0228	0.1679	0.5130	-0.2446	-0.0430	0.9089	-0.1396	-0.2311	-0.2394	1			
P/B	0.7264	0.0227	-0.1774	0.0563	-0.0073	0.0584	-0.0473	0.1048	-0.0284	0.0096	1		
ROA	0.4885	-0.0388	-0.2306	0.1025	0.0406	-0.3408	-0.0019	0.1259	0.0164	-0.3439	0.2054	1	
P/E	0.0050	0.0038	-0.0133	0.0007	0.0004	-0.0012	0.0015	0.0063	0.0027	-0.0079	0.0068	0.0094	1

Table 2 presents the correlation matrix of all of the variables employed in the empirical model for the full sample.

Table 3. Estimation Results: Full Sample

	ROE	CSR	Size	P/B	CSR	Size	ROA	CSR	Size
Interc	0.1745	0.4179	5.7017	2.6885	0.4117	5.6816	0.0429	0.4287	5.7782
	(12.43)	(15.54)	(15.84)	(13.36)	(14.94)	(15.63)	(15.08)	(15.88)	(15.48)
ROE		0.0215	-0.2222		0.2603	-0.0308		0.1137	-0.7861
(P/B, ROA)		(6.46)	(-14.21)		(11.74)	(-13.09)		(5.60)	(-8.19)
CSR-low	-0.1388		2.4626	-0.0833		2.4523	-0.1243		2.4704
(CSR)	(-3.02)		(18.19)	(-3.36)		(17.28)	(-3.09)		(18.19)
CSR-high	0.1266			0.2122			0.1192		
	(2.16)			(9.93)			(2.00)		
γ_0	0.4735			0.4501			0.4658		
	(3.19)			(7.36)			(3.49)		
γ_1	-0.0383			-0.0485			-0.0383		
	(-22.26)			(-9.59)			(-22.32)		
Size	-0.1124	0.1125		-0.0451	0.1120		-0.0109	0.1123	
	(-12.48)	(17.98)		(-15.54)	(17.28)		(-7.43)	(18.89)	
g	0.2652	0.1872	-0.7511	0.7822	0.1716	-0.4857	0.0910	0.1896	-0.7543
	(2.28)	(6.41)	(-1.29)	(4.49)	(5.88)	(-1.20)	(4.78)	(6.49)	(-1.38)
$IntCov$		-0.0032			-0.0032			-0.0032	
		(-2.46)			(-2.51)			(-2.50)	
δ	0.2999	-0.0397	0.9036	0.1991	0.0274	1.0300	-0.1102	0.0550	0.7744
	(9.56)	(-2.32)	(12.38)	(9.43)	(1.61)	(15.97)	(-21.50)	(3.26)	(11.63)
CR	-0.6861	-0.0764	-0.2304	-0.1807	-0.0647	-0.6099	-0.4624	-0.0590	-0.4117
	(-2.11)	(-0.85)	(-0.30)	(-3.72)	(-0.72)	(-1.43)	(-8.70)	(-0.66)	(-0.95)
P/S	0.0036	0.1091	-0.0107	0.1716	0.0649	-0.0052	0.0011	0.1084	-0.0110
	(3.27)	(3.54)	(-7.39)	(10.54)	(2.09)	(-3.58)	(6.24)	(3.51)	(-7.56)
FA/TA	-0.1084		-0.1101	-0.2298		-0.1450	-0.0468		-0.1214
	(-4.10)		(-3.25)	(-6.19)		(-4.35)	(-10.84)		(-3.56)
IA/TA		-0.0288			-0.0270			-0.0280	
		(-1.98)			(-1.85)			(-1.92)	

Table 3 presents the estimation results for the full sample for the empirical model in Equations (1), (2), (3) and (4). The estimation method is SUR, with fixed effects. The first three columns present the estimation results using *ROE* as a measure of financial performance, while the following panels use P/B and ROA. t-stats are reported in brackets. Each panel is dissected into three sections. The first reports estimates for the intercept, i.e., α_0, β_0, μ_0, the second the estimates for the endogenous variables, i.e. *CSR*, *CFP* and *SIZE*, while the last reports the estimates for the set of control variables, i.e. *CV*.

Table 4. Estimation Results: Regional Dissection

	BAP			EU			US		
	ROE	CSR	Size	ROE	CSR	Size	ROE	CSR	Size
Interc	0.0323	0.0924	6.2115	0.1639	0.4643	4.7871	0.1692	0.4263	5.5796
	(4.27)	(1.93)	(20.14)	(8.88)	(27.01)	(14.74)	(16.72)	(15.40)	(14.58)
ROE		0.0102	-0.2263		0.0181	-0.1925		0.0219	-0.2164
		(0.52)	(-12.81)		(3.12)	(-14.04)		(7.05)	(-19.53)
CSR-low	-0.0120		0.9374	-0.1280		2.5580	-0.2071		3.9774
(CSR)	(-1.38)		(7.47)	(-2.62)		(16.24)	(-3.49)		(29.49)
CSR-high	0.0205			0.1145			0.3241		
	(1.39)			(2.55)			(3.22)		
γ_0	0.4812			0.4681			0.4615		
	(4.17)			(3.02)			(2.92)		
γ_1	-0.0102			-0.0365			-0.0437		
	(-1.71)			(-9.83)			(-31.17)		
Size	-0.0326	0.0538		-0.1088	0.1375		-0.2366	0.1109	
	(-2.81)	(7.52)		(-9.70)	(15.74)		(-7.52)	(19.31)	
g	0.2141	0.2268	-0.8717	0.3763	0.1686	-0.5972	0.5788	-0.0384	0.2809
	(2.08)	(3.74)	(-1.65)	(2.58)	(5.05)	(-1.07)	(2.59)	(-0.83)	(0.89)
$IntCov$		-0.0142			-0.0046			-0.0015	
		(-4.29)			(-0.18)			(-1.88)	
δ	0.0672	-0.0537	1.2346	0.3498	-0.0864	1.2298	0.2147	-0.0164	0.8276
	(2.27)	(-1.04)	(13.15)	(12.01)	(-4.82)	(12.84)	(10.70)	(-0.64)	(11.59)
CR	-1.3540	0.4055	-0.9882	-0.6749	-0.6071	0.4789	-0.2595	-0.8451	0.8995
	(-5.62)	(2.68)	(-1.54)	(-2.16)	(-5.80)	(0.52)	(-1.99)	(-4.51)	(1.16)
P/S	0.0067	0.0732	-0.0060	0.0027	0.0705	-0.0071	0.0027	0.1497	-0.0215
	(6.42)	(1.09)	(-2.12)	(2.11)	(2.14)	(-4.31)	(2.58)	(4.20)	(-8.28)
FA/TA	-0.0906		0.1207	-0.0803		-0.1262	-0.2147		-0.2107
	(-3.39)		(1.71)	(-2.43)		(-3.18)	(-4.70)		(-4.21)
IA/TA		0.0265			-0.0264			-0.0346	
		(0.56)			(-1.81)			(-2.53)	

Table 4 presents the estimation results for the three sub-samples for the empirical model in Equations (1), (2), (3) and (4). The estimation method is SUR, with fixed effects. The first three columns present the estimation results for BAP, while the following panels report the estimation results for the EU and the US. t-stats are reported in brackets. Each panel is dissected into three sections. The first reports estimates for the intercept, i.e., α_0, β_0, μ_0, the second the estimates for the endogenous variables, i.e. *CSR*, *CFP* and *SIZE*, while the last reports the estimates for the set of control variables, i.e. *CV*.

Figure 1. Average MCAP across size and different levels of CSR

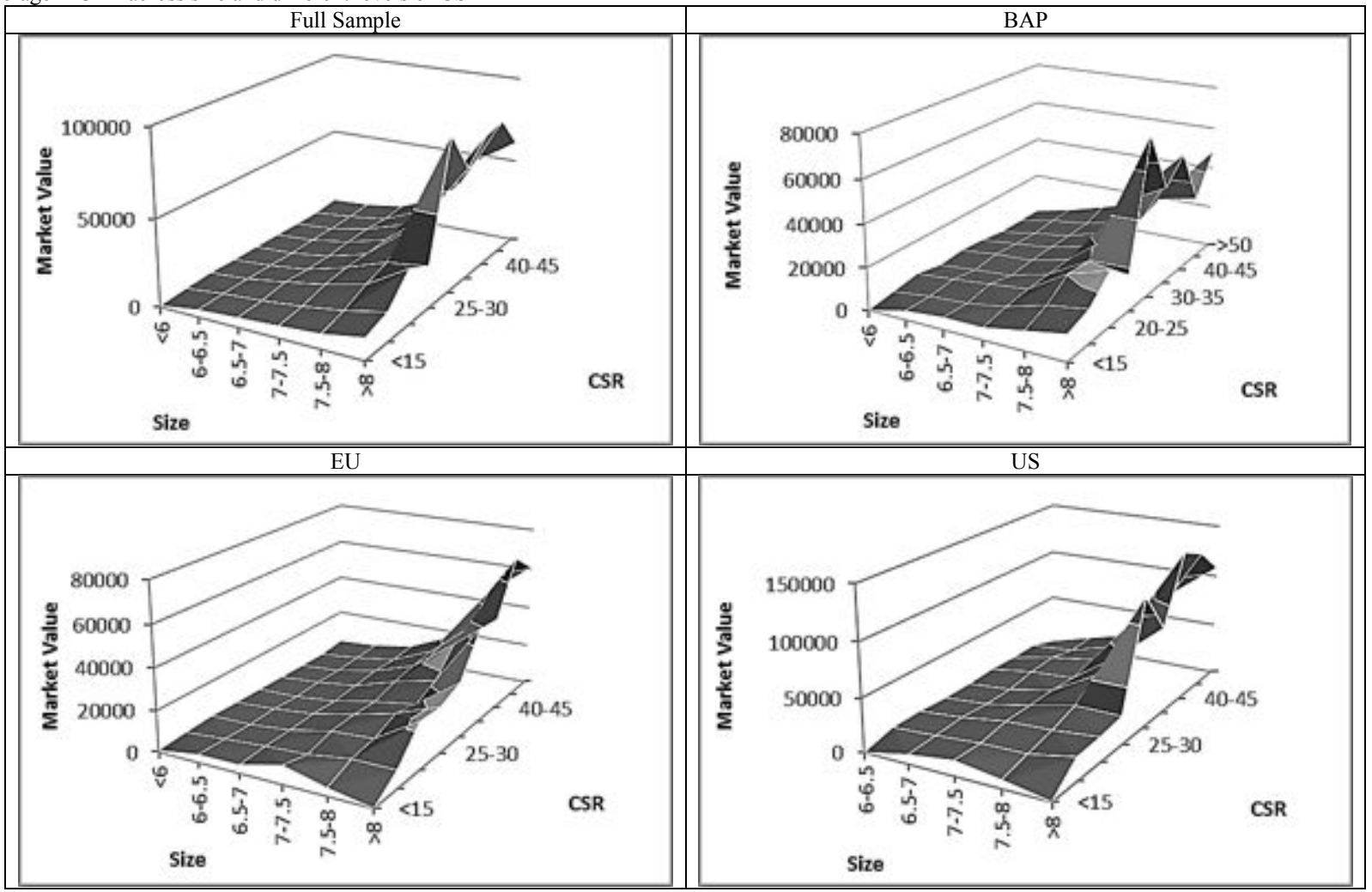


Figure 1 presents the average market capitalization (MCAP) across different levels of size and CSR performance for the full sample, as well as for the three sub-samples employed, namely BAP, EU and US.

Figure 2. Average ROE across size and different levels of CSR

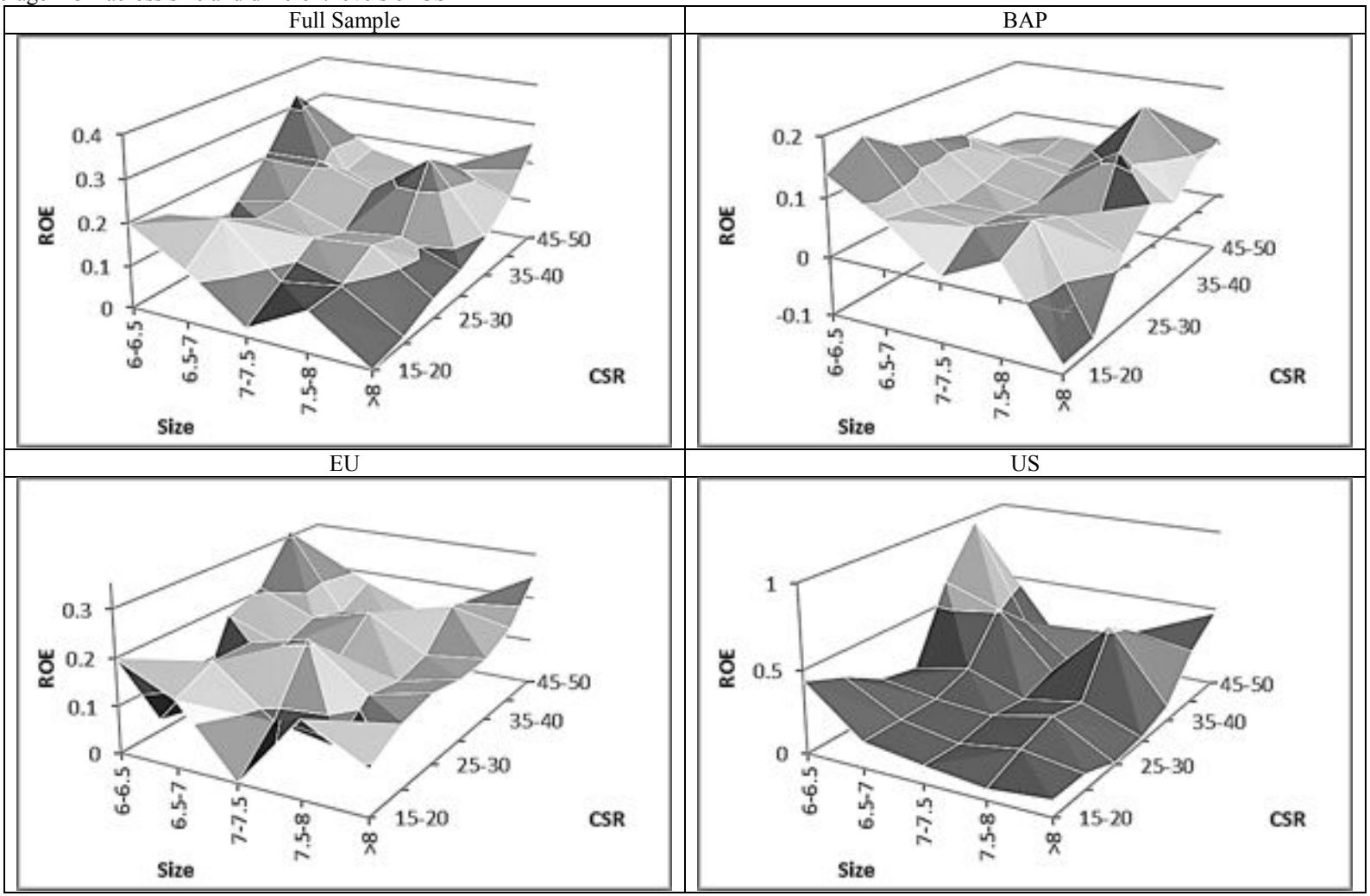


Figure 2 presents the average *ROE* across different levels of size and CSR performance for the full sample, as well as for the three sub-samples employed, namely BAP, EU and US.

Figure 3. Average P/B ratio across size and different levels of CSR

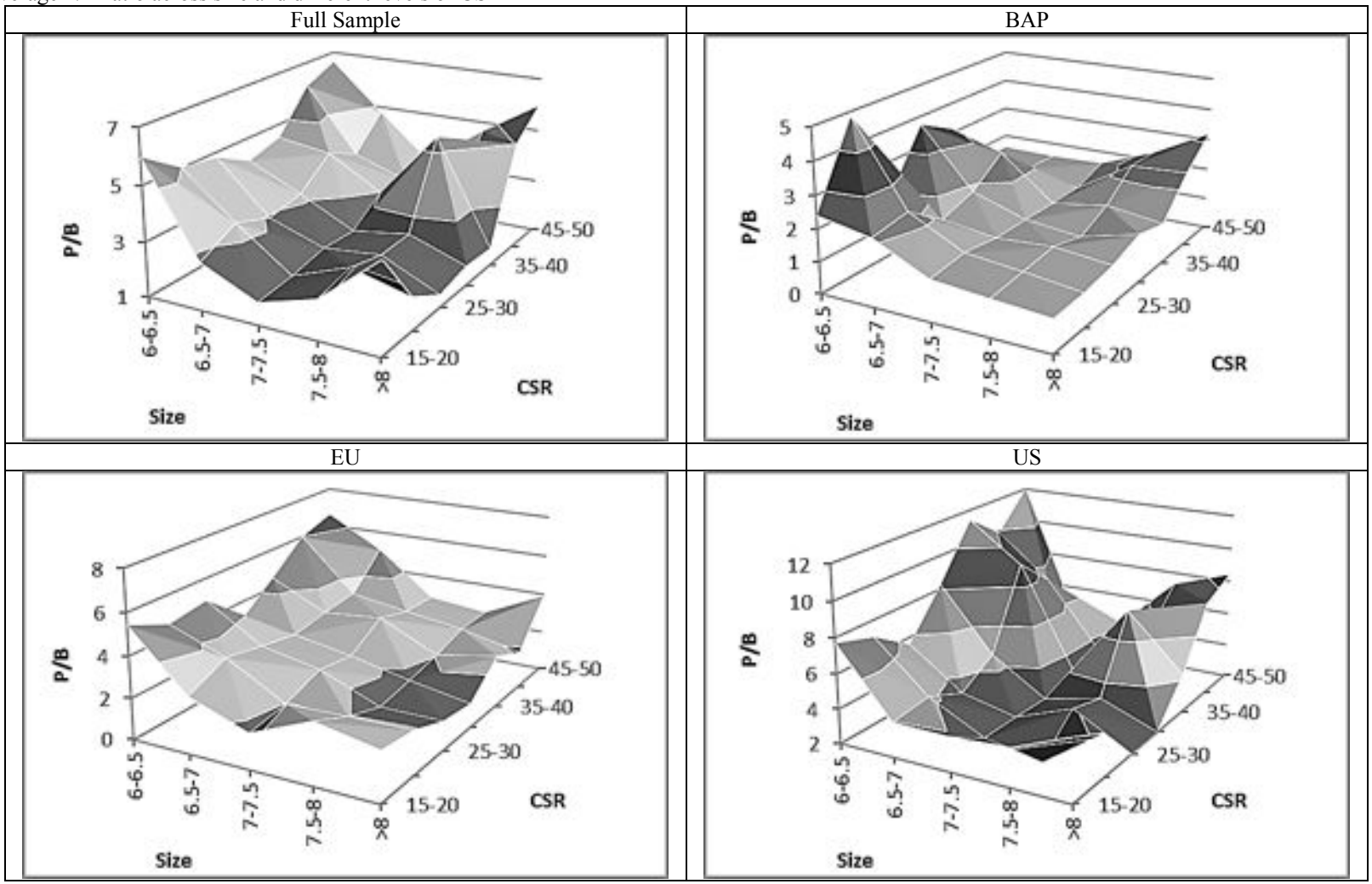


Figure 3 presents the average *P/B* ratio across different levels of size and CSR performance for the full sample, as well as for the three sub-samples employed, namely BAP, EU and US.

Figure 4. Average P/E ratio across size and different levels of CSR

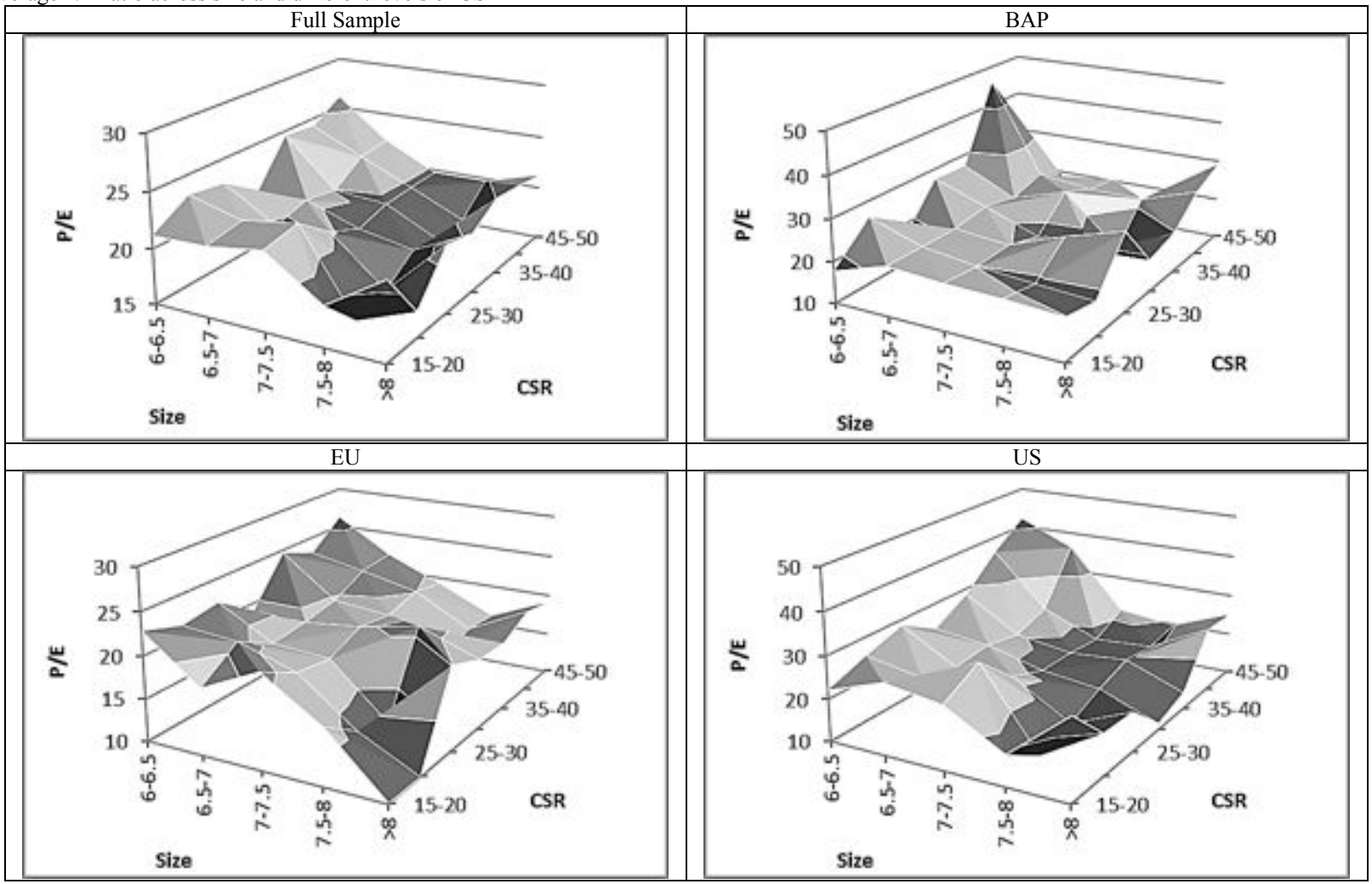


Figure 4 presents the average *P/E* ratio across different levels of size and CSR performance for the full sample, as well as for the three sub-samples employed, namely BAP, EU and US.

Figure 5 Average Size across Return on Equity and CSR performance

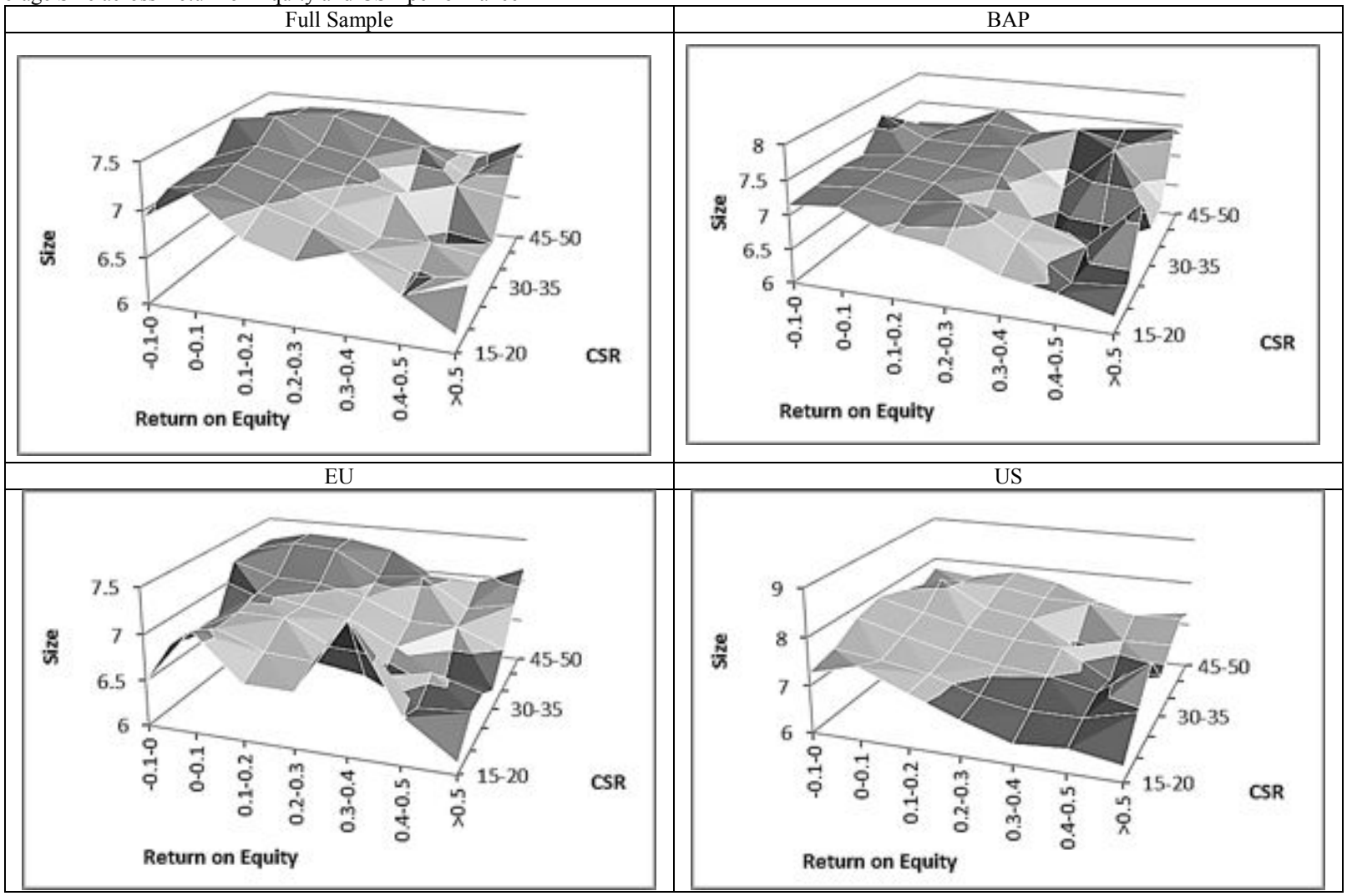


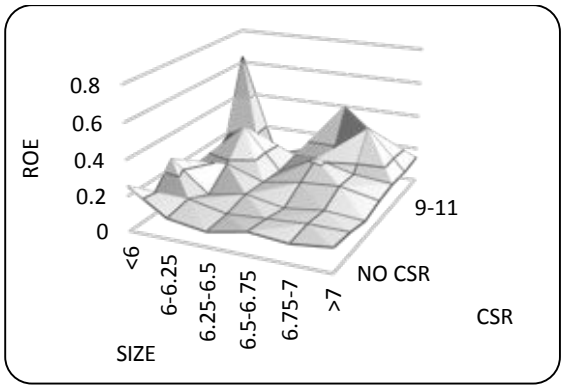
Figure 5 presents the average firm size across different levels of *ROE* and CSR performance for the full sample, as well as for the three sub-samples employed, namely BAP, EU and US.

Figure 6. KLD-S&P1500 Sample

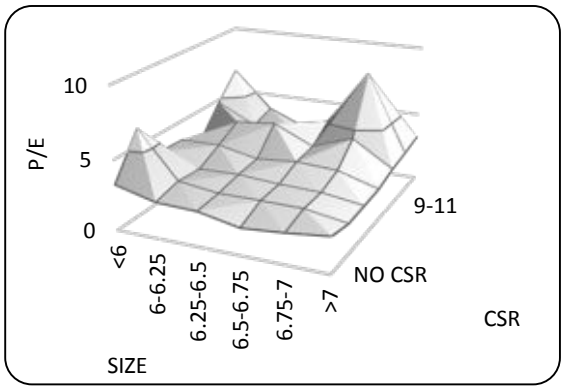
	ROE	CSR	Size
Interc	0.3697	0.4977	5.3432
	(11.81)	(13.07)	(15.57)
ROE		0.0124	-0.1617
		(4.11)	(-13.86)
CSR-low	-0.1615		3.7978
(CSR)	(5.01)		(17.94)
CSR-high	0.2180		
	(2.82)		
γ_0	0.3044		
	(2.42)		
γ_1	-0.0473		
	(-28.26)		
Size	-0.1367	0.0954	
	(-3.86)	(15.06)	
g	1.3717	-0.0126	0.1571
	(6.79)	(-0.63)	(4.34)
$IntCov$		-0.0018	
		(-1.11)	
δ	0.1714	-0.0647	0.7142
	(2.73)	(-0.74)	(15.75)
CR	-0.0127	-0.0516	0.5241
	(-0.02)	(-0.31)	(0.34)
P/S	0.0088	0.0859	-0.0107
	(-0.65)	(2.37)	(-3.64)
FA/TA	-0.0267		0.0002
	(-1.19)		(0.05)
IA/TA		-0.0297	
		(-3.52)	

Figure 6 presents the estimation results for the model in equations 1-4 for an S&P1500 data sample collected for the period 1997-2010, enhanced by using the KLD rating with regards to CSR performance. All financial variables have been collected and treated, exactly the same way as in the estimation results presented in Tables 3 and 4. Estimation is conducted using the SUR method with fixed effects for country and year, but not for industry. The KLD score has been computed as $\frac{1}{100}\sum_{m=1}^{n} C_{mit}$, where m is the one of the n categories that a company i is rated according to, from KLD, at time t. Firms with NO CSR rating are considered to have a zero score, in order to be included in the estimation. The graphs on the right distinguish the firms that get a zero score from the ones that are not rated.

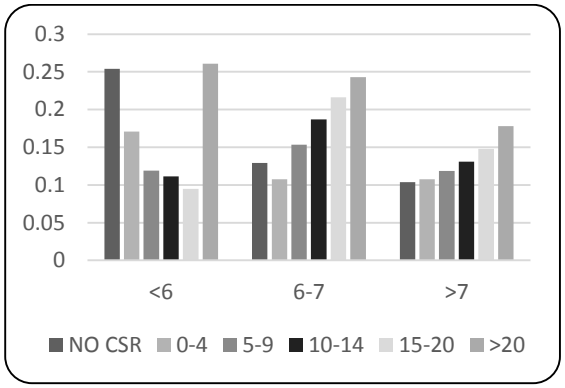
Return on Equity



Price to Book Value Ratio



CSR - ROE



CSR –P/B

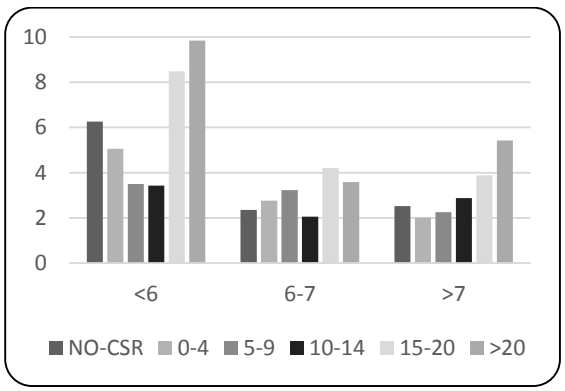
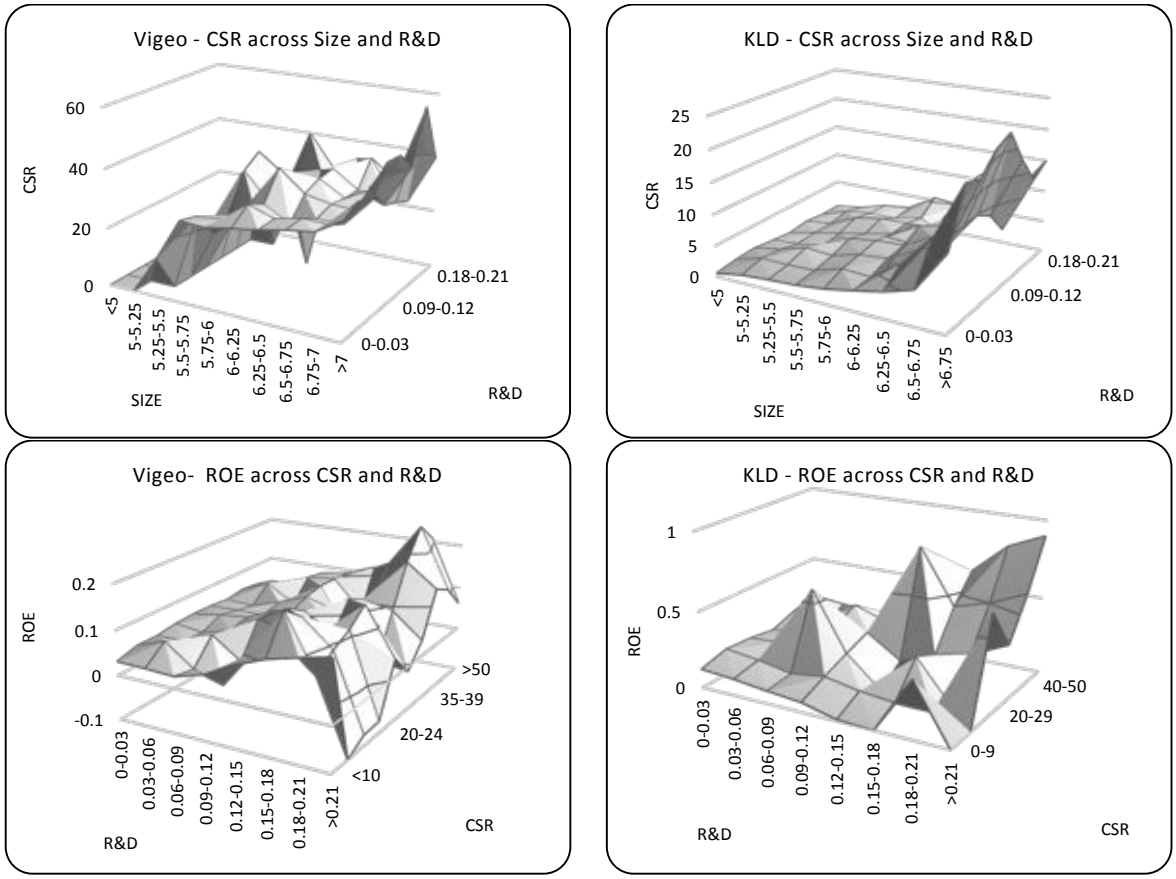


Figure 7. CSR and R&D



	ROE	CSR	Size	ROE	CSR	Size
Interc	0.1672	0.3977	5.7094	0.4858	0.5266	5.2674
	(10.76)	(14.16)	(15.91)	(9.08)	(13.45)	(15.29)
ROE		0.0180	-0.2013		0.0113	-0.1483
		(5.38)	(-12.93)		(3.44)	(-12.35)
CSR-low	-0.1570		2.3834	-0.1209		3.7872
(CSR)	(-2.90)		(16.50)	(-4.14)		(16.20)
CSR-high	0.1059			0.1933		
	(2.46)			(2.19)		
γ_0	0.4471			0.1003		
	(2.97)			(2.73)		
γ_1	-0.0295			-0.0169		
	(-15.09)			(-3.67)		
γ_2	0.3757			0.1997		
	(3.51)			(4.30)		
Size	-0.1050	0.1098		-0.1207	0.0983	
	(-10.93)	(16.66)		(-3.84)	(15.52)	
R&D	0.1577	0.0681		0.1939	0.0263	
	(4.94)	(2.68)		(5.07)	(2.05)	

Figure 7 is dissected into two panels. The first panel presents the average CSR performance across different levels of R&D expenditure and size, as well as the average ROE of firms across different levels of R&D expenditure and CSR performance. The second panel presents the estimation results of an extended version of our empirical model, where the ratio of R&D over total assets is introduced as an explanatory variable in Eq. (1) and Eq. (2). It is also allowed to affect how CSR interacts with CFP by revising the threshold value in Eq. (4), which can be written as $s_{it} = \gamma_0 + \gamma_1 SIZE_{it} + \gamma_2 R\&D_{it}$, where $R\&D_{it} = R\&D\ Expenditure/Total\ Assets$. All estimations include a set of control variables, as they are described in the methodology section, as well as industry, country and time fixed effects. Both panels refer to the full Vigeo and KLD samples.