Corporate social responsibility and corporate performance: empirical evidence from a panel of the Bucharest Stock Exchange listed companies

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Abstract: This paper aims at empirically investigating the relationship between CSR and corporate performance by using both accounting-based performance measures (e.g. ROA, ROE, and ROS), as well as market-based firm performance measures (e.g. PER, EPS, and PBV), for a sample of companies listed on the BSE during the period 2008-2011. In addition, there were considered several control variables that cover firm's characteristics including size, indebtedness, as well as the company's tenure. By employing panel data regression models without cross-section effects, we found a negative relationship between CSR and ROS, as well as a positive association between CSR and EPS. Furthermore, by estimating fixed-effects panel data regression models, the positive relationship between CSR and EPS was reinforced. In addition, we have performed several robustness checks such as the presence of autocorrelation in the residuals, as well as the variance inflation factors towards multicollinearity. The novelty of the current paper consists in the consideration of a multifarious set of performance ratios. This research is important for both managers and investors, since CSR undertakings improve corporate performance.

Introduction

Social issues have been the center of debates for centuries, but only recently researchers, academicians, and practitioners started to consider these social issues important aspects for a company strategy associated with the responsible management system (Wood, 1991). Philanthropy and social impact are considered the heart and soul of a corporation (Levy, 1999). Through social

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impact, companies must be in line with both their business objectives but also with earning profit (heart), as well as expressing the business ethics of serving society (soul).

In recent years, organizations and societies increased their attention towards companies' social practices (Margolis and Walsh, 2001) and identified these practices as corporate social responsibility (hereinafter 'CSR') practices (Carroll, 1979). Companies which clearly understood the importance of CSR, and their impact on society, as well as the benefits on the long term, integrated CSR practices into their core business strategies on a voluntary basis. The benefits arising from implementing CSR into the company's strategies are the following: a source of leverage for the company, a dynamic and important resource for competitive advantage (Porter and Kramer, 2006), a proactive strategy for business, and an important financial and effective marketing instrument to generate and to maintain a competitive advantage (Maignan and Ferrell, 2001; Drumwright, 1994). Thus, corporations became fully aware of their interrelationship with the society in which they operate. In other words, corporations' survival and competitiveness depends on their acceptance to understand that 'doing well' is not enough anymore and that 'doing better' is expected more frequently from the business decision makers as companies managers and shareholders who take part at a company social capital (Stroup and Newbert, 1987).

Companies' managers and shareholders have been often criticized for their goals/ambitions in maximizing companies' profits regardless of the effects of the corporate strategy on a wide range of stakeholders (e.g. suppliers, environment, customers, employees, etc.) in order to meet the companies' objectives. However, some companies' managers have underlined that CSR is a necessary investment which responds to the companies' objectives and also adds societal value, while others considered CSR an inconsistent effort which can affect the companies' shareholders' wealth (Friedman, 1970). As Jenkins (2005) argued, companies only focus should no longer be on maximizing profits or increasing market share, but to become conscious and to make a prime objective in allocating the company's resources efficiently in such a way that the company value is maximized (e.g. brand value, image value, market value, etc.) which is actually a CSR strategy.

In the last two decades there has been noticed an adjustment and increased attention regarding the link between the companies' affects and decisions, state, and society (Edenkamp, 2002). These turns of events have constrained many companies to engage in an extensive range of CSR practices. Thus, the CSR movement is spreading fast all over the world and many companies nowadays have adopted CSR. For these reasons, researchers developed, in recent years, a large amount of methods and frameworks in order to examine the magnitude and the value of CSR in relation with the companies' performance. Researchers, scholars and academicians still continue to debate the legitimacy of CSR, its benefits, and the relation with the company's financial performance (hereinafter 'CFP') (Tsoutsoura, 2004; McWilliams and Siegel,

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2000). This is actually the point of tension in the CSR literature because of the lack of an accepted framework and methodology of studying CSR. This divergence has prompted many researchers to examine whether there is or not a relation between CSR and CFP. Whether an active involvement in CSR practices leads to an increased CFP, a shadow of doubt persists to exist (Dusuki and Dar, 2005). Moreover, the CSR framework and methods have been developed and debated mostly from the point of view of developed countries and just a few researches have been done on developing countries. Therefore, we identify in the existing literature significant limitations regarding the theoretical and empirical studies on CSR in developing countries. Moreover, empirical studies on developing countries are miss-specified because there are omitted variables proven to be important in determining companies' profitability (Matten and Moon, 2005). The questions we raise in our study are the following: What is the impact of CSR practices on CFP?

The present study attempts to fill in this gap by analyzing the companies listed on the Bucharest Stock Exchange (hereinafter 'BSE') in Romania between 2008 and 2011. We have selected this period since the years 2008 and 2009 illustrate the crisis years, whereas the rest of the years are showing the post-crisis period. The last financial crisis (*2007*-2008) pointed out that the lack of ethics and low morality in business has critical consequences not only financial ones, but also social and environmental ones. As such, the public trust in corporations, alongside the capacity of regulatory agencies to control corporate surfeit was lessened. Besides, several corporations have been constrained to redefine their entrepreneurial strategy and implement austerity plans in order to be able to survive in uncertain environments. Popa and Salanţă (2014) say that it is fundamental for managers to explain to everybody that assuming a moral behavior and CSR activities is expected and rewarded. As such, those companies which undertake CSR actions only looking for legitimacy and direct benefits should be dramatically affected by the crisis. Likewise, according to the Slack Resources Hypothesis (Waddock and Graves, 1997), as well as the Managerial Opportunism Hypothesis (Williamson, 1965), the companies will be more or less socially responsible depending on their availability of financial resources. Contrariwise, if the companies were really integrating CSR into their business strategy, then they could have taken advantage of the crisis as an opportunity instead of considering it a threat. Based on the Agency Theory (Ross, 1973), during a crisis period, the shareholders are more interested in strategic decisions and constrain managers to keep being engaged with CSR. Jiraporn and Chintrakarn (2013) found that when the CEO is relatively less powerful, an increase in CEO power drives to more CSR engagement, whereas when CEO power goes under a certain threshold, more powerful CEOs significantly reduce CSR investments.

Therefore, we determine the impact of CSR on CFP, if whether there is a positive or negative relation between CSR and CFP by using empirical estimation for a sample of 68 companies (except the year 2008 when there were selected 67 companies) with the data collected from the BSE. The results

are organized as follow. First, we review the literature regarding the relationship between CSR, CSR benefits, and the link between CSR and CFP. The next section describes the methodology and the variable used in the regression model. Then the results are discussed and finally we summarize our findings along with identifying further research.

Literature review

The interest on the CSR concept increased in the last two decades, as well as the literature on CSR and its practices. This fact is supported by Fortune 1000 where almost half of the companies publish sustainability reports such as: CSR reports, ethics reports, Corporate Governance reports, and so on. The companies' managers have understood the magnitude of the CSR practices and realized its impact on the CFP, thus they started to implement CSR guidelines into companies' businesses strategies (Porter and Kramer, 2002). Management, researchers and academicians are trying to determine who is gaining from whom, as well as who is persistent regarding the costs of the CSR practices and to what extent companies can deal with large societal issues (Tsoutsoura, 2004).

Critics from the media, industry, and academia are skeptical by pointing to the fact that CSR is an elusive concept that still lacks a generally accepted definition (Murphy and Schlegelmilch, 2013). The role and scope of CSR continues to gain momentum even nowadays. The literature on CSR is split into two areas: development studies (definitions, theories, standards, and frameworks), and relationship studies - the relationships between CSR and CFP, as well as CSR and share market performance. Even so, the relationship between CSR and CFP is still lacks a clear and full understanding.

CSR definitions vary among different studies, despite the fact that there is not yet a common ground among regarding the extent of the CSR concept (Carroll, 1979). Hill (2006, p. 5) defined CSR as 'a set of practices that outline good management or business practices, transparency and company's disclosure'. Different authors consider CSR a concept that encourages companies to engage in positive activities or social responsibilities on a voluntary basis. Even though social activities are not directly related with the company business, they have an indirect positive impact on the businesses which consider undertaking them (Hopkins, 2003).

Researchers' opinions regarding the reasons why companies adopt and implement CSR practices are different. The link between CSR and CFP represents the point of tension, disagreements, and debates in the literature on CSR. According to Friedman (1970) and its followers, the companies' only responsibility is to maximize shareholders' wealth. Companies engaging in CSR practices incur extra-costs and these costs might exceed the company benefit, therefore affecting the companies' wealth by reducing their profits and the shareholder wealth (Waddock and Graves, 1997). In contradiction with Friedman's (1970) point of view, Freeman (1984) argued that stakeholders (e.g. customers, investors, employees, suppliers, shareholders, communities, etc.)

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are vital for the company's performance, as well as for its competitive advantage and by responding or meeting their social expectations companies will not only be considered as having a socially responsible behavior, but it will also follow a path that will continue to be profitable in the long run (Clarkson, 1995). The companies' success, growth, and survival rely on their long-term strategies, benefits, and relation with society and communities where they operate. Companies which are socially responsible can create an efficient and a sustainable contribution to the society and, at the same time, perform their economic activities (Porter and Kramer, 2002). In Drucker's (2001, p. 28) point of view, companies should try to 'turn a social problem into economic opportunity and economic benefit, into productive capacity, into human competence, into well-paid jobs, and into wealth'. Beyond 'doing good', corporations have the responsibility of 'avoiding bad' by preventing corporate social irresponsibility which comprises cheating customers, violating human rights, or damaging the environment (Lin-Hi and Müller, 2013).

CSR drivers
Companies choose to be socially responsible not only because of the CSR benefits, but also because of the social, political, and consumer pressures which demand responsible products and services delivered by the companies; pressures come also from NGOs, investors, industry codes of conduct, rankings of social performance, etc. External pressures and CSR benefits push corporations to become socially responsible. Chaudhary (2009) underlined that companies adopting CSR are motivated by the following financial drivers which are the pillar of a company's sustainable business development: increased reputation, brand, and customers' loyalty, lower risks, increased competitive advantage, reinforced market position, and reduced operation costs (Brine et al., 2007).

Building reputation
The CSR strategy becomes important once the companies' decisions are made under the CSR umbrella under which reputation is built. Vasconcelos (2011) stated that a spiritual organization must assume several prominent features as follows: the needs and demands of society through ongoing CSR actions should be fulfilled, its employees should be valued through a consistent internal marketing policy, and it should show a tendency towards achieving suitable outcomes in its business operation and be admired. Respect is not about the size or a company power on a market, it is about the transparency offered by the company, about the trust stakeholders have in the company policies, ethical behavior, and the social contribution of the company in the society where it operates. Reputation has become one of the company's leverage and its most valuable asset. The companies' stakeholders - customers, suppliers, community - have a strong impact on the companies' profitability and achievements. Therefore, companies need to shape their attitudes and perceptions regarding their stakeholders and through CSR practices trust can be build. A CSR initiative positively contributes to reputational advantages of a company and enriches its

brand value (McWilliams and Siegel, 2000). Park et al. (2014) found that the firm's accomplishment of economic and legal CSR initiatives showed a direct positive influence on corporate reputation, whilst neither ethical nor philanthropic CSR initiatives did.

Brand loyalty
According to Dsilva (2008), the companies' commitment to a well-intentioned cause is an effective way to build brand loyalty between today's increasingly difficult to satisfy consumers. Brand is another important asset of a company that can be at risk (such as a consumer boycott) if the company behavior is irresponsible. Through CSR, the chances of a consumer boycott are reduced. Moreover, CSR results in increased sales, consumer loyalty, improved company image, and a positive media coverage, but also lower risks (Simionescu and Dumitrescu, 2014) and a competitive advantage (Porter and Kramer, 2002).

Risk
Through CSR, risk management is better controlled and companies can reduce losses which can be avoided and use leadership positions to gain a competitive advantage. Thus, it is not only a method of risk mitigation, but also an opportunity for creating company value (Bassen et al., 2006). Sun and Cui (2014) found that CSR has a strong effect on default risk reduction, this relationship being stronger for corporations in highly dynamic environments than those in low dynamic environments. Kim et al. (2014) stated that if managers engage in CSR to hide bad news and divert shareholder scrutiny, CSR would be associated with higher crash risk.

Enhanced competitive advantage and market positioning
Gaining consumers loyalty and stealing them from the competitors can improve the companies' profitability and a healthy/good relation relationship with the suppliers and investors too can be a strong foundation for a competitive advantage (Dyer and Singh, 1998). Another important aspect is represented by the good relationship of the organization with the community where it operates (Waldfogel, 2003). Kemper et al. (2013) found that CSR becomes a significant moderator of the link between marketing capabilities and performance only in highly competitive industries.

Reduced operating costs
CSR is a real tool in cutting down present and future costs of a business, thereby increasing operational efficiency (Brine et al., 2007). For example, managing environmental concerns proactively can lower the costs of complying with existing and future environmental regulations, even though it can increase the operating costs in the short run (Moon, 2007). Research made by KPMG (2005), underlined that 'a successfully implemented CSR strategy calls for aligning these initiatives with business objectives and corporate values thereby integrating corporate responsibility across business functions and enhancing business reputation'.

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Empirical results between CSR to CFP

The above mentioned drivers were examined by different researchers using several econometric methods in order to determine the relationship between CSR and CFP. The corporations employ CSR, as well as environmental management activities since they are expecting to foster innovation and to improve corporate social performance (Păunescu, 2014). A positive relation between CSR and CFP prove that companies' explicit costs are not hidden costs for stakeholders. In other words, if the stakeholders' satisfaction as well as their social expectations (e.g. environment, customers, employees etc.) are taken into consideration, the cost employed by the company for CSR practices would be inferior by far to the CSR benefits (Porter and Kramer, 2002). Thus, if companies treat CSR seriously, they increase the costs with competitiveness and decrease the costs which are hidden for stakeholders.

Researchers, scholars, and academicians that have empirically analyzed the relation between CSR and CFP found different results: a positive and statistically significant relation (Stanwick and Stanwick, 1998); no relationship or mixed results (McWilliams and Siegel, 2000); a negative relationship (Waddock and Graves, 1997). The reasons why the findings of different papers are not unanimous is that they do not disclose mistakes or inaccuracies of the data or methodology, but also from the period observed, selected samples, the different measures of CFP or corporate performance, and the methodology approach regarding empirical models and incorrect definitions of the key terms (Ullmann, 1985), failure to control for the company economic activity, the use of one measures of CFP or just a few (Tsoutsoura, 2004).

Based on the literature we revised, most of the studies on CSR are made in developing countries and the variables used in many studies do not reflect both accounting and market measure. In our study we use both accounting-based performance measures (e.g. ROA, ROE, and ROS), as well as market-based firm performance measures (e.g. PER, EPS, and PBV) for the companies listed on the BSE in Romania in order to determine the relation between CSR and CFP. Thus, for a clearer picture we hypothesis the following:

H_0: *CSR has a positive impact on FP.*
H_1: *CSR has a negative impact on FP.*

Research methods and data
Sample and measurement
Initially, our dataset included all the companies listed on the BSE during the period 2008-2011. Subsequently, we removed from our sample the companies from the financial intermediation economic sector (comprising the credit institutions, the financial investment companies, SIFs, as well as the financial investment services companies, SSIFs) since the financial institutions show several specific reporting requirements. Andrikopoulos et al. (2014) found that larger and more leveraged financial institutions are more likely to extensively disclose information on their CSR practice. Thus, our final unbalanced sample

comprises 68 companies, except the year 2008 since there remained 67 companies. Therefore, the industry membership of the selected companies is multifarious as following: wholesale/retail (4), construction (8), pharma-ceutical (4, except the year 2008 when 3 companies were listed), manufac-turing (19), plastics (3), machinery and equipment (8), metallurgy (4), food (3), chemicals (4), basic resources (4), transportation and storage (2), tourism (3), utilities (2).

The variables employed within current empirical investigation are revealed in Table 1 alongside their definition and computation formula.

Table 1. *Description of the variables*

Var	Definition and computation formula
Accounting-based performance measures	
ROA	The return on assets ratio, computed by dividing net income by total assets.
ROE	The return on equity ratio, computed by dividing net income by shareholder's equity.
ROS	The return on sales ratio, computed by dividing net income before interest and tax by sales.
Market-based firm performance measures	
PER	The price/earnings ratio, computed by dividing the market value price per share by the earnings per share.
EPS	The earnings per share ratio, computed by dividing the net income by the total number of capital stock shares.
PBV	The price/book value ratio, computed by dividing the market value of equity to the book value of equity.
CSR measurements	
CSR	Dummy variable which takes the following values; 0, if the company is not considered to be socially responsible; 1, if the company is considered to be socially responsible.
Control variables	
Sales	The total amount of sales.
Empl	The total number of employees.
Lev	The leverage ratio, computed by dividing the company's total debt by its total assets.
Years	The total number of years since listing on the BSE.

Source: *Authors' findings.*

In order to assess the firm's performance we have considered both accounting-based performance measures (e.g. ROA, ROE, and ROS), as well as market-based performance measures (e.g. PER, EPS, and PBV), due to the ongoing debate in the literature. ROA shows how efficient the management is as regards the usage of its assets in order to generate earnings. ROE underlines the firm's efficiency as regards the usage of shareholders' funds to generate profits. ROS emphasizes the effectiveness of a company's operating activity in relation to its sales. Furthermore, PER relates investors how much they are paying for each dollar of a company's earning, as well as how 'cheap' or 'expensive' a stock is comparative to another benchmark such as an index or industry comparison. EPS determines how many dollars of net income have been earned by each share of common stock. Not at least, PBV is employed to compare a company's book value to its current market price, showing how much shareholders are paying for a company's net assets.

Therefore, accounting-based measures capture historical performance and are subject to bias from management manipulation and differences in

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accounting procedures (Branch and Gale, 1983). On the contrary, market-based measures capture future performance, being forward looking by nature (Hillman and Keim, 2001). According to McGuire et al. (1988), market ratios have several advantages relative to accounting-based measures: are less susceptible to differential accounting procedures and managerial manipulation and represent investors' evaluations of a firm's ability to generate future economic earnings rather than past performance. Orlitzky et al. (2003) found that CSR appeared to be more highly correlated with accounting-based measures of firm performance than with market-based ratios. However, Venanzi (2012) stated that market value-based measures of performance can be affected by the following limitations: they reflect factors beyond managers' control; they tend to aggregate relevant information in an inefficient manner for compensation purposes; they cannot be disaggregated beyond the firm level; they can be influenced by investors' expectations which can be inconsistent with managers' rationale, because of the asymmetric information between investors and managers; they can increase the risk exposure of managers, distorting their risk perception when compared to the owners' risk perception. The data source employed in order to compute the aforementioned ratios is depicted by the financial statements which were disclosed by the selected companies, as well as the BSE webpage with the purpose to gather the stock quotes.

CSR was proxied through a dummy variable depending on the approach of each company towards socially responsible undertakings. The data source for the CSR proxy is given by the annual reports of the selected companies.

Moreover, in order to make sure that the results are not driven by firm heterogeneity, we added the control variables that cover the firm's characteristics including size, indebtedness, as well as the company's tenure. The current study uses the total amount of sales, alongside the total number of employees as an approximation of the company's size. For instance, smaller companies show a lower capacity of sustaining a more active behavior towards social action relative to larger ones that usually have more infrastructure, as well as higher cash flow levels. Likewise, as a firm grows it becomes more visible and more responsible towards different stakeholders' demands (Crisóstomo et al., 2011). We also included the leverage ratio as our measure of risk. Stakeholder wellbeing is related to the possibility of financial distress (Roberts, 1992). As such, a firm with a strong orientation towards its stakeholders may be viewed as being better managed, thus being less risky and vice versa. We employed the number of years since listing on the BSE as proxy of the company's tenure. According to Black et al. (2006) and Balasubramanian et al. (2010), older firms could differ from younger firm, since younger firms are likely to be faster-growing and perhaps more intangible asset-intensive. The data source for control variables is also represented by the financial statements of the selected companies.

Methodological approach

The relationship between CSR and firm performance will be empirically investigated by the instrumentality of panel data regression models, by considering the following general specification (Baltagi, 2005):

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \quad i = 1, ..., N; \ t = 1, ..., T(1)$$

where i denotes the selected companies listed on the BSE, whilst t denotes the time, respectively the period 2008-2011. The i subscript depicts the cross-section dimension and t denotes the time-series dimension. α is a scalar, β is K × 1 and X_{it} is the it[th] observation on K explanatory variables.

Moreover, most of the panel data applications employ a one-way error component model for the disturbances as below:

$$u_{it} = \mu_i + \nu_{it}(2)$$

where μ_i indicates the unobservable individual-specific effect and ν_{it} shows the remainder disturbance. Also, μ_i is time-invariant and it accounts for any individual-specific effect that is not included in the regression. The remainder disturbance ν_{it} varies with companies and time and can be thought of as the usual disturbance in the regression.

Furthermore, the general specification of the fixed-effects regression model is given below:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \nu_{it} \quad i = 1, ..., N; \ t = 1, ..., T \ (3)$$

In fact, the accounting-based performance measures, as well as the market-based firm performance measures will be employed as dependent variables in separate regression equations. Withal, CSR and control variables will be considered as explanatory variable.

According to Hsiao (2003) and Klevmarken (1989), there are several benefits from using panel data: controlling for individual heterogeneity; panel data give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency; panel data are better able to study the dynamics of adjustment; panel data are better able to identify and measure effects that are simply not detectable in pure cross-section or pure time-series data; panel data models allow us to construct and test more complicated behavioral models than purely cross-section or time-series data; biases resulting from aggregation over firms or individuals may be reduced or eliminated. However, limitations of panel data include: design and data collection problems, distortions of measurement errors, selectivity problems (including self-selectivity, nonresponse, and attrition), short time-series dimension, and cross-section dependence (Baltagi, 2005).

Empirical results

Descriptive statistics

Table 2 provides descriptive statistics aiming to describe the basic features of the data from current empirical investigation. Hence, univariate analysis implies the observation across cases of one variable at a time. In fact, we examined the central tendency including the mean and median, as well as the dispersion covering variance and standard deviation. In addition, we show the minimum and the maximum values of the employed variables.

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Table 2. *Descriptive statistics*

Var	Vali	Mean	Median	Min.	Max.	Variance	Std. Dev.
Accounting-based performance measures							
ROA	271	-0.0017	0.0139	-1.2347	0.2720	0.0179	0.1340
ROE	261	-0.1118	0.0226	-12.0058	0.4857	0.9587	0.9791
ROS	271	-0.0191	0.0230	-3.5546	3.1043	0.1605	0.4006
Market-based firm performance measures							
PER	271	39.1886	8.5454	-321.0736	2887.0390	41,089.443	202.7053
EPS	271	0.3672	0.0176	-9.7115	32.2385	12.4068	3.5223
PBV	271	0.6550	0.3964	-12.5988	22.8689	3.8993	1.9747
CSR measurements							
CSR	271	0.1513	0	0	1	0.1289	0.3590
Control variables							
Sales	271	5.81E+08	93,443,090	4,568,438	1.68E+10	4.3262E+1	2.08E+09
Empl	271	1,218.044	535	14	30,398	10,923,913	3,305.134
Lev	271	0.3873	0.3471	0.0069	1.6965	0.0809	0.2845
Years	271	10.7897	12	1	16	13.8482	3.7213

Note: The description of the variables is provided in Table 1.
Source: *Authors' computation.*

The mean depicts the most usual used way of expressing the central tendency, whereas the median is the score encountered at the exact middle of the set of values. However, by taking into consideration that the mean has the disadvantage of being affected by any single value which could be too high or too low relative to the rest of the sample, the median is rated as a better measure of a midpoint. Furthermore, dispersion unveils the spread of the values around the central tendency. The standard deviation is a more accurate and detailed estimate of dispersion forasmuch an outlier can strongly exaggerate the series.

Table 3 shows the frequencies of companies implementing CSR across the period 2008-2011. Unfortunately, even if the number of companies implementing CSR has doubled in 2011 compared to 2008, we notice the incipient stage of socially responsible undertakings within the listed companies on the BSE.

Table 3. *The table of frequencies of companies implementing CSR*

Year → Company type ↓	2008	2009	2010	2011
CSR companies	7	7	13	14
Non-CSR companies	60	61	55	54

Source: *Authors' computation.*

Table **4** reveals the correlation matrix which provides the correlations between all pairs of data sets. In fact, the correlations point out whether and how strongly pairs of variables are related. We notice a strong correlation (r = .8930) between the total amount of sales and the total number of employees.

Table 4. *The correlation matrix*

Var	ROA	ROE	ROS	PER	EPS	PBV	CSR	Sales	Empl	Lev	Years
ROA	1.0000 p= ---										
ROE	**.4222** **p=.000**	1.0000 p= ---									
ROS	**.6008** **p=0.00**	.1039 p=.094	1.0000 p= ---								
PER	-.0084 p=.892	.0263 p=.672	.0087 p=.888	1.0000 p= ---							
EPS	**.1800** **p=.004**	.0617 p=.321	**.1312** **p=.034**	-.0159 p=.798	1.0000 p= ---						
PBV	**-.1934** **p=.002**	**-.9014** **p=0.00**	-.0615 p=.322	-.0250 p=.687	-.0062 p=.921	1.0000 p= ---					
CSR	**.1337** **p=.031**	.0555 p=.372	.0183 p=.769	-.0615 p=.322	**.1542** **p=.013**	.0223 p=.720	1.0000 p= ---				
Sales	.0513 p=.409	.0168 p=.787	.0525 p=.398	-.0330 p=.595	.0458 p=.461	.0181 p=.771	**.4235** **p=.000**	1.0000 p= ---			
Empl	.1100 p=.076	.0364 p=.558	.0890 p=.152	-.0328 p=.598	**.1367** **p=.027**	.0051 p=.935	**.3346** **p=.000**	**.8930** **p=0.00**	1.0000 p= ---		
Lev	**-.3792** **p=.000**	**-.3533** **p=.000**	-.0743 p=.231	**-.1450** **p=.019**	**-.1427** **p=.021**	**.2203** **p=.000**	-.1111 p=.073	.0133 p=.831	-.0457 p=.462	1.0000 p= ---	
Years	-.0083 p=.893	-.0315 p=.613	-.0855 p=.168	.0520 p=.403	**-.2525** **p=.000**	.0144 p=.817	-.1120 p=.071	**-.1715** **p=.005**	-.1184 p=.056	.0549 p=.377	1.0000 p= ---

Notes: Marked correlations are significant at p < .05000. N=261 (Casewise deletion of missing data). The description of the variables is provided in Table 1.
Source: *Authors' computation*.

Forwards, a major consideration will be provided towards multicollinearity. The previously mentioned undesirable situation emerges when the explanatory variables in our regression equations are so highly correlated that it becomes hard to differentiate their individual effects on the dependent variables. For instance, the worst consequence of multicollinearity is the increase of the variances and standard errors of the ordinary least squares (hereinafter 'OLS') estimates. As such, high variances underlines that the estimates are imprecise and not very reliable. Also, high variances and standard errors entail low t-statistics. Therefore, multicollinearity increases the probability of accepting the null-hypothesis when it is false, thus concluding that CSR does not influence firm performance when in reality it does. Thereby, in order to check the severity of *multicollinearity* we will inspect the *variance inflation factor (hereinafter 'VIF')*.

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Regression results

Table 5 shows the regression results (without cross-section effects) regarding the influence of CSR on both accounting-based and market-based firm performance. We did not report the empirical results when PER was considered as market-based firm performance measure since the model was not statistically significant, based on F-stat.

Table 5. *Regression results (without cross-section effects)*

Dependent Var → Independent Var ↓	ROA (Eq. 1)	ROE (Eq. 2)	ROS (Eq. 3)	EPS (Eq. 4)	PBV (Eq. 5)
Const.	**0.075363** **(3.141898)**	**0.416036*** **(2.083631)**	**0.158210†** **(1.953002)**	**3.049008*** **(4.396664)**	0.360621 (0.880416)
CSR	-0.020909 (-0.959115)	0.024943 (0.138427)	**-0.141371†** **(-1.920128)**	**1.570716*** **(2.492084)**	0.220043 (0.591080)
Sales	6.77E-12 (0.968258)	3.76E-12 (0.055902)	2.25E-11 (0.953022)	**-7.19E-10*** **(-3.557286)**	**-4.02E-10*** **(-3.365253)**
Empl	-7.95E-07 (-0.192191)	2.72E-06 (0.070051)	-1.91E-07 (-0.013699)	**0.000444*** **(3.712137)**	**0.000212*** **(2.995099)**
Lev	**-0.255428*** **(-10.27071)**	**-1.434214*** **(-5.877177)**	**-0.411655*** **(-4.901130)**	-1.172352 (-1.630486)	0.507786 (1.195674)
Years	0.002042 (1.070435)	-0.002285 (-0.146122)	-0.000865 (-0.134267)	**-0.239892*** **(-4.349177)**	0.003729 (0.114457)
F-stat.	**21.50188***	**7.313827***	**5.405153***	**8.619440***	**2.512692***
Prob(F-stat.)	0.000000	0.000002	0.000000	0.000000	0.030369
R-sq.	0.288609	0.125422	0.092546	0.139882	0.045263
Adj R-sq.	0.275186	0.108273	0.075424	0.123653	0.027249
DW stat.	1.510082	0.987821	2.190042	0.151661	1.773069
N	271	261	271	271	271

Notes: †p < 0.10. *p < 0.05. **p < 0.01. ***p < 0.001. The t-statistic for each coefficient is reported in parentheses. The description of the variables is provided in Table 1.
Source: *Authors' computation.*

The F-test assesses the null hypothesis that all regression coefficients are equal to zero relative to the alternative that at least one does not. The F-stat. is the mean square model term divided by the mean square error term. Therefore, all the estimated models out of Table 5 are statistically significant for a significance level of 0.1%, except Eq. 5 (significance level of 5%). Accordingly, the observed R-sq. is reliable, as well as the proposed relationship between corporate performance and CSR, alongside firm-level control variables, is statistically reliable. Further, the Student's t-test is a statistical method employed in order to decide if two sets of data differ significantly. Hereby, we notice a negative relationship between CSR and accounting-based firm performance when ROS was employed as dependent variable (Eq. 3). On the contrary, we found a positive association between CSR and market-based firm performance, when EPS was used as dependent variable (Eq. 4). When using ROA (Eq. 1), ROE (Eq. 2), and PBV (Eq. 5) as dependent variable the relationship between CSR and corporate performance was not statistically validated. Moreover, we notice a negative relationship between firm size, as measured by the total amount of sales and market-based firm performance

(Eq. 4 and Eq. 5), as well as between the indebtedness level and accounting-based firm performance (Eq. 1, Eq. 2, and Eq. 3). However, we notice a positive relationship between firm size, as measured by the total number of employees and market-based firm performance (Eq. 4 and Eq. 5). As expected, we detected a negative association between firm tenure and corporate performance, but only when EPS was used as dependent variable (Eq. 4).

R-sq. reveals how close the data are to the fitted regression line, being computed as the ratio between the explained variation and total variation. Also, the Adj R-sq. is a modified version of R-sq. that has been adjusted for the number of predictors in the model. Thus, based on the values of Adj R-sq., about 28.86%, 12.54%, 9.25%, 13.98%, and 4.52% of the total variation in the dependent variable (ROA, ROE, ROS, EPS, and PBV) can be explained by the model. However, about 71.14% of the dependent variable cannot be explained by Eq.1, 87.46% by Eq. 2, 90.75% by Eq. 3, 86.02% by Eq. 4, and 95.48% by Eq. 5.

The DW stat. establishes whether there is autocorrelation in the residuals of a time series regression. There is considered that a value near 2 indicates non-autocorrelation, a value towards 0 reveals positive autocorrelation, whereas a value towards 4 shows negative autocorrelation (Gujarati, 2003). Thereby, only the Eq. 3 reveals almost the lack of autocorrelation, whereas the rest of the estimated models show autocorrelation. Even if the autocorrelation was uncovered, the OLS estimators are still linear unbiased, as well as consistent and asymptotically normally distributed, but they are no longer efficient. In fact, we notice a dynamic misspecification.

Table 6 reports the uncentered, as well as centered variance inflation factors (hereinafter 'VIF') for regressions results without cross-section effects. VIF evaluates how much the variance is inflated when compared to having uncorrelated predictors. As noticed by Belsley (1991), the centered VIFs may fail to catch the collinearity involving the constant term. Thus, an alternative is depicted by the employment of the uncentered VIFs. Computationally, VIFs are defined as the reciprocal of tolerance: $1/(1 - R\text{-sq.})$. We used the most common rule of thumb of 10 associated with VIFs, as a sign of severe or serious multi-collinearity (O'Brien, 2007). Thus, we notice the lack of multicollinearity except Const. since the values related to VIFs are below 10.

Table 6. *Variance inflation factors for regressions results without cross-section effects*

Var	ROA (Eq. 1)		ROE (Eq. 2)		ROS (Eq. 3)		EPS (Eq. 4)		PBV (Eq. 5)	
	U VIF	C VIF	U VIF	C VIF	U VIF	C VIF	U VIF	C VIF	U VIF	C VIF
Const.	11.9869	NA	12.1714	NA	11.9869	NA	11.9869	NA	11.9869	NA
CSR	1.4980	1.2714	1.4812	1.2598	1.4980	1.2714	1.4980	1.2714	1.4980	1.2714
Sales	4.7350	4.3910	6.0472	5.6502	4.7350	4.3910	4.7350	4.3910	4.7350	4.3910
Empl	4.4089	3.8800	5.7778	5.1327	4.4089	3.8800	4.4089	3.8800	4.4089	3.8800
Lev	2.9716	1.0392	3.3610	1.0428	2.9716	1.0392	2.9716	1.0392	2.9716	1.0392
Years	9.8744	1.0463	9.7418	1.0423	9.8744	1.0463	9.8744	1.0463	9.8744	1.0463

Note: The description of the variables is provided Table 1.
Source: *Authors' computation*.

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Table 7 shows the regression results (with fixed-effects). Unfortunately, when ROS, PER, and PBV were employed as dependent variable, the estimated models could not be statistically validated based on F-stat. However, the positive relationship between CSR and EPS is reinforced (Eq. 3). When ROA (Eq. 1) and ROE (Eq. 2) were used as dependent variable, the relationship between CSR and firm performance was not statistically validated. By estimating fixed-effects panel data regression models, the relationship between firm size, as measured by both the total amount of sales and the total number of employees, and corporate performance was not statistically validated. The negative relationship between leverage and corporate performance (in all the estimated models), as well as the negative relationship between the total number of years since listing on the BSE and corporate corporate performance (Eq. 2) is re-confirmed.

Table 7. *Regression results (with fixed-effects)*

Dependent Var → Independent Var ↓	ROA (Eq. 1)	ROE (Eq. 2)	EPS (Eq. 3)
Const.	**0.252124*** (3.446942)**	**2.264970*** (3.699606)**	-0.314876 (-0.417389)
CSR	0.007434 (0.180532)	0.112897 (0.357383)	**1.302970** (3.067957)**
Sales	2.54E-11 (1.152229)	-6.41E-12 (-0.031485)	2.67E-10 (1.173984)
Empl	1.21E-06 (0.081878)	-9.09E-06 (-0.078942)	0.000128 (0.840921)
Lev	**-0.562860*** (-9.352465)**	**-3.853073*** (-6.164193)**	**-1.152106† (-1.856096)**
Years	-0.004932 (-0.810030)	**-0.092981† (-1.951408)**	0.057500 (0.915632)
F-stat.	**3.753315***	**3.124240***	**39.51623***
Prob(F-stat.)	0.000000	0.000000	0.000000
R-sq.	0.577139	0.539946	0.934936
Adj R-sq.	0.423371	0.367121	0.911277
DW stat.	2.220058	1.767693	1.601199
N	271	261	271

Notes: †$p < 0.10$. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$. The t-statistic for each coefficient is reported in parentheses. The description of the variables is provided in Table 1.
Source: *Authors' computation.*

Furthermore, according to Adj R-sq., about 42.33%, 36.71%, and 91.12% of the total variation in the dependent variable (ROA, ROE, and EPS) can be explained by the model. However, approximate 57.67% of the dependent variable cannot be explained by Eq.1, 63.29% by Eq. 2, and 8.88% by Eq. 3. The DW stat. shows autocorrelation, except Eq. 1.

Table 8 discloses the uncentered, as well as centered VIFs for regressions results with fixed-effects. As such, the rule of thumb of 10 associated with VIFs is violated in case of uncentered VIFs for leverage and for the total number of years since listing on the BSE.

Table 8. *Variance inflation factors for regressions results with fixed-effects*

Var	ROA (Eq. 1)		ROE (Eq. 2)		EPS (Eq. 3)	
	U VIF	C VIF	U VIF	C VIF	U VIF	C VIF
Const.	140.1102	NA	161.2295	NA	140.1102	NA
CSR	2.1088	1.0924	2.0549	1.0965	2.1088	1.0924
Sales	5.3367	1.0452	6.2167	1.0805	5.3367	1.0452
Empl	9.5628	1.1262	9.1781	1.1561	9.5628	1.1262
Lev	15.2599	1.0351	22.4453	1.0147	15.2599	1.0351
Years	114.2354	1.2073	114.9462	1.1805	114.2354	1.2073

Source: *Authors' computation. The description of the variables is provided in Table 1.*

Concluding remarks

Current empirical investigation aimed at researching the relationship between CSR and corporate performance by using both accounting-based performance measures (e.g. ROA, ROE, and ROS), as well as market-based firm performance measures (e.g. PER, EPS, and PBV), for a sample of companies listed on the BSE over the period 2008-2011. By employing panel data regression models without cross-section effects, we found a negative relationship between CSR and ROS, as well as a positive association between CSR and EPS. Furthermore, by estimating fixed-effects panel data regression models, the positive relationship between CSR and EPS was reinforced. However, the regression results with fixed-effects are not very stable since some uncentered VIFs are high. As future research avenues, a dynamic specification should be considered.

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