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The relationship between Corporate Social Responsibility and performance: the moderating effect of financial leverage

Wafa Sahraoui¹, Rimvie Enoc Kaboré²

¹Faculty of Economics and Management of Sousse, University of Sousse, TUNISIA.

²Economics-LEDi (UMR 6307 CNRS), University of Dijon, France.

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Abstract: As an extension of theoretical work from several socio-political approaches, such as stakeholder theory and agency theory, the purpose of this study is to examine the nonlinear effects of corporate social responsibility (CSR) on firms' financial performance and identify the degree of financial leverage as a channel through which CSR exerts its influence on firm financial performance. The present research was carried out in France, where the legislation on sustainable development reports is significant. Using a sample of 70 French firms listed on the SBF 120 index, a factorial interaction model is estimated for the period 2005-2014. We find that the relationship between CSR and firms' financial performance is non linear, exhibiting an inverted U-shaped pattern. In particular, our results reveal that the CSR financial performance relationship is moderated by firms-specific factors, namely financial leverage. Our study demonstrates also the important of the evolution in the dynamic behavior of CSR effect on the financial performance firms.

Keywords: Corporate Social Responsibility, Factorial interaction model, Financial Performance, Corporate Social Responsibility, Financial leverage.

Corresponding authors: Wafa Sahraoui, e-mail: wafasahraoui65@yahoo.fr

Rimvie Enoc Kaboré, e-mail: rimvieenoc@gmail.com

1. INTRODUCTION

Over the last thirty years, a considerable attention in the literature has been given to the corporate social responsibility (CSR) issues, especially in the fields of management sciences and economics of organizations (Margolis and Walsh, 2003; Orlitzky et al., 2003). The interest of CSR must be understood in a dynamic sense, enabling new and important aspects to be taken in the world of business. It emphasizes that companies must go beyond complying with the regulatory constraints imposed on them, by integrating voluntary social and environmental concerns into their activities and relationships with stakeholders (Hirigoyen and Poulain-Rehm, 2015; Hernández et al., 2020; Farah et al., 2021). Hence, CSR is considered as a strategic decision by which organizations committed can resolve social and environmental issues aiming to have a positive effect on people outside the organization (Ramzan et al., 2021). Indeed, engagement on CSR issues appears today as an inevitable necessity (Déjean and Gond, 2004; Xu et al., 2018), through which raises several questions: *By which mechanisms can the pursuit of CSR activities contribute to the improvement of the financial performance and how does CSR relate to a firm's financial performance?*

A core issue for companies targeting CSR might be required in order to maintain well balance between financial benefits and public welfare and the preservation of the environment (Griffin, 2010; Lu et al., 2019; Hernández et al., 2020). Beyond the question of the existence of the link between financial and extra-financial performance, which has not been agreed upon (Margolis et al., 2009), the mechanism surrounding this link is complex and still academically debated.

The CSR literature survey suggests two main viewpoints: the proponents of the first refer to the classic argument defended by Friedman (1970), which argues that the sole responsibility of corporations is to increase shareholder wealth and that CSR activities are not the responsibility of commercial organizations but, rather, that of the individuals and community and individuals. In addition, the traditional view tends that CSR has a negative effect on corporate financial performance that it entails additional costs that reduce competitiveness and profitability

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(Aupperle et al., 1985; Hirigoyen and Poulain-Rehm, 2015; Kao et al., 2018). Anchored in agency cost theory, such CSR could therefore be a potential loss to shareholders by spending on charity (Brown et al., 2006; Makni et al., 2009). Similarly, Barnea and Rubin (2010) shows the agency cost incurred when managers overinvest in CSR to build their personal reputation.

Whereas interest of traditional view focuses on the profit maximization of the firm, a CSR approach is to provide a modern, stakeholder-oriented notion of organizations (Paltrinieri et al., 2020). The stakeholders' perspective makes reference to the thesis of Freeman (1984, 1994) who expects CSR to have a positive impact on corporate financial performance. Meeting the expectations and demands of different stakeholders including the shareholders, environmental advocates, employees, customers, suppliers, community, society, etc. contributes to improve the reputation of the company leading to higher net financial performance (Perrini et al., 2011; Kao et al., 2018). Focusing on stakeholder theory, many studies support that the success of a company depends on its management's relationships with stakeholders as a whole (McGuire et al., 1988; Donaldson and Preston, 1995; Hammann et al., 2009). In addition, an increase in social spending leads to an improvement in the relationship with stakeholders, which, in turn, leads the firm's to decrease social cost and offer opportunities for their business activities as a source of competitive advantage (Bhardwaj et al., 2018; Chen et al., 2019). CSR practices appear as an investment tool not as a cost to improve business which induces business organizations to spend more in such activities (Ramzan et al., 2021). In the same vein, Benlemlih (2019) argues that firms with a high CSR rating handle agency problems by offering more dividends to shareholders.

The aim of the paper is to carry out an in-depth analysis of the relationship between a company's social responsibility, represented by its different aspects, and its financial performance. In particular, this study examines the moderating effect of financial leverage, hitherto almost unexplored on the link between CSR and financial performance of French

firms. Our study contributes to the literature on CSR in two ways. First, we highlight the importance of the degree of corporate financial leverage as a channel through which CSR can influence financial performance at the corporate level.

Given the focus of prior studies on the direct link between RSE and financial performance, there should be a mutual and interactive relationship between these variable (Waddock and Graves, 1997). The majority of previous studies introduce size, risk, industry, and research and development as control variables affecting both the level of social responsibility and financial performance. To our knowledge, the effect of moderating variables on the CSR-financial performance relationship has only been explored in the case of certain factors linked to the degree of innovation (Hull and Rothenberg, 2008), others to the size of the company (Loannou and Serafeim, 2010; Hernández et al., 2020) or intangible assets (Surroca et al., 2010) or even the firm ownership type (Kao et al., 2018).

To fill this gap, our study therefore attempts to determine how contingency factors such as financial leverage moderate the CSR-financial performance relationship. Indeed, we highlight the importance of the firm's degree of financial leverage as a channel through which CSR can influence firm-level financial performance. Second, due to the dynamic nature of firms and their environment, few existing studies explicitly examine how CSR and firm performance are related over times (Cochran and Wood, 1984; Herremans et al., 1993; VanBeurden and Gossling, 2008). In this study, incorporating the moderating effect of the financial leverage, we examine the dynamic effect of CSR activities on financial performance, over several sub-periods allows us to take into account some factors that add to the complexity of this link and to appreciate the extent to which the time factor conditions its nature. Using a factor interaction model, we empirically test this relationship on a panel of 70 French companies listed over the period 2005 to 2014.

This work is structured as follows: after the introduction, the second section is dedicated to the theoretical framework and hypothesis, in which a review of the most pertinent aspects of the relationship between CSR and financial performance is carried out. In the third section, the methodological

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part and the descriptive analysis are developed. The econometric specification and the results are presented in sections 5 and 6 respectively.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Over recent decades, CSR has garnered much attention from companies, regulators, policy-makers, and other stakeholders (Gond et al., 2011; Park, et al., 2017; Farah, et al., 2021). CSR has been defined by McWilliams and Siegel (2001, p17) as “actions that appear to further some social good, beyond the interests of the firm and that which is required by law” (p.17). More generally, the primary purpose of the business is economic nature that operates in the financial sphere of society, also is inevitably involved both in social and environmental spheres. This triple commitment is spread out in the objectives, processes and results of the business, providing three types of responsibilities economic, social and environmental which generate intrinsic value (Freeman, 1984; Hernández, et al., 2020). From this perspective, the question of the CSR and financial performance relationship has triggered considerable academic work (McGuire et al., 1988; Griffin and Mahon, 1997; Margolis and Walsh, 2003; Orlitzky et al., 2003; Scholtens, 2008; Cornett et al., 2016). However, it remains a very controversial subject despite the abundant literature on the theme, thus, it is still required to fully understand the drivers of this relationship, or, put another way, how companies succeed both financially and extra-financial levels (Surroca et al., 2010). In fact, several theories coexist to clarify and formalize the relationship.

In this study, the theoretical framework adopted is stakeholder theory (Freeman 1984), which is one of the two competing theories used for conceptualizing the relationship between CSR and financial performance (Marom 2006; Bernard et al., 2018). The social impact hypothesis based on the theory of stakeholders argues that CSR wields a positive impact on firms’ financial performance (Preston and O’Bannon 1997; García-Castro et al., 2010). Indeed, CSR engagement can improve relationships among various stakeholder groups and thus will result in better firm financial performance (McGuire et al., 1988; Preston and O’Bannon, 1997).

In the same line, Jo and Harjoto (2011) highlights that CSR involvement represents a response for managers to resolve conflicts among stakeholders and maximize the shareholders' wealth, leading to positive influence firm performance. According to Blasi et al. (2018), serving the implicit claims of stakeholders will improve a firm's reputation and thus predicts a positive effect on a firm's performance.

Nevertheless, an alternative school of thought assumes the existence of negative or inconclusive relationship between CSR and firm financial performance (Vance, 1975). Two related hypotheses are suggested for the negative relation between CSR and firm performance. First, the trade-off hypothesis, related to the argument by Friedman (1970) and neoclassical theory summarize that CSR incurs costs directly or implicitly. The involvement in CSR activities generates numerous costs which reduce profit and lower shareholder wealth (Waddock and Graves, 1997). Second, based on agency theory framework (Jensen and Meckling, 1976), it can be highlighted that CSR engagement reflects an agency problem between shareholders and managers. It expects that managers extract private benefits from CSR investments by building their own managerial reputation at the expense of shareholders' interests. In fact, CSR engagement entails a net waste of valuable resources, which in turn reduces the company's performance (Barnea and Rubin, 2010; Kao et al., 2018).

Several factors can be involved in mediating CSR-financial performance relationship such as, size, risk, reputation, research and development, etc. (McWilliams and Siegel, 2000; Hillman and Keim, 2001; Konar and Cohen, 2001). However, the moderating effects such as the financial leverage on CSR-financial performance have not been examined by literature. Our work will contribute to estimate empirically this link. Indeed, Roberts (1992) postulates that power of creditors as a stakeholder, depends on the ability of the firm on debt financing. In a vein similar, Ziegler and Schröder (2010) assumes that low debt firms are more committed than others in environmental and social activities. It follows that firm's leverage and social performance are negatively related (Bernard, 2018; Kao et al., 2018).

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It seems necessary to mention that the relationship between CSR and financial performance depends on changing demands, technological advances, market preferences, and ongoing developments in the field of CSR (Bamett, 2007; Kao et al., 2018). Engaging in CSR could be relevant to provide financial benefits to firms by ensuring their long-term sustainability (Gregory et al., 2014). Given the aforementioned theoretical and empirical context, we formulate our main hypothesis below:

Hypothesis H1: Firm financial leverage has a moderating effect on the relationship between CSR and financial performance.

Hypothesis H2: The CSR-financial performance relationship is not stable over time.

3. DATA AND METHODOLOGY

3.1 SAMPLE CONSTRUCTION

Two sources of data are matched in this research. The accounting and CSR data are sourced by the Datastream and Thomson Reuters Asset4 databases, respectively, which are themselves supplied from the Thomson One Reuters base. Asset4 provides a disaggregate score capturing a company's CSR performance, which is categorized into four pillars, i.e. economic, environmental, social and corporate governance (Cheng et al., 2014; Yang and Baasandorj, 2017; Farah et al., 2018). To test our hypotheses, the sample contains 70 French firms listed in SBF 120 representing all sectors except for financial services. Financial institutions were excluded from our sample because their financial characteristics and structure differ from those of non-financial companies. The maximum period covered extended from 2005 to 2014. Finally, we yield 684 observations (firm-year). Descriptive statistics (mean, dispersion) can be found in Table 2.

3.2 VARIABLES

Dependant variable: financial performance

Accounting-based and market-based measures consisting are adopted for financial performance analysis (Waddock and Graves, 1997; Hilman and Keim, 2001). Market-based measurements indicate market expectation of future financial performance, while accounting-based measures indicate a firm's current financial performance (McGuire et al., 1988). In this study, we refer with prior studies (Griffin et Mahon, 1997; Preston and O'Bannon, 1997; Guenster et al., 2011), in adopting Return On Asset (ROA) as an accounting-based measurement to analyze the impact of CSR activities on financial performance (see Table 1).

CSR performance: independent variables

Following (Ding et al., 2016; Yang and Baasandorj, 2017; Farah et al., 2021), we use CSR scores to measure effect toward financial performance. The CSR score includes the overall scores on CSR, economic performance, social performance, environment performance, and governance performance (see Table 1).

- The social dimension (CSRSoc). It takes into account seven elements including: quality of employment; health and safety; training and development; human rights, community; product responsibility; diversity and opportunity.
- The economic dimension (CSREco). This dimension is taken into account customer loyalty, shareholder loyalty and performance.
- The environmental dimension (CSR Env). This dimension incorporates three elements, resources reduction, emissions reduction and product innovation.
- The governance dimension (CSRGov). It assesses the company in terms of board structure, remuneration policy, board functions, shareholder rights and vision and strategy.

In addition, in order to take into account the heterogeneity performance of firms, these indicators are weighted according to their sector relevant and performance firms. Thus, each company receives a score for each of the pillars in a given year t , comparing its performance with the rest of the companies and based on all the available information in

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year $t-1$. Although they can be criticized, these indicators have the advantage of being better informed and regularly updated (monthly) for better exploitation. In order to know whether the CSR performance plays a continuous role, we also considered his dynamic effect over several periods.

Control variables

We consider a set of firm-level control variables that are typically used in the literature (Waddock and Graves, 1997; Scholtens, 2008; Surroca et al., 2010; Baird et al., 2012; Harjoto, 2016). In this study, we select firm size which is measured by total assets and age firms to identify the effect toward financial performance (Hillman and Keim, 2001; Kim et al., 2014; Wang et al., 2018) (see Table 1).

Lastly, in order to identify possible moderating effects we have introduced interaction terms into our model (Orlitsky et al., 2003; Lee et al., 2013). The combined effect of certain company-specific factors such as financial leverage is likely to temper any impact upon financial performance. Vogel (2005), find that one of the ways to resolve causal bias is to assume that the link between CSR and financial performance is not directly established but can be reinforced by a moderator. In fact, the introduction of the interactive term (CSR*LEV) in our study, allows us to assess a possible CSR impact on financial performance.

Table 1. Variables definitions and measures

Variable	Name	Variable definitions
Financial performance	ROA : Return On Assets.	Net profit / average total assets for the year (in %).
Corporate Social Responsibility	CSR_{Env}	Environmental score calculated from the overall weighted average (scores from 0-100).
	CSR_{Soc}	Social score calculated from the overall weighted average (scores from 0-100).
	CSR_{Eco}	Economic score calculated from the overall weighted average (scores from 0-100).
	CSR_{Gov} :	Governance score calculated from the overall weighted average (scores from 0-100).
Firm size	SIZE	The logarithm of total assets.
Financial leverage	LEV	Total debt divided by total equity for the year (in %).
Firm age	Age	The logarithm of years elapsed since firm foundation.

Source: Thomson One Reuters base.

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4. DESCRIPTIVE ANALYSIS

4.1. UNIVARIATE ANALYSIS

Table 2 provides descriptive statistics of variables. The heterogeneous distribution of financial performance, characterized by a Skewness coefficient greater than zero, reflects the intrinsic nature of the variable itself to understand different financial performance between companies. Moreover, the coefficients of variation CSR levels indicate an almost similar distribution between the series. Apart from the CSR_{env} series where the coefficient of variation is almost half of the other three, the coefficients of the series are around 0.4. This indicates that the distribution of these series is relatively homogeneous and confirms our use of the database of the rating agency "Asset 4" which provides homogeneous information for all companies at the same date. Furthermore, given the nature of the varieties of measures used to evaluate CSR, the coefficient of variation makes it possible to ensure the homogeneity of the criteria used. This indicates that the distribution of these series is relatively homogeneous and confirms our use of the database of the rating agency "Asset 4", which provides homogeneous information for all companies at the same date. Furthermore, given the nature of the variety of measures used to evaluate CSR, the coefficient of variation allows us to ensure the homogeneity of the criteria used.

Table 2. Descriptive statistics of the variables

	ROA	CSRsoc	CSRenv	CSRgov	CSReco	SIZE	AGE	DEBT
Mean	0.0531639	99.177	76.97883	53.79732	66.97755	3.22E+07	72.5317	0.2396219
Median	0.0486	116.28	88.19	55.53	74.9	9648855	56.5	0.1805298
Maximum	0.4967505	144.55	97.14	96.64	98.52	7.90E+08	310	2.48363
Minimum	-0.3246	-34.88	10.02	2.16	1.5	581551	0	0.0001362
Std.Dev.	0.06272	43.4968	23.04955	24.85315	27.04429	8.84E+07	60.33034	0.2761282
Coefficient de variation (CV)	-	0.43857749	0.29942713	0.46197747	0.40378142	-	-	-
Variance	0.0039334	1891.972	531.2819	617.6789	731.3938	7.81E+15	3639.75	0.0762468
Skewness (S)	0.8576673	-1.585	-1.504704	-0.2157987	-0.7359446	6.689289	1.180303	4.799148
Kurtosis	15.19979	4.377	4.110127	1.909482	2.368334	51.76654	4.621235	34.39617
Observations	700	700	657	657	657	700	694	697

Source: W.Sahraoui & R.E. Kaboré

Table 2 presents the number of observations, mean, standard deviation, minimum and maximum of the variables used. The Variance Inflation Factor (VIF) measures multicollinearity between the scores of the four dimensions of CSR taken into account.

The differences in the mean according to the level of the CSR performance score are presented in Table 2. We assume that when the firm's overall score is below the sample average, it is low CSR, otherwise it is high. In summary, more than average companies tend to have high CSR and significantly growing financial performance. For example, in terms of governance score, 85.86% of companies are highly responsible and only 14.14% have low responsibility.

Table 3. Sample distribution by level of CSR

	CSR _{Eco}		CSR _{Soc}		CSR _{Env}		CSR _{Gov}	
	Number of firms	Percentage	Number of firms	Percentage	Number of firms	Percentage	Number of firms	Percentage
Low CSR	267	38.14	178	25.43	212	30.29	99	14.14
High CSR	433	61.86	522	74.57	488	69.71	601	85.86
Total	700	100	700	100	700	100	700	100

Source: W. Sahraoui & R.E. Kaboré

Table 4 reveals that most firms have higher net financial performance based on the CSR scores in Table 3. Firms with higher financial performance have positive ROA while those with lower financial performance have negative ROA. The table shows that 90.14% of the companies have high financial performance against only 9.86% with low financial performance. However, we can highlight that performance on CSR dimensions has a strong correlation with financial performance and thus motivates our intuition on exploring a positive relationship that could exist between these two variables.

Table 4. Sample distribution by level of financial performance

	Number of firms	Percentage
Low financial performance	69	9.86
High financial performance	631	90.14
Total	700	100

Source: W. Sahraoui & R.E. Kaboré

Table 5 reveals that more than half of the companies have a very low level of financial leverage. Table 5 shows that 65.75% of companies have a low level of financial leverage, because it is lower than the average and 34.25% of the sample has a high level of financial leverage. More specifically, companies having both higher financial and CSR performance are those with a low financial leverage level.

Table 5. Sample distribution by level of financial leverage

	Number of firms	Percentage
Low financial leverage	432	65.75
High financial leverage	225	34.25
Total	657	100

Source: W. Sahraoui & R.E. Kaboré

4.2. MULTIVARIATE ANALYSIS

Our main estimates are based on a factorial interaction model, which is reduced, linear and easily relatable to the subject of our study. This model captures, on the one hand, the responses of the different CSR dimensions when they interact with the level of financial leverage that the firm can take and, on the other hand, the responses of the firm's financial performance. The specification of our model therefore consists in analyzing the interaction of each of the four CSR dimensions with the level of financial leverage. The first interactive term consists in crossing the environmental dimension of CSR with the level of financial leverage. Thus, we obtain the variable $CSREnv \times LEV$. The second term crosses the social aspect of CSR with the level of financial leverage and allows us to obtain the variable $CSRSoc \times LEV$. We added the third term which crosses the economic

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dimension of CSR with the level of financial leverage and allowed us to obtain the interaction variable $CSREco \times LEV$. Finally, the last interactive term named $CSRGov \times LEV$ is obtained by multiplying the governance dimension by the level of financial leverage. The particularity of this specification is to explore, in line with the recommendations of the meta-analyses of Allouche and Laroche (2013), the mechanisms of the interaction between CSR and ROA, insofar as, it introduces the interactive term into the model. It is also possible to determine how CSR can influence financial performance.

This specification is estimated using the ordinary least squares (OLS) method. Given the type of variables used (i.e. the interaction variables) and mainly for the purpose of our study, once the estimations are done, we calculate the marginal effects of the different CSR dimensions of the firm following the regressions. As pointed out by Amable et al (2010), the introduction of the interactive term of two variables "A" and "B", the evaluation of the global effect of the variable "A" requires a calculation of its marginal effect conditional on the values that the variable "B" can take.

The multivariate analysis is completed by estimating the logistic model based on equation (2) on the entire sample of companies in terms of social responsibility. This econometric model allows conclusions to be drawn about the interrelationships between the independent variables and their impact on the probability of a company having a better performance.

5. ECONOMETRIC SPECIFICATION

We investigated whether the level of financial leverage influences the relationship between CSR and financial performance. Furthermore, this methodology allows us to capture the dynamic link between financial and non-financial performance. The impact of explanatory variables on firms' financial performance was assessed through panel data modeling.

In line with previous literature (Waddock and Graves, 1997; Orlitzky et al., 2003), the basic model for estimating the link between corporate financial performance and CSR is as follows:

$$\ln ROA_{it} = \alpha_0 + \alpha_1 CSR_{it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (1)$$

In order to test the effect of moderating variables upon the CSR-financial performance relationship, we propose an extension to model (1) that introduces the interactive term $CSR \times LEV$. By following Romalis (2002), the model becomes:

$$\ln ROA_{it} = \alpha_0 + \alpha_1 \ln X_{it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (2)$$

With X the type of CSR dimension:

CSR economic dimension

$$\ln ROA_{it} = \alpha_0 + \alpha_1 \ln CSR_{Eco\ it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (3)$$

CSR social dimension

$$\ln ROA_{it} = \alpha_0 + \alpha_1 \ln CSR_{SOC\ it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (4)$$

CSR environmental dimension

$$\ln ROA_{it} = \alpha_0 + \alpha_1 \ln CSR_{Env\ it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (5)$$

CSR governance dimension

$$\ln ROA_{it} = \alpha_0 + \alpha_1 \ln CSR_{Gov\ it} \times \ln LEV_{it} + \alpha_2 \ln SIZE_{it} + \alpha_3 \ln AGE_{it} + \varepsilon_i + \varepsilon_t + \varepsilon_{it} \quad (6)$$

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With i is the number of firms and t the year of observation. Where $\ln ROA_{it}$ is the financial performance of firm i at time t . X_{it} is the CSR of firm i at time t . $\ln SIZE$ represents logarithm of total assets of firm i at time t . LEV is the ratio of total debt to total equity of firm i at time t . $\ln Age$ is logarithm of years elapsed since firm foundation of firm i at time t . ε_t and ε_i capture the unobservable time fixed effects and the vector of individual fixed effects respectively. Fixed individual effects aim to capture all the permanent differences between sectors observed in financial performance; fixed individual effects. Whereas fixed temporal effects capture the temporal shocks common to the sectors, i.e. shocks that can affect all sectors in the same way. ε_{it} represents the error term i.i.d. orthogonal to the individual and temporal levels.

This model is estimated when the financial leverage is not zero, i.e. assuming that there is a minimal level of leverage in the financial market. The specification (2) allows us to detect a possible moderating effect of financial leverage, otherwise it would be zero and the model would be irrelevant. Thus, we establish the link between CSR and financial performance according to the level of financial leverage in the market. For instance, the equation (2) shows that when the level of financial leverage is set at 1%, the level of CSR on financial performance is $\alpha_1 \ln LEV$ %. This reveals clearly that the effect of CSR level is conditional on the financial leverage level.

Marginal effect of CSR

Since we introduced interaction terms between the level of CSR and the level of financial leverage, the evaluation regarding the expected overall effect of the level of social responsibility on the firm's financial performance requires the calculation of its marginal effect conditional on specific values of the level of financial leverage. The marginal effects of CSR in our estimation model allow us to interpret the coefficient $\widehat{\alpha}_1$ in each of our specifications as an elasticity. Formally, it is a partial elasticity.

Indeed, from our main equation (equation 2), we obtain the marginal effects as follows: $E_{m|x} = \frac{\partial \ln ROA}{\partial \ln X} = \widehat{\alpha}_1 \ln LEV$

The marginal effects in our estimation model reveal the effect of the interaction between the level of CSR scores and the level of financial leverage. The marginal effect value reflects the x% change in firm financial performance induced by a one percent change in CSR level, all else equal. Detecting an $\widehat{\alpha}_1 > 0$ and significant shows that for a firm with low financial leverage, a high level of CSR of 1% leads to an increase in $\widehat{\alpha}_1 \ln LEV$ % of the firm's financial performance. In our regressions, we evaluate the marginal effect and its significance for various levels of financial leverage, i.e., at three deviations, two deviations, one deviation below the mean, at the mean level of leverage, at one deviation, two deviations, and 3 deviations above the mean.

6. RESULTS

Table 5 below presents our main results regarding the impact of CSR on financial performance moderated by the level of leverage. These results are obtained by stepwise estimation of equations 2 through 5 above. For each regression, the table below shows the estimated marginal effects of the level of CSR for different levels of financial leverage. The first row of the bottom part of the table provides the value of the marginal effect of corporate social responsibility when the level of financial leverage is at its mean minus three standard deviations (SD). The last row of this part of the table provides the marginal effect value of the level of corporate social responsibility when the level of leverage is at its maximum, i.e., at its mean plus three standard deviations. The marginal effect coefficients are also presented for the average level of leverage, the average level minus 2SD, the level minus 1SD, the average level plus 1SD and the average level plus 2SD. Reading this part of the table shows how social responsibility affects the financial performance of the firm. Thus, it explains how the effect of the level of CSR changes when the level of financial leverage changes from its average level.

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6.1. THE MARGINAL EFFECT OF CSR ON THE FINANCIAL PERFORMANCE

The model estimated in this paper is a multiplicative interaction model that highlights the interaction between the level of CSR and the financial leverage of the firm. Such a specification allows us to show, through the marginal effects, that the beneficial effect of CSR activities on financial performance depends very much on the ability or not of firms to take on more debt. Table 6 presents the results of the estimation of this model. As several studies have shown (Aupperle et al., 1985; Drucker, 1984; Friedman, 1962, 2007), one can conclude from the results in the upper part of Table 1 and even from those in Tables 5.A and 6.A in the appendix that there is a negative effect of CSR on firm financial performance, regardless of the nature of the CSR measures. However, this is not the case when examining the coefficients associated with the marginal effects, as this is considered an interactive model. Thus, through the results in the lower part of Table 1, which propose the coefficients of the marginal effects of social responsibility, we obtain a differentiated effect of the level of CSR on the firm's financial performance depending on the level of financial leverage.

The results in this table show that the effect of the increase associated with CSR differs according to the firm's level of financial leverage. All else being equal, for a firm with a level of financial leverage equal to the mean minus three, minus two and minus one standard deviation, CSR, regardless of its dimension, has a positive effect on the firm's financial performance to varying degrees. Conversely, when the level of financial leverage is equal to the mean plus two, plus three or more standard deviations, CSR has a disproportionately negative effect on the firm's financial performance. For low-leverage firms, those with below-average leverage, the results show that the lower the leverage level, the more socially responsible the firm's behavior, the better the firm performs financially. This table shows a strong variation in the elasticity as the level of financial leverage moves from one level to another. Thus, when the leverage level is at its average level, a 1% increase in the CSR score leads to a 0.046% improvement in

the company's financial performance. Whereas, when the level of financial leverage is very low, at its average level minus 3 SD, an increase in the CSR score of 1% leads to an improvement in financial performance of 0.765%. On the other hand, for firms with a very high level of financial leverage (those with a leverage level higher than the average level), our results show that as the level of financial leverage increases, corporate social responsibility has a negative impact on financial performance. The table reveals that the coefficients are even negatively very elastic when the level of financial leverage becomes very high.

Indeed, when the level of financial leverage goes from its average level plus 2 SD to its average level plus 3 SD, the elasticity of financial performance goes from -0.046% to -1.368%. Thus, when the level of financial leverage increases until it reaches its maximum level (here set at the average level plus 3 SD), the adoption of socially responsible behavior by the firm does not improve its financial performance. It even leads to a more than proportional decrease in the firm's financial performance.

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Table 6. Estimating the marginal effects of CSR

Panel A : Estimation of the cross effect between CSR and ROA

SIZE	-0.146*** (0.0230)	-0.156*** (0.0228)	-0.143*** (0.0244)	-0.156*** (0.0229)
AGE	0.138*** (0.0284)	0.140*** (0.0286)	0.142*** (0.0306)	0.141*** (0.0286)
CSRE _{co} ×LEV	-0.0229*** (0.00531)			
CSRGov×LEV		-0.0195*** (0.00594)		
CSRSoc×LEV			-0.0180*** (0.00529)	
CSREnv×LEV				-0.0166*** (0.00559)

Panel B : CSR marginal effects

<i>3 SD below the mean</i>	0.765*** (0.17724)	0.652*** (0.19800)	0.600*** (0.17669)	0.552*** (0.18660)
<i>2 SD below the mean</i>	0.535*** (0.12411)	0.456*** (0.13865)	0.420*** (0.12379)	0.387*** (0.13067)
<i>1 SD below the mean</i>	0.077*** (0.01785)	0.066*** (0.01994)	0.061*** (0.01798)	0.056*** (0.01880)
<i>Mean</i>	0.046*** (0.01074)	0.039*** (0.01200)	0.037*** (0.01088)	0.034*** (0.01131)
<i>1 SD over the mean</i>	0.016*** (0.00363)	0.013*** (0.00405)	0.013*** (0.00378)	0.011*** (0.00382)
<i>2 SD over the mean</i>	-0.015*** (0.00349)	-0.013*** (0.00390)	-0.011*** (0.00332)	-0.011*** (0.00367)
<i>3 SD over the mean</i>	-0.046*** (0.01060)	-0.039*** (0.01185)	-0.035*** (0.01041)	-0.033*** (0.01116)
Constant	-1.368*** (0.407)	-1.167*** (0.404)	-1.414*** (0.438)	-1.162*** (0.408)
Observations	587	587	551	587
R-squared	0.152	0.140	0.132	0.137

Source: W. Sahraoui & R.E. Kaboré

Another specification of the estimation model is to study the effect of aggregate CSR¹ on firms' financial performance. The results are presented in Table 7 and reveal that aggregate CSR does not influence firms' financial performance. However, the results in Table 6 show that disaggregated CSR measures can have an impact on firms' financial performance.

Table 7. Effect of aggregate CSR on ROA

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA
CSR_Aggregate	0.00550 (0.00631)	0.00400 (0.00633)	0.00754 (0.00644)	0.00579 (0.00632)	0.00627 (0.00649)
AGE		0.0209* (0.0121)			0.0165 (0.0125)
SIZE			-0.0146 (0.00931)		-0.0137 (0.00944)
LEV				0.00278 (0.00295)	0.00214 (0.00300)
Constant	0.0424 (0.0320)	-0.0163 (0.0477)	0.264* (0.145)	0.0459 (0.0323)	0.207 (0.154)
Sectoral fixed effect	Yes	Yes	Yes	Yes	Yes
Fixed effect year	Yes	Yes	Yes	Yes	Yes
Observations	657	653	657	654	650
R-squared	0.409	0.413	0.411	0.409	0.416

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Source: W. Sahraoui & R.E. Kaboré

¹ Aggregate CSR is calculated as the weighted average of the different scores for the four dimensions of social responsibility.

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6.2 THE EVOLUTION IN THE DYNAMIC BEHAVIOR OF CSR EFFECT ON THE FINANCIAL PERFORMANCE FIRMS

In light of the dynamic and evolving character of CSR concept, it is important to be able to evaluate its impact on financial performance over time. This specification allows us not only to confirm our results on the effect of CSR but also to follow its dynamic effect over time. To do so, another analysis arises which consists in observing the evolution of CSR elasticity over time during the period in the study. Thus, we estimate this elasticity by time shifting by one year following the study period. This technique is applied to our different equations previously defined and allows us to estimate, progressively throughout the estimation period, the conditional response of the financial performance when CSR dimensions change over time.

Tables 8 to 11 sets out the results of the estimation of CSR performance which is categorized into four pillars, i.e. environmental, social, governance and corporate economic. We find that only the coefficients associated with the marginal effects of CSR, as a function of the average level of financial leverage, are retained. Regardless of the criterion adopted to capture CSR, the results show that over time, when the financial leverage level is moderate (i.e., the average level), the socially responsible behavior of the company significantly improves its financial performance. Apart from periods of crisis (the 2008 financial crisis, with its earlier effect, and the new stock market crash of 2012), the results reveal a positive and increasing elasticity over the years, confirming our previous findings on the positive effect of CSR.

Indeed, the net benefits of CSR on financial performance are not cyclical or circumstantial. It takes time for being social responsive to translate into higher financial performance. That is, a firm has to be socially responsive strategy consistently over time to receive CSR benefits. Our results are consistent with several studies (Barnett and Salomon, 2012; Erin et al., 2018) that argue CSR as a long-term investment in creating the capacity to influence stakeholder's relations and improve firm's financial performance.

Table 8. Evolution of the marginal effects of CSR_{Eco} on financial performance

VARIABLES	(1) >=2005	(2) >=2006	(3) >=2007	(4) >=2008	(5) >=2009	(6) >=2010	(7) >=2011	(8) >=2012	(9) >=2013	(10) >=2014
<i>Estimation of the marginal effects of corporate social responsibility according to the average level of the financial leverage</i>										
<i>Level mean LEV</i>	0.046*** (0.01074)	0.047*** (0.01131)	0.041*** (0.01174)	0.046*** (0.01217)	0.049*** (0.01335)	0.056*** (0.01474)	0.062*** (0.01704)	0.054*** (0.01664)	0.062*** (0.01925)	0.095*** (0.03033)
Constant	-1.368*** (0.407)	-1.254*** (0.435)	-1.128** (0.457)	-1.188** (0.489)	-1.320** (0.550)	-1.500** (0.613)	-1.879*** (0.715)	-0.804 (0.695)	-0.266 (0.770)	-1.159 (1.243)
Observations	587	536	481	418	356	299	233	169	109	50
R-squared	0.151	0.156	0.147	0.159	0.151	0.156	0.162	0.239	0.345	0.374

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9. Evolution of the marginal effects of CSR_{Gov} on financial performance

VARIABLES	(1) >=2005	(2) >=2006	(3) >=2007	(4) >=2008	(5) >=2009	(6) >=2010	(7) >=2011	(8) >=2012	(9) >=2013	(10) >=2014
<i>Estimation of the marginal effects of corporate social responsibility according to the average level of the financial leverage</i>										
<i>Level mean RISQ</i>	0.039*** (0.01200)	0.039*** (0.01258)	0.034*** (0.01297)	0.043*** (0.01344)	0.049*** (0.01469)	0.056*** (0.01619)	0.061*** (0.01844)	0.061*** (0.01778)	0.074*** (0.02029)	0.109*** (0.03074)
Constant	-1.167*** (0.404)	-1.030** (0.431)	-0.939** (0.451)	-1.004** (0.483)	-1.163** (0.544)	-1.34** (0.608)	-1.696*** (0.708)	-0.732 (0.681)	-0.281 (0.752)	-1.158 (1.206)
Observations	587	536	481	418	356	299	233	169	109	50
R-squared	0.140	0.145	0.138	0.151	0.145	0.148	0.154	0.245	0.362	0.404

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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Table 10. Evolution Evolution of the marginal effects of CSR_{Soc} on financial performance

VARIABLES	(1) ≥2005	(2) ≥2006	(3) ≥2007	(4) ≥2008	(5) ≥2009	(6) ≥2010	(7) ≥2011	(8) ≥2012	(9) ≥2013	(10) ≥2014
<i>Estimation of the marginal effects of corporate social responsibility according to the average level of the financial leverage</i>										
<i>Level mean LEV</i>	0.037*** (0.01088)	0.037*** (0.01145)	0.035*** (0.01165)	0.040*** (0.01194)	0.044*** (0.01294)	0.050*** (0.01418)	0.052*** (0.01607)	0.047*** (0.01545)	0.054*** (0.01779)	0.089*** (0.02895)
Constant	-1.414*** (0.438)	-1.255*** (0.467)	-1.271*** (0.484)	-1.319** (0.514)	-1.470** (0.572)	-1.580** (0.627)	-1.825** (0.725)	-0.681 (0.693)	-0.157 (0.774)	-1.118 (1.268)
Observations	551	506	458	402	345	293	230	168	108	49
R-squared	0.132	0.137	0.131	0.142	0.137	0.142	0.145	0.233	0.339	0.368

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Evolution of the marginal effects of CSR_{Env} on financial performance

VARIABLES	(1) ≥2005	(2) ≥2006	(3) ≥2007	(4) ≥2008	(5) ≥2009	(6) ≥2010	(7) ≥2011	(8) ≥2012	(9) ≥2013	(10) ≥2014
<i>Estimation of the marginal effects of corporate social responsibility according to the average level of the financial leverage</i>										
<i>Level mean LEV</i>	0.033*** (0.01131)	0.033*** (0.01196)	0.030*** (0.01230)	0.038*** (0.01278)	0.042*** (0.01396)	0.049*** (0.01539)	0.054*** (0.01757)	0.052*** (0.01706)	0.065*** (0.02012)	0.107*** (0.03251)
Constant	-1.162*** (0.408)	-1.027*** (0.436)	-0.943*** (0.456)	-1.009** (0.488)	-1.137** (0.549)	-1.317** (0.612)	-1.684** (0.716)	-0.733 (0.696)	-0.253 (0.769)	-1.068 (1.220)
Observations	587	536	481	418	356	299	233	169	109	50
R-squared	0.137	0.142	0.136	0.148	0.140	0.144	0.148	0.233	0.345	0.387

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

7. CONCLUSION

The study confirms the research hypotheses. CSR is simultaneously reflected as a combination of the four economic, social, environmental and governance values. First, the results confirm that the relationship between CSR and financial performance is non-linear exhibiting an inverted U-shaped pattern (Wang et al., 2008). Indeed, the results show that the coefficient associated with this interaction measure is significant, confirming the moderating role of financial leverage on the relation between CSR and financial performance. This argument implies if the level of financial leverage, on the one hand, is above its average level, the effect of CSR activities is negative, on the other hand, it is positive whether it is below the average level. Specifically, we argue that when firm with a low debt level, they are more socially responsible leading to improve financial performance. Conversely, for firms those with higher debt should have a lower engagement in CSR activities which ultimately result in a reduction in nets benefits. Therefore, it is necessary for managers to minimize their financial leverage which generate additional costs, through their social improvement activities. Similar evidence was provided by Toms et al. (2009). This finding is similar to Ziegler and Schröder (2010) which presume that low debt firms are more flexible to engage in social and environmental activities.

Second, we have empirically quantified the dynamic effect of CSR by using the method “time sliding” and we find significant coefficients of the positive impact of CSR on financial performance insofar as the financial leverage is at its average level or at its level below the average level. In addition, this dynamic aspect implies that the financial impact of CSR engagement changes over time, which is in line with the argument in favor of a link that cannot be universal but rather contingent on the time period (Cochran, 2007; Kao et al.,2018)

Nevertheless, like all research, this work has limits. Accounting-based are adopted for financial performance analysis which can be confusing

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(Kinney and Wempe, 2002). In addition, the data used for our study are relatively old. As a line of future research, it would be preferable to use other financial performance indicators such as the ROS or even other stock market indicators, to explore new databases and to push eventually the reflection on the dynamic analysis.

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9. Appendices

Table 1A. Methodology for calculating scores

Thomson Reuters ESG Scores Calculation Methodology

Percentile Rank scoring methodology is adopted to calculate the 11 category scores. It is based on the rank, and therefore it is not very sensitive to outliers. The distribution of the scores generated with percentile rank score is almost flat, for this reason average and standard deviation of the scores generated with percentile rank score are not overly useful.

Each category score is the equally weighted sum of all the indicators used to create it. The normalized weights are calculated excluding indicators with no data available in the public domain.

To calculate the overall Thomson Reuters ESG Score, we have applied an automated, factual logic that determines the weight of each category.

The driver is the number of indicators that make up a category in comparison to all indicators used in the TR ESG Score framework. As a result categories that contain multiple issues like Management (composition, diversity, independence, committees, compensation, etc.) will have higher weight than lighter categories such as Human Rights.

Each category consists of a different number of measures. The count of measures per category determines the weight of the respective category. Detailed counts and weights are provided in the table below.

The overall ESG Score is a weighted average of the underlying 10 category scores.

Pillar	Category	Indicators in Rating	Weight
Environmental	Resource Use	20	11%
	Emissions	22	12%
	Innovation	19	11%
Social	Workforce	29	16%
	Human Rights	8	4.50%
	Community	14	8%
	Product Responsibility	12	7%
Governance	Management	34	19%
	Shareholders	12	7%
	CSR Strategy	8	4.50%
TOTAL		178	100%

The ESG Scores are calculated on the basis of the 176 data points listed in Glossary plus 2 analytics

Tableau 2A. Correlations between variables: the case of firms with high financial performance

	ROA	CSRSoc	CSREnv	CSRGov	CSREco
ROA	1.0000				
CSRSoc	-0.2322*	1.0000			
CSREnv	-0.2450*	0.7510*	1.0000		
CSRGov	-0.1254*	0.5365*	0.4406*	1.0000	
CSREco	0.0909	0.5634*	0.4015*	0.3980*	1.0000

Source: W. Sahraoui & R.E. Kaboré

Table 3A. Correlations between variables: the case of firms with low financial performance

	ROA	CSRSoc	CSREnv	CSRGov	CSREco
ROA	1.0000				
CSRSoc	0.1058	1.0000			
CSREnv	0.1065	0.7933*	1.0000		
CSRGov	0.0022	0.6165*	0.4106*	1.0000	
CSREco	0.0743	0.4394*	0.3009	0.1979	1.0000

Source: W. Sahraoui & R.E. Kaboré

Table 4A. Effect of CSRs controlled for size and age

VARIABLES	(1) CSREnv	(2) CSRSoc	(3) CSREnv	(4) CSRGov
SIZE	-0.185*** (0.0224)	-0.156*** (0.0247)	-0.147*** (0.0249)	-0.167*** (0.0233)
AGE	0.118*** (0.0288)	0.142*** (0.0309)	0.145*** (0.0289)	0.140*** (0.0290)
CSREco	0.189*** (0.0458)			
CSRSoc		-0.0848 (0.0516)		
CSREnv			-0.170** (0.0696)	
CSRGov				-0.0448 (0.0478)
Constant	-1.236*** (0.402)	-0.651 (0.425)	-0.468 (0.400)	-0.665* (0.393)

The relationship between Corporate Social Responsibility and performance: the moderating effect of financial leverage

Observations	589	553	589	589
R-squared	0.151	0.120	0.135	0.127

Standard errors in parentheses

*** p<0.01. ** p<0.05. * p<0.1

Source: W. Sahraoui & R.E. Kaboré

Tableau 5A. Effect of CSRs without controlling for size and age

VARIABLES	(1) RSE	(2) CSREco	(3) CSRSoc	(4) CSREnv	(5) CSRGov
CSREco	0.479*** (0.0600)	0.173*** (0.0479)			
CSRSoc	-0.273*** (0.0696)		-0.155*** (0.0520)		
CSREnv	-0.219** (0.104)			-0.317*** (0.0655)	
CSRGov	-0.0284 (0.0613)				-0.112** (0.0487)
Constant	-2.721*** (0.418)	-3.720*** (0.199)	-2.328*** (0.239)	-1.663*** (0.280)	-2.586*** (0.188)
Observations	555	591	555	591	591
R-squared	0.128	0.022	0.016	0.038	0.009

Standard errors in parentheses

*** p<0.01. ** p<0.05. * p<0.1

Source: W. Sahraoui & R.E. Kaboré