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Abstract: This paper addresses firms' decisions on Corporate Social Responsibility (CSR) investments as a function of the prevailing macroeconomic context, namely under an economic crisis, a relevant scenario for many world economies nowadays. We focus on the corporate giving dimension of CSR. Under unfavorable macroeconomic conditions two possible situations may, *a priori*, occur: firms decide to restrict their CSR contributions in order to save resources, or they use CSR to differentiate more effectively. To address this issue, we derive a general theoretical framework comprising product differentiation and firm competition in two dimensions: price and corporate giving. Corporate giving as a share of firm's revenues is found to be lower the less sensitive demand is to rivals' pricing policies, and the more sensitive demand is to rivals' CSR. We prove that, in equilibrium, all the rest equal, profit maximizing firms will make less CSR contributions when the business cycle is unfavorable, independently of the market structure. We then provide empirical testing and validation of the theoretical model's results through a comprehensive battery of econometric tests and real data evidence. We also inspect the business cycle properties of corporate giving, as well as that of receipts, concluding for a procyclical relation with real Gross Domestic Product.

Key-words: corporate social responsibility, corporate giving, economic crisis, business cycle, demand sensitivity, competition.

1. INTRODUCTION

Corporate Social Responsibility (CSR) constitutes a key element in firm positioning and has been increasingly employed as a strategic tool. Moreover, corporate giving represents an important contribution to society, especially when government funding is scarce. Social solidarity institutions may rely, more or less extensively, on companies' charitable contributions. Through the CSR component of firms' strategy, firms obtain an improved image in the eyes of consumers, which may benefit sales. However, firms' contributions are not invariant over time, and one of the reasons behind this behavior may be business fluctuations, according to the economic cycle. This paper explores the role of the macroeconomic environment on firms' decisions as to the amount to invest in CSR. The microeconomic context, concerning the degree of competition and product differentiation in the industry, is also taken into account. A theoretical model is developed and its results are empirically tested through a comprehensive battery of econometric procedures including stationarity testing and cointegration analysis. Additionally, the business cycle properties of corporate giving are assessed, using a band pass filter. Our approach is novel in the extension of the Dorfman-Steiner formula to other competitive environments and by integrating management-driven arguments into an economic theory founded model which is further subject to explicit econometric testing. The extensive tests performed add robustness to the conclusions that point for corporate giving falling when in an economic downturn, such as the current crisis.

To the best of our knowledge, this paper is a first attempt to model and test the role of CSR in times of economic crisis. Should firms re-schedule their priorities and decrease CSR expenditures when the macroeconomic environment is adverse? Or, on the contrary, should they invest more in this variable, in order to counterweight the negative

effects of demand contraction?

Nowadays, the pressure for corporate accountability is increasing, no matter if it concerns legal, ethical, social or moral issues (Waddock, 2004). What should be the firms' priority? An ever-continuing debate exists between 'doing good' and 'doing well'. Campbell (2007) argues that economic factors, such as the level of competition and the health of the economy are likely to affect the degree to which corporations act in socially responsible ways, two issues addressed in the current paper. Several calls have been made in the literature, asking for contributions covering the mechanisms connecting prior Corporate Financial Performance (CFP) to subsequent Corporate Social Performance (CSP) (Cavaco & Crifo, 2010; Margolis, Elfenbein, & Walsh, 2007) and to the market structure, when analyzing the firm's decision on the amount to invest in a CSR project (Husted & Salazar, 2006). With this paper, we try to answer such calls, by looking at the influence of the macroeconomic context on the CSR strategies of firms, embedded in the degree of competitiveness in which they operate. We particularly focus on the corporate giving component of CSR. Measured as a share of firm's revenues, corporate giving is found to be lower the less sensitive demand is to rivals' pricing policies, and the more sensitive demand is to rivals' CSR. In equilibrium, all the rest equal, we conclude that profit maximizing firms will make less CSR contributions when the business cycle is unfavorable, independently of these expenses being of a fixed nature or proportional to production, and independently of the market structure. Although this may seem an unsurprising result, that fact that it is proven for any number of players and regardless of the degree and type of competitiveness, is a rather new insight. Moreover, our integrated approach (management arguments built into a formal economic model further subject to validation against the data), novel to the literature, lends robustness to the findings.

The remainder of the paper is organized as follows. Next section presents a review of the recent and seminal literature regarding the CSR decision. In the third section we derive the formal theoretical model that addresses the optimal CSR strategy. The fourth section provides empirical testing and validation of the model, as well as evidence on corporate giving behavior over the business cycle. Although the literature on CSR is fairly well developed, its empirical analysis is rather incipient. Main conclusions appear in section five, along with some management policy implications. Finally, the paper concludes with some lines for future research.

2. LITERATURE REVIEW

Corporate Social Responsibility, as a concept, has suffered from severe heterogeneity, visible in the number of different definitions and operationalizations that can be found in the literature. For example, although theoretically, 'Corporate Social Responsibility' and 'Corporate Social Performance' can be distinguished[1], they are often used interchangeably in empirical studies (Margolis, Elfenbein, & Walsh, 2007). The multidimensional nature of the construct brings additional variability: some researchers measure only one dimension, such as pollution control, while others, defining it as multidimensional (Carroll (1979) views CSR as having four dimensions, namely, economic, legal, ethical and discretionary) focus on broad appraisals of CSR/CSP as a whole (Margolis, Elfenbein, & Walsh, 2007).

From Friedman's liberal perspective (1970) in which CSR is "to conduct the business in accordance with shareholders' desires" to the more common definition where CSR is

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[1] Keinert (2008) defines Corporate Social Performance as an indicator concerned with results from CSR strategies, policies and programs. Wood (1991:693) classically defined CSP as a "business organization's configuration of principles of social responsibility, processes of social responsiveness, and policies, programs, and observable outcomes as they relate to the firm's societal relationships".

viewed as actions that foster social good beyond the firm's interests and what is required by law (McWilliams, & Siegel, 2001), others define it as "the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life" (WBCSD, 2000), or as a programme of actions to reduce externalized costs or to avoid distributional conflicts (Heal, 2005).

The analysis of the relationship between CSP/CSR and CFP has produced mixed results, with some studies concluding for a positive, others negative and even others for the inexistence of such a relationship (Margolis, Elfenbein, & Walsh, 2007; Margolis & Walsh, 2001; McWilliams, & Siegel, 2000; McWilliams, & Siegel, 2001). The meta-analysis carried out by Orlitzky, Schmidt, and Rynes (2003) concludes that a large proportion of this cross-study variance is due to statistical or methodological artefacts, such as sampling and measurement errors. Their analysis supports a generally positive correlation between CFP and CSP across a variety of industries and study contexts, attributing the difference in the magnitude of the positive correlation among studies to reputation effects, market measures of CFP or CSP disclosures.

The most discussed issue around CSR is whether successful firms have more resources to spend on initiatives of CSR ('the slack resources theory') or whether better CSR (and consequent CSP) results in better financial outcomes ('the good management theory'). Sometimes, these two perspectives are also called, respectively, the altruistic and the strategic views of CSR (Baron, 2001; Fernández-Kranz, & Santaló, 2010). Most of the existing research is concerned with CSR as an investment, looking at the impact of CSR over CFP. Barnett (2007) distinguishes CSR from other corporate investments, by assigning it a high social welfare orientation and a stakeholder relationship orientation. McWilliams and Siegel (2001) defend a cost-benefit analysis to determine the

appropriate level of CSR investment, but do not empirically determine it. The willingness of a firm to allocate resources to CSR can come from different motivations, such as corporate reputational effects – either risk mitigation or external expectations (Campbell, 2007; Fombrun & Shanley, 1990; Peloza, 2006), development of internal capabilities and organizational efficiency (Majumdar & Marcus, 2001), innovative products or access to markets and employee commitment (Margolis, Elfenbein, & Walsh, 2007). Looking at the reasons for corporate giving, Campbell, Gulas and Gruca (1999) found that altruistic ones were, by far, the most cited motivation, when compared to business motives. Baron (2001) asserts that firms engage in profit-maximizing CSR, defining it as the private provision of a public good. Husted and Salazar (2006) distinguish altruistic, egoistic and strategic types of motivation to engage in social activities, and conclude that the potential benefits to both the firm and society are greater in the strategic type, where the socially responsible initiatives are aligned with the firm's self-interest. Marx (1999) claims that companies are increasingly integrating philanthropic management into the formal strategic planning of the firm. Moreover, Porter and Kramer (2002) find that only when corporate philanthropy has an influence on a company's competitive context, it can be said that philanthropy is strategic, converging social and economic interests and gains. Bénabou and Tirole (2010) discuss three alternatives views on CSR with different implications regarding the CSR-profit relationship: the first ('win-win') is equivalent to the strategic perspective of CSR, in which being a good corporate citizen can turn a firm more profitable; the second one ('delegated philanthropy') concerns the fact that stakeholders might demand corporations to engage in philanthropy in their behalf; and the third vision ('insider-initiated corporate philanthropy') reflects management's own desires to engage in philanthropy. Baron (2011) distinguishes CSR firms from profit-maximizing firms and

analyses the attractiveness of firms as targets for social pressure from activists. Further, he claims that if the marketplace rewards the internalization of social benefits, profit-maximizing firms can strategically accept social responsibilities.

In this paper, we are concerned with the impact of CFP over CSR. CSR corresponds to an area of management discretion (…'beyond the law'…). As such, efforts of environmental protection or voluntary social policies may, to an extent, depend on the availability of monetary funds. The positive association between prior CFP and subsequent CSR/CSP may illustrate that prior higher levels of CFP provide the needed resources to engage into CSR initiatives (Waddock & Graves , 1997). Moreover, Orlitzky et al. (2001) proposed bidirectional causality between CFP and CSP, creating a loop in which prior CFP leads to subsequent CSP, which in turn will lead to CFP. Both Waddock and Graves (1997) and McGuire, Sundgren, and Schneeweis (1988) found evidence of the two directions of causality, suggesting also a virtuous cycle. Margolis et al.'s research (2007) found that for charitable contributions, companies with a solid CFP tended in the future to donate more, while socially responsible corporate policies appear to be more likely for those companies enjoying a past financial success, but that didn't predict future financial success. They suggest that these results showed that there are investments, other than CSR that produce higher financial outcomes. Again, McGuire et al. (1988) and Scholtens (2008) concluded that a firm's prior CFP conditions CSR more than its subsequent financial performance.

One of the papers more directly connected with our approach is Campbell (2007). The author proposed that firms are less likely to act in socially responsible ways when they experience weak financial performance and when they operate in a relatively unhealthy economic environment where the possibility for near-term profitability is limited. Moreover, he defended that in a monopoly structure, firms have little interest in CSR

because reputation and loyalty will not likely affect sales or profits. Monopoly can lead to price gouging, a corporate social irresponsibility. Further, he expected firms to be less interested in acting in social responsible ways in situations of too much or too little competition. While Baron (2001) conceptualized 'strategic CSR' as redistribution (either through lump-sum transfers or changes in business practices) to appeal to a stakeholder group for the purpose of increasing demand or reducing costs, Bagnoli and Watts (2003) extended Baron's analysis and looked into how does market structure affect CSR. Analyzing a market with a private and a public good, they found that there is an inverse relationship between the provision of CSR (public good) and competition in the market for the private good. Scholtens (2008: 52), analyzing the causality between CFP and CSP, points, as a limitation of his own research, the fact that market structure was not considered, saying that "the results (on the link between CFP and CSP) can differ significantly in the cases of competitive, monopolistic or oligopolistic markets, since market power enables some firms always to earn abnormal returns". Ullman (1985: 553) stated that "in periods of low profitability, economic demands will have priority over social demands. (…) Economic performance will influence the financial capability to undertake programs related to social demands". So, the macroeconomic conditions, such as the economic context will probably affect the potential financial performance and the firms' subsequent willingness to allocate resources to social projects.

Corporate giving is a specific dimension of CSR. The relationship between this dimension and concentration/competition has somehow been covered by the existing literature. Johnson (1966) stated the absence of competition as a necessary but not sufficient reason for contributions, and based on the work of Manne (1962) and on his own analysis of the period 1936-61 for the US, claimed that oligopolistic, imperfectly or

monopolistically competitive industries have a higher contribution ratio, due to the need to achieve a comparative advantage. Conversely, he concluded that atomistically competitive firms could not afford to donate and monopolistic firms did not have an incentive to donate. In the same way, Useem (1988) found that product sectors containing only a few dominant firms had higher giving rates than sectors with many firms. Johnson (1966), as well as Useem (1991) also found evidence that giving tended to mirror the business cycle, depending on the degree of industry rivalry. Kitzmueller (2008) points that, given the firm competition for consumers with social preferences, CSR may be correlated with the degree of competition in the market. Fernández-Kranz and Santaló (2010) empirically study the link between competition and firm's social performance and conclude that firms in more competitive markets invest more in CSR, which is consistent with the strategic perspective of CSR. Also, their results show that CSR variability across firms is more intense in more competitive industries.

Useem (1988) concluded that size was the most important institutional determinant (i.e. larger firms donate more), while net income was the most important market determinant of giving (i.e. more profitable firms donate more). Johnson (1966) also found that profits were the primary determinants of corporate donations. Donations and corporate giving also seem to depend on the profitability of the corporate sector (Kirchberg, 1995; Leclair & Gordon, 2000). In terms of size, Maddox and Siegfried (1980) showed that over certain size ranges, giving increased with firm size, while more recently, Amato and Amato (2007) found evidence of a cubic relationship between charitable giving and firm size, meaning that small and large firms give more relative to total receipts than medium size firms. The authors claim that small firms are particularly close to the community and large firms give more because their large size creates an increased need for a positive public image.

3. THE MODEL

This section presents the theoretical analysis of firm behavior for firms selling a differentiated product and investing in CSR. Corporate giving can be regarded as a component of CSR. Although we look into corporate giving, the model is general enough so as to capture any CSR dimension.

Spending money in CSR can be beneficial to revenues, on the one hand, but increases costs, on the other. What is the final balance and how is it affected by the macroeconomic conditions and microeconomic interactions?

Consider that there are n firms ($i=1,2,...,n$) competing in a differentiated product market. Demand directed to firm i is expressed by $q_i(p_i, p_{-i}, S_i, S_{-i})$, where p_i represents the price charged by firm i, p_{-i} represents the price vector of competitors, S_i is the corporate giving amount of firm i, and S_{-i} is the corporate giving vector of the other firms. Besides "traditional" differentiation, captured by price competition, we also have here a sort of "subjective" differentiation, through consumers' perception of firms' CSR activities. Quite intituively, we assume that $\partial q_i/\partial p_i < 0$, $\partial q_i/\partial p_{-i} > 0$, $\partial q_i/\partial S_i > 0$ (the amount spent by the firm in CSR is assumed to increase demand for the product, because consumers are sympathetic to firms that contribute to social causes), and $\partial q_i/\partial S_{-i} < 0$ (rivalry effect). Considering, for simplicity, that marginal production cost is constant and equal to c_i, each firm chooses p_i and S_i to maximize

$$\pi_i = (p_i - c_i).q_i(p_i, p_{-i}, S_i, S_{-i}) - S_i$$

First-order conditions are as follows:

$$\frac{\partial \pi_i}{\partial p_i} = q_i + (p_i - c_i)(\frac{\partial q_i}{\partial p_i} + \sum_{j \neq i} \frac{\partial q_i}{\partial p_j}\frac{\partial p_j}{\partial p_i}) = 0 \qquad (1)$$

$$\frac{\partial \pi_i}{\partial S_i} = (p_i - c_i)(\frac{\partial q_i}{\partial S_i} + \sum_{j \neq i} \frac{\partial q_i}{\partial S_j} \frac{\partial S_j}{\partial S_i}) - 1 = 0 \qquad (2)$$

Let us denote the conjectural variation $\partial p_j / \partial p_i > 0$ by γ (prices are strategic complements) and the conjectural variation $\partial S_j / \partial S_i > 0$ by λ (corporate giving investments are strategic complements too). Assuming symmetry we can re-write (1) and (2) as

$$\frac{\partial \pi_i}{\partial p_i} = q_i + \frac{(p_i - c_i)}{p_i}(\frac{\partial q_i}{\partial p_i} \frac{p_i}{q_i} q_i + (n-1)\gamma \frac{\partial q_i}{\partial p_j} \frac{p_j}{q_i} \frac{p_i q_i}{p_j}) = 0 \qquad (1')$$

$$\frac{\partial \pi_i}{\partial S_i} = \frac{(p_i - c_i)}{p_i}(\frac{\partial q_i}{\partial S_i} \frac{S_i}{q_i} \frac{p_i q_i}{S_i} + (n-1)\lambda \frac{\partial q_i}{\partial S_j} \frac{S_j}{q_i} \frac{p_i q_i}{S_j}) - 1 = 0 \qquad (2')$$

Denote the direct price elasticity $\frac{\partial q_i}{\partial p_i} \frac{p_i}{q_i} < 0$ by ε_{ii}, the cross price elasticity $\frac{\partial q_i}{\partial p_j} \frac{p_j}{q_i} > 0$ by ε_{ij}, the direct elasticity to corporate giving $\frac{\partial q_i}{\partial S_i} \frac{S_i}{q_i} > 0$ by η_{ii}, the cross elasticity to corporate giving $\frac{\partial q_i}{\partial S_j} \frac{S_j}{q_i} < 0$ by η_{ij}, and the sales revenue $p_i q_i$ by R_i. The cross elasticity ε_{ij} captures the degree of traditional or "objective" product differentiation, whereas the cross elasticity η_{ij} captures a sort of "subjective" differentiation attained through CSR spending and is related with consumers' preferences over social concerns.[2] Then,

$$\frac{p_i - c_i}{p_i} = -\frac{1}{\varepsilon_{ii} + (n-1)\gamma\varepsilon_{ij} \frac{p_i}{p_j}} \qquad (1'')$$

$$\frac{p_i - c_i}{p_i} = \frac{1}{\eta_{ii} \frac{R_i}{S_i} + (n-1)\lambda\eta_{ij} \frac{R_i}{S_j}} \qquad (2'')$$

Equating (1'') and (2'') and employing the symmetry condition (from which $p_i = p_j$ and $S_i = S_j$), one obtains

$$-\varepsilon_{ii} - (n-1)\gamma\varepsilon_{ij} = \frac{R_i}{S_i}\left[\eta_{ii} + (n-1)\lambda\eta_{ij}\right]$$

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[2] Rigorously speaking, what we call "objective" differentiation refers to all product dimensions but CSR, which are subject to competition through price and also include subjective assessments like, for instance, the ones related with the firm-customer relationship.

or, stated differently,

$$\frac{S_i}{R_i} = \frac{\eta_{ii} + (n-1)\lambda\eta_{ij}}{-\varepsilon_{ii} - (n-1)\gamma\varepsilon_{ij}} \quad i = 1, 2, ..., n \qquad (3)$$

This expression gives us the equilibrium amount of corporate giving per unit of firm's revenues, and is obtained under quite general conditions concerning the degree of both price competitiveness and social responsibility competitiveness.[3]

Of course $\frac{S_i}{R_i} < 1$, otherwise the firm would be making negative profits. This implies that

$-\varepsilon_{ii} - (n-1)\gamma\varepsilon_{ij} > \eta_{ii} + (n-1)\lambda\eta_{ij}$, that is, the impact on the volume of sales of a strategic price change is stronger than the impact of a change in the corporate giving policy of the firm, which is reasonable to assume.

By setting $n = 1$ in (3) one obtains the monopoly equilibrium as a particular case. Expression (3) then resumes to a sort of the usual Dorfman-Steiner (1954) condition,[4] also employed by Navarro (1988):

$$\frac{S}{R} = \frac{\eta}{-\varepsilon}$$

The higher the sensitivity of demand to corporate giving, the more the monopolist firm will spend in CSR. Note that demand elasticity to S has to do with consumers' preferences over social concerns.[5] On the other hand, the lower the sensitivity of demand to price in absolute terms, the more the monopolist firm will spend in CSR, because a low price elasticity means a large price-cost margin and hence the possibility

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[3] For it to be positive one must impose that either $-\varepsilon_{ii} > (n-1)\gamma\varepsilon_{ij}$ and $\eta_{ii} > -(n-1)\lambda\eta_{ij}$, or $-\varepsilon_{ii} < (n-1)\gamma\varepsilon_{ij}$ and $\eta_{ii} < -(n-1)\lambda\eta_{ij}$ (direct effects of price changes and social giving either both weaker or both stronger than indirect ones).

[4] Originally derived for the advertising effort.

[5] Since $S < R$ (otherwise profits would be negative), it is immediate that demand elasticity to CSR must be lower than (the absolute value of) demand elasticity to price. This is a particular case of the general expression interpreted before $(-\varepsilon_{ii} - (n-1)\gamma\varepsilon_{ij} > \eta_{ii} + (n-1)\lambda\eta_{ij})$. In the particular case of monopoly the positive sign of S/R is assured, since $\eta > 0$ and $-\varepsilon > 0$.

for the firm of benefitting more from a CSR investment (that turns into larger sales). A macroeconomic crisis scenario translates into a contraction in consumer purchases so, *ceteris paribus*, lower revenues. Clearly less CSR will take place (to preserve the equality), as $S = R\frac{\eta}{-\varepsilon}$ and therefore $\frac{\partial S}{\partial R} > 0$. If one admits that adverse economic conditions increase consumers' sensitivity to price, all the rest equal the *S/R* ratio declines; however, if consumers' sensitivity to firms doing socially good improves, *S/R* tends to increase, making the overall effect unclear. For the ratio *S/R* to increase under adverse economic conditions, the adjustment in consumers' sensitivity to CSR has to be stronger than the one in consumers' sensitivity to price.

Revenues' contraction occurs for some exogenous reason, outside the firm's control. This can be, for instance, a negative shift in autonomous demand (associated with a general economic downturn). Recall that the firm only controls and decides upon two variables - price and CSR expenditures.

When there are two or more firms in the market, parameters γ and λ capture their interaction ($\gamma = \lambda = 0$ would mean no strategic interaction at all). On the other hand, the level of product differentiation is captured by ε_{ij} and η_{ij}: the lower they are, the stronger the differentiation (in the limit, null cross elasticities mean that, from the point of view of consumers, products from firms *i* and *j* are independent). Assuming that the conditions for $\frac{S_i}{R_i}$ to be positive are verified, a macroeconomic crisis scenario also means less investment in CSR, as under monopoly,[6] but this effect is now influenced by γ and λ, as well as by cross elasticities. If one admits that adverse economic conditions increase consumers' sensitivity to price, both own and rivals', then the effect on the *S/R* ratio is ambiguous (it depends on the relative magnitude of the two

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[6] This is consistent with Johnson (1966), who shows that there exists a high degree of correlation between contribution ratios across different market structures – monopoly, competition and rivalry.

variations, as well as on the number of market players and on γ); if consumers' sensitivity to firms doing socially good also improves, the impact on *S/R* is again unclear (it depends on the relative magnitude of the two variations, as well as on the number of market players and on λ).

The following Propositions state the results of some simple comparative statics analysis. It is interesting to observe that:

Proposition 1 *The existence of price rivalry increases the equilibrium amount of corporate social expenses as a share of firm's revenues (as compared with the no-competition case), but the existence of firm rivalry in what concerns CSR decreases it.*

Proof Immediate, by taking the appropriate derivatives in expression (3).

Furthermore,

Proposition 2 *When firm's revenues decrease (increase), firm's social giving decreases (increases) too, independently of the market structure.*

Proof This is an immediate consequence of $S_i = R_i \frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}} > 0$ and hence

$$\frac{\partial S_i}{\partial R_i} = \frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}} > 0.$$

Is the negative impact of the economic crisis on CSR mitigated or exacerbated by firm competition? And by product differentiation?

Proposition 3 *If $\eta_{ii}+(n-1)\lambda\eta_{ij}>0$ and $-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}>0$, when firm's revenues decrease (increase), firm's social giving decreases (increases) more in a competitive scenario as compared with the monopolist case if and only if the relationship $\gamma\varepsilon_{ij}\eta_{ii} > \lambda\eta_{ij}\varepsilon_{ii}$ holds.*

If $\eta_{ii}+(n\text{-}1)\lambda\eta_{ij}<0$ and $-\varepsilon_{ii}-(n\text{-}1)\gamma\varepsilon_{ij}<0$, when firm's revenues decrease (increase), firm's social giving decreases (increases) more in a competitive scenario as compared with the monopolist case if and only if the relationship $\gamma\varepsilon_{ij}\eta_{ii} < \lambda\eta_{ij}\varepsilon_{ii}$ holds.

Proof Note that the sign of both $\eta_{ii}+(n\text{-}1)\lambda\eta_{ij}$ and $-\varepsilon_{ii}-(n\text{-}1)\gamma\varepsilon_{ij}$ is unclear. However, it must be the same (both positive or both negative), otherwise we have $S_i/R_i<0$. Comparing $\frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}}$ with $\frac{\eta}{-\varepsilon}$ (where η corresponds to η_{ii} and ε to ε_{ii}), one can see that the former may be larger or smaller than the latter. Actually,

$\frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}} > \frac{\eta_{ii}}{-\varepsilon_{ii}} \Leftrightarrow \gamma\varepsilon_{ij}\eta_{ii} > \lambda\eta_{ij}\varepsilon_{ii}$ when $\eta_{ii}+(n\text{-}1)\lambda\eta_{ij}>0$ and $-\varepsilon_{ii}-(n\text{-}1)\gamma\varepsilon_{ij}>0$. In turn,

$\frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}} > \frac{\eta_{ii}}{-\varepsilon_{ii}} \Leftrightarrow \gamma\varepsilon_{ij}\eta_{ii} < \lambda\eta_{ij}\varepsilon_{ii}$ when $\eta_{ii}+(n\text{-}1)\lambda\eta_{ij}<0$ and $-\varepsilon_{ii}-(n\text{-}1)\gamma\varepsilon_{ij}<0$.

All the rest equal, the entry of a new player increases the sensitivity of CSR to macroeconomic conditions if and only if $\gamma\varepsilon_{ij}\eta_{ii} > \lambda\eta_{ij}\varepsilon_{ii}$. Actually,

$\frac{\partial}{\partial n}\left(\frac{\eta_{ii}+(n-1)\lambda\eta_{ij}}{-\varepsilon_{ii}-(n-1)\gamma\varepsilon_{ij}}\right) = \frac{\gamma\varepsilon_{ij}\eta_{ii}-\lambda\eta_{ij}\varepsilon_{ii}}{(n\gamma\varepsilon_{ij}-\gamma\varepsilon_{ij}+\varepsilon_{ii})^2} > 0 \Leftrightarrow \gamma\varepsilon_{ij}\eta_{ii} > \lambda\eta_{ij}\varepsilon_{ii}$. These results show that increased competition is not a sufficient condition for firms to adapt their CSR strategies more intensively to the macroeconomic context.

Proposition 4 *All the rest equal,*

i) firms operating in markets with low "objective" product differentiation (that is, high sensitivity to the rivals' prices) will tend to reduce more their corporate giving in response to adverse macroeconomic conditions than firms selling highly differentiated products;

ii) firms operating in markets with low "subjective" product differentiation (that is, high sensitivity to the rivals' CSR) will tend to reduce less their corporate giving in response

to adverse macroeconomic conditions than firms selling highly differentiated products.

Proof Low product differentiation means close substitutes, so high ε_{ij} and η_{ij}. The result follows immediately from expression (3).

The previous findings can be explained in the following way. Firms which are less differentiated through products' physical attributes (or other non CSR characteristics, which are subject to price competition) obtain lower margins. Therefore a corporate giving effort and the corresponding sales' increase are less effective in counterweighting the negative effects of the macroeconomic shock. On the other hand, low CSR differentiation implies higher price cost margins, so a further corporate giving effort is worthwhile in order to mitigate the adverse effects of the crisis scenario. [7]

The analysis above has considered CSR as a lump-sum contribution to society - a fixed amount, independent of production (e.g., giving money to charity). Sometimes the amount of CSR is a variable one, directly connected with the firm's activity as, for instance, spending resources trying to avoid pollution originated by production. In this respect, consider now that s_i corresponds to the marginal social contribution per added unit produced.[8] Firm i intends to maximize

$$\pi_i = (p_i - c_i - s_i).q_i(p_i, p_{-i}, s_i, s_{-i})$$

The results obtained ($\frac{s_i.q_i}{R_i} = \frac{\eta_{ii} + (n-1)\lambda\eta_{ij}}{-\varepsilon_{ii} - (n-1)\gamma\varepsilon_{ij}}$) match the ones for the lump-sum transfer, considering that the total amount spent (S_i before) is now $s_i.q_i$. Conclusions stated in Propositions 1 to 4 are therefore valid, independently of corporate giving being of a

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[7] This can be seen from expressions (1') and (2').
[8] This is equivalent to having new marginal costs equal to $c_i + s_i$.

fixed nature or proportional to production.

Next section empirically tests the results provided by this theoretical framework, with a thorough analysis envolving a battery of econometric tools to validate comovement between revenues and corporate giving, on the one hand, and between corporate giving and Gross Domestic Product, on the other.

4. EMPIRICAL VALIDATION

This section provides empirical validation of the model just presented and evidence on the effects of the recent economic and financial crisis on corporate giving. The techniques employed are the most adequate to handle the problem at hand.

4.1. Empirical Validation of the Model

The theoretical model of the previous section delivers a major empirical prediction in favor of comovement between corporate giving and firm's revenues (expression 3). To empirically validate this result we collected yearly data from the Internal Revenue Service of the United States Department of the Treasury (IRS). To the best of our knowledge, this is the longest official time series with specific data on giving and sales revenues, along with tax and accounting information.[9] The data, available in SOI Tax Stats - Historical Table 13 of IRS, ranges from 1990 to 2008. This can be considered a small sample for time series analysis, which led us to employ a wide variety of time series techniques as a robustness device.[10] All results obtained favor the fit of our model to real world data, therefore validating the empirical prediction of comovement of

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[9] For a complete view, consult the source at http://www.irs.gov/taxstats/article/0,,id=175846,00.html.
[10] We acknowledge small sample difficulties, in particular those related with detecting structural breaks and/or outliers, long run relations and frequency domain analysis. However, the diversity of techniques employed and the choice of small sample critical values allowed us to reach consensual conclusions.

giving and revenues.[11]

The ratio giving/revenues. In this subsection we address the behavior of the ratio "Contributions or gifts" to "Business receipts" (our *S/R*), searching for covariance stationarity. In other words, we investigate whether the ratio fluctuates around a constant mean and with constant variance.

Since a unit root and/or a structural break imply high persistence, we computed the autocorrelation function, along with the Ljung-Box statistic at various horizons. The results in Table 1 below indicate that this variable, taken in logarithms, is likely to be stationary.[12]

TABLE 1

Autocorrelation Function[a] for ln(*R/PQ*)

Lags	Autocorrelations	Ljung-Box p-value
1	0.41	
2	0.11	0.14
3	-0.17	0.20
4	0.14	0.27

[a] 95 per cent confidence band for autocorrelation [-0.459,0.459].

More formally, the stationarity of ln(*S/R*) was tested with ADF (Augmented Dickey-Fuller) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests. The former takes the unit root as the null hypothesis, whereas the latter, used as confirmatory analysis, takes stationarity as the null. The number of lags selected was three, according to standard

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[11] Beforehand, one may notice that, if anything, advertising and giving data from IRS, in log-differences, is positively correlated and significant for a one standard error confidence band. Hence, treating advertising and corporate giving as expenditures with similar role is supported by the data, rendering our model as an adequate framework for our analysis of giving (and the economic cycle).

[12] Applying logarithms helps stabilizing the variance. Actually, this is a specific case of the Box-Cox transformation.

information criteria and to the Ljung-Box statistic, while keeping a parsimonious specification. A constant was also included.[13] The residuals, however, suggested the existence of an outlier in 2005. Thus the Lanne, Lütkepohl and Saikkonen (2002) unit root test (LLS) was also applied, and a single lag selected.[14] Results from unit root tests are reported in Table 2.

Table 2

	Test statistics	Critical values
		(1 per cent; 5 percent; 10 per cent)
ln(S/R)	ADF = -2.723	(-3.959; -3.081; -2.681)
	KPSS = 0.353	(0.739; 0.463; 0.347)
	LLS = -2.870	(-3.64; -2.99; -2.67)
ln(Business receipts) (i.e., ln(S))	ADF = -0.606	(-3.920; -3.066; -2.673)
	KPSS = 0.725	(0.739; 0.463; 0.347)
	LLS = -1.307	(-3.64; -2.99; -2.67)
ln(Contributions or gifts) (i.e., ln(R))	ADF = --	(--)
	KPSS = 0.958	(0.739; 0.463; 0.347)
	LLS =-2.283	(-3.64; -2.99; -2.67)

Note: ADF critical values are taken from MacKinnon (1996).

Taken as a whole, formal testing indicates that ln(*S/R*) is covariance-stationary, that is, ln(*S)* and ln(*R)* appear to be cointegrated, with cointegrating vector (1,-1).

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[13] This choice, and the one related with excluding a time trend, followed from the inspection of Dickey and Fuller (1981) *F* and *t* type of tests, using the critical values tabulated for 25 observations.

[14] The critical values for inference about the ADF e LLS statistics refer to the smallest sample size with tabulated values, respectively, T=20 and T=50, except for KPSS where the asymptotic values tabulated were used.

Cointegration testing and estimation. We then applied cointegration analysis, testing for the existence of a long run relationship between *ln(S)* and *ln(R)*, and estimating the cointegrating vector. The presence of a unit root was tested, using both the ADF statistic and the KPSS confirmatory test for these variables. The two variables proved to be I(1).

Namely, for "Business receipts" we selected a specification with a constant and two lags. Possibly, as suggested by inspection of the residuals, there may be an outlier in 2000. The same battery of statistics was then run for the first differences, concluding with similar statistical significance for stationarity.

For "Contributions or gifts" the specification chosen had one lag, a constant term and a shift dummy starting in 2005.[15] The first differences, with an analogous statistical model, could be considered stationary at one percent level.

Provided this evidence, we considered both *ln(S)* and *ln(R)* I(1) variables and inquired for the existence of cointegration. Employing the Johansen approach (1988, 1991), which overcomes the eventual normalization problem, we selected a VAR (Vector AutoRegressive) model with one lag and a constant in the cointegration relation that we found.[16] This choice proved reliable, since normality was ensured along with the absence of autocorrelation.[17]

Table 3

ln(R)= 12.100+1.188*ln(S)			
Doornik-Hansen *p-value* = 0.231			LM(2) *p-value* = 0.390
Lutkepohl *p-value* = 0.323			L-B(2) *p-value* = 0.423
	Max eigenvalue	Trace	Test the Null that b=1
0-1 cointegrationg vector	27.749 (15.9*)	33.964 (20.262*)	LR *p-value* = 0.240

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[15] The ADF statistic, although delivering similar results, did not exhibit such a satisfactory residuals autocorrelation function.

[16] Alternatively, we ran the Engle-Granger procedure (1987), reaching similar results.

[17] Stability analysis was performed on the cointegration relation, using Candelon and Lutkepohl (2001) and Hansen and Johansen (1999) tests. The results do not point out clear signs of structural breaks.

1-2 cointegration vector	6.216	6.216	
	(9.165*)	(9.165*)	

Note: The 5% small sample critical values are taken from MacKinnon, Haug and Michelis (1999).

Finally, we tested if the estimated cointegrating vector was statistically different from (1,-1), as suggested in our analysis of ln(*S/R*). Indeed, the Likelihood Ratio statistic gives supporting evidence for the existence of a one-to-one long run relation between Giving and Revenues.

Finally, note that while concluding for cointegration one-to-one between giving and revenues, we also conclude that the (natural logarithm of the) ratio involving elasticities and conjectural variations parameters, as stated in (3), is stationary.

Causality analysis on giving-revenues, giving-profits and giving-real GDP. The appropriate concept for the analysis of causality is that of Granger, however seldom used in the literature on assessing corporate social responsibility and corporate financial performance. Here, we apply Granger-causality, using the procedure of Dolado and Lutkepohl (1996), hereafter DL, first to giving and revenues, then to giving and profits and lastly to giving and real GDP. Results are presented in Table 4.

We already concluded that giving and revenues are cointegrated, therefore Granger-causality exists in at least one direction. Next we analyzed causality between giving and profits (specifically, "Income subject to tax"), which proxy, respectively, corporate social responsibility (CSR) and corporate financial performance (CFP), often inspected in the literature.[18] Finally, we tested for causality between macroeconomic activity,

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[18] Profits is an I(1) variable, since the LLS test with one lag and allowing for a break in 2005 takes the value -2.740, above the 5 per cent critical value, -2.99. Applying the unit root testing to first difference points out to stationarity.

measured by real GDP, and giving, as proxy for corporate social responsibility. [19] In all these bivariate systems we selected one lag and a constant. From these tests we conclude that: revenues Granger-cause giving, but not the reverse; neither profits Granger-cause giving, nor otherwise; economic activity does Granger-cause giving, with positive effect, while giving does not Granger-cause economic activity. The first and last results are similar, as expected since revenues are tightly linked to economic activity. They give new empirical evidence, based on sound statistical framework, reinforcing the previous conclusion on the positive link between giving and activity, now indicating that business cycle/sales causes giving. Notice that profits and giving are unrelated (in line with Aupperle et al. (1985) and contrary to Adams and Hardwick, (1998)), thereby launching the old issue of CSR and CFP, desirably now guided by a sound statistical approach (i.e., Granger-causality).

Table 4

Yes/No, *t-statistic*

	Revenues?	Profits?	Economic activity
Is Giving *Granger-caused* by	Yes, *2.020*	No, *1.243*	Yes, *3.196*
Does giving *Granger-cause*	No, *0.097*	No, *0.457*	No, *-0.032*

Giving over the business cycle. We now turn to the analysis of giving over the business cycle. For extracting the reference cycle, real GDP data was collected from *U.S. Department of Commerce: Bureau of Economic Analysis*, with ID GDPCA. The giving and business receipts were deflated with CPI seasonally adjusted data from *U.S.*

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[19] Real GDP is I(1) since: ADF with one lag and a constant delivered -2.505, against a 5 per cent critical value of -3.052; taking into account an eventual break in 2000, LLS with two lags was -2.600, against a 5 per cent critical value of -2.99. First difference is stationary, as pointed out by the unit root testing.

Department of Labor: Bureau of Labor Statistics, with ID CPIAUCSL. Finally, the asymmetric band pass filter of Christiano and Fiztgerald (2003) was applied, considering variables in logarithms and as I(1), extracting cycles over a 2 to 8 years band.[20]

Importantly, the cross correlation pattern of giving and revenues with real GDP reveals a significant comovement (respectively 0.67 and 0.77). This result shows that in real activity contractions, such as the recent crisis, we should expect Giving to fall, as well as Revenues.[21]

Although the contemporaneous cross-correlations are the strongest, inspection of the lead/lag structure gives some interesting insights. First, Giving appears to lag the cycle about three years, with negative cross-correlation of 0.64, meaning that a few years after the real activity downturn firms invest more in CSR, possibly accompanying the expected expansion path. Second, business revenues display mixed evidence, favoring both a lead and lag relation and somewhat weaker than the pattern observed for Giving. Third, Giving and Revenues move together with a contemporaneous cross-correlation of 0.67, and lead/lag cross-correlations seem to suggest that the current year's giving leads to higher revenues in the next year; nevertheless, the highest lead/lag cross-correlation indicates that a bad revenues' year leads to increased CSR investment three years after.

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[20] The results are not sensitive, in qualitative terms, to using nominal instead of deflated giving and business receipts, neither to other choices within the application of the band pass filter.

[21] In fact, if we would try and identify the VECM (Vector Error Correction Model) previously found, Giving would tend to appear as explaining a fraction of about 20 to 25 percent of the fluctuations in revenues over short and long horizons.

4.2. Evidence from Committee Encouraging Corporate Philanthropy data

This subsection provides further evidence using a broader cross section dataset, although with a shorter time span. Our analysis is based on data from the *Committee Encouraging Corporate Philanthropy* (CECP), for 2006 to 2009. The data origins from the *Corporate Giving Standard* survey on about 150 companies from different countries, comprising three types of giving - direct cash, foundation cash and non-cash giving - for a range of program areas.[22]

Corporate giving data supports the empirical predictions from our model, pointing to a decline in this component of CSR from 2008 to 2009, in line with the downturn of the economic cycle.

Our findings show that corporate giving has a tight connection with revenues, and with pre-tax profits, on a contemporaneous basis. This fact is reinforced when we grasp a dynamic relation between giving and financials (see CECP Giving in Numbers (2010)). Namely, the median giving dropped in 2009, after the 2007-2008 crisis period.[23] Table 5 below summarizes the findings.

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[22] Top recipients include Health & Social Services, Education (K-12 and Higher) and Community & Economic Development.

[23] Although non-cash corporate giving may be limited, and highly volatile, the evidence for the change from 2007 to 2008 (see CECP Giving in Numbers (2010)) suggests a (net) positive behavior, contrary to direct and foundation cash.

TABLE 5

Corporate Giving in 2006-2009

|	**2006**	**2007**	**2008**	**2009**
Median of giving/revenues	0.12 %	0.13 %	0.13%	0.10%
Median of giving/pre-tax profit	0.88 %	0.92%	1.23%	1.12%
Median giving (million USD)	21.89	23.53	25.95	19.26

Source: CECP Giving in Numbers (2010).

This evidence can be completed by analyzing the breakdown by activity sector, revenues, employees and pre-tax profit. For a clear cut view, let us comment on the 2008-2009 change.

Looking at the 2008-2009 period and controlling for the activity sector, aside from consumer discretionary and staples and energy, all sectors exhibit a decline in the giving to revenues ratio (*S/R*, in our model), as suggested in Figure 1. Note, however, that inspection of the period 2006-2009 reveals that, except for health care which shows a marked decrease, the remaining sectors display a smooth behavior of the *S/R* ratio.
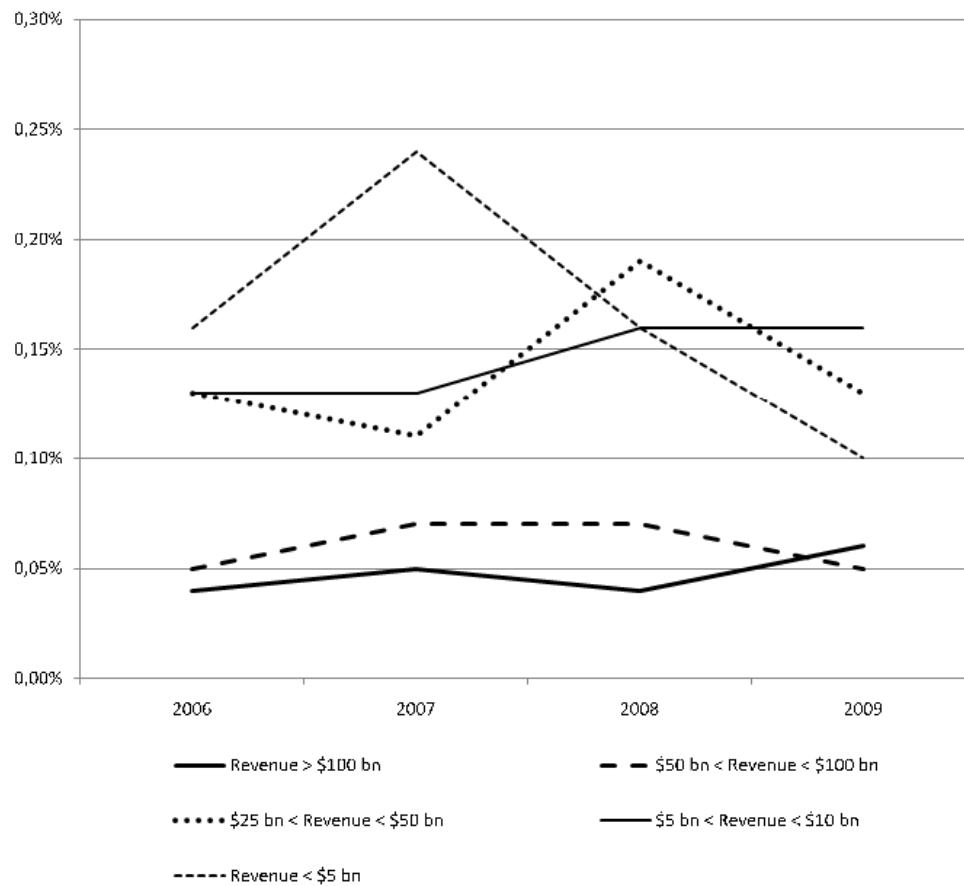
FIGURE 1

Giving/Revenues 2006-2009
Activity sector breakdown
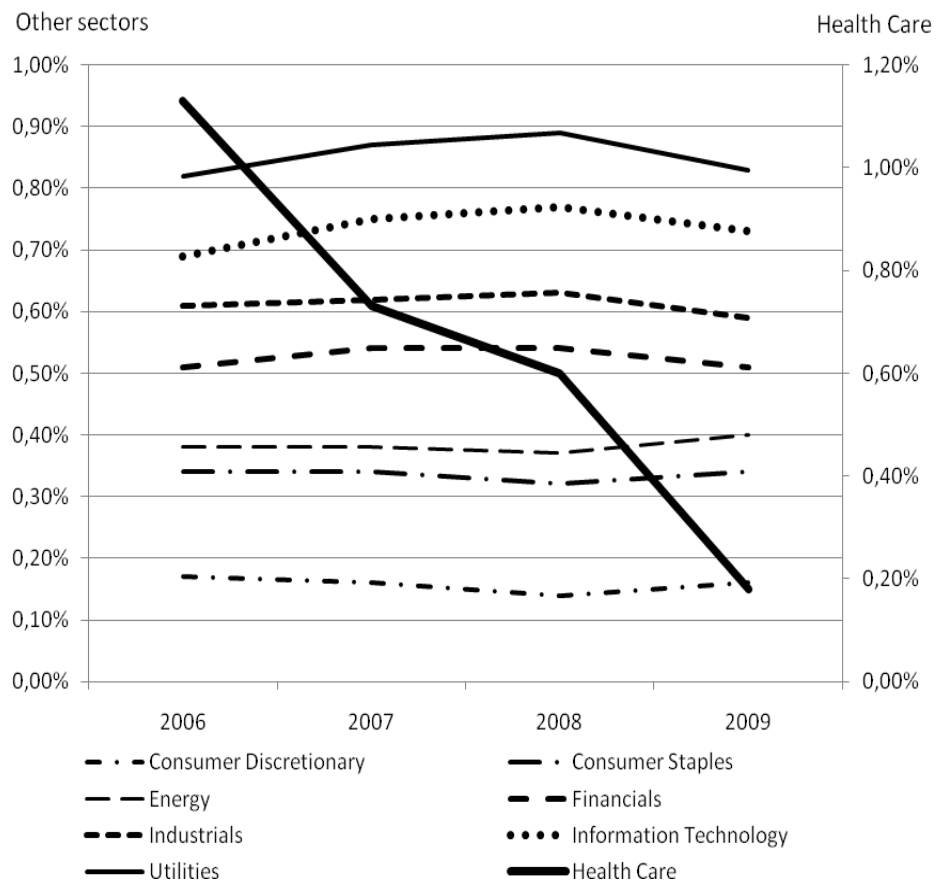
As to the breakdown by size of revenues, all cohorts, except for revenues over 100 billion USD, point to a decline in *S/R* from 2008 to 2009 (see Figure 2).
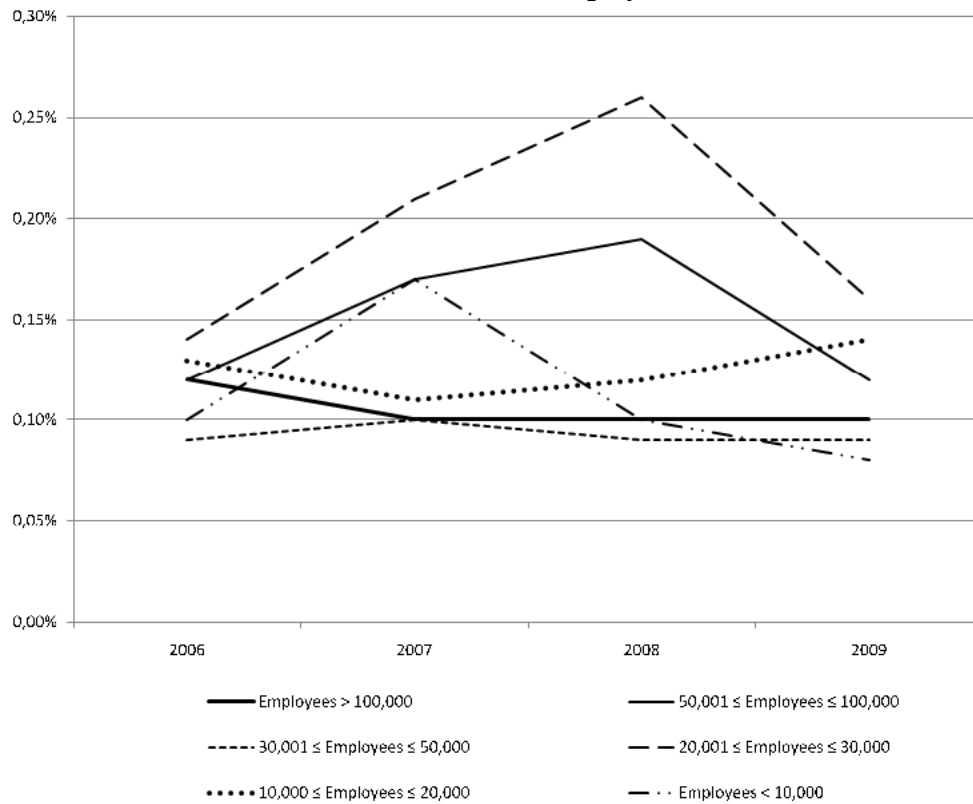
FIGURE 2

Giving/Revenues 2006-2009
Size – Revenue Breakdown

The size breakdown according to the number of employees displays also the general result of decline from 2008 to 2009, except for the [10 000, 20 000] employees' tier (Figure 3).
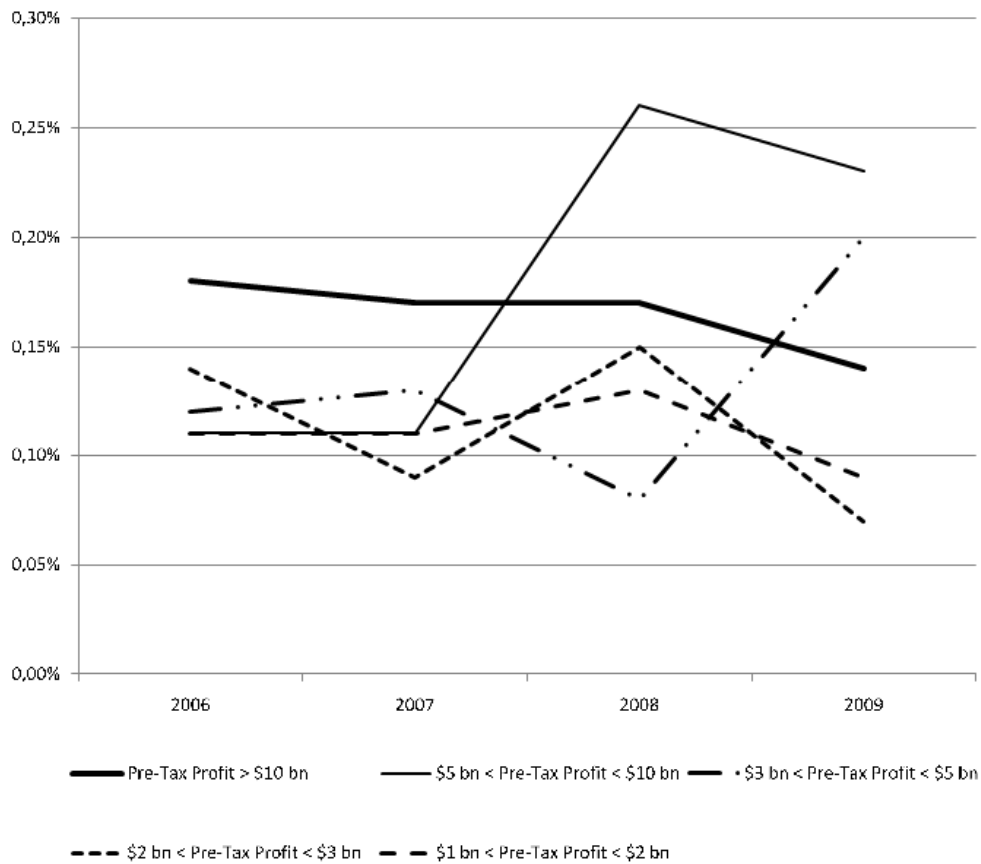
FIGURE 3

Giving/Revenues 2006-2009
Size – Number of Employees Breakdown

Finally, the pre-tax profits breakdown yields similar results, without exceptions for the various tiers, as Figure 4 illustrates, for the cohorts comparable across time.

FIGURE 4

Giving/Revenues 2006-2009
Size – Pre-tax Profit Breakdown

Altogether, we find support for corporate giving refrain in hard times.

5. CONCLUSIONS

This paper addresses the choice of CSR expenses under changing macroeconomic conditions. We derive a theoretical model that deals with firms' decision on CSR and we find that, with adverse economic conditions (such as the current economic and financial crisis), firms are expected to reduce CSR spending, independently of the market structure and notwithstanding the fact that these expenses increase demand. In a

competitive environment, corporate giving, as measured as a share of firm's revenues, is found to be lower the less sensitive demand is to rivals' pricing policies, and the more sensitive demand is to rivals' CSR. In terms of managerial implications, we find that, facing an adverse economic scenario, firms should only increase their CSR spending (as a share of firm's revenues) if the change in the demand elasticities (as a consequence of the adverse scenario) happens in such a way that the equilibrium amount of CSR spending increases (expression 3 in our model). Kitzmueller (2008) concludes that if firms compete for consumers with CSR preferences, then CSR spending will be correlated with the degree of competition. Other than the degree of competition, our conclusions point to the economic scenario and consumers' reaction to price (both firm and rivals) and to CSR activities (both firm and rivals) as the factors that will determine CSR spending.

Our theoretical findings are tested through a careful and comprehensive econometric analysis, providing a novel integrated approach. The analysis includes, namely, stationarity testing of the ratio giving/revenues, cointegration testing between giving and revenues, and comovement testing between giving and GDP. According to Kitzmueller (2008:19), "rigorous statistical analysis (…of empirical studies concerning CSR…) is still in an infant state". Our study tries to overcome this limitation of empirical studies and to the best of our knowledge, it is the first time that the relationship between corporate giving and the business/economic cycle is modeled and empirically tested with such statistical analysis, providing robustness to the results and conclusions presented.

The major empirical results, supported by various statistical tools, favor a one-to-one long run relation between giving and revenues. Moreover, considering business cycle frequencies, giving is a pro-cyclical variable. Therefore, one should expect giving to fall

during real economic activity contractions, as predicted by our model.

Lastly, two further implications for management practice can be drawn from the applied analysis conducted. First, CSR investment is a valuable tool to positively influence current and next year(s) revenues performance. Second, in bad times a more cautious screening of each firm's target market is advised, since there appears to be sector and firm size differences for the giving/revenues behavior.

6. LIMITATIONS AND FURTHER RESEARCH

To complement our study of the supply-side view of CSR effort, a further research would also include an analysis of CSR's impact on consumer welfare. Moreover, on the empirical side, using firm level data and own market characteristics should prove useful for deriving more specific lessons on the CSR strategic choice.

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