THE INTERACTION BETWEEN CSP AND CFP IN SPANISH COMPANIES; THE IMPACT OF THE GLOBAL FINANCIAL CRISIS

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Abstract
This study assesses the relationship between Corporate Social Performance (CSP) and Corporate Financial Performance (CFP) in the Spanish market, considering the two possible directions of causality. In the paper, it is hypothesized that either financial performance precedes social performance, or the other way round. In order to analyze this relations, we use a distributed–lag model which is concerned with the timing of the change and the length of time its takes for an effect to take place, taking also into account also the effect of the appearance of financial crisis in 2007 during the analyzed period. Based on a sample of 42 Spanish listed companies drawn from CSR index DataStream which cover the period 2006-2009, we apply a Granger Causation model which it will allow us to text empirically Neoclassic Economy Theory and the Stakeholder theory. The results indicate a number of significant statistical relationships between CFP and CSR. Concretely we prove a significant positive causality between market profitability and CSP, and between market risk and CSP. On the other hand, we don’t found a significant relation between CSP and the market value.

Resumen
El presente estudio pretende evaluar la relación existente entre el performance financiero (PF) y el performance social (PS) en empresas españolas cotizadas, considerando las dos posibles direcciones de causalidad. El trabajo, pretendemos contrastar las hipótesis respecto a si el performance financiero precede al performance social o viceversa. A la hora de analizar estas hipotéticas relaciones, utilizamos modelos de retardos temporales, que nos permiten comprobar cuando se producen estas correlaciones y cuanto tiempo necesitan para que se materialicen, teniendo en cuenta a su vez elo efecto de la aparición de la crisis financiera en el año 2007. En el estudio nos hemos basado en una muestra de 42 compañías españolas cotizadas
para elaborar un índice de RSC utilizando la base de datos ASSET4, que cubre el periodo de 2001 a 2010, aplicamos un modelo de VAR que nos permite textar empíricamente las teoría Neoclásica y la Teoría de los Stakeholders. Los resultados indican la existencia de una relación estadística significativa entre el PF y el PS. Concretamente hemos probado una la existencia de una causalidad significativa entre la rentabilidad del mercado y el PS, y entre el riesgo de mercado y el PS. Por otra parte no hemos podido constatar la existencia de una relación significativa entre la PS y el valor de mercado.
1. Introduction

The incidence of Corporate social responsibility (CSR) has increased significantly during the last decades in academic literature and also in the company’s management (Deegan et al., 2002; Fernández and Larrinaga, 2005; Gray et al., 1995; Mc Williams et al, 2006; Schotens, 2008, Gray), there has been set a great increase in the number of companies that have issued reports on social and environmental performance, and therefore it has hallmark of being a global idea (Gjolberg, 2009).

Under the traditional businesses approach, ecological and social issues are ignored in management objectives because they are not visible or do no significant financial impact (Moneva et al, 2006). But this changes with Brundland Report in 1987; sustainable concept was broadly implemented by corporations and business organizations in their agendas. Now it accepted that without corporate support, society will not achieve sustainable development (Bansal, 2003).

This context brings up the question of instrumentality of CSR (Figge and Hahn, 2001). For Figge Hanh and (2001,), sustainable development is a normative and paradigmatic but anthropocentric construct in that favour a safe, healthy high quality for current and future generation, thus unlike ecocentric notions and deep green views sustainable development is per definition an instrumental concept that it meant to serve long term human well being.

The aim of this paper is to investigate the interaction between corporate social performance and financial performance using a distributed lag to assess the time – dependent relationship. What more, as contribution to the literature, the paper analyzes the effect of the actual financial crisis in the hypothetical relation between CSP and CFP in the Spanish economy context.

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1. more than half of the Fortune 1000 companies issue corporate social responsibility (CSR) reports (KPMG, 2008)
The paper is organized as follows. Literature overviews locate the subject in the first chapter in the second chapter after develop academic background we stabilized the hypotheses to contrast, the third part of the word is relating the methodology, and the fourth part analyzes the results. Finally, the conclusions summarize our findings

2. Academic Background, Theory and Hypotheses

In the last decades, many studies investigate the instrumental approach of de CSR (Lockett et al, 2006; Scholtens, 2008) and concretely the Scholars have been searching for a link between corporate social performance (CSP) and corporate financial performance (CFP) for thirty-five years (Margolis et al, 2007). Given the inherent instrumentality of sustainable development (Hahn and Figge, 2011), it is often argued that companies will only contribute to sustainable development if they perceive an incentive to do so (Epstein and Roy, 2003; Husted and de Jesus Salazar, 2006, Rowley and Berman, 2000).

Despite that great number of contributions of the academy the linkages between CSP and CFP are still not clear (Brammer and Millington, 2008; Hahn and Figge, 2011; Lockett, et al, 2006; Orlitzky et al, 2003; Ullman, 1985; Wadddock and Graves, 1997), and the results of empirical research stabilised an ambiguous relationship. Even more, when the relationship is established it still unclear the direction of the relationship, a good CSP generate a better CFP or simply successful companies to spend on CSP and therefore attain a higher standard (Brammer and Millington, 2008; Wadddock and Graves, 1997). From this great number studies few studies attempt to analyze the time-depend relationships between CSP and CFP (Chatterji et al, 2007; Bird et al, 2006, Scholtens, 2008).

Margolish and Walsh (2001) showed a overview of 52 empirical papers witch try to establish the relationships between CSR and CSP, in their research the 50% of the studies found a positive relationship, 25% found no relationship, 20% had mixed results and 5% had negative relationship. In the same way, Orlitzky et al (2003) developed a
meta-analysis in light of 30 years of empirical data; they show that across the studies CSP is positively correlated with CFP, the relationship tends to be directional and simultaneous. Wu (2006) developed a meta-analysis of 121 empirical studies, to investigate the relationship CSP CFP and firm side, and found that 38 papers revealed a positive relationship between CSP and CFP, the analysed studied with used market measures have smaller effect sizes than other measures (profitability, asset utilization and growth), and no relationship was found between firm side and social performance. Margolish (et, al. 2007) conduct a meta-analysis of 192 effects revealed in 167 studies. The overall effect is positive relationship but small. They find that the association is strongest for the analysis of the specific dimensions of charitable contributions, revealed misdeeds, and environmental performance and when CSP is assessed more broadly through observer perceptions and self-reported social performance. The association is weakest for the specific dimensions of corporate policies and transparency and when CSP is assessed more broadly through third-party audits and mutual fund screens. Although the results suggest no financial penalty for CSP, they indicate at least as strong a link from prior CFP to subsequent CSP as the reverse (Margolish et, al. 2007, p 2)

Those empirical studies have been critiqued for lacking theoretical foundation (Ullman, 1985) and other authors conclude that this positive relationship between CSR and CFP resulted from poor execution of event study methodology (Lockett et al, 2006, Mc Williams and Siegel, 1997, 1998)

There are different opinions about the interaction between those performances and the empirical research has not arrived at consensus (Scholtens, 2008), so to understand the possible relationship between CSP and CFP in our paper we are going to analyze two opposite theories: Neoclassic Economy Theory and Stakeholder theory.

**Neoclassic Economy Theory**

In the traditional view of the business, the main goal of the companies is to use the resources efficiently and to maximize the return on capital for the shareholders who are
the owners of the company (Jensen and Meckling, 1976; Williamson, 1964). Social responsibility of business is to maximize profits within the bounds of the law goes against the inspiration of most business and society work that examines the impact of business power on society (Davis, 1983). From this perspective, Levitt cautions that “government jobs in not business, and business’s job is not government” (Mc Williams, et al, 2006). Based in this postulate, the liberal and classic view of the company suggest a negative link, CSP involves cost and therefore damages the financial performance of the company (Friedman, 1970), so from this point of view the firms that perform responsibly incur a competitive disadvantage (Aupperle et al, 1985), because they are incurring cost that might otherwise be avoided or that should be borne by others, for example a decision to invest in pollution control asset when other competitors do not (Waddock and Graves, 1997). Jensen (2002, p. 238) indicated that it is ‘logically impossible to maximize in more than one dimension at the same time unless the dimensions are monotone transformations of one another’. This constraint implies that profits and social performance cannot be maximized simultaneously. In other words, there is a trade-off between profits and social performance (Husted and Salazar, 2006), because of that social constraints on the firm and socially responsible behaviour may go against the value maximisation (Brummer, 1991; Jensen, 2001). Feedman (1970) consider that the mere existence of CSR is a signal of an agency problem with the firm. Mc Williams et al (2006) summarise that this theory implies that CSR is a misuse of corporate resources that would be better spent on valued-added internal process or returned to shareholders, and what more, it also suggest that CSR is an executive perk, in the sense that managers use CSR to advance their careers or other personal agenda.

According to this line of thinking there are few readily measurable economics benefit to socially responsible behaviour where are numerous cost not (Waddock and Graves, 1997), so this theory expect a negative relationship between CSR and CSP (Brammer et al, 2006; Freedman and Jaggi, 1986; Ingram and Frazier, 1983; Kedia and Kuntz,
Hypothesis 1: There are a negative relationship between CSP and CFP, ceteris paribus
Hypothesis 2: There are a negative relationship between CFP and CSP ceteris paribus

**Stakeholder Theory**

The Stakeholder Theory proposes a tension exits between the firm explicit cost and implicit cost to other stakeholders (Waddock and Graves, 1997). Based on this perception of the social relationships this theory considers that satisfying stakeholders interest in others performances -different from the maximization of the return on capital for the shareholders- will result in firm’s financial and economic performance (Freeman, 1984; Porter and Van der Linde, 1995). Stakeholders theory argue that bilateral stakeholder management relationships serve as monitoring and enforcement process that prevent managers from diverting attention from broad organisational financial goals (Hill and Jones, 1992; Jones, 1995). Furthermore, managing the claims of company’s stakeholders, the efficiency could increases due to the organizations’ adaption to external demands (Freeman and Evans, 1990). Instrumental Stakeholder Theory (Clarkson, 1995; Cornell and Shapiro, 1987; Donaldson and Preston, 1995, Jones, 1995; Freeman, 1984, Mitchell et al, 1997) suggests a positive relationship between CSP and CFP (Preston, 1978; Anderson and Frankle, 1980; Freman and Stagliano, 1991; Blacconiere and Northucut, 1997, Graves and Waddock, 2000; Griffing and Mahon, 1997, Berman et al, 1999; Van de Velde et al, 2005; Orltzy et al 2003). In order to analyze the direction of the causality; two views can be contrasted and tested empirically: Slack resource and good management (Waddock and Graves, 1997):

**Slack Resource**

Waddock and Graves (1997) consider that slack resource argue that better financial performance potentially results in the availability of slack, financial and other resources that provide the opportunity to invest in social performance, thus better financial
performance would be a predictor of better CSP (McGuire et al, 1990). This line of thinking considers that high financial performance or financial successful companies have more financial resources so they could spend on CSP more and therefore attain a higher standard (Brammer and Millington, 2008; Waddock and Graves, 1997). Margolish et al (2007) found that companies with superior CFP are more likely to engage in CSP (Allouche & Laroche, 2005; Orlitzky et al., 2003). For the same authors (Margolish et al, 2007) at least four motivations seem plausible: risk mitigation that could be reputational (Peloza, 2006) or related with environmental management developed to reduce environmental risks, external expectations of their generosity in the company has a successfully financial performance could be asked for additional social investments (Campbell, 2007); generalized reciprocity may also propel companies that do well to endeavor to do good (Margolish et al, 2007), and guilt (Cho 2009). Therefore, we predict that there is a positive relationship:

Hypothesis 3: There are a positive relationship between CFP and CSP, ceteris paribus

**Good management**

For Waddock and Graves (1997), good management theorist argue that there is a high correlation between good management practice and CSP, because attention to CSP improves relationships with key stakeholders groups (Freeman, 1984), resulting in better CFP (McGuire et al, 1990). CSP as a distinctive resource—a way of treating others, for example, or a way of running the company’s operations—that substantively generates benefits or reduces costs, both of which improve financial performance (Margolish et al, 2007), for example reducing costs by mitigating the likelihood of negative regulatory, or legislative action (Freeman, 1984; Berman et al, 1999). But also, another set of theoretical accounts suggests that the appeal of CSP, rather than its substantive impact, generates financial returns. Independent of the actual effects of efforts to do good, the second model suggests that the appearance of doing good (or the perception among key stakeholders that a company is doing good) generates demand for and commitment to the company’s stock, jobs, or products (Margolish et al,
2007). Furthermore, managing the claims of company’s stakeholders, the efficiency could increases due to the organizations’ adaption to external demands (Freeman and Evans, 1990). Wu’s (2006) research support that the cost having a high level of corporate social responsibility is minimal and that firms may actually benefit from socially responsible actions in terms of employee morale and productivity (Moskowitz, 1972; Parket and Eilbirt, 1975; Soloman and Hansen, 1985; McGuire et al., 1988). Firms can be more successful by developing (up to some margin) relationships with customers, employees, communities and governments (Harrison and St. John, 1994; Kotter and Heskett, 1992), differentiate the firm’s products/services, thereby attracting socially responsive investors (Kapstein, 2001). Ribstein (2005) consider that CSR could determine higher financial results based on strategy processes improvement, and also employee, customer and society loyalty. Watch more, the perception of “ethical” company could improve the reputation of the company (Klein and Davar, 2003; Peloza, 2005; Turban and Greening, 1996), or attract financial resources from socially responsive investors (Kapstein, 2001).

Therefore, we predict that:

Hypothesis 4: There are a positive relationship between CSP and CFP, ceteris paribus

Neutral Association

There are also a third possibility, that there are simply no relationship between CSP and CFP (Abbott and Monsen, 1979; Alexander and Burchholz, 1978; Aupperle, et al, 1985, Berman et al, 1999; Fombrum and Shaley, 1990; Waddock et al, 2000; Soana, 2011). From this line of thought, it has been argued that there are so many intervening variables between social and financial performance that there is not reason to expect a relationship to exits except possibly by chance (Ullman, 1985).

Therefore, we predict that:

Hypothesis 5: There are not relationship between CSP and CFP, ceteris paribus
3. Data, measures, and method

For some authors the fundamental reason for the uncertainty about the relationship between CSP and CFP is the problem of measuring CSP (Waddock and Graves, 1997; Brammer and Millington, 2008), CSP is a multidimensional construct, with behaviours ranging across a huge variety of inputs related (Carroll, 1979; Waddock and Graves, 1997; Wood, 1991-a, Aupperle, 1985, Brammer and Millington, 2008). In order to measure the CSP there is not consensus; witch has been quantified in previous studies according to five methods (Waddock and Graves, 1997, Soana, 2011):

- Content analysis: it measures CSR as declared in publish documents (Abbott and Monsen, 1979; Gray et al, 1995; Patten and Crampton, 2004; Wolfe, 1991).
- Questionnaire survey: Questionnaires completed by company managers are analyzed to appraise the level of social performance (Aupperle, 1991, Aupperle et al, 1985; Maignan and Ferrel, 2000; Turker, 2008)
- Reputational measures: Fortune reputational or Moskowitz reputational scale (Bowman and Haire, 1975; McGuire et al, 1998)
- One dimension indicator they measured one single aspect of the CSR construct (Brammer and Millington, 2008)
- Rating: A multidimensional index calculate by specialized agency (Abbott and Monsen, 1979; Cho and Patten , 2007; Graves and Waddock, 1994; Greening and Turban, 2000; Griffing and Mahon, 1997; Gjolber, 2009, Mahoney and Thorne, 2005; Waddock and Graves, 1997)

In our paper we chose the way to measure the CSR performance by a rating, concretely using DataStream data base from Thomson Reuter.

3.1. Measures of FP and SSCP
This paper tries to analyze the relationship between FP and CSP in the Spanish listed companies the Spanish Stock Exchange (IBEX 35). Concretely we take datas from 2006-2009 related with the financial performance and also from CSP. Although there are 35 companies in the index, we select dates from 23 companies, because for 12 of them we had not found enough dates. Those 23 companies represent the 80% of the market value, so that situation generates robustness to the chosen sample, for the statistical analysis we have 92case/year dates.

The literature establish  (Orlitzky et al., 2003; Wu, 2006; Van Beurden y Gössling, 2008; Ortas y Moneva, 2011), ther relationship between this two construct is not clear, may be because CSR is a methaconstruct and those component vary across the authors  (Carroll, 1979). The indicators used to evaluate the CSP of the different companies are shows in the Table.

(TABLE 1)

CSP was measured through a three-step procedure. First, an intensive search of the Thomson DataStream database identified the key performance indicators of CSP. We are going to calculate the CSR score for each company, therefore companies Could score a punctuation between 21 –  0, 21 represent the highest punctuation and the best CSR performance and 0 represent the poorest CSP, a similar model was applied by Scholtens (2008).

In order to evaluate the FP we took dates from: a) Market profitability (DF-RENT) for all the years of the sample (2006-2009); y, b) Market risk (DF-RIES), witch is obtained using the standard deviation of the daily market profitability.

Table 2 shows the main descriptive statistics of both FP and CSP measures. Some interesting features of this table warrant comment. The maximum and minimum values of the FP and CSP dimensions show a wide diversity in their values in the different periods, which suggests that the investigation of the dependence patterns between these constructs is promising. The highest Market profitability are in 2006,
coinciding with large economic growth in the major economies over the world. In the other hand the lowest values of profitability are in 2008, damaged by the financial crisis. The highest level of risk are in 2008 and 2009, and the lowest in 2006.

*(TABLE 2)*

The profitability of every company (DF-RENT) are positively correlated with the level of risk (DF-RIES) for the analyzed period. That result is based in the notion that consider companies witch reach a highest risk produces a highest profitability, and vice versa. And also we can see that CSP have been increased during all the period.

### 3.2. Econometric models

Recent meta-analyses examining the relationship between firm’s financial success and various sustainability practices indicate that it mostly is the linear regression that it employed to test the association of these concepts (Roman et al., 1999; Margolis and Walsh, 2003; Orlitzky et al., 2003; Wu, 2006; Van Beurden and Gössling, 2008). However, with very few exceptions (Bird, et al., 2006; Chatterji, et al., 2007), the literature lacks studies investigating the causation between CSP and FP constructs. Among the various methods available to analyze the causation of these constructs and its direction, the literature highlights the a) distributed-lag and b) Granger causality models. The Granger causality model was deemed more suitable for the purposes of this research, because: a) the distributed-lag model focuses only on timing and, thus, may require determining how far back in time it is necessary to go to find any interaction between CSP and FP, and b) the Granger causality model is more concerned with precedence than the usual sense of causation (Scholtens, 2008). Thus, the Granger causality model should yield convincing evidence to answer such questions as whether changes in the level of SSCP cause changes in firms’ FP and

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2 Datos no insertados en la tabla, pero la matriz de correlación de todas las variables consideradas está disponible bajo petición.
vice versa. In addition, this approach allows capturing bidirectional causality between SSCP and FP (Brooks, 2002). To test for Granger causation, a model with three lags was constructed, which is given by the following set of equations:

\[
\begin{align*}
\text{CSP}_{1-t} &= \beta_1 \text{PFREN} + \beta_2 \text{PFREN} - 1 + \beta_3 \text{PFREN} - 2 + \beta_4 \text{PFREN} - 3 + \varepsilon_{1,t} \\
\text{CSP}_{1-t} &= \beta_1 \text{PFRIES} + \beta_2 \text{PFRIES} - 1 + \beta_3 \text{PFRIES} - 2 + \beta_4 \text{PFRIES} - 3 + \varepsilon_{1,t} \\
\text{PFREN}_{1-t} &= \beta_1 \text{PCSP} + \beta_2 \text{PCSP} - 1 + \beta_3 \text{PCSP} - 2 + \beta_4 \text{PCSP} - 3 + \varepsilon_{1,t} \\
\text{PFRIES}_{1-t} &= \beta_1 \text{PCSP} + \beta_2 \text{PCSP} - 1 + \beta_3 \text{PCSP} - 2 + \beta_4 \text{PCSP} - 3 + \varepsilon_{1,t}
\end{align*}
\]

Where CSP\(_{i,t}\) refers to the level of Corporate Social Performance (CSP) of the company ‘i’ in the period ‘t’; FP\(_{i,t}\) is the level of Financial Performance (FP) of the company ‘i’ in the period ‘t’; β\(_i\) refers to the regression coefficients; and finally, ε\(_{i,t}\) and ν\(_{i,t}\) are the residuals of each equation.

4. Results

The results show that CFP (PFREN) and Risk (PFRIES) have dependent relationships with the CSP (Table 3).

\textbf{(TABLE 3)}

Therefore, we have to refuse Hypothesis 1 and 2. We found a positive relation between CFP (PFREN) & CSP in 2006, 2007 and 2009, so we can accept Hypothesis 3. In 2008 the relationship is also positive, but starts the crisis and the decrease of profitability generates a decrease in CSP. The results show that CFP (PFREN) & Risk (PFRIES) have dependent relationships with the CSP, therefore we refuse Hypothesis 1 and 2.

In the other hand exists a positive relation between CFP (PFREN) & CSP in 2006, 2007 and 2009, so we can accept Hypothesis 3. In 2008 is also positive, but start the crisis and the decrease of profitability generate a decrease in CSP. Risk (PFRIES) has a negative relation with CSP, so there are asymmetric effect in the relationship CFP
and CSP. The positive effect from CFP to CSP is less important than the negative effect from negative CFP to CSP. CSP doesn't explain the market profitability and risk, and we refuse Hypothesis 4

**Conclusions**

But we can prove that there are some relations between the concepts. The incidence of CSR has increased significantly, therefore this results brings up the question of instrumentality of CSR (Figge and Hahn, 2001). The results of the paper evidence that there is a relationship between CFP and CSP, but only this direction and positive. Also a relationship Risk and CSP but in this case is negative. So Companies with less CFP and higher Risk has poorest CSP. CSP is not a relevant factor to explain CFP.

**Limitation of the paper**

Limitation:
The number of companies,
The valuation of CSP may Could be better if we develope a syntetic index
Bibliography

• Cho, C. and Patten, D. 2007. The role of environmental disclosure as a tools of legitimacy: A research note. Accounting Organizations and Society, 32, 639-647
• Cho, C H. 2009. Legitimation Strategies Used in Response to Environmental Disaster: A French Case Study of Total SA's Erika and AZF Incidents, European Accounting Review, 18 (1), 33–62,
• Cornell, B., and. Shapiro, A.C. Corporate Stakeholders and Corporate Finance,” Financial Management 16, 1987, 5-14
• Friedman, M. 1970. The social responsibility of business is to increase its profits. New York Times Magazine, September 13: 32–33, 122, 124, 126
• Kapstein, EB. 2001. The corporate ethics crusade. Foreign Affairs, 80 (5), 105-119


• Preston, L. E. Analysing corporate social performance: Methods and results. Journal of Contemporary Business, 7, 135–150


Table 2. Descriptives

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Tabla 3. Resultados de Granger

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