Corporate reputation and market value: Evidence with generalized regression neural networks

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ABSTRACT

Corporate Reputation (CR) is a critical intangible asset for a firm. As a representation of its past actions and results, CR encompasses a number of features which conform the status of a firm regarding its competitors. This helps corporations not only to gain competitive advantages, but also to survive in times of economic turbulences. Despite its apparent relevance, it remains inconclusive and controversial whether CR affects firms' financial performance, a key point for current and potential investors. Our aim is to provide new evidence that could shed some light in determining the role of CR in stock market valuation. Since most of the previous research focus on this relationship using Multiple Regression (MR), it has been suggested that more conclusive results could be achieved using neural networks, but it has not been proven yet to the best of our knowledge. Using a sample of Spanish listed companies in the period 2008–2011, MR and a neural network technique, Generalized Regression Neural Network (GRNN), have been used. At an empirical level, results show that the mere presence of a firm in a reputation ranking has a positive impact on its market value, and that also a higher CR have a favorable influence on financial performance. At a methodological level, results of GRNN have proven to be more robust than those obtained using traditional MR.

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1. Introduction

Corporate Reputation (CR) is undoubtedly an intangible asset which provides a competitive advantage for firms (Rose & Thomsen, 2004; Hall, 1992). However, controversy arises when the discussion turns into how financial markets value that reputation. Some studies conclude that favorable reputations contribute to increase the market value of firms (Black, Carnes, & Richardson, 2000; Stuebs & Sun, 2011; Wang & Smith, 2008), while others reject this assertion (Brammer, Brooks, & Pavelin, 2004, 2009). This contradictory set of results motivates the search for new methodological perspectives, different from those traditionally used (as multiple regressions, MR), with the purpose of shedding some light on the controversy. Our study uses Generalized Regression Neural Networks (GRNN) to measure the relationship between CR and the firms' market value.

MR has an important role in identifying signs and meanings of variables, but the impact analysis of variables using GRNN takes into account non-linearity, adding significant results to our research by comparing both techniques. Since the two approaches are mutually informative, our research is intended to shed light on the importance of CR to explain the market value of firms, providing both conceptual and practical contributions. To the best of our knowledge, GRNN have not been used to investigate the effects of CR in the value of companies, modeling procedures using neural networks are expected to be more robust than the traditional MR, adjusted for potential nonlinearities between the variables under study (Pao, 2008).

The structure of the paper is organized as follows. After the introduction, relevant literature on the topic and research hypotheses are developed in Section 2. Section 3 presents research models and methods. Section 4 is dedicated to the data used and the selected sample, and Section 5 the results obtained in the investigation. Finally, main conclusions and future research suggestions are shown.

2. Literature review and hypotheses

CR is a collective representation of past actions and results of a company, and describes its ability to distribute the value created between different stakeholders. CR also measures the relative status of a company, both internally with employees and externally with stakeholders within a competitive and institutional environment (Fombrun & Van Riel, 1996).

According to the Resource-Based View, CR is an asset for the company, and as such, it has the ability to create value. This point has been empirically and theoretically demonstrated, proving that a good CR increases the expected reward in future interactions with others

(Fombrun, Gardberg, & Barnett, 2000; Pfeiffer, Tran, Krumme, & Rand, 2012). The rationale behind this assertion is that CR acts as a mechanism to reduce asymmetric information, allowing the company to attract better resources under more favorable terms (De Quevedo Puente, De la Fuente Sabaté, & Delgado García, 2005). When it occurs, a company with a good CR is capable of getting better productive (first order) resources, linking past and future resources within the firm. Thus, CR becomes a second order resource whose task is to ease the attraction of new resources for the achievement of better conditions for business activity, and therefore constituting both CR and the other resources a differential strategic advantage over competitors (Hall, 1992). Kotha, Rajgopal, and Rindova (2001) state that CR is an inimitable, irreplaceable asset, unevenly distributed, and source of barriers within and between sectors through differentiation. In the words of Capraro and Srivastava (1997) and Fombrun and Shanley (1990), CR confers on the company a valuable, scarce and sustainable competitive advantage.

Previous literature has no doubts on the economic benefits provided by a good CR, but controversy still surrounds the valuation made by financial markets on CR (Agnihotri, 2014; Raithel & Schwaiger, 2015). As stated by Tischer and Hildebrandt (2014), several works have analyzed this relationship, but none of them have been able to confirm undoubtedly the influence of CR on financial performance. In some papers the claimed effects cannot be proven, and in some others the direction of causality is unclear.

There are several works concluding that CR is a valuable business resource, capable of generating sustainable competitive advantage over time, which causes a higher market value of their securities (Agnihotri, 2014; Black et al., 2000; Cole, Brown, & Sturgess, 2014; Hall Jr. & Lee, 2014; Raithel & Schwaiger, 2015; Tischer & Hildebrandt, 2014; Wang & Smith, 2008). Similarly, Stuebs and Sun (2011) and Wang and Smith (2008) consider that a good CR stands for the company's financial health, a highly valued aspect in the eyes of investors, since they use the presence of a firm in the reputation rankings as a signal to invest in. Cole et al. (2014) and Raithel and Schwaiger (2015) point out that given the level of competition among investment fund managers seeking better returns, they are required to look beyond the conventional parameters (accounting data) and find increasingly innovative ways to beat the market. One such way is estimating the value of CR.

Other studies, however, do not consider that the mere presence in the rankings of CR can be identified with obtaining higher yields, so CR does not cause any noticeable effect on the stock markets (Brammer et al., 2004, 2009).

The disparity of previous findings encourages us to test empirically, for the Spanish case, whether a listed company labeled as "reputable" (with a good or high CR in a reputation ranking) has a differentiating factor in terms of market value, compared with other listed companies not included in the ranking. Therefore we formulate the following Hypothesis 1:

Hypothesis 1. *(H1): In the Spanish stock market, the presence of firms in the CR rankings affects positively the market value of shares.*

Other group of studies have also found that the rankings of CR generate an implicit classification between the ranked companies, assigning to each of them a score that allows comparison with other firms. This implies that there will be "best" and "worst" companies, i.e., companies with better CR and companies with worse status among stakeholders. The key issue here is whether the market takes into account this stratification in the form of increased stock value. The literature shows again mixed and inconclusive results. Authors such as Rose and Thomsen (2004); Srivastava, McInish, Wood, and Capraro (1997); and Vergin and Qoronfleh (1998) show that firms with higher CR obtain a higher return for a given level of risk, increasing the market value of their stocks. In similar terms, Black et al. (2000); Chung, Eneroth, and Schneeweis (2003); Filbeck et al. (1997);

Filbeck, Gorman, and Preece (1997); and Filbeck and Preece (2003) show that if the performance of companies with higher and lower CR is compared within the rankings, the former provide greater profitability.

However, some other works obtain the opposite effect in many aspects. Chung et al. (1999); Filbeck (2001); and McGuire, Schneeweis, and Branch (1990), state that it is not possible to beat the market by investing in companies with good CR. Some other authors conclude that a high CR even produces the opposite effect: the actions of the most reputable companies have lower returns, on average, that the actions of the less reputable companies (Anginer & Statman, 2010), or even negative income (Brammer et al., 2004). This reaction may be motivated by two investor behaviors: first, the tendency to invest in well-known companies or in those which have a good CR, both synonymous for quality (just as consumers buy branded products to their family); and second, investors are driven by the buying euphoria of certain companies, which leads them to overreact and to pay more than its value. Companies usually are not able to meet those high expectations, motivating the subsequent fall in the share price (Brammer et al., 2004; Brammer & Pavelin, 2004).

These results leave open the debate on whether a higher level of CR has a positive effect on the market value of a company. Therefore, we state our second hypothesis in the following way:

Hypothesis 2. *(H2): In the Spanish stock market, companies with the highest score in CR have a higher market value.*

Most of the previous research focused on the relationship between CR and market value has been using multiple regression analysis models (MR) as the preferred statistical method. Studies in other fields of financial research suggest that MR cannot capture nonlinear relationships between the analyzed variables, and more robust results can be achieved with the use of neural networks (NN) as a method of analysis, specifically Generalized Regression Neural Networks (Abdou, Kuzmic, Pointon, & Lister, 2012; Pao, 2008). Chavarnakul and Enke (2008); Chen and Yu (2009); and Enke and Thawornwong (2005), state that GRNN is a NN architecture that can solve any problem of function approximation. Mostafa (2011) and Chavarnakul and Enke (2008) found that the GRNN prediction performance was superior to other statistical and stochastic methods applied to financial data. In addition, GRNN has several methodological advantages over other NN, such as its ability to train once the training set (Er, Yumusak, & Temurtas, 2010; Wu, 2011), and that previous decisions regarding the number of hidden layers and the adjustment of the initial weights are not required (Chavarnakul & Enke, 2008; Yaghobi, Rajabi, & Ansari, 2011). Another advantage of GRNN is that, being a type of NN, is able to find out the sensitivity of the variables considered in the analysis, allowing comparison with the statistical significance provided by MR.

To our knowledge, no NN techniques have been used in research about CR and market value, and this is where we find another research gap that leads us to state the hypothesis 3 of our paper:

Hypothesis 3. *(H3): Generalized Regression Neural Network (GRNN) achieve more robust results than conventional multiple regression (MR) in analyzing the relationship between CR and market value of firms.*

3. Methods

One of the most widely used approaches to test the relationship between CR and market value is the "Ohlson model" (Ohlson, 1995). Originally this model has been applied by many authors to try to close the gap between market and book values, from the basis of the Gordon–Shapiro dividend–discount pricing model (Agarwal, Taffler, & Brown, 2011; Black et al., 2000; Kotha et al., 2001; Smith, Smith, & Wang, 2010; Wang & Smith, 2008). The method consists