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Sensitive industries produce better ESG performance: Evidence from emerging markets

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ABSTRACT

Given the rising interest in corporate social responsibility (CSR) globally, this paper investigates whether the financial profile of a firm is associated with superior environmental, social and governance (ESG) performance, considering firms from Brazil, Russia, India, China and South Africa (the so-called BRICS countries) with the aim of addressing a gap in relevant research. The study entails an analysis of ESG performance in sensitive industries (i.e., those subject to systematic social taboos, moral debates, and political pressures and those that are more likely to cause social and environmental damage). To test our hypotheses, we applied linear regressions with a data panel using the Thomson Reuters Eikon™ database to analyze data from 365 listed companies selected from BRICS between 2010 and 2012. The results suggest that companies in sensitive industries present superior environmental performance, even when controlling for the firm's size and country. Our study contributes to research on both the impact of ESG disclosure and the relationship between financial and ESG performance, as well to the practice of sustainability management in firms in developing countries.

1. Motivation

A central reason companies seek recourse in capital markets is the possibility of raising money at low costs. This is conditional, however, on the skill of firms to remunerate investors adequately because investors prioritize companies that provide a better return per unit of risk. In this regard, the quality of institutional communication with the market via reports containing accurate, extensive and reliable information is central for firms (Mendes-Da-Silva and Onusic, 2014; Mendes-Da-Silva et al., 2014). Moreover, in the last decade, the governance practices and social and environmental performance of firms have become increasingly important not only for policy makers and the general public but also for investors. Hence, the search for growing returns is likely to coexist with better governance social and environmental practices (Cheng et al., 2014).

Previous studies found that the commitment of a company to sustainability and Corporate Social Responsibility (CSR) reduces uncertainty, business risk and, by extension, the cost of capital for the firm (Bassen et al., 2006; Orlitzky and Benjamin, 2001). Assuming business risk as the probability that the company will not meet its objectives, companies that pollute or have unfair employee relations may suffer penalties, fines or even be forced to halt operations, leading to financial losses. In the view of Bassen et al. (2006), a major risk of irresponsible corporate behavior is reputational loss.

Incidents caused by irresponsible behavior can reduce the trust and loyalty that stakeholders place in a company. The *Deepwater Horizon* oil spill of BP in the Gulf of Mexico in 2010 is an exemplary case (Roberto, 2011). Likewise, bad CSR performance may motivate consumers to boycott the products of a firm, as occurred with Shell in the Brent Spar incident in 1995 (Dickson and McCulloch, 1996). If a company operates responsibly, however, the risk of consumer boycotts or other penalties is lower, rendering it more interesting for investors.

However, the question of whether firms in controversial industry sectors can become socially responsible largely remains unanswered. Sensitive industry sectors, which are typically characterized by social taboos, moral debates, and political pressure,

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include sinful industries, such as tobacco, gambling, alcohol, and adult entertainment (Cai et al., 2012). In this study, we identify companies as being sensitive (major socio-environmental impact: energy, including oil and gas; chemicals; paper and pulp; mining; and steel making) according to Richardson and Welker (2001) and Lee and Faff (2009).

The literature on Environmental, Social and Governance (ESG) performance, with CSR issues being renamed in the finance-oriented literature, has evolved slower than the practice. Wood (2010) suggested that studying CSR and the Corporate Financial Performance-CFP relationship is of no value to the CSR and Corporate Social Performance-CSP literature. Rahdari (2016) argued that these suggestions might be of some veracity for well-developed markets but in regard to developing countries, with few studies conducted on the subject and a lower level of understanding of the strengths and weaknesses, examining such a relationship might be of a great value to the CSR literature. Roman et al., (1999) had a similar concern.

When markets with a less mature economy - also called emerging markets - are considered, the ESG literature is even scarcer (Orsato et al., 2015). For this reason, this paper analyzes the relationship between the financial performance of companies listed in emerging markets belonging to the group of BRICS (Brazil, Russia, China, India and South Africa) and their ESG performance. In such contexts, ESG practices are expected to be in greater demand than in mature markets (Dobers and Halme, 2009; Baughn et al., 2007) due the deprived social and environmental demands in BRICS countries. In this respect, our study contributes to better understanding ESG performance in countries where it matters most. In addition to this research gap, we investigate the ESG performance of companies in these countries operating in sensitive sectors.

While acknowledging the different terms that many practitioners and academic researchers have coined, in this paper, we use the terms corporate social responsibility and ESG somewhat interchangeably. A consultancy firm named Goldman Sachs originally popularized the term “ESG performance”.

This study is relevant and contributory for three reasons. First, according to Friede et al. (2015), the knowledge regarding the associations between financial performance and ESG aspects remains fragmented. Some studies have also analyzed potential differences in the ESG and Corporate Financial Performance (CFP) across different regions. In particular, some found strong correlation between ESG and CFP in the Emerging Market group, significantly higher than in the developed markets. Second, part of the literature ascertains that lower ratings for ESG imply lower disclosure and/or lower adherence to ESG standards, which can induce riskier and more unstable environment for investments.

Yet, countries with higher economic growth, like the BRICS, may enable companies to invest more in ESG practices, to limit ESG related costs’ impact in the long term (Peiró-Signes and Segarra-Oña, 2013). Third, since the 1970s most studies have pointed to a positive ESG-CFP correlation (Friede et al., 2015), but there is no agreement that sensitive industries always entail low ESG performance (Statman and Glushnov, 2009; Hong and Kacperczyk, 2009). Therefore, our study is relevant because it addresses these three issues, as well as the scarcity of empirical evidence from emerging countries, the BRICS in particular.

The paper is structured as follows. The next section provides the background that supports the arguments put forward in this research. The third section presents the hypotheses. In the fourth section, we describe the empirical model, the data, the sample and the working method employed. The empirical results are discussed in the fifth section, including a section dedicated to robustness tests. The final section presents the conclusion.

2. Theoretical background

2.1. Environmental, social and governance (ESG), risk and financial performance

In one of the initial studies on Corporate Social Responsibility (CSR), Carrol (1979) proposed a model for testing CSR investments in organizations based on the economic, legal and ethical domains (Environmental issues were embedded in the economic and legal domain). Since then, expressions such as sustainability, corporate responsibility, corporate governance, socio-environmental governance, and environmental, social and governance (ESG) have been used as synonymous. From a generic perspective, Bassen et al. (2006:16) state that CSR is “a dynamic concept, and its ethical content depends largely on theoretical paradigms, regional economic traditions, business-level specifics and on the time period involved”. Other authors (for instance, Arya and Zhang, 2009; Child, 2005) agree with the argument that business organizations operating in different nations are embedded in distinct institutional environments experiencing different degrees of coercive pressures to engage in CSR activities. Overall, the lack of consensus about a definition, among other problems, has limited empirical testing. Numerous definitions of CSR have been proposed, and often no clear definition is given, making theoretical development and measurement difficult (McWilliams et al., 2006).

Stakeholder theory has been central for the topic of CSR. Freeman and McVea (2000) argue that companies should make decisions that are in line with the interest of groups or individuals who can be affected by the activities of the company: the so-called stakeholders. In a nutshell, stakeholder theory states that the capacity of a firm to generate sustainable wealth is determined by its relationships with its various stakeholders. Following this line of thinking, the company should disclose financial and non-financial information to be as transparent as possible. Such practices will reduce informational asymmetry with the general public, resulting in greater confidence levels by investors. As Cheng et al. (2014: 16) stated, “Higher levels of transparency reduce informational asymmetries between the firm and investors, thus mitigating perceived risk”. In a meta-analysis, Orlitzky and Benjamin (2001) confirmed such a proposition: better CSR performance reduces the risk of the company.

After all, research on the association between financial and socio-environmental performance has been inconclusive (Griffin and Mahon, 1997; Roman et al., 1999). Studies on the subject seek to identify the influences of ESG factors on the financial performance of companies and vice versa (Surroca et al., 2010; Lourenço and Branco, 2013). Orlitzky and Benjamin (2001), for instance, argue that managers and financial analysts still consider that social performance increases the risk of the company and is, therefore, a ‘punishable offense’. Although they are not explicit, this perspective is based on the neo-classical view that ESG practices constitute a source of inefficiency, which has the potential to reduce shareholders’ returns. In contrast, Bassen et al. (2006), Cheng et al. (2014) found positive associations between best ESG practices and the risk profile of a company.

Systematic risk can be managed, minimized or reduced, but it is difficult to eliminate it or completely shield from it; it is even more difficult when the risks are associated with political, economic and social events, called systematic risks. Companies can manage only unsystematic diversifiable risk. By showing that the disclosure of negative information about a company by the press increases its unsystematic risk, Bansal and Clelland (2004) confirmed the hypotheses that corporate environmental legitimacy is related to unsystematic risk. According to the authors, corporate environmental legitimacy may be associated with low unsystematic risk for

three reasons: (i) organizations obtain legitimacy as a result of institutional expectations; (ii) high legitimacy is associated with low unsystematic risk, because firms with legitimacy have better access to funds than non-legitimized firms; and (iii) firms with high legitimacy are more isolated from criticism, because the adoption of institutional standards result in these firms suffering fewer inspections from external agents. Finally, Lam, et al. (2012) found evidence that the increase of investments in companies with good ESG performances can also reduce systematic market risk. Such a reduction is due to these companies, on average, being better capitalized in the market and presenting better ESG performances. Sassen et al., (2016), on the basis of a large European panel dataset of 8752 firm-year observations covering the period 2002–2014, found that a higher CSP decreases total and idiosyncratic risk.

Other studies have investigated the impact on the risk and cost of capital of companies based on ESG practices. When investigating if the voluntary disclosure of non-financial information has an impact on the risk of the company and its capital cost, Dhaliwal et al. (2011) concluded that companies that had a high capital cost in a particular year obtained a reduction in their cost of capital when, in the following year, they publicized their ESG activities. Serafeim (2014) reached similar conclusions in his study of North American companies between 2002 and 2010. By preparing an Integrated Report (i.e., a report that combines financial and sustainability data), companies attract investors that value long-term investments. The Beta risk indicator, calculated using the Capital Asset Pricing Model (CAPM) procedure, had a negative correlation with the ESG indicators, showing that the disclosure of CSR practices results in less risk and, consequently, a lower cost of capital (Serafeim, 2014).

Controversially, Richardson and Welker (2001) concluded that there is no relationship between the disclosure of social practices and the cost of capital among companies whose return on capital is higher than the average. In sum, the association between the ESG, risk and financial performance of companies remains an open question.

2.2. BRICS and sensitive industries

The British economist Jim O'Neill created the term BRIC in 2001, suggesting that, together, the economies of Brazil, Russia, India and China (South Africa would be added later) would overtake the economies of the West by 2040 (O'Neill, 2012). The aggregated Gross Domestic Product, GDP, of these four countries quadrupled in the decade of 2000–2010, jumping from US$3 trillion to US$12 trillion. According to O'Neill (2012), the opportunity for productivity growth is greater in the BRICS than in developed countries. In other words, countries with a younger and growing labor force have higher potential to generate GDP growth.

Nevertheless, pressure is growing for less orthodox development - one that includes ESG practices in BRICS companies. Such a trend can already be seen in the capital markets of South Africa and Brazil, for instance, which have created sustainability indexes in their stock exchanges, giving visibility to companies that excel in ESG practices (Orsato et al., 2015). As the previous session hinted, ESG attributes are starting to have an impact on both the risk profile and the financial returns of companies – even if the results are still inconclusive (Orlitzky and Benjamin, 2001; Bassen et al., 2006; Hong and Kacperczyk, 2009; Cheng et al., 2014) and if the majority of studies about the influence of ESG practices on the business risk use companies operating in developed economies (Richardson and Welker, 2001; Dhaliwal et al., 2011; Serafeim, 2014). Few works have been developed using data from emerging economies (Dobers and Halme, 2009; Baughn et al., 2007).

Lockett et al. (2006) find that 89% of theoretical CSR papers are non-normative, whereas for the CSR in the literature on developing countries, the balance is far more evenly split. This is largely due to the relatively large number of papers on the role of business in development, which tend to adopt a normative, critical perspective (Blowfield and Frynas, 2005; Willi et al., 2011). Responsible management in developing countries is generally characterized by contributions to local urgent causes and religious values of the community, which are often based on philanthropy or charity (Raynard and Forstater, 2002). Managers responsible for companies located in these countries experience a great challenge: meetings international standards of global markets while facing legal infrastructure failures and a culture of support for responsible business.

Different economies are at different stages of development, with varying sophistication in civil society, and so companies are also at different stages of corporate responsibility maturity. Likewise, the stakeholder demand for CSR can vary substantially across nations, regions, and lines of business (McWilliams et al., 2006). Sensitive industries constitute a particular group requiring attention in BRICS. Social taboos, moral debates, and political pressures typically characterize sensitive industries (or controversial industries, as they have also been called). This is an overarching term that includes sinful industries, such as tobacco, gambling, alcohol, and adult entertainment, as well as industries involved with emerging environmental, social, or ethical issues, such as weapons, nuclear, oil, cement, and biotech (Baron et al., 2009). Traditionally, socially responsible funds have used negative screening (also called ethical screening or exclusion) as the criterion to leave companies operating in such sectors out of investment portfolios (see Orsato et al., 2015).

Some studies suggest a positive association between firm size and industry membership with social disclosure (e.g., Deegan and Gordon, 1996; Baron et al., 2009). However, whether firms of sensitive industries can become socially responsible remains an open question (Moura-Leite et al., 2014; Rodrigo et al., 2016). Research on the ESG performance and the financial profile of the companies from sensitive industries operating in BRICS countries is still missing.

In sum, the review of the literature suggests the existence of differences between the institutional context and company profiles of advanced economies, when compared with emerging economies, in terms of attributes such as (1) the Capital Market (Khanna and Palepu, 1997); (2) the Risk profile of companies (Cheng et al., 2014); and (3) Environmental legitimacy (Ioannou and Serafeim, 2014). These differences in attributes may impact the results of academic research among countries, as observed by Jamali and Karam (2016): the nuanced forms of CSR in the developing world are invariably contextualized and locally shaped by multi-level factors and actors embedded within wider formal and informal governance systems. In sum, the review of the literature suggests the existence of differences between the institutional context and company profiles of advanced economies, when compared with emerging economies, as described in Table 1.

Because institutional context and culture can play an important role in determining appropriate CSR priorities and initiatives, other scholars (Visser, 2005; Hamann, 2006) note that models such as Carrol's (1991), which was developed in an American context, may not be relevant for emerging economies. Hence, our research has empirical relevance.

3. Hypotheses

Anchored in the specialized literature presented in the previous sections, we depart from the premise that there is no association between best ESG practices and financial performance in companies operating in BRICS. This is because companies operating in

Table 1
Differences between advanced and emerging economies.

Attribute	Advanced economies	Emerging economies	Theoretical foundations
Institutional context	Reliable enforcement of liability laws; efficient dissemination of information; many activist consumers	Limited enforcement of liability laws; little dissemination of information; few activist consumers	Carrol (1991); Visser (2005); Hamann (2006); McWilliams et al. (2006)
Capital Market	Equity-focused; monitoring by disclosure rules and the market for corporate control	Underdeveloped, illiquid equity markets and nationalized banks; weak monitoring by bureaucrats	Hong and Kacperczyk (2009); Orsato et al. (2015)
Risk profile of companies	Investors have a free flow of largely accurate information about companies that have better access to funds	Limited dissemination of companies information do not attract attention of investor and financial analysts	Orlitzky and Benjamin (2001); Bassen et al. (2006); Cheng et al. (2014); Sassen et al. (2016); Richardson and Welker (2001); Dhaliwal et al. (2011); Serafeim (2014)
Environmental legitimacy	Pressure and encourage the disclosure of ESG initiatives, as GRI and Integrated Report	Low ESG investments due the deprived social environment	Blowfield and Frynas (2005); Willi et al. (2011); Deegan and Gordon (1996); Baron et al. (2009); Raynard and Forstater (2002)

these countries have limited sources of finance due, in part, to the weakness of the local capital markets and the trade off between investing in ESG and other (and often more lucrative) activities (López Iturriaga and Crisóstomo, 2010). Together with economic issues, the institutional framework of a country influences the nature and degree of adoption of ESG practices (Dobers and Halme, 2009).

National institutional environments, such as weak and contracted governments; gaps in public governance and transparency; arbitrary enforcement of rules, regulations, and policies; and low levels of safety and labor standards, affect how CSR is conceived and practiced in developing countries. Hence, CSR continues to be equated with philanthropy in the developing world, and substantive engagement with CSR is the exception rather than the norm (Jamali and Neville, 2011). Therefore, we do not expect ESG practices to be capable of increasing the investment returns of companies operating in the BRICS countries. Hence, we formulate the following generic hypothesis:

H1. *There is no significant association between the profitability of the investments of a company and its ESG performance.*

Assuming the disaggregation of the ESG performance proxy, hypotheses H_{1a}, H_{1b}, and H_{1c} are proposed as constituents of H_1:

H1a. *There is no significant association between the profitability of the investments of a company and its environmental performance.*

H1b. *There is no significant association between the profitability of the investments of a company and its social performance.*

H1c. *There is no significant association between the profitability of the investments of a company and its governance performance.*

As the review of the literature also indicated, associations between the financial and ESG performances of companies belonging to sensitive industrial sectors, such as oil, gas chemicals, mining, steel-making and paper and pulp, are inconclusive. For instance, according to Richardson and Welker (2001), whereas companies in sensitive industries have better financial and social disclosure rates, they present inferior financial performance and lower cost of capital estimates than their counterparts in non-sensitive industries.

In contrast, Baron et al. (2009) found that the coefficients of KLD Exclusionary (Alcohol, Gambling, Firearms, Military, Nuclear Power, and Tobacco) are positive and statistically significant, indicating better financial performance for firms operating in such sensitive industrial sectors. In addition to such contentious findings, most studies include only samples of North American and European companies. This research gap motivated us to develop the following hypothesis for the companies operating in BRICS:

H2. *There is no significant association between a company being in a sensitive industry and its ESG performance.*

Assuming the disaggregation of the ESG performance proxy, the following hypotheses are put forward:

H2a. *There is no significant association between a company being in a sensitive industry and its environmental performance.*

H2b. *There is no significant association between a company being in a sensitive industry and its social performance.*

H2c. *There is no significant association between a company being in a sensitive industry and its governance performance.*

We followed the definition of sinful industries (e.g., tobacco, gambling, weapons, alcohol, adult entertainment) based on Baron et al. (2009). For other sensitive sectors in environmental or ethical terms, we followed the suggestion of Richardson and Welker (2001), who included oil, gas, chemical, mines, metals and forestry products. Finally, our classification set of firms belonging to sensitive industries followed previous research that classified firms according to Standard Industrial Classification (SIC) codes (Cowen et al., 1987; Patten, 2002) for industries often classified as environmentally sensitive, include mining, oil and gas, paper, chemicals (excluding pharmaceuticals), and metals.

An example of the social and environment impacts of such industries is the recent tragedy caused by the Brazilian mining firm Samarco Mineração SA. In a nutshell, a dam holding mineral sludge managed by Samarco collapsed, releasing an avalanche of sludge that buried a rural village, killing 17 people and travelling more than 400 miles. Considered one of Brazil's worst environmental disasters ever, the incident (in Nov 5, 2015) triggered a criminal investigation and a roughly $5 billion civil lawsuit by authorities against Samarco and its parent companies, mining giants Vale SA and BHP Billiton Ltd. (Kiernan, 2016).

Environmentally sensitive firms are more likely to disclose their environmental performance (Cormier and Magnan, 2003; Kilian and Hennigs, 2014) and as a result tend to show better perform than firms that belong to non-sensitive sectors (Lin et al., 2015; Cai et al., 2012). Companies with manufacturing processes that negatively influence the environment will have greater disclosure compared with companies in other industries. In general,

industries including mining, petroleum, and chemical companies will emphasize the environment, health, and safety (Jenkins and Yakovleva, 2006; Line et al., 2002).

The question of whether firms of sensitive industries can become socially responsible remains largely unanswered. Because large firms and firms in these industries have their social and environmental performance closely scrutinized, research on the firms of developed countries suggests a positive association between industry membership and the interaction of firm size and industry membership with social disclosure (Deegan and Gordon, 1996; Baron et al., 2009). Contrary of this rationale, our hypotheses assume that there are no differences between the ESG performance and the financial profile of companies belonging to sensitive industries, versus non-sensitive industries, operating in BRICS countries.

4. Method

4.1. Data and variables

Regarding data collection, two criteria were employed for the selection of firms. First, we considered just companies listed in emerging economies, particularly the group known as BRICS, comprising Brazil, Russia, India, China and South Africa. Second, we did not consider financial companies because of the specificity of their operational activity. After this filter, the total sample was composed of 1095 observations from 365 companies, distributed in eight different sectors, identified based on the North American Industry Classification System (NAICS) 3-digit code as follows: Mining and construction (19%); Manufacturing of food, textile, lumber, publishing, chemicals, and petroleum products (18%); Manufacturing of plastics, leather, concrete, metal products, machinery, and equipment (18%); Transportation, communications, electricity, gas, and sanitary services (20%); Trade (9%); Diversified Industrials, Retail and Diversified reits (8%); Personal, business, and entertainment services (4%); and Professional services (4%).

The data were collected from two different databases. Data were collected first from Thomson Reuters Eikon™ to compose the dependent variables of the empirical model (1), namely the ESG (Environment, Social and Governance) performance of the company. In other words, we collected data about the performance of the company in environmental, social and corporate governance terms. The second database used was DataStream, which made it possible to collect data relating to independent variables about the company profile. The reliability of these databases has been questioned neither in the academic community nor among users of corporate information, as Cheng et al. (2014) argue.

Thomson Reuters Eikon™ offers a comprehensive platform for establishing customizable benchmarks (e.g., sector and country) for the assessment of corporate performance. Annually, 400 data points are used as inputs to a default equal-weighted framework to calculate 70 key performance indicators (KPIs), to be further organized into 18 categories within three pillars[1]: a) the environmental performance score, b) social performance score, and c) corporate governance performance score. Thomson Reuters Eikon™ integrates economic research and strategy development with asset analysis. Because we were dealing with component variables of the empirical model, four dependent variables were used: *Overall ESG performance*, *Environmental performance*, *Social performance*, and *Performance in corporate governance*. With regard to the independent variables at the company level, we used variables usually adopted in the finance literature (Dowell et al., 2000; Maury and Pajuste, 2005; Cheng et al., 2014): *Systematic risk index*, *the firm's financial leverage index*, *the firm's free cash flow*, *market capitalization*, and *return on assets*. Control variables are added to the model so that the results are moderated for a vaster number of factors. The literature also frequently controls for firm size and sector (Dhaliwal et al., 2011; Richardson and Welker, 2001). The variables are listed in Table 2.

Based on the Thomson Reuters Eikon™ database, we used a general performance score for each company, which is categorized into three pillars: social, environmental and governance. We selected companies from BRICS countries from this database. Although the database of ESG indicators dates back to 2001, only in 2007 were the ESG scores for companies from BRICS countries introduced. Considering, however, the limited quantity of companies from these countries in the database in the period from 2007 to 2009, for the purposes of the sample of this work, we decided to use the period of 2010–2012.

4.2. Empirical model

In view of the objective of this research, which is to check for the existence of associations between the financial profile of listed companies in BRICS countries and their ESG performance by way of panel data regressions (static and unbalanced), and based on the set of variables chosen, the model to be tested is (1), with: $N = 1095$ and $T = 3$.

$$i = 1, \ldots, N,$$

$$t = 1, \ldots, T.$$

$$Firm\ per\ performance_{it} = \beta_0 + \beta_1 Roa_{it} + \beta_2 Industry_{it} + \beta_3 FCF_{it} + \beta_4 Risk_{it} + \sum_{j=1}^{k} \delta_j CV_{ji} + \varepsilon_{it} \quad (1)$$

in which the value of the i-nth firm, in the t-nth year, $Performance_{it}$, depends on K exogenous variables, $(x_{1it}, \cdots, x_{Kit})$, which differ between the firms at a given moment in time and vary over time. The error term, ε_{it}, which is assumed to be an IID (independent and identically distributed) random variable, with a mean of zero and variance σ_u^2, independent of $(x_{1i}, \cdots, x_{iT})$, represents the effects of the omitted variables that are peculiar both to the firms as well as to the period studied.

This work uses linear regressions with a data panel. Three different methods are used for estimating the model: pooled regression, random effects and fixed effects. The constant coefficients model presupposes that both the intercept and inclinations do not vary. This model is also called a pooled regression. The individual fixed effects model presupposes that the inclinations are maintained but that the intercepts are different for each unit. In this case, no temporal effects influence the regression, just individuals ones. These effects can be observable or not and are normally correlated with the regressors. In other words, they are endogenous (Baltagi, 2001). The random effect model presupposes that if there are effects that do not form part of the model, they will be exogenous and not correlated with the regressors. No indications were found for the correlation between regressors and the regression error, which suggests the non-existence of problems of endogeneity (Hsiao, 2005; Petersen, 2009).

[1] http://financial.thomsonreuters.com/en/products/data-analytics/company-data/esg-research-data.html, September, 2016.

Table 2
Variables definitions and measures.

Variable	Definition	Theoretical foundations
ESG performance	= Measure that varies from 0 to 100%. It is based on information grouped into governance, economic, environmental and social pillars, as compiled by Thomson Reuters. It reflects the average performance of a company in these four areas. Data: Thomson Reuters Eikon™.	Sassen et al. (2016); Cheng et al. (2014)
Environmental performance	= Measure that varies from 0 to 100%. It measures the impact of a company on natural systems, including air, soil, and water, as well as on natural ecosystems. There are 57 indicators. Among the environmental factors that go to make up this rating is information about the use of energy, the reuse of water, carbon dioxide emissions and waste recycling. Data: Thomson Reuters Eikon™.	Sassen et al. (2016); Cheng et al. (2014)
Social performance	=Measure that varies from 0 to 100%. It measures the company's capacity to generate trust and loyalty in its workers, customers and society, through the use of best management practices. There are 60 indicators that include information about employee turnover, work-related accident rates, hours of training, health programs and worker safety. Data: Thomson Reuters Eikon™.	Sassen et al. (2016); Cheng et al. (2014)
Performance in corporate governance	= Measure that varies from 0 to 100%. It measures the systems and processes of a company, which guarantee that its board members and executives act in the best interests of its shareholders, with a long-term view of the operations. There are 48 information indicators, such as the rights of minority shareholders, executive remuneration, independent board members and audit committees. Data: Thomson Reuters Eikon™.	Sassen et al. (2016); Cheng et al. (2014)
Systematic risk index	= Obtained from the *beta* index of companies, considering a timeframe of 24 months. It is calculated by the covariance between the asset returns of the company and the return on the share portfolio of the market, divided by the variation in the return of the share portfolio of the market. Data: DataStream database.	Maury and Pajuste (2005); Sassen et al. (2016)
Financial leverage index of the firm	= calculated by dividing Total Liabilities by Total Assets. Data: DataStream database.	Barnett and Salomon (2012)
Free cash flow of the firm	= this is the value in US$ based on the series of cash receipts that comprise the cash flow divided by the average weighted cost of capital. Data: DataStream database	Mishra and Modi (2013)
Firm size	= continuous variable that reflects the size of the company. It was measured by two different proxies, one accounting: ln of net revenue, measured in US dollars, of the *i*-nth company in the *t*-nth year; and another from the market: ln of market capitalization. Data: DataStream database.	Dhaliwal et al. (2011)
Asset profitability	= calculated by dividing the result by the Total Assets. Data: DataStream database.	Dowell et al. (2000)
Industry	= dummy variable that identifies whether the company belongs to an industry that is seen as being sensitive (major socio environmental impact: energy - includes oil and gas - chemicals, paper and pulp, mining and steel-making). Receives the value 1 if yes and 0 otherwise. Data: DataStream database	Richardson and Welker (2001); Lee and Faff (2009)

Note: An online appendix with a detailed description of the Thomson Reuters Eikon™ dataset is available online from: http://financial.thomsonreuters.com/content/dam/openweb/documents/pdf/financial/esg-research-brochure.pdf.

5. Results and discussion

5.1. Descriptive statistics and correlations

Before performing a multivariate analysis to test the hypotheses introduced previously, we calculated the descriptive statistics in Table 3.

The average for the ESG General Performance score in the sample is 45.9, with a standard deviation of 30.7, suggesting significant variation in the practice of the ESG General Performance. This significant variation can be explained by Table 4. Based on the mean of the overall ESG performance indicator of the sample companies, Table 5 shows the evolution of this indicator. The ESG indicators of Brazil and Russia increased over the last three years, whereas India's and South Africa's ESG indicators showed reductions. Some of the indicators for China increased, such as governance, and some stagnated, such as environmental and social indicators. The analysis indicates that even with a drop in its indicators over three years, South Africa is the BRICS country that has the highest ESG and is three times better than China (the overall performance index in 2010). China has the lowest rates in the sample, with the exception of its governance index, which beats India's.

Table 3-Panel B shows the matrix of correlations for the variables used in the study. The bivariate correlations reveal that there are no unexpected standards but that there is a positive relationship between social and environmental indicators and the value of the firm, as observed in the Market Capitalization variable, which is similar to what we find in Lam et al. (2012). Corporate governance seems to be the only ESG factor that has no positive relationship with the value of a firm, but this is mainly the result of Russian companies that present a negative relationship between these indicators.

As can also be observed in Table 3-Panel B, the dependent variables point to a low correlation with the independent variables, corroborating Lattin et al. (2011), who state that when dealing with social sciences, the typical values of R can vary between 0.1 and 0.5.

5.2. Univariate analysis

Table 5 supplies descriptive information about the variables studied and shows the existence of differences between the groups of companies belonging to the industries judged to be sensitive (oil, gas, chemicals, mining, steel making and paper and pulp) relative to

Table 3
Summary statistics and correlations.

Variable	N	Mean	Median	Std. dev.	Min.	1Q	3Q	Max.	Asymmetry
	Panel A: Descriptive statistics								
General performance	904	45.96**	46.32	30.75	3.10	13.95	75.44	96.51	0.05
Environment performance	904	47.17**	44.00	27.93	8.64	20.39	72.96	94.67	0.19
Social performance	904	56.21**	61.00	31.03	4.09	25.18	86.76	97.08	−0.27
Governance performance	904	34.11**	29.17	24.56	1.73	12.23	52.21	94.13	0.58
Systematic Risk	525	0.53**	0.49	0.53	−0.89	0.18	0.82	2.22	0.40
Leverage	1078	33.00**	31.36	22.62	0.00	14.74	49.37	103.60	0.37
Market Capitalization	1067	17.30**	17.09	1.88	13.52	15.82	18.73	22.22	0.31
Return on assets	1060	9.34**	8.02	8.66	−28.63	4.52	12.62	118.74	3.04
Free cash flow	1039	1.70**	0.41	14.72	−39.39	−0.46	2.69	73.34	1.74
	Panel B: Correlations								
	1	2	3	4	5	6	7	8	9
1. General performance									
2. Environment performance	0.870**								
3. Social performance	0.933**	0.807**							
4. Governance performance	0.660**	0.440**	0.533**						
5. Systematic Risk	0.07	0.103*	0.105*	0.00					
6. Leverage	-0.087**	−0.01	−0.05	−0.06	0.05				
7. Market Capitalization	0.158**	0.242**	0.138**	−0.06	0.233**	−0.04			
8. Free Cash Flow	0.099**	0.076*	0.087*	0.078*	0.124**	-0.227**	0.119**		
9. Return on assets	0.148**	0.067*	0.122**	0.04	−0.05	-0.331**	0.161**	0.193**	

Note: The Panel A shows the descriptive statistics of the variables studied. The column that shows the mean values also points to the existence of significant differences between companies in sensitive industries and industries in an alternative situation. **p-value < 0.05; *p-value < 0.1.
Source: Author's calculations.

Table 4
Evolution of average ESG indicators.

Pillars	Year	Brazil	Russia	India	China	S. Africa
General[a]	2012	55.0	44.2	46.9	24.0	57.6
	2011	49.5	42.5	47.9	23.6	62.6
	2010	50.6	40.0	51.4	21.1	71.9
Environmental[b]	2012	55.9	42.8	55.5	32.7	46.9
	2011	52.0	40.6	52.8	31.8	56.1
	2010	50.1	39.3	56.2	31.6	62.0
Social[c]	2012	67.2	53.9	58.4	29.9	65.9
	2011	62.7	53.1	59.0	30.8	72.6
	2010	64.9	53.7	63.9	30.9	77.7
Governance[d]	2012	30.0	34.9	25.6	31.7	57.0
	2011	27.0	31.4	23.9	25.5	55.5
	2010	25.2	31.0	24.6	19.3	60.9

Note: This table shows the evolution of ESG indicators for each of the BRICS countries in an aggregate way[a]; the environmental index[b]; the social index[c]; and just the governance index[d].
Source: Author's calculations.

Table 5
Descriptive statistics segregated by industry type.

Variable	N	Average	Std Dev.	Min.	Max.
Panel A: Sensitive industries					
General performance	191	57.44	28.16	4.46	96.46
Environment performance	191	58.71	25.01	10.25	94.02
Social performance	191	68.85	25.94	5.93	96.73
Governance performance	191	39.98	26.31	2.87	94.13
Systematic Risk	102	0.78	0.50	−0.63	1.59
Leverage	214	29.02	19.64	0.00	77.00
Market Capitalization	213	17.88	2.08	13.56	22.22
Return on assets	211	8.50	8.87	−12.18	63.98
Free cash flow	211	1.11	14.50	−39.39	73.34
Panel B: Non-sensitive industries					
General performance	713	42.88	30.70	3.10	96.51
Environment performance	713	44.07	27.88	8.64	94.67
Social performance	713	52.82	31.42	4.09	97.08
Governance performance	713	32.53	23.84	1.73	91.66
Systematic Risk	423	0.47	0.52	−0.89	2.22
Leverage	864	33.99	23.20	0.00	103.60
Market Capitalization	854	17.16	1.81	13.52	21.89
Return on assets	849	9.55	8.60	−28.63	118.74
Free cash flow	828	1.85	14.78	−39.39	73.34

Source: Author's calculation.

those companies belonging to industries in an alternative situation. Companies in sensitive industries have better ESG indicators for the three dimensions considered: environmental, social and governance. The average overall ESG performance is 57.44 in companies from sensitive industries, compared with 42.88 in companies from other industries.

The financial indicators are also consistent with the literature (Richardson and Welker, 2001; Deegan and Gordon, 1996), with companies from sensitive sectors having a larger systematic risk (average 0.78 on the *Beta* index, compared with 0.47) and smaller Return on Assets (ROA) index than companies from non-sensitive sectors (8.50 versus 9.55). The two groups of sectors have similarities in terms of company size, measured by the logarithm of their Market Capitalization value (with averages of 17.88 in sensitive sectors and 17.16 for other sectors).

5.3. Regressions

The results of the impact of the independent variables chosen on company corporate social responsibility performance, which was estimated by way of three different procedures (Ordinary Least Squares-OLS, Random Effects-RE and Fixed Effects-FE), are shown in Table 6 (the dependent variable being the *general performance* of the firm in ESG), in Table 7 (the dependent variable being the *environmental performance* of the firm), in Table 8 (the dependent variable being the *social performance* of the firm); and finally in Table 9 (the dependent variable being the performance in *corporate governance* of the firm).

With respect to identifying the estimation method that best adjusts to each estimated model, the following tests were used: White's (for the existence of heteroskedasticity), Hausman's (for adjusting the fixed effects model better), Breusch-Pagan's, and the F tests (Hsiao, 2005; Petersen, 2009), when the FE adjustment was found with a robust standard error (Hsiao, 2005; Petersen, 2009).

Table 6
Estimated coefficients for panel data regression: dependent variable, Overall ESG Performance.

	OLS		Random Effect		Fixed Effect	
	Model I	Model II	Model III	Model IV	Model V	Model VI
Const	46.093*** (4.477)	−172.945*** (27.035)	45.350*** (3.618)	−160.556*** (34.477)	51.904*** (2.206)	−72.302* (40.592)
Industry (sin = 1; Otherwise = 0)	15.619 *** (5.112)	7.565 (4.602)	11.903 ** (5.401)	6.536 (4.990)		
Return on assets	0.493 (0.301)	−0.102 (0.289)	0.359* (0.197)	−0.015 (0.194)	0.389 (0.243)	0.210 (0.261)
Free cash flow	1.129** (0.476)	0.725* (0.371)	0.192 (0.193)	0.154 (0.187)	0.040 (0.109)	0.026 (0.113)
Systematic risk	1.003 (4.485)	1.045 (4.119)	4.562 (4.042)	3.531 (3.986)		
Market capitalization		10.839*** (1.676)		9.880*** (1.505)		7.741*** (2.554)
Country dummy	No	Yes	No	Yes		
N [#Companies]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]
R^2 Adjust	8.96%	25.9%			92.7%	93.3%
Akaike Criterion	3650.8	3574.7	3663.9	3579.9	3023.1	3008.2
F	10.428	20.127			15.444	16.026
Durbin-Watson	0.230	0.255			1.743	1.7571

Notes: This table shows the results obtained for estimates of the panel data regression parameters in three different models (Model I and II: Ordinary Least Squares; Model III and IV: Random Effects; Model V and VI: Fixed Effects). It was found that Model VI is adequate: Fixed Effects and robust standard error, since these tests of premises suggested that this method was convenient (384 observations of 172 companies over a period of three years). i) Breusch- Pagan's Test = 186.726 ($p < 0.001$); ii) White's Test, with LM statistic = 29.8623 ($p = 0.005$); iii) Hausman's Test = 4.99198 ($p = 0.1724$); iv) F Test for examining group differences in the intercepts = 11.5296 ($p < 0.001$). ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.
Source: Author's calculations based on data collection.

Table 7
Estimated coefficients for panel data regression: dependent variable, Environmental Performance.

	OLS		Random Effect		Fixed Effect	
	Model VII	Model VIII	Model IX	Model X	Model XI	Model XII
Const	46.055*** (4.060)	−170.500*** (28.277)	42.590*** (3.353)	−145.160*** (31.997)	50.896*** (1.686)	−46.518 (35.396)
Industry (sin = 1; Otherwise = 0)	13.069*** (4.554)	7.562* (4.455)	11.186** (5.092)	8.620* (4.681)		
Return on assets	0.045 (0.288)	−0.472 (0.286)	−0.019 (0.176)	−0.326* (0.174)	0.045 (0.188)	−0.096 (0.189)
Free cash flow	0.855** (0.402)	0.541 (0.342)	0.232 (0.168)	0.207 (0.165)	0.150 (0.128)	0.139 (0.111)
Systematic risk	2.430 (3.928)	−0.237 (3.773)	5.771 (3.809)	1.298 (3.738)		
Market capitalization		10.922*** (1.722)		9.256*** (1.376)		6.071*** (2.209)
Country dummy	No	Yes	No	Yes		
N [#Companies]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]
R^2 Adjust	5.69%	22.2%			93.7%	93.9%
Akaike Criterion	3614.7	3543.6	3625.7	3548.6	3187.68	2903.2
F	6.779	16.637			18.184	18.694
Durbin-Watson	0.170	0.190			1.656	1.674

Notes: This table shows the results obtained for estimates of the panel data regression parameters in three different models (Model VII and VIII: Ordinary Least Squares; Model IX and X: Random Effects; Model XI and XII: Fixed Effects). It was found that Model XII is adequate: Fixed Effects and robust standard error, since these tests of premises suggested that this method was convenient (384 observations of 172 companies over a period of three years). i) Breusch- Pagan's Test = 228.556 ($p < 0.001$); ii) White's Test, with LM statistic = 62.07 ($p < 0.001$); iii) Hausman's Test = 6.018 ($p = 0.111$); iv) F Test for examining group differences in the intercepts = 14.234 ($p < 0.001$). ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.
Source: Author's calculations based on data collection.

Table 8
Estimated coefficients for panel data regression: dependent variable, Social Performance.

	OLS		Random Effect		Fixed Effect	
	Model XIII	Model XIV	Model XV	Model XVI	Model XVII	Model XVIII
Const	57.096*** (4.499)	−130.180*** (27.862)	57.127*** (3.584)	−122.050*** (35.370)	65.824*** (2.592)	−24.163 (32.909)
Industry (sin = 1; Otherwise = 0)	14.855*** (4.527)	8.807** (4.462)	12.397** (5.328)	8.193 (5.127)		
Return on assets	0.381 (0.286)	−0.079 (0.275)	0.132 (0.197)	−0.151 (0198)	0.051 (0.286)	−0.079 (0.297)
Free cash flow	1.081** (0.420)	0.789** (0.369)	0.165 (0.194)	0.134 (0190)	0.012 (0.131)	0.002 (0.144)
Systematic risk	2.651 (4.339)	2.623 (4.089)	6.261 (3.987)	5.569 (4.096)		
Market capitalization		8.316*** (1.719)		7.596*** (1.541)		5.608*** (2.063)
Country dummy	No	Yes	No	Yes		
N [#Companies]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]
R^2 Adjust	8.5%	19.5%			92.3%	92.5%
Akaike Criterion	3635.5	3589.3	3650.4	3596.7	3027.6	3020.9
F	9.891	14.247			14.528	14.733
Durbin-Watson	0.236	0.250			1.615	1.616

Notes: This table shows the results obtained for estimates of the panel data regression parameters in three different models (Model XIII and XIV: Ordinary Least Squares; Model XV and XVI: Random Effects; Model XVII and XVIII: Fixed Effects). It was found that Model XVIII is adequate: Fixed Effects and robust standard error, since these tests of premises suggested that this method was convenient (384 observations of 172 companies over a period of three years). i) Breusch- Pagan's Test = 172.355 ($p < 0.001$); ii) White's Test, with LM statistic = 60.510 ($p < 0.001$); iii) Hausman's Test = 4.778 ($p = 0.189$); iv) F Test for examining group differences in the intercepts = 11.593 ($p < 0.001$). ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.
Source: Author's calculations based on data collection.

Table 9
Estimated coefficients for panel data regression: dependent variable, Performance in Corporate Governance.

	OLS		Random Effect		Fixed Effect	
	Model XIX	Model XX	Model XXI	Model XXII	Model XXIII	Model XXIV
Const	37.613*** (3.929)	−33.259 (21.433)	43.397*** (3.172)	−21.426 (26.985)	43.830*** (2.376)	17.639 (40.901)
Industry (sin = 1; Otherwise = 0)	16.147*** (5.613)	6.333* (3.600)	12.139*** (4.620)	4.433 (3.779)		
Return on assets	0.262 (0.312)	−0.153 (0.239)	−0.024 (0.181)	−0.239 (0.169)	−0.154 (0.262)	−0.191 (0.269)
Free cash flow	0.423 (0.402)	0.031 (0.224)	0.058 (0,183)	0.000 (0.176)	−0.003 (0.108)	−0.006 (0.109)
Systematic risk	−2.217 (3.550)	5.338 (3.255)	−2.899 (3.458)	5.883* (3.019)		
Market capitalization		3.393** (1.376)		2.650** (1.232)		1.632 (2.549)
Country dummy	No	Yes	No	Yes		
N [#Companies]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]	384 [172]
R^2 Adjust	6.4%	40.4%			90.80%	90.81%
Akaike Criterion	3545.0	3374.6	3553.6	3376.5	2996.4	2997.6
F	7.584	38.140			11.981	11.883
Durbin-Watson	0.222	0.357			1.653	1655

Notes: This table shows the results obtained for estimates of the panel data regression parameters in three different models (Model XIX and XX: Ordinary Least Squares; Model XXI and XXII: Random Effects; Model XXIII and XXIV: Fixed Effects). It was found that Model XXIV is adequate: Fixed Effects and robust standard error, since these tests of premises suggested that this method was convenient (384 observations of 172 companies over a period of three years). i) Breusch- Pagan's Test = 135.316 ($p < 0.001$); ii) White's Test, with LM statistic = 48.6096 ($p = 0.009$); iii) Hausman's Test = 0.258 ($p < 0.967$); iv) F Test for examining group differences in the intercepts = 0.829 ($p < 0.001$). ***p <0.01; **p < 0.05; *p < 0.1.
Source: Author's calculations based on data collection.

We found no evidence of a correlation between the regressors and the regression error, which suggests there are no problems of endogeneity: i) Breusch-Pagan's test ($p < 0.001$) rejected the adjustment of pooled OLS, suggesting the use of RE; ii) the F test ($p < 0.001$) suggested that the coefficients generated by pooled OLS are not consistent (suggesting greater consistency controlling by FE); iii) White's test indicated problems of heteroskedasticity ($p < 0.001$); and iv) Hausman's test ($p < 0.001$) contradicted the null hypothesis that the model of parameters controlling by RE was consistent.

Therefore, as assumed by Yermack (1996), and following the recommendations of Hsiao (2005), in this research, the regression model controlling for FE (as a result of the existence of unobserved variables that probably affect the ESG performance of the company) gave more consistent parameters. In situations such as this, the model (FE) controls the variables omitted from the regression. In addition, the FE model allows for a single intercept for each firm, so it is desirable for modeling panel data when the intercept α_i is dealt with as a fixed parameter. It is equally desirable to use FE when observations are obtained from the whole population and the aim is to make inferences for the individuals (firms) for which data are available. All these conditions fit this work.

The associations between ESG-CFP found in the literature are inconclusive and lack further research (Friede et al., 2015). Thus, the consideration of different time-periods, the use of different methods, the use of new variables, and the study of different institutional environments produces more robust results. Considering the scope and the design adopted for the present research: we are not concerned about causation. Instead, we focused our discussion on associations between the variables studied in the emerging markets context. As a result, our study signals empirical associations, rather than causation. Together with existing studies that focus on the evidence of associations, the findings of this study can also contribute to the evidence of causation (Morgan and Winship, 2015).

Thus, the main contribution of our study is on unprecedented evidence, and on the description of the mechanism through which these associations can occur. This may be preponderant for future studies focusing on the causal relationships between ESG-CFP. Studies indicating a negative association between ESG-CFP are a minority in the literature. In this regard, there is an expectation that 'good companies', i.e. those with the best ESG rating, achieve better productivity and better market valuation.

However, belonging to an industry with controversial reputation, such as alcohol, gambling, tobacco, firearms, military, and nuclear industries, does not necessarily imply low ESG performance. Although firms that operate in sensitive industries generally run higher risks (Sassen et al., 2016), they are subject to a more intense controlled system, either in the internal or in the external environment, and often achieve higher financial performance (Hong and Kacperczyk, 2009). Therefore, they have an incentive to seek higher productivity, and performance, including ESG.

5.3.1. Company profile and overall ESG performance

Table 6 gives the results obtained for the dependent variable, *Overall ESG Performance*, which reflects the company's performance in the three aspects of ESG considered in this study in an aggregate way. Observing Model I, which used the OLS estimation method, we find that companies belonging to sensitive industries seem to achieve better performance than companies not belonging to industries that are seen as having stronger socio-environmental impacts ($\hat{\beta}_1$−15.619; $p < 0.01$).

This result corroborates the studies of Richardson and Welker (2001) and Deegan and Gordon (1996), who found that companies from sensitive industries disclose their socio-environmental practices more consistently as a way of legitimizing their operations, because they belong to sectors that have the biggest socio-environmental impact. Mendes-Da-Silva et al. (2014) also discussed the argument that more aggressive and more risky companies need to have a greater level of disclosure as a way of reducing informational asymmetry and, by extension, helping to reduce the cost of capital for the company and creating value by increasing the net present value of the company's investment projects.

In addition, the free cash flow of the firm is positively associated with ESG performance ($\hat{\beta}_3$−1.129; $p < 0.05$). Free cash flow is a factor that can reduce the indebtedness of companies (Jensen, 1986); in other words, companies with greater free cash flow get into less debt, as seen in Table 3-Panel B, where the correlation between the Indebtedness (*Leverage*) and Free Cash flow (*FCF*) variables is both negative and significant (−0.227). Free cash flow has also been used as an argument for influencing the socio-environmental initiatives of companies (Mishra and Modi, 2013). Companies that have financial resources are better able to invest,

including in socio-environmental issues.

However, when considering control variables, such as company size and the country in which the companies are listed, only Free Cash Flow proves to be associated with overall ESG performance, but with a lower effect on the performance of the firm ($\widehat{\beta}_3$–0.725; $p < 0.1$). In other words, the results of Models I and II show that the company size and country of listing exercise a more expressive effect on ESG performance than the sector in which the firm operates. This result was also obtained by Surroca et al. (2010) and Cheng et al. (2014).

When observing the results obtained by the random effects method, shown in Models III and IV in Table 6, we note that once again the effect of company size and the institutional environment are more expressive than the sector in which the firm operates. Put another way, whereas in Model III the fact that the company belongs to a sensitive sector seems to be associated with a greater overall ESG performance ($\widehat{\beta}_1$–11.903; $p < 0.05$), Model IV considers the control variables for company size and country of listing having an influence on the behavior of the coefficient estimated for the sector, which is found to be non-significant ($\widehat{\beta}_1$–6.536; $p > 0.1$). In addition, with respect to the estimates via random effects, we see that Free Cash Flow is not associated with ESG performance, unlike what we found in the estimates via OLS. Finally, two simulations were carried out using the fixed effects method, with the results for the estimated parameters shown in Models V and VI.

Therefore, assuming the results via fixed effects, only the size of the firm seems to have an influence on ESG performance; larger companies tend to have a better overall performance, as already found in previous works (Cheng et al., 2014; Surroca et al., 2010; Richardson and Welker, 2001; Bansal and Clelland, 2004; Dhaliwal et al., 2011). According to Lam et al. (2012), large companies have more resources for carrying out activities that enhance their performance in ESG, and so socially responsible investment portfolios have a tendency to prefer companies with a larger market capitalization.

Therefore, H_2 cannot be rejected, in which (and confirmed by the estimation model by fixed effects with robust standard error) the conclusion is that there is no significant association between being a company in a sensitive industry and its overall performance in socio-environmental terms. This result differs from the results found and evidenced in the literature review (Richardson and Welker, 2001; Deegan and Gordon, 1996), possibly because the companies selected for this study came from countries with emerging economies.

Hypothesis H_1 cannot be rejected as well, because the best estimation model does not indicate the existence of a significant association between the company's investment profitability and its overall performance in socio-environmental terms. Only in the random effect estimation model and without such control variables as the size and country of origin of the company does the relationship between overall ESG performance and investment return become significant and positive, as found by Bassen et al. (2006), Surroca et al. (2010), and Lourenço and Branco (2013).

5.3.2. Company profile and environmental performance

Table 7 shows the results obtained for the regressions, with environmental performance as the dependent variable. Models VII and VIII show the coefficients estimated using the OLS method. In these models, even controlling for the size of the firm and country in which it is listed, the sector seems to play a relevant role in the environmental performance of the company. In other words, companies from sensitive sectors, such as oil and gas, chemicals, paper and pulp, mining and steel making, tend to report better performance when compared with companies that are not in these sectors. However, the effect on environmental performance of belonging to sensitive sectors is lower when control variables are considered, as reported in Model VIII ($\widehat{\beta}_1$–7.562; $p < 0.1$). The effect of Free Cash Flow, in turn, on environmental performance seems to be reduced when the control variables of the size of a firm and the country in which the company is listed are considered.

Similar to the results obtained by the random effects estimation procedure, as shown in Models IX and X, these results support the idea that when a company belongs to sensitive sectors, this has an effect on its environmental performance and this result persists, even when controlling for the firm's size and listing in the country variables ($\widehat{\beta}_1$–8.620; $p < 0.1$), rejecting H_{2a}, which predicted that there would be no significant association between being a company in a sensitive industry and its environmental performance.

This result was accompanied by the finding that the return on investments of the firm is negatively associated with its environmental performance when control variables are considered ($\widehat{\beta}_2$–0.326; $p < 0.1$). This possibly occurs because, according to López Iturriaga and Crisóstomo (2010), the company earmarks part of its investment for environmental practices, thereby failing to allot it to the company's profitable activities. Models XI and XII show the results obtained when the procedure of estimating by fixed effects was used. As can also be observed in Table 7, none of the independent variables points to the existence of an association with the environmental performance of the firm, as seen for the dependent variable of overall ESG performance shown in Table 6.

5.3.3. Company profile and social performance

Table 8 shows the results obtained when the dependent variable is the social performance of the firm. Considering the company's social performance, according to the estimates via OLS, the fact that the company belongs to sensitive sectors is still associated with the firm's performance. Similar to what we observed for the overall ESG performance and environmental performance dependent variables, social performance seems to be sector associated, as shown in Model XIII ($\widehat{\beta}_1$–14.855; $p < 0.01$), even after considering the controls for company size and country where it is listed, but with a lesser effect, as shown in Model XIV ($\widehat{\beta}_1$–8.807; $p < 0.05$).

If the estimations carried out via random effects are considered, the sector was not associated with social performance, when the control variables are considered, as shown in Model XVI ($\widehat{\beta}_1$–8.193; $p > 0.1$). Estimations via the fixed effects procedure are found in Models XVII and XVIII, and as we found for the overall ESG performance and environmental performance dependent variables, none of the variables of interest proved to be associated with performance in social performance, whether the control variables adopted in this research are considered. These results do not allow for the rejection of H_{1b} and H_{2b}, which assume that there is no significant association between the profitability of the company's investments and its performance in social terms, just as there is no association between the fact of the company belonging to a sensitive sector and its performance in social terms.

5.3.4. Company profile and governance performance

Performance in corporate governance was the dependent variable in the results reported in Table 9. Models XIX and XX show the results obtained via OLS and, similar to what we saw when the dependent variable is overall ESG performance, environmental performance and social performance, the fact of being part of a sensitive sector seems to help improve a firm's performance in terms of corporate governance, as shown in Model XIX ($\widehat{\beta}_1$–16.147; $p < 0.01$). This occurs even when the control variables for company size and country of listing are considered, but the effect is smaller when such variables are considered, as seen in the results obtained in Model XX ($\widehat{\beta}_1$–6.333; $p < 0.1$).

Models XXI and XXII show the results obtained via random

effects. In this study, the sector proved not to be associated with performance in corporate governance when the control variables are considered, i.e., in Model XXII ($\widehat{\beta}_1$–4.433; p > 0.1). The estimations via the fixed effects procedure are shown in Models XXIII and XXIV and, as was found for the overall performance in ESG, environmental performance and social performance dependent variables, none of the variables of interest proved to be associated with performance in corporate governance, whether the controls adopted in this research were considered. These results do not allow us to reject H_{1c} and H_{2c}, according to which there is no significant association between the profitability of the company's investments and its performance in terms of corporate governance, or between the fact of it being a company in a sensitive industry and its performance in terms of corporate governance.

Finally, the results found in this study for the hypotheses are briefly described in Table 10.

As verified, environmentally sensitive firms are more likely to disclose their environmental performance (Cormier and Magnan, 2003; Kilian and Hennigs, 2014) and as a result tend to show better perform than firms that belong to non-sensitive sectors (Lin et al., 2015; Cai et al., 2012). Companies with manufacturing processes that negatively influence the environment will have greater disclosure compared with companies in other industries. In general, industries including mining, petroleum, and chemical companies will emphasize the environment, health, and safety (Jenkins and Yakovleva, 2006; Line et al., 2002).

5.4. Robustness tests

The economic literature has documented both theoretically and empirically that there are reasons to believe in the possibility of non-linear associations between the systematic risk of a company (i.e., the performance capacity of the company being impacted by the behavior of the economy generally) and economic results. This line of thinking assumes that moments of stress in the financial system can amplify the fundamental adverse shocks and result in depressions or crises. However, the absence of stress does not necessarily trigger a macroeconomic boom (Gertler and Kiyotaki, 2010; Mendoza, 2010; He and Krishnamurthy, 2012; Giglio et al., 2016).

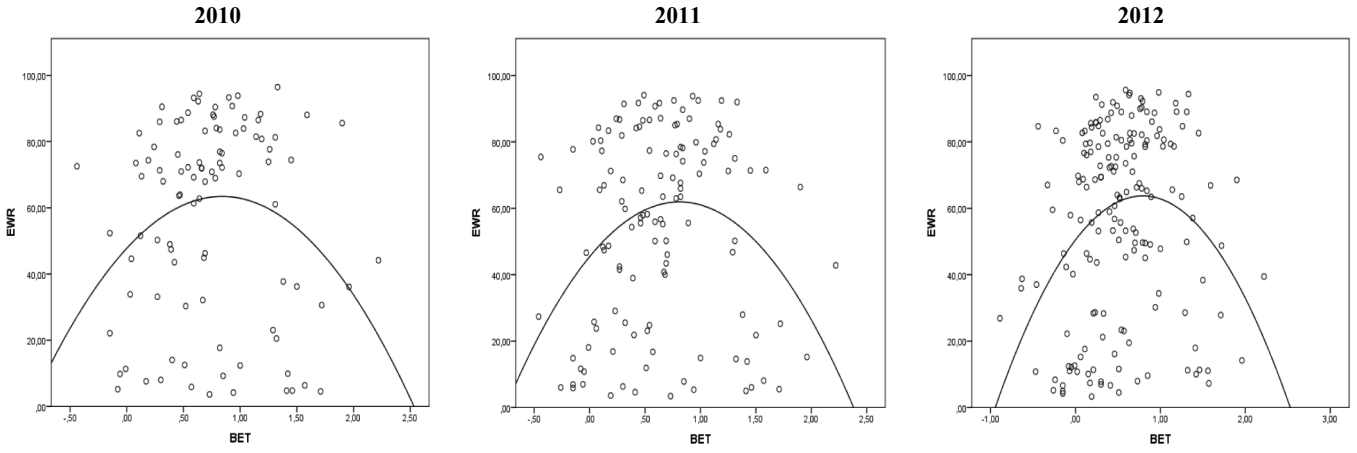
Therefore, understanding that a company's performance is not simply summed up in its economic and financial performance, it is assumed that there are reasons to test the non-linearity potential of systematic risk with the ESG performance of the firm. The results obtained for auxiliary regressions, which include quadratic terms for each of the independent variables considered, point to possible non-linearity between the systematic risk of the firm and its ESG performance, which is shown in Exhibit 1.

The results of these auxiliary regressions suggest the existence of a relationship that can be described by way of an "inverted U-shaped" curve. Put another way, it seems that companies with greater or less systematic risk have poorer ESG performance; in other words, the results suggest that there are values for systematic risk that maximize ESG performance: and that these values are also close to 1. Therefore, it seems that companies that have a systematic risk that is similar to the portfolio of market assets are the ones that have the best aggregate ESG performance.

A number or recent studies have estimated a U-shaped relationship between Corporate Social Performance and Corporate Financial Performance, such that better financial returns are

Table 10
Results summary.

	Hypotheses	Results
H_1	There is no significant association between the **profitability** of the investments of a company and its **overall** ESG performance	Not reject
H_{1a}	There is no significant association between the **profitability** of the investments of a company and its **environmental** performance	Reject
H_{1b}	There is no significant association between the **profitability** of the investments of a company and its **social** performance	Not reject
$H1_c$	There is no significant association between the **profitability** of the investments of a company and its **corporate governance** performance	Not reject
H_2	There is no significant association between being a company in a **sensitive** industry and its **overall** ESG performance	Not reject
H_{2a}	There is no significant association between being a company in a **sensitive** industry and its **environmental** performance	Reject
H_{2b}	There is no significant association between being a company in a **sensitive** industry and its **social** performance	Not reject
$H2_c$	There is no significant association between being a company in a **sensitive** industry and its **corporate governance** performance	Not reject



Source: Author's calculation.

Exhibit 1. Quadratic association between general ESG performance and firm systematic risk.
Source: Author's calculation.

associated with the highest and lowest levels of Corporate Social Performance (e.g., Barnett and Salomon, 2012; Brammer and Millington, 2008).

The associations between systematic risk and the sustainability of a business have already proven to be a topic of interest to the business media and regulatory agents in mature markets (Krosinsky, 2013). However, it is understood that while the question of sustainability constitutes determinants for business performance, investors and the regulatory agents still seem to pay little attention to this issue, despite the fact that some representative investors have already alleged they are adopting structures for analyzing companies using ESG concepts (CalPERS, 2014).

6. Conclusions

The literature on motivations for superior performance in corporations has historically concentrated on developed economies (Bassen et al., 2006; Cheng et al., 2014; Dhaliwal et al., 2011). Emerging markets, despite representing a significant proportion of the businesses around the word, have yet to find an expressive presence in the literature that addresses ESG performance (Dobers and Halme, 2009; Baughn et al., 2007). In part, this is because reliable data were not available until quite recently. In this respect, this study is both timely and relevant because it addresses ESG practices in emerging markets.

Based on data from 365 companies listed in the BRICS countries, and using four different ESG performance proxies, i) overall ESG performance, ii) environmental performance, iii) social performance, and iv) performance in corporate governance, we hypothesized that the financial profile of the BRICS firms had no impact on their ESG performance. Our hypotheses for the BRICS companies denies the counter-intuitive evidence that companies in sensitive industries could have better ESG performance than companies from other sectors – including cleaner, non-sensitive industries.

However, even when the size of the company and the country in which it is listed are controlled, we found that the best environmental performance is predominantly in those companies that are seen as sensitive or as being more likely to cause damage to society, as observed by a regression with random effects. Such findings support the studies on corporate environmental legitimacy for companies from sensitive industries, which tend to disclose their ESG performance to protect their reputation.

Evidence was found that the association between the systematic risk of the firm and its ESG performance could be described as an inverted U-shaped curve, indicating the existence of a maximum value for ESG performance, by way of the firm's systematic risk level. This result sheds light on the timely role of investors and regulatory agents in systemic risks. If investors continue to largely ignore systemic risks such as those arising from climate change (environment), inequality and working conditions in poor countries (social), they will effectively be indicating that these risks are irrelevant. In addition, regulatory market agents, such as the SEC in the United States, are taking the opinion of investors as the basis for determining who deserves the attention and actions of public regulatory agents.

In terms of academic contribution, our research has added to the numerous efforts researchers have made to further knowledge on the relationship between CSP and CFP, with the advantage that we tested firms of emerging countries. Our analytical results indicate that the profitability of the firm's assets is associated with only one of the ESG performance proxies, environmental performance, as observed by the regression with random effects. The negative sign of this association indicates that the companies with the best ESG performance tend to be less profitable.

The design chosen for this research imposes some limitations that are worth registering. First, the dataset includes only companies listed in the BRICS countries and at a particular moment in time. With regard to the period of time, we worked with the data available at the time this research was carried out. Second, the econometric techniques adopted may have resulted in biases because of variables that are important but were not studied; however, the use of different estimation techniques may moderate this limitation. Finally, the lack of studies on the topic discussed here points towards an agenda in which the following may be chosen in future research: i) repeating this study to include other companies listed in other emerging countries; ii) expanding the period studied, in view of the availability of more recent data on the topic studied; and iii) employing alternative estimation methods.

Notes: This table shows the results obtained for estimates of the panel data regression parameters in three different models (Model XIX and XX: Ordinary Least Squares; Model XXI and XXII: Random Effects; Model XXIII and XXIV: Fixed Effects). It was found that Model XXIV is adequate: Fixed Effects and robust standard error, since these tests of premises suggested that this method was convenient (384 observations of 172 companies over a period of three years). i) Breusch- Pagan's Test = 135.316 ($p < 0.001$); ii) White's Test, with LM statistic = 48.6096 ($p = 0.009$); iii) Hausman's Test = 0.258 ($p < 0.967$); iv) F Test for examining group differences in the intercepts = 0.829 ($p < 0.001$). $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

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