Which Dimensions of Social Responsibility Concern Financial Investors?

Isabelle Girerd-Potin · Sonia Jimenez-Garcès · Pascal Louvet

Abstract Social and environmental ratings provided by social rating agencies are multidimensional. The first goal of our paper is to identify a small number of independent and relevant socially responsible (SR) dimensions reflecting a firms' coherent posture toward social issues. We put forward that these dimensions are not exactly the same as the ESG ones (Environment, Social, and Governance). Using the six sub-ratings provided by the Vigeo rating agency, we perform a principal component analysis and we highlight three main independent SR dimensions related to (1) business stakeholders (employees, customers, and suppliers), (2) societal stakeholders (environment and society), and (3) financial stakeholders (stockholders and debt holders). The second objective of our paper is to explore the link between stock returns and these three SR dimensions. Our most notable finding is that for each SR dimension, investors ask for an additional risk premium when they accept to hold non-socially responsible stocks. The cost of equity is thus lower for SR firms. The average premium over the period 2003–2010 is larger for the components "business stakeholders" and "financial stakeholders" than for the component "societal stakeholders." The premium for this last component has only existed since the end of 2008. Since that time, environment and community involvement have become important risk factors strongly considered by investors. For the three dimensions, investors notably penalize large non-social firms and reward small social firms.

Keywords Asset pricing · Corporate financial performance · Principal component analysis · Social ratings · Socially responsible investment

Abbreviations

CSR	Corporate social responsibility
EBITDA	Earnings before interest, taxes, depreciation, and amortization
HML	Return of high book-to-market firms minus return of low book-to-market firms
IBES	Institutional Brokers' Estimate System
KLD	Kinder, Lydenberg, and Domini
ESG	Environmental, social, and corporate governance
NMR	Return of non-socially responsible firms minus return of socially responsible firms
SMB	Return of small firms minus return of big firms
SR	Socially responsible
SRI	Socially responsible investment
PCA	Principal component analysis

I. Girerd-Potin (✉) · S. Jimenez-Garcès · P. Louvet
Univ. Grenoble Alpes, CNRS, CERAG, BP 47 , 38040 Grenoble, France
e-mail: Isabelle.Girerd@iae-grenoble.fr

S. Jimenez-Garcès
e-mail: Sonia.Jimenez@imag.fr

P. Louvet
e-mail: Pascal.Louvet@iae-grenoble.fr

Introduction

Since the emergence of the issue of firm social responsibility, the link between stock returns and socially responsible investment (SRI) has been studied in academic literature. Theoretically, this link can be positive or

negative. It can be positive because of a temporary efficiency anomaly. This anomaly can be explained by investor myopia preventing prices from fully reflecting the social responsibility benefits. Conversely, the expected return of socially responsible (SR) firms can be less than the expected return of non-SR firms if SR firms are seen as less risky than others, or if investors are not motivated purely by financial returns and accept a financial sacrifice to "improve the world."

Empirical results concerning the link between SRI and financial performance are mixed and depend on performance measures, countries, periods, assets, and portfolios. One reason for these mixed results could be due to the complex nature of the field of corporate social responsibility (CSR). In this context, the literature has recently moved toward an examination of the main dimensions of SRI. The underlying intuition is that the relationship between SRI components and stock returns is not necessarily uniform. When a firm chooses to improve its corporate governance system, it acts in pursuit of pure financial rationality, whereas when a firm invests in a social foundation it is probably motivated by a more complex rationale, including social arguments. These two alternatives may imply different impacts on financial performance.

Social responsibility includes many considerations such as respect for employees, customers, suppliers, stockholders, bankers, environment, human rights, and community involvement, among others. These dimensions are estimated by rating agencies and give rise to "sub-ratings" (seven for KLD, six for Vigeo). Characterizing a firms' SR behavior by several sub-ratings, rather than by a unique rating, may provide a more precise idea of the financial markets' reaction to the SR information. It does not, however, necessarily help one understand the fundamental reason for such a reaction. Indeed, empirical studies about the link between sub-ratings, provided by social rating agencies, and a firms' financial performance still exhibit ambiguous results. Clarifying social responsibility and its impact on financial performance supposes identifying the pertinent aspects of the concept able to structure all the SR information in a small number of dimensions. In mainstream practice, the need to reduce the number of dimensions has led to aggregating sub-ratings into three SR dimensions, namely environment, social, and governance (ESG). However, firm behaviors in the three ESG dimensions appear to be not independent, as shown in our correlation analysis presented in the "Methodology" section.

The first goal of our paper is to identify, by exploratory analysis, the independent and relevant SR dimensions and to put forward that these dimensions are not exactly the same as the ESG ones. Using the six sub-ratings provided by the Vigeo rating agency, we perform a principal component analysis (PCA) and we highlight the existence of three main SR dimensions related to (1) business stakeholders (employees, customers, and suppliers), (2) societal stakeholders (environment and society), and (3) financial stakeholders (stockholders and debt holders). Instead of splitting SR dimensions by "objects" (Planet, People, Profit), our data analysis suggests splitting them according to the three spheres in which the firm acts: (1) the business sphere in which it operates, (2) the society in which it is involuntarily or deliberately connected with individuals, groups, and environment, and (3) the financial sphere in which it finds its capital. In each sphere, the firm faces different groups of stakeholders but tends to adopt a similar and coherent behavior toward each group. We note that our classification is different from the ESG one. For example, from the ESG perspective, all concerns related to mankind belong to the "Social" dimension because it implies "People," while concerns related to mankind belong to the societal sphere in our classification owing to the relation with the firms' civic conduct. Does a firm consider all humans in the same way it considers its employees, as the ESG perspective supposes? Our classification rejects this assumption, but rather considers community involvement and respect for the environment as a kind of political commitment.

Having identified the pertinent dimensions of social responsibility, we focus on the study of the link between SR dimensions and stock returns. We use a Fama–French (1993) approach with risk premiums associated with each of the three new social dimensions we put forward in our PCA. The main findings of this section are that the financial market demands a risk premium for each one of the three dimensions when a firm neglects its social responsibility. The average premiums over the period 2003–2010 are larger for "business stakeholders" and "financial stakeholders" components than for the "societal stakeholders" component. For this last component, the premium has existed explicitly only since the end of 2008, environment and community involvement having only recently become important risk factors in investors' minds. Investor reaction to SR firm behavior is proved by these results. Investors accept earning lower returns when owning SR firms, either because they associate SR with less risk or because their benevolence toward other stakeholders leads them to accept a profit decrease. The market reaction is greater for the SR dimensions including the firms' closer stakeholders.

Our paper is structured as follows. Section "Theory and Hypotheses" introduces our theoretical framework and posits hypotheses for the empirical section. Section "Methodology" includes the data presentation and our research methodology for both extracting three independent dimensions from social performance and empirically

studying the impact of social performance on financial performance. Sections "Results" and "Discussion" consist of the presentation and the discussion of our results. The last section contains our conclusions.

Theory and Hypotheses

Contextual Framework

Our first concern in this article is to study the link between SR dimensions and stock returns. A first step toward achieving this goal is to carry out an exploratory analysis to identify independent dimensions in CSR. Stakeholder theory helps us name and interpret these dimensions. According to the broad definition by Freeman (1984), a stakeholder is "any group or individual who can affect or be affected by the achievements of an organization's objectives." A firm enters into contracts with its partners, employees, customers, suppliers, banks, and stockholders. It operates in a legal, natural, social context that indirectly influences its activities and performance.

There is a debate as to who and what counts as firm stakeholders. For example, Laine (2010) gives the pros and cons of including "nature" in the firms' stakeholder group. He proposes using the term "natural environment" and considers it as something surrounding the firm and its stakeholders. In other words, the natural environment is not a stakeholder by itself but it represents the environment in which the stakeholder network is embedded.

Among the typologies introduced to classify stakeholders, Clarkson's (1995) typology of primary and secondary stakeholders is widely accepted (Avetisyan and Ferrary 2012). "Failure to retain the participation of a primary stakeholder group will result in the failure of that corporate system" (Clarkson 1995, p. 107). Primary stakeholder groups, including shareholders and investors, employees, customers, suppliers, government, and communities are characterized by a high level of interdependence. On the contrary, "Secondary stakeholder groups are defined as those who influence or affect, or are influenced or affected by, the corporation, but they are not engaged in transactions with the corporation and are not essential for its survival" (Clarkson 1995, p. 107).

Firms probably do not have the same strategy regarding different kinds of stakeholders. A firm can exhibit a high level of SR regarding one group of stakeholders (employees, for instance) and a low level in another domain (environment, for instance). Clarkson (1995), following Wartick and Cochran (1985) and Carroll (1979), characterizes corporate strategy or posture toward social responsiveness. The terms used are Reactive, Defensive, Accommodative, and Proactive (RDAP scale). Clearly,

what is important when classifying firm SR dimensions is to assemble them in terms of the firms' strategies.

Social Rating Agencies and Their Dimensions

Social rating agencies were created to give information to investors about a firms' SR behavior. Their increasing influence contributes to standardizing stakeholder categories and SR performance measures. Following Avetisyan and Ferrary (2012), CSR can be conceptualized as an emerging field composed of various interested stakeholders and CSR rating agencies. These rating agencies are Institutional Entrepreneurs who evaluate corporate social performance (CSP) by providing ranking services. "Obviously, CSR rating agencies contributed to make companies more aware of their responsibilities and influenced the way companies were meeting the requirements of reporting the sustainability" (Avetisyan and Ferrary 2012).

The social rating agencies sector is becoming more concentrated and *MSCI ESG research* now encompasses former rating groups Innovest, KLD, and IRRC. In Europe, Vigeo is the leading social rating agency and is developing its activity worldwide thanks to acquisitions and partnerships. Social rating agencies provide many sub-ratings to investors. For example, the ratings provided by KLD (now part of MSCI ESG research) are split into seven themes: community relations, corporate governance, diversity, employee relations, environment, product, and human rights (the last one being considered since 2000).

Our paper relies on the Vigeo ratings. Very few studies are available using this database as compared to studies using KLD and the rating methodologies are different. Articles based on the Vigeo ratings mainly concern European firms. Vigeo values six dimensions: human resources, environment, corporate governance, community involvement, business behavior, and human rights.[1] The score is relative inside a sector and for a date. The results may be different from those obtained on US firms using KLD scores even if the dimensions are close. Five KLD criteria directly corresponding to Vigeo ratings are community, corporate governance, human resources, environment, and human rights. However, while KLD has a special dimension for diversity, Vigeo includes this issue in human rights. The other difference concerns the sub-ratings product (for KLD) versus business behavior (for Vigeo). Unifying these dimensions could be achieved by introducing a "value chain" criterion.

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[1] See www.vigeo.fr.

Reducing the Number of Dimensions

Actors in SR investment needed to condense SR dimensions. Extra-financial factors used by analysts are now aggregated under the denomination ESG factors. SR funds, rating agencies, firms, and analysts, all use this acronym regularly. For instance, Vigeo is described on its website as the leading European expert in the assessment of companies and organizations with regard to their practices and performance on ESG issues. The RobecoSAM Corporate Sustainability Assessment presents three dimensions named economic dimension, environmental dimension, and social dimension. Each one of these dimensions is split into four criteria. Corporate governance is included in the economic dimension. The classification is not so far from that of ESG. Even if there is a broad consensus about the ESG classification, is it the best way to embed the SR dimensions and, above all, to reflect a firms' SR behavior? The firms appear to have non-independent behaviors in the sub-ratings proposed by rating agencies (see Table 2 and, for instance, Semenova et al. 2010). The existence of a correlation between the dimensions of the ESG classification means that the firm does not make a clear distinction in its behavior toward stakeholders belonging to the different dimensions. We can thus wonder whether this ESG typology helps us understand the way firms define their SR policy. Homogeneity inside each dimension and independence across dimensions are important qualities for a typology. ESG appears to be a simple aggregation of sub-ratings into three groups and it is doubtful that this classification has the required quality of homogeneity and independence.

A firm should adopt a uniform behavior when it acts in a specific sphere, regardless of who the stakeholder is in the sphere. In the financial sphere, the firm has to face shareholders and debt holders. The latter assume some risk on the capital they entrust to the firm and want to be ensured about the firms' governance quality. In the business sphere, employees, customers, and suppliers are in a relationship with the firms' management. Each one can deduce the way they will be treated from the way the other business stakeholders are considered. In the societal sphere, if a firm is aware of its impact on the community, it probably is also aware of its impact on the natural environment. This reasoning leads to the first hypothesis, H1, of our empirical study.

H1 Social information can be structured in a limited number of independent dimensions which are consistent with the different spheres in which the firm operates.

The purpose of hypothesis H1 is to clarify the complex nature of CSR information by finding its internal consistency: a PCA proposes a way to make CSR information more readable. To confirm the pertinence of our interpretation, we must test the external consistency of the new dimensions of the CSR information we put forward. To do so, we check how the financial market reacts to these new dimensions.

Measuring Financial Performance: Market Value or Stock Returns

The relationship between SR dimensions and financial performance is a question of interest. Having identified the relevant SR dimensions for firms, we must choose the suitable financial performance measure to explore this link. Since our question concerns the market reaction to CSR information, we focus on market performance. Two kinds of measures can be proposed for appraising market performance: stock returns or the market value of equity. All things being equal, are stock returns larger for SR firms or is the market value of equity larger for SR firms? Market value does not seem to be an appropriate measure for detecting market sensitivity to SR for two reasons. First, assuming a firms' social commitment can be reflected in its market value means that future cash-flows and/or discount rates depend on the firms' SR level. As a result, these two effects are likely to influence the firms' market value and it will be very difficult to disentangle the effects. Second and more importantly, if the market is at equilibrium and shareholders and managers rationally have the same goal of maximizing the firm value, the market-to-book ratio must be identical for all companies in a given sector. The reason is that in a given sector, costs are similar for reaching the same social commitment and, at equilibrium, no firm will take advantage of a change in its social status to become more or less SR. The lower cost of capital for SR firms (due to lower risk or stockholder altruism) is, therefore, compensated by the higher costs they incur and their lower expected cash-flows. It can be expected that, over long periods, empirical tests studying the relationship between equity performance and social responsibility (especially when social responsibility is valued by comparison between firms belonging to the same sector) will show only one thing: a lower return for SR stocks. We thus prefer to consider and analyze stock returns as the measure of financial performance. Another theoretical reason justifying our choice is that the average rate of return over long periods converges toward the investor's expected rate of return. As social rating aims at transmitting information to investors, we need to focus on the way investors adjust their expectations to this information.

Literature About the Link Between Market Value and Social Sub-ratings

Articles trying to find a link between the market value of equity and social scores present mixed results. This is in

line with our previously mentioned arguments against the use of market value. Moreover, empirical issues contribute to ambiguous results. To test if the value creation of a firm depends on its social scores, one first needs a good measure of value creation, and, second, to identify all other variables impacting value creation (sector, size, growth…). The chosen measure is alternatively the market-to-book ratio, the price to earnings, or the Tobin's Q. Empirical studies give a positive, a neutral, or a negative link between market value and each SR dimension. Even for studies using the same scores (KLD), the results do not converge. For Bird et al. (2007) who use the KLD ratings over the period 1991–2003 for US companies, returns and valuation multiples are positively linked to diversity and employee strengths. On the contrary, there is a conflict between community strengths, environmental strengths, and market valuation. The results of Galema et al. (2008) introduce more uncertainty. The link between KLD scores and market value over the period 1992–2006 is positive for diversity, environment, and product, whereas the governance score has a negative effect on market value and the dimensions of community and employee relations do not exhibit any significant effect.

Some studies investigate the value relevance of environmental and social performance ratings provided by social rating agencies other than KLD. Semenova et al. (2010) use the GES Investment Services risk rating for Swedish companies belonging to the SIX 300 Index over the period 2005–2008. The environmental index appears to be positively related to the market value of equity. The relationship between global social index and market value is significantly negative. Regarding social sub-ratings, the relationship is negative with employees, but positive with community and suppliers. Guenster et al. (2011) use eco-efficiency scores coming from Innovest (monthly scores over the period 1996–2004). Eco-efficiency is defined as "the ability to create more value while using fewer environmental resources, such as water, air, oil, coal and other limited natural endowments." The authors find a positive relationship between, on the one hand, eco-efficiency and, on the other hand, asset returns and market value. The valuation differential between the most eco-efficient firms and the least eco-efficient firms is time-varying and has increased over the period. This result favors an efficiency anomaly, environmental information being gradually incorporated into the stock price. However, Marsat and Williams (2011) using MSCI ESG ratings (formerly Innovest) over a later period (2005–2009) observe a negative impact of the responsible behavior on the corporate market value. The negative relation between the market value and the CSR score is observed both on the global rating and on the four sub-ratings (environment, human capital, strategic governance, and stakeholder capital). Dowell et al. (2000)

find that higher market value is associated with the adoption of a high environmental standard.

The results concerning market value and social responsibility do not converge. The empirical difficulties in testing this relation could be due to the weak impact of social responsibility on market value. This weak impact may arise from the two previously mentioned offsetting effects, namely lower discount rates and, at the same time, greater costs for more SR firms. In this context, we choose, hereafter, to focus our interest on and test the relationship between SR dimensions and stock market returns.

Literature About the Link Between Stock Returns and Social Sub-ratings

The literature provides results about the link between stock returns and SR dimensions as evaluated by rating agencies. For Galema et al. (2008), the employee relations score is the only one to have a significant positive effect on individual stock excess returns. Statman and Glushkov (2009) show similar results over the period 1992–2007. They build portfolios with increasing SR scores and obtain significantly positive returns for long SR/short non-SR portfolios when the SR criterion is employee relations or community involvement. For employee relations, significant results only appear during the first sub-period (1992–1999). Conversely, the human rights sub-rating is not significant for the whole period but is significantly negative for the second sub-period (2000–2007). Brammer et al. (2006), using scores provided by EIRIS (Ethical Investment Research Service) that were updated and made available in July 2002, show that the UK companies with higher social performance scores tend to achieve lower returns. On disaggregate data, they observe that the environmental and community involvement indicators are negatively correlated with returns while the employment indicator is weakly positively related. Over the period 1993–2000, Nelling and Web (2009) examine the "virtuous circle" between CSR and financial performance. They find a unique significant link: higher stock returns led to higher values for the KLD employee relations sub-rating.

The link between social scores and financial returns has probably changed over the last several years owing to increasing investor preoccupation with social and environmental issues. The point of interest for companies and investors in the future will be to forecast the cost of equity in relation with present social ratings. ElGhoul et al. (2011), examining a sample of US firms, find that firms with higher CSR ratings exhibit significantly lower implied cost of equity capital. The implied cost of equity is an ex-ante measure coming from different discounted cash flow models, data being provided by IBES. Furthermore, they find that among the six KLD social performance

dimensions, only three are related to the cost of equity. Employee relations, environmental policies, and product strategy sub-ratings are negatively related to this cost.

Some papers are devoted to the study of a sole CSR dimension, with environment and employee relations being the most frequently considered sub-ratings. Edmans (2011) finds that firms with a high level of employee satisfaction (firms belonging to the 100 best companies to work for in America) earned an annual abnormal return of 3.5 % from 1984 to 2009. He interprets his findings as a market failure to fully incorporate intangible assets into stock valuations, even if, all things being equal, these firms exhibit greater market values (as measured by the market-to-book ratio, the price-to-earnings ratio, and the ratio of aggregate value to EBITDA). These results indicate that the market is at least partially valuing the intangibles.

Stock Returns and SR Dimensions: A Positive or Negative Link?

Our hypothesis is that more highly SR firms exhibit lower stock returns, either because they are less risky or because stockholders accept incurring a financial sacrifice to hold their stocks. Some of the risks avoided by SR companies include, for example, consumer boycotts, employee strikes, environmental penalties, legal prosecutions and fines, and changes of social and environmental laws and regulations. Godfrey (2005) presents SR behavior as a form of insurance for the firm, thanks to the creation of a moral capital. "Positive moral capital acts as insurance as it protects relational wealth against loss by mitigating negative stakeholder assessments and related sanctions when bad acts occur" (Godfrey 2005, p. 786). SR behaviors provide a sort of protection for a firms' relational wealth, in particular, affective commitment among employees, legitimacy among communities and regulators, trust among suppliers and partners, and brand credibility with customers.

Empirical studies about risk and social responsibility have focused on financial risks. Using meta-analysis, Orlitzky and Benjamin (2001) summarize the results of the first studies and conclude that the correlation between social performance and risk is negative. The latest empirical results show that SR firms exhibit slightly smaller systematic risk (see Salama et al. 2011; Oikonomou et al. 2012). Systematic risk is measured by the original CAPM beta, the beta from a CAPM dealing with downside risk, or by the Fama–French betas. The main result obtained about financial risk, as measured on stock returns, show that SR firms exhibit a lower idiosyncratic risk (Luo and Bhattacharya 2009; Mishra and Modi 2012). This result either means that SR firms are less affected by specific events or that there is a systematic risk ignored by traditional risk-

return models. Stock returns could be explained by a new common factor representing the risk of not being SR; firms would present different sensitivities to this factor and as a result, different SR premiums. Based on this last hypothesis, hereafter we propose an empirical risk-return asset pricing model including a non-social risk factor.

If SR firms are less risky, they must have a lower required rate of return. However, empirical studies dealing with the link between stock returns and SR dimensions do not lead to a unique and undisputed conclusion. We can explain why positive links between SR ratings and stock returns can appear by employing the following arguments. First, the studies putting forward these positive links were carried out over periods of SRI growth. An increasing demand for SR stocks can create temporary abnormal returns. Second, an efficiency anomaly could be responsible for such results. The reason for this efficiency anomaly resides in investor and firm myopia about SR impacts. Firms do not understand the profits they can obtain from SR strategies (Porter and Kramer 2011) and are reluctant to implement them. Investors underestimate positive SR impacts and SR information is gradually incorporated into stock prices. We note that on a more mature market, the previously mentioned effects gradually disappear.

The second question we raise in this paper is the following. Does the financial market exhibit reactions to the SR independent dimensions we put forward, and as such, give them an external consistency? In other words, do the independent SR dimensions previously found make sense for investors? Our second hypothesis can be formulated as follows.

H2 Regardless the independent SR dimensions, a lower SR level is associated with a risk premium.

The nature and strength of the link between stock returns and SR ratings depends on the chosen sub-rating. Past literature highlights discrepancies among the impacts of SR dimensions on stock returns. For instance, the employee criterion appears to be an important explanatory variable for stock returns (Galema et al. 2008; ElGhoul et al. 2011; Edmans 2011). Using our strategic relevant dimensions described in hypothesis 1, we expect to put forward the existence of a stronger link between stock returns and the firms' primary stakeholders, which include the financial stakeholders and business stakeholders. The third hypothesis we test in this paper is stated as follows.

H3 The risk premium associated with societal stakeholders is smaller than the other SR risk premiums.

Our research question precisely focuses on the risk translated in low social ratings. We study the existence of a risk premium required for non-SR firms in the different dimensions of social responsibility.

Methodology

Data

Our dataset consists of the monthly social ratings of 816 firms followed by the Vigeo rating agency between December 2003 and November 2010. The social responsibility valuation embeds six different ratings concerning different aspects of social commitment: human resources, environment, business behavior, corporate governance, community involvement, and human rights. Each of these ratings ranges from 0 for the least SR firms to +4 for the most SR ones. We construct a global rating based on these six sub-ratings.[2]

Book-to-market ratios as well as market values, necessary for our Fama–French (1993) based empirical methodology, come from Datastream. The market index we consider is the Stoxx Europe 600, the data for which comes from the Stoxx website.[3]

We note that the number of rated stocks changes on a monthly basis over the period under consideration. For instance, data concerning each of the six social ratings are available for 43 firms in December 2003, 306 in December 2004, 525 in December 2005, 577 in December 2006, 631 in December 2007, 685 in December 2008, 787 in December 2009, and 816 in December 2010. This represents a total of 816 different firms rated over the period under consideration. Accounting and financial data are converted into Euros using the relevant exchange rate at the end of each financial year.

The Vigeo sub-ratings are relative measures. When a firm obtains a score above 2, it does not mean that its behavior is good in absolute terms but only that it is better than average. Similarly, the maximum score 4 does not mean that the rated firm has perfect behavior with respect to CSR, but only the best behavior among all the other firms. Since the Vigeo methodology tends to standardize the sub-ratings, it does not transmit any information about the effective heterogeneity between firm behaviors regarding each social dimension. We cannot know if the human rights concern, for instance, is more homogeneous across firms than is the environment one.

Table 1 presents some descriptive statistics for the financial variables included in the following empirical tests: the stocks' excess returns on the risk-free rate, the market risk premium, the stock market values, and the stocks' book-to-market values.

The Three Main Dimensions of Social Responsibility

Social responsibility is an extensive concept that can be measured by a large number of criteria. In the Vigeo methodology, each one of the six sub-criteria is supposed to characterize a specific dimension of social responsibility according to the stakeholder approach that includes debtholders and stockholders, employees, clients and suppliers, environment, society, and humanity. We can ask if these dimensions are all relevant for the financial market. Before answering this question, it is useful to analyze the information provided by each sub-criterion. Are the six dimensions necessary to describe the complexity of social responsibility? Are some of them redundant? Is it possible to synthesize all of them in a reduced number of components?

The ESG approach considers that human resources, human rights, clients and suppliers, and community involvement can be gathered in a unique social dimension. A simple look at the correlation matrix presented in Table 2 shows that the ESG typology cannot help define independent and consistent dimensions. As expected by this typology, the correlation between sub-ratings gathered in the social dimension is high; it reaches a maximum of 0.647 between human rights and human resources; but all other sub-rating pairs also exhibit a relatively high positive correlation coefficient. For instance, correlations between environment and sub-criteria included in the social dimension are above 0.5. Corporate governance seems, however, to be a specific dimension with a relatively weak correlation with other sub-criteria. Corporate governance is also the sub-rating that is the least linked to the global social rating.

According to the previous analysis, the high correlation between each sub-criterion and the global rating suggests that the information can be summarized in fewer dimensions which may be different from the ESG analysis. A PCA can be applied to extract the relevant and independent dimensions.

The PCA is run on the whole sample during the entire period. In Table 3, we show that the first component has an eigenvalue of 3.431 and accounts for about 57 % of the total variance. It is clearly the main factor. The second and third components, respectively, explain about 14 and 9 % of the total variance and can be retained to improve the representation of the social responsibility diversity. Together, these three components explain 80 % of the total variance. The other components can be neglected.

To facilitate the factor interpretation, we apply a Varimax rotation on the three retained social components. Results about the link between these rotated components

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Table 1 Descriptive statistics on the financial variables

	Excess return (in %)	Market risk premium (in %)	Market value (in M€)	Book-to-market
Average	0.34	0.30	11,221.75	0.6129
Median	0.09	1.20	4,523.84	0.4808
Standard deviation	10.27	4.45	18,809.03	0.9381
Minimum	−99	−13.59	3.06	−25.00
Maximum	229	14.16	207,385.03	33.33

This table presents some descriptive statistics (average, median, standard deviation, minimum, and maximum) for the financial variables (the stock excess return over the risk-free rate, the market risk premium, the firm market value, and the firm book-to-market value)

Table 3 Eigenvalues of the PCA

Component	Initial eigenvalues	% Variance	Cumulated variance
1	3.431	57.186	57.186
2	0.851	14.183	71.369
3	0.542	9.035	80.405
4	0.428	7.128	87.533
5	0.419	6.987	94.520
6	0.329	5.480	100.000

This table presents the eigenvalues of each component of the PCA as well as the percentage of the total variance which is accounted for by each component

(designated by C1–C3 in the following) and the six initial sub-ratings are explained in "Results" section.

Social Performance Impact on Financial Returns

This section describes the methodology we use to measure the impact of each of the three dimensions of social performance on financial performance. Firms that are not SR are seen as more risky. As a result, investors are likely to ask for an additional risk premium when they decide to hold non-SR stocks. We will precisely test the existence of this risk premium and answer the following question: are all three dimensions of social responsibility highlighted by the PCA associated with a risk premium?

We first construct, in the same vein as Fama–French (1993), a "non-social" risk premium factor, called NMR (the return of non-socially responsible firms minus the return of SR firms), for each of the three dimensions of social performance put forward in "Methodology" section. These NMR1, NMR2, and NMR3 factors are orthogonalized against the size

and book-to-market dimensions, following the Fama–French (1993) methodology.

More precisely, we use the following steps to construct portfolios based on size, book-to-market, and social responsibility.

1. Each month, the stocks in our sample are split into two groups according to their size. The stocks with a size smaller than the median are in the small (S) group. The stocks with a size larger than the median are in the big (B) group.
2. Independent of size classification, we split the stocks in our sample into three groups based on their book-to-market ratio. Stocks with a book-to-market ratio among the 30 % lowest book-to-market ratios will form the L (Low book-to-market) group. Stocks with a book-to-market ratio falling in the group with the 30 % highest book-to-market ratios will form the H (High book-to-market) group. The other stocks make up the M (Median book-to-market) group.
3. Stocks are then classified according to their social performance. SR performance is appraised successively by the value of the first social component (C1), the second social component (C2), and the third social

Table 2 Correlation matrix of the six sub-ratings and the global rating

Rating	Global rating	Human resources	Environment	Clients and suppliers	Corporate governance	Community involvement	Human rights
Global rating	1						
Human resources	0.771***	1					
Environment	0.796***	0.567***	1				
Clients and suppliers	0.789***	0.557***	0.562***	1			
Corporate governance	0.553***	0.205***	0.324***	0.319***	1		
Community involvement	0.753***	0.485***	0.563***	0.517***	0.302***	1	
Human rights	0.792***	0.647***	0.541***	0.589***	0.297***	0.511***	1

This table presents the Pearson correlation coefficients of the six sub-ratings and the global rating

*, **, *** The coefficient is significantly different from zero at the 10, 5, and 1 % levels, respectively

component (C3). Stocks with a social performance belonging to the lowest 30 % will form the N (**N**on-socially responsible) group. Stocks with a social performance belonging to the highest 30 % will form the R (socially **R**esponsible) group. The other stocks will form the I (**I**n-between) group.

We then obtain 18 portfolios for each of the three social dimensions, thus a total of 54 portfolios. Each portfolio includes all the firms belonging to the same size, book-to-market, and social responsibility levels. Below is a table explaining the splitting for each criterion.

Criteria	Size	Book-to-Market	Social Responsibility
First group	S (Small size firms—50 % of the firms)	H (High book-to-market firms— 30 % of the firms)	N (Non-socially responsible firms—30 % of the firms)
Second group		M (Median book-to-market firms— 40 % of the firms)	I (In-between firms—40 % of the firms)
Third group	B (Big size firms– 50 % of the firms)	L (Low book-to-market firms— 30 % of the firms)	R (socially Responsible firms—30 % of the firms)

The monthly return of each portfolio is computed as a weighted average of the return of the stocks belonging to this portfolio during the considered month. The weights are the market values at the beginning of the month. This methodology allows us to construct three risk premia: NMR1, NMR2, and NMR3.

NMR1 (respectively, NMR2, NMR3) corresponds to the return of the less SR firms' portfolio minus the return of the more SR firms' portfolio, social commitment being measured by the first (respectively, second, third) component of social performance, C1 (respectively, C2, C3). NMR1, NMR2, and NMR3 are computed as follows for $J = 1$–3:

$$NMRJ_t = \left\{ \frac{1}{6} \left(\bar{R}_{SHNJ_t} + \bar{R}_{SMN_{J,t}} + \cdots + \bar{R}_{BLN_{J,t}} \right) \right\} - \left\{ \frac{1}{6} \left(\bar{R}_{SHR_{J,t}} + \bar{R}_{SMR_{J,t}} + \cdots + \bar{R}_{BLR_{J,t}} \right) \right\},$$

where $\bar{R}_{SHN_{J,t}}$ is the return weighted average of the stocks belonging to the Small/High book-to-market/Non-socially responsible group, social responsibility being measured with the component CJ. The same definition applies to the 35 other average returns involved in the three equations above. We show the results for a deep study of the "non-social" risk premia NMR1, NMR2, and NMR3, in "Results" section.

The next step of our methodology aims at considering additional risk premia in the Fama–French (1993) model.

Our objective is to analyze the impact of the three SR risk premia on the return of the 54 portfolios presented above.

We run the following empirical model, inspired by Fama–French (1993), for the 54 portfolios constructed previously.

$$R_{P,t} - r_{f,t} = \alpha_P + \beta_{P,t}(R_{M,t} - r_{f,t}) + s_P SMB_t + h_P HML_t + e_P NMR1_t + f_P NMR2_t + g_P NMR3_t,$$

(1)

where $R_{P,t}$ is the return of portfolio P on month t, $R_{M,t}$ is the return of the market portfolio on month t, SMB is the return of the "Small minus Big size" Fama–French portfolio, HML is the return of the "High minus Low BTM" Fama–French portfolio, and NMR1, NMR2, NMR3 are the three SR-based portfolios constructed previously. Note that SMB and HML are constructed without considering social responsibility issues, that is, by considering the six Fama–French traditional portfolios only based on size and book-to-market dimensions. Once regression (1) has been carried out, we will be able to analyze the factor loadings for the three portfolios NMR1, NMR2, and NMR3. In particular, we will check whether (1) the non-SR portfolios (among the 54 portfolios) are positively linked to the NMR risk premia and (2) the factor loading decreases with the port-folios' SR commitment.

To deepen our analysis of the portfolios' NMR coefficients as well as our understanding of the link between social responsibility, size of the firm, and market reaction, we perform the following regression of the portfolios' NMR coefficient on the SR level, size level, and book-to-market level of portfolios:

$$\beta_{NMR} = \alpha_0 + \alpha_1 Size\_level + \alpha_2 BTM\_level + \alpha_3 SR\_level,$$

(2)

where β_{NMR} is the portfolios' NMR coefficient. $Size\_level$ takes the value of -1 for small size and the value of 1 for large size. BTM_level takes the value of -1 for low book-to-market levels, 0 for in-between levels, and 1 for high book-to-market levels. Finally, SR_level takes the value of -1 for low levels of social responsibility, 0 for in-between levels, and 1 for high levels of social responsibility.

Results

Principal Components Analysis Results: The Three SR Dimensions

Table 4 presents the correlations between the rotated components (noted C1–C3) and the initial sub-ratings. All the sub-ratings contribute strongly to one or another of the three components.

Analyzing those correlations, we can associate C1 with human resources, business behavior, and human rights sub-ratings and we can refer (for this component) to the "business stakeholders." Employees, clients and suppliers are explicit and primary stakeholders are linked to the firm by a contract. Human rights are logically associated with business stakeholders because it refers to the way a firm is concerned by human rights in its relation with its employees.[4] The association of several stakeholders in a same component suggests that the firm behaves toward these partners in the same way. For example, when a firm is concerned for its employees, it tends to consider its clients and suppliers in the same way. The second component, which is the most highly correlated with the environment and community involvement sub-ratings, can be interpreted as social responsibility toward society, what we call "societal stakeholders." The relationship between a firm and the environment or the community is not regulated by a specific and explicit contract, but by general law and implicit social pressure. Finally, the third component is most highly correlated with the corporate governance sub-rating and reflects social responsibility toward financial stakeholders. This confirms our intuition that corporate governance is a specific and independent dimension of social responsibility.[5] These results seem to indicate that firms identify three main and independent targets in their social responsibility policy: value chain or business stakeholders (employees, clients and suppliers), societal stakeholders (environment and society), and financial stakeholders (debtholders and stockholders). Even if our financial dimension is the same as the "G" in the ESG denomination, the societal and business dimensions do not correspond exactly to the "E" and "S" of this definition.

As can be seen in Tables 3 and 4, the three components do not contribute equally to the variance explanation. C1 captures 57 % of the social information: the majority of information collected by Vigeo tends to describe the firms' social responsibility in their management. C2 and C3, respectively, explain only 14 and 9 % of the total variance: this means that

Table 4 Rotated component matrix

Rating	Components		
	C1	C2	C3
Human resources rating	**0.846**	0.278	0.001
Environment rating	0.497	**0.650**	0.190
Business behavior rating	**0.681**	0.392	0.227
Corporate governance rating	0.135	0.159	**0.971**
Community involvement rating	0.266	**0.897**	0.124
Human rights rating	**0.839**	0.221	0.165
Explained Variance	57.18 %	14.18 %	9.04 %
Concern	**Business stakeholders:** employees, clients and suppliers	**Societal stakeholders:** environment and society	**Financial stakeholders:** stockholders and debt holders

This table presents the correlations between the rotated components (noted C1–C3), and the initial sub-ratings. The highest correlations are identified by bold characters

the societal and financial dimensions of social responsibility are not so well-documented. The main reason for this inequality resides in the fact that three sub-ratings contribute to defining C1, while only two (respectively, one) constitute C2 (respectively, C3). We can thus conclude that the main object of this rating is the firms' management. Even if C2 and C3 are less representative, they are, however, informative and can be exploited, like C1, by the financial market. Construction of a global rating as a simple average of all sub-ratings is questionable: a better solution would be to propose a linear combination of the three components in which the coefficients are chosen according to the weight the users want to apply to each SR dimension.

We present in Table 5 the component score coefficients used to compute the value of our three new components C1–C3. For each component, the sign of the coefficient is such that the more responsible a firm is, the higher its score. According to the correlation analysis, when a sub-rating can be associated with a component, its coefficient is positive; inversely, if it cannot be associated, its coefficient is negative. To test the validity of the score functions, the PCA is run again on two equal sub-periods (cf. columns 2 and 3). The results are similar and prove the robustness of the analysis: each coefficient keeps the same sign and has a close level.

[4] As mentioned by Vigeo, the human rights rating deals with respect for freedom of association, the right to collective bargaining, non-discrimination and promotion of equality, elimination of illegal working practices such as child or forced labor, prevention of inhumane or degrading treatment such as sexual harassment, protection of privacy and personal data.

[5] We also run the Varimax rotation only on C1 and C2. The first rotated component aggregates the five non-financial sub-ratings and the second one reflects only the corporate governance dimension. Comparing both rotations, we can observe that increasing the number of components allows splitting the first "non-financial stakeholders" component into two parts: the main one which considers the business stakeholders and the second one which considers the societal stakeholders.

Table 5 Component rating coefficient matrix

Sub-rating	Whole period	December 2003–May 2007	June 2007–November 2010	Difference between sub-periods
Component C1				
Human resources	0.547	0.647	0.493	0.154
Environment	−0.033	−0.186	0.005	−0.191
Clients and suppliers	0.298	0.231	0.324	−0.093
Corporate governance	−0.108	−0.121	−0.098	−0.023
Community involvement	−0.395	−0.367	−0.389	0.022
Human rights	0.561	0.590	0.562	0.028
Component C2				
Human resources	−0.213	−0.299	−0.141	−0.158
Environment	0.461	0.586	0.43	0.156
Clients and suppliers	−0.013	0.105	−0.063	0.168
Corporate governance	−0.154	−0.168	−0.143	−0.025
Community involvement	0.961	0.840	0.972	−0.132
Human rights	−0.329	−0.285	−0.359	0.074
Component C3				
Human resources	−0.178	−0.123	−0.214	0.091
Environment	−0.027	−0.034	−0.027	−0.007
Clients and suppliers	0.064	0.004	0.094	−0.09
Corporate governance	1.034	1.068	1.012	0.056
Community involvement	−0.142	−0.152	−0.128	−0.024
Human rights	0.023	−0.011	0.042	−0.053

This table presents the component score coefficients used to compute the value of our three new components C1–C3. For each component, we present the rating coefficients from the analysis applied over the whole period (column 2), then over two equal sub-periods (columns 3 and 4). In the last column, we also present the difference between the coefficients obtained for each sub-period

Table 6 Descriptive statistics on the three components of social performance

	C1	C2	C3
Average	1.7170	1.4194	1.5295
Median	1.7402	1.3681	1.5189
Standard deviation	0.9418	0.9499	0.9578
Minimum	−1.03	−1.39	−1.05
Maximum	4.74	4.60	3.99

This table presents some descriptive statistics (average, median, standard deviation, minimum, and maximum) for the value of the three components (C1–C3)

Finally, Table 6 presents some descriptive statistics for the three components which will be considered in the following section. The components seem to have a similar distribution: we can thus compare the score calculated for each component. As the sum of the function coefficients is inferior to 1, the average score is under the median score of each sub-rating (around 1.5 instead of 2).

The "Non-Social" Risk Premia

In this section, we analyze the level and the evolution of the social responsibility premia we previously proposed in an augmented Fama–French model. A "non-social" risk premium measures the rate of return difference between two portfolios, the first being composed of non-socially responsible firms and the second consisting of socially responsible firms. It measures the rate of return sacrificed by an investor to protect its portfolio against the risk faced by non-SR firms.

Figure 1a shows the evolution of the cumulative non-social risk premium when it is calculated by referring to the global rating.[6] While the Stoxx Europe 600 Index is particularly erratic during the period under study, the cumulative non-social risk premium increases regularly. At the end of the seven year period, the non-socially responsible portfolio out-performs the socially responsible one by 15 %. Exceptionally, during 2008, the non-social risk premium fell by 10 % but easily withstood the crash.

We run the Fama–French model extended to the SR-rating defined by components C1–C3 of the PCA analysis. Results are reported in Table 7. The three SR average risk premia are significantly positive. They are higher for components C1 (business stakeholders) and C3 (financial stakeholders) than for C2 (societal stakeholders). We note that to avoid interference with the SR component, we have strictly reproduced the Fama–French procedure for

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[6] The same methodology as that presented in Section "Methodology" was carried out to construct a NMR risk premium based on the global rating, instead of on C1, C2 or C3 components.
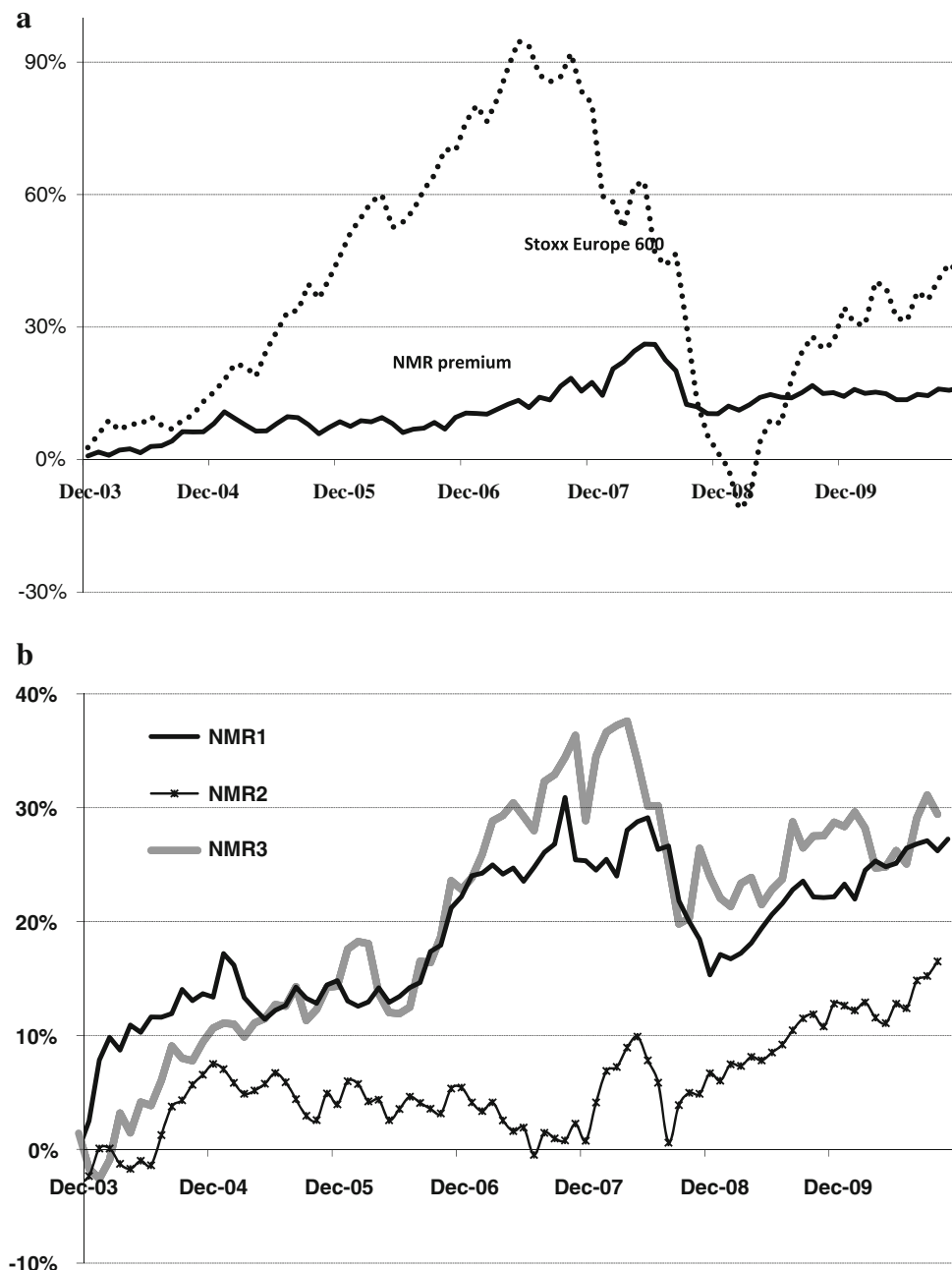
Fig. 1 a Evolution of the NMR premium for the global rating. This figure presents the cumulative monthly return of the NMR premium calculated following the Fama–French (1993) model extended to the SR global rating. For comparison purposes, the Stoxx Europe 600 index cumulated return is also presented. **b** Evolution of NMR premia for the three SR components. This figure presents the cumulative monthly return of the calculated NMR1–NMR3 factors based on the Fama–French methodology extended to SR components C1, C2, or C3

computing the SMB and HML risk premia (i.e., without SR component).

Figure 1b shows the evolution of the SR risk premium (NMR) based on each component. The NMR risk premia based on C1 and C3 increase regularly from the beginning of the period, while the increase of C2 is obvious only from the end of 2008. Financial investor SR concerns initially only dealt with the way firms manage their relationship

with their primary stakeholders. Environment and community involvement have only recently become a risk factor in investors' minds. Progressively increasing financial market awareness of SR dimensions is a question of maturity. At an early stage, the financial market focuses on SR behavior toward primary stakeholders because of its direct impact on business conditions; in the next stage, it also pays attention to the firms' societal externalities.

Table 7 Descriptive statistics on the extended Fama–French monthly risk premia

Monthly premia	Market risk premium $R_m\_R_f$ (in %)	SMB (in %)	HML (in %)	NMR1 (in %)	NMR2 (in %)	NMR3 (in %)
Average	0.30	−0.40	−1.71	0.35	0.20	0.35
Median	1.20	−0.46	−0.90	0.24	0.12	0.08
Standard deviation	4.45	1.93	4.67	1.44	1.36	1.96
Minimum	−13.59	−5.76	−20.62	−3.19	−4.08	−3.24
Maximum	14.16	6.32	19.31	5.31	3.41	9.34

The Fama–French methodology is employed for the three alternative specifications of the social rating. Each specification is based on a component (C1, C2, or C3) of the principal components analysis. The NMR1–NMR3 risk premia in columns 5–7 are reported for each specification. Market risk premium (column 2) is the same regardless of SR specification. SMB and HML in columns 3 and 4 are also the same regardless of SR specification since they are constructed without considering social responsibility issues (i.e., we consider the six Fama–French traditional portfolios only based on size and book-to-market dimensions). All average premia differ significantly from 0 at the 0.1 % level

Table 8 Pearson correlation matrix of the risk premia

	$R_m\_R_f$	SMB	HML	NMR1	NMR2	NMR3
$R_m\_R_f$	1.00***	0.451***	0.772***	−0.167	−0.135	−0.005
SMB	0.451***	1.00***	0.485***	0.100	−0.012	−0.147
HML	0.772***	0.485***	1.00***	−0.292***	−0.249**	−0.037
NMR1	−0.167	0.100	−0.292***	1.00***	0.267**	−0.179
NMR2	−0.135	−0.012	−0.249**	0.267**	1.00***	0.268**
NMR3	−0.005	−0.147	−0.037	−0.179	0.268**	1.00***

This table presents the Pearson correlation coefficients of the market risk premium as well as the Fama–French based risk premia

*, **, *** The coefficient is significantly different from zero at the 10, 5, and 1 % levels, respectively

In Table 7, the SR risk premia are less volatile (their standard deviation is around 1.5 %) than the Market risk (4.45 %), SMB (1.93 %) and HML (4.67 %) factors. Two conclusions can be inferred from this result. First, the evidence is stronger for the SR risk premium than for the other ones: we thus conclude that the SR criterion is more relevant for defining risk. Second, the SR premium is relatively unaffected by market fluctuations or changes in investor expectations. We carry out a correlation analysis between the different risk premia (see Table 8): NMR1, NMR2, NMR3, the market risk premium and the SMB, and HML traditional Fama–French size and book-to-market premium. Table 8 suggests that the three SR risk premia are counter-cyclical, meaning that when the market is bullish, the NMR risk premium decreases: investors thus appear to be more concerned about social responsibility when the market is bearish. However, we note that the correlations between the NMR risk premium and the market are not statistically significant.

SR-Augmented Fama–French Regressions Results

Table 9 presents the results for the 18 portfolios based on each of the components (C1–C3) of social performance. Adding the NMR1, NMR2, and NMR3 risk premia to the traditional Fama–French (1993) specification (only based on the market, SMB and HML risk premia) allows increasing the adjusted R^2 by approximately 2.20 %. The average adjusted R^2 of the SR-augmented Fama–French (1993) regression (i.e., the regression including the NMR1, NMR2, and NMR3 risk premia) is about 86.29 %.

When we analyze the coefficient significance at the 10 % level, we note that the NMR1 coefficient is significant for nine portfolios out of 18, the NMR2 coefficient is significant for 13 portfolios out of 18, and the NMR3 coefficient is significant for 15 out of 18 portfolios. Globally, these results confirm the significance of the NMR factors for explaining the return differences between SR and non-SR portfolios.

Link Between Portfolio SR Ratings and Their NMR Sensitivity

Table 10 presents the average factor loadings of the NMR1, NMR2, and NMR3 risk premia in the SR-augmented Fama–French regression. The factor loadings are aggregated depending on the SR commitment of the portfolios. The first column of Table 10 presents the average factor loadings for the portfolios based on the first component of SR performance (C1). The first (and, respectively, second and third)

Table 9 Results for the 18 portfolios based on the components of social performance

Portfolio	NMR1			NMR2			NMR3		
	Coefficient	Adjusted R^2 (%)	R^2 variation (%)	Coefficient	Adjusted R^2 (%)	R^2 variation (%)	Coefficient	Adjusted R^2 (%)	R^2 variation (%)
SLN	0.470**	81.32	2.65	0.413**	84.40	1.39	0.365***	81.84	1.94
	(0.015)			(0.012)			(0.005)		
SLI	−0.200	84.56	0.00	0.264	84.35	0.61	0.020	74.49	0.09
	(0.191)			(0.116)			(0.884)		
SLR	−0.482***	78.57	1.45	−0.747***	72.04	3.60	−0.702***	87.74	8.25
	(0.005)			(0.001)			(0.000)		
SMN	0.334**	90.43	0.62	0.308**	91.08	1.07	0.268**	87.62	1.96
	(0.014)			(0.034)			(0.021)		
SMI	−0.342***	94.34	0.66	−0.017	93.69	1.44	0.364***	94.19	2.01
	(0.004)			(0.886)			(0.000)		
SMR	−0.995***	87.39	6.75	−0.459**	87.72	1.45	−0.452***	86.79	1.69
	(0.000)			(0.014)			(0.001)		
SHN	0.833***	96.12	1.99	0.374**	94.81	0.37	0.479**	81.11	3.89
	(0.000)			(0.023)			(0.020)		
SHI	−0.136	88.67	−0.35	0.447**	93.18	0.40	0.195*	95.85	0.02
	(0.524)			(0.012)			(0.078)		
SHR	−1.375***	89.85	4.04	−1.264***	94.80	3.08	−0.873***	89.91	4.51
	(0.000)			(0.000)			(0.000)		
BLN	0.419**	63.67	3.45	0.478**	72.26	2.56	0.584***	77.21	8.06
	(0.019)			(0.016)			(0.000)		
BLI	−0.132	76.67	0.15	−0.278**	72.79	0.72	0.110	72.67	3.84
	(0.324)			(0.037)			(0.227)		
BLR	−0.078	76.62	1.19	−0.149	78.60	0.65	−0.312***	83.88	3.64
	(0.552)			(0.272)			(0.001)		
BMN	0.195	81.30	6.39	0.689***	84.09	5.04	0.690***	88.17	8.13
	(0.284)			(0.000)			(0.000)		
BMI	−0.056	88.28	−0.40	−0.012	90.86	0.77	0.366***	91.66	3.07
	(0.693)			(0.924)			(0.000)		
BMR	−0.153	89.17	4.23	−0.036	87.65	0.98	−0.133	86.24	0.30
	(0.207)			(0.791)			(0.218)		
BHN	0.691***	78.12	2.17	0.574***	90.77	0.98	0.636***	93.29	3.44
	(0.004)			(0.003)			(0.000)		
BHI	−0.218	94.19	−0.02	0.590***	92.82	2.00	0.166*	96.17	0.35
	(0.196)			(0.000)			(0.065)		
BHR	−0.055	96.71	−0.08	−0.365**	94.74	0.37	−0.487***	94.45	1.52
	(0.661)			(0.018)			(0.000)		

This table presents the NMR coefficient, the adjusted R^2 and its variation when adding the NMR1, NMR2, and NMR3 risk premia in a traditional Fama–French (1993) specification (based only on market, SMB and HML risk premia). In the first three columns, portfolios are based on the C1 component and consequently the NMR1 risk premium is added to the Fama–French factors in the regression. In the next three columns, portfolios are based on the C2 component and consequently the NMR2 risk premium is added. In the last three columns, portfolios are based on the C3 component and consequently the NMR3 risk premium is added

*, **, *** The coefficient is significantly different from zero at the 10, 5, and 1 % levels, respectively. The numbers in parenthesis are the p values

row concerns the average factor loadings for the six least (respectively, in-between and more) SR portfolios. The second column of Table 10 presents the average factor loadings for the portfolios based on the second component of SR performance (C2). Finally, the third column of Table 10 presents the average factor loadings for the portfolios based on the third component of SR performance (C3).

As expected, we observe that the non-SR (SR) portfolios show a negative (positive) sensitivity to the NMR risk premia. The average factor loading decreases when the portfolios' SR commitment increases.

Table 10 presents *average* factor loadings. To see whether *for each portfolio* based on size and book-to-market groups, the coefficient of the non-SR portfolio is higher than the coefficient of the corresponding SR portfolio, we propose illustrating these coefficients in Fig. 2.

Figure 2a (respectively, b and c) graphs the sensitivity to the NMR1 (respectively, NMR2 and NMR3) risk premium

Table 10 Average factor loadings for the portfolios based on the three components of SR performance

	NMR1	NMR2	NMR3
Non-SR	0.490	0.473	0.504
In-between	−0.181	0.166	0.203
SR	−0.523	−0.503	−0.493

The first column of this table presents the average factor loadings for the portfolios based on the first component of SR performance (C1). The first (respectively, second and third) row concerns the average factor loadings for the six less (respectively, in-between and most) SR portfolios. The second (respectively, third) column presents the average factor loadings for the portfolios based on the second (respectively, third) component of SR performance

of the six non-SR portfolios, the six In-between portfolios, and the six SR portfolios. We clearly see that the plain black line is always above the broken gray line and that the two lines never cross. This indicates that, for each portfolio based on size and book-to-market deciles, the sensitivity of the non-SR portfolio (to the NMR risk premium) is higher than the sensitivity of the corresponding SR portfolio.

In Fig. 2a–c, the sensitivity level to NMR risk premia is higher for big firms (which appear on the right side of the figure). For SR firms, the sensitivity level is negative when the firm is small and close to zero when the firm is large. In other words, the reward for socially responsible firms is greater when the firm is small. The market expects a high social commitment from large firms: when the rating is high, it has nearly no influence on the cost of equity. For non-SR firms, the market exerts a penalty which tends to be greater for big firms. The social impact on the cost of equity is more obvious on social small firms and non-social big firms. A non-social small firm increasing its social commitment will improve its cost of equity, and a social big firm giving up its social commitment will increase its cost of equity. These conclusions are strengthened by Table 9. The R^2 variation and the significance of the SR factor loading are greater for small SR portfolios and big non-SR portfolios.

SR Level and Size as Determinants of the Portfolios' NMR Sensitivity

Performing regression (2) for our 54 values of β_{NMR} gives the results presented in Table 11. As expected, we find that β_{NMR} is significantly and strongly negatively linked to the portfolio SR level. β_{NMR} is independent of the BTM level but has a slightly positive link with the size: the bigger the firm, the higher the NMR coefficient. The importance of company size is confirmed. Another proof of the importance of size is given by Lourenço et al. (2012) on a sample of Canadian and American firms over the period 2007–2010. A firms' SR commitment is proxied by membership in the Dow Jones

Sustainability Index (DJSI). Large and profitable firms not included in the DJSI are associated with a lower market value of equity. Investors penalize these firms that are expected to signal sustainability leadership.

Discussion

The first conclusion we can draw from our empirical results is that a firms' SR behavior can be described in a three-dimensional way by its governance, its business management, and its societal impact. According to stakeholder theory, the manager is placed at the center of the game, because he is "under contract" with all stakeholders. (1) He has a contract with financiers, i.e., the shareholders and the debtholders. Financiers incur the investment risk and ask for good governance to reduce the moral hazard problem implied by their financial contract. (2) The manager also has a relationship with stakeholders (employees, suppliers, and customers) through usual business practices. These stakeholders expect the manager to both fulfill the explicit contract and be respectful toward them. (3) Finally, the manager is responsible for the firms' impact on society. Society is linked to the firm by an implicit contract requiring the firm to act in harmony with commonly accepted societal rules and expectations. Since these three dimensions are independent, we admit that managers can be swayed differently by the three stakeholder categories. One can thus infer that different styles of SR management will be evidenced depending on manager behavior with different stakeholder groups.

Understanding why managers give priority to a category of stakeholders in their SR behavior is an interesting issue for study, and agency theory can help with this undertaking. When managers are perfectly controlled by shareholders, they have to focus their SR policy toward financiers and they concentrate their efforts on improving the social quality of the firms' governance. When shareholder control is less efficient, managers are more interested in increasing their entrenchment. They can reach this goal either by satisfying their business stakeholders or by increasing their political reputation thanks to positive acts for society in general (environment or community). In other words, when social responsibility concerns non-financial stakeholders, it can be seen as an illustration of discretionary managerial slack. This statement is, however, not consistent with the second main conclusion of our paper. All SR dimensions are indeed considered in the same way by the financial market: market investors ask for a risk premium for all the SR dimensions neglected by the firm. Managerial and political aspects of social responsibility are appreciated by investors and do not reveal

Fig. 2 **a** Sensitivity to the first SR component risk premium. This figure illustrates the sensitivity to the NMR1 risk premium of the six Non-SR portfolios, the six In-between portfolios, and the six SR portfolios based on the first SR component (C1). **b** Sensitivity to the second SR component risk premium. This figure illustrates the sensitivity to the NMR2 risk premium of the six Non-SR portfolios, the six In-between portfolios, and the six SR portfolios based on the second SR component (C2). **c** Sensitivity to the third SR component risk premium. This figure illustrates the sensitivity to the NMR3 risk premium of the six Non-SR portfolios, the six In-between portfolios, and the six SR portfolios based on the third SR component (C3)
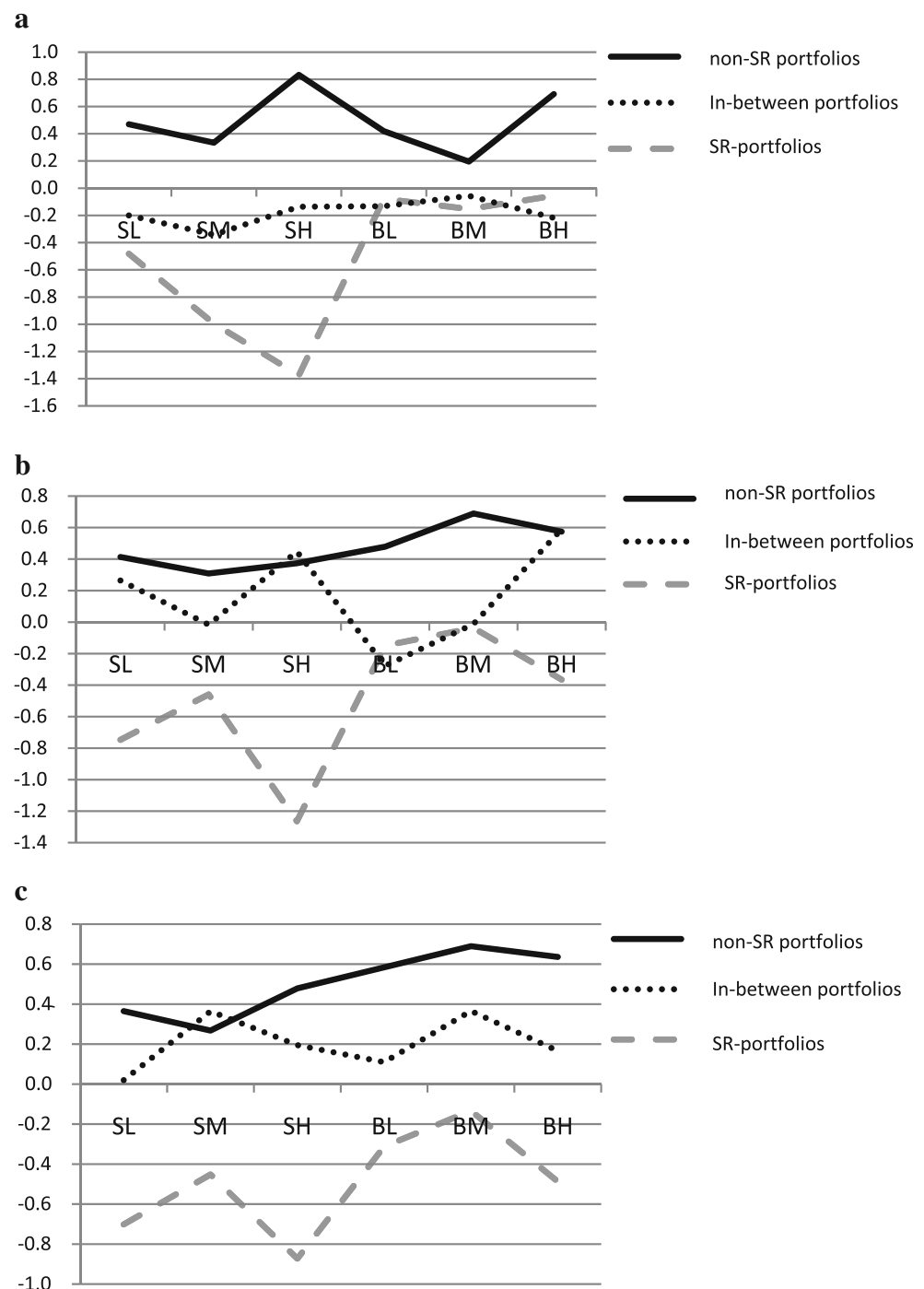
existence of a conflict of interest between the principal and the agent.

Another way to examine firm behavior with respect to the different dimensions of social responsibility can be found in economic analysis and the Resource Based View. Following pure economic reasoning, managers will focus on those SR dimension(s) for which marginal effort is best rewarded, either because the effort is not too strenuous or because the gain is potentially high. For instance, the effort required to improve your SR business management may be small when you only have to deal with a few employees, suppliers, or customers. The gain can be high when moral hazard significantly impacts the contracts' realization or when the stakeholders are particularly sensitive to the implicit nature of the contract. The optimization problem depends also on the firms' situation. Verbeke and Tung (2013) show, for example, that firms must manage stakeholder relationships in the early stage of their development

Table 11 Link between portfolio NMR coefficients and their SR level

Variable	Coefficient	Standard deviation	Students t	p value	Adjusted R^2 (%)
Constant	0.015	0.038	0.401	0.690	70.10
Size_level	0.123***	0.038	3.260	0.002	
BTM_level	0.005	0.046	0.102	0.920	
SR_level	−0.498***	0.046	−10.793	0	

This table presents the results of the regression $\beta_{NMR} = \alpha_0 + \alpha_1 Size\_level + \alpha_2 BTM\_level + \alpha_3 SR\_level$. β_{NMR} is the NMR coefficient of the portfolios. Size_level takes the value of −1 for small sizes and the value of 1 for large sizes. BTM_level takes the value of −1 for low book-to-market levels, 0 for in-between levels, and 1 for high book-to-market levels. SR_level takes the value of −1 for low levels of social responsibility, 0 for in-between levels, and 1 for high levels of social responsibility

*, **, *** The coefficient is significantly different from zero at the 10, 5, and 1 % levels, respectively

differently from the way they do in mature relationships. This analysis emphasizes the firms' maturity and consequently a size effect. Our results concerning this size effect tend to confirm that SR impact on financial return is greater for smaller firms.

To confirm this idea of a trade-off between the efforts and the gain related to an SR behavior, it would be useful in future research to more precisely define the characteristics of the implicit or explicit contracts linking the manager with the firms' stakeholders. A major characteristic for a contract is its duration. Long-term contracts are exposed to greater uncertainty since, over its term, the context may frequently and significantly change. Each counterpart thus needs to be convinced that, even if the context changes, the other party will respect the contract. Reputation, then, appears to be a valuable quality over the long term (Godfrey 2005), along with creation of moral capital. Socially responsible behavior helps a manager build a good reputation and develop the trust of his counterparts. Further theoretical research will help us show that the contracts between the firm and each group of stakeholders defined by our SR typology have similar characteristics. Conversely, we claim that social responsibility has an impact on the firm contracts efficiency. In a theoretical model, we will show that the contracts characteristics, and in particular the moral hazard problems affecting the contracts between the firm and its stakeholders, justify the usefulness of SR information.

Since our study is performed on an international sample, one can imagine that a country effect explains some differences in firm SR management. Since La Porta et al. (1998), it has been well established that investor protection depends on the legal context. Responsible governance is certainly more appreciated in a country where the law does not guarantee property rights. Some differences in firm governance policy could thus be explained by the fact that these firms are located in different countries, and are subject to different laws as a result. Stakeholder sensitivity to SR behavior can also influence firm choices. This sensitivity has a cultural dimension and can motivate firms to adapt their SR strategy to their national context. In future research, it would be interesting to compare firm mean SR profiles country by country. The results of our PCA define a three-dimensional space in which it is possible to locate firms according to their nationality. Generally, this kind of location analysis, when applied to various characteristics, can provide some explanation for the heterogeneity of firm SR policies.

Conclusion

Social and environmental ratings provided by social rating agencies are multidimensional. While the first papers exploring the link between social scores and financial performance mainly used a unique global rating, recent studies try to highlight the relations between stock returns (or equity market values) and sub-ratings. The literature is mixed and provides no certainty about these links. The European agency Vigeo rates firms on six dimensions, providing six sub-ratings. We contribute to a better understanding of the relation between the different dimensions of social responsibility thanks to an exploratory analysis of the sub-ratings. A PCA of the six sub-ratings allows us to identify three socially responsible dimensions reflecting a firms' coherent behaviors inside each dimension and independent behaviors across dimensions. We put forward that these dimensions are not exactly the same as the ESG ones. Stakeholder theory helps us name and interpret these dimensions. We finally show that firms identify three independent targets in their SR policy: business stakeholders contributing to the value chain (employees, customers and suppliers), societal stakeholders (environment and society), and financial stakeholders (stockholders and debt holders). Consequently, each firm can be represented by three orthogonal sub-scores. If we rank the firms separately according to each of these scores, it appears that the difference between risk-adjusted returns on portfolios with low- and high-rated firms is positive, regardless the sub-score. This difference constitutes a risk premium required by investors to hold non-SR firm stocks. The three average SR risk premia are significantly positive. They are higher for the first and third components ("business stakeholders" and "financial stakeholders") than for the second component ("societal stakeholders"). The SR risk premia for the first and third components increase regularly from the beginning of the period, while the increase of the second is obvious only from the end of 2008. It appears that before 2008 financial investors focused their SR concerns on the way firms managed their relationship with their business stakeholders. Recently,

environmental and community involvement have also become risk factors in investors' minds. When adding the non-socially responsible risk premia to a Fama–French three-factor model, sensitivity to the social factor of portfolios with different levels of social commitment exhibits the expected pattern. We show that sensitivity decreases with social score. For the three dimensions, firm size plays a role in the market reaction to social responsibility: the greatest impacts are seen for SR small firms that are rewarded by lower equity costs, and for non-SR big firms that are penalized by more expensive cost of equity.

The limitations inherent to our study offer interesting avenues for future research. An important research angle would be to explore the ways firms choose and adapt their SR behavior. Why does a firm favor one group of stakeholders ("business stakeholders," "societal stakeholders," or "financial stakeholders") over another? This question could be answered by defining and theoretically analyzing the characteristics of the implicit or explicit contracts linking the firms' manager with each group of stakeholders. It would be pertinent to precisely measure how those contract characteristics correspond to the firm's social responsibility commitment. We propose that contract characteristics may help explain the ways firms adapt their SR behavior in each one of the three independent SR dimensions. We propose to develop a theoretical model studying to which extent SR information can improve the contracts efficiency.

A related opportunity for future research concerns stakeholder sensitivity to a firms' SR behaviors. More precisely, how does stakeholder SR sensitivity influence a firms' SR choices and explain the heterogeneity of the firms' SR policies? We claim that stakeholder SR sensitivity has a cultural dimension and can motivate firms to adapt their SR strategy to their national context.

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