The performance of socially responsible stock portfolios: International evidence

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Keywords: Socially responsible investing; Corporate social responsibility; International stock markets; Portfolio performance evaluation; Market states.

JEL Classification codes: G11, G15, M14

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Abstract

This paper investigates the financial performance of international stock portfolios formed according to corporate social responsibility (CSR) criteria over the period 2002 to 2017. The dataset includes companies from North America, Europe, Japan, and the Asia Pacific region. Portfolios are formed considering both an aggregate dimension of CSR and three of its individual dimensions: Environment, Social and Corporate Governance. Using a robust multi-factor model and controlling for industry effects, our findings show that portfolios formed on European stocks with high Social scores perform better than their low-rated counterparts. Asia Pacific firms that perform well on the Governance dimension also show some evidence of outperformance. In other regions, though, there are no statistically significant performance differences between high- and low-ranked portfolios formed on CSR criteria. We further observe that regional portfolios of high-socially rated firms perform similarly. We also analyze portfolio performance across different market states and find that European firms that perform well along the Social and Environment dimensions tend to outperform their less responsible counterparts in bull markets.

Keywords: Socially responsible investing; Corporate social responsibility; International stock markets; Portfolio performance evaluation; Market states.

1. Introduction

In recent decades, investment management has undergone a progressive adaption process in which conventional financial objectives are increasingly being complemented by non-financial attributes such as environment, social and governance (ESG) criteria. This trend reflects an increasing awareness of environmental, social, and ethical issues that is strongly influencing the purchase decisions of investors (Mollet and Ziegler, 2014). Socially responsible investment (SRI) appeals to investors who wish to go beyond the financial utility of their investments and also derive non-financial utility from holding securities that reflect their social values (Auer, 2016; Auer and Schuhmacher, 2016). Additionally, ESG issues are becoming an important part of investors' decision-making process by helping them to identify firms' long-term opportunities and risks. According to the 2016 Global Sustainable Investment Review, in 2016 there were $22.89 trillion of assets being professionally managed under responsible investment strategies globally, representing an increase of 25 percent since 2014. In 2016, 53% of the total professional managed assets in Europe used SRI strategies, whereas the proportion of SRI relative to total managed assets in the US represented 22%. And in Australia/New Zealand, 51% of assets under professional management were directed to socially responsible investing.

The basic idea of SRI is to apply a set of screens to the available investment universe, in order to select or exclude assets based on ESG criteria (Auer, 2016). In practice, there is a range of SRI strategies, such as integration, positive/best-in-class screening, ethical/negative screening, governance and engagement, etc. All of these aim to drive funds towards socially responsible firms with constructive sustainable projects and policies.

Extant studies indicate that not all socially responsible investors are alike, and screens are an important instrument for distinguishing socially responsible stock practices that serve specific segments of socially conscious investors (Derwall et al., 2011). From an investors' perspective, the critical issue is whether socially responsible stock selection leads to gains or losses in terms of financial performance. On the firms' side, the question is whether spending resources on corporate social responsibility (CSR) practices will render benefits for the firm and increase its value. If doing good is indeed linked to doing well, firms may be led to behave more conscientiously. A positive relationship between social and financial performance would even legitimize CSR on economic grounds (Margolis et al. 2009). There are many empirical studies on the financial consequences

of including non-financial criteria in the portfolio selection process. An important stream of the literature has focused on the financial performance of SRI mutual funds. In general, these studies find that there are no significant differences between the performance of SRI mutual funds and conventional funds.[1] However, assessing the financial impact of SRI by evaluating the performance of actively managed SRI mutual funds has some shortcomings. For instance, as Brammer et al. (2006), and Kempf and Osthoff (2007) point out, there are confounding effects - such as fund manager skills and management fees - that may make it difficult to identify the performance that is due to the social characteristics of the underlying holdings. Furthermore, the fact that a mutual fund is classified as a SRI fund does not assure investors that they truly hold stocks of socially responsible companies, thereby suggesting that the label 'socially responsible' may be more of a marketing strategy used by the fund industry. In fact, Utz and Wimmer (2014) show that, on average, SRI funds do not hold more ethical firms than conventional funds, and Statman and Glushkov (2016) even find evidence of 'closet' SRI funds, which are conventional funds that avoid investing in unethical stocks. To overcome the limitations associated to studies on actively managed SRI mutual funds, an alternative approach to evaluate the financial effects of SRI involves evaluating the performance of synthetic portfolios formed on firms' social characteristics. This paper follows this approach to evaluating socially responsible investments.

The purpose of this paper is to investigate the financial performance of international stock portfolios based on CSR criteria. We form portfolios of stocks with high and low sustainability scores and investigate the performance of such portfolios using several multi-factor models. Sustainability is measured by an aggregate measure of CSR as well as three indicators of its individual dimensions: Environment, Social and Corporate Governance. Out database comprises international companies covered by ASSET4 ESG database between 2002 and 2017. Previous studies that address the performance of socially screened synthetic portfolios suffer from some limitations and inconsistencies, namely, (1) the majority of prior evidence only refers to the US and European stock markets; (2) with the exception of Badía et al. (2017), previous studies do not compare the performance of SRI portfolios of different regions worldwide; (3) there are studies that measure CSR through one of its individual dimension only, whereas others consider

[1] For a review of studies on the performance of SRI equity funds see, for instance, Capelle-Blancard and Monjon (2012), and Revelli and Viviani (2015).

an aggregate construct of CSR; (4) most studies do not evaluate the influence of specific industries on the financial performance of SRI stock portfolios; (5) in several studies assessing European firms, undersized samples are used; and (6) up-to-date evidence is lacking; (7) additionally, some researchers who document that SRI stock portfolios outperform conventional investments investigate whether there could be a 'time effect', i.e., whether SRI returns were better in earlier years and yet declined in more recent periods. Consistent with the error-in-expectations hypothesis, superior financial performance linked to SRI in earlier times can be a result of a mispricing that disappeared once markets learned how to price these stocks correctly (Derwall et al., 2011), and, hence, markets have adjusted to a pricing equilibrium. The findings of Derwall et al. (2011), Borgers et al. (2013), and Halbritter and Dorfleitner (2015) support this argument by documenting a notable downward movement of abnormal returns of SRI portfolios over time. However, Kempf and Osthoff (2007), Statman and Glushkov (2009), and Mollet et al. (2013) find no significant differences in SRI portfolio performance between sub-periods. These inconsistent results suggest that splitting the sample merely into sub-periods may provide a cursory interpretation of the behavior of SRI portfolio performance in time. In a different perspective, recent studies have provided evidence that socially responsible investments perform differently according to the state of the market, (e.g., recession and expansion periods). Examples of such studies include Nofsinger and Varma (2014), Becchetti et al. (2015), and Leite and Cortez (2015) on SRI equity funds; Henke (2016) on SRI fixed-income funds; and Brzeszczynski and McIntosh (2014), Carvalho and Areal (2016), and Badía et al. (2017) on SRI stock portfolios. We suggest that the inconsistent results of prior studies dividing the sample period in sub-samples may have neglected an important effect, specifically, the impact of different market states.

Hence, our main contributions to the existing literature are fivefold: (1) we extend the analysis on the impact of including socially responsible screens on investment portfolios performance to additional geographical areas (North America, Europe, Japan, and Asia Pacific). (2) we compare the financial performance of SRI portfolios of these regions to each other; (3) we form portfolios based an aggregate measure of CSR as well as of three of its specific ESG dimensions; (4) we evaluate the influence of specific industries on the financial performance of SRI stock portfolios; and finally, (5) we assess the financial performance of SRI stock portfolios over different market states: bear, bull and mixed periods. Considering the growth of socially responsible investments in international

capital markets and intensifying global competition, the valuation implications of sustainability in an international context is of practical interest to management, investors and regulators worldwide.

The remainder of the paper is organized as follows: Section 2 discusses the financial effects of SRI, providing an overview of the most influential studies related to the financial performance of SRI stock portfolios and discussing their limitations. Section 3 describes the data. Section 4 presents and discusses the empirical methodology and results, and section 5 summarizes the main results and presents some concluding remarks.

2. The financial effects of SRI

2.1 Theoretical arguments

There are two contrasting hypothesis on the effects of socially responsible investing in portfolio financial performance. The underperformance hypothesis is consistent with a traditional view of CSR that suggests a negative link between CSR and corporate financial performance (CFP). According to this perspective, supported by Friedman (1970), integrating environmental and social aspects in firm policies will have negative financial implications, since it implies internalizing additional costs. As Eccles et al. (2014) mention, high-sustainability firms may underperform since, for instance, they may discard valuable business opportunities that do not match their policies and values, or they may experience higher labor costs by providing more benefits to their employees. A further argument supporting the underperformance of SRI portfolios stems directly from portfolio theory, that sustains that portfolios formed on the basis of a limited set of investment opportunities will not be mean-variance efficient. Additionally, the screening process implies increased monitoring and information costs that also penalize financial performance (Cortez et al., 2009). Finally, there is evidence that stocks shunned by socially responsible investors (e.g., tobacco, alcohol and weapons) yield abnormal returns (Hong and Kacperzyck, 2009; Statman and Glushkov, 2009; Derwall et al., 2011). Since socially responsible investors typically avoid these stocks, they will not be able to benefit from those returns to the extent conventional investors do so.

Nevertheless, proponents of SRI claim that socially screened investing may result in a higher financial performance. This argument is supported by many empirical studies that

document a positive relation between CSR and CFP and valuation.[2] The outperformance hypothesis is consistent with stakeholder theory (Freeman, 1984) and the argument that integrating stakeholders' interests creates value for shareholders (Jensen, 2001). For instance, responsible firms may outperform by constituting confident supply chains, by innovating and developing products that maintain environmental constraints, and by attracting and retaining high-quality human capital (Eccles et al., 2014). Preston and O'Bannon (1997) also argue that satisfying the interests of different corporate stakeholders enhances a firm's reputation, resulting in a positive impact on its financial performance. They note that, since CSR involves constantly assessing corporate influences and relationships with stakeholders and the environment, it allows management to recognize and react to evolving strategic opportunities and challenges. In this line of reasoning, the use of social screens can help investors identify companies with better management skills (Bollen, 2007), and consequently benefit from an improved financial performance.

2.2 A critical look at prior empirical evidence

This section provides an overview of the most influential studies related to the financial performance of SRI stock portfolios. Table 1 summarizes empirical studies that assess the financial performance of SRI stock portfolios and the links to the seven controversial issues outlined in the introduction.[3]

[Insert Table 1]

According to the column 'Portfolio Construction', most studies form a portfolio with high-sustainability firms on the basis of a CSR indicator (high-ranked) and another with low-sustainability firms (low-ranked), and compare their financial performance by forming a differences portfolio, obtained by subtracting the low-ranked portfolio returns from the returns of the high-ranked portfolio (H-L analysis). Other studies (e.g., Filbeck et al. (2009); Edmans et al. (2011); Mollet et al., 2013; Brzeszczynski and McIntosh, 2014; Auer, 2016, and Badía et al., 2017) compare the performance of portfolios of high-sustainability stocks to conventional benchmarks (CCB analysis).

[2] For a more in-depth discussion of the empirical studies in the field, see for example, the review studies of Margolis and Walsh (2003), Orlitzky et al. (2003), Margolis et al. (2009), Lu et al. (2014), and Javed et al. (2016).

[3] We do not include in this discussion studies analyzing the relationship between reputation and financial performance (as reputation is a more vague concept, not so easily measured as the other components of ESG) nor those that do not use risk-adjusted measures to evaluate portfolio performance.

Table 1 confirms that the majority of prior studies address the US and the EU markets. This could be justified given the noteworthy proportions of assets that are professionally managed under responsible investment strategies in these countries. Auer and Schuhmacher (2016), and Badía et al. (2017) are the exception, since they extend their scope to Asia-Pacific countries in a multiregional analysis, and evaluate the financial performance of firms from the US, European, and Asia-Pacific markets. And although Auer and Schuhmacher (2016) compare, within each region, high- and low-ranked stock portfolios, they do not evaluate the relative financial performance of each regional portfolio. Badía et al. (2017) compare the returns of regional portfolios to each other from a retail investor's perspective and find outperformance of SRI portfolios in some specific geographical areas. Considering this evidence as well as the heterogeneity in the patterns of development of SRI across countries (Neher and Hebb, 2015), SRI financial performance should be further documented and compared in different regions. The extension of SRI research to other geographical areas is further motivated by Hörisch et al. (2015), who indicate that country-specific factors tend to affect the relationship between corporate social and financial performance. Additionally, investors' ESG concerns can also differ from region to region. For instance, Eccles et al. (2011) find that European investors are more interested in environmental concerns, while US investors are more interested in governance issues. In turn, Cortez et al. (2012) identify geographical differences in the investment style of socially responsible funds. Furthermore, given the progressive saturation of the SRI market in the US (Mollet et al., 2013), SRI diffusion and expansion in other regions could be indicative of a productive niche for positive abnormal returns.

The information in the column 'Individual CSR dimension or an aggregate CSR dimension' of Table 1 shows the criteria used to measure CSR. Authors such as Filbeck and Preece (2003), Derwall et al. (2005), Derwall et al. (2011), Edmans et al. (2011), and Carvalho and Areal (2016) focus their attention on a singular dimension of CSR: environment or employee relations. While this type of analysis shows the impact of a specific dimension of CSR on financial performance, it is restrictive to draw general conclusions about the effect of general features of sustainability on performance. On the other hand, the use of individual dimensions of CSR may be important because relevant characteristics of companies might end up diluted when using a combined measure of CSR (Hoepner et al., 2016). Some authors have used both specific dimensions of CSR as

well as an aggregate construct. For instance, within the US market, Kempf and Osthoff (2007) analyse six different CSR dimensions, together with an aggregate score, and Statman and Glushkov (2009) consider seven dimensions and an aggregate score. However, Galema et al. (2008) leave the overall score aside, while Borgers et al. (2013) only consider an aggregate score. Regarding the European SRI market, studies such as Van de Velde et al. (2005) and Auer (2016) scatter sustainability among different dimensions, while Humphrey et al. (2012) and Mollet and Ziegler (2014) only consider a combined measure of CSR. Auer and Schuhmacher (2016), and Badía et al. (2017), who also evaluate the Asia Pacific region, follow different approaches. The former use both an aggregate score and individual dimensions (ESG), whereas the latter only uses an aggregate score. As we discuss, there are various advantages and disadvantages on using an aggregate or individual dimensions of CSR to qualify the social responsibility of firms. In this paper, we consider both an aggregate measure of CSR as well as measures of its individual components (Environment, Social, and Governance), which allows us to recognise the individual influence of each singular dimension, along with the effect of an overview score on portfolio financial performance.

The column 'Industry effect' of Table 1 shows the studies assessing the influence of specific industries on the financial performance of SRI stock portfolios. Several studies such as Eccles et al. (2014) and Auer and Schuhmacher (2016) analyse the industry effects in socially responsible investing, whereas Mollet and Ziegler (2014), Halbritter and Dorfleitner (2015), Auer (2016), and Badía et al. (2017) do not look at this aspect. Focusing on the US market, Derwall et al. (2005), Galema et al. (2008), Edmans et al. (2011), Lee et al. (2013), and Eccles et al. (2014) evaluate specific-industry influences, but Filbeck and Preece (2003), Kempf and Osthoff (2007), Statman and Glushkov (2009), Borgers et al. (2013), and Carvalho and Areal (2016) do not. A similar scenario is observed in European and multiregional studies. These ambiguous findings are surprising since some studies (e.g., Derwall et al. 2005; Brammer et al. 2006; Porter and Kramer, 2006; Hoepner et al., 2010) have shown that different industries differ in terms of the concrete CSR opportunities and risks, and that these may influence the relationship between CSR and CFP. In this vein, we investigate the industry-sensitivity of SRI stock portfolios.

An additional limitation related to prior evidence is the under-sized sample bias stressed by Auer (2016). We confirm this evidence in such studies as Van de Velde et al. (2005),

and Brammer et al. (2006). Table 1 shows that empirical evidence is just documented up to 2014. The column 'End' of Table 1 displays the last year analyzed by prior studies. We can see that the more up-to-date sample period (to 2014) is studied by Badía et al. (2017). As noted in reports such as the Global Sustainable Investment Review of both 2014 and 2016, SRI expansion has been intensive in recent periods. Therefore, we emphasise that more contemporary evidence is required on the financial influence of considering SRI aspects.

The most controversial issue associated with SRI is the financial impact if social screening. Observing Table 1, we note that the results are inconclusive. The column 'Results: Statistic financial differences?' concerns the financial implications of SRI. While some studies do not find significant financial differences between high- and low-sustainable firms, or conventional benchmarks (e.g., Van de Velde et al., 2005; Galema et al., 2008, Brammer et al. (2009), and Lee et al. 2013), others support the positive financial performance of SRI (e.g., Derwall et al., 2005; Kempf and Osthoff, 2007; Edmans et al. (2011), Eccles et al., 2014; and Badía et al., 2017). In contrast, Brammer et al. (2006) and Auer and Schuhmacher (2016) find evidence of negative performance in some European countries. The information presented in Table 1 shows that accounting for SRI aspects in the portfolio selection process tends to have no negative effects on financial performance in the majority of cases.

Finally, the column 'Market state' identifies the studies assessing the impact of different market states on the financial performance of SRI stock portfolios. As noted previously, the recent literature has documented a significant effect of different market phases on the performance of SRI investment funds, indices, portfolios, etc. However, Table 1 shows that, with the exception of Brzeszczynski and McIntosh (2014), Carvalho and Areal (2016), and Badía et al. (2017), no prior studies of SRI stock portfolios have distinguished SRI performance in different market states. Brzeszczynski and McIntosh (2014) identify bull and bear periods via the Woodward and Anderson (2009) approach, finding that there are no financial differences in performance between bull and bear markets. However, they simply observe raw return differences, without testing for statistical differences in alphas. By a more sophisticated methodology– specifically, through a conditional model that allows both risk and performance to vary over different market phases - Carvalho and Areal (2016) find that both the financial performance and the systematic risk of a SRI stock portfolio remain unaffected in bear markets. They use the Pagan and Sossounov

(2003) procedure to identify bull and bear periods. In a similar process, Badía et al. (2017) document that SRI portfolios outperform conventional investments during bull periods and abide neutral during bear markets. As mentioned above, there are some studies that have divided the sample period into sub-periods, but they could render only a cursory review of the performance evolution. Consequently, we analyse the financial performance of SRI stock portfolios in different market states (bull and bear markets).

In sum, this review discusses the limitations and shortcomings of prior empirical studies. In this paper, we aim to overcome these limitations in the evaluation of SRI stock portfolio performance.

3. Data

We assess the financial consequences of social screening processes on a global scope. To form portfolios, we use the social responsibility ratings of companies provided by Thomson Reuters ASSET4 ESG database.[4] The ASSET4 ESG rating classifies stocks based on roughly 700 individual data points, then combined into over 250 key performance indicators (KPIs), and later aggregated into a framework of 18 categories to form the four ESG pillars (Economic, Environmental, Social and Corporate Governance pillars). As part of the calculation rating method, all companies are measured against the complete firm universe. The ASSET4 ESG database further computes an overall ESG score that includes the four pillars mentioned above. Since we wish to form portfolios on the basis on non-economic indicators, we do not use the overall ESG score computed by the database. Instead, we compute a combined ESG score as an equally-weighted average of these three individual scores, as in Auer (2016). Instead, we construct an overall ESG score as an equally-weighted average score of the three pillars: Environment, Social and Corporate Governance.

We analyze an international sample including firms from 23 countries over the period January 2002 to December 2017. In order to mitigate a potential short country-specific sample bias that could reduce the power of our tests, we combine the 23 countries into four diversified regional portfolios: North America (NA), that includes the United States and Canada; Europe (EU), that includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden,

[4]The Thomson Reuters ASSET4 ESG database has been used in prior studies evaluating the financial performance of SRI stock portfolios (e.g., Eccles et al., 2014; Halbritter and Dorfleitner, 2015).

Switzerland, and the United Kingdom; Japan (JA); and Asia Pacific (AP), that includes Australia, New Zealand, Hong Kong, and Singapore. We follow the allocation of Fama and French (2012, 2017) who group countries in regions mainly by geographic location and market integration. Monthly discrete returns of all stocks are computed based on the total return series (in US dollars) collected from the Thomson Reuters database. In line with Cooper et al., (2004) and Asem (2009), in order to minimize nontrading and microstructure-induced biases, stocks whose prices are below $1 at the beginning of the holding period and those with a stable price for two consecutive months are screened out. Survivorship bias does not affect our results since we use the full ASSET4 universe, thus including both active and inactive stocks.

Since we investigate the financial performance of SRI in different regions, it is interesting to show the proportion of firms evaluated in each region relative to the local markets. To this purpose, we track the local stock exchange where stocks are traded and evaluate the percentage of firms with ESG qualifications on them. For instance, for the JP market, the TOPIX index is considered as the local market since stocks with ESG information in ASSET4 are included in this index. A year-by-year analysis is done on the constituents of the index. Then, we calculate the percentage of stocks with ESG values provided by ASSET4 on the local stock exchange market.[5]

Figure 1 shows that the proportion of stocks with ESG scores on each region has increased progressively over the sample period, with exception of the JP market, that shows a notable growth of stocks in the TOPIX index just in recent periods. Nonetheless, the number of stocks with ESG ratings in this market has increased, and with the exception of the two first years, around 20% of firms have social ratings. A similar picture is documented in the AP market for the two first years, although the evolution in this region is somewhat different. It is striking that at the beginning of the sample period only around 1% of firms have ESG scores and, yet, in the two most recent periods, more than a half of the firms are rated. As for the EU market, firms with ESG scores have continuously increased across the sample period, representing around 40% of stocks on local markets

[5]Indices for the EU market are: ATX, BEL 20, OMX COPENHAGEN, SBF 120, FTSE All-Share, FTSE MIB, ATHEX COMPOSITE, OMX HELSINKI, IRELAND SE OVERALL, MADRID SE GENERAL, AMSTERDAM (AEX), OMX AFFARSVARLDENS GENERAL, OSLO SE OBX, PSI GENERAL, DAX 30 PERFORMANCE, SWISS ALL SH; for the NA market are: S&P 500 COMPOSITE, S&P/TSX COMPOSITE INDEX, NASDAQ COMPOSITE; for the AP market are: ASX ALL ORDINARIES, HANG SENG, NZX Main Board, STRAITS TIMES INDEX; and for the JP market is: TOPIX.

in the last year. As expected, these figures allow us to recognize that the firms in the NA market are the most rated ones. It is also interesting to note the notable increase of socially rated firms after the beginning of the international financial crisis. Finally, it is also worth mentioning the substantial growth in the proportion of firms with ESG scores in the NA market in the most recent periods.

In sum, we can observe that number of firms that are rated according to their ESG concerns has increased progressively, surely reflecting an increase in the market-investor demand for this kind of information. Since investors are the main user of that information, it represents an additional evidence of the growing interest for knowing extra-financial information (ESG) of firms.

[Insert Figure 1]

The use of aggregate or individual dimensions of CSR to qualify for the social responsibility of firms has been a debatable point. A first approach suggests that an analysis of specific dimensions of CSR is likely to be important, since different aspects may have differential impacts, depending on the nature of the firm's business (Van de Velde et al., 2005). As Galema et al. (2008) stress, aggregated CSR measures may confound relationships among different aspects of CSR and CFP. Initiatives such as using energy-saving technology may reduce operating costs, but practices like flexible scheduling may enhance productivity and reduce absenteeism, which may in turn make it easier to recruit and retain outstanding staff (Brammer et al., 2006). As Hoepner et al. (2016) note, important social features may be hidden by using an aggregated measures of CSR. Another viewpoint argues that for many investors a firm overall CSR indicator is more useful than an indicator that reflects an individual dimension of CSR (Boutin-Dufresne and Savaria, 2004). As Lee et al. (2013) point out, most investors do not include only environmental, social, or governance criteria in their decisions. Moreover, Wimmer (2013) highlights that not all investors have a deep understanding of what exactly SRI entails. Consequently, offering an overall CSR measure helps investors to select SRI stocks. Arguably, the first approach is more closely related to a firm view, and the second is more likely to be associated with the investor's perspective. In any case, we consider both an aggregate CSR score and individual dimensions of its components: the Environment, Social, and Governance performance, enabling us to assess not only the influence of CSR on financial performance, but also the individual influence of each of its individual dimension.

Figure 2 displays the evolution of the max, min and mean values associated to the ESG and the aggregate scores for each region. By observing the max and min values we conclude that there are firms with very high and low ESG scores in all regions. As an exception, max values for the JP market on the Governance criteria are persistently lower than the rest of markets. JP firms are, on average, the worst rated on the Governance criteria. This is not surprising considering the concerns related to transparency, independence, auditing and monitoring functions of JP firms. Despite legal initiatives, such as the Corporate Governance Code of 2015, to improve the governance of firms, the Governance mean value is still far from those of the rest of regions. These figures also allow us to acknowledge that EU firms have on average, the highest Social values over the sample period, NA firms stand out on the Governance criteria, and both EU and JP firms obtain the highest mean values on the Environmental issues. Moreover, while AP, UE, and JP firms show at least, a slight increase in the mean values of Environment, Social, Governance and the overall scores, NA firms show a downward trend in scores over the most recent two periods. This pattern appears on the three dimensions of NA firms, and cannot be dissociated with the notable increase in the number of firms evaluated in the US market (see Figure1). Thus, it will be of interest to observe the future evolution of US firm scores. By focusing on the aggregate dimension, despite the low values of the JP firms on the Governance score, the aggregate mean value is not too different from the other regions. Indeed, the evolution is very similar to the AP market. EU firms show the highest overall mean value over the sample period. Finally, the figures display highest instability of ESG scores of firms in the first periods, especially in the JP and AP markets, probably associated to the low number of stocks in these regions over the initial period (see Figure 1). Our evidence contrasts to that of Auer and Schuhmacher (2016) who evaluate NA, EU and AP firms using data from the Sustainalytics database. They find that firms rate higher in the Governance than in Environment and Social criteria in all regions; however, we show that EU firms rate higher in Social concerns every year. Our findings are in line with respect to the NA and AP markets, although we evaluate JP firms individually and find that these firms rate lower in Governance than in Social and Environmental aspects. Our findings on NA firms are also in line with Halbritter and Dorfleitner (2015) who, using the ASSET4 database, find that US firms rate highest in the Governance criteria.

[Insert Figure 2]

4. Empirical implementation and results

4.1. Portfolio formation

To test the financial consequences of considering social screens in the investment process, each year we form equally-weighted portfolios of stocks of companies based on their social ratings in the previous year. The high-rated portfolio comprises stocks with the best socially rated companies and the low-rated portfolio includes those with the worst socially rated companies. As in prior studies (e.g., Van de Velde et al., 2005; Kempf and Osthoff, 2007; Derwall et al., 2011; Halbritter and Dorfleitner, 2015; and Auer, 2016), we use different cut-offs to form the portfolios (10%, 20%, and 30%), thus allowing us to evaluate portfolios that are more restricted or more broad with respect to the social criteria used. Portfolios are formed for each ESG dimension and for the aggregate score. Then, we form the difference portfolio, which is obtained by subtracting the low-ranked portfolio returns from the returns on the high-ranked stock portfolio, thus representing a strategy of going long in the high-rated stocks and short in the low-rated stocks. The analysis of the performance of the long-short portfolios enables us to conclude whether there are statistically significant differences between the performance of high- and low-rated portfolios. To assess performance differences of SRI firms among regions, we compare the regional high-ranked portfolios to each other.

Table 2 presents descriptive statistics of the ESG regional portfolios under different cut-offs. Although in most cases high-rated portfolios yield a higher average return than low-rated portfolios, the differences between average returns are not statistically significant whatever region, ESG dimension, and cut-off level considered. We can also see that inside each region average returns do not change substantially for portfolios formed on different cut-offs. For instance, in EU, the mean return of high-rated portfolios across the sample period is almost the same at the 20% and 30% cut-off levels considering the aggregate score. A similar picture is observed regarding the low-rated portfolios of AP at the 10% and 20% cut-off levels (Environment score), and the high-rated portfolios of JP under the 10% and 20% cut-off levels (Social score). The level of portfolios' standard deviations allows us to observe that the higher returns of high-rated portfolios are generated together with large volatility. In some cases, differences in standard deviations are even significant. These findings encourage the use of risk-adjusted measures to evaluate financial performance. Finally, as in the case of average returns, we can observe

a similar pattern in standard deviation differences among portfolios within regions and different cut-offs.

[Insert Table 2]

4.2. Financial performance

To evaluate portfolio performance, we compute alphas from a multi-factor model, as for example in Van de Velde et al. (2005), Edmans (2011), Humphrey et al. (2012), and Badía et al. (2017). These studies examine performance using the four-factor Carhart (1997) model that captures the risk premiums associated with size and value versus growth (as in Fama and French, 1993) as well as momentum, (motivated by Jegadeesh and Titman, 1993). More recently, Fama and French (2015) identify an additional set of risk factors in the US market. They test a five-factor asset pricing model that adds the profitability and investment factors to the market, size, and value-growth factors. Their results show that the inclusion of these new risk factors to the Fama and French (1993) three-factor model improves the capacity to explain the cross-section of expected stock returns. Fama and French (2017) test the five-factor model specification in an international context (North America, Europe, Japan, and Asia Pacific), and also find satisfactory results. In spite of the fact that these additional risk factors may capture relevant sources of systematic risk, none of the prior studies on the performance of SRI portfolios uses them. We follow Fama and French (2018) and use a six-factor model that includes the five factors of the Fama and French (2015) five-factor model augmented by the momentum factor. The model is estimated given the following equation:

$$R_{it} - R_{Ft} = a_i + b_i Mkt_t + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + m_i MOM_t + e_{it} \quad \text{(eq.1)}$$

where R_{it} is the dollar return on portfolio *i* for month *t*, R_{Ft} is the risk-free rate (the one-month US Treasury bill rate), Mkt_t is the value-weighted market portfolio return minus the risk-free rate. The remaining variables are the differences between the returns on diversified portfolios of small and large stocks (SMB_t), high and low B/M stocks (HML_t), stocks with robust and weak profitability (RMW_t), stocks of low and high investment firms, conservative minus aggressive, (CMA_t), and winning and losing stocks in the past year (MOM_t). e_{it} is a zero-mean residual. α_i is the estimated financial performance measure of the portfolio, and b_i, s_i, h_i, r_i, c_i, and m_i represent the estimated risk measures

associated with the different risk factors. The independent variables are obtained from Professor Kenneth French's website.

Since the relationship between SRI and financial performance may be affected by industry characteristics in terms of the specific ESG opportunities and exposure (Derwall et al. 2005; Brammer et al. 2006), and considering the widely-held view among investors that industry-specific ESG criteria provide useful information (Humphrey et al., 2012),[6] we investigate the industry-adjusted portfolio performance following Geczy et al. (2003) We extend the multi-factor model (eq.1) to include controls for industry biases. To this end, for each region, we first run a regression of the 25 TRBC[7] industry indices on the market index, thus making sure that they are orthogonal to the market. A new 'cleaned' index is created by the sum of the intercept and the residuals of the regression. The cleaned industry index is then only capturing industry specific return characteristics. Next, a principal components analysis is performed to drive industry factors. These factors are added to equation (1) to control for industry effects that are not captured, as follows:

$$R_{it} - R_{Ft} = a_i + b_i Mkt_t + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + m_i MOM_t + \sum_{k=1}^{\gamma} l_k IP_{it} + e_{it} \quad \text{(eq.2)}$$

where $\sum_{k=1}^{\gamma} l_k IP_{it}$ represents the γ principal component factors capturing industry effects on portfolio returns. γ principal components are selected for regions:[8] for the NA portfolio, we use six industry components; for the EU portfolio, four industry components; for the AP portfolio, five industry components; and for the JP portfolio, four industry components. Previous studies use an alternative number of components depending on the market evaluated (see, for example, Derwall et al., 2005; Humphrey et al., 2012).

Panel A of Table 3 displays, for each region and ESG dimension, the alphas of the long-short portfolios under the different cut-offs[9]. In the NA market, high-rated portfolios

[6]In fact, DiBartolomeo and Kurtz (1999), Porter and Kramer (2006), and Hoepner et al. (2010) find evidence that industry exposures drive the financial performance of SRI portfolios.
[7]The Thomson Reuters Business Classification.
[8]Principal components with eigenvalues superior to 1 are selected for each region.
[9]As we are focusing on the performance of SRI portfolios, only the alphas of the long-short portfolios are reported. Nonetheless, coefficients related to specific beta risk-factors are available upon request.

formed on the Governance dimension and a 10% cut-off tend to perform better than their low-rated counterparts but this outperformance is not statistically significant at conventional levels of significance.[10] In AP, high-ranked firms on the Environmental score (under the portfolio cut-off of 30%) and the Governance score (at the 10% cut-off level) outperform their low-ranked peers. In the JP market, we do not observe any differences in the performance of high-rated versus low-rated firms. The more systematic effect of social screening is observed in European portfolios. Considering the Social score, high-ranked firms outperform low-ranked ones whatever the cut-off considered. In contrast, we find that EU high-ranked firms according to the Governance dimension underperform low-ranked ones under the most demanding cut-off of 10%.

It seems that screening for the Social dimension in the EU market and for the Corporate Governance and Environment dimensions in the AP region has a positive effect on portfolio performance. Additionally, high-ranked firms only underperform their low-ranked counterparts in one case. These findings are of interest to SRI investors since it suggests they can form portfolios that are consistent with their beliefs and personal values without being negatively affected in terms of financial performance. Our results support those of Auer and Schuhmacher (2016) for the AP, and NA market, but contrast with those that the authors obtain for the EU market. The findings of Mollet and Ziegler (2014) are also in line with our results for NA, while contrasting with those of the EU market. Yet, it is important to keep in mind that Mollet and Ziegler (2014) only measure sustainability with an aggregate indicator of CSR. In fact, as previously mentioned, any comparison of results with those of previous studies (summarized in Table 1) must be done with caution, as some of them assess CSR by using measures of its individual dimensions and others use an aggregate measure of CSR score.

Panel B of Table 3 shows the results considering industry bias-free alpha estimates. Although after industry-adjustment portfolio performance is similar to the previous results, we observe some increases in estimates of performance and the corresponding statistical significance, indicating that some of the previous alphas were adversely influenced by industry exposures. In contrast, in the case of AP firms ranked on the Environment dimension, the significant outperformance of the 30% cut-off portfolio found previously disappears. Overall, we note that industry exposure affects mainly

[10] We will focus the analysis on the results that are statistically significant at conventional levels (at least at the 5% level).

portfolios formed on the Environmental dimension, in both the EU and AP market. Humphrey et al. (2012) do not find any that industry-specific criteria affects the financial performance of UK SRI portfolios formed on an aggregate measure of CSR. The findings of Mollet et al. (2013), who also use an aggregate indicator of CSR for the EU market, are similar. Our results on the portfolios formed on the aggregate ESG score are in line with them. However, our findings emphasize the relevance of considering industry effects when evaluating individual dimensions of CSR. On the other hand, whereas Derwall et al. (2005), focusing on the Environmental performance of US firms, find that the difference in financial performance between high- and low-rated portfolios increases when industry effects are considered, we do not find significant industry effects in that market. Our results for the NA market are thus in line with Galema et al. (2008), and Lee et al. (2013), who find that industry components do not have a significant effect on the financial performance of portfolios based on ESG criteria.

[Insert Table 3]

Table 4 shows the results on the relative financial performance across regional portfolios. Panel A displays, for pairs of regions, the alphas of the long-short portfolios under different cut-offs. The results show that, in general, SRI regional portfolios do not show statistical significant differences in performance. The exception refers to high-rated NA portfolios formed on the Governance dimension and a 10% cut-off, which outperform JP portfolios of high-rated firms at the 5% significance level. Given these results, regional-specific aspects do not seem to have a significant effect on the financial performance of SRI portfolios. The financial performance of high-rated portfolios is similar across regions. This evidence contrasts with that of Badía et al. (2017), who document that country-specific factors may affect the relationship between corporate social and financial performance. In this regard, despite the patterns of development of SRI not being homogenous across countries (Neher and Hebb, 2015), and a roughly progressive saturation of SRI in markets such as the US (Mollet et al., 2013), our evidence does not uncover regional differences in the financial consequences of SRI.

Panel B of table 4 shows, for pairs of regions, the alphas of the SRI long-short portfolios under different cut-offs controlling for industry effects. The relative performance after industry-adjustment is mostly akin to our previous results and only three alphas are affected. The alpha of the long-short portfolio EU&NA formed on the aggregate ESG dimension at the 10% cut-off level increases its statistical significance, meaning that the

financial performance of NA high-ranked firms was negatively affected by industry effects. Moreover, in JP&NA, the significance of alphas of the long-short portfolios formed on the aggregate and Governance dimensions at the 10% cut-off level is reduced, allowing us to conclude that the performance of JP high-rated firms is negatively affected by industry effects. Despite these particular observations, in contrast to the high- and low-rated portfolio performance within specific regions, these findings show that the relative financial performance of SRI firms among regions is not affected when controlling for industry exposure. Our findings are novel in this regard since previous studies do not compare SRI regional portfolios taking into account industry effects. Nonetheless, we acknowledge that these results are not surprising since if alphas of SRI portfolios of different regions do increase in a similar way after industry controls (as we show in Table 3, Panel B), significant differences among them will not be expected. In sum, we find evidence that industry characteristics affect the financial performance of high and low-ranked stock portfolios within regions but do not influence the performance of SRI portfolios among regions.

[Insert Table 4]

4.3. Financial performance under different market conditions

To analyse the market state effect on financial performance, the first step is to identify market phases across the sample period. To this purpose, we use the Pagan and Sossounov (2003), hereafter PS, approach. PS develop a procedure to identify the peaks and troughs of a stock market index. A peak is established at t time in the case of the event $PK = [\ln P_{t-8}, \dots, \ln P_{t-1} < \ln P_t > \ln P_{t+1}, \dots, \ln P_{t+8}]$ occurs, where P_t represents the quotation of the stock market index, and a trough at time t in the case of the event $TH = [\ln P_{t-8}, \dots, \ln P_{t-1} > \ln P_t < \ln P_{t+1}, \dots, \ln P_{t+8}]$ occurs. Following previous studies (e.g., Leite and Cortez, 2015; Badía et al., 2017), we qualify bear periods as those with a downtrend in the relevant market index of at least 20% from peak to trough. The remaining periods are considered as bull periods. The relevant stock market indices used are: the MSCI North America Index, the MSCI Europe Index, the MSCI Japan Index, and the MSCI Pacific ex Japan Index. Table 5 shows the bear markets identified according to PS (2003).

[Insert Table 5]

The downward trend in prices related to the international financial crisis that emerged in 2007 is identified in all markets. We even observe that the Japanese market somewhat anticipates this crisis (March 2007) compared to other markets. We further identify two additional bear market periods in Europe: from May 2011 to May 2012, and from June 2014 to February 2016. The former can be associated to the Euro sovereign debt crisis, and the latter to the uncertainty about the future of the Greek economy. We also find an additional bear market period in the Asia-Pacific region from August 2014 to February 2016, which can be associated to the slowdown in the growth of the Chinese economy.

Once the market states have been identified, portfolio performance is evaluated by a model that includes two dummy variables, in line with Nofsinger and Varma (2014). This model allows both risk and performance to vary across different market phases, as follows:

$$\begin{aligned} R_{it} - R_{Ft} = {} & a_{Bear}D_{Bear,t} + a_{Bull}D_{Bull,t} + b_{Bear}Mkt_tD_{Bear,t} + b_{Bull}Mkt_tD_{Bull,t} \\ & + s_{Bear}SMB_tD_{Bear,t} + s_{Bull}SMB_tD_{Bull,t} + h_{Bear}HML_tD_{Bear,t} \\ & + h_{Bull}HML_tD_{Bull,t} + r_{Bear}RMW_tD_{Bear,t} + r_{Bull}RMW_tD_{Bull,t} \\ & + c_{Bear}CMA_tD_{Bear,t} + c_{Bull}CMA_tD_{Bull,t} + m_{Bear}MOM_tD_{Bear,t} \\ & + m_{Bull}MOM_tD_{Bull,t} + e_{it} \end{aligned}$$

(eq.3)

where $D_{Bear,t}$ is a dummy variable that takes value 1 for bear market periods and zero otherwise, and $D_{Bull,t}$ is a dummy variable that takes value 1 for bull market periods and zero otherwise; α_{Bear} corresponds to the financial performance in bear markets and α_{Bull} in bull markets; b_{Bear}, s_{Bear}, h_{Bear}, r_{Bear}, c_{Bear}, and m_{Bear} correspond to the factor loadings in bear periods; and b_{Bull}, s_{Bull}, h_{Bull}, r_{Bull}, c_{Bull}, and m_{Bull} in bull periods. This specification of the model extends the one used by Nofsinger and Varma (2014) by incorporating the dummy variables both for the alphas and for the risk factors. We are thus the first study to extend the Nofsinger and Varma (2014) approach to the Fama and French (2015) five-factor model augmented by the momentum.

Table 6 displays the alpha estimates of regional portfolios over different market phases. Panel A shows that over bull market periods, there are no significant differences between high- and low-rated portfolios in NA. In bear market periods, high-rated portfolios formed on the Environment and Governance criteria (with a 10% cut-off) have higher alphas than their low-rated peers, although the difference is not statistically significant at the 5% level. In the EU market, there are no significant differences between high- and low- rated

portfolios in bear market periods, whereas in bull markets high-rated portfolios outperform their low-rated counterparts. The outperformance of high-ranked firms is observed for portfolios formed on the aggregate ESG dimension and the individual Environment and Social dimensions. Whereas evaluating the financial performance of EU portfolios across the full sample period only shows significant performance differences on portfolios formed on the Social dimension, assessing the financial performance over different market states uncovers performance differentials in bull markets on all portfolios with exception of those formed on the Governance dimension. These results are in line with Badía et al. (2017), who also document that the financial performance of SRI portfolios is market state dependant. The picture in AP portfolios is similar to EU portfolios. In bull markets, significant performance differentials appear in portfolios formed on the Environment and Governance dimensions. In bear market periods, the financial performance differences between high- and low-ranked firms are not statistically significant. Finally, the results for the JP market show that during bull periods firms with high ratings do not perform differently from those with low ratings, whereas during bear markets high-ranked firms underperform low-ranked ones. This result suggests that the ESG screening processes do not provide investors in Japanese socially responsible stocks an additional protection in times of crisis.

Panel B shows that industry characteristics mainly affect the performance of AP and JP portfolios. In the AP market, the alpha of the long-short portfolio formed on the Governance criteria using a 10% and 30% cut-off levels became significant in bear periods, indicating that performance were negatively affected by industry characteristics. However, during bull periods, alphas become insignificant, indicating that influential industry characteristics appear to have different effects over different market phases. As for the JP market, we observe that the influence of industry characteristics is strong. The previous negative and statistically significant alphas in bear periods disappear after controlling for industry effects. This result is consistent across several ESG dimensions and highlights the relevance of controlling for industry effects when evaluating the financial performance of SRI portfolios.

[Insert Table 6]

When identifying market states in different regions, we observe that bull and bear periods do not always match across markets. Table 7 shows that, for instance, whereas the EU market is bearish over the period May 2011 to May 2012, the NA market is not. Likewise,

while the AP market is depressed from August 2014 to February 2016, the NA market is not. Considering this mismatch of economic conditions across different markets, we further analyze portfolio performance in times where a specific market state does not occur simultaneously in matched markets. The 'mixed' market state analysis allows us to identify whether financial performance differences are a result of firms of different regions being affected by different market conditions in opposition to country-specific factors related to SRI. Since our results comparing SRI high-rated firms of different regions show that country-specific factors do not seem to affect the financial performance of SRI stock portfolios, with this procedure we investigate whether significant differences among SRI portfolios of different regions are driven by the different market stages they are experiencing. The findings of Badía et al. (2017) suggest the existence of performance differences among SRI regional portfolios. However, they do not evaluate relative financial differences across regions under different market conditions. Hence, as far as our knowledge, we are the first study in doing so. To evaluate that effect, we extend equation (3) to incorporate a new dummy variable, thereby, $D_{Bear,t}$ is a dummy variable that takes value 1 when both markets are over bear periods and zero otherwise, $D_{Bull,t}$ is a dummy variable that takes value 1 when both markets are over bull periods and zero otherwise, and $D_{Mixed,t}$ is a dummy variable that takes value 1 when a market is over a bull period and the other one is over a bear period, i.e. mixed market states, and zero otherwise. These periods are identified in table 7.

[Insert Table 7]

Table 8 shows estimates of alphas of regional portfolios across different market conditions. In panel A we observe significant differences among SRI regional portfolios of high-ranked firms over different market phases. SRI portfolios perform similarly when both markets are experiencing bull periods. When both markets are in bear periods AP firms formed on the Governance dimension outperform NA firms. These results suggest that AP firms tend to have an increased resilience to crisis compared to firms of other regions. Nonetheless, the most relevant result in panel A is observed for mixed market states. Strong significant performance differences are observed between JP and NA firms as well as between AP and EU firms. The fact that EU firms are experiencing two bear market periods when AP firms are over bull periods seems to lead to significant performance differences among the portfolios. As for the relative performance between JP and NA firms, despite JP firms suffering an additional bear period in comparison to

NA firms, JP firms outperform NA firms during the mixed market state. In spite of the fact that the NA market started the bear period later (nov-2007), during June and July 2007, the NA market went down the 5% whereas the JP market went down only the 0.5%. This result highlights how different market conditions affect the performance of SRI portfolios. Over mixed market states, we also find that NA firms outperform EU firms in terms of the Governance dimension, probably because EU firms suffer two bear periods while NA firms experience a bull market. In sum, these findings contrast to previous ones comparing SRI firms of different regions over the full sample period (table 4). This evidence suggests that differences in financial performance among regions are generated because firms of different regions are influenced by different economic conditions<. Panel B allows us to observe the industry effect on the financial performance of SRI portfolios. We find that some alphas become significant whereas others turn into insignificant. Similarly to previous findings, these results further emphasize the relevance of controlling for industry characteristics.

[Insert Table 8]

Discussion and conclusions

In this paper we investigate the financial performance of international stock portfolios based on CSR criteria. Using an international dataset of companies between 2002 and 2017, we extend the evidence on SRI portfolio performance to North America, Europe, Japan, and Asia Pacific. We consider different screening effects by evaluating portfolios formed both on an aggregate dimension of CSR and on specific ESG dimensions. Using a multi-factor model controlling for industry effects, we compute alphas of long-short portfolios under different cut-offs. Our results show that portfolios formed on EU stocks with high Social scores outperform their low-ranked counterparts. Also, AP firms that perform well on the Governance dimension tend to perform better than low-ranked firms. It is worth mentioning that high-ranked firms only underperform their low-ranked counterparts in one case: portfolios of EU firms that are ranked according to the Governance dimension.

We also compare the financial performance of SRI portfolios among regions. The results show that, in general, high-rated SRI regional portfolios perform similarly. Regional-specific aspects do not seem to have a significant effect on the financial performance of SRI portfolios. Our results thus suggest that high socially rated firms across regions share benefit from a similar characteristics in terms of risk and opportunities. We also analyse

how SRI portfolio performance across different market states. We compute the alpha of regional portfolios over different market phases and find mixed results. While for the full sample period we found just a few cases with differences in performance between high- and low-ranked portfolios, assessing the financial performance over different market phases uncovers more performance differentials long-short portfolios. The differences are especially notable in EU. In bull markets, EU high-rated firms on the Environment, Social and Overall dimensions outperform their low-rated peers. These results reflect the impact of different market phases on the financial performance of SRI portfolios. Since bull and bear periods do not always match across markets, we further establish a third market phase: the mixed state. In times where different regions are experiencing different market cycles, significant performance differences appear between high-rated JP and NA firms, as well as between high-rated AP and EU firms. These findings suggest that differences in financial performance among SRI regional portfolios are generated by different economic conditions.

In general, our results reflect the different patterns of ESG screening across different regions. EU firms score highest on the Social dimension and consequently high-rated portfolios formed on these dimensions perform better than low-rated portfolios. In the NA market, the dimension that stands out is Corporate Governance. NA firms show the highest scores in terms of this dimension and, consistent with this, well governed firms tend to outperform those with low Governance scores. These results suggest that ESG concerns across regions are different and that can ultimately be reflected in a higher financial performance of geographical portfolios formed on specific dimensions. This is in line with several studies that document regional and cultural idiosyncrasies in socially responsible investing. For instance, Louche and Lydenberg (2006) explore the development and practices of SRI in the US and EU markets. The authors note, for instance, that the emphasis placed on Environment is stronger in Europe than in the US. The environment was a core concept to the development of SRI in Europe.

Our evidence supports the view suggesting that an evaluation of specific dimensions of CSR is useful (e.g., Van de Velde et al., 2005; Galema et al., 2008; Hoepner et al., 2016). Different ESG screens have differential impacts on financial performance of portfolios across regions. Our results suggest that looking at different dimensions of CSR is useful for investors who wish to 'do good while doing well'. Our results also highlight how industry influences affect the relationship between CSR and financial performance. We observe that industry exposure affects mainly portfolios formed on the Environmental

dimension, in both the EU and AP market. These findings are in line with those of Porter and Kramer (2006) and Hoepner et al. (2010), who find that industry characteristics drive the financial performance of SRI portfolios. In this regard, some institutions such as the Sustainability Accounting Standards Board (SASB) have acknowledged the relevance of specific industry information in SRI.

Overall, our findings support the argument that, in general, global investors can align their personal concerns related to social and ethical values and beliefs with their investment decisions without sacrificing financial performance. They can even benefit from abnormal returns if investing in companies of specific geographies (EU and AP) according to specific dimensions of social responsibility. Besides making the case for investing with a conscience, our results also suggest that SRI can be used as an investment process to change and improve the behaviour of corporations in different regions. Professional investment managers driving their funds towards responsible firms yield similar or higher financial performance compared to a conventional investment approach and, in addition, they can attract an increasing segment of investors concerned with SRI demands.

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Table 1. Prior evidence of studies assessing the financial performance of SRI stock portfolios

This table presents the most influential studies that form stock portfolios on the basis of social criteria and evaluate their financial performance. Column *Market state* identifies the studies assessing the impact of different market states on the financial performance of SRI stock portfolios. Column *Specific market* shows the market that the authors analyse: US (the United States), EU (European Union), UK (the United Kingdom), and AP (Asia Pacific). Column *Start* shows the first year analyzed by the authors and column *End* identifies the last year analyzed. Column *Industry effect* indicates the studies assessing the influence of specific industries on the financial performance of SRI stock portfolios. Column *Individual or an aggregate score* shows the criterion used regarding the ESG dimensions to assess the effect of CSR on the financial performance. SD means that authors use a singular dimension; MD means that authors evaluate several dimensions (multi-dimension) and (XD), indicates the authors focus on X individual dimensions; AD means that authors use an aggregate dimension. Column *Results: Statistic financial differences?* shows whether there are statistically significant differences between the financial performance of compared portfolios (for instance, high minus low-ranked stocks). Column *Portfolio construction* shows the procedure to compare the financial performance between portfolios. H-L indicates that authors form a high and a low portfolio and assess financial performance differences; CCB indicates that authors compare high sustainable firms to conventional benchmarks. (1*) a portfolio of firms that score high on employee relations and a sin stocks portfolio is formed. (2*) depending on the ESG dimensionused, investors in Europe tend to pay a price for socially responsible investing.

Article	Market state	Specific market	Start	End	Industry effect	Individual or an aggregate score	Results: Statistic financial differences?	Portfolio construction
Filbeck and Preece (2003)	Not	US	1987	1999	Not	SD - Employee	Yes +	CCB
Derwall et al. (2005)	Not	US	1995	2003	Yes	SD - Environment	Yes +	H-L
Van de Velde et al. (2005)	Not	EU	2000	2003	Not	MD (5D) & AD	Not	H-L
Brammer et al. (2006)	Not	UK	2002	2004	Yes	MD (3D) & AD	Yes -	CCB
Kempf and Osthoff (2007)	Not	US	1992	2004	Not	MD (6D) & AD	Yes +	H-L
Galema et al. (2008)	Not	US	1992	2006	Yes	MD (6D)	Not	H-L
Brammer et al. (2009)	Not	US	2000	2004	Yes	AD	Not	CCB
Filbeck et al. (2009)	Not	US	2000	2007	Not	AD	Yes +	CCB
Statman and Glushkov (2009)	Not	US	1997	2007	Not	MD (7D) & AD	Yes +	H-L
Derwall et al. (2011)	Not	US	1992	2008	Not	SD - Employee	Not analyzed	H & L (1*)
Edmans et al. (2011)	Not	US	1984	2009	Yes	SD - Employee	Yes +	CCB
Humphrey et al. (2012)	Not	UK	2002	2010	Yes	AD	Not	H-L & CCB
Borgers et al. (2013)	Not	US	1992	2009	Not	AD	Yes +	H-L
Lee et al. (2013)	Not	US	1998	2007	Yes	AD	Not	H-L
Mollet et al. (2013)	Not	EU	2002	2009	Yes	AD	Yes +	CCB
Brzeszczynski and McIntosh (2014)	Yes	UK	2000	2010	Not	AD	Not	CCB
Eccles et al. (2014)	Not	US	1993	2010	Yes	AD	Yes +	H-L
Mollet et al. (2014)	Not	US & EU	1998	2009	Not	AD	Not	H-L
Halbritter and Dorfleitner (2015)	Not	US	1991	2012	Not	MD (ESG) & AD	Not	H-L
Auer (2016)	Not	EU	2004	2012	Not	MD (ESG) & AD	Yes +	CCB
Auer and Schuhmacher (2016)	Not	US & EU & AP	2004	2012	Yes	MD (ESG)	US & AP Not / EU Yes -/+ (2*)	H-L & CCB
Carvalho and Areal (2016)	Yes	US	1998	2010	Not	SD - Employee	Not	CCB
Badía et al. (2017)	Yes	US & EU & AP	2005	2014	Not	AD	Yes +	CCB

Table 2. Descriptive statistics of regional portfolios

This table presents a summary statistics of high (H) and low (L) ESG regional portfolios. Mean (SD) is the average month return (standard deviation) of portfolios over the sample period: from January 2002 to December 2017. Portfolios at the 10% [10], 20% [20], and 30% [30] cut-off level for the Aggregate (AD), Environment (ENV), Social (SOC), and Corporate Governance (CGV) dimensions are formed from stocks in North America (NA), Europe (EU), Asia Pacific (AP), and Japan (JP).The asterisks are used to represent the statistically significant differences at the 1% (***), 5% (**) and 10% (*) significance levels on tests of equality of mean and variances (t-test and F-test) between high and low portfolios.

Mean	AD			ENV			SOC			CGV		
	H	L		H	L		H	L		H	L	
NA [10]	0.01342	0.01121		0.01228	0.01189		0.01142	0.01113		0.01324	0.01118	
NA [20]	0.01201	0.01199		0.01193	0.01203		0.01090	0.01137		0.01250	0.01199	
NA [30]	0.01198	0.01226		0.01116	0.01250		0.01143	0.01177		0.01250	0.01187	
EU [10]	0.01261	0.01016		0.01395	0.01122		0.01421	0.01043		0.01180	0.01099	
EU [20]	0.01366	0.01029		0.01313	0.01118		0.01458	0.01018		0.01278	0.01055	
EU [30]	0.01367	0.01063		0.01348	0.01116		0.01404	0.01052		0.01296	0.01138	
AP [10]	0.01580	0.01283		0.01662	0.01266		0.01337	0.01339		0.01654	0.01123	
AP [20]	0.01538	0.01195		0.01507	0.01276		0.01421	0.01306		0.01477	0.01165	
AP [30]	0.01430	0.01214		0.01510	0.01208		0.01381	0.01280		0.01447	0.01222	
JP [10]	0.00946	0.00660		0.01137	0.01011		0.01011	0.00930		0.00817	0.00878	
JP [20]	0.00954	0.00878		0.00946	0.00920		0.01013	0.00815		0.00906	0.00932	
JP [30]	0.01007	0.00880		0.00994	0.00947		0.00992	0.00858		0.00887	0.00982	
SD	AD			ENV			SOC			CGV		
	H	L		H	L		H	L		H	L	
NA [10]	0.05374	0.04553	**	0.05114	0.04672		0.05662	0.04264	***	0.05271	0.04959	
NA [20]	0.05300	0.04516	**	0.05044	0.04737		0.05555	0.04456	***	0.05252	0.05005	
NA [30]	0.05349	0.04695	*	0.05198	0.04793		0.05385	0.04616	**	0.05243	0.04988	
EU [10]	0.06584	0.05923		0.06717	0.06215		0.06659	0.05893		0.06410	0.06086	
EU [20]	0.06452	0.05965		0.06418	0.06247		0.06531	0.05950		0.06389	0.05989	
EU [30]	0.06380	0.05982		0.06369	0.06159		0.06446	0.05973		0.06327	0.06041	
AP [10]	0.07143	0.06152	**	0.06582	0.06287		0.07346	0.05906	***	0.06960	0.06580	
AP [20]	0.06684	0.06100		0.06399	0.05920		0.07118	0.06101	**	0.06654	0.06490	
AP [30]	0.06675	0.06165		0.06693	0.06120		0.07109	0.06136	**	0.06574	0.06600	
JP [10]	0.04869	0.04944		0.04888	0.05095		0.04994	0.04656		0.04246	0.05046	**
JP [20]	0.04559	0.04620		0.04369	0.04904		0.04930	0.04487		0.04127	0.04721	*
JP [30]	0.04307	0.04525		0.04319	0.04751		0.04637	0.04455		0.04132	0.04702	*

Table 3. Regional portfolio performance

This table shows estimates of alpha (abnormal returns) of the long-short portfolios at the 10% [10], 20% [20], and 30% [30] cut-off level for the Aggregate dimension (AD), Environment (ENV), Social (SOC), and Corporate Governance (CGV). The long-short portfolio is formed by subtracting the returns of the high-ranked portfolio from the returns of the low-ranked portfolio (H-L). Portfolios are formed for North America (NA), Europe (EU), Asia Pacific (AP), and Japan (JP). Panel A displays results of estimating portfolio financial performance by means of the Fama and French (2015) five-factor model augmented by the momentum factor (eq.1). The independent variables are obtained from Professor Kenneth French's website. Panel B shows the results of extending equation (1) to control for industry effects following the approach of Geczy et al. (2003). The multi-factor models are estimated by OLS based on the heteroskedasticity and autocorrelation adjusted errors of Newey and West (1987). One-month US T-bills proxy for the risk-free rate. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels. The full sample period is from January 2002 to December 2017.

Panel A: Alphas of the long-short portfolios: H-L analysis

NA	AD	ENV	SOC	CGV
Long-Short [10]	0.0023	0.0017	0.0001	0.0025*
Long-Short [20]	-0.0001	0.0011	-0.0008	0.0008
Long-Short [30]	-0.0002	-0.0004	-0.0003	0.0007
EU	AD	ENV	SOC	CGV
Long-Short [10]	-0.0004	0.0026	0.0037**	-0.0038**
Long-Short [20]	0.0022*	0.0018	0.0049***	-0.0011
Long-Short [30]	0.0018	0.0025*	0.0035***	-0.0017
AP	AD	ENV	SOC	CGV
Long-Short [10]	0.0036	0.0044	-0.0006	0.0062**
Long-Short [20]	0.0042*	0.0023	0.0013	0.0037*
Long-Short [30]	0.0028	0.0034**	0.0015	0.0024
JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0013	0.0017	-0.0002	-0.0009
Long-Short [20]	-0.0004	0.0006	0.0002	-0.0004
Long-Short [30]	0.0009	0.0005	0.0002	-0.0009

Panel B: Alphas of the long-short portfolios controlling for industry effects: H-L analysis

NA	AD	ENV	SOC	CGV
Long-Short [10]	0.0023*	0.0018	0.0002	0.0025*
Long-Short [20]	0.0000	0.0011	-0.0007	0.0008
Long-Short [30]	-0.0001	-0.0003	-0.0003	0.0007
EU	AD	ENV	SOC	CGV
Long-Short [10]	-0.0004	0.0026*	0.0037**	-0.0037**
Long-Short [20]	0.0022*	0.0017	0.0049***	-0.0010
Long-Short [30]	0.0018	0.0025*	0.0034***	-0.0016
AP	AD	ENV	SOC	CGV
Long-Short [10]	0.0032	0.0049*	-0.0007	0.0064**
Long-Short [20]	0.0040*	0.0021	0.0012	0.0036*
Long-Short [30]	0.0027	0.0032*	0.0015	0.0024
JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0012	0.0017	-0.0004	-0.0009
Long-Short [20]	-0.0003	0.0007	0.0002	-0.0004
Long-Short [30]	0.0010	0.0006	0.0002	-0.0009

Table 4. Relative financial performance of regional portfolios

This table shows estimates of alpha (abnormal returns) of the long-short portfolios at the 10% [10], 20% [20], and 30% [30] cut-off level for the Aggregate dimension (AD), Environment (ENV), Social (SOC), and Corporate Governance (CGV). The long-short portfolio is formed by subtracting the high-ranked portfolio returns of a region from the returns on the high-ranked portfolio of another one (H-H). Panel A shows results of estimating portfolio financial performance by means of the Fama and French (2015) five-factor model augmented by the momentum factor (eq.1). The independent variables are obtained from Professor Kenneth French's website. Global factors are used to estimate the financial portfolio performance among regions. Panel B shows results of extending equation (1) to control for industry effects following the approach of Geczy et al. (2003). 25 TRBC industry global indices are used and principal components with eigenvalues superior to 1 are selected. The multi-factor models are estimated by OLS based on the heteroskedasticity and autocorrelation adjusted errors of Newey and West (1987). One-month US T-bills proxy for the risk-free rate. The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels.The full sample period is from January 2002 to December 2017.

Panel A. Alphas of the long-short portfolios: H-H analysis

EU & NA	AD	ENV	SOC	CGV
Long-Short [10]	-0.0045	-0.0034	-0.0005	-0.0050*
Long-Short [20]	-0.0009	-0.0020	0.0016	-0.0030
Long-Short [30]	-0.0008	-0.0006	0.0001	-0.0029
AP & NA	AD	ENV	SOC	CGV
Long-Short [10]	0.0000	-0.0004	-0.0016	0.0012
Long-Short [20]	0.0021	0.0000	-0.0001	0.0013
Long-Short [30]	0.0007	0.0006	-0.0012	0.0006
JP & NA	AD	ENV	SOC	CGV
Long-Short [10]	-0.0059*	-0.0052	-0.0042	-0.0055**
Long-Short [20]	-0.0041	-0.0051	-0.0030	-0.0037
Long-Short [30]	-0.0033	-0.0035	-0.0035	-0.0044
AP & EU	AD	ENV	SOC	CGV
Long-Short [10]	0.0045	0.0030	-0.0012	0.0062*
Long-Short [20]	0.0030	0.0020	-0.0017	0.0043
Long-Short [30]	0.0015	0.0011	-0.0014	0.0034
EU & JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0014	0.0018	0.0038	0.0005
Long-Short [20]	0.0032	0.0031	0.0046	0.0008
Long-Short [30]	0.0025	0.0029	0.0036	0.0015
AP & JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0059	0.0048	0.0026	0.0067
Long-Short [20]	0.0062	0.0051	0.0029	0.0051
Long-Short [30]	0.0039	0.0041	0.0022	0.0049

Panel B: Alphas of the long-short portfolios controlling for industry effects: H-H analysis

EU & NA	AD	ENV	SOC	CGV
Long-Short [10]	-0.0045*	-0.0034	-0.0005	-0.0050*
Long-Short [20]	-0.0010	-0.0020	0.0015	-0.0030
Long-Short [30]	-0.0009	-0.0006	0.0001	-0.0029
AP & NA	AD	ENV	SOC	CGV
Long-Short [10]	0.0000	-0.0004	-0.0017	0.0012
Long-Short [20]	0.0020	-0.0001	-0.0002	0.0013
Long-Short [30]	0.0006	0.0005	-0.0013	0.0005
JP & NA	AD	ENV	SOC	CGV
Long-Short [10]	-0.0060	-0.0053	-0.0043	-0.0055*
Long-Short [20]	-0.0042	-0.0052	-0.0031	-0.0038
Long-Short [30]	-0.0033	-0.0035	-0.0035	-0.0044
AP & EU	AD	ENV	SOC	CGV
Long-Short [10]	0.0045	0.0030	-0.0012	0.0062*
Long-Short [20]	0.0030	0.0020	-0.0017	0.0043
Long-Short [30]	0.0014	0.0011	-0.0014	0.0034

EU & JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0014	0.0019	0.0038	0.0005
Long-Short [20]	0.0032	0.0031	0.0046	0.0008
Long-Short [30]	0.0025	0.0029	0.0036	0.0015
AP & JP	AD	ENV	SOC	CGV
Long-Short [10]	0.0060	0.0048	0.0026	0.0067
Long-Short [20]	0.0062	0.0051	0.0029	0.0051
Long-Short [30]	0.0039	0.0040	0.0022	0.0049

Table 5. Bear market states

This table identifies bear market periods according to the Pagan and Sossounov (2003) procedure. The indices used are the MSCI North America Index, the MSCI Europe Index, the MSCI Japan Index, and the MSCI Pacific ex Japan Index. Consistent with the literature, we require the rise (fall) of the market being greater (less) than either 20%. The window breadth for eight, nine and ten months is evaluatedand the same results are obtained. The full sample period is from January 2002 to December 2017.

Portfolio	Start date	Index value (Points)	End date	Index value (Points)	Change in market index	Length of bear period (months)
NA	Nov-07	1558.805	Feb-09	776.949	-0.5016	16
EU	Nov-07	2159.770	Feb-09	873.949	-0.5954	16
	May-11	1588.340	May-12	1164.809	-0.2667	13
	Jun-14	1819.889	Feb-16	1391.740	-0.2353	21
AP	Nov-07	1521.787	Feb-09	607.648	-0.6007	16
	Aug-14	1463.360	Feb-16	1025.155	-0.2995	19
JP	Mar-07	3303.140	Feb-09	1720.810	-0.4790	24

Table 6. Financial performance in different market states

This table shows results of estimating alpha (abnormal returns) of the long-short portfolios in different market states at the 10% [10], 20% [20], and 30% [30] cut-off level for the Aggregate dimension (AD), Environment (ENV), Social (SOC), and Corporate Governance (CGV). The long-short portfolio is formed by subtracting the return of the high-ranked portfolio from the returns of the low-ranked portfolio (H-L). Portfolios are formed for North America (NA), Europe (EU), Asia Pacific (AP), and Japan (JP). The Pagan and Sossounov (2003) procedure is used in order to identify different market states (bear and bull). Panel A displays estimates of portfolio financial performance based on equation (3). Panel B shows results of extending equation (3) to control for industry effects following the approach of Geczy et al. (2003). The multi-factor models are estimated by OLS based on the heteroskedasticity and autocorrelation adjusted errors of Newey and West (1987). The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels. The full sample period is from January 2002 to December 2017.

Panel A: Alphas of the long-short portfolios: H-L

	Bear				Bull			
NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0049	0.0081*	0.0000	0.0120*	0.0020	0.0011	-0.0008	0.0012
Long-Short [20]	-0.0053	-0.0009	-0.0026	0.0026	-0.0004	0.0007	-0.0014	0.0006
Long-Short [30]	-0.0026	-0.0052	-0.0015	0.0021	-0.0005	-0.0007	-0.0012	0.0009
EU	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0008	0.0003	0.0004	0.0011	0.0001	0.0036*	0.0028	-0.0013
Long-Short [20]	-0.0004	-0.0013	0.0007	0.0025	0.0033**	0.0018	0.0038**	0.0001
Long-Short [30]	-0.0002	-0.0024	-0.0009	0.0006	0.0024*	0.0033**	0.0031***	-0.0004
AP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0038	0.0000	0.0056	0.0065	0.0029	0.0081**	-0.0001	0.0070**
Long-Short [20]	0.0038	0.0008	0.0016	0.0027	0.0045*	0.0032	0.0018	0.0041
Long-Short [30]	0.0033	0.0031	0.0013	0.0043	0.0028	0.0034*	0.0016	0.0021
JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0012	-0.0041	0.0019	-0.0094**	0.0003	0.0019	-0.0006	-0.0017
Long-Short [20]	-0.0078**	-0.0079**	-0.0014	-0.0046	-0.0001	0.0015	-0.0001	-0.0009
Long-Short [30]	-0.0078***	-0.0064***	-0.0043***	-0.0052**	0.0012	0.0012	0.0001	-0.0009

Panel B: Alphas of the long-short portfolios controlling for industry effects: H-L

	Bear				Bull			
NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0070	0.0072	0.0006	0.0147*	0.0018	0.0012	-0.0008	0.0010
Long-Short [20]	-0.0060	-0.0044	-0.0032	0.0054	-0.0002	0.0012	-0.0012	0.0003
Long-Short [30]	-0.0036	-0.0087**	-0.0036	0.0042	-0.0004	-0.0002	-0.0009	0.0007
EU	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0014	-0.0011	0.0001	0.0019	-0.0004	0.0039*	0.0029	-0.0018
Long-Short [20]	-0.0006	-0.0025	-0.0005	0.0037	0.0033**	0.0021	0.0044**	-0.0007
Long-Short [30]	-0.0004	-0.0033	-0.0019	0.0016	0.0023*	0.0035**	0.0034***	-0.0010
AP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0077	0.0020	0.0060	0.0149**	0.0017	0.0077*	-0.0001	0.0050
Long-Short [20]	0.0057	0.0022	0.0025	0.0066	0.0040	0.0026	0.0015	0.0031
Long-Short [30]	0.0061	0.0028	0.0049	0.0097**	0.0021	0.0033	0.0007	0.0008
JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0022	-0.0014	-0.0033	-0.0101	0.0004	0.0016	0.0001	-0.0014
Long-Short [20]	-0.0029	-0.0069	0.0024	-0.0035	-0.0008	0.0014	-0.0007	-0.0010
Long-Short [30]	-0.0053	-0.0046	-0.0024	-0.0039	0.0009	0.0011	-0.0002	-0.0011

Table 7. Bear and mixed market periods

This table identifies bear and mixed market periods according to the Pagan and Sossounov (2003) procedure. Mixed market periods are identified when bull and bear periods do not match across markets. The indices used are the MSCI North America Index, the MSCI Europe Index, the MSCI Japan Index, and the MSCI Pacific ex Japan Index. Consistent with the literature, we require the rise (fall) of the market being greater (less) than either 20%. The window breadth for eight, nine and ten months is evaluatedand the same results are obtained. The full sample period is from January 2002 to December 2017.

Portfolio	Start date	End date	Period	Bear market	Length of period (months)
EU & NA	Nov-07	Feb-09	Bear	Both	16
	May-11	May-12	Mixed	EU	13
	Jun-14	Feb-16	Mixed	EU	21
AP & NA	Nov-07	Feb-09	Bear	Both	16
	Ago-14	Feb-16	Mixed	AP	19
JP & NA	Mar-07	Oct-07	Mixed	JP	8
	Nov-07	Feb-09	Bear	Both	16
AP & EU	Nov-07	Feb-09	Bear	Both	16
	May-11	May-12	Mixed	EU	13
	Jun-14	Jul-14	Mixed	EU	2
	Ago-14	Feb-16	Bear	Both	19
EU & JP	Mar-07	Oct-07	Mixed	JP	8
	Nov-07	Feb-09	Bear	Both	16
	May-11	May-12	Mixed	EU	13
	Jun-14	Feb-16	Mixed	EU	21
AP & JP	Mar-07	Oct-07	Mixed	JP	8
	Nov-07	Feb-09	Bear	Both	16
	Ago-14	Feb-16	Mixed	AP	19

Table 8. Relative financial performance across regional portfolios in different market states

This table shows results of estimating alpha (abnormal returns) of the long-short portfolios in different market states at the 10% [10], 20% [20], and 30% [30] cut-off level for the Aggregate dimension (AD), Environment (ENV), Social (SOC), and Corporate Governance (CGV). The long-short portfolio is formed by subtracting the high-ranked portfolio returns of a region from the returns on the high-ranked portfolio of another one (H-H). The Pagan and Sossounov (2003) procedure is used in order to identify the different market states. Panel A displays estimates of portfolio financial performance based on equation (3) incorporating a new dummy variable (mixed) that takes value 1 when a market is in a bull period and the other one is in a bear period, and zero otherwise. Global factors are used to estimate the financial portfolio performance across regions. Panel B shows results of controlling for industry effects following the approach of Geczy et al. (2003). 25 TRBC industry global indices are used and principal components with eigenvalues superior to 1 are selected. The multi factor-models are estimated by OLS based on the heteroskedasticity and autocorrelation adjusted errors of Newey and West (1987). The asterisks are used to represent the statistically significant coefficients at the 1% (***), 5% (**) and 10% (*) significance levels. The full sample period is from January 2002 to December 2017.

Panel A: Alphas of the long-short portfolios: H-H

	Bear				Bull				Mixed			
EU & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0049	0.0001	-0.0041	0.0075	-0.0034	-0.001	-0.0008	-0.0026	-0.0087	-0.0055	-0.0027	-0.0153**
Long-Short [20]	-0.0065	-0.0069	-0.0078	0.0036	0.0006	-0.0007	0.0011	-0.0011	-0.0058	-0.0045	-0.0002	-0.0116*
Long-Short [30]	-0.0073	-0.0056	-0.0135*	0.0033	0.0002	0.0000	0.0003	-0.0011	-0.0045	-0.0033	-0.0003	-0.0127*
AP & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0145	0.0142	0.0077	0.0235*	-0.0014	0.0032	-0.0023	0.0018	0.0056	0.0025	0.0086	0.0044
Long-Short [20]	0.0187	0.0105	0.0143	0.0211*	0.0016	0.0008	-0.0006	0.0013	0.0043	0.0034	0.0043	0.0038
Long-Short [30]	0.0131	0.0150	0.0110	0.0233**	0.0001	0.0002	-0.0014	-0.0006	0.0037	0.0005	0.0035	0.0039
JP & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0018	0.0095	0.0025	0.0050	-0.0044	-0.0039	-0.0022	-0.0048	0.0253***	0.0196***	0.0384***	0.0151***
Long-Short [20]	0.0058	0.0077	0.0015	0.0053	-0.0021	-0.0035	-0.0010	-0.0025	0.0158***	0.0107	0.0215***	0.0418***
Long-Short [30]	0.0007	0.0089	-0.0051	0.0062	-0.0015	-0.0023	-0.0015	-0.0033	0.0262***	0.0325***	0.0374***	0.0408***
AP & EU	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0045	-0.0044	0.0053	0.0070	0.0022	0.0049	-0.0021	0.0061	0.0472***	0.0431***	0.0460***	0.0491***
Long-Short [20]	0.0051	0.0008	0.0007	0.0041	0.0015	0.0016	-0.0017	0.0032	0.0450***	0.0336***	0.0435***	0.0481***
Long-Short [30]	0.0029	-0.0004	0.0009	0.0065	0.0001	0.0005	-0.0023	0.0009	0.0441***	0.0388***	0.0425***	0.0483***
EU & JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0067	-0.0093	-0.0066	0.0025	0.0044	0.0045	0.0064	0.0041	-0.0084	-0.0032	-0.0096	-0.0115
Long-Short [20]	-0.0123	-0.0146	-0.0093	-0.0017	0.0066	0.0051	0.0073	0.0038	-0.0072	-0.0048	-0.0058	-0.0110
Long-Short [30]	-0.0080	-0.0145	-0.0084	-0.0030	0.0053	0.0049	0.0064	0.0047	-0.0063	-0.0038	-0.0053	-0.0102
AP & JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0127	0.0048	0.0052	0.0184*	0.0033	0.0063	0.0019	0.0068	0.0144**	0.0076	0.0111	0.0084
Long-Short [20]	0.0129	0.0028	0.0128	0.0158	0.0042	0.0036	0.0019	0.0036	0.0094	0.0069	0.0096	0.0062
Long-Short [30]	0.0124	0.0061	0.0161	0.0171*	0.0021	0.0019	0.0013	0.0024	0.0076	0.0069	0.0063	0.0094*

Panel B: Alphas of the long-short portfolios controlling for industry effects: H-H

	Bear				Bull				Mixed			
EU & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0099	0.0175*	0.0111	0.026***	-0.0040	-0.0019	-0.0011	-0.0038	-0.0136*	-0.0106	-0.0086	-0.0190***
Long-Short [20]	0.0119	0.0067	0.0056	0.0203**	0.0001	-0.0013	0.0012	-0.0022	-0.0120*	-0.0094	-0.0068	-0.0153**
Long-Short [30]	0.0086	0.0077	-0.0005	0.0204**	-0.0002	-0.0005	0.0001	-0.0019	-0.0102	-0.0080	-0.006	-0.0173**
AP & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0057	0.0156	0.0035	0.0292*	-0.0015	0.0037	-0.0020	0.0015	0.0107	-0.0018	0.0077	0.0033
Long-Short [20]	0.0183	0.0097	0.0104	0.0178	0.0017	0.0011	-0.0005	0.0011	0.0036	0.0016	0.0048	0.0065
Long-Short [30]	0.0080	0.0080	0.0045	0.0193	0.0002	0.0004	-0.0012	-0.0007	0.0052	0.0016	0.0048	0.0060
JP & NA	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0131	0.0209	0.0175	0.022	-0.0059	-0.0053	-0.0043	-0.0071**	0.0261**	0.0174	0.0388***	0.0261***
Long-Short [20]	0.0257*	0.0237	0.0230	0.0206	-0.0048	-0.0056	-0.0039	-0.0046	0.0233**	0.0144	0.0266**	0.0472***
Long-Short [30]	0.0198	0.0267*	0.0150	0.0217*	-0.0041	-0.0047	-0.0042	-0.0053	0.0325***	0.0371***	0.0431***	0.0455***
AP & EU	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	0.0084	-0.0030	0.0072	0.0102	0.0014	0.0054	-0.0027	0.0057	0.0526***	0.0435***	0.0508***	0.0517***
Long-Short [20]	0.0082	0.0034	0.0046	0.0070	0.0009	0.0012	-0.0030	0.0029	0.0498***	0.0377***	0.0520***	0.0517***
Long-Short [30]	0.0055	0.0019	0.0040	0.0090	-0.0006	-0.0002	-0.0032	0.0003	0.0497***	0.0450***	0.0491***	0.0531***
EU & JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0086	-0.0116	-0.0085	-0.0030	0.0046	0.0051	0.0067	0.0045	-0.0100	-0.0054	-0.0107	-0.0130*
Long-Short [20]	-0.0185	-0.0221	-0.0213	-0.0078	0.0073	0.0059	0.0087	0.0038	-0.0086	-0.0061	-0.0071	-0.0112
Long-Short [30]	-0.0163	-0.0234*	-0.0196	-0.0092	0.0061	0.0058	0.0076	0.0049	-0.0074	-0.0050	-0.0065	-0.0105
AP & JP	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV	AD	ENV	SOC	CGV
Long-Short [10]	-0.0044	-0.0085	-0.0068	0.0086	0.0038	0.0071	0.0027	0.0077	0.0196**	0.0099	0.0131	0.0089
Long-Short [20]	-0.0034	-0.0124	-0.0079	-0.0004	0.0050	0.0043	0.0028	0.0042	0.0130*	0.0103	0.0142**	0.0106
Long-Short [30]	-0.0080	-0.0150	-0.0056	-0.0007	0.0031	0.0032	0.0024	0.0031	0.0119*	0.0104*	0.0105	0.0138**

Figure 1. Proportion of stocks with ESG scores on each region over time (2002-2016)

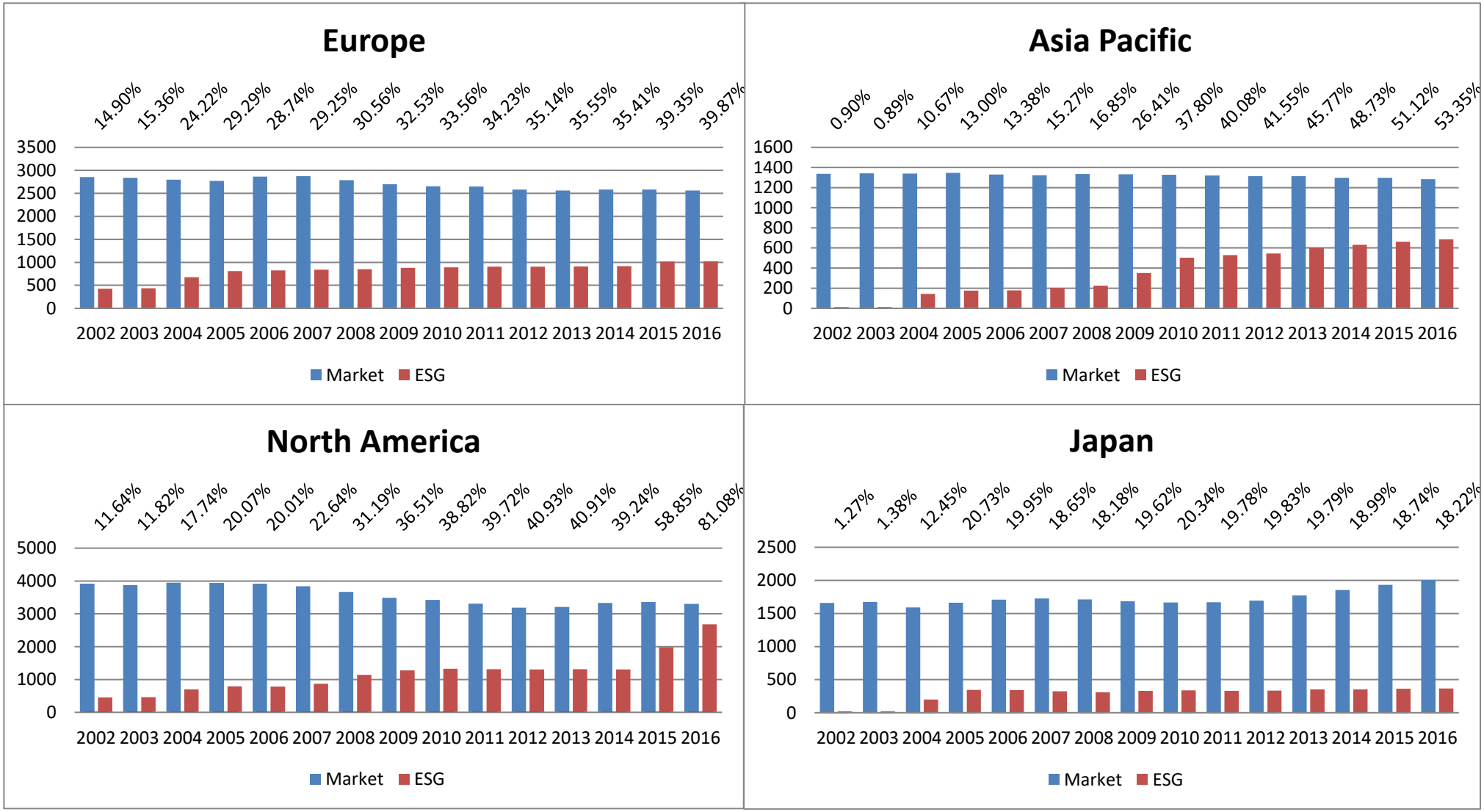

Figure 2. Evolution of the mean, max, and min values of the ESG and Aggregate scores for each region (2002-2016)