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Research article

Earnings management in socially responsible firms around seasoned equity offerings: Evidence from France, Germany, Italy and Spain

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ABSTRACT

Earnings manipulation (EM) has been a matter of interest to researchers for decades. How this is measured or the motivations of managers to engage in such actions have been studied in detail. Some studies find that managers have incentives to manipulate the earnings that accompany financing activities such as seasoned equity offerings (SEO). Under the corporate social responsibility (CSR) approach, profit manipulation actions have been shown to be mitigated in socially responsible companies. To the best of our knowledge, there are no studies that analyse whether CSR mitigate EM actions in a SEO context. Our work contributes to filling this gap. We investigate whether socially responsible companies exhibit EM in periods prior to SEO. This study uses a panel data model of listed non-financial firms from countries with the same currency and similar accounting rules (France, Germany, Italy and Spain) between 2012 and 2020. Our results show that in all the countries analysed, except Spain, there is a manipulation of operating cash flows in the year prior to capital increases, and only in French companies is there a decrease in the management of this variable in companies with higher development of corporate social responsibility.

1. Introduction

Earnings management (EM) can be defined as the purposeful intervention in the elaboration financial reporting process, with the intent of obtaining some private gain [1,2] and reducing the quality of financial reporting. EM have been widely analysed in the literature under different approaches, such as managers manipulating real activities to avoid reporting annual losses [3,4] and accrual-based earnings management through changes in estimates and accounting policies [5–7]. Therefore, if directors deliberately alter their investment decisions by manipulating actual activities, or alter estimates or accounting methods to influence accruals, we are in an EM environment. The motivations for these practices can be stock market reasons related to stock price movements or analysts' judgments, contracting motivations - both lending and incentive motivations - or regulatory reasons [8]. EM activities are often examined under an agency approach, as they are usually motivated by conflicts of interest between ownership and control, where asymmetric information exists [9–11].

Some studies show that companies use EM to manipulate share prices or to align reported results with investor expectations [6,

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12–17]. EM generally has a negative impact on the quality of financial reporting, which can reduce the value of the company, causing stakeholders to lose confidence. EM has also been analysed regarding other issues such as insider trading [18], mergers and acquisitions [19], debt issuance [20], or bankruptcy risk [21].

In capital markets, there has been a particular interest in analysing EM around capital increases. Authors such as [22–24], showed that the operating performance of issuing companies showed a substantial improvement before the offering, and that this performance declined in subsequent periods. This pattern was analysed by [25–27], among others, who studied the relationship between EM and equity issues, concluding that issuing firms deliberately manipulate earnings prior to equity offerings. Previous studies have documented that issuing companies manipulate earnings prior to SEOs. When an SEO occurs, investors pay close attention to the company and its share price, and managers have inventive ways to inflate its earnings, the overvaluation of which translates into a transfer of wealth to the company's current and future shareholders [28]. SEOs thus become a particularly favourable context for analysing EM. Such actions around SEOs are negative signals and induce investors to be optimistic about future earnings and overvalue these firms [29]. Managerial opportunism is the factor that is often pointed to explain these behaviours that meet both the immediate needs of the firm as well as its long-term financing needs [30]. The literature has demonstrated that firms use different strategies to manage their earnings around SEOs: using accruals [31,32], managing real earnings [33] or a combination of both procedures [34,35].

Corporate Social Responsibility (CSR) has played a relevant role in business strategy for decades. It has been shown that CSR strategy is positively valued by investors, has a positive effect on corporate reputation [36], and that its practices and disclosure help to reduce asymmetric information in the capital market [37,38]. SEOs are corporate events that play a key role for companies in facilitating external financing activities in the stock market [39] and, in SEO context, there is an information asymmetry between the issuer and external investors [40]. Feng et al. [41] study whether good CSR practices help the firm to reduce this information asymmetry in the SEO context. They conclude that issuers with high CSR scores provide more transparent financial reporting and add value to their shareholders by reducing this asymmetry.

Some studies have shown that companies carry out EM actions in an SEO context. Conversely, most of the literature finds that companies committed to CSR do not engage in EM actions, and conclude that managers of socially responsible companies are less likely to use earnings manipulation strategies [42–45]. Given the relevance of SEO in capital markets, and the influence of CSR on investor behaviour, it is of interest to analyse whether companies considered socially responsible perform EM actions in an SEO context. As far as we know, there are not studies that analyse this issue and our research contribute to filling this gap. Therefore, our aim is to investigate whether, in the SEO environment, the behaviour pattern of CSR companies is similar to that of the rest of the companies (non-CSR companies) or, on the contrary, the fact of being considered socially responsible is a determining factor for not engaging in such practices.

Our empirical analysis focuses on panel data consisting of listed non-financial companies from the largest EU countries (France, Germany, Italy and Spain), for 2012–2020 period, since their financial statement are formulated in the same currency (euro) and are subject to European Directives and IFRS. Besides, we use two measures as a proxy of each company's CSR performance: the inclusion in the Dow Jones Sustainability Index Europe and the Global Reporting Initiative level of non-financial reporting.

In our analysis we study both real earnings manipulation and accrual-based earnings manipulation practices (total earnings management-TEM) and observe that for Spanish companies there is no relationship between TEM or any of its components with subsequent years' capital operations (SEO) or with the quality and development of CSR. For the remaining countries (France, Germany and Italy), we only find a positive relationship between subsequent years' capital operations and discretionary operating cash flows, i.e., companies in these countries increase their discretionary operating cash flows two years before SEO. We also observe that only French companies show a statistically significant and negative relationship between equity issuance and EM.

The rest of study is organised as follows: Section 2 reviews the literature and develops the study hypothesis. Section 3 explains the methodology used to test the hypothesis. Section 4 describes the data. Section 5 shows the results obtained from the estimated models. Section 6 presents the main conclusions.

2. Literature review and hypothesis development

Schipper [1] points out that EM could occur in any part of the external disclosure process, and could take several forms such as different accrual-based earnings management (AEM) and real earnings management (REM). Both meanings have been widely explored and raise substantial implications. AEM occurs when managers control reported earnings by exploiting accounting discretion [1,6,8,46]. Thus, AEM is achieved by modifying the accounting methods or estimates used when introducing a given transaction in the financial statements, for example, changing the method of depreciation of fixed assets or the estimate of the impairment of doubtful accounts.

REM is defined by Roychowdhury [4] as "*departures from normal operational practices, motivated by desire of managers to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations*" (p.337), and can appear in many forms, such as offering price discounts to temporarily increase sales, accelerating sales, engaging in overproduction to lower cost of goods sold, and reducing or delaying discretionary expenditures to improve margins. Al-Shattarat et al. [47] explain REM under opposing approaches such as the signalling theory and the opportunistic theory. According to signalling theory, companies use REM to indicate good future performance [3,4,48]. From the opportunistic approach, managers use REM to manipulate results and deliberately mislead external investors, which could lead to a further decline in future performance. Thus, companies that use REM will experience a negative impact on the subsequent value of the company and its performance.

Managers can also use both practices simultaneously. Zang [49] analyzes the trade-offs between accrual manipulations and REM and concludes that high (low) real activities manipulation realized is directly offset by a lower (higher) amount of AEM. In addition,

executive surveys conducted by Graham et al. [50] suggest that managers emphasize real economic actions rather than exercise accounting discretion to hit earnings benchmarks.

Literature has studied the relationship between CSR and performance in business management [51]. While some authors suggest that socially responsible companies tend to build long-term relationships with stakeholders rather than maximise short-term profits, others argue that CSR is a practice used by managers who engage in opportunistic behaviour [52].

Heal [53] and Harjoto and Jo [54] noted that socially responsible companies make better use of resources and innovation, which translates into an increase in the value of the company. Chen et al. [55] found that the influence of CSR on stock performance depends on the corporate value of the company, and show that CSR activities of companies with low corporate value have a negative effect on stock performance. Conversely, companies with high corporate value have a greater ability to implement CSR, and CSR investments can increase their share prices. Lopatta et al. [56] study CSR under the opportunistic theory and disaggregate the CSR data into a normal and an abnormal component that is subject to agency problems. They find that only normal CSR is not negatively associated with financial performance, while the relationship between abnormal CSR and financial performance is negative.

Recently, environmental, social and governance (ESG) factors have been developed as a subset of CSR [57], and we also find several papers linking ESG and firm financial performance. For instance, Friede et al. [58] analyse 2,000 empirical studies published since the 1970s and conclude that approximately 90% of papers find a non-negative relationship between ESG and financial performance, and the vast majority of studies report positive results, with this relationship being stable over time.

With regard to the object of this empirical research, relationship between CSR and earnings management, there is an extensive literature that found empirical evidence. Chih et al. [59] conclude that companies committed to CSR tend not to smooth earnings; in the similar direction, authors such as [42,43,45,60] find that firms engaged in CSR are less profit management, and that CSR moderates the negative impact of EM on financial performance [61]. Rahmawati et al. [44] show that higher level of real manipulation in cash flow from operations has a negative effect on the relationship between CSR and financial performance. Bozzolan et al. [62] conclude that CSR-oriented firms are less likely to participate in real activity manipulation than accrual manipulation, and this orientation acts as a restriction for REM, which contributes to the creation of value for stakeholders. Almahrog et al. [63] reveal that companies with a higher commitment to CSR are less likely to manage earnings through accruals. Moratis and Egmond [64] prove no relationship between EM and CSR, and that firms with high environmental impact do not appear to practice profit management, but show higher CSR performance. Dimitropoulos [65] study the impact of CSR performance on EM behaviour using a sample from 24 European Union (EU) countries over the period 2003–2018, and conclude that there is a negative association between CSR and EM, so that companies with high CSR performance are associated with higher quality financial reporting. Chen and Hung [66] argue that the company engages in CSR not only to increase the transparency of CSR information and to create interaction with stakeholders, but also to reduce the phenomenon of EM. When the firm's CSR performance is lower, it is susceptible to EM. Moreover, CSR performance can increase the value of the firm, but if the firm uses CSR to cover up and distract attention from management manipulation of profits, the value of the firm will decrease. In the same vein, Palacios-Manzano et al. [52] find that firms that are more committed to CSR are less involved in EM. This negative relationship between EM and CSR extends to other studies that consider environmental, social and governance (ESG) information, and reach similar conclusions ([67–70]. Borralho et al. [71] independently considered the influence of ESG disclosure's three components on EM and found that environmental disclosure is positively associated with EM, while social disclosure and governance disclosures are negatively associated with EM. Nagy et al. [72] find that CSR performance of companies is positively correlated with the volume of profits earned and negatively correlated with the level of discretionary accruals. Khenissi et al. [73] relate the inclusion of CSR criteria in compensation contracts, observing a negative relationship with EM. Chouaibi and Zouari [69] analyse a sample of 540 European ESG firms over the period 2011–2019, concluding that the more important CSR practices are, the less the firm engages in an aggressive earnings management strategy, which negatively affects its cost of capital cost of equity. Khlifi and Zourari [74] show that CSR is significantly and negatively associated with REM in the most innovative companies and, the same authors, show that good corporate governance takes on a moderating role in the relationship between CSR and REM [75]. The role of gender policies has also been analysed and authors such as [76] confirm that companies that participate in CSR activities are less motivated to practice EM and are more likely to produce high quality financial reports. At the same time, gender diversity increases board effectiveness by reducing the level of earnings management, ensuring high quality financial reporting and developing CSR activities.

In contrast, Prior et al. [77] reveal a positive association between EM and CSR practices and conclude that CSR companies may be involved in earnings management practices, and that the combination of EM and CSR causes a decrease in the company's financial performance; in the banking sector, Grougiou et al. [78] prove a positive significant relationship between CSR and EM. Martínez-Ferrero et al. [36] demonstrate that CSR activities can be used to hide EM practices. More recently, López-González et al. [79] conclude that companies with greater social responsibility activity show a higher manipulative behaviour through the promotion of actions that mask the company's financial and economic reality, with this positive relationship moderating downwards in family firms.

Regarding the relationship between capital increases and EM, Rangan [25] and Teoh et al. [26], among others, have shown that in the run-up to a capital increase, companies tend to exaggerate their earnings by providing the investor with a misleading view of their situation, and that there is a negative relationship between the returns obtained around the offerings and the profits obtained afterwards, indicating that companies deliberately manipulate earnings prior to share offerings. Cohen and Zarowin [34] show that firms engage in both forms of EM in the years prior to SEO, and find that the decline in operating performance after SEO attributable to actual activity management is more severe than that attributable to accruals management. The reasons for this behavior and how to mitigate it have also been analysed. Kim [17] shows that in firms that raise capital, managers with greater accounting flexibility are more likely to provide more optimistic forecasts than analysts. Yang et al. [29] discover that financial constraints and distress risk are two motives that drive firms to report broader earnings around SEO. From UE companies data, Fauver et al. [80] note that the implementation of

the Market Abuse Directive and the Prospectus Directive improves the transparency and quality of company reporting which helps to reduce incentives for managers to manipulate profits around public equity issues. Chang and Lin [35] show that firms will use real, as well as accrual-based, earnings management activities around SEO. In general, companies planning to issue new shares have more incentives to improve their image. Overly optimistic earnings forecasts, combined with EM, provide a useful tool to manipulate investor expectations and are likely to lead to a decline in earnings after the capital increase [81]. Bertomeu et al. [82] conclude that there is more EM during SEO in smaller and growing firms and in industries with more irregularities. Opare et al. [83] show that post-SEO performance is worse for firms that engage in RAM than for those that manipulate accruals, that the joint use of AEM and RAM leads to worse post-SEO performance, and that as the legal regime is reinforced the impact of earnings management is reduced. Wu and Lo [84] indicate that institutional investors avoid management's use of REM around SEOs. We also find studies that analyse whether investing in environmentally friendly companies through capital raising operations is good for their equity. Chan and Walter [85] show that a "green" factor is important in explaining long-term stock return performance after seasoned equity offerings (SEO). They document positive and statistically significant excess returns for these firms, in contrast to the control samples used, which underperform.

But despite the extensive literature, to the best of our knowledge, there is no empirical study that has analysed whether performance management around SEO is related to the degree of the company's commitment to CSR. Thus, the purpose of this study is to find out whether CSR of companies decreases EM and whether such reduction is more evident based on around capital operations.

Therefore, our hypothesis is as follows:

H1. *Higher CSR performance firms show lower earning management in issuing SEOs.*

3. Research methodology

3.1. Earnings management estimation

To estimate total earnings management (TEM), we assume models used by Cohen and Zarowin [34] and by Chen and Hung [66]. Cohen and Zarowin [34] first introduced REM in the SEO environment, analysing accrual-based earnings management (AEM) and real earning management (REM) separately. Chen and Hung [66] applied their methodology to calculate TEM as the sum of the two components (AEM and REM) in the analysis of earnings manipulation in companies considered socially responsible. Thus, we define the total earnings management of firm i in fiscal year t ($TEM_{i,t}$) as follows:

$$TEM_{i,t} = DA_{i,t} - DCFO_{i,t} - DEXP_{i,t} \tag{1}$$

where $DA_{i,t}$ represents discretionary accruals, $DCFO_{i,t}$ shows the abnormal cash-flows from operations and $DEXP_{i,t}$ indicates the abnormal operating expenses. We multiply both abnormal operating cash flow and abnormal operating expenses by minus one, and then add them, following the model proposed by Chen and Hung [66]. The higher DFCO and DEXP amounts, the more likely it is that the company is manipulating sales and cutting discretionary expenses to manage reported earnings upwards [34].

We estimate the discretionary accruals using the regression analysis proposed by Kothari et al. [5]:

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \cdot \frac{1}{Assets_{i,t-1}} + \alpha_2 \cdot \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \cdot \frac{TDA_{i,t}}{Assets_{i,t-1}} + \alpha_4 \cdot RoA_{i,t} + \sum_{t=1}^{T} \delta_t \cdot D_t + \varepsilon_{i,t}^{TA} \tag{2}$$

where, TA represents the total accruals defined as income from continuing operation minus the cash flow from operations; $Assets$ is the total assets; $\Delta Sales$ is the difference in sales between two consecutive fiscal years or sales growth; TDA shows the total depreciable assets and RoA denotes the total RoA (Return on Assets). D_t is a dummy for each year and shows temporary effects. Finally, α_0 is the constant and represents the individual effect for each firm. The residual term is $\varepsilon_{i,t}^{TA}$.

Note that Eq. (2) is a panel data model and then, once the parameters are estimated, we calculate the nondiscretionary accruals (NDA) as follows:

$$NDA_{i,t} = \widehat{\alpha}_0 + \widehat{\alpha}_1 \cdot \frac{1}{Assets_{i,t-1}} + \widehat{\alpha}_2 \cdot \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \widehat{\alpha}_3 \cdot \frac{TDA_{i,t}}{Assets_{i,t-1}} + \widehat{\alpha}_4 \cdot RoA_{i,t} + \sum_{t=1}^{T} \widehat{\delta}_t \cdot D_t \tag{3}$$

And then, we estimated the discretionary accruals (DA) as: $DA_{i,t} = \frac{TA_{it}}{Assets_{i,t-1}} - NDA_{i,t} = \varepsilon_{i,t}^{TA}$. We consider that our nondiscretionary accruals are independent of temporal and individual effects since, these effects are included in Eq. (3).

Similarly, and following the proposals of [4,66], we model the operative cash-flows (CFO):

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_0 + \beta_1 \cdot \frac{1}{Assets_{i,t-1}} + \beta_2 \cdot \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \cdot \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \sum_{t=1}^{T} \delta_t \cdot D_t + \varepsilon_{i,t}^{CFO} \tag{4}$$

where, CFO represents the operating cash-flows; $Sales$ are those for the fiscal year and $\varepsilon_{i,t}^{CFO}$ is the residual term. As above and from estimated parameters, we determine the normal operating cash-flows ($NCFO$) as follows:

$$NCFO_{i,t} = \widehat{\beta}_0 + \widehat{\beta}_1 \cdot \frac{1}{Assets_{i,t-1}} + \widehat{\beta}_2 \cdot \frac{Sales_{i,t}}{Assets_{i,t-1}} + \widehat{\beta}_3 \cdot \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \sum_{t=1}^{T} \widehat{\delta}_t \cdot D_t \quad (5)$$

And then, discretionary operating cash-flows (*DCFO*) are defined as: $DCFO_{i,t} = \frac{CFO_{i,t}}{Assets_{i,t-1}} - NCFO_{i,t} = \varepsilon_{i,t}^{CFO}$. We consider that nondiscretionary operating cash-flows are independent of temporal and individual effects since these effects are included in Eq. (5).

Finally, we model operating expenses (*EXP*) as [34] to avoid the problem of modelling expenses as a function of current sales, when firms record sales upwardly to increase earnings:

$$\frac{EXP_{i,t}}{Assets_{i,t-1}} = \gamma_0 + \gamma_1 \cdot \frac{1}{Assets_{i,t-1}} + \gamma_2 \cdot \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \sum_{t=1}^{T} \delta_t \cdot D_t + \varepsilon_{i,t}^{EXP} \quad (6)$$

Where *EXP* represents the difference between operating revenues and operating income (EBIT); Sales is the revenue for fiscal year t-1 and $\varepsilon_{i,t}^{EXP}$ is the residual. Again, we estimate normal operating expenses (*NEXP*) as:

$$NEXP_{i,t} = \widehat{\gamma}_0 + \widehat{\gamma}_1 \cdot \frac{1}{Assets_{i,t-1}} + \widehat{\gamma}_2 \cdot \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \sum_{t=1}^{T} \widehat{\delta}_t \cdot D_t \quad (7)$$

And then, discretionary operating expenses (*DEXP*) are: $DEXP_{i,t} = \frac{EXP_{i,t}}{Assets_{i,t-1}} - NEXP_{i,t} = \varepsilon_{i,t}^{EXP}$. We consider that nondiscretionary operating expenses are independent of temporal and individual effects since these effects are included in Eq. (7).

3.2. Testing hypothesis

Then, since our nondiscretionary estimates are independent of temporary and individual effects, we estimate Eq. (8) to test our hypothesis:

$$TEM_{i,t} = \omega_1 \cdot D_{i,t}^{SEO} + \omega_2 \cdot D_{i,t}^{CSR} + \omega_3 \cdot D_{i,t}^{FRQ} + \delta_1 \cdot ln\left(Assets_{i,t}\right) + \delta_2 \cdot RoA_{i,t} + \delta_3 \cdot BtM_{i,t} + \delta_4 \cdot DEBT_{i,t} + \varepsilon_{i,t}^{TEM} \quad (8)$$

We define the dummies variables: $D_{i,t}^{SEO}$, $D_{i,t}^{CSR}$ and $D_{i,t}^{FRQ}$:

- $\boldsymbol{D_{i,t}^{SEO}}$ is 1 when the company has increased capital in the year or in any of the 2 subsequent years (t, t+1 and t+2); otherwise, it takes the value 0.
- $\boldsymbol{D_{i,t}^{CSR}}$ shows the degree of the firm's involvement with CSR. There are different ways of assigning a value to this variable in the literature, ranging from using external databases [62,86,87] to taking into consideration whether the company is included in sustainability indeces [59,88]. In any case, these ways of acting are not exempt from a certain degree of subjectivity, so some studies have constructed *ad-hoc* indicators [44] even though they do not completely eliminate the subjectivity of the measure. More recently, following the mandatory requirement in some countries for listed companies to present non-financial information within financial statements, the measurement has been based on the quality of such non-financial information [89]. In our case, we will take two measures of the CSR variable: on the one hand, the inclusion of the company in a sustainability index and, on the other, the degree of quality of the non-financial information provided by the firm according to the standards of the Global Reporting Initiative (GRI). In this way, we can contrast whether the results are sensitive to the way of measuring the degree of CRS involvement of the company. We use the Down Jones Sustainability index as other authors such as [90–95].

Thus, we consider socially responsible companies that belong to the index, so that the variable $D_{i,t}^{CSR}$ takes value 1 if the company is part of the index in the year, and −1 if it is not included. This dummy is centered and thus, we ensure that the constant is zero, since the dependent variable, by definition, has zero mean, since the models for estimating the earnings management components already include the time and individual effects.

In addition, in order to make the analysis more robust, we complete the CSR measurement by considering whether companies prepare their sustainability reports in accordance with the criteria established by GRI, following authors such as [96–100]. GRI publishes a list of international companies that prepare reports with non-financial information according to the content standard applied, and also according to whether this information has been verified by a specialised external agent.

Thus, our variable $D_{i,t}^{CSR}$ takes a value of 1 if the company complies with GRI standards and submits the information to external verification; we assign it a value of 0 if it complies with GRI standards but does not undergo external verification, and finally it has a value of −1 if it fails to comply with GRI standards.

- Finally, we define $\boldsymbol{D_{i,t}^{FRQ}} = D_{i,t}^{SEO} \cdot D_{i,t}^{CSR}$ as multiplicative variable. So, $D_{i,t}^{FRQ}$ takes a value of 1 if the company has increased capital and has the highest rating of CSR; it takes a value of −1 if the company has increased capital but has the lowest rating of CSR, and otherwise it takes 0 value. Note that this is possible since the dummy variable $D_{i,t}^{CSR}$ is centered.

Furthermore, as in the literature reviewed, we include the usual control variables of size (*ln*(*Assets*)), return on assets (*RoA*), growth

options measured by Book-to-Market ratio (*BtM*) and level of indebtedness measured by Debt-to-Book value ratio (*DEBT*).

In short, according to estimating results of Eq. (8):

- If $\omega_1 = 0$, firms that increase capital do not show higher levels of EM. However, if $\omega_1 \neq 0$, the companies that increase capital show higher ($\omega_1 > 0$) or lower levels ($\omega_1 < 0$) of EM.
- If $\omega_2 = 0$, EM is independent of firms' CSR. But, if $\omega_2 < 0$, firms with higher CSR quality present lower levels of EM.
- If $\omega_3 = 0$, firms with higher accomplishment of CSR and that increase capital do not present different EM from the rest. Instead, if $\omega_3 < 0$, the firms with higher CSR quality and that increased capital show lower levels of EM around SEOs. In the latter case, we accept our hypothesis and then, when a capital increase occurs, the financial reporting quality of companies with higher CSR development is higher than that of companies with lower CSR.

3.3. Model estimation

For the estimation[1] of Eqs. (2), (4) and (6), in order to extract the residual or components of the total manipulation of the result, and given that we are dealing with a panel of data, first we determine whether the individual effect of each company is fixed (constant for the whole sample period) or random. To do so, we will use the Hausman test whose null hypothesis is that the estimation by generalised least squares (random effects) is efficient. On the contrary, if the hypothesis is rejected (p-value$<$0.05), then the ideal estimation procedure would be ordinary least squares with fixed effects, i.e. substituting α_0 by $\alpha_{0,i}$ or including a dummy for each of the companies in the sample.

In addition, to test for the absence of endogeneity in the model, we estimate the [107] autocorrelation tests on the residuals. Thus, if the null hypothesis of absence of autocorrelation is not accepted, we should estimate the models as if they were a dynamic panel data using the generalised method of moments and using instrumental variables to correct for the endogeneity problem. We will apply this same methodology to estimate Eq. (8), since the dependent variable is the result of the previous estimations.

4. Data

The sample is made up of French, German, Italian and Spanish[2] (representing the largest EU economies) non-financial listed firms (banks, insurance, financial and real estate companies are excluded), since their financial statements are formulated in the same currency (euro) and subject to European Directives and IFRS. The data period runs from 2012 to 2020, but as some variables are estimated on the basis of differences between two consecutive fiscal years, the analysis period covers 2011–2020. To obtain all financial data, we have used Amadeus database of Bureau van Dijk (BvD). If the necessary variables are not available for one year, we exclude this company for this year. As usual in literature, we also exclude, for each firm, those years with negative book value,[3] as well as those extreme values that lie in the distribution tails (less than 1% or more than 99%). As a result of the search, the final sample has the following composition:

Table-1 shows a regular growth in the total number of companies in the sample, up to 2019. In 2020 there is a decrease of 21.57% in the total sample, probably as a consequence of the pandemic (COVID-19). In addition, France and Germany account for more than twice as many as Italy and Spain.

Table-2 shows the number of companies that have increased capital for each of the countries and years in the sample. Note that the country with the highest number of SEOs was France (47.7% of the total), followed by Germany with 26.8%, while the sum of the data for Italy and Spain is similar to that of Germany. On the other hand, 2014–2015 was the period with the highest percentage of SEOs per total companies in France, 2013–2014 in Germany and 2017-18 in Italy and Spain. In summary, this heterogeneity in size and periods justifies this comparative study.

[1] To test the proposed hypothesis, we can either estimate a single model for the set of countries, or we can estimate the model for each country separately. We have opted for the latter possibility for several reasons: When the estimation is joint, we need to include a dummy variable for each country in the sample, so the number of dummy variables and their multiplicative effects grows exponentially (remember that in addition to the country dummy, we have defined those corresponding to the following effects: temporary, individual, CSR and SEO), with the consequent increase in multicollinearity problems and the added difficulty of correctly understanding multiplicative effects, for example when analyzing the multiplicative effect of year and country. On the other hand, as the literature shows [101–106], although the countries belong to a common EU area, the financial characteristics of the companies are different -and so are their capital markets-, among others: level of internationalization of companies, level of investor protection, bank-oriented versus market-oriented financial system, taxation and creditors protection. And then, including a country (or group) effect could be capturing other differentiating characteristics that could have distorting effects on the objective sought in the study.

[2] Specifically, the initial goal was to include more EU countries (Finland and Netherlands), but the size of their capital market meant that the number of companies was low, furthermore, within that set, the number of firms included in the CSR indeces was even lower, and finally, there were almost no companies that had performed SEO in the sample period and belonged to the above subsets (for example, of the observations in Finnish companies, only 7.5% raised capital). Thus, the inclusion in our sample of a small amount of data from another country, not only seems irrelevant, but the results could be interpreted more as an idiosyncratic case than as a general behavior.

[3] In the literature it is usual to exclude firms with negative book value for different reasons: difficult interpretation of the results or high credit risk, among others. There are usually few data, and therefore, the complexity of their treatment in isolation from the rest of the sample means that they are normally excluded. For example, in the capital market, the field in which we work in our study of SEOs, the size factor is key and these outliers are excluded for their estimation (see Refs. [108–110], among others).

Table 1
Sample composition.

Year	France	Germany	Italy	Spain	Total sample
2012	497	426	197	135	1255
2013	531	439	202	147	1319
2014	552	413	219	151	1335
2015	568	405	238	180	1391
2016	589	424	249	191	1453
2017	609	427	261	213	1510
2018	619	466	286	230	1601
2019	621	489	291	222	1623
2020	557	424	214	140	1335
Sum	**5143**	**3913**	**2157**	**1609**	**12822**

Note: This table shows the number of companies in the sample, disaggregated by year and country.

Table 2
Number of companies with SEO.

Year	France	Germany	Italy	Spain	Total
2012	176	107	43	26	352
2013	177	120	34	30	361
2014	213	128	56	38	435
2015	241	124	65	53	483
2016	212	107	61	56	436
2017	232	120	82	72	506
2018	233	128	90	86	537
2019	228	122	87	57	494
2020	210	126	64	23	423
Total	**1922**	**1082**	**582**	**441**	**4027**

Note: This table shows the number of companies that have increased their capital for each of the countries and years in the sample.

Table-3 shows the main quartiles of the financial variables used in the empirical study after discarding outliers (below 1% or above 99%). We present quartiles instead of other usual statistics (mean and standard deviation) because the probability distribution of the variables does not have to be Gaussian, and quartiles show more accurately the dispersion of the variables throughout the entire distribution, not only around the mean (all financial variables are in thousands of euros).

Analysing the data by median, we find that BtM and size are similar for all countries. On the other hand, for the remaining variables, except total depreciable assets and debts, the lowest median value corresponds to Spanish companies, while the highest is for French (inverse of total assets), German (sales, RoA, operating cash-flows and expenses) and Italian companies (total accruals and sales growth). Finally, Spanish companies show the highest median value for debts, and German companies the lowest, while the highest and lowest values for total depreciable assets correspond to Italian and France companies, respectively.

According to the amplitude (max. minus min.), French companies show the highest dispersion in profitability (RoA) and operating cash-flow indicators; German companies show the greatest dispersion in sales and expenses indicators; Italian companies present the highest amplitude in total accruals, inverse of total assets, sales growth and size; Spanish companies show the greatest dispersion in Book-to-Market, debts, and total depreciable assets.

With regard to the CSR variable, it should be noted that our sample begins in 2012, since the Dow Jones Sustainability Index for Europe[4] was created in April 2010. Finally, we also consider the GRI[5] level of the different companies in the sample. Table-4 presents the number of companies per year and country that are included in the DJSI index (Panel A), and the number of companies whose non-financial information included in the annual financial statements (Panel B) has been externally audited (Audit) or has not been externally audited (No Audit).

In Table-4 Panel-A, we observe that around 3% of the total number of companies in France, Germany and Italy are included in the DJSI index, while in Spain this percentage rises to 5.3%. Table-4 Panel-B shows that the percentage of companies whose non-financial CSR information has been externally verified is higher than those without external verification. By country and overall, Spanish companies show the highest percentage of externally verified information, while French companies show the lowest Finally, note that the percentage of companies with and without external verification is 6.35% for the total sample (12822 observations), while the percentage of companies included in the DJSI index is 3.31%, so that the GRI seems to be less restrictive than the DSJI index and, as a consequence, the differentiating analysis of both indeces is justified for our aim.

[4] The inclusion of the companies in this index can be consulted at: https://www.spglobal.com.

[5] GRI database has been consulted at https://database.globalreporting.org/(available until September 2021) and https://www.globalreporting.org/reportregistration/verifiedreports (available from October 2021).

Table 3
Quartile analysis of financial variables.

Variable	Quartile	France	Germany	Italy	Spain	Variable	Quartile	France	Germany	Italy	Spain
$\frac{TA_{i,t}}{Assets_{i,t-1}}$	Max	−0.0001	0.0000	−0.0007	0.0000	$\frac{CFO_{i,t}}{Assets_{i,t-1}}$	Max	0.4022	0.5507	0.4265	0.5080
	Upper quartile	−0.0166	−0.0201	−0.0278	−0.0123		Upper quartile	0.0949	0.1167	0.1175	0.0984
	Median	−0.0333	−0.0375	−0.0449	−0.0271		Median	0.0541	0.0734	0.0695	0.0500
	Lower quartile	−0.0563	−0.0593	−0.0702	−0.0452		Lower quartile	0.0059	0.0281	0.0311	0.0056
	Min	−0.2526	−0.2406	−0.2628	−0.2176		Min	−1.0969	−0.8300	−0.4135	−0.3402
$\frac{EXP_{i,t}}{Assets_{i,t-1}}$	Max	3.6485	5.5128	5.2131	3.0135	$\frac{100}{Assets_{i,t-1}}$	Max	0.1754	0.2482	0.4487	0.1803
	Upper quartile	1.1827	1.3164	1.0641	0.7839		Upper quartile	0.0061	0.0035	0.0039	0.0039
	Median	0.8043	0.8760	0.7373	0.4149		Median	0.0011	0.0007	0.0007	0.0006
	Lower quartile	0.4668	0.4467	0.4720	0.0559		Lower quartile	0.0001	0.0001	0.0002	0.0001
	Min	0.0073	0.0075	0.0096	0.0038		Min	0.0000	0.0000	0.0000	0.0000
$\frac{TDA_{i,t}}{Assets_{i,t-1}}$	Max	1.1755	1.3280	1.5638	1.5738	$\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}$	Max	1.1704	1.4803	2.4265	0.9237
	Upper quartile	0.5165	0.5492	0.5849	0.5920		Upper quartile	0.0883	0.1039	0.1265	0.0507
	Median	0.3428	0.3515	0.4162	0.3755		Median	0.0156	0.0244	0.0286	0.0053
	Lower quartile	0.1553	0.1283	0.2383	0.0818		Lower quartile	−0.0358	−0.0305	−0.0291	−0.0142
	Min	0.0000	0.0000	0.0019	0.0000		Min	−0.8932	−1.0256	−0.6419	−0.5317
$\frac{Sales_{i,t}}{Assets_{i,t-1}}$	Max	3.7180	5.3600	5.0486	3.0616	$\frac{Sales_{i,t-1}}{Assets_{i,t-1}}$	Max	4.1466	4.5860	2.9356	2.7092
	Upper quartile	1.1990	1.3846	1.1542	0.8150		Upper quartile	1.1602	1.3137	1.0391	0.8057
	Median	0.7861	0.9179	0.7783	0.4194		Median	0.7777	0.8996	0.7401	0.4338
	Lower quartile	0.4055	0.4302	0.4835	0.0730		Lower quartile	0.4030	0.4294	0.4795	0.0652
	Min	0.0001	0.0019	0.0021	0.0001		Min	0.0000	0.0018	0.0000	0.0001
$RoA_{i,t}$	Max	0.5282	0.4824	0.6568	0.3298	$DEBT_{i,t}$	Max	8.8388	6.7813	12.3630	25.8177
	Upper quartile	0.0801	0.0952	0.0832	0.0679		Upper quartile	0.9637	1.0043	1.4760	1.6707
	Median	0.0368	0.0487	0.0425	0.0314		Median	0.4713	0.4603	0.7582	0.8131
	Lower quartile	−0.0235	−0.0043	−0.0014	−0.0065		Lower quartile	0.1710	0.1405	0.3506	0.3583
	Min	−1.1805	−1.0368	−0.4746	−0.3240		Min	0.0000	0.0000	0.0000	0.0000
$BtM_{i,t}$	Max	5.9057	4.4384	5.4987	36.3510	$ln(Assets_{i,t})$	Max	18.3281	18.5000	18.5128	18.3418
	Upper quartile	1.1400	0.9945	1.1778	1.1670		Upper quartile	13.4782	13.5465	13.3459	14.1391
	Median	0.6728	0.6039	0.6813	0.6643		Median	11.4688	11.8897	11.9211	11.9847
	Lower quartile	0.3742	0.3371	0.3798	0.3530		Lower quartile	9.7676	10.3309	10.2341	10.2673
	Min	0.0315	0.0477	0.0554	0.0434		Min	6.3572	6.1321	5.9873	6.9430

Note: This table shows the main quartiles of the financial variables used disaggregated by country. Values are shown for the variables in Eqs (2), (4) and (6), i.e.*: TA*: Total accruals defined as income from continuing operation minus the cash flow from operations; *CFO*: Operating cash-flows; *Sales*: Revenue; *EXP*: Difference between operating revenues and operating income (EBIT); *Assets*: Total assets; *ΔSales*: Difference in revenue between two consecutive fiscal years or sales growth; *TDA*: Total depreciable assets; *RoA:* Return on Assets; *Ln(Assets)*: Log-asset; *BtM:* Book-to-Market ratio; *DEBT*: Level of indebtedness measured by Debt-to-Book value ratio.

Table 4
Analysis of dummies for CSR.

Panel A. DJSI Index companies								
Year	France		Germany		Italy		Spain	
2012	12		13		8		13	
2013	15		19		8		11	
2014	14		16		8		8	
2015	19		11		7		9	
2016	22		9		6		10	
2017	24		9		6		9	
2018	24		9		4		9	
2019	22		10		5		9	
2020	21		12		6		8	
Sum	**173**		**108**		**58**		**86**	
Panel B. Companies by GRI rating								
Year	**Audit**	**No Audit**	**Audit**	**No Audit**	**Audit**	**No Audit**	**Audit**	**No Audit**
2012	9	3	20	12	11	3	22	1
2013	8	1	20	15	13	2	22	1
2014	10	3	18	13	13	1	23	4
2015	9	0	20	11	12	0	23	5
2016	7	0	22	8	13	0	24	3
2017	9	0	35	8	19	0	25	4
2018	8	0	40	6	20	0	28	1
2019	9	0	42	6	20	0	27	2
2020	8	0	39	6	20	0	27	0
Sum	**77**	**7**	**256**	**85**	**141**	**6**	**221**	**21**

Note: This table shows number of companies included in the DJSI Index (Panel A) and in the GRI rating (Panel B) disaggregated by year. In Panel B we distinguish between the number of companies that have been externally verified and those that have not been externally verified.

5. Results and discussion

5.1. Earnings management results

First, we estimate the explanatory models of total accruals, operating cash-flows and operating expenses according to Eqs. (2), (4) and (6), in order to determine, from the values obtained, the discretionary accruals, operating cash-flows and expenses. Table-5 shows the results.

From the results in Table-5 we see that the Hausman test rejects the hypothesis on the consistency of the GLS estimation in all cases, so that the individual effects included in the model are fixed and the estimation method LSDV, while the standard errors are robustly estimated in the face of heteroscedasticity and autocorrelation. We observe that the explanatory power is very similar across countries. However, there are slight differences for each dependent variable. Finally, it should be noted that the [107] autocorrelation tests on the residuals (AR (1) and AR (2)) show the absence of time dependence of the residuals, so that from these results we consider that the models do not show endogeneity.

From the results analysed in Table-5, we can see that although the models used are statistically significant, the values obtained are different by country, which justifies our analysis of the results management differentiated by the origin of the company. So, for total accruals (Eq. (2)), the inverse of total assets is only significant for Spanish companies (with negative impact). Sales growth in Spanish companies is not significant; for the rest of the countries the effect is negative, with Italian companies showing the highest weight. The effect of depreciable assets is negative and significant in all countries, although the weight is slightly lower for French companies. Finally, RoA shows a significant positive effect for all countries, although Italian companies show a weight of more than double that of companies in the other countries, consistently with [45,111]. For operating cash flows (Eq. (4)), we find that the inverse of total assets has only a significant negative effect for German companies. With respect to sales growth, the effect is positive and Spanish companies have the highest weight for this variable. Lastly, and according to [4,112], fiscal year sales also show a positive and significant effect for all countries, but France and Spanish companies present the highest weight for this variable. Finally, in the operating expenses model (Eq. (6)), in line with [4,49,112], we find that the two regressors show positive and statistically significant parameters for all countries and, while sales in the previous fiscal year have a similar weight on the operating expenses for all companies, the inverse of total assets shows a much higher effect in the case of French companies.

Table-6 shows an analysis by quartiles of discretionary accruals, operating cash-flows and expenses for each country.

Discretionary accruals and operating cash-flows show a clear positive asymmetry as the lowest quartile show higher values in absolute value than the highest quartile. The opposite is true for discretionary expenses in all countries in the sample. Moreover, discretionary accruals show lower values than discretionary cash-flows for the respective percentiles, and the latter show lower values than discretionary expenses. This is relevant and justifies the analysis of each component of TEM because, although the estimation model for discretionary expenses showed the highest explanatory power according to the adjusted R2 (see Table-5), we now see in Table-6 that these are the ones that show the highest values and therefore the widest range of values.

Table 5
Results from estimates of discretionary accruals, operating cash-flows, and expenses.

Regressors	$\frac{TA_{i,t}}{Assets_{i,t-1}}$ (2)		$\frac{CFO_{i,t}}{Assets_{i,t-1}}$ (4)		$\frac{EXP_{i,t}}{Assets_{i,t-1}}$ (6)		$\frac{TA_{i,t}}{Assets_{i,t-1}}$ (2)		$\frac{CFO_{i,t}}{Assets_{i,t-1}}$ (4)		$\frac{EXP_{i,t}}{Assets_{i,t-1}}$ (6)	
	parameter	t-value	parameter	t-value	parameter	t-value	parameter	t-value	parameter	t-value	parameter	t-value
Panel A. Results from French companies							***Panel B. Results from German companies***					
$\frac{1}{Assets_{i,t-1}}$	8.4106	0.683	−32.8478	−0.421	766.44	5.36 (***)	−10.4328	−1.34	−115.442	−2.3 (**)	483.711	2.95 (***)
$\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}$	−0.0091	−3.59 (***)	0.0566	3.43 (***)			−0.0072	−2.94 (***)	0.0830	4.88 (***)		
$\frac{TDA_{i,t}}{Assets_{i,t-1}}$	−0.0177	−3.50 (***)					−0.0419	−7.83 (***)				
$RoA_{i,t}$	0.0558	8.42 (***)					0.0369	4.59 (***)				
$\frac{Sales_{i,t}}{Assets_{i,t-1}}$			0.0930	7.01 (***)					0.0622	3.35 (***)		
$\frac{Sales_{i,t-1}}{Assets_{i,t-1}}$					0.5591	14.30 (***)					0.6545	10.9 (***)
Individual effects	Yes		Yes		Yes		Yes		Yes		Yes	
Temporary effects	Yes		Yes		Yes		Yes		Yes		Yes	
Hausman	87.2512	(0.000)	20.1548	(0.000)	194.8127	(0.000)	11.4852	(0.021)	35.4571	(0.000)	244.0742	(0.000)
AR (1) residuals	0.704	(0.459)	1.166	(0.243)	1.935	(0.053)	0.910	(0.363)	1.183	(0.237)	1.306	(0.192)
AR (2) residuals	0.592	(0.554)	1.082	(0.279)	0.399	(0.690)	0.894	(0.371)	1.053	(0.292)	0.686	(0.493)
adjusted R^2	75.02%		77,30%		87,19%		75.78%		69.53%		91.07%	
Panel C. Results from Italian companies							***Panel D. Results from Spanish companies***					
$\frac{1}{Assets_{i,t-1}}$	7.0441	1.32	−44.1474	−1.64	232.073	2.39 (**)	−16.9974	−2.26 (**)	−56.5195	−0.912	380.061	1.96 (*)
$\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}}$	−0.0171	−4.16 (***)	0.0391	2.26 (**)			0.0011	0.231	0.1218	3.74 (***)		
$\frac{TDA_{i,t}}{Assets_{i,t-1}}$	−0.0432	−4.95 (***)					−0.0357	−4.15 (***)				
$RoA_{i,t}$	0.1205	7.64 (***)					0.0229	1.98 (**)				
$\frac{Sales_{i,t}}{Assets_{i,t-1}}$			0.0765	5.65 (***)					0.0917	4.22 (***)		
$\frac{Sales_{i,t-1}}{Assets_{i,t-1}}$					0.6241	9.22 (***)					0.5725	7.14 (***)
Individual effects	Yes		Yes		Yes		Yes		Yes		Yes	
Temporary effects	Yes		Yes		Yes		Yes		Yes		Yes	
Hausman	22.1348	(0.000)	21.2591	(0.000)	228.132	(0.000)	28.8745	(0.000)	29.1146	(0.000)	188.2586	(0.000)
AR (1) residuals	1.716	(0.086)	1.098	(0.272)	1.112	(0.266)	0.995	(0.340)	1.186	(0.236)	1.123	(0.262)
AR (2) residuals	0.517	(0.605)	0.990	(0.322)	0.453	(0.650)	0.201	(0.842)	1.006	(0.315)	0.991	(0.322)
adjusted R^2	76.34%		69.66%		88.84%		87.63%		63.90%		92.95%	

Note: This table shows the results of estimating discretionary accruals (according to equation (2)), operating cash flows (according to equation (4)) and operating expenses (according to equation (6)) for the French (Panel A), German (Panel B), Italian (Panel C) and Spanish (Panel D) companies. *TA:* Total accruals defined as income from continuing operation minus the cash flow from operations; *CFO*: Operating cash-flows; *Sales*: Revenue; *EXP*: Difference between operating revenues and operating income (EBIT); *Assets*: Total assets; *ΔSales*: Difference in revenue between two consecutive fiscal years or sales growth; *TDA*: Total depreciable assets; *RoA*: Return on Assets. Hausman test rejects the hypothesis on the consistency of the GLS estimation in all cases, the autocorrelation tests (AR(1) and AR(2)) show the absence of time dependence of the residuals and adjusted R2 indicates the explanatory power. (*), (**) and (***) indicate that the parameter is statistically significant at a confidence level of 10%, 5% and 1%, respectively.

Table 6
Quartiles of discretionary accruals abnormal operating cash-flows and abnormal expenses.

Discretionary	Quartile	German	France	Italy	Spain
Accruals	Max.	0.1219	0.1179	0.1107	0.0443
	Upper quartile	0.0067	0.0074	0.0081	0.0039
	Median	0.0006	0.0007	0.0003	0.0002
	Lower quartile	−0.0043	−0.0048	−0.0061	−0.0031
	Min.	−0.1575	−0.1750	−0.1422	−0.1128
Operating Cash-Flows	Max.	0.6003	0.5577	0.3287	0.4917
	Upper quartile	0.0220	0.0235	0.0191	0.0208
	Median	0.0000	0.0011	0.0000	0.0000
	Lower quartile	−0.0217	−0.0201	−0.0204	−0.0182
	Min.	−0.7400	−0.8133	−0.3587	−0.2803
Operating Expenses	Max.	2.8504	2.4044	2.2378	1.5964
	Upper quartile	0.0584	0.0561	0.0567	0.0363
	Median	−0.0019	−0.0057	−0.0053	0.0000
	Lower quartile	−0.0651	−0.0628	−0.0629	−0.0351
	Min.	−1.8989	−1.5073	−1.1166	−1.0016

Note: This table shows an analysis by quartiles of discretionary accruals, operating cash-flows and expenses for each country.

5.2. Hypothesis testing and discussion

To test our research hypothesis, we estimate Eq. (8) by applying the OLS and GLS models, and present the results in Table-7 which shows the results of the estimation using DJSI as the explanatory variable for CSR, and in Table-8 which presents the results using GRI. Furthermore, in order to draw more robust conclusions, we have estimated Eq. (8) using not only TEM as the dependent variable, but also its decomposition according to Eq. (1) into discretionary accruals (DA), discretionary operating cash-flows (DCFO) and discretionary operating expenses (DEXP).

From Tables 7 and 8, we observe that our results are robust since both the value of the parameters and their statistical significance do not show relevant variations.[6] Tables 7 and 8 show that when using the GRI dummy as a measure of CSR quality, the goodness-of-fit of the model is slightly higher than when using the DJSI dummy. We also observe the highest explanatory power for the discretionary operating cash-flows, while discretionary operating expenses shows the lowest level of goodness-of-fit. By country, the explanatory power from lowest to highest value and for any of the dependent variables is: Spain, Italy, Germany and France. Therefore, there is an inverse relationship between financial market size and the explanatory power of the model. With respect to the control variables, we observe that they do not show the same explanatory capacity either across countries and for each dependent variable.

The components of TEM show a different sensitivity to each control variable, and furthermore, this sensitivity is different for each country in the sample; the results of estimating Eq. (8) for the TEMs show this variety. Focusing on the control variables, in the DA model, French and German companies show a negative relationship with the level of indebtedness. In DCFO model, we observe similar behaviour in all the countries analysed when we take profitability (with a positive relationship) and firm size (with a negative relationship) as control variables. French and German companies also exhibit a similar behaviour in the DEXP model where there is a negative relationship with BtM.

Although the countries analysed use the same currency and are subject to a common basic regulatory framework, our studies reveal differences in their behaviour. Despite this common framework, each country shows different factors in relation to its institutional environment. In this context, Halabi et al. [113] identify three factors: investor protection, enforcement quality and equity market development. According to their study, French and German companies showed similar results to one another and differ from those obtained by Italian and Spanish companies.

In the model with the highest explanatory power (DCFO), for French, German and Italian companies we find a positive relationship between capital operations in subsequent years and discretionary operating cash-flows, i.e., companies in these countries increase their discretionary operating cash-flows during the two years prior to the equity issues (SEO). Given that discretionary operating cash-flows is part of the REM measurement, these results are in line with previous literature that shows real activity manipulation in the SEO environment [28,34]. Only French companies show a decrease in DCFO the better the quality and development of their CSR, proxied by both the firm's DJSI membership and its GRI level. This result is in line with [61] who observe in the French context that EM has a negative impact on financial performance and that CSR moderates this impact. Finally, the hypothesis that firms with better CSR quality and development (DJSI or GRI level) show lower operating cash-flows management in the years preceding equity issues is rejected.

We observe that for Spanish companies there is no relationship between TEM or any of its components (DA, DCFO and DEXP) with subsequent years' capital operations (SEO) or with the quality and development of CSR as measured by companies'inclusion in the DJSI. However, we found a negative and significant relationship between DA and Spanish socially responsible companies as measured by the GRI level of their non-financial information. This result is in line with that obtained for Spanish companies by Gras-Gil et al. [45]

[6] We appreciate the comments made in the review of the paper that recommended showing the estimation results with both the OLS and GLS methodologies.

Table 7
Results using Dow Jones Sustainability Index.

	OLS ESTIMATION								GLS ESTIMATION							
Panel A. France																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	−0.0010	−0.5400	0.1484	7.92 (***)	0.0548	1.74 (*)	−0.1850	−6.33 (***)	−0.0001	−0.42	0.1308	6.45 (***)	0.0592	1.71 (*)	−0.1633	−6.01 (***)
BtM	−0.0003	−0.89	8.9062	0.48	−0.0089	−2.28 (**)	0.0084	2.13 (**)	−0.0004	−0.71	6.4513	0.39	−0.0182	−2.15 (**)	0.0082	2.08 (**)
DEBT	−0.0013	−3.32 (***)	−0.0033	−1.83 (*)	0.0051	1.3600	−0.0026	−0.72	−0.0011	−3.08 (***)	−0.0015	−1.79 (*)	0.0055	1.29	−0.0018	−0.64
LN	0.0001	1.97 (**)	−0.0010	−2.88 (***)	−0.0002	−0.35	0.0011	1.71 (*)	0.0001	1.95 (**)	−0.0010	−2.66 (***)	−0.0002	−0.25	0.0011	1.69 (*)
SEO	−0.0011	−0.78	0.0161	3.01 (***)	0.0070	0.81	−0.0212	−2.12 (**)	−0.0026	−0.59	0.0142	2.96 (***)	0.0094	0.78	−0.0207	−2.09 (**)
DJSI	−8.7287	−0.12	−0.0087	−2.08 (**)	0.0003	0.48	0.0062	0.82	−7.4194	−0.09	−0.0228	−2.01 (**)	0.0006	0.45	0.0048	0.73
FRQ-DJSI	−0.0005	−0.37	0.0032	0.64	0.0002	0.29	−0.0020	−0.21	−0.0009	−0.33	0.0014	0.55	0.0002	0.24	−0.0047	−0.17
adjusted R^2	0.40%		9.28%		0.42%		2.81%		0.38%		9.16%		0.39%		2.75%	
Panel B. Germany																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.0039	1.1200	0.2131	8.03 (***)	0.0348	0.5970	−0.2279	−3.30 (***)	0.0006	1.05	0.1862	7.55 (***)	0.0808	0.55	−0.2113	−3.210 (***)
BtM	−2.6958	−0.53	0.0033	1.4100	−0.0122	−1.72 (*)	0.0089	1.2400	−2.4898	−0.47	0.0097	1.36	−0.0110	−1.68 (*)	0.0018	1.19
DEBT	−0.0008	−1.68 (*)	−0.0018	−0.94	0.0012	0.27	−2.4377	−0.57	0.0009	−1.65 (*)	−0.0045	−0.89	−0.0008	0.23	−1.8283	−0.51
LN	4.3290	0.6500	−0.0013	−4.71 (***)	0.0002	0.35	0.0009	1.3800	5.5844	0.60	−0.0015	−4.36 (***)	0.0001	0.31	0.0002	1.33
SEO	−0.0018	−1.0200	0.0081	1.76 (*)	0.0010	0.11	−0.0099	−1.0300	−0.0047	−0.97	0.0071	1.71 (*)	0.0002	0.08	−0.0052	−0.96
DJSI	0.0003	0.34	−0.0026	−0.98	0.0012	0.21	0.0012	0.19	0.0002	0.31	−0.0059	−0.91	0.0015	0.16	0.0011	0.14
FRQ-DJSI	−0.0017	−0.98	0.0019	0.43	−0.0022	−0.32	−0.0006	−0.74	−0.0049	−0.86	0.0011	0.38	−0.0063	−0.28	−0.0006	−0.66
adjusted R^2	0.30%		14.78%		0.17%		1.73%		0.29%		14.52%		0.15%		1.67%	
Panel C. Italy																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.0117	1.4200	0.1672	8.61 (***)	0.0971	1.66 (*)	−0.2348	−3.57 (***)	0.0138	1.35	0.1445	8.11 (***)	0.1039	1.66 (*)	−0.2664	−3.49 (***)
BtM	0.0009	2.07 (**)	0.0035	2.77 (***)	0.0069	1.50	−0.0089	−2.13 (**)	0.0010	2.01 (**)	0.0032	2.52 (***)	0.0084	1.40	−0.0096	−2.06 (**)
DEBT	−0.0003	−1.1600	0.0020	2.66 (**)	−0.0014	−0.58	−0.0006	−0.2700	−0.0003	−1.02	0.0025	2.44 (**)	−0.0014	−0.51	−0.0007	−0.21
LN	0.0000	−0.21	−0.0010	−4.68 (***)	−0.0006	−1.01	0.0014	2.28 (**)	0.0000	−0.15	−0.0010	−4.35 (***)	−0.0008	−0.96	0.0017	2.23 (**)

(*continued on next page*)

Table 7 (*continued*)

	OLS ESTIMATION								GLS ESTIMATION							
SEO	−0.0023	−0.63	0.0051	1.97 (**)	−0.0024	−0.31	−0.0046	−0.51	−0.0020	−0.55	0.0060	1.95 (**)	−0.0022	−0.26	−0.0052	−0.44
DJSI	−0.0001	−0.78	0.0008	0.39	0.0062	1.0400	−0.0071	−1.21	−0.0001	−0.71	0.0008	0.31	0.0077	1.02	−0.0079	−1.16
FRQ-DJSI	−0.0009	−0.24	−0.0007	−0.24	−0.0118	−1.4700	0.0117	1.2600	−0.0008	−0.14	−0.0008	−0.18	−0.0097	−1.41	0.0152	1.21
adjusted R^2	0.84%		10.79%		0.48%		1.98%		0.77%		10.49%		0.44%		1.89	
Panel D. Spain																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.0008	0.17	0.1727	4.49 (***)	0.0085	0.12	−0.1740	−2.27 (**)	0.0008	0.12	0.1788	4.21 (***)	0.0103	0.09	−0.2227	−2.11Ç (**)
BtM	0.0000	0.14	0.0008	0.6920	0.0000	0.21	−0.0008	−0.81	0.0000	0.10	0.0008	0.61	0.0000	0.18	−0.0010	−0.76
DEBT	0.0000	−0.56	−0.0007	−0.7830	−0.0009	−0.61	0.0015	0.97	0.0000	−0.51	−0.0006	−0.70	−0.0008	−0.56	0.0016	0.92
LN	0.0000	−0.5100	−0.0004	−2.03 (**)	0.0000	0.38	0.0004	0.82	0.0000	−0.44	−0.0005	−1.98 (**)	0.0000	0.32	0.0005	0.76
SEO	0.0008	0.67	−0.0046	−1.0200	0.0049	0.44	0.0007	0.64	0.0010	0.58	−0.0044	−0.96	0.0056	0.41	0.0006	0.59
DJSI	−0.0007	−1.41	0.0014	0.6010	0.0010	0.29	−0.0029	−0.79	−0.0007	−1.36	0.0014	0.55	0.0012	0.22	−0.0025	−0.73
FRQ-DJSI	0.0010	0.79	−0.0069	−1.5700	0.0026	0.22	0.0051	0.46	0.0011	0.72	−0.0063	−1.52	0.0026	0.16	0.0063	0.38
adjusted R^2	0.14%		7.91%		0.10%		1.91%		0.13%		7.74%		0.09%		1.87%	

Note: This table shows the results of the estimation of Eq (8) using the DJSI as explanatory variable disaggregated by country: France (Panel A), Germany (Panel B), Italy (Panel C) and Spain (Panel D). Dependent variable: TEM (total earnings management). Disaggregation of TEM: DA (discretionary accruals), DCFO (discretionary cash flow from operations), DEXP (discretionary operating expenses). Control variables: ROA: Return on Assets; BtM: Book-to-Market ratio; DEBT: Level of indebtedness measured by Debt-to-Book value ratio; LN: Log-asset; Dummy variables: SEO: 1 when the company has increased capital in t, t+1 and t+2; otherwise, 0; DJSI: 1 if the company is part of the index in the year, and −1 if it is not included; FRQ_DJSI: Multiplicative variable that takes the value of 1 if the company has increased the capital and has the highest rating of DJSI; takes a value of −1 if the company has increased the capital but has the lowest rating of DJSI, and otherwise takes 0 value. (*), (**) and (***) indicate that the parameter is statistically significant at a confidence level of 10%, 5% and 1%, respectively. Adjusted R2 indicates that the explanatory power of the model. GLS and OLS estimation results are provided.

Table 8
Results using GRI.

	OLS ESTIMATION								GLS ESTIMATION							
Panel A. France																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	−0.00128	−0.66	0.15338	8.09 (***)	0,05400	1,71 (*)	−0,18848	−6.44 (***)	−0.00108	−0,53	0,14986	7,88 (***)	0,05221	1,68 (*)	−0,20412	−6,37 (***)
BtM	−0.00028	−0.74	−0.00080	−0.43	−0,00870	−2,21 (**)	0,00907	2.26 (**)	−0.00035	−0,71	−0,00072	−0,41	−0,00723	−2,17 (**)	0,00889	2,19 (**)
DEBTS	−0.00126	−3.35 (***)	−0.00313	−1.74 (*)	0,00505	1,35	−0,00274	−0.75	−0.00133	−3,12 (***)	−0,00311	−1,71 (*)	0,00600	1,25	−0,00301	−0,73
LN	0.00017	2.86 (***)	−0.00212	−5.55 (***)	0,72225	0,86	0,00190	2.32 (**)	0.00022	2,53 (***)	−0,00259	−5,42 (***)	0,66374	0,82	0,00209	2,28 (**)
SEO	−0.00176	−1.97 (**)	0.02935	5.1 (**)	0,00220	0,17	−0,02840	−2.24 (**)	−0.00169	−1,95 (**)	0,03768	4,93 (**)	0,00237	0,15	−0,03359	−2,21 (**)
GRI	0.00053	0.72	−0.02343	−4.88 (***)	0,00320	0,31	0,01704	1.72 (*)	0.00065	0,70	−0,02807	−4,79 (***)	0,00263	0,26	0,01576	1,70 (*)
FRQ-GRI	−0.00118	−1.33	0.01698	3.44 (***)	−0,00482	−0,39	−0,00949	−0.79	−0.00111	−1,31	0,02025	3,36 (***)	−0,00626	−0,34	−0,00829	−0,73
adjusted R^2	0.43%		9.64%		0.43%		2.84%		0,40%		9,35%		0,39%		2.72%	
Panel B. Germany																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.00395	1.14	0.21303	8.03 (***)	0,03534	0,61	−0,22832	−3.31 (***)	0.00504	1,09	0,27588	7,88 (***)	0,04199	0,58	−0,27810	−3,28 (***)
BtM	0.00010	0.19	0.00317	1.33	−0,01161	−1,66 (*)	0,00857	1.21	0.00009	0,12	0,00298	1,29	−0,01132	−1,65 (*)	0,00957	1,18
DEBTS	−0.00074	−1.69 (*)	−0.00189	−0.97	0,00125	0,28	−0,00002	−0.53	−0.00093	−1,67 (*)	−0,00226	−0,92	0,00135	0,26	−0,00002	−0,51
LN	0.00006	1.21	−0.00121	−5.22 (***)	0,00039	0,61	0,00077	1.14	0.00007	1,18	−0,00114	−5,17 (***)	0,00043	0,57	0,00072	1,13
SEO	−0.00124	−1.76 (*)	0.00746	2.96 (***)	−0,00271	−0,44	−0,00529	−0.85	−0.00103	−1,72 (*)	0,00908	2,91 (***)	−0,00254	−0,42	−0,00685	−0,81
GRI	0.00072	1.75 (*)	−0.00255	−1.49	0,00460	1,22	−0,00164	−0.41	0.00083	1,71 (*)	−0,00263	−1,43	0,00509	1,21	−0,00195	−0,36
FRQ-GRI	−0.00134	−1.77 (*)	0.00139	0.56	−0,00740	−1,32	0,00516	0.89	−0.00142	−1,73 (*)	0,00163	0,52	−0,00766	−1,29	0,00472	0,85
adjusted R^2	0.31%		14.81%		0.19%		1.75%		0,28%		14,42%		0,18%		1.63%	
Panel C. Italy																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.01176	1.41	0.16704	8.59 (***)	0,09789	1,67 (*)	−0,23532	−3.57 (***)	0.01126	1,39	0,17172	8,51 (***)	0,08085	1,64 (*)	−0,20285	−3,49 (***)
BtM	0.00088	1.99 (**)	0.00344	2.71 (***)	0,00693	1,51	−0,00892	−2.13 (**)	0.00072	1,96 (*)	0,00321	2,68 (***)	0,00620	1,48	−0,00845	−2,09 (**)
DEBTS	−0.00031	−1.17	0.00199	2.64 (***)	−0,00132	−0,53	−0,00072	−0.31	−0.00025	−1,09	0,00200	2,57 (***)	−0,00114	−0,49	−0,00063	−0,28

(*continued on next page*)

Table 8 (*continued*)

	OLS ESTIMATION								GLS ESTIMATION							
LN	−0.00005	−0.75	−0.00099	−5.77 (***)	−0,00079	−1,31	0,00161	2.64 (**)	−0.00006	−0,72	−0,00098	−5,69 (***)	−0,00101	−1,28	0,00198	2,55 (**)
SEO	−0.00055	−0.38	0.00377	1.96 (**)	0,00043	0,73	−0,00447	−0.47	−0.00065	−0,35	0,00332	1,91 (*)	0,00036	0,67	−0,00387	−0,42
GRI	−0.00061	−1.67 (*)	0.00006	0.54	0,00485	1,22	−0,00541	−1.42	−0.00054	−1,65 (*)	0,00006	0,51	0,00523	1,19	−0,00556	−1,38
FRQ-GRI	0.00113	0.84	−0.00205	−0.81	−0,00973	−1,28	0,01289	1.38	0.00104	0,83	−0,00235	−0,77	−0,01036	−1,24	0,01610	1,32
adjusted R^2	0.86%		10.81%		0.51%		2.01%		0,84%		10,73%		0,48%		1.84%	
Panel D. Spain																
Regressors	DA		DCFO		DEXP		TEM		DA		DCFO		DEXP		TEM	
	parameter	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*	*parameter*	*t-value*
ROA	0.00048	0.09	0.17249	4.48 (***)	0,00744	0,11	−0,17328	−2.26 (**)	0.00044	0,03	0,16248	4,42 (***)	0,00738	0,10	−0,18038	−2,21 (**)
BtM	0.00003	0.11	0.00083	0.69	0,00004	0,24	−0,00087	−0.82	0.00004	0,08	0,00094	0,62	0,00003	0,22	−0,00101	−0,78
DEBTS	−0.00005	−0.19	−0.00060	−0.64	−0,00109	−0,72	0,00159	0.98	−0.00005	−0,14	−0,00071	−0,60	−0,00096	−0,69	0,00205	0,93
LN	−0.00001	−0.17	−0.00050	−2.62 (***)	−0,00004	−0,94	0,00051	1.16	−0.00001	−0,12	−0,00054	−2,57 (***)	−0,00005	−0,91	0,00058	1,12
SEO	0.00094	1.11	−0.00237	−0.71	0,00902	1,12	−0,00540	−0.68	0.00092	1,06	−0,00301	−0,66	0,00791	1,08	−0,00524	−0,64
GRI	−0.00079	−1.67 (*)	0.00016	0.87	0,00037	0,10	−0,00111	−0.32	−0.00096	−1,65 (*)	0,00016	0,85	0,00042	0,09	−0,00095	−0,28
FRQ-GRI	0.00172	1.88 (*)	−0.00585	−1.6	0,01010	1,21	−0,00270	−0.33	0.00202	1,82 (*)	−0,00706	−1,56	0,01102	1,18	−0,00348	−0,26
adjusted R^2	0.52%		8.03%		0.27%		1.93%		0,49%		7,88%		0,26%		1.86%	

Note: This table shows the results of the estimation of Eq (8) using the GRI as explanatory variable disaggregated by country: France (Panel A), Germany (Panel B), Italy (Panel C) and Spain (Panel D). Dependent variable: TEM (total earnings management). Disaggregation of TEM: DA (discretionary accruals), DCFO (discretionary cash flow from operations), DEXP (discretionary operating expenses). Control variables: ROA: Return on Assets; BtM: Book-to-Market ratio; DEBT: Level of indebtedness measured by Debt-to-Book value ratio; LN: Log-asset; Dummy variables: SEO: 1 when the company has increased capital in t, t+1 and t+2; otherwise, 0; GRI: 1 if the company complies with GRI standards and submits the information to external verification; 0 if it complies with GRI standards but does not undergo external verification; −1 if it fails to comply with GRI standards; FRQ_GRI: Multiplicative variable that takes the value of 1 if the company has increased the capital and has the highest rating of GRI; takes a value of −1 if the company has increased the capital but has the lowest rating of GRI, and otherwise takes 0 value. (*), (**) and (***) indicate that the parameter is statistically significant at a confidence level of 10%, 5% and 1%, respectively. Adjusted R2 indicates that the explanatory power of the model. GLS and OLS estimation results are provided.

who measure the degree of CSR of companies with the MERCO (Spanish Monitor of Corporate Reputation) index, which bases part of its evaluation on companies' monitoring of the GRI [114].

When we consider TEM, in French companies this variable increases with firm size and growth options. Furthermore, we found a positive relationship between TEM and CSR companies as measured by the GRI indicator, and a negative one for companies raising capital. For Italian firms, TEM increases with company size and decreases when RoA and growth options are positive, and in all countries there is an inverse relationship between TEM and profitability. The positive association between size and TEM is in line with the result obtained by Ref. [65]. The results for French companies show that the larger the growth opportunities the higher the propensity to practice TEM in line with [115].

As a consequence of the above, at a global level (TEM) only French companies show a statistically significant relationship between equity issuance and EM. In this case, moreover, the sign is negative because the component (DCFO) on which the manipulation is performed shows this sign when integrated in the total (see Eq. (1)).

6. Conclusion

Empirical evidence shows that managers engage in earnings management practices prior to capital increases. It has also been analysed whether socially responsible companies resort to EM practices, finding that those companies that are more committed to CSR are less involved in such practices. The objective of our study is to test whether socially responsible companies engage in EM practices in the periods prior to capital increases.

For this purpose, we analyse a sample of non-financial companies listed in France, Germany, Italy and Spain between 2012 and 2020. These are EU countries that use the same currency, thus avoiding exchange rate inconsistencies, and are subject to a common basic accounting framework. We incorporate a total of 12822 firms, with France having the largest number of firms, followed by Germany, Italy and Spain.

When estimating the explanatory models for total accruals, operating cash flows and operating expenses, we find that they all are statistically significant and that the parameters obtained for the explanatory variables differ across countries, which justifies our country-by-country analysis. However, for total accruals, in all countries we find a positive relationship with profitability and a negative association with depreciable assets. Regarding with operating cash flows, the association is positive with the increase in sales and sales for the fiscal year. Finally, in the operating expenses model, the two regressors show positive and statistically significant values for all countries.

To test our hypothesis we consider capital increases in the year or in any of the following two years, and we test the degree of the company's commitment to CSR in that period. In order to provide further robustness to the study, we have considered a double measure of CSR. We check the company's inclusion in the DJSI index, we also verify whether or not they prepare their sustainability reports in accordance with the GRI criteria, and whether or not they have been verified by an external agent. Furthermore, we have not only presented the results using total earnings management (TEM), but also its decomposition into its three components (discretionary accruals -DA-, abnormal cash-flows from operations -DCFO- and abnormal operating expenses -DEXP-).

We find that when the GRI variable is used as a measure of CSR quality, the goodness of fit of the model is slightly higher than when the DJSI variable is used, and that there is an inverse relationship between the size of the financial market and the explanatory power of the model.

Results show that, in Spanish companies, there is no relationship between TEM or any of its components with the capital increase in the following years, nor with CSR as measured by the two indeces used (DJSI and GRI). In the rest of the countries, in relation to the SEO variable we only find a positive relationship in the DCFO component, which means that companies in France, Germany and Italy increase their DCFO in the years prior to the capital increase. These results were foreseeable according to previous studies; however, it is necessary to go deeper into the analysis of Spanish companies, where the results obtained have not been significant.

If we focus on the CSR level variable, only French companies show a decrease in DCFO as the quality and development of their CSR increases, according to the two indices considered. As a result, when analysing the TEM and capital increases, we observe that there is only a significant and negative relationship for French companies.

Our research provides a first contribution to the understanding of the behaviour of socially responsible companies with regard to performance management in an SEO environment, although it is subject to certain limitations. Borralho et al. [71] show that ESG components (environmental, social and corporate governance) have different impact on the EM. Therefore, our results can be contrasted by applying these criteria as measures of corporate social commitment. Another limitation is the number of countries analysed, as well as not considering the sector of activity of the companies, aspects that can be studied in future research. Although all countries studied share a common legal framework and a common currency, the results obtained differ between countries. Future research can include specific factors to identify the causes of these behaviours.

Despite the limitations, this study represents a breakthrough in the analysis of EM, as its relationship with CSR and SEO has so far been studied separately. However, it is interesting for academics, analysts and investors to know whether companies considered socially responsible engage in earnings management practices before going to the capital market to obtain financing through SEO operations. This study could be extrapolated, with the necessary adaptations, to any other environment or market.

Author contribution statement

Mariano González-Sánchez; Ana Segovia-San Juan; Eva M. Ibáñez Jiménez: Conceived and designed the experiments; Performed the experiments; Analysed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

Data included in article/supp. material/referenced in article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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