REAL EARNINGS MANAGEMENT, CSR AND THE MODERATING EFFECT OF CORPORATE GOVERNANCE IN INNOVATIVE FIRMS

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ABSTRACT

The purpose of this paper was to examine the effect of corporate social responsibility (CSR) on the level of real-based earnings management (REM) as well as the moderating effect of the corporate governance (CG) on the CSR-REM relationship in American innovative firms. This empirical study was conducted on a sample of 280 American firms indexed in S&P 500 during the period between 2012 and2018. We divided the full sample into two sub-samples according to the Research and development (R&D) intensity median. Indeed, firms with high R&D intensity are considered more innovative. The results demonstrate that CSR is significantly and negatively associated with REM in more innovative firms but the relationship CSR-REM is not moderated by CG score in the two groups of firms. This study primarily contributes to the literature on CSR, CG and REM by providing evidence of the moderating effect of CG on the relationship CSR-REM in innovative firms.

INTRODUCTION

In the wake of financial scandals, real earnings management (REM) practices have attracted increasing attention. Indeed, to manage their accounting results, managers have turned to real activities because they are difficult to control. These financial scandals have led to a tendency to develop and implement methods of corporate governance (CG) that limit opportunistic behavior and improve the credibility of financial statements (Watts and Zimmerman, 1986; Zouariand Zouari-Hadjji, 2010; Gras-Gil et al., 2016). For this reason, innovative firms, in particular, seek to manage their results using a responsible governance system. Indeed, there are different practices of responsible governance among which corporate social responsibility (CSR) and corporate governance, which are the focus of the present work.

Over recent decades, there has been a considerable change in the nature of investments characterized by a shift towards intangible rather than tangible assets. To adapt to such a change and ensure their sustainability, many companies have specialized in the high-tech industry (Chandrasekaran and Linderman, 2015; Chen and Gavious, 2016; Chouaibi et al., 2019).In this way, innovation turns out to stand as an important source of economic growth (Romer, 1990).

Recent research has shown that REM is becoming the most dominant method in the business world (Graham et al., 2005; Roychowdhury, 2006). This work aimed to study the effect of CSR and good CG on REM as well as the moderating effect of the latter on the CSR-REM relationship within American innovative firms. To meet the research objective, the establishment of two samples of firms, innovative and non-innovative, was required. The first is a test sample

and the second is a control sample. The interest in the American context can be explained by the fact that it offers an interesting framework for research due to the diversity of normative choices and accounting and regulatory methods as well as the flexibility offered to managers in the choice of accounting practices. As a result, our work attempted to contribute to enriching the academic literature on the advantages and obstacles linked to this approach.

Indeed, this research work can enrich the existing literature on the relationship between REM, CSR and CG in high or low innovation-intensive firms. It presents several theoretical and practical contributions. Theoretically, we tried to broaden the concept of REM in innovative firms. Furthermore, we explored the contributions of behavioral finance to study the reality and prospects of REM for innovative firms in the presence of CSR. The moderating effect of the CG on the CSR-REM relationship was also investigated.

The remainder of this paper is structured as follows: Section 2 provides the literature review and hypotheses formulation. Section 3 presents the methodology used. The result and discussion are presented in Section 4. Section 5 concludes the paper.

LITERATURE REVIEW

Real Earnings Management has received increasing interest since the introduction of the Sarbanes-Oxley law (Cohen et al., 2008). The recent shift from accrual accounting to REM represents a gap in the literature. It is therefore important to study the use of REM (Beekhuis, 2017). Although REM has been defined differently by different authors, the same main idea persists in all these definitions. Our study is part of the work of Roychowdhury (2006) who defines REM as "deviations from normal operational practices, motivated by the desire of managers to mislead at least some stakeholders, in particular making them believe that certain financial reporting objectives have been met in the normal course of operations. These differences do not necessarily contribute to the value of the company even if they allow managers to meet certain reporting objectives." The author presents three types of real activities manipulation: an abnormal operating cash flow (AB_CFO), abnormal production costs (AB_PROD) and abnormal discretionary expenses (AB_EXP).

Over the last few decades, the level of R&D investment has undergone a remarkable evolution, especially in the United States, because these investments improve knowledge creation, leading to product and process innovation (Padgett and Galan, 2010). Similarly, R&D investment could give firms some monopoly power by exploiting cheaper ways of producing existing goods, lowering costs or developing new and better products to earn excess profits. Consistent with these arguments, empirical studies provide evidence supporting a positive relationship between firms' investment in R&D, firm performance (Ho et al., 2018) and firm value (Lev and Sougiannis, 1996; Aboody and Lev, 1998; Katila and Shane, 2005; Chandrasekaran and Linderman, 2015).

Moreover, the investment community of tenses R&D as an important driver for innovation for companies and as a potential source of economic rents that can be used to foster economic development. As a result, research has shown that R&D spending can lead to growth and competitive advantage for companies, but managers can also reduce R&D spending to

promote short-term results. Indeed, Bushee (1998) finds that some managers manipulate R&D investments to achieve short-term profit targets; thus, they have a negative impact on investors through their short-term R&D investment actions. Roychowdhury (2006) found that companies could increase revenues by reducing discretionary spending on R&D, advertising and repairs. Besides, Osma (2008) explains that reducing R&D spending reduces pressure on short-term results. In the same vein, Dechow and Sloan (1991) observe that managers often reduce R&D spending towards the end of their mandate to increase short-term results.

Managerial practices have attracted much attention after the accounting scandals that involved, for example, Enron, WorldCom and Parmalat. These financial scandals have led to the development and implementation of CG methods, which limit opportunistic behavior, and therefore improve the credibility of financial statements (Watts and Zimmerman, 1986; Zouari and Zouari-Hadjji, 2014; Gras- Gil et al., 2016).

Indeed, the latest financial scandals have created a climate of uncertainty and mistrust of the market and stakeholders. To distinguish themselves, companies have started to voluntarily engage in socially responsible business approaches and implement good governance mechanisms. In fact, CSR improves the economic and financial performance of companies. Furthermore, it contributes significantly to economic development (McWilliams and Siegel, 2000; Dhaliwal et al., 2012) and reflects the continued commitment of companies to behave ethically. Recently, technological firms have also resorted to earnings management. Good CG provides a structure that facilitates the determination of a company's objectives as well as a means of determining techniques for monitoring work (Darmawati et al., 2004; Lutfi et al., 2016). Agency theory asserts that this problem of earnings management can be minimized by oversight through good corporate governance. CG is a concept aiming to improve management performance in terms of management supervision or monitoring while guaranteeing shareholder management responsibility on the basis of a regulatory framework (Dalimunthe et al., 2016; Lubis et al., 2016; Muda et al., 2016). The concept of CG has been proposed to achieve more transparent management of the company for all users of the financial statements. If the concept is used correctly, economic growth is expected to strengthen in parallel with more transparent business management, which will ultimately provide benefits to many parties (Nasution and Setiawan, 2007).

This work highlights the importance of the commitment of innovative firms to CSR activities to reduce REM practices. CSR activities can help gain and maintain a competitive advantage by establishing a solid relationship with key stakeholders of firms (Carroll and Shabana, 2010). Furthermore, this study has implications for the development of the link between responsible governance and REM. To our knowledge, this is the first study that examines this relationship based on a sample of 280 U.S. companies listed on the S&P 500 during the period between 2012 and 2018.

Methodologically, we made a considerable effort to collect data on high or low innovation-intensive American firms. We used several data collection methods. Our basic idea was to determine the impact of CSR and CG on REM in innovative firms. To date, this is the first study to examine this relationship in two sub-samples: innovative and non-innovative American companies.

On the managerial level, this research work can be important in showing the importance of the behavioral approach in understanding the function and the important roles of CG and CSR in limiting REM. This research can be a springboard for future research as it provides useful information to the various users. Similarly, our results can useful in convincing investors to establish good CG and conduct CSR activities to reduce REM within innovative firms and increase their assets. Moreover, they would also help investors when selecting securities by emphasizing the R&D intensity associated with CSR and REM activities. To maintain sustainable development and progress in their competitive and innovative position, companies must continually invest in R&D and participate in CSR activities (Ho et al., 2018). Finally, this study helps decision-makers to understand the common functioning of CSR and CG within innovative firms. In short, this study proves that the interaction between proactive CSR and good CG helps promote effective resource allocation in the capital markets by providing reliable information upon which investors can base their investment decisions (Cho et al., 2015).

HYPOTHESES DEVELOPMENT

CSR and REM of innovative firms

Our study presents REM in the context of innovative firms because most of the evidence regarding REM relates to the opportunistic reduction of R&D expenditure in order to reduce declared expenditure (Roychowdhury, 2006). Dechow and Sloan (1991) found that CEOs cut their R&D spending towards the end of their tenure to increase their short-term earnings.

To fight against these practices of real activities and reduce the opportunistic behavior of managers, companies have implemented more responsible CG mechanisms and thus engage in CSR activities. Indeed, recent trends suggest that more and more companies are adopting CSR approaches to help ensure efficiency, stimulate innovation and induce continuous organizational growth (Asongu, 2007). CSR is often explained as being an economic, social and environmental development. Moreover, the study by Baumgartner (2014) showed that CSR is generally considered as an approach to integrate social and environmental aspects in the activities of the company. In the same context, the studies of McWilliams and Siegel (2000), Surroca et al. (2010) and Martinez-Conesa et al. (2016) argue that CSR should be integrated into business management models because they are useful for justifying strategic choices and for allowing the company to generate valuable intangible strategic assets in order to obtain competitive advantages and high level of financial performance. The main reason for choosing a sustainability approach is to reduce the negative environmental and social impacts of business activities while improving the economic performance of the company (Baumgartner and Rauter, 2017). For this reason, innovative firms have turned towards sustainable development. Sun and Stuebs (2013) state that companies must become more innovative to maintain or improve their competitiveness while fulfilling their various CSR with the stakeholders. CSR can encourage companies to be more productive by aligning their activities with their strategies to create innovation and competitiveness (Bocquet et al., 2013).

The study of REM is part of research into the positive accounting theory, which focuses on the analysis of the accounting choices observed by Watts and Zimmerman (1986) to influence the decisions of current and potential investors and other stakeholders in the aim of transferring wealth to shareholders or managers. According to social norms theory, earnings management is negatively associated with CSR (Lim and Choi, 2013; Cho et al., 2016; Ho et al., 2018). Finally, in the light of the signaling theory, CSR is considered to be dissociated from earnings management. Lim and Choi (2013), focusing on the effect of the ethical implication of CSR on financial reporting, indicate that companies with good CSR activities constrain REM. Similarly, the results found by Cho et al. (2016) confirm the negative relationship between CSR and REM. In the same vein, Prior et al. (2008) and Martinex-Ferrero et al. (2016) point out that companies use CSR activities strategically to protect themselves against negative perceptions of earnings management.

Almahrog et al. (2018) argue that since earnings management is seen as an irresponsible act that is incompatible with the principles of CSR, companies that are strongly committed to CSR are more inclined to act responsibly when they present their financial statements. The authors also believe that CSR can be used as an effective tool to combat stakeholder activism when managers manipulate financial statements.

However, in our research work, we consider that the relationship between CSR and REM of innovative firms can be negative, since innovative companies with high CSR activities are encouraged to reduce REM in order to obtain a good reputation and a better corporate identity by establishing good relationships with stakeholders. In addition, CSR activities are considered to be a discretionary field which remains among the hidden acts of manipulation by the managers of firms with high R&D intensity, which negatively affects the relationship with stakeholders. Hence our first hypothesis is as follows:

Hypothesis 1: CSR has a negative effect on REM in innovative firms.

Moderating effect of CG

Accounting discipline has received increasing interest over the last decade and formed the basis of good corporate governance. Corporate behavior is further examined by all stakeholders, including regulators and financial press.

Technological and economic development has led to integrating CG mechanisms in order to heal financial crises and cope with financial instability. As a result, accounting results are more reliable and more informative when the opportunistic behavior of managers is controlled by a variety of monitoring systems (Dechow et al., 1996). After several financial scandals, companies resorted to CG to reduce the asymmetry of information and reduce the conflict of interest between stakeholders through engagement in CSR activities (Cho and Chun, 2016). These mechanisms help investors align the interests of managers with those of shareholders and improve the reliability and integrity of the financial reporting process (Watts and Zimmerman, 1986; Gras-Gil et al., 2016).

The relationship between earnings management and CG, ensuring the reliability and quality of accounting results, will be improved when managers' opportunistic behavior in terms

of recurrence management is monitored by CG mechanisms (Dechow and al., 1996). Similarly, the study by Stuebs and Sun, (2015) found a positive association between corporate governance and CSR. Their results suggest that good corporate governance leads to good CSR the year after.CG is a monitoring mechanism capable of controlling the decisions made by managers and limiting their opportunism (Cho and Chun, 2016). Thus, previous studies indicate that a company with good management capacity is more successful in preventing managers from exploiting its assets by monitoring their business decisions (Choi et al., 2013; Cho and Chun, 2016)

Cho and Chun (2016) used 1432 firm-year observations of Korean listed companies and found a negative and significant relationship between CSR and REM, which suggests that companies with high-level CSR tend to engage in lower REM. They also found that CG moderates the relationship between CSR and REM, i.e. good governance strengthens the negative relationship between CSR and REM. Overall, the results indicate that companies with a high CSR and a good corporate governance system can compel REM to improve brand image and reputation by maintaining good relations with the main stakeholders and by monitoring managers' opportunistic incentives to exploit CSR.

Based on previous studies, we expect the joint effect of desirable CSR and good CG on REM to be stronger than the individual effect of CSR or CG. As a result, we anticipate that good CG will strengthen the negative relationship between CSR and REM. This leads us to state our third hypothesis:

Hypothesis 2: CG strengthens the negative relationship between CSR and REM in innovative firms.

SAMPLE AND RESEARCH DESIGN

Sample

To test our hypotheses, we opted for American firms listed on S&P 500 index. Firms with missing data (220 firms) were eliminated from the initial sample, thus the final sample consisted of 280 firms. The observations were carried out over a7-year review period. The Thomson Reuters Eikon database was used to collect financial and accounting data. To measure the CSR index, we used a panel dataset with environmental, social and economic performance scores as well as CG index obtained from Thomson Reuters ASSET4. Our sample selection is summarized in Tables 1.

In accordance with the existing literature on innovation, our study used R&D intensity (RDI) as a measure of firms' innovation degree (Hall et al., 2016). Companies with strong innovation potential are believed to be more involved in the REM process. In addition, firms that invest heavily in R&D are more likely to be competitive based on the level of innovation and technology.

However, to answer our research problem, it was necessary to subdivide our total sample according to the R&D intensity of American firms (companies with a high innovation potential and those with low innovation potential). To distinguish between these two classes to distinguish these two classes, we adopted the Brown (1997) method, which considers as firms with high innovation potential those with an RDI above the average of the sector to which they belong for

firms that have announced positive R&D expenditures. However, companies having an RDI below the average of the sector to which they be long are considered as potentially low in innovation. Our sample selection is summarized in Table1.

Table 1: SAMPLE SELECTION AND BREAKDOWN BY R&D INTENSITY			
Panel A: Sample selection			
Sample		#firms	#Obs.
S&P 500 index		500	3500
- Firms with missing data		(220)	(1540)
Final sample		280	1960
Panel B: Sample distribution by R&D intensity			
Firms		#Obs.	%
sample test (highly intensive innovative potential)		792	40.35%
sample control (less intensive innovation potential)		1169	59.65%
Total		1960	100 %
Panel C: sample distribution by industry			
SIC code	Industry	#firms	%
1000-1999	Mining and construction	41	14.64%
2800-2890	Chemicals	73	26.08%
3000-3999	Manufacturing	63	22.5%
5063-5084	General Industrials	16	5.72%
5200-5999	Retail Trade	43	15.36%
7000-8999	Services	44	15.71%
Total		280	100%

The total sample was divided in to two subsamples based on the median[1] of the industry R&D intensity. Thus, following Kouaib and Jarboui (2016) and Chouaibi et al. (2019), we consider that firms with high innovation potential are those with an R&D intensity above the median. However, those with an R&D intensity below the median are considered to have low innovation potential.

For ease of data retrieval, DataStream offers the ability to search for up to eight standard industry codes (SICs) for each company, based on the level of revenue derived from each industry. In other words, to retrieve the "SIC 1" on DataStream for a certain company, it proceeds to provide the industry code following the highest share of the company's revenue. In the next step, industry classification information was extracted from DataStream for all companies in the entire ESG Asset 4 Universe and for American companies for which certain characteristics or necessary information was deleted. A total of 280 companies were selected for

[1] *The calculation of the median is commonly done to represent different distributions and is easy to understand. It is also more robust than average in the presence of extreme values.*

this 7-year study (fromearly 2012 to late 2016). According to Table 2, our test sample contains 113 companies while our control sample contains 167 companies.

Table 2: SAMPLE DISTRIBUTION ACCORDING TO THE INDUSTRY-MEDIAN OF R&D INTENSITY					
SIC code	Industry	Median RDI	Test sample	Control sample	Total sample
1000-1999	Mining and construction	0,0581	15	26	41
2800-2890	Chemicals	0,0288	32	41	73
3000-3999	Manufacturing	0,0404	19	44	63
5063-5084	General Industrials	0,0474	12	4	16
5200-5999	Retail Trade	0,0302	17	26	43
7000-8999	Services	0.0623	18	26	44
Total			113	167	280

The dependent variable: real earnings management index (REMI)

To estimate the normal levels of REM, Roychowdhury (2006) constructed three empirical models that include three real-world manipulation techniques; cash flow from operations (M1), production costs (M2) and discretionary expenses (M3). According to this measure introduced by Roychowdhury (2006), and developed by Cohen et al. (2008); Cohen and Zarowin (2010) and Zang (2012), we calculated the sum of the residuals of the 3 models as proxy of the dependent variable while multiplying M1 and M3 by -1 (Table 3).

Table 3: SUMMARY OF REM INDEX MEASURE		
Variables	**Measures**	**authors**
Abnormal operating cash flows (AbnCFO)	$\frac{CFOt}{TAt-1}=\alpha 0+\alpha 1\left(\frac{1}{TAt-1}\right)+\beta 1\left(\frac{Sales\ t}{TAt-1}\right)+\beta 2\left(\frac{\Delta Sales\ t}{TAt-1}\right)+\varepsilon t$ Where: CFO t is cash flows from operations (net cash-flow-operating activities); Ait-1 is the total assets at the beginning of year t; SALESt is net sales; ΔSales t t is the change in net sales.	Roychowdhury (2006) Cohen et al. (2008), Cohen et Zarowin (2010) and Zang (2012)
Abnormal production costs (AbnPR)	$\frac{PROt}{TAt-1}=\alpha 0+\alpha 1\left(\frac{1}{TAt-1}\right)+\beta 1\left(\frac{Sales\ t}{TAt-1}\right)+\beta 2\left(\frac{\Delta Sales\ t}{TAt-1}\right)+\beta 3\left(\frac{\Delta Sales\ t-1}{TAt-1}\right)+\varepsilon t$ Where: PROt is production costs: Sum of cost of goods sold and change in inventory; ΔSALESit-1 is lagged change in sales.	
Abnormal discretionary expenses (AbnDE)	$\frac{DEXP\ t}{TAt-1}=\alpha 0+\alpha 1\left(\frac{1}{TAt-1}\right)+\beta\left(\frac{St-1}{TAt-1}\right)+\varepsilon t$ Where: DEXP t is discretionary expenses: Sum of advertising expenses, R&D expenses, and selling, general and administrative expenses (SG&A). Advertising expenses are excluded since data on this variable is not available on thomson Reuters Eikon database.	
REMI= (-1)*AbnCFO + AbnPR + AbnDE*(-1)		

Independent variables measurement

CSR index. Corporate social responsibility entails aligning company's activities with the social, economic and environmental expectations of its 'stakeholders' (OECD, 2003). In this study, we used the equally weighted average of the social, the environmental and the economic score for the innovative firm for every year in our panel dataset.

CG score. The corporate governance pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value. However, we use the CG scores obtained by companies as a proxy for corporate governance, and we call it Index CG for short thereafter in the paper.

Control variables

We included various control variables that have been documented in prior studies and that are related with REM. Thus, we retain as control variables: firm size, Leverage ratio (LEV), Return on Assets (ROA) and R&D intensity (IRD).Firm size (SIZE) is defined as the natural logarithm of total assets, LEV is defined in terms of debt as divided by total assets and ROA is the return on total assets.IRD is an indicator variable that takes the value of 1 if the firms are innovative and 0 if the firms are non-innovative.

Model specification

The research model that allows testing research hypotheses formulated in the previous section is as follows:

$$\text{Model 1: } REMI_{it}=\alpha_0 + \alpha_1 CSR_{it} + \alpha_2 CG_{it} + \alpha_3 CSR_{it} * CG_{it} + \alpha_4 SIZE_{it} + \alpha_5 LEV_{it} + \alpha_6 ROA_{it} + \alpha_7 IRD_{it} + + \varepsilon_{it}$$

Where: REMI is real earnings management index; CSR is corporate social responsibility; CG is corporate governance, SIZE is firm size; LEV is leverage ratio; ROA is return on assets; IRD is intensity in R&D. a_0; a_1; a_2; a_3; a_4; a_5; a_6 and a_7 are the parameters subject of estimation and ε_{it} is indicates a random error of firm i in year t.

RESULT AND DISCUSSION

Univariate analysis

Table 4, below, depicts the descriptive statistics of Test, control and full samples.

Table 4: DESCRIPTIVE STATISTICS				
Variables	**Statistics**	**Full sample**	**Test sample**	**Control sample**
REMI	Mean	0.014571	.0185974	0.0118466
	Std. Dev.	0.1932046	0.1634824	0 .2109789
	Min	-0.8923254	-0.6527995	-0.8923254
	Max	0.8678847	0.6577299	0 .8678847
CSR	Mean	0.6333789	0.6779143	0.6088628
	Std. Dev.	0.238721	0.2211326	0.2454135
	Min	0.0664	0.1022333	0.0664
	Max	0.9625667	0.9625667	0.9545333
CG	Mean	0.7927584	0.8150659	0.7796119
	Std. Dev.	0.1447996	0.1255403	0.1534076
	Min	0.0299	0.258121	0.0229
	Max	0.9802	0.97653	0.9802
CSR*CG	Mean	0.5219166	0.5688068	0.4955713
	Std. Dev.	0.2435005	0.2274846	0.248691
	Min	0.003002	0.0430167	0.003002
	Max	0.926093	0.9222641	0.926093
SIZE	Mean	16.64816	16.92291	16.48594
	Std. Dev.	1.39421	1.403443	1.359732
	Min	12.7037	13.73247	12.7037
	Max	21.66839	20.65385	21.66839
LEV	Mean	0.2758443	0.2769451	0.2747982
	Std. Dev.	0.1854793	0.1815865	0.1874445
	Min	0	0	0
	Max	1.9403	1.9403	1.1922
ROA	Mean	0.0743628	0.0836818	0.068849
	Std. Dev.	0.071656	0.0741101	0.0695309
	Min	-0.6135	-0.3526	-0.6135
	Max	0.4855	0.4855	0.3257
IRD	Freq	0.3494898	1	0
	Std. Dev.	0.4769305	0	0
	Min	0	1	0
	Max	1	1	0

Bivariate analysis

To verify our hypotheses, we used the difference between means test on the two samples considered in our study. The variable (IRD) is then dichotomous: firms having R&D intensity higher than the median value take 1 (group G1) and firms having an R&D intensity lower than

the median value take 0 (group G2).Subsequently, we calculated the REM index for both groups of companies to check if there is a significant difference in their average.

The hypothesis to be tested H0: there is no significant difference between means of the REMI of the two groups of companies (more IRD intensive/ less IRD intensive).

Table 5 below presents the difference between the means of the variable to be explained and that of the explanatory variables of the two groups.

Table 5: VARIABLES' DIFFERENCES BETWEEN MEANS

Panel A:The explanatory variables' difference between means with respect to R&D intensity

Variables	Level of innovative firms	No. of observations(firms-years)	Means
REMI	More R&D intensive 1	791	0.018
	Less R&D intensive 0	1169	0.011
CSR	More R&D intensive 1	791	0.514
	Less R&D intensive 0	1169	0.496
CG	More R&D intensive 1	791	0.770
	Less R&D intensive 0	1169	0.740
CSR*CG	More R&D intensive 1	791	0.532
	Less R&D intensive 0	1169	0.483
SIZE	More R&D intensive 1	791	16.852
	Less R&D intensive 0	1169	16.510
LEV	More R&D intensive 1	791	0.275
	Less R&D intensive 0	1169	0.275
ROA	More R&D intensive 1	791	0.080
	Less R&D intensive 0	1169	0.069

Panel B: t test on explanatory variables and variable to explain as a function of R&D intensity

Variables	R&D Intensity Hypothesis	T-test for equality of means		
		T	Significance	Difference between means
REMI	The unequal-variance assumption	-1.472	0.070	-0.012
CSR	The unequal-variance assumption	-2.371	0.008	-0.026
CG	The unequal-variance assumption	-2.898	0.001	-0.027
CSR*CG	The unequal-variance assumption	-4.006	0.000	-0.048
SIZE	The unequal-variance assumption	-5.595	0.000	-0.371
LEV	The unequal-variance assumption	-0.542	0.293	-0.004
ROA	The unequal-variance assumption	-2.891	0.001	-0.009

As can be seen from table 5, there is a significant difference in the REM index between the two groups of firms (more IRD intensive/less IRD intensive). R&D intensive firms are more involved in REM practices (the average of R&D intensive firms (0.018) is higher than the average of firms that are less intensive in R&D. However, the same table reveals that the difference between means test (for unequal variance assumptions) has a student value equal to -1.472 statistically significant at the 10% threshold (p-value=0.070).

Regarding the explanatory variable, the CSR score, the results show that there is a significant difference between the two groups of companies. Thus, companies with a high R&D intensity (the mean equals 0.514) practice REM more than firms with a low R&D intensity (the mean equals 0.496, Table 5). By observing the difference between means test for the unequal variance hypotheses, the results show a significant difference between means of the two groups (t student = -2.371 with p-value= 0.008).

For CG variable, the results show that there is a significant difference in the CG score between the two groups of companies. This shows the importance of the presence of good governance in the monitoring and control of investment strategies for innovation. The average score of the CG of R&D intensive firms (0.770) is higher than that of firms with low R&D intensity (0.740, Table 5). By observing the test of difference between means for unequal variance hypotheses, we find that the t student = -2.898 is significant at the 1% threshold.

Subsequently, the results of the moderating effect of CG on the relationship between CSR and REM show that there is a significant difference between the two groups of companies. Moreover, for this variable, the mean of R&D intensive firms (0.532) is greater than that of firms that are less intensive in R&D (0.483, Table 5). The difference between means test for unequal variance hypotheses shows that the t student (-4.006) is significant at the level of 1%.

With regard to the control variables, the results show that there is a significant difference in firm size between the two groups of firms. The average size of R&D intensive firms (16.852) is higher than the average size of those with low R&D intensity (16.510). Similarly, this difference between means is significant and has a t-student equal to -5.595 significant at the 1% threshold.

For the LEV performance variables, the results show that there is no significant difference between the two groups. Indeed, the difference between means tests for unequal variance hypotheses reveals t student of respectively-0.542 and 0.468 with significance thresholds greater than 10%. Therefore, these variables are not considered to be determining factors for R&D intensive firms.

Return on assets presents a significant difference in the results between the two groups of companies. Therefore, companies with a high R&D intensity (the mean is 0.080) are more profitable than companies with a low R&D intensity (the mean is 0.069). Regarding the difference between means test for unequal variance hypotheses, the results show that t student with a value of -2.891 is significant at the 1% level.

Multivariate analysis

Before running multiple regressions based on panel data, we performed several specification tests to ensure that the regression specification matches the data. We carried out the following tests: Correlation test, ~~normality test for residuals,~~ Homogeneity test, Hausman test and heteroskedasticity test. This implies that the regression models are estimated using multiple regression analysis for panel data using the STATA 13.0 software.

Indeed, based on the correlation matrix (Table 6), we can conclude that according to Pearson's test, the problem of bi-variatemulti-collinearity between the two sample groups is perfectly absent in the model to be tested.

Table 6: PEARSON CORRELATION MATRIX BETWEEN INDEPENDENT VARIABLES

	CSR	CG	CSR*CG	SIZE	LEV	ROA	IRD
CSR	1						
CG	0.022 (0.328)	1					
CSR*CG	0.021 (0.336)	0.018 (0.414)	1				
SIZE	0.030 (0.171)	0.017 (0.445)	0.011 (0.599)	1			
LEV	-0.016 (0.460)	0.004 (0.859)	-0.007 (0.729)	-0.026 (0.254)	1		
ROA	-0.007 (0.731)	0.014 (0.532)	-0.003 (0.884)	-0.013 (0.560)	0.008 (0.702)	1	
IRD	-0.020 (0.366)	-0.015 (0.498)	0.021 (0.347)	0.009 (0.668)	0.022 (0.310)	-0.008 (0.697)	1

Notes:*Corporate social responsibility (CSR), corporate governance (CG), firm's size (SIZE), leverage ratio (LEV), return on assets (ROA), R&D intensity (IRD).*
All correlations between variables are significantly smaller than 0.8 (threshold at which we begin to experience serious problems of multi-colinearity, Gujarati 2004). In the Pearson test (T-statistics are reported in parentheses)and the index of conditioning we have found that these variables are distinct from each other and are not significant (correlation thresholds above 10% and the packaging is less than 1000).

Furthermore, given the special nature of panel data, it is necessary to follow the order of certain econometric steps and carry out certain tests to obtain robust estimates. The first is intended to test the presence of any individual effects, culminating in an "F-Statistic". Thus, this test produced a significant Chi-square value. This result does actually confirm the presence of individual effects, testifying the sample's heterogeneous character (full sample, test sample and control sample).Subsequently, a Hausman test gave a chi-square value equal to 25.42 and a probability equal to 0.000 (full sample, Table 7). This result suggests the presence of a fixed effect for our model, allowing us to accept the implementation of the Ordinary Least Squares (OLS) regarding the fixed-effects model while rejecting the generalized least squares (GLS) as provided by the random-effect model. Finally, a panel-level heteroscedasticity test needed be performed through the application of the Breusch–Pagan test, as shown in Table 7. The result of

this test is a significant Chi-square and hence the null hypothesis of constant variance is rejected indicating that the three models have heteroskedasticity problem. In this case, we use the Eicker-White method with the "robust" optionto correct the standard deviations. Indeed, it is recommended to use heteroskedasticity-robust standard errors in hypothesis testing to make the test results more convincing.

Table 7reports the regression analysis results associated with our hypothesis, which tests the relationship between R&D intensity and firm REM activities. As part of this study, a multivariate regression analysis on panel data was used to empirically test this hypothesis. The results from the various tests reveal that the majority of the explanatory variables have a significant impact on the REM. The multiple regression brings out Fisher statistics (F), measuring the global significance of the model, significant at the 1% threshold. Therefore, these models are overall significant. As the R2adjusted for the total sample is 0.046, the explanatory variables contributed to the explanation of the dependent variable at 4.6%.

Table 7: REGRESSION RESULTS

Variables	Pred. Sign	Full sample	Test sample	Control sample
CSR	-	-0.021** (-2.33)	-0.029** (-2.08)	-0.020 (-1.47)
CG	-	-0.046*** (-2.92)	-0.066*** (-3.52)	-.0394 (-1.54)
CSR*CG	-	0.038*** (2.58)	0.066*** (2.82)	0.060** (2.51)
SIZE	+	0.023*** (4.10)	0.030*** (4.44)	0.037*** (4.58)
LEV	-	-0.072*** (-3.56)	-0.036** (-1.11)	-0.124*** (-3.60)
ROA	-	0.203*** (5.64)	0.176*** (4.88)	0.197*** (3.50)
IRD	+	0.017* (1.83)	0.015** (2.09)	0.020 (1.12)
Firmfixedeffects		Included	included	included
Yearfixedeffect		Included	included	included
Adj R-squared (%)		4.6%	5.8%	5.7%
Nb. Of Obs.		1960	791	1169
Fisher test		44.98***	43.73***	41.23***
Normality test Prob(Skewness) Prob(Kurtosis)		 0.0000*** 0.0000***	 0.0000*** 0.0000***	 0.0000*** 0.0000***
Homogeneity test		44.98***	43.73***	41.23***
Hausman test		25.42***	19.69***	20.93 ***
Breusch-Pagan test forHeteroskedasticity		28.03***	28.47***	11.33***

Notes: REMI is real earnings management index; CSR is corporate social responsibility; CG is corporate governance; SIZE is firm size; LEV is leverage ratio, ROA is the return on assets, IRD represents the R&D-associated expenses divided by total sales. Year and firms are included in our regression model but their coefficients are not shown in this Table. The Asterisks ***, ** and * appearing close to a coefficient indicate the significance levels of 1%,5% and 10%,respectively.

In testing H1, The CSR score seems to be important in explaining the level of REM of innovative firms. This finding indicates that companies engaged in CSR activities are less likely to manipulate real activities. This also implies that the more strongly involved in CSR activities companies are, the more inclined to act responsibly they are when they present their financial statements. The coefficient estimated on CSR is negative (β=-0.029) and significant (p= -2.08) when the intensity of R&D is high. However, the negative relationship between CSR and REM is not significant (β=-0.020; p= -1.47) for firms that have a low R&D intensity. Therefore, the validation of our research hypothesis is consistent with the assertion that CSR activities reduce REM within innovative firms, by focusing on the effect of the ethical implication of CSR on financial reporting which ensures a good relationship with stakeholders (Cho et al., 2016). As a result, the context characterized by a higher R&D intensity constitutes a favorable environment for the application of sustainable development from CSR activities which leads to the reduction of REM practices. This result is in line with several previous studies which state that companies with high CSR practices are less likely to engage in REM activities (Lim and Choi, 2013; Cho et al., 2016; Ho et al., 2018). Hence our first hypothesis (H1) is accepted.

The second hypothesis consists in verifying the moderating effect of CG score on the relationship between CSR and the REM practices of innovative firms. We tested this relationship in the three sub-samples used in our work. The results of the test sample show that the CSR score has a positive (β=0.066) and significant (p=2.82) effect at the 1% threshold on the relationship between the CSR score and REM of high innovation-intensive firms. The control sample provides statistical evidence, the coefficient is positive (β=0.060) and significant (p=2.51) at the 10% threshold in firms with low innovation intensity. For the total sample, the results show a positive sign (β=0.0386 of good corporate governance score on the CSR-REM relationship at the 1% level. Initially, we found interesting results regarding the active role played by CSR in reducing the extent of REM of innovative firms. However, in the phase where we integrated governance, the effect of CSR became positive, i.e., the interaction between CSR and CG does not allow to reduce REM. In other words, governance takes precedence over CSR practices in explaining the REM of highly innovative firms. Based on the results found, we can conclude that hypothesis H2 is rejected. With a positive coefficient interaction term, it can be concluded that corporate governance is less effective in reducing REM for firms with high CSR commitment, or a high CSR commitment may contribute to more REM for firms with high CG scores. As a result, CSR and CG have competing effects on REM, and therefore a company may benefit from engaging in one, but not both, to mitigate REM.

Furthermore, the results pertaining to some of the subsample firms' control variables are not similar. For the firm size variable, it proves to positively and non-significantly influence the REMI with regard to the three (Test, control and full samples) samples. However, the larger the size of the innovative and non-innovative firm, the more managers will be encouraged to engage in REM. As a result, this variable has an explanatory power of our model. As for the leverage variable, the results from the estimation of the model reveal a negative and non-significant correlation for firms with high R&D intensity. Nevertheless, the control sample and the total sample have a negative and significant effect at threshold of 1%. This shows that this variable is a determining factor for companies that are less intensive in R&D but not for R&D intensive

companies. Therefore, an increase in the level of debt leads to a decrease in the level of REM of less innovative firms. Regarding the return on assets variable for the 3 samples, it has a positive and significant effect on the level of REM of innovative and non-innovative firms. This implies that when ROA increases, leaders of innovative and non-innovative firms are engaged in the practices of manipulation of the real activities. As a result, ROA is not a determining variable for firms with a high R&D intensity. We finish with R&D intensity which has a positive and significant impact on the REM practice of firms that are more intensive in R&D. This affirms that innovation is considered as a favorable environment for the manipulation of real activities. However, it has no significant impact on REM within firms that have low R&D intensity.

CONCLUSION

The aim of this paper was to demonstrate, theoretically and empirically, the impact of CSR on the REM and we also investigate the moderating effect of CG on CSR-REM relationship in American innovative firms. We conducted our empirical study on a sample of 280 U.S. companies listed on the S&P 500 during the period from 2012 to 2018. The results obtained made it possible to conclude that the means of the REM index between the two groups are significantly different. This difference is explained by the fact that R&D intensive firms are less involved in the manipulation practices of real activities than those with a low R&D intensity according to the study by Chouaibi et al. (2019). In addition, the empirical results show that CSR has a negative and significant effect on REM and that the moderating effect of CG does not strengthen the negative relationship between CSR and REM.

This article has implications for the development of the relationship between CSR, CG and REM. To our knowledge, this is the first study to examine this relationship on two sub-samples: innovation and non-innovation American companies. It provides new evidence on the link between CSR index and good corporate governance on REM in innovative firms.

The regression results are almost similar to the difference between means test results. It is also necessary to state that like all research works, our study has certain limitations in terms of data collection and the size of the studied sample which was reduced to 280 American companies due to the non- availability of all the necessary data for the period from 2012 to 2018. As the sample is not very large, this could distort the results. As this study was based on data from American companies, the results cannot be generalized to all contexts and this highlights the need for further researches and obviously open up new perspectives.

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