Internal control and real earnings management in the French context

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Abstract

Purpose – This study aims to examine whether the internal control system quality in the French context improve the information quality having been reflected by the level of real earnings management (REM) measured by inventory overproduction, discretionary expenses reduction and sales manipulation.

Design/methodology/approach – The research uses a multiple regression analysis to examine the association between internal control and REM. The years 2010-2015 are used as analysis period by focusing on the French context. Three panel data are applied to the companies belonging to the Cotation Assistée en Continu (CAC) 40 index for the entire study period.

Findings – The results show that high internal control index has a negative impact on the REM and that better internal control indeed makes financial reporting more credible to investors. Further, the results demonstrate that control environment, risk assessment, control activities and monitor are the components that mainly affect REM.

Originality/value – The results contribute to the literature dealing with the relationship between internal control quality and REM by shedding light on the importance of internal control quality in improving information quality in the French context. Moreover, this study is using a quantitative measure of the internal control quality while much of the prior literature uses material weaknesses to estimate the effectiveness of internal control system.

Keywords Real earnings management, French context, Internal control index, Internal control quality

Paper type Research paper

1. Introduction

Corporate governance associated failure, due mainly accounting scandals have raised concerns as to the honesty of accounting information provided to investors and culminated in the latter's shaken confidence. Such failures have made it essential for both the financial market's specialist and accounting researchers to improve the understanding of internal control effectiveness, as well as the promotion of the pervasiveness of control issues and their association with the earnings management attached behavior.

As mandated by Section 404 of the 2002 Sarbanes–Oxley Act (SOX, US house of representatives, committee on financial services), management has to document and test their internal control system to provide an annual report that contains an assessment of the internal control structure's effectiveness. The securities and exchange commission

JEL classification – G30, M40, M41, M42

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stipulates that such requirement would enhance the quality of reporting and reestablish the investor's confidence in the fairness and truthfulness of the securities markets. While the internal control systems are designed and implemented by management, their weaknesses implicitly create doubts about the management's competence and views in regard of financial reporting. Furthermore, a weak system of internal control system might influence management attempts to further manipulate firm operations by means of controlled production costs, discretionary expenses and sales.

According to Roychowdhury (2006), real earnings management (REM) refers to the manipulation practices or acts introduced on real operational activities to achieve short-term financial goals. The purpose lying behind such practices consists in decreasing future cash flows rather than enhancing long-term company value over the current period. Contrary to accrual-based earnings management, REM is not related to accounting issues *per se* and, may, therefore, be fully executed within the generally accepted accounting principles without necessarily falling within the purview of auditors or regulators (Cohen *et al.*, 2008). In fact, the wide-ranging use of manipulated real activities as in touted to manage earnings, either instead of or further to accounting manipulation (Graham *et al.*, 2005; Cohen *et al.*, 2008), along with the pervasive problems relating to the control environment and governance as perceived to persist in companies with internal control weaknesses (Zhang *et al.*, 2007; Hoitash *et al.*, 2009; Skaife *et al.*, 2013) raise the question of whether the REM issue is rather more commonly prevalent in companies characterized with ineffective internal control.

Indeed, much of the existing literature appear to apply material weaknesses (MW) to estimate the effectiveness of internal control system and to model earnings management as the magnitude or level of a firm's accruals (Doyle *et al.*, 2007; Ashbaugh-Skaife *et al.*, 2008; Cohen *et al.*, 2008; Nagy, 2010; Myllymäki, 2014). Other researchers test the relationship between ineffective internal controls and accounting conservatism (Ji *et al.*, 2016). Therefore, this study expands the scope of research beyond a focus on the relationship between the internal control system's quality and earnings quality as proxies via REM. In addition, to our knowledge, our advanced work is among the few studies that apply a quantitative measure of the internal control system quality along with the REM as means to provide a thorough assessment of earnings quality within the French context. Moreover, this research used the 2013 Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission with a view to assessing the impact of the factors:

- Control environment,
- Risk assessment,
- Control activities,
- Information and communication and
- Monitoring on the effectiveness of internal control on REM.

In conformity with the USA' SOX Act and on August 1, 2003, the French parliament passed the law on financial security (LSF, 2003). The Act requires that the board's chair should provide an annual report concerning the internal control practices as implemented in company level. Following the publication of the code of corporate governance practices, commonly known as the AFEP/MEDEF code (2008), the listed French companies have the freedom to choose among different internal control frameworks such as the AMF (Autorité des marchés financiers) or COSO and corporate governance reporting requirements. Accordingly, these companies could disclose information only in conformity with the Article

116 of the Financial Security Act (LSF, 2003). In this respect and following conducted study WaMandzila and Zéghal (2016) discover that half of the SBF 120 companies surveyed appear to apply the AMF framework associated internal control to inform shareholders on the control and risk management procedures. These firms are predominantly small involving small boards and are not listed on the French stock market. Inversely, 34% of these firms are discovered to implement the COSO framework and 16% applying other frameworks. Indeed, the present study is designed to investigate whether internal control quality could be manifested in REM behavior.

The remainder of the paper is organized as follows. Section 2 is devoted to expose the relevant prior studies that have already been conducted and develop the relating hypotheses. The Section 3 describes our sample, variables and estimation models. Section 4 presents our empirical findings. In Section 5, we undertake robustness test to control the endogeneity. Eventually, Section 6 presents the summary, conclusion and suggestions for future research.

2. Literature review and hypothesis

2.1 Background of internal control requirements for French companies

The law number 2003 – 706 passed in August 1, 2003 relevant to financial security (the Reform) was adopted by the French parliament a year following the US SOX Act with the same objective of restoring the investor's trust in the French markets. The reform stimulates improving the quality of information provided by joint-stock companies to their shareholders and to the public in connection with the corporate governance procedures applied. In fact, the reform requires that the Directors' board or Supervisory board of corporations prepare, in addition to the board's annual management report, a separate report on the internal control of the company, which should indicate the conditions relevant to the preparation and organization of the board meetings as well as the company's internal control procedures (Article L. 225 – 37 and L. 225 – 68 of the Commercial Code). For the sake of clarifying the purpose and content of this additional report, two major associations, representing the interests of French companies (MEDEF [1] and AFEP [2]), have published certain guidelines detailing the information that should be included in this report and offering a possible outline for the report. Similarly, the legal committee of the National Association of Joint-Stock Companies also published a note aimed at explaining the report purpose. According to this association, the report should provide significant, factual and concise information concerning the internal control procedures themselves without dealing with the procedures.

Certainly, both of the American and French laws are aimed at establishing a legal framework whereby to help govern corporate internal control. Noteworthy, however is that they appear to differ in several aspects. In a first place, the American law has made more rigid choices whose breach is strongly penalized, whereas the French law is seeking a change in practices while progress is being made on implementing new internal control and corporate governance associated obligations under the AMF supervision and recommendations.

In a second place, the SOX law stipulates that internal control needs to account for financial reporting accuracy. Such a choice stems from the SOX allotted role to maintain the financial communication's transparency and reliability. However, the Financial Security Act does not specify the concept of internal control nor does it define the nature of the internal control procedures to be applied to the public limited companies. Under the French law, internal control is considered with regard to the entirely of aspects relating mainly to the reporting efficiency, reliability well as legal conformity.

Additionally and under the LSF, the auditor's report prove to be limited to internal control over financial reporting, just as it is the case with SOX. The standard set by the CNCC [3] on auditor report defines internal control over financial reporting as being as follows: "internal control procedures relating to the accounting and financial information preparation are those, which company must produce, to be able to guarantee the accounts and information reliability. Such information shall be that extracted from interim, annual or consolidated accounts or those, which may be reconciled with the data used in the preparation of those accounts".

Furthermore, the US law associated pragmatism and rigidity are reflected in the obligation to evaluate the internal control over financial reporting as an annual basis, which should entice managers to judge their effectiveness using a such recognized reference as the COSO. As regard to the French LSF, however, it does not appear to require the executives to formulate an evaluation. So, the Chairman's report is rather descriptive.

Eventually, the law implementing section 404 of the SOX Act and the PCAOB (public company accounting oversight board) standards precisely define the rules and quantitative criteria relevant to the evaluation approach and the assessment of the internal control over financial reporting effectiveness. Such an approach strives toward maximizing objectivity in detecting and qualifying these controls relating to the weaknesses, which must, if necessary, be disclosed. As for the French LSF case, it does not specify the need to disclose control failures or the regulations governing their qualification, leaving a large discretion margin for the executives.

These highlighted differences distinguishing both laws, lead to explore the French context given the fact that most of the previously conducted studies appear to deal predominantly with the US context.

2.2 Internal control and earnings quality

The PCAOB (2004) proves to define internal control over financial reporting as being "a process[. . .] to provide reasonable assurance regarding the reliability of financial reporting". It is aimed to prevent and/or detect errors or fraud likely to result in a misstatement of the financial statements. Indeed, internal control systems function at different levels of effectiveness, ranging from very effective controls to very low-quality ones [Committee of Sponsoring Organizations of the Treadway Commission (COSO), 1992]. By definition, good internal control is supposed to lead to more reliable financial information. Such an association has its roots in the agency theory concerning the outcomes of the principal-agent relationship (Jensen and Meckling, 1976). Accordingly, opportunist managers would use their discretionary power to manipulate information. So, the internal control system should to help in mitigating agency costs as engendered by agency conflicts taking place between shareholders, managers and stakeholders and stemming from information problems faced by stakeholders, shareholders and potential conflicts occurring between managers and lenders. Empirical evidence dealing with the relationship binding internal control quality and that of accounting information, as perceived in the relevant literature, appear to reveal well that companies reporting MW prove to display lower earnings quality, (Ashbaugh-Skaife *et al.*, 2008; Doyle *et al.*, 2007). These latter have discovered that firms disclosing internal control deficiencies turn out to exhibit greater noise in accruals and larger abnormal accruals in respect of those firms, which exhibit effective internal control systems. They have also reached the conclusion that firms, which undertake to remediate previously disclosed material weakness, as confirmed by an unqualified SOX 404 audit opinion, tend to exhibit significant improvements in accruals quality relative those firms, which fail to remediate their control problem, which is confirming by Bedard *et al.* (2012). Myllymaki

(2014) highlights that low financial reporting quality of MW404 companies appear to persist into the post MW404 period, outlining that following the post MW404 period, companies turn out to be more likely to have undiscovered misstatements in their financial statements than those that have never gone through MW404. Ji *et al.* (2016) demonstrate that both accounting-related and non-accounting-related internal control weaknesses affect accounting conservatism.

The extensive literature treating the relationship between earnings management and internal control is largely focused on accrual-based earnings management. Only a small stream of literature has undertaken to investigate the possibility for an ineffective internal control system to entice managers to manipulate real transactions to distort earnings.

In addition to accruals, firms may also manipulate earnings figures through the adoption of real operational activities (Healy and Wahlen, 1999; Dechow and Skinner, 2000; Graham *et al.*, 2005).In this regard, Zang (2012) concludes that the REM decision usually precedes the decision to manage earnings through accruals and that both earnings management strategies act as substitutes, as accrual-based and real manipulations are negatively correlated. This is inconsistent with the other research finding that firms do not use discretionary accruals as a substitute for real management when they report internal control weaknesses (Lenard *et al.*, 2016). According to Cohen and Zarowin (2010), there are, at least, two reasons justifying executives' high willingness to manage earnings through real activities rather than through accruals. Firstly, an accrual-based earnings management is more likely to draw auditor or regulatory scrutiny than real decisions such as those related to product pricing, production and R&D or advertising expenditures. Secondly, an exclusive reliance on accrual manipulation is too risky. The realized shortfall between unmanaged earnings and the targeted threshold may help exceed the amount by which it is possible to manipulate accruals following the fiscal period end. Should the reported income appear to fall below the threshold, which all the accrual-based strategies necessary to meet it are exhausted, then managers turn out to be left with no options, as real activities cannot be adjusted, neither at nor after the end of the fiscal reporting period.

Graham *et al.* (2005) advance that following the SOX imposed certification requirements, the managers' preferences may have changed owing to the mix between taking accounting vs real actions to manage earnings. However, Cohen *et al.* (2008) have proved that REM is increasing significantly and the level of earnings management has witnessed a decline, suggesting that firms shifted from accrual-based to REM after the SOX act. Järvinen and Myllymäki (2016) suggest that the internal controls over financial reporting could well be associated with REM behavior despite the fact that their ultimate goal is not meant to constrain the real activities' manipulation, in so far as the internal control effectiveness reflects the management's attitude toward financial reporting quality. Hence, an ineffective internal control system could well have its explanation in the management's lack of competence or commitment to establish effective internal controls or the lack of qualified chief financial officers (Hoitash *et al.*, 2009; Li *et al.*, 2010). These findings imply that managers are liable to use their discretion in a bid to take advantage of the weak internal controls for their proper self-interest.

In addition to the direct association of internal control with accounting information quality, a larger number of previously studies undertake to assess the implications of internal control on firm activities. In this respect, Cheng *et al.* (2013) outline that ineffective internal control over financial reporting turn out to a significant adverse impact on investment efficiency. In turn, Feng *et al.* (2009) conclude that firms characterized with inventory-related MW appear to systematically have lower inventory turnover ratios and are more liable to report inventory impairments, in respect of those firms having effective internal control over financial reporting.

They have also discovered that the inventory turnover rates, sales, gross profit and operating cash flows turn out to increase those firms that undertaking to remediate MW associated with inventory tracking actions.

2.3 Relationship between internal control components and earnings management

The major administered tests are associated with the assumption that an effective internal control system helps in reducing REM. Such an assumption is made on the basis of the entire internal control system, as a whole. An alternative assumption, however, stipulates that only certain components of such a system may have an effect on the earnings' quality as measured by REM. Indeed, Johnstone *et al.* (2011) find that the most common type of internal control material weaknesses (ICMW) in the COSO framework involves weaknesses in control activities, followed weaknesses in the control environment and in risk assessment. They also reveal that the board of directors seems to play an important role in the remediation of control environment issues, rather than issues such as control activities or monitoring activities. The audit committee has a significant effect on internal control disclosure (Ashfaq and Rui, 2019) and seems most closely tied to remediation of control activity and monitoring ICMWs. Not surprisingly, top management plays a role in the remediation of all types of ICMWs across the COSO framework, which highlights the important role of top management in the remediation process.

It is worth noting that the control environment involves a set of standards of conduct, processes and structures that help provide the basis for carrying out internal control across the organization. The board of directors and senior management establish the top rank regarding the importance of internal control (Goh, 2009; Khlif and Samaha, 2019). The control environment involves the organization's integrity and ethical values, making up the parameters enabling the directors' board to carry out its governance oversight responsibilities; the organizational structure and assignment of authority and responsibility; the process for attracting, developing and retaining competent individuals; and the rigor around performance measures, incentives and rewards to drive accountability for performance (Uwadiae, 1992). As for risk assessment, it involves a dynamic and iterative process useful for identifying and assessing risks attached with the achievement of objectives in relation with the established risk tolerances. In fact, as every entity is faced with a variety of risks emanating from its internal and external environment, risk assessment constitutes the background, whereby risk management could be determined with respect to objectives. Concerning control activities, they constitute the preventive or detective actions established through policies and procedures likely to help ensure that the management's objective risk mitigating directives are actually implemented. In this context, Bargeron *et al.* (2010) find that risk-taking decline significantly for US vs non- US firms after SOX. The magnitudes of the declines are related to several firm characteristics, including pre-SOX board structure, firm size and R&D expenditures. As regard to control activities, they are performed at all levels of the entity, at various stages within the business' processes and over the technology environment. Regarding the area of information and communication, information stands as critical factor, necessary for the entity to execute the internal control responsibilities, useful for sustaining the achievement of its objectives. Management obtains or generates and uses relevant and reliable information as defined from both internal and external sources to maintain support the functioning of internal control. In this respect, internal and external communications represent the continual, iterative process of providing, sharing and obtaining necessary information. With respect with monitoring activities, they are continuous and separate evaluations implemented to ascertain whether each of the five internal control associated components, including controls

useful for ensuring that the principles relevant to each component is actually present and functioning. All findings should be evaluated in respect of the criteria established by regulators, standard-setting bodies or management and the directors' board, while deficiencies need to be communicated to management and the board of directors as appropriate.

2.4 Hypotheses development

As a matter of fact, internal control system proves to have no clear ex ante effect on financial reporting. Relevant arguments highlight the persistence of both positive and negative potential effects on REM practices, as well as reasons to expect negligible changes following ratification of the SOX act. On the one hand, regulators expect that the implementation of an effective internal control improve corporate transparency and increase the quality of financial reporting (COSO, SOX). In this respect, the essence of Section 302 of the SOX act states that both of the CEO and CFO are directly responsible for the accuracy, documentation and submission of all financial reports as well as the internal control structure to the SEC. This responsibility may act as a disincentive for managers to engage in earnings management practices and may put pressure on management to report truthful results. In addition, Section 404 entails that all annual financial reports must include an internal control report stating that management is responsible for an "adequate" internal control structure and an assessment of the control structure's effectiveness from the part of management. Any shortcomings noted in these controls must also be reported. Registered external auditors must also attest to the accuracy of the company management assertion that internal accounting controls are in place, operational and effective.

Instead, should management enjoy strong earnings management incentives, it may opportunistically neglect the internal control procedures' capacity to achieve the desired reporting goals. Furthermore, firms with no incentives to install an effective internal control system may respond to mandatory compliance with a "tick-box" mentality, rather than with sincere efforts to improve their internal control system and, thereby, their reporting quality. Additionally, lax enforcement could well bring about ineffective internal control, thus, restricting their effectiveness in enhancing accounting quality. However, even with perfect enforcement, misunderstandings and miscalculations, collusion, carelessness, distraction and fatigue of the staff and management interventions are likely to shake up internal control quality.

Overall, the internal control system's role in influencing REM practices may well be limited in relation to the other forces' impacts, those relating to the managers' incentives, audit quality, ownership structure, corporate governance provisions, enforcement, regulation and the litigation environment.

Based on the present section advanced discussion, one might well assume that an inefficient internal quality system helps in further in intensifying result manipulation and there after REM. Inversely, however, more effective better internal controls are likely to constrain corporate opportunistic earnings management behavior.

Still the impact of internal control system's quality on REM remains an open empirical question and a subject of intense debate among academics and practitioners. Accordingly, the above arguments lead to the formulation of the following hypothesis, as stated in the following null form.

H1. Internal control system's quality affects the level of REM

Given the fact that REM stands as a latent variable, an appeal is made to the previously conducted studies to develop the corresponding relevant proxies (Roychowdhury, 2006;

Zang, 2012; Gunny, 2005). Accordingly, three metrics are considered to examine the level of real activities manipulations, namely, the abnormal levels of cash flow from operations (CFO), discretionary expenses and production costs. The above-mentioned studies help provide evidence on the construct validity of these proxies.

Hence, it follows that the three following sub-hypotheses could be derived on the basis of the main hypothesis, they are:

H1.1. The quality of the internal control system affects the level of inventory overproduction.

H1.2. The quality of the internal control system affects the level of discretionary expenditures.

H1.3. The quality of the internal control system affects the level of sales manipulation.

3. Data and methodology

3.1 Sample selection

To examine the above-cited hypotheses, company-year observations concerning the French listed companies are used as part of this study, covering the years 2010-2015. The choice of this particular study period has its explanation in the following justifications. Firstly, several regulatory measures were adopted in France during the year 2008 with the aim of consolidating the internal control system. Secondly, we have sought to move away from the subprime crisis for eliminating any potential impact of such a crisis on the firm's internal control system.

Given the specific accounting and financial characteristics of firms operating in the financial sectors, as identified by the global industry classification standard, mainly the insurance companies, credit agencies and banks, we have considered convenient to exclude them. This procedure has its justification in the fact that their inclusion in the sample might well result in biased results (Urquiza *et al.*, 2012).

Data concerning internal control over financial reporting are derived from the annual reports, while the financial statement relating data are obtained from the Data stream database.

In defining the effect of an internal control system, we measure real management every year. Given that our sample is made up of the French companies belonging to the CAC 40 index, the number of observations by sector of activity is low, we use industries in which even one observation is available, by means of one-digit SIC code. Find that accuracy improves as the definition of industry is narrowed from zero to three digits, but that the accuracy of using four digits is no better than that of three digits. The industry distribution is reported in Table 1.

3.2 Internal control measure

The internal control quality is measured via the internal index, as developed by Chen *et al.* (2017) in regard of listed firms in China by tracking their internal control information as drawn from financial statements, CSRC (China securities regulatory commission) filings, government documents and press releases gathered over the period ranging from 2007 to 2010. This index considers controls as not only related to the financial reporting reliability and assets' safeguarding but also as pertaining to the effectiveness and efficiency of operations and compliance with the relevant laws and regulations. It is based on five COSO associated elements, including the control environment, risk assessment, control activities,

Industry	Two-digit SIC codes	Frequency	(%)
General building	15	2	5.88
Special trade	17	1	2.94
Food products	20	3	8.82
Textile mill products	22	1	2.94
Chemicals	28	6	17.65
Petroleum and coal	29	1	2.94
Rubber and plastics	30	1	2.94
Non metal products	32	3	8.82
Machinery and equipment	35	2	5.88
Electronic equipment	36	2	5.88
Instruments products	38	1	2.94
Truck transport	42	1	2.94
Telecommunications	48	4	11.76
Public utilities services	49	1	2.94
Wholesale trade-durables	50	1	2.94
Hotels and other lodging places	70	1	2.94
Business services	73	2	5.88
Social services	83	3	8.82
		34	100

Table 1.
Sample by sector

information and communication as well as internal monitoring. Under each level, there exist a series of sub-level criteria. For instance, the first-level criterion, Control Environment, is divided into six second-level criteria, namely, corporate governance, internal auditing, human resources, employee quality, social responsibility and corporate culture. Every second a sub-level criterion is, in turn, divided into sub-standard levels (third level). As an example, corporate governance includes institutional arrangement, shareholders' composition, board of directors, board of supervisors, management. Finally, every third level criterion is further divided into number of indicators (fourth level). The final index involves five first-level criteria, 24 second-level criteria, 43 third-level criteria and 144 fourth-level criteria.

The findings reached following the study conducted by Rao *et al.* (2017) provide partial support for the associations persistent among the COSO components and enhanced monitoring quality likely to lead to good corporate governance. Evaluation of each element involves a series of indicators. Each indicator takes 1 if the firm does apply it and 0 otherwise. The overall evolutionary system turns out to consist of a total of four levels and 144 indicators. This particular index may be applied to the French context for two main reasons. Firstly, it is based on the COSO relating elements, as well known integrated framework of internal control. Secondly, the AMF authorizes and recommends listed companies to apply this framework.

According to Leuz and Wysocki (2006), the disclosure-associated measures appear to suffer from a number of limitations, more specifically that the selection and coding of the relevant disclosures are subjective. They generally capture the existence of any particular disclosures rather than their attached quality. Moreover, the construction of a single index assigns particular weights to the different disclosure items. In this regard, Chen *et al.* (2017) point out that this criticism also applies to their internal control index. Consequently, the validity of this index must be established in a first place. Based on Doyle *et al.* (2007) and Ashbaugh-Skaife *et al.* (2008) reached findings highlighting that firms enjoying an effective internal control system tend to have high accruals quality, we go on assuming that our

internal control index would, in turn, be related to earnings quality, should it prove to be properly fit for measuring the internal control quality.

It should be noteworthy that earnings management is measured by REM, estimated, by the residuals of the three models related to the proxies of REM. Given that the number of observations by industry is less than six, we use one digit industry. Then, we generate a sample of 204 firm-year observations. We choose REM, as a proxy of earnings management over discretionary accruals for several reasons. First of all, despite the efforts made by researchers in this context, estimating discretionary accruals remain still the subject of criticism (Dammak, 2013). Inspite of existing numerous of models for estimate discretionary accruals (Healy, 1985; DeAngelo, 1986; Jones, 1991; Jones-modified by Dechow *et al.*, 1995; Kothari *et al.*, 2005; Dechow *et al.*, 2003; Dechow *et al.*, 2012), there is no single measure, that is superior for all decision models (Dechow *et al.*, 2010). Secondly, some models require a fairly large number of observations and variables, which make their estimates much more restrictive (Degeorge *et al.*, 2013). Thirdly, the most popular estimation approach is the cross-sectional by year and industry approach and the SIC codes at two-digit level are the most common industry classification used (Di Narzo *et al.*, 2018). However, this approach is impossible due to the lack of sufficient observations in each two-digit SIC code (Ecker *et al.*, 2013). Moreover the effect of internal control quality on discretionary accruals as a measure of earnings management is widely studied in the previous literature (Doyle *et al.*, 2007; Ashbaugh-Skaife *et al.*, 2008; Bedard *et al.*, 2012; Chen *et al.*, 2017). That is why, we exclude discretionary accruals in our research.

3.3 Model specifications

3.3.1 Real earnings management models. Following a number of previously conducted studies, we consider applying three different methods whereby the REM can be appropriately captured. More specifically, we propose to examine the real activities' manipulation increased earnings by reducing the cost of goods sold via overproducing inventory (as measured by the abnormal level of production costs), reducing discretionary expenditures (as measured by the abnormal level of discretionary expenditures) and sales manipulation (as measured by the abnormal level of CFO) (Roychowdhury, 2006; Cohen *et al.*, 2008; Cohen and Zarowin, 2010; Alhadab, 2018). Some earlier conducted studies (Thomas and Zhang, 2002; Baber *et al.*, 1991; Bens *et al.*, 2002) report that managers undertake to overproduce in a bid to decrease the cost of goods sold and resort to cutting the research and development expenses and capital expenditures so as to meet specific earnings targets.

3.3.1.1 Internal control quality and overproduction. For the purpose to reduce fixed costs per unit, firms tend to produce an excessive volume of units. This overproduction of inventories, considered as a means of earnings management, helps in spreading fixed overhead costs over a larger number of units (Cohen *et al.*, 2008). Thus, overproduction could help reduce sales' costs over a current period, thus increasing earnings, if greater inventory holding costs or marginal cost per unit are not offsetting realized cost savings (Gunny, 2010). Noteworthy, however, is that in subsequent periods, high inventory holding costs resulting from an excess of inventories would negatively affect cash flows. The normal production costs' level is measured via implementation of the following model:

$$\frac{PROD}{TAt-1} = \alpha + \beta 1 \frac{1}{TAt-1} + \beta 2 \frac{St}{TAt-1} + \beta 3 \frac{\Delta St}{TAt-1} + \beta 4 \frac{\Delta St-1}{TAt-1} + \varepsilon \tag{1.1}$$

where PROD denotes the sum of the cost of goods sold in year t and the change in inventory from t-1 to t, S stands for net sales and TA designed total assets. The estimated residuals represent the abnormal level of production costs (AB_PROD). Higher residuals indicate greater inventory overproduction, which helps reduce the cost of goods sold and increase earnings.

3.3.1.2 Internal control quality and reducing discretionary expenditures. The previously elaborated literature dealing with real activities management is primarily centered on the reduction of discretionary expenditures, defined as the sum of advertising expense, research and development, as well as selling, general and administrative expenses, undertaken to alter accounting information or to influence contractual outcomes (Cohen *et al.*, 2008; Roychowdhury, 2006). In this regard, Graham *et al.* (2005) find that a larger number of respondents prove to admit opting for reducing discretionary expenditures and/or capital investments rather than engaging in other manipulative methods. Several other studies have been conducted to examine managerial discretion over R&D expenditures (Baber *et al.*, 1991; Dechow and Sloan, 1991; Bushee, 1998; Cheng, 2004), while other works have been specifically elaborated to investigate firms' reduced R&D expenditures (Dechow and Sloan, 1991; Bushee, 1998).

Actually, reducing discretionary expenditures implies that managers try to decrease expenses, as reducing such costs can help boost current period earnings. Such a procedure might well have a negative effect on future cash flow and does not, therefore, represent an optimal long-term operational decision.

According to Graham *et al.* (2005), delaying the launching of a new project or shutting down a research site may well result in weakening the company's competitive advantage in the markets. Actually, the normal discretionary expenditures' level is measured by means of the following model:

$$\frac{DISC}{TAt-1} = \alpha + \beta 1 \frac{1}{TAt-1} + \beta 2 \frac{St-1}{TAt-1} + \varepsilon \tag{1.2}$$

Where DISX stands for the discretionary expenditures (i.e. the sum of R&D expenditure, advertising and SG&A expenditure) in year t. Model (1.2) is estimated for firms-years and the estimated residuals represent the abnormal level of discretionary expenditures (AB_DISX), with lower values indicating greater REM applied to increase earnings.

3.3.1.3 Material weaknesses and sales manipulation. For the sake of increasing reported earnings, managers use different techniques applicable with the current year earnings such as sales' manipulation (Roychowdhury, 2006). In fact, for an attempt to enhancement of the sales volume firms may resort to offering customers abnormal discounts or lenient credit terms. As a result, managers proceed with pulling sales from the upcoming fiscal year into the current year, even if as the expense of reducing cash flows and sacrificing future earnings (Cohen *et al.*, 2008; Gunny, 2010). Besides, re-establishing former prices and payment terms can adversely affect demand should customers defer purchases in an anticipation of more favorable terms to reappear (Roychowdhury, 2006; Gunny, 2010). The normal level of CFO is measured through the application of the following model:

$$\frac{OCF}{TAt-1} = \alpha + \beta 1 \frac{1}{TAt-1} + \beta 2 \frac{\mathrm{S}t}{TAt-1} + \beta 3 \frac{\Delta St}{TAt-1} + \varepsilon \tag{1.3}$$

where OCF denotes cash flow from operations in year t. The model is estimated for firms-years and the estimated residuals represent the abnormal level of operating cash

flows (AB_OCF), with lower values indicating greater REM intended to increase earnings.

3.3.2 Research models. To investigate the multivariate relationship between independent and dependent variables, we performed an ordinary least squares (OLS) regression. To test the effect of internal control index on earnings quality as measured by REM, we undertake, in a first stage, to implement a global measure of real activities' manipulation, controlling for industry and year specifications. The relevant model looks as the following:

$$REM = \beta_0 + \beta_1 IC_I ndex + \beta_2 SIZE + \beta_3 LVE + \beta_4 ROA_{t-1} + \beta_5\ MC + \\ + \beta_6 \Delta\ INCOME + \beta_7\ MB + \beta_8 \sum x_i Industry_{it} + (2)\ \ \beta_9 \sum y_{iYearit} + \ \xi_{it} \tag{2}$$

In a second stage, we proceed with testing the effect of internal control quality on every proxy of REM through application of the following models:

$$APC = \beta 0 + \beta 1 IC_I ndex + \beta 2\ SIZE + \beta 3\ LEV + \beta 4\ ROAt - 1 + \beta 5 MC \\ + \beta 6 \Delta\ INCOME + \beta 7\ MB + \beta 8\ \sum xi\ Industryit + (2)\ \ \beta 9 \sum yiYearit\ \ + \xi it \tag{2.1}$$

$$ADE = \beta 0 + \beta 1 IC_I ndex + \beta 2\ SIZE + \beta 3\ LEV + \beta 4\ ROAt - 1 + \beta 5\ MC \\ + \beta 6 \Delta\ INCOME + \beta 7\ MB + \beta 8\ \sum xi\ Industryit + (2)\ \ \beta 9 \sum yiYearit\ \ + \xi it \tag{2.2}$$

$$AOCF = \beta 0 + \beta 1 IC_I ndex + \beta 2\ SIZE + \beta 3\ LEV + \beta 4\ ROAt - 1 + \beta 5\ MC \\ + \beta 6 \Delta\ INCOME + \beta 7\ MB + \beta 8\ \sum xi\ Industryit + (2)\ \ \beta 9 \sum yiYearit\ \ + \xi it \tag{2.3}$$

where APC, ADE and AOCF stand for the proxies used to measure the firms' earnings management activities; IC_INDEX refers to the Internal Control Index; SIZE represents the natural logarithm of assets; LEV is the total liabilities to total assets ratio; ROA_{t-1} is calculated as net income before extraordinary items, scaled by the average total assets of fiscal years t_1 and t_2; LOGMC is The natural logarithm of market capitalization; Δ INCOME is the change marked in a the company's annual net income before extraordinary items, as scaled by the beginning of the year total assets; MB denotes the market equity value to book equity ratio. To capture possible effects related to the year and the industry, year and industry dummies are incorporated.

The models include control variables involving company characteristics such as size, leverage, market capitalization, lagged ROA, income variation and price to book ratio. Most of the previously conducted studies have discovered that such characteristics prove to have an impact on financial information quality (Doyle *et al.*, 2007a; Chan *et al.*, 2008; Ashbaugh-Skaife *et al.*, 2008; Nagy, 2010; Bedard *et al.*, 2012). As financial reporting quality prove to depend highly on the effectiveness of associated internal controls, most of these company characteristics turn out to be closely are also related to the internal control associated quality

(Ashbaugh-Skaife *et al.*, 2007; Doyle *et al.*, 2007 b; Alzeban, 2019) and to the MW remediation process (Bedard *et al.*, 2012).

4. Results and discussion

4.1 Descriptive analysis

The description of our final sample is provided in Table 1, which includes 34 firms. The above data filtering process generates a sample of 204 firm-year observations. The industry distribution, which reported in Table 1, illustrates that the sector with the highest frequency is from Chemicals (two-digit SIC code 28; six firms or 17,65% of the sample); followed by Telecommunications (two-digit SIC code 48; four firms or 11,76% of the sample); Non-metal products (two-digit SIC code 32; three firms or 8,82% of the sample) and Social services (two-digit SIC code 83; three firms or 8,82% of the sample).

Table 2 illustrates the descriptive statistics relevant to the variables subject of the sample. The mean values of the dependent variables APC, ADE and AOCF turn to be 0.50, 0.180 and 0.09 respectively. As for IC index, it bears a mean of 0.00 ranging between −30.14 and 30.26. Besides, a high market to book ratio (MB) has to be noted with a mean value of rate of 30.42. As regard the size variable mean value of size, it turns around 70.44.

4.2 Univariate analysis

Table 3 reports the Pearson correlation coefficients between the dependent variable and the continuous independent ones. The APC, ADE and AOCF turn out to be negatively and significantly associated with the IC index. Therefore, the univariate analysis proves to support the *H1* stipulating that internal control play a remarkable role in reducing REM in the French context.

Variables	Obs	Mean	Std. dev.	Min	Max
APC	204	0.50	0.36	−0.13	30.03
ADE	204	0.18	0.03	−0.07	0.26
AOCF	204	0.09	0.15	−0.02	20.02
REM	204	0.23	0.31	−10.39	20.41
IC INDEX	204	0.00	0.99	−30.14	30.26
CTRLENV	188	−10.94	70.68	−400.79	100.26
RISK	195	−10.26	60.31	−201.00	200.73
CTRACI	195	0.74	60.78	−500.03	200.41
INFOCOMM	195	0.74	60.60	−200.25	300.98
MONITOR	195	−0.37	60.83	−200.27	100.77
SIZE	204	70.44	0.69	−0.75	80.33
LEV	204	0.35	0.66	0.01	70.65
ROA	204	0.02	0.03	−0.05	0.31
LOGMC	204	70.23	0.62	0.01	80.01
Δ *INCOME*	204	0.04	0.51	−0.12	70.26
MB	204	30.42	30.32	0.00	230.91

Notes: APC, ADE and AOCF are the proxies used to measure firms' earnings management activities; IC_INDEX is the internal control index; SIZE is the natural logarithm of assets; LEV is the ratio of total liabilities to total assets; ROA_{t-1} is calculated as net income before extraordinary items, scaled by the average total assets of fiscal years t_1 and t_2, LOGMC = The natural logarithm of market capitalization; Δ INCOME is the change in a company's annual net income before extraordinary items, scaled by the beginning of the year total assets; MB is the ratio of market equity value to book equity

Table 2.
Descriptive statistics

Table 3.
Correlation matrix

Variables	APC	ADE	AOCF	REM	IC INDEX	CTRLENV	RISK	CTRACI	INFO COMM	MONITOR	SIZE	LEV	ROA	LOGMC	INCOME	MB
APC	1															
ADE	0.1698**	1														
AOCF	0.4381*	−0.3883*	1													
REM	0.9170*	0.2946	0.0495	1												
IC INDEX	−0.1410**	−0.1097**	−0.0697**	−0.1179	1											
CTRLENV	−0.0988	−0.101	−0.0484	−0.0806	0.5343**	1										
RISK	−0.1134	0.0944	−0.0325	−0.1224	0.4649*	0.2781*	1									
CTRACI	0.1409	−0.0256	0.1599*	0.0859	−0.3612*	0.0026	−0.0406	1								
INFOCOMM	−0.1027	−0.0935	−0.0750*	−0.0729	0.7445*	0.3621 *	0.3003*	−0.2645**	1							
MONITOR	−0.1747 **	−0.0928	−0.0709*	−0.1574*	0.7301*	0.4236**	0.3748**	−0.1846*	0.4155*	1						
SIZE	0.1061	0.4896*	−0.7099*	0.4237 *	0.0556	−0.0954	−0.0224	−0.1841*	0.1028	−0.0512	1					
LEV	−0.0958	−0.6295*	0.6439*	−0.3673*	−0.0947	0.0005	−0.132	0.0993	−0.0334	0.0154	−0.7513*	1				
ROA	0.0008	−0.5061*	0.6397*	−0.2655*	0.0228	−0.0765	−0.0366	0.0836	−0.0146	0.0689	−0.7170*	0.55	1			
LOGMC	0.0174	0.4138*	−0.7473 *	0.3469 *	0.0366	−0.1464*	−0.052	−0.1659*	0.0832	−0.0287	0.8676*	−0.6478	−0.4898**	1		
Δ INCOME	0.0114	0.6132*	−0.8950***	−0.3682*	0.0041	0.0108	0.0009	0.1107	−0.0196	0.0123	−0.8415*	0.7832*	0.7462*	−0.8271	1	
MB	−0.1475*	−0.2067*	−0.1369 *	−0.3682	0.0041	−0.0201	−0.1777*	0.1081	0.026	−0.0279	0.0948	−0.0345	0.0768	0.1343*	−0.0731	1
VIF																
IC INDEX	CTRLENV	RISK	CTRACI	INFO COMM	MONITOR	SIZE	LEV	ROA	*LOGMC*	Δ INCOME	MB					
6.41	1.7	1.44	1.34	2.6	2.58	4.91	3.31	2.83	8.76	5.49	1.12					

Notes: *Correlation is significant at the 0.05 level. **Correlation is significant at the 0.01 level. Mean VIF 3.07

With respect to the control variables, namely, Size, LEV and LOG MC, they are discovered to be positively and significantly associated with REM measured by discretionary expenditures, while the variable size appear to be negatively associated with abnormal operating cash flow respectively (−0.7099, −0.7473). Concerning the remaining control variables, involving income variation, ROA and leverage, their association with the REM associated proxies appear to be negatively and significant. It should be noted, here, that the IC index is not linked to all the control variables.

Besides, we examine the variance inflation factor (VIF) of all variables in the estimation of the main regression model and find that the VIFs of all the variables is 3.07, which is much lower than the common rule of 10 as a sign of severe multicollinearity. This result indicates that none of the correlations are large enough to raise concern related to multicollinearity (Evrard *et al.*, 2003).

4.3 Multivariate analysis

In this research, we use OLS regressions to examine the effect of our internal control index on REM. Following Lenard *et al.* (2016), we estimate regressions for every industry, every year, via the Hausman and Breush-Pagan Tests.

Our multivariate analysis is conducted following two step procedure. In a first step and in consistence with Zang (2012) and Cohen and Zarowin (2010), the *AOCF* and *ADC* are multiplied by minus one, thus, the higher the amount of *AOCF* and *ADE* are, the more likely it is for the firm engaging in sales manipulation practices mainly through price discounts and discretionary expenses cuts. In a second step and in conformity with the previously conducted studies (Zang, 2012; Cohen *et al.*, 2008; Cohen and Zarowin, 2010; Zhao *et al.*, 2012), we proceed with combining the individual measures to end up with computing a special total *REM* relating measure. For the sake of avoiding the sample reduction, the *REM* is set to equal the algebraic sum of the three individual measures (*APC*, ADE and *AOCF*).

The empirical results are based on both of the aggregate *REM* along with the individual REM proxies (*APC, AOCF* and *ADE*).

On using a sample comprising a set of non-financial CAC 40 French companies to test whether the internal control quality is actually associated with earnings management, the following Models (2.1), (2.2) and (2.3) are estimated. Table 4 reports the results relevant to the impact of internal control system on REM. Concerning the *REM,* applied as a dependent

Variables	Coef	Std err	T	P > |t|
CONSTANT	−1.0033	0.6825	−1.51	0.130
IC INDEX	−0.0489	0.0225	−2.17	0.030
SIZE	0.2641	0.1011	2.61	0.009
LEV	−0.0248	0.0629	−0.39	0.693
ROA t-1	2.9066	1.6626	1.75	0.080
LOG MC	−0.0795	0.1163	−0.68	0.495
Δ *INCOME*	−0.1204	0.1410	−0.85	0.393
MB	−0.0071	0.0074	−0.96	0.336
Industry	Yes			
Year	Yes			
Hausman test				
$\chi^2 = 23.98$ (0.0011)				
Breusch-pagan				
Wald $\chi^2 = 99.90$ (0.0000)				

Table 4.
Results of REM (global measure)

variable, the reached results turn out to provide some evidence that the internal control system related quality proves to have a negative and a significant impact on REM, highlighting that the French firms enjoying an effective internal control do not appear to engage in manipulating their real activities.

Table 5 reveals that similar results apply to the individual REM associated proxies (*APC*, ADE and *AOCF*). Firstly, panel A indicates that the relevant coefficient IC-index turns to be

Variables	Coef	Std err	T	P > |t|
Panel A Results of Abnormal production costs (APC)				
CONSTANT	−0.86232	0.8829	−0.98	0.329
IC INDEX	−0.0647	0.0290	−2.23	0.026
SIZE	0.2854	0.1287	2.22	0.027
LEV	−0.0579	0.0814	−0.71	0.477
ROA t−1	3.1435	2.0427	1.54	0.124
LOGMC	−0.0622	0.1473	−0.42	0.672
Δ *INCOME*	0.1514	0.1787	0.85	0.397
MB	−0.0086	0.0094	−0.92	0.358
Industry	Yes			
Year	Yes			
Hausman test				
$\chi^2 = 26.07$ (0.0005)				
Breusch-pagan $\chi^2 = 507.78$ (0.000)				
Panel B Results of discretionary expenditures (ADE)				
CONSTANT	0.2659	0.0034	6.16	0.000
IC INDEX	−0.0026	0.0065	−1.74	0.082
SIZE	−0.0029	0.0042	−0.44	0.657
LEV	−0.0147	0.1009	−3.48	0.000
ROA t-1	0.0128	0.0074	0.13	0.898
LOG MC	−0.0033	0.0091	−0.45	0.654
Δ *INCOME*	−0.0354	0.0004	−3.90	0.000
MB	−0.0011	0.0431	−2.34	0.019
Industry	Yes			
Year	Yes			
Hausman test				
$\chi^2 = 29.83$ (0.0001)				
Breusch-pagan				
$\chi^2 = 320.36$ (0.0000)				
Panel C Results of abnormal operating cash flow (AOCF)				
CONSTANT	−0.0906	0.1203	−0.75	0.451
IC INDEX	−0.0140	0.0040	−3.45	0.001
SIZE	0.0458	0.0187	2.44	0.015
LEV	−0.0230	0.0113	−2.03	0.042
ROA t-1	0.3214	0.3249	0.99	0.322
LOG MC	−0.0233	0.0216	−1.08	0.281
Δ *INCOME*	0.2890	0.0264	10.94	0.000
MB	−0.0032	0.006	−1.77	0.088
Industry	Yes			
Year	Yes			
Hausman test				
$\chi^2 = 61.25$ (0.000)				
Breusch-pagan				
$\chi^2 = 1011.41$ (0.0000)				

Table 5.
Results of multivariate analysis

is negative and highly significant at the 5% level (p-value = 0.026) with respect to APC dependent variable. Such result indicates clearly that the internal control system' quality helps greatly in decreasing inventories' overproduction. Accordingly, an effective internal control based on a segregation of duties, authorization and good governance should ensure a good inventory management to be maintained, thereby, reducing overproduction.

Secondly, by an estimation of Model (2.2) implemented to test whether the IC-index is associated with reduction in discretionary expenditures, leads to the results depicted in Panel B (Table 5). The attained findings indicate well that the internal control quality is negatively and significantly (−0.0026) related to abnormal discretionary expenditures at the 10% level (p-value = 0.082). Besides, evidence also suggests that companies with an effective internal control system do not undertake to reduce then discretionary expenses to manage earnings. Concerning the third proxy, Panel C (Table 5) highlights well that the IC-index is negatively and significantly associated with abnormal operating cash flows, suggesting well that a good internal control system helps remarkably in decreasing the sales' manipulation practices.

Moreover, the multivariate analysis as figuring on Tables 4 and 5 proves to support the research hypothesis is suggesting that the level of REM tend to decrease when the internal control quality turn out to be higher. Overall, as our revealed results, as attained via the applied models, appear to corroborate the findings published by Doyle *et al.* (2007), Ashbaugh *et al.* (2008), Jarvinen and Myllymäki (2016) and Cohen *et al.* (2008), there is ground to establish the validity of our index by confirming the establishment of a relationship between internal control quality and earnings quality.

In regard of the control variables, the relevant results reveal that size stand as significantly and positively associated with abnormal overproduction as well as with abnormal operating cash flows. This finding suggests that firm size helps in kindling the managers' incentives to manipulate earnings. Besides, leverage, Δ Income and market-to-book ratio have significant and negative coefficients when real management is proxied by means of discretionary expenditures and abnormal operating cash flow. This result suggests that the persistence of debts decreases the incentives to manage earnings.

4.4 Additional analysis

Ongoing further with the analysis, one could even dislocate the IC index into its five components: control environment (CtrEnv), risk assessment (Risk), control activities (CtrAct), information and communication (InfoCom) and monitoring (Monitor).

Regarding Model 2.1 where the APC is the dependent variable, the coefficients associated with the control activities and Monitor are significantly negative. Such results are justified by the fact that the control activities stand as actions established through policies and procedures helping ensure that the management's risk mitigating directives, related to the achievement of objectives, are actually implemented and carried out. Control activities are performed at all levels of the entity, at various stages and over the technology environment. They are preventive or detective in nature and could involve a range of manual and automated activities such as authorizations, approvals, verifications, reconciliations and reviews of operating performance, leading to a better financial reporting (Uwadiae, 2015; Anh *et al.*, 2020).

With reference to Model 2.2, only the control environment, as a component of internal control, stand as significantly and negatively associated with the dependent variable ADE at the 10% level. According to Committee of Sponsoring Organizations of the Treadway Commission (COSO) (1992), "the control environment is the foundation for all other components of internal control". This component measures the firm's strength

level of corporate governance, internal auditing and human resources. It helps organizations to capture the fraud-prevention mechanism established in a firm. Therefore, firms enjoying a strong control environment or an established fraud-prevention mechanism appear to be characterized with a lower level of earnings management practices. Our reached findings are notably consistent with those documented by Doyle *et al.* (2007) and Chen *et al.* (2017).

Relating to Model 2.3, where the AOCF is the dependent variable, the coefficient associated with the risk assessment, control activities and monitor are significantly negative. These components have a positive effect on the effectiveness of internal control in the entity, which enables personnel to understand internal control responsibilities in support of achievement of its objectives (COSO, 2013) and thus reducing the level of earnings management. Besides, the most of control variables such as Size, Leverage, Δ Income and MB are significant in this model.

Eventually, using the aggregate REM, only two components of internal control namely the control activities and monitor are significant, suggesting that high monitoring can be effective in reducing REM. These findings are confirmed with Chen *et al.* (2017). Additionally, negative link between monitoring activities and REM (as aggregate measure or its components) may be explained by the fact that these activities are used to make sure that the principles within each component, is present and functioning and to evaluated against criteria established by regulators, standard-setting bodies or management and the board of directors. Hence, monitoring activities should limit discretionary power of management to manage earnings through overproduction, discretionary expenses or sales policies. Furthermore, the negative association between risk assessment and REM could be due to this internal control component serving to identify, estimate and manage risks to the achievement of the reliability of financial information' objective. Therefore, this process can reduce the manipulation of real operational activities. (Table 6)

5. Robustness test: controlling for endogeneity

In our primary tests, we examine the hypothesis that an effective internal control system reduces real activities manipulation. Following Lenard *et al.* (2016), we control for endogeneity using the dynamic panel data approach. This two-stage system, using the generalized method of moments (GMM) model, treats all explanatory variables as endogenous and orthogonally uses lagged values as instruments and checks for both forms of causation–from internal control quality to REM and from REM to internal control quality, in the event this relation were to occur. Table 7 reports the estimation results. The significant *F*-test shows the model is well fitted suggesting that the instruments are valid in the two-stage system GMM model. The negative association of IC-index with REM indicates a higher level of real activities manipulation in firms with poor internal control system. Notably, the results of dynamic two-stage model indicate that the causality direction is only from IC-index to REM because the coefficient of IC-index is still significant, as previously reported in Tables 4 and 5, after controlling for endogeneity. In other words, the direction confirms that internal control effectiveness prompt firms to decrease real activities manipulation for our sample of firms. Results are the same when we take APC, ADE and AOCF as dependent variables.

Eventually, we perform our results using the method of three-stage least squares regressions (3SLS). Table 8 confirmed the results found in Table 7 showing a negative association of IC-index (-0.0517, $p = 0.008$) with REM.

Variables	*APC*		*ADE*		*AOCF*		*REM*	
	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|	Coef	P>|t|
CONSTANT	−0.7195	0.328	0.329	0.000	0.025	0.849	−1.07415	0.078
CtrlEnv	0.0047	0.192	−0.00029	0.099	0.0002	0.679	0.00478	0.114
Risk	−0.0071	0.138	−0.00015	0.524	−0.0014	0.099	−0.00555	0.164
CtrAci	−0.0104	0.009	−0.00019	0.324	−0.0015	0.027	−0.00904	0.006
InfoComm	0.0026	0.546	−0.00002	0.921	0.0004	0.592	0.00226	0.537
Monitor	−0.0110	0.033	−0.00005	0.822	−0.0165	0.078	−0.00933	0.03
Size	0.3373	0.004	−0.00338	0.556	0.0485	0.021	0.29217	0.002
LEV	−0.0536	0.410	−0.0014	0.000	−0.0206	0.080	−0.01836	0.733
ROA	0.0761	0.042	−0.0040	0.410	0.3992	0.237	3.30843	0.032
LOGMC	−0.1301	0.322	−0.0064	0.326	−0.0250	0.294	−0.09872	0.364
Δ *INCOME*	0.0922	0.541	−0.0418	0.000	0.2816	0.000	−0.14751	0.238
MB	−0.0151	0.060	−0.0011	0.004	−0.0034	0.019	−0.01054	0.113
Industry	Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes	
Hausman test	10.83 (0.4579)		249.61 (0.0000)		52.70 (0.0000)		45.35 (0.000)	
Breusch-pagan	41.26 (0.000)		0.57 (0.4505)		0.64 (0.5585)		0.4 (0.5264)	

Table 6.
Effect of the internal control index components on REM

Table 7.
Dynamic two-stage GMM regression results

Variables	*REM* Coef	*REM* Sign	*APC* Coef	*APC* Sign	*ADE* Coef	*ADE* Sign	*AOCF* Coef	*AOCF* Sign
CONSTANT	0.0402	0.786	0.6892	0.000	−0.4801	0.000	0.6171	0.000
IC INDEX	−0.0212	0.000	−0.0252	0.000	−0.0027	0.025	−0.0042	0.000
SIZE	0.0627	0.015	−0.0115	0.719	0.0951	0.000	−0.0476	0.000
LEV	0.0286	0.271	0.0202	0.417	−0.0453	0.000	0.0161	0.139
ROA t-1	0.6057	0.000	−0.0287	0.895	−0.4476	0.000	−0.6156	0.000
LOG MC	−0.0441	0.006	−0.0225	0.320	−0.0034	0.416	−0.0259	0.000
Δ INCOME	−0.2796	0.000	−0.1061	0.005	0.1304	0.000	0.1842	0.000
MB	−0.0048	0.011	−0.0048	0.049	−0.0012	0.097	0.0001	0.815
REM	−0.0141	0.001						
APC			0.0011	0.887				
DISC					−0.0310	0.131		
AOCF							0.0691	0.000

Table 8.
Three-stage least squares (3SLS) regression results

Variables	*REM* Coef.	*REM* $P>z$	*APC* Coef	*APC* $P>z$	*ADE* Coef	*ADE* $P>z$	*AOCF* Coef.	*AOCF* $P>z$
CONSTANT	−1.0119	0.025	−0.8115	0.141	0.2659	0.000	−0.0655	0.525
IC_INDEX	−0.0517	0.008	−0.0724	0.003	−0.0046	0.001	−0.0160	0.000
SIZE	0.2941	0.000	0.3443	0.001	−0.0009	0.869	0.0511	0.006
LEV	−0.0297	0.574	−0.0734	0.257	−0.0180	0.000	−0.0256	0.034
ROA_{t-1}	3.1643	0.028	3.3866	0.055	−0.0431	0.674	0.2654	0.421
LOG MC	−0.1310	0.124	−0.1702	0.102	−0.0093	0.124	−0.0298	0.125
Δ INCOME	−0.1229	0.271	0.1611	0.238	−0.0241	0.002	0.3082	0.000
MB	−0.0146	0.013	−0.0215	0.003	−0.0018	0.000	−0.0049	0.000
RMSE	0.2711		0.3315		0.0192		0.0620	
R-SQ	0.2397		0.1404		0.5229		0.8322	
χ^2	64.31		33.31		223.60		1,011.41	
p-value	0.000		0.000		0.000		0.000	

6. Summary and conclusion

The present study is designed to examine the association between internal control quality and earnings management as implemented through manipulation of real operational activities. On applying an index selected to comprehensively evaluate the firm's internal control based on the COSO framework, our attained empirical findings appear to reveal that the three measures associated with REM turn out to be negatively and significantly associated with the IC-index. More specifically, the results suggest that the inventory overproduction factor proves to be useful for implementation as an earnings management method concerning the case in which companies are characterized with low market capitalization and leverage levels.

Noteworthy, also, are that companies appear to cut on discretionary expenditures when they turn out to have effective internal controls and when they have gone through a previously poor market-to-book ratio situation. In terms of sales manipulation, the reached results prove to corroborate the previous findings published in the relevant literature. More particularly, they appear to validate the index developed by Chen *et al.* (2017) by confirming the persistence of a commonly recognized relationship binding internal control quality and earnings quality in the French context. On categorizing our IC index into its five

components, namely, control environment (CtrEnv), risk assessment (Risk), control activities (CtrAct), information and communication (InfoCom) and monitoring (Monitor), the achieved results turn out to reveal that on placing APC and AOCF as the dependent variables, the coefficients associated with CtrAct and Monitor proves to be significantly negative. As for control environment, it appear to display a significantly negative association with the dependent variable ADE. Actually, the analysis reached results prove to sustain the idea that the companies, which draw on the COSO's internal control framework, should gain profitable benefit from a better understanding of the direct, indirect and reciprocal associations persistent between the internal control systems' various components. Such advantages and benefits may well provide companies with valuable assistance as to enhancing their corporate governance practices toward the achievement of operational, financial reporting and compliance objectives (Rae *et al.*, 2017).

The findings released by the present study should be of certain interest to several parties. Mainly, regulators are highly interested in internal control system relating costs and benefits. Indeed, our achieved findings prove to highlight well the fact that an effective internal control leads to decreased earnings management and therefore a better information quality.

In addition, specialist academics are also extremely interested in further exploring the internal control area. The findings provided shed new light and deeper insight on the association binding internal control system's quality and the earnings management as observed within the context of existing MW.

Finally, firms are likely to be interested in the issues raised in this study. Firms should strive to improve their internal control systems to produce a reliable and effective financial information while maintaining (and/or protect) good reputations on the markets.

Nevertheless, this study is not void of limitations. Firstly, the sample exclusively involves the treatment of the CAC 40 index. For instance, the results reached following investigation of this particular sample may be further extended to include CAC All Tradable index. Secondly, the dependent variable measure, namely real earnings management, might well turn out to be biased due, mainly, to an erroneous use of the models. Hence, the inclusion of other earnings management relating proxies could well help in further improving the reached findings.

Notes

1. Mouvement des entreprises en France (Entreprises' mouvement in France).
2. Association Française des entreprises privées (The French Association of private entreprises).
3. Compagnie nationale des commissaires aux comptes (The national company of accounting commissionner).

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