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ORIGINAL PAPER

The effect of internal control quality on real and accrual-based earnings management: evidence from France

Mounia Boulhaga[1] · **Abdelfettah Bouri**[1] · **Hany Elbardan**[2]

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Abstract

This paper examines the effect of internal control (IC) quality, measured by IC weakness disclosures, on the quality of financial statements' information, measured by real and accrual-based earnings management. The sample consists of 686 firm-year observations of French non-financial companies listed in the SBF 120 index during the period between 2012 and 2018. Using ordinary least squares (OLS) and generalized method of moments (GMM) regression, our empirical results indicate that IC weakness disclosures are positively and significantly related to real activities manipulation and negatively associated with discretionary accruals. This provides empirical evidence that a good system of IC reduces accrual-based earnings management activities and improves the reliability of financial statements; however, it cannot control real earnings management (REM). The research findings are of practical interest not only to financial analysts, auditors, and investors—guiding them to pay attention to REM activities in case of disclosures of IC weaknesses—but also to regulators, who may consider additional disclosure requirements when reporting material IC weaknesses and designing policies that could help in reducing REM practices.

Keywords Internal control weaknesses · Real earnings management · Discretionary accruals · Generalized method of moments (GMM)

✉ Hany Elbardan
hany.elbardan@gmail.com

Mounia Boulhaga
mouniabensalem11@gmail.com

Abdelfettah Bouri
bouriabdelf@gmail.com

[1] Faculty of Economics and Management of Sfax, University of Sfax, Sfax, Tunisia

[2] Bournemouth University Business School, UK, Faculty of Commerce, Alexandria University, Alexandria, Egypt

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1 Introduction

Recurrent corporate financial scandals indicate that executives exercise some discretion over the reported accounting results in financial statements, which may not accurately reflect the economic reality of firms; executives exercise such discretion either to mislead shareholders or to obtain certain private benefits at the expense of other stakeholders (Healy & Wahlen, 1999; Hu et al., 2020; Prior et al., 2008). This opportunistic behaviour of managers, involving the use of discretion, is known as the managing of the results. Internal control (IC) is an important mechanism through which to ensure the quality of financial reporting by controlling the management of the results. The IC process is designed to provide reasonable assurance regarding the achievement of organizational objectives; that is, the efficiency and effectiveness of operations, the reliability of financial information, and compliance with regulations and laws (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2013). Previous studies suggest that a weak system of IC can increase the likelihood of material errors and financial misrepresentation (Bell & Carcello, 2000; Ji et al., 2020; Kinney & McDaniel, 1989). Thus, it may increase the likelihood that a company will manipulate its results (Bizarro et al., 2011); a weak system of IC creates more opportunities for intentional profit management and unintentional accounting estimation errors (Ashbaugh-Skaife et al., 2009; Doyle et al., 2007; Ji et al., 2020).

Financial scandals have led to the loss of confidence of fund providers in the credibility of financial reporting (Li et al., 2020; Liu et al., 2020). To restore this confidence, the Sarbanes–Oxley Act (SOX), which was a response to numerous financial scandals and corporate bankruptcies (Altamuro & Beatty, 2010), focuses on the obligation on the part of management and the auditor to assess IC over financial reporting. This is to ensure that IC reduces the risk of procedural errors and random estimates in annual reports, limits the intentional manipulation of information, and mitigates the risks inherent in business strategies and operations that may affect the quality of information reported (Brown et al., 2014). Although the effectiveness of such regulations concerning IC is still debated and remains controversial (Bedard & Graham, 2011; Rice & Weber, 2012), many countries have enacted IC reforms. For example, Japan has implemented an internal reporting system but with less stringent requirements for all listed companies (Nishizaki et al., 2014). Other countries, such as the UK and certain EU member states, have taken a broad approach that involves the IC system in the entire management process, rather than just focusing on financial reports (Deumes & Knechel, 2008). However, the extant literature has mainly focused on the consequences of SOX (e.g., Ashbaugh-Skaife et al., 2008; Doyle et al., 2007; Jarvinen & Myllymäki, 2016; Patterson & Smith, 2007; Schroeder & Shepardson, 2016); scant evidence is provided on the impact of IC regimes on reporting quality in other developed countries (e.g., Brown et al., 2014; Dutillieux et al., 2016; Enomoto & Yamaguchi, 2017; Hu et al., 2020). For example, Germany adopted its control

legislation, which resulted in an improvement in the quality of financial reporting (Brown et al., 2014). In addition, the quality of financial reporting improved after the adoption of the Canadian IC regime (Lu et al., 2011).

The emphasis on IC reflects the perception that effective IC can reduce or prevent the misrepresentation of the economic performance of companies. Thus, a weak IC system can constitute an opportunity for real or accrual-based earnings management. REM is defined as management action not taken following normal business practice to exceed or meet certain revenue thresholds (Roychowdhury, 2006). Companies use REM to avoid losses and to exceed or meet analyst forecasts. Managers increase revenues by offering price discounts and lenient credit terms and reducing the cost of inventory sold through overproduction, which reduces the fixed production costs allocated to each inventory (Zang, 2012). Furthermore, managers reduce discretionary expenses such as research and development (R&D) and advertising to increase earnings (Roychowdhury, 2006; Zang, 2012). REM is undesirable for stakeholders because it may reduce the value of a firm in future periods, as customers may demand a reduced sale price in the future. Sales on credit can increase bad debts and opportunity costs because receivables must be financed, while excessive available inventory leads to additional carrying costs and the risk of impairment if the net realizable value falls below the cost of such inventory. Reductions in advertising and R&D costs may reduce future revenues and potentially cause firms to lose their competitive advantage. On the other hand, weaknesses in IC could cause accrual-based earnings management because of intentional and unintentional errors in accrual estimation and low accrual quality. This can ultimately affect the reported financial statements' quality, which is the main concern of shareholders. When a company has weak IC, intentionally biased discretionary accruals might be greater due to the failure to limit management's ability to manage profits, while unintentional accrual estimation errors might be higher, permitting more procedural errors (Doyle et al., 2007).

Some US-based research indicates that SOX has successfully incentivized firms to have stronger IC, thereby improving the accuracy of firm disclosures and the efficacy of operations (e.g., Ashbaugh-Skaife et al., 2008; Feng et al., 2015; Patterson & Smith, 2007; Schroeder & Shepardson, 2016). IC regulations have also had an impact on reporting quality in other jurisdictions, such as Germany (Brown et al., 2014), Belgium (Dutillieux et al., 2016), Japan (Enomoto & Yamaguchi, 2017), and China (Hu et al., 2020). Empirically, there is a disagreement between researchers on the effect of the quality of IC systems on the quality of financial reporting. A positive effect of IC on earnings management practices has been confirmed by Nakashima and Ziebart (2015), Lenard et al. (2016), Jarvinen and Myllymäki (2016), and Ji et al. (2017). On the other hand, Lu et al. (2011) and Wali and Masmoudi (2020) have found a negative influence. The mixed empirical results can be explained by the failure to consider the endogeneity bias. Following Wintoki et al. (2012) and Lahouel et al. (2019), simultaneity, heterogeneity, and dynamic endogeneity are the main sources of endogeneity bias; these are absent from the previous empirical literature. Moreover, the empirical results mentioned above cannot be generalized to other contexts because of the differences in the institutional environments, such as in France.

France, after being shaken by its scandals with the case of the Vivendi Company, adopted the law on financial security that strengthens the legal provisions in corporate governance (Wali & Masmoudi, 2020). In France, the Grenelle II law requires listed firms to disclose their societal commitments in terms of sustainable development through enhancing ICs and reducing earnings management. Analyzing the period following the implementation of this regulation provides richer information regarding auditors' and regulators' focus on reducing earnings management practices. This has prompted researchers to study the implications of this law for the reliability of accounting information and remedies for the manipulation of financial information, as well as the impact of the implementation, evaluation, and monitoring of an effective IC system on the quality of financial information. Therefore, the objective of this paper is to study the effect of IC weaknesses on not only real but also accrual-based earnings management in French companies belonging to the SBF 120 index. To improve the estimation by reducing heterogeneity between variables, we set up a GMM estimator system. This method provides solutions to the problems of reverse causality, omitted variable bias, and simultaneity, which were unaddressed in prior studies. In addition, it makes it possible to control specific temporal and individual effects (Blundell & Bond, 1998; Lahouel et al., 2019).

This paper extends the previous studies, thereby making distinct contributions. This paper contributes, first, by expanding the scope of research beyond the focus on the link between IC and earnings management as proxies via only one accrual-based or REM, by considering both. Whereas most of the prior literature applies the level of accruals to measure earnings management (e.g., Ashbaugh-Skaife et al., 2008; Cohen et al., 2008; Doyle et al., 2007), fewer studies have examined the possibility that an ineffective IC system will entice managers to manage real activities to distort earnings, and only a few have considered both accrual-based and REM.

Second, prior research mainly focuses on the consequences of IC regulation and its impact on jurisdictions and enforcement, especially concerning the impacts of SOX in the US (e.g., Jarvinen & Myllymäki, 2016; Schroeder & Shepardson, 2016). This research extends the extant research by examining the impact of IC quality on real and accrual-based earnings management in the French context. To the best of our knowledge, our research is one of the few that used a French dataset of real and accrual-based earnings management measures of earnings manipulation to provide a comprehensive assessment of the effect of IC quality on earnings quality. In fact, in terms of IC reporting obligations, the French scenario significantly differs from those of the United States. In this vein, SOX Section 404 requires the managers to document their evaluation of the efficacy of the IC systems. Inadvertently, IC flaws cast doubt on the managers' ability to provide financial reports. As a result, a poor IC system may persuade managers to manage earnings through business operations by controlling sales, manufacturing costs, and discretionary spending (Wali & Masmoudi, 2020). Article 116 of the legislation on financial security (LSF, 2003) in France mandates management to report on IC practices, which implies that enterprises should share only information following this article. Furthermore, following the publication of the corporate governance code (AFEP/Mouvement of French enterprises [MEDEF], 2008), listed French firms are free to choose between different IC frameworks, such as the corporate governance requirements, AMF (the authority

of the financial markets), or COSO. Therefore, these rules may have various effects on the earnings management methods in France. COSO 1992 was updated in 2013, maintaining the definition, the five components and essential IC evaluation criteria, to consider the changes in the commercial and operational environments over the course of the last two decades. The contributions of the new COSO are essential and include the support of an "effective" organization on three lines of control: management risks; operational management; internal audit. AMF framework was proposed in 2007, providing that "each company is responsible for its organization and therefore of its internal control". It includes general principles of internal control and risk management; two general questionnaires, one relating to accounting and financial internal control, the other relating to risk analysis and control, an essential component of any internal control system; an application guide relating to internal control and risk management of accounting and financial information published by issuers. The AMF frame is largely inspired by COSO. The AMF framework appears to be used by half of the SBF 120 enterprises to educate shareholders on their risk management and IC practices (Mandzila & Zéghal, 2016).

Third, prior research is limited to the setting of the IC system, with a focus on financial reporting in particular. As a result, it is unclear if IC flaws other than those in financial reporting have any impact on earnings quality. Given that financial reporting is an integral component of a company's operations and that the quality of financial disclosures is affected by all parts of business management, our study argues that a broader scope of IC weakness disclosure impacts earnings management. Therefore, this seems to be consistent with the belief that diverse aspects of IC must work together to reduce corporate risks.

This research shows that the disclosure of IC weaknesses in French companies is positively and significantly related to real activities manipulation and negatively associated with discretionary accruals. The findings of this article provide empirical evidence that a good system of IC reduces accrual-based earnings management activities and improves the reliability of financial statements. Our paper adds to previous studies by examining the impact of IC weakness disclosures on real and accrual-based earnings management based on a large sample of 98 listed companies belonging to the SBF 120 index in France over a period of seven years, from 2012 to 2018. Our results present empirical evidence to support the fundamental link between IC and earnings management. The findings of this research have practical implications, as they are important to regulators who may consider additional disclosure requirements for companies and design policies that could help reduce earnings management practices. Our results have policy implications for regulators worldwide who are considering whether SOX should be expanded to non-accounting-related areas. Moreover, the results are important for auditors, who can increase their examination of financial statements. The results of this paper are useful for investors' decision-making, as they can provide insights into the expected transparency of the profits declared by entities.

The rest of this paper is organized as follows. Section 2 develops the literature review and proposes our research hypotheses. Section 3 looks at research methodologies. Section 4 covers the statistical test results as well as their interpretations and a

discussion. Finally, the conclusion discusses the main results obtained and suggests future avenues of research.

2 Literature review and hypothesis development

2.1 Internal control and earnings management practices

Management errors, fraud, or the simple manipulation of accounts could be reasons for the unreliability of disclosed financial information and the cause of many financial scandals that have had enormous consequences for the global economy. Previous studies (e.g., Arslan-Ayaydin et al., 2020; García-Meca & García-Sánchez, 2018; Yang & Kim, 2020) have focused on the extent of managerial discretion concerning the financial information disclosed by firms that allow earnings management to affect the reliability of financial information reported. Earnings management occurs when managers use their discretion in the financial accounting process (Healy & Whalen, 1999). In fact, without violating accounting rules and in compliance with the legal framework, managers may manage earnings by taking advantage of the latitude offered to them to act on the presentation and content of financial statements, especially for accounting results. Among the most cited reasons for the unreliability of disclosed financial information, the practice of earnings management appears to be the most important (Healy & Whalen, 1999; Oh et al., 2014).

A stricter IC is more likely to restrict the discretionary behaviour of managers by enhancing controls. However, managers are still able to exercise discretion, which may lead to improved financial reporting in some cases. However, this only occurs when managers have superior knowledge about the business and exercise their discretion to select reporting methods, estimates, and disclosures that accurately reflect the companies' business economics (Healy & Wahlen, 1999). However, management's use of judgment also creates opportunities for earnings manipulation in which managers choose reporting methods and estimates that do not accurately reflect their companies' underlying economics. If companies establish and operate effective IC, managers' opportunistic behaviour is more likely to be curbed by these controls (Oh et al., 2014).

The literature on earnings management distinguishes between accrual-based earnings management and REM. The first, which corresponds to accounting management, has been the subject of most empirical studies (Ashbaugh-Skaife et al., 2008; Chan et al., 2008; Chih et al. 2008; Prior et al., 2008; Scholtens and Kang 2013). The second has received enormous consideration in the accounting literature since Roychowdhury's study (2006). Within this modality, Roychowdhury (2006) distinguishes three practices based on operating activities; namely, sales manipulation, discretionary spending reduction, and overproduction. According to Cohen et al. (2008), the adoption of SOX and its Canadian version in 2004 has shifted the preference of managers towards the use of REM instead of accounting earnings management, to allay the fears of various stakeholders. Moreover, Graham et al. (2005) find an upward trend in the use of a combination of accounting and REM.

Previous studies have examined whether companies that report IC weaknesses have poor accounting quality and have reported conflicting results. For example, Doyle et al. (2007) find that the disclosure of IC weaknesses is associated with poor accruals quality. However, Ogneva et al. (2007) did not find a relationship between the disclosure of weaknesses and the quality of accrual accounting, while Chan et al. (2008) provide evidence that firms that report IC weaknesses have more discretionary accruals. Singer and You (2011) find that firms complying with SOX exhibit a significant reduction in the absolute value of discretionary accruals. Ashbaugh-Skaife et al. (2008) and Goh and Li (2011) find an increase in the quality of accruals accounts and the timely recognition of losses, respectively, when correcting weaknesses. These results support our argument that changes in the effectiveness of IC are accompanied by predictable changes in the quality of accounting information.

A negative association between the disclosure of IC weaknesses and accrual quality has been found by Lu et al. (2011) in the Canadian context. In the same vein, Brown et al. (2014) find that German companies experience an increase in timely loss recognition, a decrease in profit smoothing after the application of the KTG law, and a decrease in loss avoidance behaviour. Similarly, Hu et al. (2020) examine the effect of IC regulation reform on reporting quality in China. The findings show that accrual-based earnings management is enhanced after compliance with the Chinese regulation (C-SOX), without causing more REM. Similarly, Jaggi et al. (2015) show that, in general, companies with generalized control weaknesses at the firm level have a relatively higher quality of results. The quality of results of companies with IC weaknesses audited by Big 4 firms specializing in the sector is higher than that of companies audited by non-specialist Big 4 firms. No difference in audit quality is evident between companies with weak IC if they are audited by non-specialist Big 4 or by non-Big 4 auditors.

A positive association between the weaknesses of IC and manipulation of real activities is documented by Lenard et al. (2016). After the issuance of the Japanese regulation (J-SOX), Nakashima and Ziebart (2015) find that real and accounting management of results increases for companies that disclose information about IC weaknesses. Jarvinen and Myllymäki (2016) show that firms that disclose IC weaknesses are more engaged in REM. Using a sample of Chinese firms, Ji et al. (2017) show that the quality of results, measured by absolute discretionary accruals, is positively associated with the voluntary disclosure of IC weaknesses. In the same context, Yuanyuan et al. (2020) find that IC quality has a great positive marginal impact on accruals, earnings, and cash flows. Li et al. (2020) investigate the moderation effect of IC on the association between financial distress and earnings management using a sample of listed companies in China. IC exerts a moderating impact on the relationship between financial distress and earnings management by restraining both accrual-based and REM. Liu et al., (2020) show that the remediation of material IC weaknesses significantly improves earnings quality and that companies engaging new auditors are more likely to remediate their material IC weaknesses effectively in the subsequent year.

In short, there is an empirical disagreement among researchers. The mixed empirical results in models that ignore endogeneity have led to misleading interpretations, inflated estimates, and flawed theoretical propositions about the dynamic nature of

the association between IC and earnings management. To improve our results by reducing the heterogeneity between the variables, we apply the GMM.

2.2 Development of the research hypotheses

IC is defined as a process to provide reasonable assurance about the reliability of financial information (Public Company Accounting Oversight Board [PCAOB], 2004). By definition, a good IC system is supposed to reduce IC weakness disclosures and result in more reliable financial information. The purpose of IC is to prevent and detect fraud that may lead to errors in financial statements. A weak control environment can allow accounting to be intentionally biased by both profit management and unintentional errors in accounting estimates (Doyle et al., 2007). In this study, we use IC weaknesses to measure the quality of IC, as in prior studies (Ashbaugh-Skaife et al., 2008). A weakness exists when the design or operation of IC fails to prevent or detect errors early and may result in a material misstatement in financial statements (Chan et al., 2008). According to PCAOB Auditing Standard No. 2, the existence of an IC weakness requires management and the auditor to conclude that IC is not effective. The enactment of SOX aimed to improve the quality of financial reporting. Section 404 of SOX requires management to be accountable for the effectiveness of IC procedures at the end of each financial year, and the evaluation must be certified by external auditors. Financial officers and audit partners perceive SOX to be successful in reducing the practice of managing results (McEnroe, 2007). In addition, Cohen et al. (2008) suggest that absolute discretionary accruals decreased after the adoption of SOX in 2002.

Prior research on the link between IC and earnings management has mostly concentrated on accrual-based earnings management. Only a small stream of research investigates the possibility of an ineffective IC system to entice managers to alter real transactions to falsify profitability. Besides accruals quality, corporations can affect the profit by implementing real activity manipulation (Graham et al., 2005; Healy & Wahlen, 1999). In this regard, Zang (2012) documented that the decision to manipulate earnings through real activities and the decision of manipulating earnings through accruals serve as substitutes because accruals and real management are negatively correlated. Cohen and Zarowin (2010) stated that there are at least two reasons why CEOs are so eager to affect the results through genuine manipulation rather than accruals when there is an ineffective IC system. An accrual profit manipulation is more likely to attract regulatory or auditors' scrutiny than actual acts, like manipulating sales, manufacturing expenses, promotion, or R&D. Second, relying only on accrual earnings management is too risky.

After SOX focused on the importance of the IC system, the directors' attitudes may have shifted due to making genuine choices rather than using accounting to affect profitability (Graham et al., 2005). Cohen et al. (2008) showed that real manipulation is dramatically growing, which implies that, after the SOX Act, corporations changed from accruals to real management. According to Järvinen and Myllymäki (2016), the IC over financial reporting may be connected to REM behaviour. Misstatements are more likely to arise among firms that have a weak

IC, partly because the managers are generally motivated to increase the earnings using accruals and act opportunistically. Furthermore, unintentional errors are more likely to occur when IC is weak, which will reduce the accrual quality. A robust IC system, which includes establishing suitable accounting rules and processes, educating the staff to be appropriately competent, and encouraging the employees to conscientiously execute their task, would be likely to discover and avoid inadvertent and deliberate misstatements through accruals (Ashbaugh-Skaife et al., 2008; Doyle et al., 2007).

A weak IC environment makes businesses manipulate real activities and firms can create unusually high revenues or surplus cash flows by raising the output or reducing discretionary spending (Lenard et al., 2016). While Järvinen and Myllymäki (2016) revealed that, compared to organizations with an efficient IC, companies with IC flaws engage in a greater real activity manipulation, which is harder for outsiders to identify or restrain, Cohen et al. (2008) showed that real earnings management has risen since the SOX Act despite an overall drop of the accruals-based earnings management. On the other hand, even though firms are required to report deficiencies in IC and external auditors are expected to issue an attestation report on the quality of IC of their client company, a weak system of IC may also affect the managers' attempts to further manipulate the firms' operations through controlled revenues, discretionary expenses, and production costs while.

Previous studies have shown that discretionary accruals are closely associated with the quality of IC (Ashbaugh-Skaife et al., 2008; Chan et al., 2008; Doyle et al., 2007; Lu et al., 2011). Using US data, Doyle et al. (2007) document that a weak IC environment can allow management to make unintentional errors in the estimation of results. Ashbaugh-Skaife et al. (2008) study the effect of the disclosure of IC weaknesses on the quality of accruals and suggest that IC weaknesses can affect abnormal accruals through random and unintentional reporting errors. Lu et al. (2011) indicate a negative association between the voluntary disclosure of IC weaknesses and the quality of accruals in Canada. However, Lenard et al. (2016), Jarvinen and Myllymäki (2016), and Ji et al. (2017) document a positive relationship between IC disclosure and earnings management practices.

Consistent with agency theory, the quality of IC disclosures is an important means of addressing the problem of information asymmetry, which can mitigate conflicts of interest and directly reduce agency costs. In addition, managing results is a behavioural consequence of agency costs between management and shareholders, so improving the quality of IC disclosures reduces agency costs and thus reduces earnings management practices (Jensen & Meckling, 1976; Wali & Masmoudi, 2020). The mechanism by which IC inhibits earnings management manifests itself primarily in two ways: first, IC helps achieve a balance of power, thereby reducing intentional manipulation and the risk of inaccurate errors; second, the intrinsic objectives of IC are to ensure reasonable legal compliance and reliable financial reporting, IC may encourage REM activities (Chen, 2016). We argue that stronger internal controls impede accrual-based earnings management making companies switch to real earnings management. We assume that the disclosure of IC weaknesses, as an indicator of a weak internal control system, decreases accrual-based

earnings management and increases real earnings management. Thus, we construct the following hypotheses:

H1 The disclosure of IC weaknesses increases real earnings management.

H2 The disclosure of IC weaknesses decreases accrual-based earnings management.

3 Research methodologies

3.1 The sample and data sources

The study is carried out on a sample of French listed companies belonging to the SBF 120 index (Mandzila & Zéghal, 2016) over a period of seven years, from 2012 to 2018. The choice of this index is justified by the broad, faithful, and diversified vision of the market offered by the SBF 120, which allows us to obtain a sufficiently large population to allow statistical tests to be carried out. The study period begins from the date of the adoption of the Grenelle II law, which entered into force in 2012. Considering the initial population, we remove financial and real estate companies; this is because of sector specificities and the accounting regime of credit institutions. Thus, the final sample is made up of 98 companies over a period of seven years, i.e., a total of 686 observations. Data on IC and audit quality were collected manually from annual reports. The financial and accounting data used for the earnings management calculation were extracted from the Thomson Reuter database (Datastream).

For this reason, we reviewed the distribution of firms according to their IC framework, which gave us the results presented in Table 1, which indicate that only half of the firms in the SBF 120 index (59%), adopted the AMF framework against 41% that applied the US COSO.

3.2 Dependent variable measurement

3.2.1 Real earnings management

To test the effect of IC weaknesses on REM, used as a dependent variable in this study, we build on previous studies (Cohen et al., 2008; Hu et al., 2020; Lenard et al., 2016; Li et al., 2020; Roychowdhury, 2006) to develop our approximations for the manipulation of real activities. Specifically, we use the following four metrics to

Table 1 Distribution of firms according to the IC framwork

Sample distribution	SBF 120	
AMF	58	59%
COSO	40	41%
Total	98	100%

detect real activities manipulation: (1) abnormal levels of operating cash flow; (2) abnormal production costs; (3) anomalies in discretionary expenses; and (4) a combined measure of REM. We measure the abnormal levels of the first three measurements of real activities manipulation as a residue. Following Cohen et al. (2008) and Zang (2012), we calculate the three individual proxies as well as a combined real activities manipulation proxy. Considering the expected orientation of the first three variables, we measure COMBINED_RAM as AB_CFO—AB_PROD + AB_EXP.

(1) Abnormal levels of operating cash flows (AB_CFO)

$$\frac{CFO_t}{A_{t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2\left(\frac{S_t}{A_{t-1}}\right) + \beta_3\left(\frac{S_t}{A_{t-1}}\right) + \varepsilon_t$$

where AB_CFO are estimated by the residuals (ε); CFO_t is the cash flow from operating activities; A is total assets; and S is sales, $\Delta S = S_t — S_{t-1}$.

(2) Abnormal production costs (AB_PROD)

$$\frac{PROD_t}{A_{t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2\left(\frac{S_t}{A_{t-1}}\right) + \beta_3\left(\frac{S_t}{A_{t-1}}\right) + \beta_4\left(\frac{S_{t-1}}{A_{t-1}}\right) + \varepsilon_t$$

where AB_PROD are estimated by the residuals (ε); $PROD_t$ = cost of sales + change in inventory; A is total assets; and S is sales, $\Delta S = S_t — S_{t-1}$.

(3) Abnormal discretionary expenses (AB_EXP)

$$\frac{DISEXP_t}{A_{t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2\left(\frac{S_{t-1}}{A_{t-1}}\right) + \varepsilon_t$$

where AB_EXP are estimated by the residuals (ε); $DISEXP_t$ = R&D + advertising; A is total assets, and S is sales.

(4) Combined real activities manipulation

Following Cohen et al. (2008) and Zang (2012), we measure COMBINED_RAM as AB_CFO—AB_PROD + AB_EXP.

3.2.2 Performance-adjusted discretionary accruals

Following prior studies (Chan et al., 2008; Jaggi et al, 2015; Ji et al., 2020; Jones, 1991; Kothari et al., 2005; Oh et al., 2014), our proxy to measure earnings management is discretionary accruals.

$$\frac{TAc_t}{A_{t-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{t-1}}\right) + \beta_2\left(\frac{REV_{t-1}}{A_{t-1}}\right) + \beta_3\left(\frac{PPE_{t-1}}{A_{t-1}}\right) + \beta_4\left(\frac{ROA_{t-1}}{A_{t-1}}\right) + \varepsilon_t$$

where TAc_t is total accruals, defined as the difference between net income and cash flow from operating activities; ΔREV_{t-1} is the change in revenues; PPE_{t-1} is the gross property plant and equipment, and ROA_{t-1} is the return on assets. Each variable is

deflated by TA_{t-1} total assets. The residuals obtained from the regression equation are defined as a measure for discretionary accruals.

3.3 Measurement of the independent variable

The independent variable of the study is the disclosure of IC weaknesses. IC is a binary variable coded 1 if the firm discloses information on IC weaknesses, and 0 otherwise (Boulhaga et al., 2022; Chan et al., 2008; Doyle et al., 2007; Jaggi et al., 2015; Ji et al., 2017; Lenard et al., 2016; Li et al., 2020).

3.4 Measurement of control variables

We measure firm size by the logarithm of the market value (Liu et al., 2020). The level of debt is measured by the ratio of long-term debt over total assets (Boulhaga et al., 2022; Lu et al., 2011). GROWTH is measured based on changes in total revenue deflated by total revenue (Boulhaga et al., 2022; Ji et al., 2017, 2020; Li et al., 2020). The economic return on assets is the ratio of net income after taxes to total assets (Chouaibi & Boulhaga, 2020; Hu et al., 2020; Ji et al., 2017, 2020). CFO is the total cash flow from operations deflated by total assets (Hu et al., 2020; Ji et al., 2017, 2020; Li et al., 2020). MTB is the market-to-book ratio (Li et al., 2020). INDUS is a binary variable that takes the value of 1 if the company is classified as industrial, and 0 otherwise (Chouaibi & Boulhaga, 2020; Yuanyuan et al., 2020). TURNOVER is measured using total accounts receivable deflated by total revenue (Ji et al., 2017, 2020). Audit quality is a binary variable coded 1 if the audit firms belong to the Big 4, and 0 otherwise (Boulhaga et al., 2022; Chan et al., 2008; Ji et al., 2017; Lenard et al., 2016; Li et al., 2020; Liu et al., 2020; Lu et al., 2011; Oh et al., 2014).

3.5 3.5 Research model

Our objective is to test the effect of IC weaknesses on real and accrual-based earnings management, hence our model:

$$REM_{it} = \beta_0 + \beta_1 ICW_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \beta_5 ROA_{it} + \beta_6 CFO_{it} + \beta_7 MTB_{it} + \beta_8 INDUS_{it} + \beta_9 TURNOVER_{it} + \beta_{10} AUDTQ_{it} + \varepsilon_{it} \quad (1)$$

$$DAc_{it} = \beta_0 + \beta_1 ICW_{it} + \beta_2 FSIZE_{it} + \beta_3 LEV_{it} + \beta_4 GROWTH_{it} + \beta_5 ROA_{it} + \beta_6 CFO_{it} + \beta_7 MTB_{it} + \beta_8 INDUS_{it} + \beta_9 TURNOVER_{it} + \beta_{10} AUDTQ_{it} + \varepsilon_{it} \quad (2)$$

where REM_{it} = real earnings management; DAc_{it} = discretionary accruals; ICW_{it} = IC weaknesses; $FSIZE_{it}$ = the size of the company; LEV_{it} = level of indebtedness; $GROWTH_{it}$ = change in total revenue deflated by total revenue; ROA_{it} = the economic return on assets; CFO_{it}: Total cash flow from operating deflated by total assets; MTB_{it} = market-to-book; $INDUS_{it}$ = 1 if the company is classified as

industrial, and 0 otherwise; $TURNOVER_{it}$ = total accounts receivable deflated by total revenue; $AUDTQ_{it}$ = audit quality; $\beta_0 \rightarrow \beta_{10}$ constitute the parameters to be estimated; and ε_{it} = error term.

4 Estimation results and discussion

4.1 Descriptive analysis of the sample

Table 2 gives the descriptive statistics of the analyzed variables. The average of the REM is 5.57, the standard deviation is 0.384, and the minimum and maximum values are equal to -1.096 and 1.827, respectively. Based on the average value of COMB_RM, we find that, on average, companies in our sample engage in REM to increase revenue. This implies that the companies in the sample managed their profits more. The average DA is 1.40, and the standard deviation is 0.054. Regarding the independent variables, the average disclosure of information on IC weaknesses by the firms in our sample is about 0.588, as can be seen in Table 2.

In addition, the companies in this study have an average size (measured by the log of market value) of around 8,283, with a minimum of 5,251 and a maximum of 11,861. Regarding the debt ratio, the companies in question have an average ratio of around 20.2%. This result compares favourably with the results of previous research where the average debt level varies by 0.35 over the period 2010–2015 (Wali & Masmoudi, 2020). Indeed, the tests show that the companies in our sample have an average ROA ratio of around 0.031. The mean values of the control variables GROWTH, CFO, INDUS and TURNOVER turn out to be 0.037, 0.071, 0.437 and 0.301 respectively. Besides, an MTB has to be noted with a mean value of 2.294. Reading Table 2, we can see that most of the financial statements of listed companies are audited by "BIG 4" audit firms (96.2%). This percentage proves the

Table 2 Descriptive statistics of the sample

Variables	N	Average	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
REM	686	5.57	0.384	− 1.096	1.827	1.222	5.337
DA	686	1.40	0.054	− 0.426	0.310	− 1.146	18.702
ICW	686	0.588	0.492	0	1	− 0.361	1.130
FSIZE	686	8.283	2.340	5.251	11.861	− 2.176	8.626
LEV	686	0.202	0.142	0.001	0.766	0.770	3.658
GROWTH	686	0.037	0.182	− 2.482	0.955	− 7.164	97.121
ROA	686	0.031	0.099	− 0.967	0.58	− 2.743	35.184
CFO	686	0.071	0.089	− 0.795	0.569	− 1.604	28.608
MTB	686	2.294	3.075	− 28.61	35.78	1.639	43.413
INDUS	686	0.437	0.496	0	1	0.252	1.063
TURNOVER	686	0.301	0.320	0	2.732	3.978	23.059
AUDTQ	686	0.962	0.191	0	1	− 4.839	24.424

willingness of French companies listed on the stock exchange to choose international audit firms.

4.2 Verification of the absence of multicollinearity problems: correlation matrix

To check for the absence of multicollinearity, we use the Pearson correlation matrix. As shown in Table 3, the correlation coefficients between the different variables used in our regression model do not exceed 0.8, which corresponds to the limit set by Kennedy (1985). Likewise, we note that most variables are associated in a significant way and that the highest correlation coefficient (0.813) is between ROA and CFO.

The results in Table 3 reveal that IC weakness disclosures are positively and significantly related to real activities manipulation and negatively associated with discretionary accruals. Therefore, the univariate analysis proves to support the H1 stipulating the disclosure of IC weaknesses increases real earnings management in the French context and H2 stipulating the disclosure of IC weaknesses decreases accrual-based earnings management.

Concerning the control variables, namely, FSIZE, GROW, ROA, CFO, MTB and AUDTQ, they are discovered to be positively and significantly associated with REM, while the variable size appears to be negatively associated with discretionary accruals (−0.090), which is consistent with the study of Lu et al. (2011). Concerning the remaining control variables, involving leverage, INDUS and TURNO, their association with the REM appear to be negative and significant.

4.3 Multivariate analysis

Model 1 in Table 4 shows the results of the OLS regression. The results of the estimation show that the Fisher statistic (F), which is equal to 29.02, confirms the good quality of the model at the 1% level. In addition, we notice, from Table 4, that the model has an explanatory and significant power: $R2 = 30.06\%$ and $p = 0.000$.

Table 4 shows the results relevant to the effect of IC systems on real and accrual-based earnings management. Concerning real activities earnings management, as a dependent variable in Model 1, the results indicate that IC system quality proves to have a positive and significant effect on REM, supporting H1. Furthermore, the results, as per Model 2, indicate that IC quality is significantly and negatively related to accrual-based earnings management, which supports H2, thus highlighting that the French companies enjoying effective IC do not appear to engage in manipulating their discretionary accruals.

Concerning the control variables, the results of the GMM regression presented in Table 4 indicate that the coefficient relating to the company size is negative (−0.011) and significant ($p = 0.045$), this suggests that large companies are less likely to manipulate results, this result is consistent with the study of Li et al, (2020), suggesting that company size has a negative impact on earnings management. Indeed, Table 4 indicates that the level of indebtedness is negatively (−0.508) related to the real management of results, which confirms the lower management of results

Table 3 Pearson correlation matrix

	REM	DAc	ICW	FSIZE	LEV	GRO	ROA	CFO	MTB	INDUS	TURNO	AUDTQ
REM	1.000											
DA	−0.178***	1.000										
ICW	0.089**	−0.077**	1.000									
FSIZE	0.042	−0.090**	0.147***	1.000								
LEV	−0.175***	−0.137***	0.046	−0.081**	1.000							
GROW	0.052	0.016	−0.001	−0.090**	0.007	1.000						
ROA	0.287***	0.354***	0.009	0.123***	-0.156***	0.042	1.000					
CFO	0.430***	−0.166***	0.037	0.168***	0.077**	0.012	0.813***	1.000				
MTB	0.190***	0.051	0.001	0.177***	−0.069*	0.086**	0.165***	0.079**	1.000			
INDUS	−0.042	−0.008	0.043	0.215***	−0.254***	−0.059	0.022	0.039	−0.005	1.000		
TURNO	−0.056	0.246***	−0.063*	−0.289***	−0.123***	0.041	−0.134***	−0.321***	0.012	−0.115***	1.000	
AUDTQ	0.173***	−0.054	0.082**	0.184***	−0.0006	−0.065*	0.040	0.095**	0.023	0.159***	−0.041	1.000

*, **, *** significant relationship at the 10%, 5% and 1%

Table 4 Results of OLS regression

	Model 1. Real earnings management			Model 2. Discretionary accruals		
	Coeff	t-stat	Prob	Coeff	t-stat	Prob
ICW	0.065	2.56	0.011	− 0.004	− 1.92	0.055
FSIZE	− 0.011	− 2.01	0.045	− 0.0007	− 1.58	0.115
LEV	− 0.508	− 5.46	0.000	− 0.006	− 0.83	0.405
GROWTH	0.078	1.14	0.254	− 0.006	− 1.18	0.240
ROA	− 1.179	− 5.23	0.000	0.806	41.90	0.000
CFO	2.876	11.15	0.000	− 0.823	− 37.39	0.000
MTB	0.022	5.33	0.000	− 0.001	− 3.88	0.000
INDUS	− 0.085	− 3.19	0.001	0.001	0.48	0.631
TURNOVER	0.083	1.89	0.060	− 0.0003	− 0.10	0.918
AUDTQ	0.296	4.42	0.000	0.006	1.09	0.278
Constant	− 0.332	− 4.10	0.000	0.040	5.90	0.000
F statistic	29.02			199.83		
Prob (F)	0.0000			0.0000		
R^2	0.3006			0.7475		
R^2 adjusted	0.2903			0.7438		
Durbin- watson stat	1.0853			1.3728		
Observations	686			686		

in highly indebted companies, our results are consistent with the study of Wali and Masmoudi (2020). The results of the GMM regression indicate that there is a positive (0.806) and significant ($p = 0.000$) relationship between accrual-based earnings management and ROA, which is consistent with the study of Ji et al. (2020). This leads us to conclude that firms tend to manage their results in an attempt to improve their reputation. Concerning the other control variables, the analysis of the results indicates that the variables GROWTH, CFO, MTB, TURNOVER and AUDTQ have a positive and significant impact on real earnings management. Furthermore, the results show that there is a negative (− 0.085) and significant ($p = 0.001$) association between industry and real earnings management.

4.4 Robustness analyses

To test the robustness of our empirical results, we examine the sensitivity of our results to the use of the two-step GMM system estimator, which confirms similar evidence for our tests of OLS. Our analysis (OLS, GMM) demonstrates that companies reporting IC weaknesses manage real activities and that these companies do not manage discretionary accruals. According to Sargan's test (Table 5), the probability is 0,000—less than 5%—so the null hypothesis of uncorrelation is rejected. According to Table 5, which presents the results of the GMM system estimator, we find that there is no second-order autocorrelation since the probability of the Arellano and

Table 5 System GMM regression of the effect of IC weaknesses on real and accrual-based earning management

	Model 1. Real earnings management			Model 2. Discretionary accruals		
	Coeff	t- stat	Sig	Coeff	t-stat	Sig
ICW	0.011	9.95	0.000	−0.002	−10.67	0.000
FSIZE	−0.009	−20.60	0.000	−0.0006	−9.51	0.000
LEV	−0.120	−22.92	0.000	−0.005	−5.92	0.000
GROWTH	0.031	4.36	0.000	−0.013	−22.22	0.000
ROA	−0.372	−87.37	0.000	0.848	857.82	0.000
CFO	0.620	68.52	0.000	−0.888	−684.05	0.000
MTB	0.001	32.82	0.000	−0.001	−76.09	0.000
INDUS	−0.026	−13.37	0.000	0.003	8.98	0.000
TURNOVER	0.004	3.41	0.001	0.001	3.54	0.001
AUDTQ	0.019	2.43	0.017	0.002	2.62	0.010
constant	0.053	6.09	0.000	0.037	32.34	0.000
Arellano-Bond test AR (1) (z, p–value)	−2.58		0.010		−2.47	0.014
Arellano-Bond test AR (2) (z, p–value)	0.97		0.330		−0.22	0.826
Sargan test (Chi–square, p–value)	448.92		0.000		698.19	0.000
Hansen test (Chi–square, p–value)	87.83		1.000		87.95	1.000

Bond test (AR2) is equal to 0.330, which does not allow the null hypothesis to be rejected.

The empirical results show that IC weaknesses have a positive (0.011) and significant impact (t student = 9.95 and $p = 0.000$) at the 1% level, meaning that this variable has an impact on real activities manipulation (supporting H1). The regression analysis shows that the existence of IC weaknesses affects the REM within French companies. Thus, the information provided by French companies on IC weaknesses is credible. IC weaknesses allow management to manipulate results by overriding financial reporting and using biased accounting estimates. Therefore, companies reporting IC weaknesses are more likely to manage their bottom line.

Our results confirm the work of Lenard et al. (2016), who found a positive association between the disclosure of IC weaknesses and REM. Furthermore, our findings are consistent with the results of Lu et al. (2011), who indicated a negative relationship between the voluntary disclosure of IC weaknesses and the quality of accruals in the Canadian environment. However, Brown et al. (2014) found that German firms showed increased losses, weaker profit smoothing, and decreased loss avoidance behaviour after the KTG reform. In addition, Ji et al. (2017) found that IC is an effective tool for controlling companies' risks and that the quality of results, measured by accruals, is positively associated with the voluntary disclosure of IC weaknesses. The mixed empirical results can be explained by the failure to consider the endogeneity bias.

The GMM system regression confirms the impact of IC on discretionary accruals. We see from Table 4 that the coefficient related to the variable ICW is negative (−0.002) and significant (*t* student = −10.67 and *p* = 0.000) at the level of 1%, which supports H2. These robustness tests further support the results of our main tests. A good system of IC is an important part of a company's commitment to good governance, which ensures the company's ability to prepare reliable financial statements. In addition, an effective IC system can create an environment in which companies can achieve their strategic objectives. Without effective IC, companies can manage their profits. Thus, a good system of IC could reduce earnings management and improve the quality of financial statements. The results of this research provide empirical evidence that a good system of IC improves the reliability of financial statements and reduces accrual-based earnings management.

4.5 Additional analysis

To examine the peculiarities of the French setting, where French companies have a choice regarding the IC framework they adopt, we examined whether the results are contingent on the IC framework selected by the companies (COSO vs AMT) and whether these frameworks adopted may affect the earnings management methods in France. Thus, to test the robustness of our baseline estimations, GMM regression was performed for IC by using AMT and COSO framework. This is expected to offer better insights into the relationship between IC quality and accrual-based or real earnings management.

Then, according to the findings in Table 6, firms adopting the AMF framework manipulate further real and accrual-based earnings management than those that adopted the COSO. This result is surprising as the COSO is not as strict as the AMF framework (Mandzila & Zéghal, 2016). We also discovered that enterprises exposed to the AMF framework distort the earnings management methods more than the COSO firms. Therefore, enterprises that embraced the AMF requirements have a favourable and substantial effect on the real and accrual-based earnings management, while firms subject to the COSO criteria have a negative effect on the real and accrual-based earnings management.

Concerning the IC, the distribution of the sample businesses into two groups, those that chose the AMF framework and those that chose the COSO framework, showed statistically significant differences. As a result, selecting the AMF framework for IC has a favourable and considerable effect on real and accrual-based earnings management. Besides, this result is explained by the fact that some SBF 120 enterprises have already been adopting the COSO framework. Since there is no fundamental difference between the AMF and the COSO criteria, businesses may have decided to preserve their existing structure and explain it in their reports.

Therefore, our results may be of great interest to the regulatory authorities in France. Moreover, our paper raises awareness of the need to provide more specific guidelines about the items to be disclosed in the annual reports on internal control and corporate governance. In a globalized environment and at a time when the trend is toward international standardization, this issue remains open

Table 6 Distribution of firms according to the IC framework using GMM

	Model 1. Real earnings management		Model 2. Discretionary accruals	
	AMT	COSO	AMT	COSO
Lag	0.857***	0.899***	0.080***	0.097***
	(0.018)	(0.049)	(0.002)	(0.008)
ICW	0.019***	−0.007	0.001***	−0.001
	(0.004)	(0.006)	(0.0003)	(0.001)
FSIZE	−0.007**	−0.006*	0.0008***	−0.0008
	(0.003)	(0.003)	(0.0002)	(0.0007)
LEV	−0.070***	−0.011	0.012***	−0.0013
	(0.010)	(0.097)	(0.001)	(0.0114)
GROWTH	0.059***	−0.020	−0.011***	−0.007*
	(0.011)	(0.022)	(0.001)	(0.004)
ROA	−0.220***	−0.356***	0.869***	0.828***
	(0.035)	(0.028)	(0.002)	(0.024)
CFO	0.686***	0.496***	−0.995***	−0.838***
	(0.123)	(0.066)	(0.006)	(0.027)
MTB	0.0004	0.0002	−0.001***	−0.0004***
	(0.0004)	(0.0007)	(0.00005)	(0.0001)
INDUS	−0.023***	0.028	0.004***	-0.0015
	(0.006)	(0.029)	(0.0013)	(0.003)
TURNOVER	0.046***	−0.015	−0.015***	0.0033
	(0.012)	(0.040)	(0.0011)	(0.0071)
AUDTQ	0.009	-0.017	0.001	0.029***
	(0.015)	(0.089)	(0.0018)	(0.010)
_cons	0.020	0.053	0.031***	0.0091
	(0.026)	(0.067)	(0.0024)	(0.011)
N	406	280	406	280
AR (1) (P–value)	0.020	0.201	0.030	0.050
AR (2) (P–value	0.700	0.296	0.688	0.178
Sargan test (P–value)	0.002	0.656	0.000	0.000

Standard errors in parentheses Symbols *** $p<0.01$, ** $p<0.05$, * $p<0.1$

for future comparative research at the international level to identify the best practices in this field. Furthermore, the findings of this study provide empirical research on the degree of IC disclosure in French firms, as well as a rich information field for regulators and stakeholders to help enhance the financial report quality. As a result of these findings, the researchers recommended that French enterprises should enhance the quality of both their internal control and profits to manage the risk factors, ensure financial reporting, and achieve sustainable development.

5 Conclusion

In this paper, we study the effect of IC weaknesses on real and accrual-based earnings management in a sample of 98 French listed companies during the period between 2012 and 2018. We use OLS regression and the GMM estimator to account for the problems of reverse causality, simultaneity bias, and possible omitted variables. In addition, these allow for the control of specific temporal and individual effects. Following Lenard et al. (2016), we control for endogeneity using the dynamic panel data approach. This two-stage system, using the GMM model, treats all the explanatory variables as endogenous, orthogonally uses lagged values as instruments, and checks for both forms of causation—from IC quality to real and accrual-based earnings management—in the French context. We find a positive and significant relationship between IC and REM. Our empirical results indicate that IC disclosures are negatively and significantly related to discretionary accruals. The results of this study provide empirical evidence that a good system of IC reduces accrual-based earnings management activities and improves the reliability of financial statements. The results extend research on IC in financial reporting and research on earning management. The research findings are of practical interest not only to financial analysts, auditors, and investors, who will be guided to pay attention to the REM activities in the case of IC weakness disclosure but also to regulators, who may consider additional disclosure requirements in the case of reporting material IC weaknesses and design policies that will aid in reducing the REM practices.

Our findings further add to the literature by demonstrating the importance of addressing earnings management when analyzing IC shortcomings. Our approach adds to previous research findings by explaining why organizations with IC vulnerabilities may face greater risks and higher equity capital costs (Ashbaugh-Skaife et al., 2009). Our findings also support previous research that showed a negative relationship between disclosure of IC flaws and profit quality in the SOX regime (Ashbaugh-Skaife et al., 2008; Chan et al., 2008; Doyle et al., 2007). This implies that our findings corroborate the view that, in the post-SOX period, corporations may manipulate earnings through real-world activities due to greater scrutiny of their financial reporting techniques by external auditors (Lenard et al., 2016).

The analysis in this study has some limitations. The first is that this study focuses on a single country; therefore, future studies could address this issue in an international setting to explore the impact of different institutional contexts. A second limitation is that we have considered a limited number of governance variables; thus, the impact of other governance mechanisms associated with incentives and management monitoring, or competition in the market, should be examined. Future research could focus on the motivations for managing results by considering variables such as corporate governance structure, board size, CEO compensation, and board independence. Finally, our sample includes only publicly traded companies and listing is a form of visibility; therefore, it may also be interesting to analyze the behaviour of private companies. Future research could

investigate the market reaction to earnings manipulation by investigating whether investors recognize the decrease in value associated with earnings manipulation, particularly for companies reporting IC weaknesses in the current period, and whether the information is compounded into stock prices. Hence, it would be interesting to investigate whether the cost of capital for these companies would increase in future periods. Additionally, since the adoption of either of the COSO or the AMF frameworks is endogenous, future research may conduct further tests to ensure that it is the frameworks driving the different earning management behaviours, and not other firm characteristics.

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