

Temporal evidence on threshold hierarchy based on accruals and real earnings management: Evidence from France and the US

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Abstract

Research Questions: Does the hierarchy of earnings thresholds differ between accounting systems? Does a temporal shift occur in the hierarchy of the earnings thresholds associated with earnings management?

Motivation: A number of studies looked into the hierarchy of earnings thresholds based on the earnings distribution, capital market valuation, survey views, and discretionary accruals. Our study seeks to fill this gap by investigating the hierarchy of earnings thresholds based on real earnings management and by investigating if the hierarchy of earnings thresholds differs between accounting systems.

Idea: This paper aims to examine the hierarchy of achieving certain earnings thresholds based on the magnitude of discretionary accruals and real earnings management under two different accounting models.

Tools: Large samples of US and French firms for the period ranging from 2008 to 2018 are used. The relative extent of both discretionary accruals and real earnings management used to achieve three earnings thresholds is examined by regression analyses.

Findings: Two hierarchies emerge from the US and French contexts. On the one hand, we find (1) avoiding earnings losses, (2) avoiding earnings decreases, and (3) avoiding negative

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earnings surprises in the US context. On the other hand, we find out (1) avoiding earnings losses, (2) avoiding negative earnings surprises, and (3) avoiding earnings decreases in the French context. An analysis of the real earnings management behavior of these firms indicates that they have used the significant real earnings management for the purpose of avoiding earnings decreases in both contexts. These hierarchies are reorganized over time.

Contribution: Our paper contributes to the existing literature in several ways. First, the majorities of studies on earnings management examine and validate opportunistic incentives, whereas our results validate incentives with reference to the signaling theory. Second, our findings are of interest to investors, auditors, regulators and academics with respect to the financial statement analysis, accounting earnings quality, and financial reporting.

Research limitations: This study is subject to measurement error which is a common limitation in the earnings management literature.

Keywords: Earnings management, Hierarchy of earnings thresholds, Discretionary accruals, Real earnings management.

JEL codes: M41, M42, M48

1. Introduction

These recent years have witnessed a considerable number of studies on the relevance of accounting information. As a matter of fact, the quality of accounting information has been long a substantial concern for accounting standard bodies (Benkraiem *et al.*, 2021; Nie & Xu, 2021). Since the 1960s, the awareness of user needs has been the main focus of accounting reflections in the United States. This concern has been accentuated in these recent years, following the series of financial scandals having arisen in the United States (Enron, Worldcom and Tyco Maxwell) and in Europe (Alcatel, Alstom, Parmalat, Ahold, Vivendi Universal, Générale des Eaux, Elf, and Compagnie Financière de Suez). These events are a reminder of the importance of relevant accounting information since the main cause of these financial scandals is the production of misleading accounting information.

Managers are involved in earnings management (**EM**) so as to maximize their personal utility at the detriment of the shareholder (Jensen and Meckling, 1976). For instance, managers who are compensated on the basis of earnings manage earnings upward (Cheng & Warfield, 2005; Sikka, 2008; Adut *et al.*, 2013). Previous studies have also pointed out that managers can manage results in order to achieve certain thresholds, namely avoiding losses, avoiding earnings decreases, and avoiding negative earnings surprises (Ogilby *et al.*, 2020; Adhikary *et al.*, 2021; and Sánchez-Ballesta & Yagüe, 2021). In this context, Graham *et al.* (2005) advance the idea that the fact of publishing a result exceeding the objectives pursued is considered a signal of good management of the company. Moreover, the disclosure of a result just above

the thresholds leads to a positive reaction from the markets (Lopez & Rees, 2002). More recently, other studies have focused on the hierarchy of achieving certain earnings thresholds. They aim to clarify the earnings threshold having been the primary motivation of managers in recent years. We note that the majority of work related to earnings management pays particular attention to discretionary accruals and real earnings management for the purpose of estimating the manipulable part of earnings (Burgstahler & Dichev, 1997; Degeorge *et al.*, 1999; Brown & Caylor, 2005; Barua *et al.*, 2019; Halaoua *et al.*, 2017). Halaoua *et al.* (2017) underline that the firms engage in earnings management measured via discretionary accruals with view to meet or exceed earnings thresholds.

This paper aims at examining the hierarchy of achieving certain earnings thresholds based on the magnitude of discretionary accruals and real earnings management under two different accounting models. More precisely, we have chosen France and the United States (US) owing to their heterogeneity. Both countries have different financial and legal systems, and they are characterized by a significant institutional diversity. Within the framework of countries classified under the common-law accounting system (e.g., the United Kingdom and the United States), this accounting system is mainly characterized by the presence of large capital markets, by a close independence between accounting and taxation, and by the presence of investors as the major source of financing (Ball *et al.*, 2000). In contrast, for countries classified as civil law (e.g., France and Germany), accounting standards are set by government institutions (Ball *et al.*, 2000). The accounting system in continental European countries is essentially characterized by a relatively small capital market, and the key source of funding is the financial institutions, mainly banks (Ball *et al.*, 2000; Leuz *et al.*, 2003).

Based on annual panel data over the period ranging from 2008 to 2018, the empirical results evince that two different hierarchies emerge from the US and French contexts based on the extent of discretionary accruals. An analysis of the real earnings management behavior of firms in both the French and US samples gives proof that they have used real earnings management with the aim of avoiding earnings decreases in both contexts. The results also indicate that these hierarchies are reorganized over time. The outcomes of a complementary analysis also lead to the same conclusions.

Our paper contributes to the existing literature in several ways. First, it adds to the previous studies looking into the hierarchy of earnings thresholds based on the earnings distribution (Dechow *et al.*, 2003; Degeorge *et al.*, 1999; Halaoua *et al.*, 2017), capital market valuation (Brown & Caylor, 2005), survey views (Graham *et al.*, 2005), and discretionary accruals (Barua *et al.*, 2019). To the best of our knowledge, our research is the first one having investigated the hierarchy of earnings thresholds based on real earnings management. Second, this study complements the existing literature on earnings management, and shows that institutional differences

between the Anglo-Saxon and Continental models affect incentives to achieve earnings thresholds. In this framework, Halaoua *et al.* (2017) outline that the behaviors and motivations inherent in earnings management will be influenced by the specificities of Anglo-Saxon or Continental-European systems for achieving earnings thresholds.

Cieslewicz (2014) and Papanastasopoulos (2014) add that differences in the market integrity and culture across countries influence earnings management. Third, the majority of studies on earnings management examine and validate opportunistic incentives, whereas our results validate incentives with reference to the signaling theory. Eventually, our findings are of interest to investors, auditors, regulators and academics with respect to the financial statement analysis, accounting earnings quality, and financial reporting. Indeed, our results suggest that managers engage in earnings management through thresholds via discretionary accruals and real earnings management in two different accounting models.

The remainder of the article is organized as follows. Section 2 presents the literature review and research hypotheses. Section 3 develops the methodology of the empirical research. Section 4 sets out the empirical results, and section 5 draws conclusions.

2. Literature review and hypotheses development

Managers use different tools to manage earnings (Pajuste *et al.*, 2020): accruals and real earnings management. Accruals management aims at camouflaging the true economic performance of the company by applying the methods or estimates permitted by the generally accepted accounting principles. Real earnings management aims to achieve or exceed earnings already set by operational activity, which directly impacts the company's performance. Such management has a direct effect on cash flows and an influence on long-term economic value. Managers use these tools to achieve earnings thresholds: avoiding losses, avoiding earnings decreases and avoiding negative earnings surprises. These concepts emerge through the studies of Burgstahler and Dichev (1997) and Degeorge *et al.* (1999). They focus on irregularities in the distribution of earnings. Discontinuities in earnings distribution have been interpreted that managers tend to manage earnings to meet or exceed these thresholds. Three thresholds have been identified to determine EM behavior: the first is reporting results. This threshold derives from the psychologically important distinction between positive and negative (or zero) earnings. The second and third thresholds are based on performance against widely held company-specific values. If the company meets or exceeds this threshold, it is well-performing; if not, it is failing. The two reference thresholds are the performance relative to the previous comparable period and relative to analysts' earnings forecasts (e.g., Degeorge *et al.*, 1999). Various studies confirm that

individual earnings thresholds are important, proving that managers engage in earnings management so that they can achieve earnings thresholds (Ogilby *et al.*, 2020; Adhikary *et al.*, 2021, Sánchez-Ballesta and Yagüe., 2021). Based on the prospect theory (Kahneman & Tversky, 1979), using psychology, humans could make fundamental differences between gains and losses. Thus, understanding the human behavior drives managers to avoid losses and earnings decreases. According to the positive accounting theory hypothesis, managers seek to manage earnings upward to avoid triggering covenants. According to Graham *et al.* (2005), managers try to meet earnings thresholds to avoid triggering covenants. Jiang (2008) finds out that in the case where firms exceed the benchmarks, they benefit from a higher one-year credit rating and a lower initial bond-yield spread.

Contrary to the opportunistic motives presented above, the signaling hypothesis suggests that meeting earnings thresholds is a positive signal to investors. Gunny (2010) and Zhao *et al.* (2012) prove that corporations achieving thresholds have higher future economic performance vis-à-vis other firms. Meeting the thresholds can be considered as private information issued to the investor. This signal relates to the future economic performance of the company. This is supported by Roychowdhury (2006) finding that firms with higher growth opportunities are more motivated to achieve earnings thresholds. Furthermore, Brown (2001) indicates that managers of firms with high growth prospects report earnings meeting or exceeding analysts' expectations. In France, corporations are mainly financed by bank loans, with less consideration given to equity financing. Accordingly, we assume that growth opportunities are more likely to influence the desire to meet earnings management thresholds in US firms than in French ones.

With the intention of studying the relative importance of the three earnings thresholds, previous studies are used to provide a hierarchy of the earnings thresholds that managers seek to achieve. Burgstahler and Dichev (1997) examine two earnings thresholds (avoiding losses, and avoiding earnings decreases). They use annual data for the period spanning from 1976 to 1994, and they come to the conclusion that managers tend to manage profits to avoid losses in the first place and to avoid the decline in them in the second place. Degeorge *et al.* (1999) also add a third threshold (avoiding negative earnings surprises) in which they employ quarterly data from 1974 to 1996. The finding shows that managers tend to manage earnings so as to avoid losses and earnings decreases more than to meet or beat market forecasts. Dechow *et al.* (2003) investigate whether result objectives fixed by managers have changed over time. Using annual data from 1989 to 2001, the findings indicate that the tendency for firms to publish results equal to or better than analysts' forecasts has increased in these recent years. Brown and Caylor (2005) look into whether the relative importance of the three earnings thresholds has changed over time. On the one hand, using quarterly data, they find that managers are more likely to avoid losses or avoid earnings decreases in the early years (1985-1993) of their sample period, which is in accordance with Degeorge *et al.* (1999). On the other

hand, they report that managers are more likely to avoid negative earnings surprises than the other two earnings thresholds in the past years (1996-2002) of their sample period, which is consistent with Dechow *et al.* (2003). Brown and Caylor (2005) provide a plausible explanation for the temporal shift in the hierarchy, and indicate that managers are re-ordering the hierarchy of their earnings thresholds based on the capital market. They report that the market rewards for avoiding negative earnings surprises become more important than for avoiding losses and avoiding decreases earnings during the last years (1996-2002).

Graham *et al.* (2005) employ a survey methodology for documenting chief financial officers' opinions on the relative preference of the four quarterly earnings benchmarks, and they identify the hierarchy in the following order: (1) earnings in the same quarter of last year, (2) analyst consensus forecasts, (3) positive earnings, and (4) earnings in the previous quarter. According to their survey results, avoiding earnings decreases relative to the earnings in the same quarter of last year is the most privileged earnings threshold. Houcine and Halaoua (2017) investigate whether the Tunisian listed firms manage their results to avoid losses and earnings decreases, employing annual data from 2002 to 2014. The finding evinces that firms tend to engage in earnings management for the purpose of avoiding reporting losses and earnings decreases. Carvajal *et al.* (2017) examine the hierarchy of earnings benchmarks in Australia. Based on annual data from 1994 to 2012, they draw the inference that analyst earnings forecasts are at the top of the earnings benchmark in Australia.

Lin *et al.* (2020) study whether managers of firms with narcissistic tendencies are more likely to engage in earnings management due to the desire to achieve earnings thresholds. Based on annual data throughout the period of 2015 - 2017, the results substantiate that narcissistic managers seek to avoid earnings decreases and avoid negative earnings surprises. Barua *et al.* (2019) look into the extent of discretionary accruals used to achieve earnings thresholds. Based on an American sample over the period from 1990 to 2012, the empirical findings provide evidence that managers are most likely to engage in discretionary accruals so as to avoid earnings decreases, and least likely to engage in discretionary accruals in order to avoid negative surprises. Halaoua *et al.* (2017) compare the extent to which French and British companies are managing their profits for avoiding losses, avoiding earnings decreases, and avoiding negative earnings surprises. With reference to a panel data of 1,771 French and 2,057 British firm-year observations in the course of the period of 2002-2012, the results show that all companies manage to avoid losses and exceed the result of the previous year. However, earnings management to meet analysts' forecasts appears to be more prominent in UK companies.

Burgstahler *et al.* (2006) present the differences in earnings management across firms in 13 European countries. They prove that institutional factors - such as external investor protection, capital market structure and taxes - influence earnings

quality. Consistent with these results, Ben Othman and Zeghal (2006) assert that Anglo-Saxon and continental corporations vary in their accounting systems and the characteristics of their socio-economic environment, which may also affect accounting results. Based on the above, we develop the following hypothesis:

H1: The hierarchy of earnings thresholds differs according to accounting systems (Anglo-Saxon, Continental).

Brown and Caylor (2005) outline a temporal shift in the hierarchy of earnings thresholds, providing evidence of the corresponding shift in the market valuations associated with the achievement / non-achievement of earnings thresholds.

The relevance of this analysis stems from the evidence in previous studies of the temporal evolution of earnings properties over the past decades (Francis & Schipper, 1999; Givoly & Hayn, 2000). GAAP and regulatory reforms are also likely to affect the accruals management behavior over time (Cohen *et al.*, 2008; Lobo & Zhou, 2010). Consequently, we examine whether the temporal shift in the hierarchy of the three earnings thresholds is a function of both the real earnings management and discretionary accruals. These two tools are used to achieve the earnings thresholds. This leads to the second hypothesis:

H2: A temporal shift occurs in the hierarchy of earnings thresholds.

3. Research design

3.1 Sample

Our initial sample consists of 297 French firms belonging to the CAC-all-Tradable index, and American firms belonging to the S&P 500 index. They are observed between 2008 and 2018. We identify three sub-periods (2008-2011, 2012-2015, and 2016-2018) to examine whether there is a temporal shift in the hierarchy of the three earnings thresholds based on earnings management. The worldwide economy suffered from the financial recession. Clinch and Wei (2011) argue that the crisis begins in the last quarter of 2007 and therefore, we speculate that the effect of the 2007 crisis will appear in the 2008 annual reports. Our first sub-period is from 2008 to 2011, which covers the financial crisis and its effect on the financial reporting behavior of firms (Habib *et al.*, 2013). The European economy sustained the sovereign debt crisis in 2012, Hence, the second sub-period spanning from 2012 to 2015. The World economy in 2016-2018 witnessed a downturn in the stock market. Thus, it constitutes the third sub-period (Gao *et al.*, 2021).

The financial data of the companies is obtained from the Datastream/Worldscope database, and the analysts' earnings forecasts are obtained from the I/B/E/S database. In accordance with previous research on earnings management, we exclude financial

companies from our sample. These corporations have capital structures, investments and other characteristics that are different from other industries. We also delete observations including missing data crucial to the calculation of the variables involved in our empirical analyses. After considering all of these conditions, the American final sample contains 3,942 and 3,882 firm-year observations of Kothari *et al.* (2005) and Roychowdhury (2006) earnings management models, respectively. The French final sample contains 1936 and 2122 firm-year observations of Kothari *et al.* (2005) and Roychowdhury (2006) earnings management models, respectively. All the continuous variables are winsorized at 1 percent in order to reduce the impact of outliers.

3.2 Measures of earnings management

The measurement of real earnings management is provided by the cross-sectional models i.e., abnormal cash flows from operations, abnormal production costs and abnormal discretionary expenses proposed by Roychowdhury (2006). Since their introduction, earnings management studies have extensively used these measures.

The residual of the following model is used as abnormal cash flows from operations: $CFO_t / A_{t-1} = \alpha_0 + \alpha_1 (1 / A_{t-1}) + \alpha_2 (S_t / A_{t-1}) + \alpha_3 (\Delta S_t / A_{t-1}) + \varepsilon_t$, where CFO_t is cash flows from operations in year t ; S_t is sales in year t ; ΔS_t is the change in sales from year $t-1$ to year t ; and A_{t-1} is lagged total assets.

Abnormal discretionary expenses are measured according to the following equation: $DE_t / A_{t-1} = \alpha_0 + \alpha_1 (1 / A_{t-1}) + \alpha_2 (S_{t-1} / A_{t-1}) + \varepsilon_t$, where DE_t is the sum of R&D, advertising, and selling, general and administrative expenses in year t .

As Roychowdhury (2006) notes, manipulation of production can influence reported earnings by changing the amount of fixed costs incurred by each unit of product. He defines production costs as the sum of inventory change and cost of goods sold, and he advances the model below to capture abnormal production costs:

$$PC_t / A_{t-1} = \alpha_0 + \alpha_1 (1 / A_{t-1}) + \alpha_2 (S_t / A_{t-1}) + \alpha_3 (\Delta S_t / A_{t-1}) + \alpha_4 (\Delta S_{t-1} / A_{t-1}) + \varepsilon_t$$

where PC_t is production costs in year t and ΔS_{t-1} is change in sales from year $t-2$ to year $t-1$.

According to Cohen *et al.*, (2008), we calculate real earnings management as the sum of the standardized variables, CFO, DE and PC, and then report the results corresponding to this only proxy for real earnings management.

Finally, the modified Jones cross-sectional model - described by Dechow *et al.* (1995), and modified by Kothari *et al.* (2005) is used to estimate discretionary accruals. The model is presented as follows:

$$\frac{TA}{A_{it-1}} = \alpha_0 \left(\frac{1}{A_{it-1}} \right) + \alpha_1 \left(\frac{\Delta REV_{it} - \Delta CRE_{it}}{A_{it-1}} \right) + \alpha_2 \left(\frac{PPE_{it}}{A_{it-1}} \right) + \alpha_3 ROA_{it} + \varepsilon_{it},$$

where $TA_{i,t}$ is total accruals of firm i for year t measured as the difference between income before extraordinary items and cash flows from operations. $A_{i,t}$ is total assets of firm i for year $t-1$. $\Delta REV_{i,t}$ is the change in revenues from year $t-1$ to year t . $PPPE_{i,t}$ is the gross property plant and equipment of firm i for year t . $\varepsilon_{i,t}$ is a residual term capturing discretionary accruals. In accordance with Kothari *et al.* (2005), $ROA_{i,t}$ is calculated as net income divided by total assets.

3.3 Measuring earnings thresholds

In this study, we investigate three earnings thresholds: avoiding losses (**Suspect_zero**), avoiding earnings decreases (**Suspect_loss**), and avoiding negative earnings surprises (**Surp**). We rely on Jiang's (2008) criteria that **Suspect_zero** is an indicator variable that is set equal to one if firm's earnings per share is greater than or equal to 0 in year t , and is set equal to zero, otherwise. With view to identify companies just meeting zero earning growth, we base on Jiang's (2008) criteria that **Suspect_loss** is an indicator variable that is set equal to one if firm's earnings per share in year t is greater than or equal to that of year $t-1$, and is set equal to zero, otherwise. In order to identify corporations avoiding negative earnings surprises, we refer to Jiang's (2008) criteria that **Surp** is indicator variable that is set equal to one if firm's earnings per share beats or meets the most recent analyst's forecast in year t , and 0, otherwise.

3.4 Measurements of control variables

In our analysis, we control the characteristics of the company. The first control variable used is the logarithm of total assets as an indicator of Size. The second variable is Book to market ratio (MTB) used to control the growth opportunities. The third variable is Return on assets which is included to address concerns that EM is correlated with performance. The fourth control variable is the ratio of total debt to total assets (Total Debt).

3.5 Empirical Model

With the aim of investigating the threshold hierarchy based on the relative extent of both discretionary accruals and real earnings management used to achieve three earnings thresholds, we estimate the following model using all firm-year and in all sub-period, using static panel regression techniques:

$$EM_{i,t} = \text{Suspect_zero}_{i,t} + \text{Suspect_loss}_{i,t} + \text{Surp}_{i,t} + \text{Total Debt}_{i,t} + \text{Size}_{i,t} + \text{ROA}_{i,t} + \text{MTB}_{i,t} + \varepsilon_{i,t}$$

where

EM	The earnings management measure.
Suspect_zero	An indicator variable that is set equal to one if firm's earnings per share is greater than or equal to 0 in year t, and is set equal to zero, otherwise.
Suspect_loss	An indicator variable that is set equal to one if firm's earnings per share in year t is greater than or equal to that of year t-1, and is set equal to zero, otherwise.
Surp	An indicator variable that is set equal to one if firm's earnings per share beats or meets the most recent analyst's forecast in year t, and 0, otherwise.
Size	The logarithm of total assets.
ROA	Return on assets
MTB	The book value of equity divided by the market value of equity.
Total Debt	The ratio of total debt to total assets.

4. Empirical results

4.1 Descriptive statistics

Table 1 provides descriptive statistics for the regression variables. It presents descriptive statistics for the full sample, including mean, minimum, median, maximum, and standard deviation.

Table 1. Summary of statistics of the sample

Panel A: Summary of statistics, using Discretionary Accruals for the US context							
Variables	Mean	Min	Median	Max	SD	25th Pr	75th Pr
EM	0	-0.107	0.001	0.105	0.029	-0.012	0.011
Suspect_zero	0.917	0	1	1	0.276	1	1
Suspect_loss	0.661	0	1	1	0.473	0	1
Surp	0.293	0	0	1	0.455	0	1
TotalDebt	0.288	0	0.291	0.793	0.17	0.173	0.384
Size	16.296	13.453	16.249	19.366	1.235	15.407	17.128
ROA	0.08	-0.157	0.075	0.285	0.068	0.042	0.115
MB	0.38	-0.096	0.332	1.235	0.258	0.199	0.513

Panel B: Summary of statistics. using the Real earnings management proxy for the US context							
Variables	Mean	Min	Median	Max	SD	25th Pr	75th Pr
EM	-0.001	-0.187	-0.001	0.215	0.053	-0.021	0.018
Suspect_zero	0.918	0	1	1	0.275	1	1
Suspect_loss	0.659	0	1	1	0.474	0	1

Temporal evidence on threshold hierarchy based on accruals and real earnings management: Evidence from France and the US

Surp	0.304	0	0	1	0.46	0	1
TotalDebt	0.293	0	0.291	0.83	0.174	0.173	0.391
Size	16.277	13.415	16.251	19.382	1.225	15.401	17.111
ROA	0.08	-0.155	0.075	0.272	0.066	0.042	0.113
MB	0.378	-0.143	0.333	1.235	0.259	0.198	0.513

Panel C: Summary of statistics. using Discretionary Accruals for the French context

Variables	Mean	Min	Median	Max	SD	25th Pr	75th Pr
EM	0	-0.139	-0.001	0.169	0.038	-0.015	0.013
Suspect_zero	0.768	0	1	1	0.422	1	1
Suspect_loss	0.566	0	1	1	0.496	0	1
Surp	0.300	0	0	1	0.458	0	1
TotalDebt	0.233	0	0.209	0.684	0.165	0.101	0.347
Size	14.120	9.703	13.981	18.649	2.300	12.260	15.968
ROA	0.013	-0.571	0.040	0.211	0.123	0.011	0.067
MB	0.725	-0.250	0.610	2.857	0.526	0.371	0.926

Panel D: Summary of statistics. using the Real earnings management proxy for the French context

Variables	Mean	Min	Median	Max	SD	25th Pr	75th Pr
EM	0.019	-0.447	0.018	0.559	0.126	-0.017	0.053
Suspect_zero	0.781	0	1	1	0.414	1	1
Suspect_loss	0.557	0	1	1	0.497	0	1
Surp	0.301	0	0	1	0.459	0	1
TotalDebt	0.231	0	0.213	0.630	0.157	0.108	0.334
Size	14.332	9.744	14.272	19.211	2.339	12.490	16.141
ROA	0.018	-0.534	0.039	0.250	0.114	0.013	0.066
MB	0.737	-0.250	0.641	2.778	0.503	0.394	0.935

Panels A and B set out descriptive statistics for the US sample the accruals model proposed by Kothari *et al.* (2005), and the model suggested by Roychowdhury (2006) for the real earnings management, respectively. Panels C and D display descriptive statistics for the French sample, using the accruals model proposed by Kothari *et al.* (2005), and the model suggested by Roychowdhury (2006) for the real earnings management, respectively.

The variable earnings management (EM) has means 0 (Panel A) and 0.019 (Panel B), with medians 0.001 and -0.001, respectively. This variable has means 0 (Panel A) and -0.001 (Panel B), with medians -0.001 and 0.018, respectively.

Regarding the Earnings threshold variables, the variable Suspect_zero has means of 0.917 (Panel A) and 0.918 (Panel B). This result explains that the number of firm-

year observations reporting a value of Suspect_zero equal to 1 corresponds to the 91.7% and 91.8% of the U.S sample. This variable has means of 0.768 (Panel C) and 0.781 (Panel D). This finding substantiates that the number of firm-year observations reporting a value of Suspect_zero equal to 1 corresponds to the 76.8% and 78.1% of the French sample. The variable Suspect_loss has means of 0.661 (Panel A) and 0.659 (Panel B). This outcome gives proof that the number of firm-year observations reporting a value of Suspect_loss equal to 1 corresponds to the 66.1% and 65.9% of the U.S sample. This variable has means of 0.566 (Panel C) and 0.557 (Panel D). This result provides evidence that the number of firm-year observations reporting a value of Suspect_loss equal to 1 corresponds to the 56.6% and 55.7% of the French sample. The variable MBE has means of 0.293 (Panel A) and 0.304 (Panel B). This finding shows that the number of firm-year observations reporting a value of MBE equal to 1 corresponds to the 29.3% and 30.4% of the U.S sample. This variable has means of 0.300 (Panel C) and 0.301 (Panel D). This outcome indicates that the number of firm-year observations reporting a value of MBE equal to 1 corresponds to the 30% and 30.1% of the French sample, suggesting that firms may have the potential to engage in earnings management.

4.2 Correlation analysis

Table 2 provides information on the Pearson correlation coefficients of all variables included in the regression. Panels A and B present the correlation matrix for the US sample, using the accruals model proposed by Kothari et al. (2005) and the model proposed by Roychowdhury (2006) for the real earnings management, respectively. Panels C and D present the correlation matrix for the French sample, using the accruals model suggested by Kothari et al. (2005) and the model proposed by Roychowdhury (2006) for the real earnings management, respectively. The results show that the highest correlation coefficient of 0.675 is between Suspect_zero and ROA in panel C. Generally, a correlation of 0.70 or higher in absolute value might indicate a multicollinearity issue. In addition, the Variance inflation factor (VIF) is weak, pointing to the absence of multicollinearity between the variables in our model. According to Table 5, it is worth noting the earnings management measures are significantly positively (negatively) related to three measures of earnings thresholds in the U.S (French) context, suggesting that firms engage in earnings management in order to exceed earnings thresholds.

Table 2. Pearson correlations

Panel A: Correlation matrix, using Discretionary Accruals for US context										
	EM	Suspect_zero	Suspect_loss	Surp	TotalDebt	Size	ROA	MB	VIF	
EM	1									
Suspect_zero	0.049***	1								1.45
Suspect_loss	0.103***	0.233***	1							1.20
Surp	0.090***	0.161***	0.332***	1						1.19
TotalDebt	0.071***	-0.086***	-0.059***	-0.031*	1					1.13
Size	0.070***	0.033**	-0.055***	0.245***	0.159***	1				1.10
ROA	-0.044***	0.531***	0.295***	0.245***	-0.198***	-0.152***	1			1.88
MB	0.063***	-0.100***	-0.115***	0.044***	-0.125***	0.204***	-0.374***	1		1.32
Panel B: Correlation matrix, using the Real earnings management proxy for US context										
	EM	Suspect_zero	Suspect_loss	Surp	TotalDebt	Size	ROA	MB	VIF	
EM	1									
Suspect_zero	0.018	1								1.47
Suspect_loss	0.032***	0.224***	1							1.20
Surp	0.041**	0.161***	0.335***	1						1.20
TotalDebt	-0.048***	-0.1***	-0.065***	-0.058***	1					1.14
Size	-0.027*	0.029*	-0.079***	-0.048***	-0.159***	1				1.12
ROA	0.047***	0.539***	0.29***	0.267***	-0.194***	-0.18***	1			1.90
MB	0.041**	-0.105***	-0.103***	0.042***	-0.152***	0.23***	-0.366***	1		1.34

Panel C: Correlation matrix, using Discretionary Accruals for French context

	EM	Suspect_zero	Suspect_loss	Surp	TotalDebt	Size	ROA	MB	VIF
EM	1.000								
Suspect_zero	-0.099***	1.000							1.99
Suspect_loss	-0.035	-0.208***	1.000						1.17
Surp	0.003	0.221***	-0.350***	1.000					1.19
TotalDebt	-0.056***	0.008	-0.063***	-0.107***	1.000				1.13
Size	-0.109***	0.325***	0.014	-0.026	-0.315***	1.000			1.32
ROA	-0.219***	0.675***	0.172***	0.167***	0.022	0.359***	1.000		1.99
MB	0.009	-0.065	-0.042	-0.014	-0.006	-0.044	-0.097*	1.000	1.05

Panel D: Correlation matrix, using the Real-earnings-management proxy for French context

	EM	Suspect_zero	Suspect_loss	Surp	TotalDebt	Size	ROA	MB	VIF
EM	1								
Suspect_zero	-0.095***	1							1.95
Suspect_loss	-0.069***	0.208***	1						1.18
Surp	-0.095***	0.222***	0.365***	1					1.21
TotalDebt	-0.002	-0.028	-0.045***	-0.110***	1				1.13
Size	0.015	0.305***	0.018	-0.050***	0.3072***	1			-0.30
ROA	-0.115***	0.672***	0.186***	0.19***	-0.012	0.332***	1		1.95
MB	0.029	-0.0467***	-0.040*	-0.016	0.052***	0.065***	0.094***	1	-0.04

Notes:

***Significant coefficient at 1%

**Significant coefficient at 5%

*Significant coefficient at 10%

4.3 Results of regression and discussion

First, this study has used the Hausman (1978) test to determine which estimation model, fixed-effects or random-effects best explain our empirical results. The findings of the Hausman specification test indicate that the fixed-effects model is better than the random-effects one. Second, for addressing the heteroskedasticity problem, the Panel Corrected Standard Errors method proposed by Beck and Katz (1995) is required. This method allows correcting the heteroscedasticity problem while providing more robust results.

To identify the hierarchy of the three earnings thresholds based on the managerial discretion in the financial reporting (i.e., the choice of discretionary accruals) and the real earnings management choices, we estimate the regression specifying the two earnings management modalities (discretionary accruals and the real earnings management) as a function of the variables of interest for achieving/missing the three earnings thresholds. The coefficient of each indicator variable represents the average discretionary accruals (as a percentage of lagged total assets) used to achieve the earnings threshold utilized after controlling other factors.

Tables 3 and 4 present the regression results in the US and French contexts, respectively. The Panel A of Table 3 reports the results of the two models of earnings management based on all observations. This Panel shows that the discretionary accruals associated with avoiding losses are generally the highest of all earnings thresholds. Discretionary accruals associated with avoiding negative earnings surprises are also lower than those associated with avoiding losses and avoiding earnings decreases. In accordance with the coefficients of these three indicator variables, a hierarchy emerges as “Suspect_zero (0.014) > Suspect_loss (0,004) > MBE (0,002)”. F-tests evince highly significant differences between the coefficients of these three indicator variables (p value <.0001) for the accruals model, which is inconsistent with the results of Barua *et al.* (2019) in the same context (avoiding earnings decreases, avoiding losses, and avoiding negative earnings surprises) for two reasons: the sample period and the methodology adopted. These two causes are not the same as our methodology. An analysis of the real earnings management behavior of these firms indicates that they have used significant real earnings management to avoid earnings decreases.

The Panel A of Table 4 shows that the discretionary accruals associated with avoiding losses are generally the highest of all earnings thresholds. Discretionary accruals associated with avoiding earnings decreases are also lower than those associated with avoiding losses and avoiding negative earnings surprises. With reference to the coefficients of these three indicator variables, a hierarchy emerges as “Suspect_zero (0,010) > MBE (0,002) > Suspect_loss (-0,002)”. F-tests account for highly significant differences between the coefficients of these three indicator

variables (p value <.0001) for the accruals model, which is consistent with the results of Halaoua *et al.* (2017) stating that companies are managing their profits so that they can avoid losses, avoid earnings decreases, and avoid negative earnings surprises in the French context.

An analysis of the real earnings management behavior of these firms indicates that they have used significant real earnings management to avoid earnings decreases.

Table 3. Results of regression for the US context

Panel A: Regression based on all observations			
Dependent variables	Using the Real earnings management proxy	Using Accruals	Discretionary
Intercept	-0.004	-0.019***	
Suspect_zero	0.001	0.014***	
Suspect_loss	0.002**	0.004***	
Surp	0.001	0.002***	
Total Debt	-0.006***	0.005***	
Size	0.000	0.000	
ROA	0.017**	-0.044***	
MB	0.000	0.002***	
Sub-periods	2008-2011	2012-2015	2016-2018
Panel B: regression for each sub-period. Using Discretionary Accruals			
Intercept	0.001	-0.019***	-0.025***
Suspect_zero	0.01***	0.017***	0.011***
Suspect_loss	0.004***	0.003***	0.002***
Surp	0.001**	0.000	0.005***
Total Debt	0.003**	0.011***	0.002**
Size	-0.001***	0.000	0.001***
ROA	-0.07***	-0.009*	-0.077***
MB	0.001	0.005***	0.004***
Panel C: regression for each sub-period. Using the Real earnings management proxy			
Intercept	0.012*	0.006	0.014*
Suspect_zero	-0.004**	0.002*	0.000
Suspect_loss	0.004***	0.000	0.000
Surp	-0.003***	0.003***	0.002*
Total Debt	-0.03***	-0.001	0.000
Size	0.000	-0.001*	-0.001
ROA	0.047***	-0.022***	-0.007
MB	0.000	0.002	0.004*

Notes:

***Signifiant coefficient at 1%

**Significant coefficient at 5%

* Significant coefficient at10%

Temporal evidence on threshold hierarchy based on accruals and real earnings management: Evidence from France and the US

Table 4. Results of regression for the French context

Panel A: Regression based on all observations			
Dependent variables	Using the Real earnings management proxy	Using Discretionary Accruals	
Intercept	0.047***	-0.005*	
Suspect_zero	0.001	0.01***	
Suspect_loss	-0.004**	-0.002***	
MBE	0.001	0.002**	
Total Debt	-0.007	-0.001	
Size	-0.001***	0.000	
ROA	-0.056**	-0.112***	
MB	0.001	0.004***	
Sub-periods	2008-2011	2012-2015	2016-2018
Panel B: regression for each sub-period. Using Discretionary Accruals			
Intercept	-0.018***	0.002	0.008***
Suspect_zero	0.006***	0.009***	0.004***
Suspect_loss	-0.003***	-0.002***	0.001*
MBE	0.000	-0.002***	0.005***
Total Debt	0.000	-0.005***	0.005**
Size	0.001***	0***	-0.001***
ROA	-0.101***	-0.064***	-0.104***
MB	0.005***	0.005***	0.004***
Panel C: regression for each sub-period. Using the Real earnings management proxy			
Intercept	0.032***	0.035***	0.019**
Suspect_zero	0.010***	-0.013***	-0.01***
Suspect_loss	-0.005**	-0.001	-0.008***
MBE	0.004*	0.004***	0.003
Total Debt	-0.021***	-0.045***	0.003
Size	-0.001	0.000	0.002***
ROA	-0.144***	0.050**	-0.056*
MB	0.010***	0.000	0.001

Notes:

***Significant coefficient at 1%

**Significant coefficient at 5%

* Significant coefficient at 10%

Concerning the hierarchy based on the real earnings management, in general, the results show that it is related to the threshold so as to avoid earnings decreases whatever the context studied (French or American).

We then find two hierarchies based on discretionary accounting adjustments that are different according to the context studied. Leuz *et al.* (2003) show that the extent of earnings management is higher in the countries with high investor protection. Revert (2008) points out that earnings management is lower in the EU countries where the institutional framework is more favorable to the production of good quality of financial information (i.e. high investor protection, low ownership concentration).

On the other hand, real earnings management is associated only with the "avoiding earnings decreases" threshold in the contexts studied, since the real earnings management is based on strategic decisions made by managers (production cost, discretionary spending, cash flows). Hence, it is difficult for investors and regulators to detect this type of manipulation.

Touching the control variables, we notice in most cases a significant negative association between the earnings management and firm size. Consistent with the political cost hypothesis, managers of larger firms with higher annual profits will manage earnings downward (Zimmerman, 1983). We find out no significant association between the earnings management and firm size. The results in Tables 3 and 4 denote that in most cases, we find a negative and significant association between the earnings management and asset performance. Thus, more profitable corporations are less committed to earnings management, supporting the results of Ben Amar and Chakroun, (2018). MB and Total Debt are positively related to earnings management (e.g., El Guindy & Basuony, 2018; Barua *et al.*, 2019). The findings prove that growth opportunities are more likely to influence earnings management thresholds in the US companies than in French ones.

The Panel B of Table 3 reports the regression results, using the discretionary accruals for each sub-period in the U.S context. The coefficients of each of the three indicator variables present the same hierarchy of panel A (i.e., Suspect_zero > Suspect_loss > MBE), except for the last sub-period (2016-2018). Referring to the coefficients of these three indicator variables, a hierarchy emerges as "Suspect_zero (0,011)> MBE (0,005)> Suspect_loss (0,002)". F-tests show highly significant differences between the coefficients of these three indicator variables (p value <.0001) for each sub-period. Barua *et al.* (2019) show that the temporal shift does not affect the hierarchy of earnings thresholds based on discretionary accruals during the same period from 2008 to 2012, which aligns with our results.

The Panel C of Table 3 points out the regression results, using the real earnings management proxy for each sub-period in the US context. The hierarchy has changed over time. Based on the coefficients of these three indicator variables, a hierarchy emerges as "Suspect_loss (0,004)> MBE (-0,003)> Suspect_zero (-0,004)" for the first sub-period. F-tests indicate highly significant differences between the coefficients of these three indicator variables (p value <.0001). For the period spanning from 2012 to 2015, another hierarchy has been reorganized as "MBE (0,003)> Suspect_zero (0,002)> Suspect_loss (0,000)". F-tests display highly significant differences between the coefficients of these three indicator variables (p value <.0001). The negative sign explains that the firm has managed the result downwards by a real earnings management, e.g., reduction of R&D expenditures to achieve the earnings thresholds (e.g., Gunny, 2010; Roychowdhury, 2006). For the last sub-period (2016-2018), firms have used the real earnings management in order to avoid negative earnings surprises.

The Panel B of Table 4 reports the regression results, using the discretionary accruals for each sub-period in the French context. The coefficients of each of the three indicator variables presents a restructured hierarchy (i.e., Suspect_zero > Suspect_loss > MBE), except for the last sub-period (2016-2018). Based on the coefficients of these three indicator variables of the last sub-period, a hierarchy emerges as “MBE (0,005)> Suspect_zero (0,004)> Suspect_loss (0,001)”. F-tests show highly significant differences between the coefficients of these three indicator variables (p value <.0001) for each sub-period.

The Panel C of Table 4 points out the regression results, using the real earnings management proxy for each sub-period in the French context. The hierarchy has changed over time. In accordance with the coefficients of these three indicator variables, a hierarchy emerges as “Suspect_zero (0,010)> MBE (0,004)> Suspect_loss (-0,005)” for the first sub-period. F-tests indicate highly significant differences between the coefficients of these three indicator variables (p value <.007). For the period ranging from 2012 to 2015, another hierarchy has reorganized as “MBE (0,004)> Suspect_zero (-0,013)> Suspect_loss (-0,001)”. F-tests denote highly significant differences between the coefficients of these three indicator variables (p value <.0001). For the last sub-period (2016-2018), another hierarchy has been reorganized as “Suspect_loss (-0,008)> Suspect_zero (-0,010) >MBE (0,003)”. F-tests give proof of highly significant differences between the coefficients of these three indicator variables (p value =0.0001). The results obtained are in line with those of Brown and Caylor (2005). The authors conclude that the hierarchy of the three thresholds has changed over time.

4.5 Robustness tests

With the aim of checking the robustness of our main results, we verify that the earnings threshold is relatively more associated with discretionary accruals if we replace the accruals model proposed by Kothari *et al.* (2005) with the accruals model suggested by Raman and Shahrur (2008).

We find that the coefficients of each of the three indicator variables present the same hierarchy of the Panel A in table 3 (i.e., Suspect_zero > Suspect_loss > MBE) for the U.S context. We also find out that the coefficients of each of the three indicator variables present the same hierarchy of the Panel A in table 4 (i.e., Suspect_zero > MBE > Suspect_loss) for the French context.

Table 5. Robustness tests

Dependent variables	Using Discretionary Accruals (US Context)	Using Discretionary Accruals (French Context)
Intercept	-0.021***	-0.018***
Suspect_zero	0.014***	0.009***
Suspect_loss	0.004***	-0.002***

Dependent variables	Using Discretionary Accruals (US Context)	Using Discretionary Accruals (French Context)
Surp	0.002***	0.003***
Total Debt	0.006***	-0.006**
Size	0.000***	0.000
ROA	-0.051***	-0.106***
MB	-0.001	0.022***

Notes:

***Significant coefficient at 1%

**Significant coefficient at 5%

* Significant coefficient at 10%

5. Conclusion

This paper aims to examine the hierarchy of achieving certain earnings thresholds based on the extent of discretionary accruals and real earnings management under two different accounting models. Using a large sample of US and French firms for the period of 2008-2018, our empirical analyses classify the three earnings thresholds relying on discretionary accruals in the following order: (1) avoiding earnings losses, (2) avoiding earnings decreases, and (3) avoiding negative earnings surprises in the US context. Afterwards, our findings classify the three earnings thresholds based on discretionary accruals in the following order: (1) avoiding earnings losses, (2) avoiding negative earnings surprises, and (3) avoiding earnings decreases in the French context. An analysis of the real earnings management behavior of these firms indicates that they have used significant real earnings management in order to avoid earnings decreases. The results obtained have prominent practical implications. Firstly, this study could allow a new judgment into earnings management behaviors so as to achieve earnings thresholds, and help regulators and auditors with their enforcement processes. Our outcomes also indirectly indicate that firms avoiding losses and earnings decreases should be closely monitored when the potential financial management is investigated. Secondly, Regulators and practitioners should pay particular attention to the different thresholds when looking into the mechanisms (e.g., earnings management, expectation management, manipulation of cash flows) that management has used or could use to achieve the thresholds.

This study is subject to measurement error which is a common limitation in the earnings management literature. Another limitation is that various factors not examined in this research may affect earnings management in several ways. For instance, audit quality, corporate governance or disclosure policies are less likely to engage in earnings management. Future research can explore the factors above which are considered substantial areas in the earnings management literature.

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