



## R&D EXPENDITURES AND EARNINGS TARGETS: EVIDENCE FROM FRANCE

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### JEL Classification

M41, O32, G34

### ABSTRACT

Research and development (R&D) investments reduce current-period earnings while the benefits associated with the investments occur in the future. This problem implies an earnings management tool to boost short-term performance. While there is much evidence regarding managerial discretion through R&D capitalization, empirical studies that directly examine managerial discretion through R&D expenditure adjusting have not been widely provided in the European context. This paper seeks to determine if earnings targets influence R&D investment by encouraging R&D cuts after IFRS adoption. Focusing on a French setting, where companies invest heavily in R&D, results show that managers tend to cut the R&D expenditures in order to achieve earnings target. Studying two earnings management incentives: avoidance of losses (positive earnings target) and earnings decreases (positive earning growths target), findings support thresholds assumption and provide evidence on real earnings management through R&D expensing. This empirical research contributes to the literature by providing further evidence that post-FRS, R&D cut is a strategic decision influenced by earnings management to boost performance.

## 1. INTRODUCTION

Over past decades, there has been a strong acceleration of innovation in science-based economic sectors and an increase in intangible resources. So, a growing importance is attached to the accounting treatment of R&D expenditures. The valuation of intangible assets within the accounting framework raises several problems relating to their identification, measurement, and control (Zéghal and Maaloul, 2011). These problems imply a trade off surrounding the most effective accounting between relevance and reliability. The capitalization of R&D may increase value relevance for those who utilize financial statements (Lev and Sougiannis, 1996; Aboody and Lev 1998; Healy et al., 2002); whereas the immediate expensing of R&D is a most conservative accounting treatment and may increase reliability and decrease the earnings management risk (Nelson et al., 2003). In this setting, the accounting treatment of R&D costs is a controversial issue and there are international accounting differences about accounting for R&D costs. Furthermore, due to globalization, the need to reduce heterogeneity between the practices and the accounting standards has increased the need to the accounting harmonization.

Besides, R&D accounting treatment could be influenced by earnings management purposes. The fact is that empirical literature supports the positive effects of R&D expenditure on corporate performance.

Various studies find that R&D expenditures offer a great opportunity for growth (McConnell and Musurella, 1985 ; Smith and Watts, 1992 ; Baber et al., 1996; Ho et al., 2006) , improve benefit (Connolly and Hirshey, 1984 ; Chan et al., 1990; Sougiannis, 1994; Chan et al., 2001), productivity (Sougiannis, 1994 ; Lev, 1999 ; Aboody et Lev, 2000 ; Ding et al., 2003 ; Ding et al., 2007), and stock performance (Ben-Zion, 1978; Griliches, 1981; Hirshey, 1982). However, the nature of R&D investments highlights the importance of R&D discretion. Indeed, R&D activity differs by nature from other investments by a number of attributes: firm-specificity, information asymmetry, and high uncertainty (Holmstrom, 1989). Moreover, there is an ongoing debate on R&D accounting choice (Nelson et al., 2003; Chambers et al., 2003; Callimaci and Landry, 2003; Koch, 1981; Markarian et al., 2008; Seybert, 2010; Stadler and Banal-Estan, 2010). Accounting regulation gives firms the managerial choices made upon the R&D accounting treatment - capitalization or expensing -, the amount of R&D investment, the R&D presentation and the content of R&D information disclosed in annual reports. R&D investments are likely to increase divergence between managers and investors and provide adequate grounds for earnings management. The existing literature on earnings management shows that there are two manners of manipulation earnings. In this context, Zang (2011) shows that firms prefer different earnings management strategies in a predictive manner, depending on their operational and accounting environment. However, the focus has mostly been limited to the accounting earnings management using discretionary accruals at the expense of real earnings management using special transactions so-called real operational activities. Roychowdhury (2006) states that real activities manipulation is defined as management actions that deviated from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds. There is evidence that managers tend to use R&D expenditures as a real earnings management tool to opportunistically boost short-term performance (Bushee, 1998). Porter (1992) argues that the uncertain nature of R&D investment may encourage managers to under invest in R&D to the detriment of shareholders. It has been shown that managers adjust R&D spending in response to meet current-period earnings performance (Baber et al., 1991; Perry and Grinaker, 1994; Bange and De Bondt, 1998; Bushee, 1998; Cheng, 2004), to exceed analysts' earnings forecasts (Bhojraj et al., 2009), and to meet earnings-based compensation (Bange and De Bondt, 1998; Harter and Harikumar, 2004).

The objective of this paper is to provide evidence on real earnings management through R&D cutting for a country where managers are likely to have myopic investment behaviour. In fact, IAS No. 38 (IASB, 2004) requires that research expenditures be expensed in the income statement and development expenditures be included in the balance sheet if some conditions are respected. After IFRS adoption, managers enjoy less discretion to capitalize R&D costs which is the mandatory accounting treatment. This means reducing accounting earnings management and increasing using real earnings management. Therefore, examining whether adjusting R&D expenditures is affected by earnings-management motivations or not is important. In this context, some studies have investigated R&D manipulation through R&D expensing under US GAAP which require that

most R&D expenditures be fully expensed immediately. However, few authors have empirically investigated discretionary R&D expensing under IFRS. Consequently, more empirical studies are needed to understand how IFRS adoption will influence managers' myopic behaviour in R&D investment.

The study of R&D expensing is pertinent. First, the implementation of the international standards since 2005 in European countries has allowed numerous firms to capitalize R&D expenditures according to IAS 38. As such, IFRS may improve the information quality and reduce earnings management through R&D accounting choice (Djama et al., 2013). Thus, firms have less likely opportunities to use discretionary accruals to gain target results and have particularly strong incentives based on the existence of accounting thresholds to manage earnings. That is why the requirement that R&D must be included in the balance sheet when some conditions are respected could increase probability of a myopic R&D investment behaviour in response to short-term earnings pressures. Therefore, this paper extends the literature about the effects of IFRS adoption by examining how managers use the discretion on R&D expensing. Second, the analysis is done in the French context, recognized under the European commission Economics of Industrial Research and Innovation (EIRI), as the second most R&D intensive country in the European Union. The importance of R&D intensive companies implies the weight of R&D expenses and shows the remarkable strategic R&D accounting choice. Besides, French firms have been obliged, since 2005, to prepare their consolidated statements in compliance with IFRS. This change in accounting reference also changes the incentives and the levels of managerial discretion for R&D accounting. Third, much of the prior studies focus on R&D capitalization and earnings management (Markarian et al., 2008; Thi et al., 2009; Persson and Fuentes, 2011). This study highlights the importance of discretionary R&D expensing by examining whether R&D cutting is sensitive to achieving earnings targets. Finally, much of the empirical studies on accounting method choice are based on the opportunistic behaviour perspective which draws support from the assumptions of positive accounting theory (Watts and Zimmerman, 1986). This study highlights the importance of financial performance incitation for discretionary R&D treatments and empirically analyzes whether managers adjust R&D spending in response to earnings targets. This is important given thresholds assumption that thresholds management is motivated by the aim to achieve earnings targets.

The main objective of this paper is to determine if earnings targets influence R&D investment by encouraging R&D cuts. To this end, the study is conducted on a sample of 395 firm-year French companies investing heavily in R&D in the period 2007-2011 and accounting data are collected from the Worldscope database. Empirical results show that managers tend to cut the R&D expenditures in order to achieve earnings targets confirming the studies of Osma (2008) and Dumas (2012). Our research contributes to the literature by providing further evidence that, in the French context, R&D cut is a strategic decision influenced by earnings management to boost performance.

## **2. BACKGROUND AND HYPOTHESES DEVELOPMENT**

### **2.1. R&D Setting**

R&D activity differs by nature from other investments by a number of attributes: firm specificity, information asymmetry, and high uncertainty (Holmstrom, 1989). The uncertainty and the specificity of R&D increase the informational asymmetry. Aboody and Lev (2000) have concluded that the different characteristics of R&D cause an informational imbalance between the entity and its environment and even within the entity itself.

Their findings, for the period from 1985 to 1997, indicate that insiders take advantage of information on planned changes in R&D budgets and that R&D is, thus, a major contributor to information asymmetry. In this context, Davis (2001) defines information asymmetries as arising due to differentials in the kinds of information emanating from the firm's various R&D activities, where the information generated is initially private to that firm and hence not available to others. R&D creates information asymmetry because of the relative uniqueness of R&D investments, the absence of organized market of R&D, and the availability of many accounting choices of R&D.

Besides, R&D accounting standards offer flexibility for the managers to choose between the two accounting treatments and to decide about R&D investments. In this context, US GAAP takes a stricter approach to the issue. SFAS No. 2 -Accounting for Research and Development Costs (FASB, 1974) - mandates that all R&D expenditures be immediately charged as an expense for each reporting period, except for the development costs of computer software that can be capitalized (SFAS 86). While US GAAP prohibits R&D capitalization, International Financial Reporting Standards or International Accounting Standards (IFRS/IAS) authorizes the capitalization of R&D expenditures under certain criteria. IAS No. 38 (IASB, 2004) requires that research expenditures be expensed in the income statement and development expenditures be included in the balance sheet if some conditions are respected. Paragraph 57 of this standard requires six conditions to be fulfilled for recognition: technical feasibility, intention to complete, ability to use or sell, future economic benefits, adequate resources, and ability to measure. In this context, French standards reach a compromise between relevance and reliability. By approximating the international level, French GAAP - the CRC 04-06 - (regulation 2004-06 by the Conseil National de la Comptabilité – National Accounting Council) allows flexibility regarding the treatment of R&D. The conditions of capitalization stated by the French GAAP are similar to those required by IAS. However, while IAS requires that R&D must be included in the balance sheet when some conditions are respected, French accounting standards offer flexibility for the managers to choose between the two accounting treatments (capitalizing or expensing). Thus, the French GAAP gives the executives the inherent subjectivity of deciding whether the conditions of IAS 38 have been satisfied and of choosing the accounting treatment to adopt.

Yet, since 2005, all listed firms in European Union countries have been obliged to prepare their consolidated statements in compliance with IFRS. Consequently, firms have to capitalize R&D expenditures according to IAS 38. This change in accounting reference also changes the incentives and the levels of managerial discretion for R&D accounting. While

the capitalization of R&D costs if they meet certain criteria is optional under the French accounting standards, it is mandatory under the IFRS. In this logic, before IFRS adoption, managers used to enjoy, under French accounting standards greater discretion to capitalize R&D costs which is the preferential accounting treatment and had the option to choose the expensing or the capitalization of R&D. After IFRS adoption, managers enjoy less discretion to capitalize R&D costs which is the mandatory accounting treatment. This means reducing accounting earnings management through R&D capitalization after IFRS adoption. As such, IFRS may increase using real earnings management through adjusting R&D expenditures. Therefore, examining whether French companies' decisions to cut R&D expenditures are affected by earnings-management motivations or not is important.

## **2.2. R&D Expenditures and Earnings Management**

There is substantial evidence that managers engage in earnings management (Healy, 1985; Healy and Wahlen, 1999; Fields *et al.*, 2001; Kothari, 2001) to meet their targets. There have been at least three attempts at defining earnings management implying differing interpretations of empirical evidence in studies. Earnings management is defined as a “purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain” (Schipper, 1989). In generally accepted terms, earnings management occurs “when managers use judgment in financial-reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (Healy and Wahlen, 1999). Although these definitions are widely accepted, they suffer from not taking into account all company stakeholders. To offset this state, Degeorge *et al.*(1999) assume that improved performance is rewarded everywhere and they introduce behavioral thresholds for earnings. The particular earnings management that this paper focuses on is earnings management through R&D. The relationship between R&D and the propensity to use earnings management is justified in terms of specificity, uncertainty, and information asymmetry around R&D. The latter can complex agency problems, further reinforce the asymmetric information problem, and make the information divulgation process incomplete and biased due to the loss of managerial control (Hall, 2002). Besides, R&D accounting choice is discretionary and the change in accounting reference by IFRS adoption involves a mandatory capitalization of R&D expenditures and thus changes the incentives as well as the levels of managerial discretion for R&D accounting. This means reducing accounting earnings management and increasing real earnings management by switching from accruals management to real earnings management.

In theory, accounting practice and accounting earnings management are justified on positive accounting theory (Watts and Zimmerman, 1990) which draws support from assumptions of agency costs and political costs. But, studies on real earnings management suggest that managers' discretion can be explained by other supports (competing theories of the positive theory). In this context, Raffournier (1990) points out to the importance of signal assumption, fiscal assumption, smoothing assumption, and thresholds assumption. Particularly, understanding myopic R&D investment behavior is based on thresholds management incentives (Baber *et al.*, 1991; Perry and Grinaker, 1994; Bange and De Bondt, 1998; Bushee, 1998; Cheng, 2004; Bhojraj *et al.*, 2009). Studies on accounting thresholds grew substantially starting in the late 1990s. Thresholds management is

motivated by the aim to meet and beat short-term earnings targets. Vidal (2011) argues that performance thresholds will renew the methodology used in earnings management studies highlighting the existence of accounting thresholds or earnings targets. He states that based on statistical observations of the published results distributions, this methodology appeared in the early 2000s as an alternative to the measurement of accruals. According to Vidal (2006) the positive theory itself provides for the existence of thresholds. However, although these theories explain management to avoid thresholds, they are not yet empirically proven. A variety of theories are put forward to explain accounting thresholds avoidance.

On the one hand, the prospect theory developed by Kahneman and Tversky (1979) suggests that people make decisions based on the potential value of losses and gains rather than the final outcome and that decisions are ordered according to a certain heuristic. On the other hand, Degeorge et al.'s (1999) explanation for thresholds earnings is built on the psychological theory related to negative numbers by invoking the state of mind such as psychological or even symbolic attitude toward positive and non-positive numbers (Glass et Holyoak, 1986; Cornsweet, 1974). In addition, Jeanjean (2001) is based on the behavioral management theory made by Cyert and March (1963).

Studies view earnings thresholds as incentives to discretionary R&D investment adjustment. Interestingly, Degeorge et al.(1999) identify three earnings threshold that drive earnings management: reporting profits, performance relative to the prior comparable period and performance relative to analysts' earnings projections. Some studies focus on the reduction of investment in R&D in order to smoothen the results around the average analysts forecast (Graham et al., 2005; Perry and Grinaker, 1994; Bange and De Bondt, 1998; Mande et al., 2000). However, some authors document that R&D creates a serious timing problem because most of the annual R&D spent is likely to have occurred before analysts' forecasts (Osma, 2008; Osma and Young, 2009; Dumas, 2012). A number of studies provide evidence that managers intentionally decrease R&D investments to meet the first two thresholds mentioned by Degeorge *et al.* (1999). Earlier researches show that there are strong incentives to maintain increasing earnings and positive earnings and that managers exercise discretion to avoid earnings decrease and losses (Burgstahler and Dichev, 1997).

There exists evidence that in countries where the capitalization of assets is not allowed, firms manage their income by the amount of R&D expenditures (Perry and Grinaker, 1994). In this context, prior studies (Dechow and Sloan, 1991; Cheng, 2004) have shown discretionary cuts in R&D expenditures in executives' terminal office to avoid earnings decrease. For example, Thurow (1993) and Bens et al. (2002) provide further evidence of R&D investment as a means of earnings management and show that R&D cutting protects firms against the threat of takeover. For their part, Baber et al.(1991) assume that decisions to invest in R&D are influenced by earnings management incentives. Using a sample over the period 1977-1987, the study groups the sample firms into three mutually exclusive cases (1) current income before tax and R&D is less than the income objective (2) current income before tax and R&D exceeds income objective (3) current income exceeds income objective by cutting R&D investments. Results show that in the last case R&D investment is significantly less than the other cases. Such evidence is consistent with the hypothesis that the reduction of R&D investment is influenced by managers' objective

to meet or to beat the income objective. Bushee (1998) also analyzes R&D investment manipulation to meet short-term earnings goal and the influence of institutional investors on the myopic investment behavior in R&D. The sample covers all American firms for the period 1983-1994, with pre-R&D earnings that are below the prior year's level, but by an amount that could be reversed by reducing R&D. Inspired by the models of Baber et al. (1991) and Berger (1993), the logit model regression reveals that earnings declines' affect R&D cut and the institutional investors' effect in reducing pressure for this myopic behaviour. Later, Graham et al. (2005) find that 80% of participants, asked in their survey, decrease R&D expenditures to meet earnings target.

Roychowdhury (2006) also examines earnings management through real activities manipulation for all firms in compustat between 1987 and 2001. He reports that firms can increase earnings by reducing discretionary expenditures such as R&D, advertising, and maintenance. Recently, Xu and Yan's (2013) study underlines that the difficulty of R&D manipulation's detecting increases firms' likelihood of achieving earnings objectives through R&D cuts.

Beyond the U.S context, Mande et al. (2000) show that in the Japanese context managers adjust R&D investments to smoothen profits. Tokuga and Tanaka (2011) also, using the financial data from 1980 to 2006 of Japanese electronics companies, find that managers adjusted the amount of R&D spending to improve short-term performance. For their part, Osmo and Young (2009) employ positive earnings and positive earnings growth as two measures of target earnings and the procedure designed by all of Baber et al. (1991), Perry and Grinaker (1994), Bushee (1998), Cheng (2004), and Oswald and Zarowin (2008). Based on a large sample of UK firms during the period 1989 through 2002, their results indicate that managers cut R&D in response to earnings target. In this context, Tahinakis (2014) focuses on three of the Eurozone countries (Italy, Greece and Spain) for the period 2005-2013. He shows that earnings management through R&D manipulation avoids losses or decreases. In the French context, the only study about myopic R&D investment is conducted by Dumas (2012) over the period 2001-2010. The author assumes that managers manipulate R&D investments to meet earnings targets including zero earnings, previous period's earnings, and analyst forecasts. Testing the impact of the three earnings target on the variability of investment in R&D of French firms, the results show that managers intentionally adjust R&D to achieve earnings profit and to a lesser extent the result earnings level, but they do not establish a link between R&D and analysts' forecasts.

That is particularly notable that previous researches provide evidence for the use of managerial investment decisions as instruments for achieving income objectives not only in USA but also in other countries where firms have accounting R&D flexibility. Accordingly, the adjustment of R&D expenditures is motivated by earnings targets. Based on the above discussion, this study tests whether the decision to cut R&D investments is affected by profitability incentives. The research hypothesis is as following: ***There is a positive relationship between earnings targets (positive earnings, positive earning growths) and R&D investment decrease.***

### **3. RESEARCH METHOD**

This section describes the sample, the variables as well as the econometric model used to examine whether managers have incentives to lower R&D spending when they are under pressure to meet certain earnings targets.

#### **3.1. Sample Data**

The studies conducted to date are strongly focused on the US contexts where US GAAP require that most R&D expenditures be fully expensed immediately, while there are few studies conducted in continental Europe. To examine R&D cutting, this study uses a sample of French companies over a five-year period from 2005 to 2014.

France provides a natural context for checking the study assumption because as France is recognized under the European commission Economics of Industrial Research and Innovation (EIRI), as the second largest R&D intensive country in the European Union. The large number of R&D intensive companies implies the weight of R&D expenses and the R&D discretion's manipulation. Besides, the period of study exceeds the adoption of the international accounting standards in France. Yet, the mandatory implementation of IFRS/IAS since 2005, in the European countries, has significantly changed the contents of corporate financial statements. In fact, IAS No. 38 requires that R&D expenditures be capitalized mandatorily if some conditions are respected. So, French managers, who have the choice between expensing and capitalizing R&D before IFRS adoption, enjoy after IFRS adoption less discretion to capitalize R&D costs and may enjoy more discretion to reduce R&D spending.

The study's sample is composed of all French R&D intensive companies. This list is provided by the EIRI. The sample involves financial data from the Worldscope database. Financial firms and those whose data is empty or insufficient are eliminated. Thus, according to these requirements, the total sample includes 89 firms in sum. Then, firms that do not have all the required data for our model are crossed out. The final sample size is reduced to 80 firms (800 firm-year).

#### **3.2. Variable Measurement and Regression Model**

The paper models the probability that firms decrease R&D expenditures, conditional on the existence of target-performance incentives. The variable of interest is the R&D cut variable which is assigned a value of one if R&D spending is lower than previous period spending and zero otherwise (Osma, 2008; Zhang and He, 2013; Xu and Yan, 2013; Tahikanis, 2014; He et al., 2015). To verify that earnings targets influence R&D investment by encouraging R&D cuts, the earnings targets are used as the independent variables. They are measured by the target earnings pressures (Press), which are the positive earnings (Zero-Press) and the positive earnings growths (Growth-Press) (Osma, 2008; Osma and Young, 2009; Oswald and Zarowin, 2008). Zero-Press is assigned a value of one if last period's earnings were less than or equal to zero, and zero otherwise (Osma, 2008; Zicke, 2014). Growth-Press is assigned a value of one if period's earnings change is less than or equal to zero, and zero otherwise (Osma, 2008; Osma and Young, 2009; Oswald and Zarowin, 2008; Zicke, 2014). The paper expects positive coefficients of Zero-Press and

Growth-Press. According to the literature, there are many controlling variables that may drive discretionary R&D treatment.

**Firm leverage:** Debt is notably consistent with political costs hypothesis (Watts and Zimmerman, 1978). Jensen and Meckling (1976) argue that debt may be a source of agency problem between shareholders and creditors or between managers and shareholders. Debt provides low opportunities for growth and is a proxy for debt-covenants incentives to manipulate (Duke and Hunt, 1990; Daley and Vigeland, 1983). Hence, based on the debt assumption, the more firms are indebted the more likely they are close critical thresholds covenants is high (Saada, 1995). Thus, the firm leverage increases the likelihood that firms cut R&D (Osma, 2008; Osma and Young, 2009; Xu and Yang, 2013) in order to improve results and to increase debt ratios (Daley et Vigeland, 1983).

Following the anterior researches, the leverage ratio (LEV) is measured using firm's total debt divided by total assets (Osma, 2008; Osma and Young, 2009; Zhang and He, 2013; Xu and Yan, 2013). The LEV's coefficient is expected to be positive.

**Firm size:** Managers of large firms are particularly more visible on the capital market, more followed by analysts and more negatively associated with liquidity constraints (Opler et al., 1999). Thus, size limits the discretionary decisions (Wiedman, 1996; Opler et al., 1999). Large companies are more likely to expense their R&D expenditures (Daley and Vigeland, 1983; Aboody and Lev, 1998; Percy, 2000; Oswald and Zarowin, 2008; Tuttichi et al., 2007; Daley and Vigeland, 1983; Aboody and Lev, 1998; Oswald, 2008; Landry and Callimaci, 2003) and less likely to cut R&D (Opley *et al.*, 1999; Osma, 2008). 2012). The firm size (LogAsset) is proxied by the natural logarithmic form of the firm's total assets, (Bushee (1998). A negative association between LogAsset and R&D cut is expected.

**The market to book:** is a proxy for future growth opportunities. It has an impact on earnings management decision. Firms that are expected to grow face higher costs for discretionary spending decisions and are less likely to manipulate R&D. An important Q involves greater opportunities for growth making it costly to cut R&D expenditures (Bushee, 1998). Market to book (MKTB), is the market value of equity divided by its book value (Bushee, 1998) and its coefficient is expected to be negative.

**R&D intensity:** is a proxy for industry investment opportunity (Ding and Stolowy, 2003; Dumas, 2012; Xu and Yang, 2013). Firms in growing industries have more successful projects (Aboody and Lev, 1998; Percy 2000) and are more followed by analysts (Barth and al., 2001). Thus, innovative firms with high R&D intensity are less likely to manage earnings through R&D expenditures. R&D intensity (RDI) is a proxy of R&D intensity reflecting the level of necessary R&D to ensure the company's competitiveness. It is measured by the annual R&D expenditures divided by total sales (Osma, 2008; Osma and Young, 2009; Ding and Stolowy, 2003; Nekhili et al., 2012; Dumas, 2012; Zhang and He, 2013; Xu and Yan, 2013). A negative association between RDI and R&D cut is expected to be.

**Board independence:** is at the centre of decision making and control system (Fama and Jensen, 1983; Dechow et al., 1996). Independent directors create pressure for better disclosure (Forker, 1992) and are successful in improving financial information reporting.

The board independence is associated with a lower extent of earnings management (Osma, 2008; Affes and Ben Romdhane, 2011; Eng and Mak, 2003; Gul and Leung, 2004). Studies examining the determinants of R&D expensing provide evidence supporting the agency theory when they find that the proportion of independent directors on the board is negatively associated with the level of the R&D cutting (Dong and Gou, 2010; Osma 2008). In this context, Osma (2008) shows in the UK context that the probability of cutting R&D is sensitive to failure to report positive earnings and earnings growth and that these manipulations are reduced in presence of board independence. Affes and Ben Romdhane (2011) also find that independent directors play an inhibitive role for practicing reducing discretionary expenses and for discretionary assets disposal. The board independence (BDIND), which is the fraction of independent directors on the board (Osma, 2008; Dong and Gou, 2010) is expected to be negative.

In keeping with other studies (Osma, 2008; Osma and Young, 2009; Wang and D'Souza, 2006), R&D cutting is controlled by including lagged change in R&D ( $\Delta RD_{t-1}$ ) as a proxy of investment opportunity, change in sales ( $\Delta SALES$ ) as a proxy of firm growth and change in the capital expenditure ( $\Delta CapX$ ) as a proxy of investing activities (cycle maturity). Like a number of studies  $\Delta RD_{t-1}$  is the difference between  $\ln(R\&D_{t-1})$  and  $\ln(R\&D_{t-2})$ ,  $\Delta SALES_{t-1}$  is the difference between  $\ln(Sales_t)$  and  $\ln(Sales_{t-1})$  and  $\Delta CapX$  is the difference between  $\ln(CapX_t)$  and  $\ln(CapX_{t-1})$  (Wang and D'Souza, 2006 ; Osma, 2008 ; Osma and Young, 2009; Zhang and He, 2013). It is expected that firms with high change in investment are more likely to cut R&D and firms with high growth and those with high maturity are less likely to cut R&D.

Logistic regression is used for analysis. The logit model explains the R&D cut decision as a function of positive earnings, positive earnings growths and other control variables.

$$P(RD - CUT = 1)_{it} = a_0 + a_1 Zero - Press_{it} + a_2 Growth - Press_{it} + a_3 BDIND_{it} + a_4 RDI_{it} + a_5 LEV_{it} + a_6 LogAsset_{it} + a_7 MKTB_{it} + a_8 \Delta RD_{it-1} + a_9 \Delta Sales_{it} + a_{10} \Delta CapX_{it} + \epsilon_{it} (1)$$

Where: RD-CUT: a dummy variable equal to one if R&D spending is lower than previous period spending, zero otherwise; Zero-Press: a dummy variable equal to one if last period's earnings were less than or equal to zero, zero otherwise; Growth-Press: a dummy variable equal to one if period's earnings change is less than or equal to zero, zero otherwise; BDIND: the fraction of independent directors sitting on a board; RDI: the total investment in R&D undertaken by the firm divided by total sales; LEV: total debt divided by total assets; Log Asset: logarithm of the total assets of the firm; MKTB: the market value of equity divided by the book value (Tobin Q); RDI :  $\ln(R\&D_{t-1}) - \ln(R\&D_{t-2})$ ; Sales :  $\ln(Sales_t) - \ln(Sales_{t-1})$ ; CapX :  $\ln(CapX_t) - \ln(CapX_{t-1})$ .

#### 4. RESULTS

Descriptive statistics of main variables appear on Table 1. Nearly the third of the firms are classified as R&D cutting. In general, firms face pressure to meet the target zero (19%) and the target growth (42%). Independent directors represent only 22% of the board composition with a minimum of zero and a maximum of 80%. French intensive R&D firms have important leverage and size. Moreover, firms spend 46% of sales on R&D investments and enjoy growth opportunities (with market-to-book variable equal to

1.939347). Finally, it is noted that study's firms are on growth with positive value for lagged change in R&D, change in sales and change in the capital expenditure.

**Table 1: Descriptive Statistics**

Dichotomous Variables	Frequency (P=1)	Std-Dev	Frequency (P=0)	Std-Dev
RD-CUT	.3696203	.0243182	.6303797	.0243182
Zero-Press	.1898734	.0248462	.8101266	.0248462
Growth-Press	.4177215	.0248462	.5822785	.0248462
Continuous Variables	mean	Std-Dev	min	max
BDIND	0.227216	0.1208518	0	0.8
LEV	21.34424	13.51827	0	70.16
logAsset	3.390843	1.024908	.6063814	5.378062
RDI	.4669735	2.884265	.0003275	40.625
MKTB	1.939347	2.922137	-18.21	48.97
ΔRDt-1	.0273906	.3509854	-3.36228	1.720852
ΔSales	.0493173	.3051971	-1.942366	2.36042
ΔCapX	.0103021	.5384756	-2.786651	3.459636

Table 2 presents the Pearson correlation between the different variables and demonstrates the absence of multicollinearity problems that may prejudice the results.

**Table 2: Pearson Correlation**

	RD-CUT	ZeroP	CroissP	BDIND	LEV	Log Ass et	RDI	MKTB	ΔRD	ΔSales	ΔCapX
RD-CUT	1										
ZeroPress	0.2043	1									
CroissPre ss	0.0533	0.2182	1								
BDIND	0.0328	0.0770	-0.0511	1							
LEV	0.1408	0.0015	0.0906	0.1374	1						
LogAsset	-0.0868	-0.3157	-0.0022	0.2624	0.2967	1					
RDI	0.0028	0.2866	0.0446	0.0150	-0.1801	-0.1898	1				
MKTB	-0.0032	0.0016	0.0223	-0.0507	-0.1306	-0.0847	0.0247	1			
ΔRD	-0.0738	-0.0414	-0.0447	0.0304	-0.1092	-0.0221	0.0899	0.0371	1		
ΔSales	-0.1534	-0.0184	-0.1414	-0.0137	-0.0958	0.0246	0.2819	0.0555	0.0627	1	
ΔCapX	-0.1964	-0.0937	-0.1418	0.0404	-0.0519	0.0978	-0.1299	0.0440	0.1664	0.3303	1

To investigate the possibility of using panel data, specification test verifies that the model is perfectly identical for all companies or on the contrary each company has its own specificities: it tests the null hypothesis of homogeneity against the alternative hypothesis of fixed effects. Using Fisher test, the p-value for the statistic test  $p\text{-value} < 5\%$ , which means that the null hypothesis can be rejected and the panel data specification can be accepted.  $F(80, 299) = 2.966$  and  $\text{Prob} > F = 0, 0000$  confirms the individual heterogeneity and the overall model is significant. The study estimates fixed-effects model and random-effects model and then decides between them. Hausman (1978) tests the null hypothesis that no correlation exists against the alternative hypothesis that there is a correlation. Results of Hausman test ( $\text{Chi}^2(10) = 80.5$   $\text{Prob} > \text{chi}^2 = 0, 22$ ) accepts the hypothesis of

the absence of correlation between random term and explanatory variables. Estimators of random effects are not biased and thus are retained.

Table 3 presents the results of the equations'estimating. Confirming to the study's assumption, Zero-Press shows a positive and significant coefficient. Negative lagged earnings (failure to report profits) leads to R&D investment cuts. This finding support thresholds theory about meeting earnings that are above zero. A strongly positive significance is shown for the impact of Growth-Press on R&D cut. As expected earnings decrease (failure to report earnings growth increase) leads to R&D investment adjustment. These finding supports thresholds theory about meeting at least previous period's earnings. These results which confirm the view that managers intentionally decrease R&D to achieve earnings profit and earnings growth support the study's hypothesis.

**Table 3: Results**

<b>Variables</b>	<b>Coefficient</b>	<b>S.E.</b>	<b>Z</b>	<b>Significance</b>
<b>Zero-Press</b>	1.099159 ***	0.3351516	3.28	0.001
<b>Growth-Press</b>	0.1761583*	0.2480609	-0.66	0.022
<b>BDIND</b>	0.5116447	1.051051	0.49	0.626
<b>RDI</b>	-0.0822191 *	0.0463973	-1.77	0.076
<b>LEV</b>	0.022727**	0.0098976	2.30	0.022
<b>LogAsset</b>	-0.1569417	0.1387978	-1.13	0.258
<b>MKTB</b>	0.0184248	0.0470039	0.39	0.695
<b>ΔRD</b>	-0.0469552	0.338945	-0.14	0.890
<b>ΔSales</b>	-1.088043 *	0.5241363	-2.08	0.038
<b>ΔCapX</b>	-0.6412225*	0.2570005	-2.50	0.013
<b>constante</b>	-0.738769	0.5065285	-1.46	0.145

\*\*\* Significant at 1% \*\* Significant at 5% \* Significant at 10%; Number of observations: N= 395 ;Log likelihood = -237.17848; Wald chi2(10) = 34.68; Prob > chi2 = 0.0001

As expected, RDI shows a negative and significant coefficient implying that firms with low investment opportunities tend to choose accounting methods that increase the results. This is consistent with the studies conducted by Ding and Stolowy (2003) and Dumas (2012) who suggests that innovative firms with high R&D intensity are less likely to manage earnings through R&D expenditures. ΔSales and ΔCapX show negative and significant coefficients implying that firms with high growth and high maturity face higher cost of earnings management and are less likely to cut R&D. This is consistent with the prior studies. A strong significance is shown for the impact of leverage (LEV) on R&D cut

decision. Therefore, the results are in line with prior research in R&D discretion (Osma, 2008; Osma and Young, 2009). This finding confirms debt hypothesis and show that highly leveraged companies are more likely to cut R&D.

The estimated coefficient on BDIND is insignificant, indicating that independent directors are unsuccessful in reducing R&D's manipulation. Possible interpretation of this result is that R&D investment adjustment decision is less likely to be subject to careful reviews by the board of directors. Concerning the other control variables, results indicate no significant coefficients.

Focusing on two earnings management incentives: avoidance of losses (positive earnings target), and earnings decreases (positive earning growths target), this paper examines whether short-term performance incentives play a role in R&D investments' choices. Findings support thresholds assumption about meeting earnings that are above zero confirming the view that managers intentionally decrease R&D to achieve earnings profit and thresholds assumption about meeting at least previous period's earnings. This study confirms prior studies on earnings management by changing R&D costs in European countries after IFRS introduction (Tahinakis, 2014; Dumas, 2012). Consequently, earnings targets will influence managers' myopic behaviour in R&D investment. Results suggest that firms adopting IFRS are concerned about real earnings management through R&D expenditures. In a nutshell, this empirical study provides evidence of thresholds theory in the French context after IAS N. 38 adoption.

## **5. CONCLUSION**

Managers are likely to have myopic R&D investment behavior. In this context, most studies are conducted in countries where the capitalization of assets is not allowed (Dechow and Sloan, 1991; Cheng, 2004; Baber et al., 1991). Yet, after IFRS introduction in Europe, R&D capitalization is the mandatory accounting treatment. Thus, firms enjoy less discretion to capitalize R&D and more discretion to expense R&D costs. However, few studies are conducted in European countries after the IFRS introduction (Dumas, 2012; Tahinakis, 2013). Consequently, more empirical studies are needed in this context.

Based on a sample of 800 French R&D intensive companies for the 10-year period from 2005 to 2014, this paper shows that earnings management through R&D manipulation avoids earnings losses and decreases. This paper extends the literature about the effects of IFRS adoption by examining how managers use discretion in R&D expensing. Results highlight that R&D expensing is sensitive to achieving earnings targets. They confirm thresholds theory and provide evidence on real earnings management through R&D expensing. This research could further be extended by studying the R&D earnings management hierarchy.

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