



The interaction between real and accrual-based earnings management: analysis based on the mandatory IFRS adoption

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Abstract

The main purpose of this paper is to examine the relation between real and accrual-based earnings management after the mandatory IFRS adoption. I focus on a sample of 124 firms drawn from the 250 French-listed companies during the period from 1999 to 2011. Empirical results indicate that French firms use real activities manipulation and discretionary accruals as complementary tools to smooth earnings. Finally, unlike previous studies, I don't find evidence of the sequential nature between the two earnings management strategies.

Keywords: *Accrual-Based Earnings Management; Real Earnings Management; IFRS Adoption.*

1. Introduction

There is a vast body of literature on earnings management. Most of previous studies have examined either accounting earnings management -AEM (see, e.g., Healy 1985; Guidry et al. 1999; Defond and Jiambalvo 1994; Kasznik 1999; Healy and Wahlen 1999; Dechow and Skinner 2000; Kothari 2001) or real earnings management-REM (see, e.g., Herrmann et al. 2003; Roychowdhury 2006; Xu et al. 2007; Gunny 2010). This latter implies that managers deviate from their optimal plans of action to affect earnings by changing the timing or structuring of real transactions, (Ewert and Wagenhofer 2005). While AEM called also accrual-based earnings management is the distortion of earnings by the discretionary accruals. Given the portfolio of earnings management strategies, managers probably use multiple techniques at the same time, Zang (2012). Thus, a new stream of research examined REM and AEM at the same time. These studies have shown evidence for the trade-off between the two earnings management according to, for example, the Sarbanes-Oxley Act (SOX) adoption (Cohen et al. 2008), the seasoned equity offering (SEO) (Cohen and Zarowin 2010), the overvaluation (Badertscher 2011), their relative costliness (Zang 2012), the split share structure reform (Kuo et al. 2014).

Regarding the context of the mandatory IFRS adoption, the relation between REM and AEM was not well examined until recent years. In the best of my knowledge, I find two studies- Ipine & Parbonetti (2011) and Doukakis (2011) - which study this goal. My research differs from these studies in several important respects. First, unlike these studies which examine real and accrual-based earnings management separately as if they are independent decisions by using the method of the difference in differences, I use in this paper the method of simultaneous equations similarly as Barton (2001) to examine if there is a complementary or substitutable choice between real activities manipulation and discretion-

ary accruals following the mandatory IFRS adoption. Second, following Zang (2012), I consider the sequential decision as an alternative process when examining the relation between the two earnings management tools. In other words, I take into account the difference in timing between accounting and real manipulation because this latter has to occur during the fiscal year, however accounting manipulation can occur after the fiscal year. Therefore, managers can adjust the extent of accruals based on the realized outcome of REM. Third; I verify whether these two types of earnings are practiced in order to smooth earnings, whereas Doukakis (2013) and Ipine & Parbonetti (2011) do not. Graham et al. (2005) showed that managers are willing to manipulate real business activities to manage reported earnings than to manipulate accruals in order to reduce earnings volatility over time¹. Finally, compared to these studies which consider divers European countries, I study the case of a single country namely France which have a major accounting change after the mandatory IFRS adoption. As mentioned by Guenther et al. (2009, p.27): "Focusing on a single country study, we keep the institutional framework constant which allows us to observe directly whether IFRS standards were drivers of earnings quality".

Therefore, the three objectives of this paper are based on the assumption that managers have discretion and engage in both real and accrual-based earnings management. Specifically, I investigate whether managers use these two practices of earnings management after the mandatory IFRS adoption as complementary or substitutive approaches. Then, I determine whether real and accrual-based earnings management occurred simultaneously or sequentially. My last objective is to verify whether managers use the interaction between real and accrual-based earnings management as a way to smooth earnings.

Using a sample containing 1488 firm-year observations, 124 firms drawn from the 250 French-listed companies, over the period 1999 to 2011, I find evidence that the relation between REM and AEM is complementary but not sequential. The empirical results also

show that managers use the two earnings management strategies to smooth the net income.

Compared to previous studies, this study contributes to the IFRS and earnings management literature by examining the effect of the mandatory IFRS adoption on the relationship between REM and AEM. In this paper, REM is examined through three real activities as defined by Roychowdhury (2006): give price discounts in order to increase sales, engage in overproduction in order to reduce the cost of goods sold and keep a tight rein on discretionary spending to improve margins, while AEM is measured by the modified Jones model. This allows me, as mentioned by Fields et al. (2001), to determine the overall effect of earnings management activities after the regulatory changes in accounting standards which has known the French listed companies since 1 January 2005 with the application of IFRS. In other words, examining either type of earnings in isolation cannot lead to definitive conclusion about the impact of mandatory IFRS adoption on earnings management, Zang (2012). Thus, this study sheds light on the managerial opportunistic behavior by using a mix earnings management tools after the mandatory IFRS adoption.

The remainder of this paper is structured as follows: Section 2 provides literature review and hypotheses development. Sample selection and measurement of real and accrual-based earnings management is described in section 3. Section 4 discusses the empirical design, while Section 5 presents my empirical results, and I report my conclusion in Section 6.

2. Literature review and hypotheses development

2.1. The substitutability between real and accrual-based earnings management

Through the review on the relationship between real and accrual-based earnings management literature, I note that researchers indicate when accrual-based earnings management becomes costly, managers opt to real-based methods (i.e., reducing R&D, sales manipulation, overproduction, securitization, etc.) as substitute tool. Consistent with this, prior studies (Cohen et al. 2008; Cohen and Zarowin, 2010; Zang, 2012) provide evidence that managers trade-off the two earnings management methods based on their relative cost (e.g., the presence of high-quality auditors; heightened scrutiny of accounting practice after the passage of the Sarbanes-Oxley Act (SOX); and firms' accounting flexibility).

I note that there are a few studies which have examined the impact of mandatory IFRS adoption on the interaction between real and accounting earnings management. In this sense, Ipino and Parbonetti (2011) show that, in European Union countries with strong legal enforcement, when the standards are tighter, managers react by substituting real for accrual-based earnings management. Otherwise, they document a decrease in accrual-based earnings management and a contemporaneous increase in REM once IFRS becomes mandatory. While the results founded by Doukakis (2013) suggest that mandatory IFRS adoption had no significant impact on either REM or AEM practices.

Building on the above work, I suppose that French firms use REM and AEM as substitutes in the period post-IFRS. In other words, facing the strict character of IFRS, I predict that French firms are more likely to replace AEM with less detectable and scrutinized REM activities after IFRS. I thus test the following hypothesis:

H1. There is a negative relation between real and accrual-based earnings management after the mandatory IFRS adoption.

2.2. The sequential nature between real and accrual-based earnings management

H1 predict that real and accrual-based earnings management are jointly determined and the choice between the two strategies is influenced by the adoption of IFRS. Though, Zang (2012) indicates that a joint decision does not necessarily imply a simultane-

ous decision. He shows that there is direct substitution between real and accrual-based earnings management after the fiscal year-end due to their sequential nature. He takes into account of the difference in timing between the two earnings management strategies. Otherwise, AEM is typically conducted close or after the fiscal year end. However, REM is likely occurred over the course of the year. Therefore, Zang (2012) assumes that when managers observe the impact of real activities manipulation on earnings at the fiscal year-end, they can offset an unexpectedly high (low) impact by using less (more) accrual management. So, they fine-tune their accruals based on the outcomes of real activities manipulation.

Unlike Doukakis (2013) and Ipino & Parbonetti (2011) and as documented by Zang (2012), I consider the sequential nature between real and accrual-based earnings management after the mandatory IFRS adoption. In my study, I thus test the following hypothesis:

H2. After the mandatory IFRS adoption, the level of accrual-based earnings management is negatively related to the unexpected amount of real activities manipulation.

2.3. The smoothing earnings

Lambert (1984) argues that firms have incentives to use both accounting choices and real activities to smooth earnings. Consistent with this, Barton (2001) and Pincus & Rajgopal (2002) present evidence consistent with managers using derivative hedging as substitutes to discretionary accruals to manage earning volatility. Matsuura (2008) demonstrates that managers use REM and/or AEM to smooth income in the Japan context. More recently, Hashemi and Rabiee (2011) find the same results as Matsuura (2008) but in the Iran context. To the best of my knowledge, there has been minimal research to date having examined if managers manipulate real and accrual-based earnings management to smooth reported earnings after the mandatory IFRS adoption. Accordingly, in my study, I test the following hypothesis:

H3. Following the mandatory IFRS adoption, leaders use the interaction between real and accrual-based earnings management to smooth their earnings.

3. Sample description and measurement of real and accrual-based earnings management

3.1. Sample selection

I collect my accounting data from the Thomson Reuters Eikon, Worldscope and Infinancial databases for the period 1999-2011. Two main time periods are identified: The pre-IFRS period extends from 1999 through 2004, and contrary to prior studies, the post-IFRS periods covers six years from 2006 to 2011. Indeed, extending the study period to six years after the mandatory IFRS adoption allows me to examine whether IFRS can play an effective role in reducing earnings management by limiting opportunistic management discretions. The transition year (2005) is removed to ensure the use of consistent data in terms of accounting standards.

My initial sample consists of French companies listed in the SBF 250. Following Cohen et al. (2008) and Ipino & Parbonetti (2011), I restrict my sample to non-financial firms with at least eight observations in each two-digit SIC grouping per year. I require available data in order to compute discretionary accruals and REM proxies. I exclude observations with the fiscal year ended does not coincide with the December 31 as well as those whose accounting data were not prepared in accordance with French local accounting standards for the period between 1999 and 2004 and the international Financial Reporting Standards for the period between 2006 and 2011. Imposing these data availability requirements yields a balanced final sample of 124 firms representing 1488

firm-year observations, of which 744 observations in the pre-adoption period and 744 in the post-adoption period². All continuous variables are winsorized at the top and bottom 1% of their distributions to mitigate the influence of outliers.

3.2. Accounting earnings management: discretionary accruals measure

In my study, I employ the modified cross-sectional Jones model (Dechow et al. 1995) to calculate discretionary accruals. It is the most frequently used model by previous and recent studies (Cohen et al. 2008; Cohen and Zarowin; 2010; Ipino and Parbonetti, 2011; Zang, 2012; Doukakis, 2013). I estimate the model for each year and for every industry classified by its two-digit SIC code³ as follow:

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = \alpha_0 \frac{1}{Assets_{i,t-1}} + \alpha_1 \frac{\Delta REV_{i,t}}{Assets_{i,t-1}} + \alpha_2 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

Where: $TA_{i,t}$ = total accruals for firm i in year t , measured as net income before extraordinary items less operating cash flows ($TA = EBX_{i,t} - CFO_{i,t}$); $\Delta REV_{i,t}$ = change in revenues (sales) from preceding period, measured by revenues in year t less revenues in year $t-1$ for firm i , ($\Delta REV_{i,t} = REV_{i,t} - REV_{i,t-1}$); $PPE_{i,t}$ = gross property, plant and equipment for firm i in year t ; and $Assets_{i,t-1}$ = total assets for firm i in year $t-1$. All variables are scaled by beginning total assets to adjust for heteroskedasticity.

I then computed the level of non-discretionary accruals ($NA_{i,t}$) for each observation by using coefficients estimates from Eq.(1):

$$\frac{NA_{i,t}}{Assets_{i,t-1}} = \alpha'_0 \frac{1}{Assets_{i,t-1}} + \alpha'_1 \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{Assets_{i,t-1}} + \alpha'_2 \frac{PPE_{i,t}}{Assets_{i,t-1}} \quad (2)$$

Where: NA = non-discretionary accruals for firm i in year t ; $\Delta AR_{i,t}$ = change in accounts receivable from preceding period, measured by receivables in year t less receivables in year $t-1$ for firm i , ($\Delta REC_{i,t} = REC_{i,t} - REC_{i,t-1}$).

Finally, I measure discretionary accruals (DA) by calculating the difference between total accruals (TA) and the fitted non-discretionary accruals (NDA), defined as $DA_{i,t} = (TA_{i,t}/Assets_{i,t-1}) - NA_{i,t}$. In other words, the estimated residual ($\varepsilon_{i,t}$) from Eq.(1) represents the portion of discretionary accruals.

3.1. Measuring real earnings management

Following Roychowdhury (2006), I use three individual measures of REM: abnormal cash flow from operations, abnormal production cost and abnormal discretionary expenses (i.e., the sum of R&D, SGA and advertising expenditures). These individual proxies are computed as the difference between the actual values and the normal levels predicted from the following models, Eq. (3, 4 & 5):

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{1i,t} \quad (3)$$

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{2i,t} \quad (4)$$

$$\frac{DISEX_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{3i,t} \quad (5)$$

Where: $CFO_{i,t}$ is cash flow from operations for firm i in year t ; $DISEX_{i,t}$ is the discretionary expenditures in year t for firm i , defined as the sum of advertising expenses, R&D expenses and Selling, General and Administrative (SG&A) expenses; $PROD_{i,t}$ is production costs for firm i in year t ; $Sales_{i,t}$ is sales revenue in period t for firm i ; $\Delta Sales_{i,t}$ is change in sales revenue. It measured by sales in year t less sales in year $t-1$ for firm i ($\Delta S_{i,t} = S_{i,t} - S_{i,t-1}$); $\Delta Sales_{i,t-1}$ is measured by sales in year $t-1$ less sales in year $t-2$ for firm i ($\Delta S_{i,t-1} = S_{i,t-1} - S_{i,t-2}$); $Sales_{i,t-1}$ is sales revenue in period $t-1$ for firm i ; $Assets_{i,t-1}$ is total assets for firm i in year $t-1$. These above models are estimated cross-sectionally for each industry-year with minimum eight observations, where industry is defined by its two-digit SIC code.

As suggested by previous studies (Cohen and Zarowin, 2010; Zang, 2012), given sales levels, firms that manage earnings upward are likely to have one of all of these: unusually low cash flow from operations, and/or unusually low discretionary expenses, and/or unusually high production costs. Thereby, I multiply the residuals from the estimation models of CFO and DISEX by negative one, such that higher values indicate, respectively, the firm is engaging in sales manipulation and is cutting discretionary expenses to manage reported earnings upwards. Whereas, the residual of the estimation PROD model is a positive measure of REM, such that the higher of this amount, the more likely that managers overproduce inventories to reduce reported costs of goods sold.

Besides these individual measures, I take into account the total effect of REM by computing three aggregate proxies. For my first proxy, RM1, consistent with Cohen et al. (2008), I use the sum of three standardized REM measure (ACFO, APROD, ADISCX). For the second global measure, RM2, consistent with Cohen & Zarowin (2010), I aggregate the abnormal discretionary expenses with the abnormal production costs. For my third measure, RM3, again consistent with Cohen and Zarowin (2010), I compute the sum of abnormal cash flow from operations and abnormal discretionary expenses. So, the higher the amount of these aggregate measures, the more likely the firm engaged in REM.

4. Empirical design

To test H1 which predicts the substitution relation between real and accrual-based earnings management after the mandatory IFRS adoption, I run the following simultaneous-equations regression on annual basis, Barton (2001).

$$REM_{i,t} = \alpha_0 + \alpha_1 AD_{i,t} + \alpha_2 IFRS_{i,t} + \alpha_3 (AD_{i,t} * IFRS_{i,t}) + \sum \alpha_j * Control_{i,t} + \varepsilon_{i,t} \quad (6)$$

And

$$AD_{i,t} = \beta_0 + \beta_1 REM_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 (REM_{i,t} * IFRS_{i,t}) + \sum \beta_j * Control_{i,t} + \varepsilon_{i,t} \quad (7)$$

Where: REM and AD are the endogenous variables of my simultaneous equations model. They are already defined in the previous section. IFRS is a binary variable that takes the value 1 during the post-IFRS period (2006-2011) and the value 0 for the pre-IFRS period (1999-2004). ($AD * IFRS$) is the interaction between the adoption of IFRS and accounting management. ($REM * IFRS$) is the interaction between the adoption of IFRS and real management. Therefore, α_3 in Eq. (1) and β_3 in Eq. (2) are both expected to be negative. Control presents the control variables which are common for the two equations. I define them shortly as follows: SIZE is the company size, measured as the natural logarithm of total assets; GROWTH is the firms' growth opportunities, measured as the annual percentage change in sales; EISSUE is increase in equity, measured as the annual percentage change in common equity; DISSUE presents increase in debt, measured as the annual percentage change in total liabilities; LEV is the leverage, measured as total long term debt over total assets; CFO is cash flow from operations, measured as cash flow from operations deflated

by total assets of the year end; TURN is the turnover is measured as the ratio of sales to total assets and BIG4 presents a dummy variable equals to 1 if the firm's auditor is at least one of the big 4, 0 otherwise. Indeed, in a simultaneous equations model, endogenous variables (REM and AD) intertwine among the explanatory variables and these endogenous variables are also dependent variables in the other equations. So, the error terms are correlated with the explanatory variables, violating the basic assumptions of ordinary least squares (OLS). Thus, I check firstly if there is simultaneity problem by the Hausman test. Thereafter, if I note the presence of simultaneity, the OLS estimators become not efficient. So, I use the method of "Seemingly Unrelated Regression" (SUR), developed by Zellner (1962). This method is similar to the OLS with the difference that the system of equations is estimated taking into account the contemporaneous correlations between the residuals of different equations. Results are presented in the next section.

Besides, similarly as Zang (2012), I use a recursive equations regression to capture the sequential nature of REM and AEM after the mandatory IFRS adoption (i.e., H2).

$$REM_{i,t} = \alpha_0 + \alpha_1 IFRS_{i,t} + \sum \alpha_j * Control_{i,t} + \varepsilon_{i,t} \quad (8)$$

And

$$AD_{i,t} = \beta_0 + \beta_1 Unexpected_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 (Unexpected_{i,t} * IFRS_{i,t}) + \sum \beta_j * Control_{i,t} + \varepsilon_{i,t} \quad (9)$$

All the variables used in this recursive equations model are defined in the simultaneous-equations model except for unexpected amount of real activities manipulation realized (Unexpected REM). It is measured as the estimated residual from equation 8. For (Unexpected REM*IFRS) is the interaction term between the unexpected amount of real activities manipulation realized and the IFRS adoption. It is used to assess how IFRS affects the sequential process between REM and AEM. So, I expect a negative sign on β_3 in the accrual-based earnings management equation (Eq.9). In the recursive equation systems, endogenous variables in each equation are uncorrelated with residues of the other equation. In my research, as I use panel data, the method of feasible generalized least squares is used to estimate regressions instead of OLS because the several tests of model specification to choose the appropriate panel estimation method show the presence of heteroskedastic error structure with cross sectional correlation and error autocorrelation.

Finally, the third objective is to examine whether managers use both real and accrual-based earning management to smooth their earnings (H3). To achieve this, I use similarly to Bartov (1993) the correlation coefficients between the two following variables: (AD*IFRS*RM) and (PrEar*IFRS). Where: PrEar is premanaged earnings defined as net income minus discretionary accruals and REM. These coefficients allow me to estimate the sign and the significance level of the correlation between the above variables. A negative and significant correlation coefficient implies that companies which adopting IFRS mandatory smooth their earnings through the manipulation of real activities and discretionary accruals. Besides the correlation coefficients; two variation coefficients are retained. The first is related to net income. The second is associated to the premanaged earnings (PrEar). Indeed, a variation coefficient of net income that is lower than the variation coefficient of premanaged earnings implies that firms manage accruals and use real activities to smooth earnings.

5. Empirical results

5.1. Descriptive statistics

Table 1 presents the descriptive statistics of my final sample in the period 1999-2011 (excluding 2005). More precisely, Panel a reports the sample's representativeness, while Panel B provides a

summary statistics relating to the main variables used in my study in the pre (1999-2004) and post (2006-2011) IFRS adoption periods.

As shown in Panel A of table 1, the overall sample consists of 1488 firm-year observations, representing on average 49.6% of the population. The pre and post adoption periods comprise each about 744 firm-year observations (Panel B-Table 1). I point out that my sample presents balanced data. More precisely, Panel B shows the means and medians value of DA, ACFO, APROD, ADISC, RM1, RM2 and RM3. They are significantly decreased across the pre- and post-IFRS adoption periods. The interpretation of this result is that the post adoption period was characterized by lower earnings management. For the control variables, descriptive statistics indicate that following the adoption of international standards, there is an increase in firm size (SIZE), percentage change in common stocks (EISSUE), annual percentage change in total liabilities (DISSUE), leverage (DEBT) and cash flow from operations (CFO). Only variables measuring the growth opportunity (GROWTH) and asset turnover (TURN) tumbled on the two periods.

Table 1: Sample and Summary Statistics

Panel A: Sample's Representativeness						
Period : 1999-2011 (Excluding 2005)	Initial population (Ip)	Final sample (Fs)	Representativeness (Fs/Ip)			
Obs.number	3000	1488	49.6%			
Panel B: Summary statistics						
Pre-IFRS adoption period (1999-2004)						
Variables	Obs.	Mean	Std.	25 th pct	50 th pct	75 th pct
DA	744	-0.072	1.963	-0.076	-0.028	0.013
ACFO	744	-0.053	0.099	-0.101	-0.051	-0.006
APROD	744	0.570	0.875	0.206	0.438	0.760
ADISC	744	0.017	0.269	-0.093	-0.001	0.149
RM1	744	0.535	0.912	0.109	0.432	0.784
RM2	744	0.588	0.907	0.155	0.485	0.835
RM3	744	-0.035	0.296	-0.170	-0.034	0.116
SIZE	744	7.300	2.79	5.573	7.223	9.183
GROWTH	744	0.192	1.765	-0.009	0.072	0.192
ISSUE	744	0.155	1.081	0.000	0.000	0.052
DISSUE	744	0.189	0.693	-0.052	0.062	0.236
LEV	744	0.152	0.138	0.042	0.129	0.221
TURN	744	1.025	0.601	0.651	0.938	1.274
CFO	744	0.071	0.095	0.041	0.073	0.108
BIG4	744	0.620	0.485	0.000	1.000	1.000
Post-IFRS adoption period (2006-2011)						
Variables	Obs.	Mean	Std.	25 th pct	50 th pct	75 th pct
DA	744	-0.147	0.521	-0.073	-0.034	-0.007
ACFO	744	-0.075	0.070	-0.108	-0.071	-0.036
APROD	744	0.434	0.455	0.138	0.333	0.613
ADISC	744	-0.046	0.158	-0.140	-0.015	0.040
RM1	744	0.311	0.521	-0.023	0.222	0.528
RM2	744	0.387	0.511	0.043	0.286	0.587
RM3	744	-0.122	0.171	-0.223	-0.097	-0.015
SIZE	744	7.861	1.965	6.347	7.592	9.386
GROWTH	744	0.091	0.298	0.000	0.067	0.132
ISSUE	744	1.601	38.99	0.000	0.000	0.111
DISSUE	744	0.887	0.329	-0.037	0.033	0.121
LEV	744	0.163	0.133	0.068	0.153	0.222
TURN	744	0.932	0.521	0.597	0.867	1.169
CFO	744	0.084	0.077	0.053	0.078	0.110
BIG4	744	0.620	0.485	0.000	1.000	1.000

Table 2 presents the matrix Pearson pairwise correlation between the accrual and REM proxies. From this table, I note that, following the IFRS adoption, the correlation between discretionary accruals approximated by the modified Jones model (AD*IFRS) and the third summary measure of REM (RM3*IFRS) is significantly positive with a Pearson correlation coefficient of 0,089. Similarly, the results show that discretionary accruals (AD*IFRS) are positively and significantly correlated respectively with discretionary spending (ADISC*IFRS) (Pearson correlation of 0.074) and abnormal operating cash flows (ACFO*IFRS) (Pearson correlation of 0.058). The correlation with other measures of REM (APROD*IFRS, RM1*IFRS, RM2*IFRS) is also positive but not

significant. These preliminary results indicate that leaders engage in both real and accrual-based earnings management strategies and do not handle them as substitutes.

In addition, the analysis of correlation between the three individual REM measures (ACFO, APROD, ADISC) following the mandatory adoption of IFRS shows, firstly, a negative and significant correlation coefficient (-0.282) at the 1% level between abnormal operating cash flow (ACFO*IFRS) and the abnormal production (APROD*IFRS) and on the other hand, positive and significant correlation coefficients (0.105) between respectively discretionary spending (ADISC*IFRS) and abnormal cash flows (ACFO*IFRS) and 0.050 between the abnormal production (APROD*IFRS) and discretionary spending (ADISC*IFRS). According to these results, I can conclude that French companies prefer on the one hand, to substitute between cash flow from operations and production costs and, on the other hand, to manage discretionary expenditures and cash flow as complementary.

Table 2: Correlation Matrix of Earnings Management Metrics

	DA * IFRS	ACFO * IFRS	APROD * IFRS	ADISC * IFRS	RM1 * IFRS	RM2 * IFRS	RM3 * IFRS
DA * IFRS	1						
ACFO * IFRS	0.058 **	1					
APROD * IFRS	0.002	-0.282 ***	1				
ADISC * IFRS	0.074 ***	0.105 ***	0.050 **	1			
RM1 * IFRS	0.032	-0.087 ***	0.941 ***	0.351 ***	1		
RM2 * IFRS	0.022	-0.237 ***	0.960 ***	0.326 ***	0.988 ***	1	
RM3 * IFRS	0.089 ***	0.547 ***	-0.086 **	0.889** *	0.255 ***	0.165 ***	1

Note: *, **, *** Significant at 0.10, 0.05, and 0.01 levels respectively.

I also test the significance of the differences of all real and accrual-based earnings management proxies between the pre and post IFRS adoption to better understand the effect of the mandatory IFRS adoption in the managerial opportunism in terms of earnings manipulation. Table 3 reports respectively the median difference, the Wilcoxon rank sum test and the p-value. I used the non-parametric Wilcoxon test because the Kolmogorov-Smirnov test shows that the variables don't follow the normal law. The empirical results indicate a significant decline in both real and accrual-based earnings management in the post IFRS period compared to pre IFRS period. For example, there is a significant decrease in discretionary accruals, which decline from -2.8% to -3.4%. The individual measures of REM (ACFO, APROD and ADISC) declined respectively by 2%, 10.5%, 1.4%. Finally, for the three aggregate variables of REM, I can observe also a decrease in their value. Overall, I can confirm the results found in table 1 and 2, suggesting that French firms seem to use the real and accrual-based earnings management as complementary strategies. This finding does not support the conclusion of Graham et al.'s (2005) survey that managers tend to switch from accruals to REM.

Table 3: The Difference in Earnings Management Proxies between Pre and Post IFRS

Variables	Median difference	Wilcoxon rank sum-test	P-value
DA	-0.006	-2.268**	0.023
ACFO	-0.020	-5.769***	0.000
APROD	-0.105	-4.819***	0.000
ADISC	-0.014	-5.952***	0.000
RM 1	-0.210	-7.151***	0.000
RM 2	-0.199	-6.401***	0.000
RM 3	-0.063	-8.099***	0.000

Note: *, **, *** Significant at 0.10, 0.05, and 0.01 levels respectively.

5.1. Analysis of interaction between real and accrual-based earnings after the mandatory IFRS adoption

5.1.1. Simultaneous equations model results

As already indicated, the REM is approximated by six measures, including three individual and three aggregate previously defined on the basis of the writings of Roychowdhury (2006), Cohen et al. (2008) and Cohen & Zarowin (2010). I estimate simultaneous equations model, each time using one of these measures. The estimate by the second aggregate measure (RM2) provides the most interesting results in terms of significance compared to the other measures. Therefore, in the remainder of my analysis, I present and I base my interpretations only on the results found based on RM2 which is equal to the sum of abnormal production costs and abnormal discretionary expenses.

Before presenting the results of the estimation of simultaneous equations, it is essential to check the endogeneity⁴ between real and accrual-based earnings management with the Hausman test. Table 4 show for both equations (Eq 6 & 7) a chi-square significant at the 1% level ($p = 0.000$). This implies that the exogeneity between REM and AEM is released and the use of estimate of Seemingly Unrelated Regression (SUR) is well justified. This method allows us, on the one hand, to generate a consistent estimator better than provided by the ordinary least squares (OLS) and, on the other hand, to have a reliable detection of the problems related to the serial autocorrelation in the residuals of simultaneous equations regression. The results of the estimation of simultaneous equations by the method SUR is presented in the table below.

Table 4: Results of Simultaneous-Equations Regression

Model: $REM_{i,t} = \alpha_0 + \alpha_1 AD_{i,t} + \alpha_2 IFRS_{i,t} + \alpha_3 AD_{i,t} * IFRS_{i,t} + \sum \alpha_j * Control_{i,t} + \epsilon_{i,t}$ (6)						
$AD_{i,t} = \beta_0 + \beta_1 REM_{i,t} + \beta_2 IFRS_{i,t} + \beta_3 REM_{i,t} * IFRS_{i,t} + \sum \beta_j * Control_{i,t} + \epsilon_{i,t}$ (7)						
Right-Hand-Side Variable	Left-Hand-Side Variable					
	RM2			AD		
	Coef.	z	Sig.	Coef.	z	Sig.
Endogenous variables						
AD	0.017	1.41	0.159	---	---	---
AD*IFRS	0.083	1.69	0.091*	---	---	---
RM2	---	---	---	0.082	1.36	0.172
RM2*IFRS	---	---	---	0.094	0.79	0.430
Other factors						
IFRS	-0.157	-4.36	0.000***	0.033	0.36	0.717
SIZE	0.017	1.86	0.064*	0.020	1.07	0.283
GROWTH	-0.029	-2.03	0.042**	0.014	0.47	0.638
ISSUE	-0.000	-0.96	0.337	0.001	0.81	0.419
DISISSUE	0.029	0.88	0.377	-0.075	-1.07	0.286
LEV	-0.106	-0.77	0.440	0.350	1.20	0.229
TURN	0.509	14.66	0.000***	-0.050	-0.64	0.524
CFO	0.106	0.52	0.602	-0.550	-1.27	0.203
BIG4	0.025	0.68	0.498	0.117	1.45	0.146
Intercept	-0.063	-0.70	0.486	-0.371	-1.92	0.055*
Adj. R ²		0.165			0.008	
N		1488			1488	
Endogeneity test		$\chi^2 = 142.06$ ***			$\chi^2 = 2562.94$ ***	

Note: *, **, *** denote statistical significance at the 0.10, 0.05, and 0.01 levels respectively. All variables are as defined in Appendix A.

As shown in the table 4, results from the simultaneous-equations model reveal a positive and significant coefficient at the 10% level (coef. = 0.083, sig. = 0.091) of the variable (AD*IFRS) in the equation of the REM which is approximated by the second aggregate measure as calculated according to Cohen and Zarowin (2010) (RM2). Besides, the coefficient of the variable (RM2*IFRS) in the equation of discretionary accruals (AD) is also a positive but insignificant (coefficient = 0.094, sig. = 0.430). Thus, contrary with my prediction, these results imply a partial complementary relation between real and accrual-based earnings management following the mandatory adoption of IFRS. Otherwise, the French companies jointly use discretionary accruals and

management decisions to adjust the level of their accounting earnings in the post-IFRS period. The empirical evidence of this research contrasts those reported in Ipino&Parbonetti (2011) and Doukakis (2013). These previous studies based on a set of EU countries showed that the level of the real management increased; however the level of the discretionary accruals decreased following the IFRS adoption, suggesting a substitutive behavior between the two management tools.

For the other variables on the REM equation, I find that the coefficient associated with the variable (IFRS) is significantly negative at the 1% level (coef. = -0.157, Sig = 0.000), suggesting that the mandatory adoption of IFRS by French companies are associated with less real management. This result is consistent with the literature that suggests that the mandatory IFRS adoption improve earnings quality by restraining the manager's opportunism when managing the real business decisions, Sellami and Fakhfakh (2014). Besides, contrary to the assumption of the political costs arising from the positive theory of accounting, the firm size (SIZE) has a positive and significant effect on the level of the REM. Moreover, the coefficient of this variable is at the order of 0.017 and significant at 10%. This finding contradicts those of Zmijewski& Hagerman (1981) and Watts & Zimmerman (1990). Regarding the growth opportunity (GROWTH), it has a negative coefficient of -0.029 and significant at the 5% level (sig = 0.042). Finally, the significant positive coefficient on TURN is similar to the findings of Barth et al. (2008) and Sun et al. (2011). For the control variables on discretionary accruals equation, I find that the coefficients are not significant.

5.1.2. Recursive equation system results

Table 5 reports the estimation results of the recursive equations models. Following Zang (2012), I expect that the French companies which adopt IFRS mandatory trade-off between real decisions and discretionary accruals based on their timing. In other words, I expect that managers adjust towards the end of the year the level of discretionary accruals upward or downward depending on the level of the amount of real activities manipulation realized during the year.

Table 5: Recursive-Equations Regressions Results

Model : $AD_{i,t} = \beta_0 + \beta_1 \text{UnexpectedREM}_{i,t} + \beta_2 \text{IFRS}_{i,t} + \beta_3 (\text{UnexpectedREM}_{i,t} * \text{IFRS}_{i,t}) + \sum \beta_j * \text{Control}_{i,t} + \varepsilon_{i,t}$			
AD			
Variables	Coefficients	z	Sig. P> z
Unexpected REM	-0.021	-1.60	0.110
IFRS	-0.005	-0.09	0.928
Unexpected REM*IFRS	0.056	1.90	0.058*
SIZE	0.040	2.15	0.031**
GROWTH	0.015	0.98	0.329
ISSUE	-0.037	-0.94	0.348
DISSUE	-0.066	-2.75	0.006***
LEV	-0.075	-1.60	0.110
TURN	0.026	0.67	0.502
CFO	-0.559	-5.63	0.000***
BIG4	-0.036	-0.51	0.610
Intercept	-0.305	-2.91	0.004***
Wald chi2(11) = 198.30			
Prob> chi2 = 0.000			

Note: *, **, *** denote statistical significance at the 0.10, 0.05, and 0.01 levels respectively. Unexpected REM_{i,t} measured as the estimated residual from this regression: $RM2_{i,t} = \alpha_0 + \alpha_1 \text{IFRS}_{i,t} + \sum \alpha_j * \text{Control}_{i,t} + \varepsilon_{i,t}$. The other variables are as defined in Appendix A.

According to the results found in Table 5, the coefficient on (Unexpected REM*IFRS) in the AD equation is positive and significant at the 0.1 level. My findings are inconsistent with my second hypothesis suggesting a sequential decision between real and accrual-based earnings management after the mandatory IFRS adoption. In other words, I can conclude that there is not a direct substitutive relation between the two approaches at year and when real activities manipulation is realized, confirming the results found in the previous section.

5.1.3. Smoothing earnings

Table 6 reports the result of the smoothing earnings by discretionary accruals and real activities manipulation after the mandatory IFRS adoption by using the coefficients of correlation (Panel A) and the coefficients of variation (Panel B).

Table 6: Coefficients of Correlation and Variation

Panel A: Coefficients of Correlation			
	AD*REM*IFRS	PrEar*IFRS	
AD*REM*IFRS	1.000	-0.218***	
PrEar *IFRS	-0.218***	1.000	
Panel B: Coefficients of Variation			
	Std.	Means	Coef. of variation
RepEar*IFRS	610.474	212.652	2.87
PrEar*IFRS	699.437	223.316	3.13

Note: *** denote statistical significance at the 0.10 level. PrEar is a premanaged earnings that is equal to net income minus discretionary accruals and REM. RepEar is the reported earnings (net income). IFRS is a binary variable that takes the value 1 during the post-IFRS period (2006-2011) and the value 0 for the pre-IFRS period (1999-2004). (PrEar*IFRS): interaction variable between IFRS and the premanaged earnings defined below. (AD*REM*IFRS): interaction variable between IFRS, REM and discretionary accruals.

As results reported in table 6 (Panel A) show, the coefficient of correlation between (AD*REM*IFRS) and (PrEar *IFRS) is negative and significant at the 1% level, which is consistent with my third hypothesis suggesting that the mandatory IFRS adoption drives French firms to use both real activities (abnormal production cost and abnormal discretionary expenses) and discretionary accruals to smooth their earnings. Moreover, similarly to previous studies (Eckel 1981, Subramanaym 1996, Barton 2001), I conduct an additional analysis based on the comparison of coefficients of variation between net income and premanaged earnings. The results of this analysis show a coefficient of variation of net income (2.87) less weak than the premanaged (3.13). This confirms the results already released, (see Table 6, Panel B). Overall, I conclude that, following the adoption of international accounting standards, managerial discretion is guided by the desire to reduce the variability of earnings by the manipulation of real activities and discretionary accruals. This is consistent with the outcomes of Matsuura (2008) and Hashemi & Rabiee (2011) that suggest that managers use the interaction between REM and AEM to smooth their earnings in order to secure their reputation, reflect good performance of their business and change the risk perceived by stakeholders (Eckel, 1981 and Trueman & Titaman, 1988).

6. Conclusion

This study examines the effect of the mandatory IFRS adoption on both real and accrual-based earnings management. It complete previous literature (Ipino and Parbonetti, 2011) by taking into account the interaction between the two alternatives earnings management mechanisms instead of looking at them independently. I measure discretionary accruals by the Jones (1991) model as modified by Dechow et al. (1995). To capture REM, I used three individual proxies (i.e., abnormal cash flow from operation, abnormal production-operating costs and abnormal reduction of discretionary expenses) computed as Roychowdhury (2006) and in order to capture the total effect of REM I calculated single proxies consistent with Cohen et al. (2008) and Cohen & Zarowin (2010). Based on a final sample of 1488 firm-year observations in the French context, the results of simultaneous-equations regression show that the level of real activities does not influence the levels of discretionary accruals, but the latter has an impact on real decisions in a complementary way. Hence, the rejection of the idea that the mandatory IFRS adoption pushes French companies to use the real management as a substitutable tool for discretionary accruals. Besides, similarly to Zang (2012), I use the recursive-equations regression to test if there is a relative timing difference of the two earning management strategies. The findings don't

support the notion of the sequential decisions. Finally, my results indicate that French firms manage accruals and use real activities to smooth earnings.

Overall, my work contributes to two lines of research, the literature on earnings management and the literature on the consequences of the introduction of IFRS in a country characterized with weak investor protection and that have a major accounting change after the mandatory adoption of IFRS. It may have implications for both standard setters and researchers. For standard setters, they will be more aware of the existence of opportunistic accounting practices based not only on discretionary accruals, but also on real activities manipulation and, therefore, of the possibility of joint manipulation of these two management practices. Thus, my findings can contribute to advancing their reflections in the development of future standards. For researchers, they will focus on real activities manipulation as well as accrual-based earnings management in order to explain fully the opportunism of managers when managing their earnings.

However, these findings are subject to several caveats. First, I use annual data when studying the sequential relation between real and accrual-based earnings management. Further research could examine quarterly data in order to better identify the timing of earnings management within a fiscal year. Moreover, the explanatory power of my model remains modest. This may be due to empirical reasons such as the choice of the real and accruals earnings management proxies, the methodology, the empirical setting, the existence of omitted variables, etc. This limitation can be taken into account in the future research.

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Notes

- [1] Earnings smoothing can be viewed in different perspective. It can be used as way to approximate the earnings quality (Barth et al. 2008). In other hand, it can be used as form of signaling to convey private information to the outside by enabling the firms to communicate its expected persistent earnings power (Matsuura, 2008). In my study, I consider smoothing earnings as described in the second perspective.
- [2] My final sample consists of balanced data because the exclusion of a firm in one year for any reason automatically leads to the exclusion of the same firm from the other years.
- [3] Following previous literature, I use at least eight observations to estimate discretionary accruals.
- [4] The endogeneity is the result of several causes including: [1] an omitted variable of the estimated model, [2] a reverse causality between one of the explanatory variables and the dependent variable, [3] the measurement errors on the explanatory variables and finally, [4] a data selection problem. In my case, the endogeneity problem mainly comes from the double causality between real and accrual-based earnings management since this latter explains the real management and vice versa.

Appendix A: variables summary

The variables used to measure the discretionary accruals from modified Jones model.

Code	Variable definitions
TA	The difference between operating cash flows (CFO) and Income before extraordinary items (EBXI), otherwise Total accruals= EBXI -CFO
PPE	Gross value of property, plant and equipment
REV	Revenues
ΔREV	Change in revenues from preceding period
REC	Accounts receivable
ΔREC	Change in accounts receivable from preceding period
ASSETS	Total assets
ε	Error term represents the portion of discretionary accruals

The variables used to measure REM according to Roychowdhury (2006).

Code	Variable definitions
CFO	Cash flow from operations
GOGS	Cost of Goods Sold
INV	Inventories
ΔINV	Change of inventories
PROD	Production costs = Cost of Goods Sold (GOGS) + Change of inventories (ΔINV)
R&D	Research and development expenses
SG&A	Selling, general and administrative expenses
ADVEXP	Advertising expenses
DISEXP	The sum of advertising expenses, R&D expenses and SG&A expenses; DISEXP = ADVEXP + R&D + SG&A
Sales	Sales revenue
ΔSales	Change in sales revenue over time
Assets	Total assets
ε ₁ , ε ₂ , ε ₃	Error terms representing respectively abnormal cash-flows from operations (AB_CFO), abnormal production costs (AB_PROD) and abnormal discretionary expenditures (AB_DISCX)

The variables used in the models to examine the impact of mandatory IFRS adoption on AEM and REM.

Code	Variable definitions
<i>Dependent Variables</i>	
AD	The discretionary accruals computed using the Modified Jones Model
ACFO	The level of abnormal cash-flow from operations computed as in Roychowdhury (2006). It is a negative measure of real earnings management
APROD	The level of abnormal production costs computed as in Roychowdhury (2006), where production costs are defined as the sum of costs of goods sold and change in inventories. It is a positive measure of real earnings management

ADISCX	The level of abnormal discretionary expenses computed as in Roychowdhury (2006), where discretionary expenses are the sum of advertising expenses, R&D expenses and SG&A expenses. It is a negative measure of real earnings management
RM1	It represents the sum of the standardized three real earnings management proxies computed as in Cohen et al. (2008), i.e., AB_CFO, AB_PROD and AB_DISEXP.: RM1 = -AB_CFO + AB_PROD- AB_DISEXP
RM2	The sum of the standardized two real earnings management proxies: RM2= AB_PROD- AB_DISEXP
RM3	The sum of the standardized two real earnings management proxies: RM3= -AB_CFO - AB_DISEXP

Independent variables

IFRS	Binary variable that takes the value 1 during the period post-IFRS (2006-2011) and the value 0 for the period pre-IFRS (1999-2004).
Unexpected REM	Unexpected amount of real earnings management realized Estimated residual from Eq. (8)

Control variables

SIZE	Company size measured as the natural logarithm of total assets
GROWTH	Represent the annual percentage change in sales
ISSUE	Increase in equity, measured as the annual percentage change in common equity.
DISSUE	Increase in debt, measured as the annual percentage change in total liabilities.
LEVERAGE	Leverage, measured as total long term debt over total assets.
TURN	Turnover is measured as the ratio of sales to total assets.
CFO	Cash flow from operations, measured as cash flow from operations deflated by total assets of the year end.
BIG4	Dummy variable equals to 1 if the firm's auditor is at least one of the big 4, 0 otherwise.