MNCS' STRATEGY IN R&D: THE EFFECT OF THE DECENTRALIZATION ON THE PERFORMANCE AND ON THE EARNINGS MANAGEMENT

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ABSTRACT

This paper studies the relationship between R&D decentralization and financial performance. It examines also the impact of this decentralization on earnings management. To specify what does matter in the decentralization of the R&D we try to examine the relationship between centralization or decentralization of the R&D and the firm's performance on one hand and the earnings management as measured by discretionary accruals on the other hand. We use two internal finance indexes (internal cash flows, internal market capital) and two mechanism of governance (stock-options, institutional investors) to explain the determinants of the R&D's strategy.

Using a sample of 160 U.S. Multinational companies (MNCs) between 2001 and 2006 our results show that MNCs decentralize their R&D for dual goal to improve firm's profitability or performance and to help manager to manage earnings in their own interest. Moreover, despite the fact that R&D decentralization has a positive impact on performance, institutional shareholders and performance-based compensation encourage managers to decentralize their R&D in order to spur their opportunistic behavior.

***Keywords:** Decentralization, R&D, Performance, Earning Management, Institutional investors, based-performance compensation, MNC.*

***JEL Classification:** G30; G38; F23; O32.*

INTRODUCTION

A point of view commonly shared is that these last decades the multinational companies (MNCs) attach a great importance to the investments in research and development (R&D) and carry out a majority part of their intangible investments on their subsidiaries. Having such strategies, they are distinguished to their domestic competitors by a higher performance and a weaker failure risk. This specific context of MNCs incites to investigate their investments strategies in order to determine if it would be better to them to adopt *a single investment strategy on R&D (centralization or decentralization) or a mixed strategy (centralization and decentralization)?* The analyses are realized on two level, that of performance and that of earnings management. The subject mobilized rarely the researchers and the approach, firstly,

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in combination to the large traditional theoretical currents and to the ground chosen and, secondly, with association to the American MNCs, constitutes an originality which does not go in the sense of facility.

In this line, our objectives are to study and compare the R&D investment strategies of the MNCs and investigate the factors inciting to disperse these investments into the subsidiaries. This study examines, firstly, the impact of the strategy chosen on the performance. In this sense, the decentralization of R&D can, through its impacts as regards technical training (De Meyer, 1993b; Dodgson, 1993; Kuemmerle 1998), failure risk smoothing (Dhaoui, 2008; 2009) and adaptation of products to local requirement, improve the quality of the production process and that of the products and influence, consequently, financial performance., It examines, secondly, the impact of this decentralization on earnings management insofar as it increases informational asymmetries and spurs the manipulation of accounting results.

As regard to these objectives we are looking forward to find the answer to these questions:

Did managers decentralize their R&D to improve the firm's performance or to serve their own interests? In which way can financial policy and mechanisms of governance influence the decentralization of the R&D?

Using a sample of 160 American MNCs over the 2001-2006 period, we showed that the decentralization of the R&D is carried out in the double objective: improving the firm's profitability and serving the managers' interests. We found, moreover, that the presence of internal capital market (ICM) incites managers to decentralize their R&D in order to create favorable ground to manage the earnings. Our results indicate also that, in spite of their impacts significantly positive on performance, both the institutional investors and the based-performance compensation encourage managers to decentralize their R&D in order to rich their own objectives.

This paper is organized as follows. In the first section, we present the conceptual framework and the hypotheses. The second section is devoted to present followed methodology, in this section we try also to present and discuss the results of our study. The conclusion is presented in the third section.

1. RELATED STUDIES AND DEVELOPMENT OF TESTING HYPOTHESES

The decentralization of the R&D improves technical learning and organizational efficiency (DeMeyer, 1993b; Dodgson, 1993; Kuemmerle 1998). In addition, it allows firms to smooth their failure risk (Dhaoui, 2008; 2009) and to adapt their product to local requirement. This improves the quality of the production process and that of the products and spurs therefore the firm's incomes. It influences, consequently, positively the financial performance. Thus we put this hypothesis:

H1 : In opposition to their centralization the decentralization R&D investments improves significantly the firm's performance.

Oppositely, the decentralization of the R&D helps managers to create favorable conditions to earnings management. This later constitutes according to Dye (1988) and Nier (2000) a "*logical consequence*" of a situation of informational asymmetry which allows managers to

escape from the control of the shareholders. In this same development of thought, the decentralization of the R&D increases, particularly, the informational asymmetry between shareholders and managers and spurs the opportunistic behavior of these later whose objective is to manipulate earnings in their own interests. Thus our second hypothesis:

H_2: *The decentralization of R&D investments, in opposition to their centralization, spurs the earnings management.*

In the same way, several studies considering the Fazzari et al. (1988) predictions as a starting point such as those of Plane and Bardos (2002) and Belin and Guille (2002) show that R&D investments are constrained on external market and can be financed only by internal flows. Particularly, Lahiri and Kedia (2009) investigate the relationship between internal finance and performance. Using various measurements, they identify positive links between the two variables. However, according to our knowledge, in spite of the importance of these results, the relationship between this mode of financing of the decentralized R&D investments and the firm's performance on one hand and the managers' opportunistic behavior on the other hand remains less explored. Thus, we try to investigate if the presence of significant cash-flows incites managers to decentralize the R&D investments into the subsidiaries in order to improve the firm's performance or rather to reinforce the managerial discretionary. Thus we put the two hypotheses:

H_3: *In presence of a significant cash-flow, managers decentralize their R&D into their subsidiaries in order to improve performance.*

H_4: *In presence of a significant cash-flow, managers decentralize their R&D into their subsidiaries in order to facilitate earnings management.*

Compared to their domestic competitors having only external capital market, MNCs create their ICM which helps them to finance the growth opportunities in their subsidiaries. However, in spite of the importance of studies which confirm the assumption of effectiveness of the ICM such as those of Weston (1970), Williamson, (1975) and more recently, Stein (1997), several others such as Friedman *et al.* (2003), Jensen (1986), Stulz (1990), Jian and Wong (2003), Liu and Lu (2004), Thomas *et al.* (2004), Chang (2003), and Friedman et al. (2003) consider that it spurs the management entrenchment by financing specific investment increasing asymmetric information between managers and shareholders. This disagree between authors indicates that the effect of the ICM on firm's performance and on earnings management needs more investigations. Thus we put our hypotheses H_5 and H_6.

H_5: *To improve performance, the presence of internal capital market incites for decentralization of R&D.*

H_6: *To spur earnings management, the presence of internal capital market incites for decentralization of R&D.*

The mechanisms of governance are not without impact on the decentralization choice. On one hand, institutional investors have necessary competences allowing them to supervise the managers' behavior better than ordinary shareholders. Several studies which take the predictions of the agency theory as a starting point such as those of Brickley *et al.* (1988), Barclay and Holderness (1991), Bethel and Liebeskind (1993), McConnell and Servaes (1990), Chaganti and Damanpour (1991) and Case and Fowler (1992) suppose that institutional investors are

able to exert effective control on the managers. The high level of capital which they hold gives them more abilities to make decisions affecting the managers' opportunistic behavior (Brickley and Al, 1988). This capacity enables them to force these later to act in the shareholders' interests. Thus we consider this hypothesis:

> ***H₇:*** *To enhance performance, the presence of institutional investors incites managers to decentralize their R&D.*

Oppositely, several authors such as Pound (1988), Slovin and Sushka (1993) and Koh (2003) consider that the institutional investors can collaborate with managers in order to increase their own wealth. When their investment horizons are directed towards short term level or their equity participation are not important, institutional investors encourage managers and incite them to make decisions which gets them more satisfaction even if there are at the expense of the ordinary shareholders. Thus we put our hypothesis:

> ***H₈:*** *To spur earnings management, the presence of institutional investors encourages managers to decentralize their R&D.*

On another hand, incentive compensation is considered by Caby and Hirigoyen (2005) intended "*to solve agency problems by binding the managers' remuneration to the performance*". Thus, it may influence positively the firm profitability (Chakraborty *et al.*, 2009). However, several authors such as Chen et al. (2006) and Sullivan and Spong (2007), who take inspiration from the prediction of the management entrenchment theory, reject the assumption of effectiveness of the incentive compensation in terms of reduction of agency problems between shareholders and managers. They, confirm, in opposition, the assumption of discretionary behavior. Their results show that managers find it more beneficial to make decisions allowing them to manage earnings when their remuneration is indexed on performance, in order to increase their own wealth at the expense of the shareholders.

This disagreement between authors pushes us to investigate more the strategies of investments in R&D adopted by MNCs in order to show if the based-performance compensation encourages managers to act in the shareholders' interest or rather so as to increase their own wealth. Thus we put our hypotheses:

> ***H₉:*** *To enhance performance, the remuneration by stock-options incites managers to decentralize their R&D.*

> ***H₁₀:*** *To spur earnings management, the remuneration by stock-options incites managers to decentralize their R&D.*

2. METHODOLOGY, RESULTS AND DISCUSSION

2.1. Research Methodology

2.1.1. Data

The preliminary sample of this study consists of 572 companies, identified trough the Worldscope/Disclosure CD-ROM database for the year 1998 trough 1995. Only the name list of firms is collected from the Worldscope/Disclosure database. Financial and managerial information are collected from annuals reports of each firm over the years from 2001 to 2006.

After classification of these firms into multinational and domestic companies, we consider only multinational ones.

To distinguish between MNC and domestic's ones two criteria are used: foreign sales ratio (foreign sales divided by total sales) and foreign assets ratio (foreign assets divided by total assets). MNC sample consists of companies having both foreign assets ratio and foreign sales ratio over than 10% (Doukas and Pantzalis, 2003). Financial firms and those that their economic operation is difficult to conceive in reason of the insufficiency of the data that we dispose are withdrawn from the initial sample. The final sample of this study consists of 160 companies over a period of 6 years that makes 960 observations. We choose panel data in order to consider both individual and temporal dimension of information available.

2.1.2. Measuring Effects of Decentralization of R&D on Firm's Performance and on Earnings Management

This section examines the influence of decentralization and centralization of R&D on firm's performance and on earnings management.

Three ratios are used to measure firm's performance. Return on equity (net incomes divided by shareholders equity), return on assets (incomes before interests and taxes divided by total assets) and market value (Tobin's Q: Market capitalization divided by total assets).

The earnings management is measured according to Kothari *et al.* (2005) model. Discretionary accruals are determined as follow[1]:

$$\frac{Discretionary\ accruals_{it}}{Total\ assets_{it-1}} = \frac{Total\ accruals_{it}}{Total\ assets_{it-1}} - \left(\hat{\alpha}_0 + \hat{\alpha}_1 \frac{change\ in\ sales_{it}}{Total\ assets_{it-1}} + \hat{\alpha}_2 \frac{change\ in\ fixed\ assets_{it}}{Total\ assets_{it-1}} + \hat{\alpha}_3 ROA_{it-1} \right)$$

The R&D expenditure gives idea on technological intensity in the firm's activity. These expenditures are assimilated as indicators to potential growth opportunities (Myers, 1977). Total R&D expenditures divided by total sales is considered as standard measurement of R&D intensity. Decentralized R&D consists in all expenditures invested into the subsidiaries. Oppositely, centralized R&D consists in all investments on R&D realized in the headquarters.

Both the performance and the accruals may also be affected directly or indirectly by factors other than centralization and decentralization of the R&D such as internal cash flow, internal capital market, institutional investors and incentive compensation. Internationalization degree, debt and firm's size are used as control variables. Given below are discussions on these predictors.

Internal capital market [ICM]: Internal capital market consists in all transactions realized within the group (headquarters and subsidiaries). It contains the whole of loan-borrowing operations between subsidiaries and their headquarters and between subsidiaries themselves. In this way, flows can benefit to subsidiaries or to headquarters. To distinguish between them we consider those moved to subsidiaries as positive flows and those moved to headquarters as negative flows.

Institutional investors [INST]: We consider as institutional investors only those having more than 5% of equity. The variable « INST » is binary. If institutional investors hold 5% or more of the firm's equity, the artificial variable is 1, if not, it will be 0.

Incentive compensation [STOP]: Managers' remuneration contains fixed pay and based-performance pay such as stock-options. Incentive compensation takes the level 1 if managers are remunerated by stock-options and 0 if not.

Cash-flows [CF]: The cash-flows correspond to earnings before expenses financial and taxes. We retain cash-flow before interests and taxes in order to make it possible to avoid a mechanical skew during the tests of the debt according to the cash-flows. Indeed, a significant debt lead to more significant financial interests and thus to less cash-flow after financial expenses.

Size of the firm [SIZE]: The size of the firms can be measured by the logarithm of total assets. This measure is adopted since the activities of the big-sized firm, compared to small-sized one, are diversified and depend less on the success of a specific project (Lehmann and Neuberger, 2000).

Internationalization degree [ID]: The internationalization level measures the intensity of foreign activity carried by the firm. Two criteria are used to measure internationalization degree: foreign assets on total assets and foreign sales on total sales. These criteria are used recently by Doukas and Pantzalis (2003).

Financial debt [DEBT]: Financial debt includes both short term and long term debts. These later include bank debt and bonded one. To investigate the wage of debt in all financing resources we use the total debt reported to total liabilities ratio as measure of financial debt.

Based on these considerations, two seemingly unrelated regression models are estimated separately for performance and earnings management. The first model associated to the firm's performance is the following:

$$\begin{cases} PERF_{it} = \alpha_0 + \alpha_1 DEC_{it} + \alpha_2 CENT_{it} + \alpha_3 ID_{it} + \alpha_4 SIZE_{it} + \varepsilon_{it} \\ DEC_{it} = \beta_0 + \beta_1 CF_{it} + \beta_2 ICM_{it} + \beta_3 INST_{it} + \beta_4 STOP_{it} + \beta_5 DEBT_{it} + \beta_6 SIZE_{it} + \varepsilon_{it} \\ CENT_{it} = \delta_0 + \delta_1 CF_{it} + \delta_2 ICM_{it} + \delta_3 INST_{it} + \delta_4 STOP_{it} + \delta_5 DEBT_{it} + \delta_6 SIZE_{it} + \varepsilon_{it} \end{cases}$$

With:

PERF: represents performance indicators as measured by « ROE », « ROA » or « Tobin's Q »,

DEC: represents the proportion of R&D expenditures decentralized into the subsidiaries,

CENT: represents the proportion of R&D expenditures centralized in the headquarters,

CF: represents the sum of available cash-flows,

ICM: represents the internal capital market,

INST: indicates the presence of institutional investors,

STOP: indicates the presence of based-performance compensation.

SIZE, ID and DEBT are used as control variables.

The model associated to the earnings management is presented as below:

$$\begin{cases} ACCRUALS_{it} = \alpha_0 + \alpha_1 DEC_{it} + \alpha_2 CENT_{it} + \alpha_3 ID_{it} + \alpha_4 SIZE_{it} + \varepsilon_{it} \\ DEC_{it} = \beta_0 + \beta_1 CF_{it} + \beta_2 ICM_{it} + \beta_3 INST_{it} + \beta_4 STOP_{it} + \beta_5 DEBT_{it} + \beta_6 SIZE_{it} + \varepsilon_{ot} \\ CENT_{it} = \delta_0 + \delta_1 CF_{it} + \delta_2 ICM_{it} + \delta_3 INST_{it} + \delta_4 STOP_{it} + \delta_5 DEBT_{it} + \delta_6 SIZE_{it} + \varepsilon_{it} \end{cases}$$

With:

ACCRUALS: represents the discretionary accruals.

2.2. Results and Discussion

2.2.1. Descriptive Statistical

Table I presents summary statistics for T-test. To decompose our sample into two sub-samples we used the median criteria. We use this criteria since one problem with using the mean is that it often does not depict the typical outcome. If there is one outcome that is very far from the rest of the data, the mean will be strongly affected by this outcome. Thus, the median is better for describing the typical value. It has also for advantage the ability to subdivide the sample into two equal sub-samples.

Table I
T-Test Associated to Centralization and Decentralization of R&D

Variables	CENT Binary	N	Mean	T-student	DEC Binary	N	Mean	T-student
R&D	1	479	0,077	24,293	1	480	0,065	14,411
	0	480	0,005	(***)	0	479	0,016	(***)
CF	1	479	0,082	7,109	1	480	0,075	4,202
	0	481	0,049	(***)	0	480	0,055	(***)
ICM	1	479	- 0,366	3,351	1	480	- 0,365	3,437
	0	481	- 0,426	(***)	0	480	- 0,426	(***)
DEBT	1	479	0,134	- 3,552	1	480	0,135	- 3,303
	0	481	0,155	(***)	0	480	0,154	(***)
SIZE	1	479	13,879	5,096	1	480	14,307	12,357
	0	481	13,210	(***)	0	480	12,781	(***)
ROE	1	479	0,131	- 0,641	1	480	0,161	2,506
	0	481	0,143	(ns)	0	480	0,113	(**)
ROA	1	471	0,084	- 1,470	1	476	0,099	1,155
	0	477	0,101	(ns)	0	472	0,086	(ns)
TOBIN's Q	1	476	1,707	4,613	1	479	1,671	3,430
	0	481	1,432	(***)	0	478	1,466	(***)
ACCRUALS	1	479	0,031	6,376	1	480	0,000	2,860
	0	481	- 0,082	(***)	0	480	- 0,051	(***)

Considering results presented in table I, we note significant differences in means between firms with high decentralized (high centralized) R&D and less decentralized (respectively, centralized) R&D for all variables except the "ROA". This makes it possible to reject the null hypothesis of equality of the mean between the two groups of firms: those having a strong

decentralization (or centralization) and those having a weak decentralization (respectively, a less centralization).

Particularly, we note that firms choose centralized or decentralized strategy when they have high R&D expenditures. Firms with less expenditure prefer rather mixed strategy. We also note that firms which choose a single strategy prefer financing their R&D investments by own capital stocks (cash-flows). They have less debt ratio than those having mixed investment strategy. They are involved in debt than those choosing a mixed strategy of R&D investment. The internal resources which devote the firms choosing a single strategy (centralization or decentralization) rises with approximately 2 times those in firms choosing a mixed strategy.

As regards to the performance, we didn't identify significant differences in ROE or ROA between firms with single or mixed investment strategy ($T_{CENT/ROE} = -0.641$; $T_{CENT/ROA} = -1.470$; $T_{DEC/ROA} = 1.155$). In opposition, the difference in the market value are significant ($T_{CENT/Q \ of \ TOBIN} = 4.613$; $T_{DEC/Q \ of \ TOBIN} = 3.430$). On average the market value of the firms with strong decentralization (centralization) of R&D is about 1.671 (respectively 1.707). By comparison, the market value of the firms with a weak centralization (decentralization) is limited to 1.432 (respectively 1.466).

The statistics related to de governance mechanism are presented in table II.

Table II
Statistics Related to the Participation of Institutional Investors and the use of Stock-options

		INST				STOP			
		0	1	Total	Khi-deux	0	1	Total	Khi-deux
DEC	0	454(47%)	25(3%)	479(50%)	182,916 (0,000)	314(33%)	164(17%)	478(50%)	15,395 (0,000)
	1	275(29%)	203(21%)	478(50%)		255(27%)	224(24%)	479(50%)	
	Total	729(76%)	228(24%)	957(100%)		569(59%)	388(41%)	957(100%)	
CENT	0	429(45%)	49(5%)	478(50%)	96,949 (0,000)	300(31%)	178(19%)	478(50%)	4,327 (0,038)
	1	300(31%)	179(19%)	479(50%)		269(28%)	210(22%)	479(50%)	
	Total	729(76%)	228(24%)	957(100%)		569(59%)	388(41%)	957(100%)	

According to the results presented in table II we reject the hypothesis in which there is no significant difference in frequency in equity participation of institutional investors between both firms with a single investment strategy and those with mixed strategy. Indeed, the Khi-square (X_2) index is higher than theoretical value.

Results in table II show that about 89% of the firms with high equity participation of institutional investors choose a decentralized R&D investment strategy. Oppositely, only 38% of those with week equity participation of institutional investors decentralize their R&D.

In the same way, we show that about 41% of firms use based-performance compensation. More than 57% of them prefer a decentralized R&D investment strategy. Oppositely, only 45% of firms in which the stock-options are not used as based-performance compensation choose a decentralized strategy. Firms using stock-options as incentive compensation constitute about 47% (35%) of those with high (respectively less) decentralized R&D investment. These

results show that the decentralization of the R&D calls for the use of a based-performance compensation.

Results in table II chow, in the same time, that 78% of firms with high equity participation of institutional investors opt for centralization. Oppositely, only, 22% opt for mixed strategy. We chow also that institutional investors participate in nearly 38% of firms with high centralization of R&D. Their participation in firms with mixed strategy rich only 10%.

Incentive compensation is used in nearly 44% of the firms choosing a strong centralization of their R&D (that makes 22% of total sample). These firms represent about 55% of the whole companies using stock-option as incentive compensation. Companies with neither centralization nor incentive compensation represent approximately 31% of the total sample.

2.2.2. Econometric Results

To estimate our models we must exanimate if there is presence of a multicollinearity problem. Multicollinearity refers to a situation in which two or more explanatory/independent variables in multiple regression model are highly correlated. It causes problems to draw conclusion about the relationships between predictors and outcome. It can be detected through analyzing the Pearson correlation matrix. If the Pearson correlation coefficient exceed 0,7 (limit fixed by Kervin, 1992), we conclude the presence of multicollinearity. Tables III and IV present the correlation coefficient associated to independent variables used in our models.

Table III
Correlation Matrix for Independent Variables Explaining the Performance and the
Earnings Management

	DEC	CENT	ID	SIZE
DEC	1			
CENT	0,396	1		
ID	0,606	0,023	1	
SIZE	0,235	- 0,071	0,425	1

Table IV
Correlation Matrix for Independent Variables Explaining the Decentralization and the
Centralization of the R&D

	CF	ICM	INST	STOP	DEBT	SIZE
CF	1,00					
ICM	0,196	1,00				
INST	0,098	0,061	1,00			
STOP	0,043	0,008	0,037	1,00		
DEBT	-0,289	-0,006	-0,043	-0,036	1,00	
SIZE	-0,0157	-0,122	0,208	0,153	0,227	1,00

Results in tables III and IV indicate that all Pearson correlation coefficients are less than 0,7. Thus, we conclude the absence of a multicollinearity problem.

Results presented in tables V and VI chow that the decentralization, in opposition, to the centralization of the R&D enhances firm's profitability as measured by ROE ($\alpha_{[ROE/DEC]} = 1.335$, $t_{[ROE/DEC]} = 1.97$). However, it have a non significant effect on the ROA ($t_{[ROA/DEC]} = 0.88$).

Table V
Regression of the Performance as Measured by the ROE on the Centralization and the Decentralization of R&D and the Variables of Control

Variables	ROE		DEC		CENT	
	Coef.	z-statistic	Coef.	z-statistic	Coef.	z-statistic
DEC	1,335**	1,97				
CENT	-0,606***	-10,10				
ID	0,059	0,93				
SIZE	0,018***	3,90	0,002***	8,78	-0,002**	-2,35
CF			0,063***	1,51	0,233***	8,70
ICM			0,002	1,12	0,012*	1,80
DEBT			0,012***	1,01	0,022***	5,06
INST			0,001	-5,19	0,005	1,45
STOP			-0,029***	8,49	0,027	1,30
Con_	-0,095	-1,52	-0,020***	-5,80	0,039***	3,03
R-Square		0,139		0,279***		0,128
Obs.		954		954		954

Statistically significant at the level: (***) 1% ; ** 5% et * 10%.

Table VI
Regression of the Performance as Measured by the ROA on the Centralization and the Decentralization of R&D and the Variables of Control

Variables	ROA		DEC		CENT	
	Coef.	z-statistic	Coef.	z-statistic	Coef.	z-statistic
DEC	0,377	0,88				
CENT	-0,535***	-5,02				
ID	0,039	1,00				
SIZE	0,011***	3,93	0,002***	8,20	-0,001*	-1,79
CF			0,061***	8,51	0,212***	8,26
ICM			0,002	1,31	0,013**	2,11
DEBT			0,012***	10,56	0,025***	5,90
INST			0,001*	1,90	0,001	0,51
STOP			-0,030***	-5,46	-0,008	-0,43
Con_	-0,062	-1,61	-0,019***	-5,60	0,037***	3,05
R-Square		0,060		0,284		0,137
Obs.		943		943		943

Statistically significant at the level: (***) 1% ; ** 5% et * 10%.

Results presented in table VII chow that both centralization and decentralization of R&D influences positively the market value. However the impact of the decentralization is more important than that associated to the centralization ($\alpha_{[Q\ de\ TOBIN/DEC]}$ = 9.438, $\alpha_{[TOBIN's\ Q/CENT]}$ = 4.888). These results confirm, partially, the predictions of DeMeyers (1993b) and Kuemmerle (1998). The decentralization of the R&D enhances technical learning, smoothes the failure risk and improves the product quality. Even if its impact can be non-significant in the short term it becomes significant once an experience is acquired. This result confirms globally our first hypothesis.

Table VII
Regression of the Performance as Measured by the Tobin's Q on the Centralization and the Decentralization of R&D and the Variables of Control

Variables	TOBIN's Q		DEC		CENT	
	Coef.	z-statistic	Coef.	z-statistic	Coef.	z-statistic
DEC	9,438***	3,49				
CENT	4,888***	7,69				
ID	0,266	1,04				
SIZE	- 0,055***	- 2,85	0,002***	8,72	- 0,002**	- 2,22
CF			0,067***	9,38	0,242***	9,04
ICM			0,003*	1,79	0,013*	1,93
DEBT			0,011***	9,98	0,022***	4,96
INST			0,001	1,26	0,006*	1,66
STOP			- 0,032***	- 5,71	0,020	1,00
Con_	2,036***	8,05	- 0,020***	- 5,95	0,038***	2,94
R-Square		0,054		0,278		0,127
Obs.		953		953		953

Statistically significant at the level: (***) 1% ; ** 5% et * 10%.

We note also that, in accordance with our third hypothesis, the decentralized R&D investments are financed specially by internal resources. Given that they have a wealthy financial structure, the MNCs use, firstly, internal resources to finance their growth opportunities in their subsidiaries. This financial strategy allows them to avoid using debt which increases significantly the failure risk. This result is consistent with the predictions of the pecking order theory of Myers (1984) and Myers and Majluf (1984) which argue that firms have to finance their investment with internal resources before using external debt.

We note, oppositely, that the MNCs use in same time their internal resources in order to serve their headquarters at the expense of their subsidiaries. Indeed, the ICM presents a significantly and positively impact on the "CENT" and a non-significantly impact on the "DEC". This funds movement penalizes subsidiaries with high opportunities of growth and influences negatively their future profitability.

We note, moreover, that in accordance with our hypotheses H_7 and H_9, both the equity participation of institutional investors and the incentive compensation encourage managers to decentralize their R&D in order to improve the performance. Compared to the ordinary shareholders, the institutional investors are more able to evaluate the risks associated to their investment and to dissuade managers to act in the interest of the shareholders. These results confirm those founded by Agrawal and Mandelker (1992), Bathala *et al.* (1994) and Smith (1996) who argue that the presence of institutional investors improves the firm's performance. They have, indeed, the necessary competences and the ability to control managers in order to guarantee a sufficient remuneration to their investments.

Results associate to our second model are presented in table VIII.

Table VIII
Regression of the Earnings Management as Measured by the Discretionary Accruals on the
Centralization and the Decentralization of R&D and the Variables of Control

Variables	ACCRUALS		DEC		CENT	
	Coef.	z-statistic	Coef.	z-statistic	Coef.	z-statistic
DEC	2,652***	4,14				
CENT	0,597***	3,97				
ID	0,058	0,97				
SIZE	-0,053***	-11,66	0,002***	8,79	-0,002**	-2,16
CF			0,06***	8,37	0,225***	8,42
ICM			0,006***	3,65	0,021***	3,22
DEBT			-0,031***	-5,53	0,022	1,06
INST			0,012***	10,05	0,022***	5,01
STOP			0,0008	0,85	0,005	1,41
Con_	0,607***	10,21	-0,019***	-5,5	0,042***	3,23
R-Square		0,140		0,276		0,126
Obs.		954		954		954

Statistically significant at the level: (***) 1% ; ** 5% et * 10%.

Results in table VIII indicate, in accordance with our hypothesis H_6, that the decentralization of the R&D is adopted by managers in order to increase informational asymmetries and therefore to facilitate the manipulation of the accounting results. This result confirms the predictions of Dye (1988) and Deny (2000) according to which the earnings management constitutes a "*logical consequence*" of a situation of informational asymmetry that managers can benefit to escape from the control of the shareholders. Wishing increase informational asymmetries toward shareholders, the managers decentralize their R&D. This strategy allows them to manage more easily the firm's results ($\alpha_{[ACCRUALS/DEC]} = 2.652$, $T_{[ACCRUALS/DEC]} = 4.14$) than the situation where the R&D is centralized ($\alpha_{[ACCRUALS/CENT]} = 0.597$, $T_{[ACCRUALS/CENT]} = 3.97$).

We note moreover, in accordance with the predictions of the free cash flows theory that managers can benefit from the presence of a significant level of internal cash flows to invest in R&D on heir subsidiaries. They choose such strategy in order to facilitate the manipulation of accounting results. They, particularly, profit from the flexibility of transactions within the framework of the ICM to move the excess of resources towards subsidiaries loaded with R&D. This provides them to increase their own wealth at the expense of the shareholders.

We note also that the based-performance compensation encourages managers to make decisions improving the firm's value. If the firm's results fell down, the managers whose remuneration is indexed on performance will be incited to manage earnings in order to influence the way how potential investors perceive the firm's performance. This allows us to validate our hypothesis H_{10} according to which in order to increase earnings management the performance-based compensation incites managers to manage the firm's results.

CONCLUSION

While the positive and negative attributes of R&D in the firm's performance have been theoretically and empirically examined, in this paper we examine the impact of the

decentralization of the R&D on the performance and on the earnings management. Specifically, we analyzed this impact using a sample of 960 firm-year observations for MNCs over the 2001-2006 period. Our results showed that managers decentralize their R&D for dual goal: improving firm's performance and serving their own interests. We have integrated variable indicating the firm's capacity to finance growth investment such internal cash flows and ICM. Our results show that this later allows managers to move excess funds to the subsidiaries with more intangible investments which improve their discretionary latitude on earnings.

We found, in the same time, that despite their significant positive effect on firm's performance, the based-performance compensation and the institutional investors can spur the managers' discretionary behavior. Between performance and earnings management, the impact of the decentralization of the R&D depends on the firm's strategy and ipso facto on the managers' decisions.

Note

1.   For more details readers can see Kothari *et al.* (2005) and Dhaoui (2008, 2009).

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