

THE DETERMINANTS OF NEW CAPITALIZATIONS OF R&D EXPENSES IN CANADA

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Abstract

Under certain conditions, Canadian and international accounting standards allow firms to present R&D costs in their balance sheets (capitalization). This article analyzes the determinants of new capitalizations of R&D costs by focusing on positive accounting theory and the influence of the CEO. Based on a sample of 440 observations of Canadian firms between the years 2000 and 2003, the results show that the size, debt load, presence of a CEO who holds an important but not majority block of shares, and CEO's years of seniority all influence the decision to present new capitalizations of R&D costs. The presence on the board of an important stockholder other than the CEO attenuates the influence of the CEO.

Keywords: Capitalization - R&D- Positive Accounting Theory - Influence of CEO- Canada

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Introduction

Disclosing relevant financial information is a challenge for firms in the new economy. In these firms, intellectual capital plays a predominant role in their resources. According to some classifications, R&D projects, with their human capital, are a component of intellectual capital. One means used to disclose the scope of intellectual capital is to present R&D expenditures in the firm's financial statements.

Under certain conditions, the capitalization of R&D expenses is permitted by both international accounting rules (*International Accounting Standard n° 38*) and those applying in Canada (chapter 3064 of the Manual of the Canadian Institute of Chartered Accountants). However, American accounting rules explicitly forbid capitalization of R&D costs (*Statement of Financial Accounting Standard n° 2*), except for those involved in the development of software proven to be technologically feasible (*SFAS n° 86*).

Despite the strict capitalization criteria set by Canadian and international standards (but also because of asymmetric information), it is ultimately top managers of the firms subjected to these standards who decide whether to capitalize their R&D costs or to immediately recognize them as an expense.

This study examines the determinants of new capitalizations of R&D costs. In a given financial year, a new capitalization consists in entering as assets some or all of the R&D costs of that year, regardless of whether certain amounts have already

been capitalized in previous years. To our knowledge, this study is the first to adopt this dynamic approach, which makes it possible to observe a firm's behavior over time. Although the measure of new capitalizations has been used by Ding *et al.* (2004), their study, which is based solely on the year 2000, does not allow this kind of follow-up (a limitation recognized by the authors, p. 103). Landry and Callimaci (2003) note only whether or not R&D costs are entered as assets in the balance sheet of a given year, without distinguishing between new capitalizations and capitalizations reported in previous years.

Canadian firms in sectors that invest heavily in R&D have been selected. The final sample is composed of 440 firm-year observations, and the data collected cover the years 2000 to 2003. Of these observations, 73 (16%) firms report new capitalizations. Over time, the number of new capitalizations declines consistently.

The determinants of new capitalizations tested have been inspired by writings on positive accounting theory, a theory used to predict the choice of accounting methods. Added to these determinants are variables referring to the influence of the CEO.

The tests run use both univariate (Student's t-test) and multivariate (multiple regression logistic) analyses. In the multivariate analysis, several control variables are used: financial year, sector of activity, listing on American stock markets, and capitalization of R&D costs in previous years.

The results show that smaller firms and those with a very high debt load tend to present new capitalizations of R&D costs. These results support positive accounting theory.

Regarding the CEO's influence, the results indicate that firms whose CEOs are important stockholders are more likely to present new capitalizations. However, this fact is valid only for participants holding between 11% and 50% of the shares. Further, firms whose CEOs have many years of seniority are more likely to report new capitalizations. Finally, the presence of a board member who is a large stockholder but not a company executive appears to moderate the influence of top management and the reporting of new capitalization. In this case, new capitalization reporting tends to decline.

The results of this study should shed light on the strategies firms employ to disclose information concerning R&D costs. These results could also open new avenues for the definition and evaluation of strategies used to disclose information concerning intellectual capital in general.

The rest of the article is structured as follows: a study of the theoretical foundations of the argumentation (part 1) will be followed by a description of the methodology (part 2). Part 3 presents the empirical results obtained. A conclusion and a discussion of the results end the article.

1. Theoretical foundations

A presentation of the current of research on determinants of accounting choices (1.1) is followed by a presentation of the determinants of the capitalization of R&D costs (1.2) and by the influence wielded by the CEO.

1.1 Determinants of accounting choices

The choice of accounting methods has been the topic of several studies. These studies have all revolved around the studies of Jensen and Meckling (1976) and Watts and Zimmermann (1978, 1986), which explain accounting decisions based on positive accounting theory.

According to this theory, the accounting methods adopted are systematically linked to specific firm characteristics. The three hypotheses of positive accounting theory take into account the following factors: manager remuneration (decisions prompting an increase in accounting results); restrictive debt covenants (decisions favoring an increase in accounting results); and political visibility (decisions that favor a decrease in accounting results).

Empirical studies treating the choice of accounting methods have generally focused on linear or degressive methods of fixed asset amortization

(Hagerman and Zmijewski, 1981; Labelle, 1990); stock valuation methods (Holthausen, 1981; Labelle, 1990; Kuo, 1993); useful life of goodwill (Hall, 1993); and the methods for translating financial statements of foreign subsidiaries (Labelle, 1990; Bartov and Bodnar, 1996). The results obtained in these studies—all of them North American—tend to provide empirical confirmation of positive accounting theory.

1.2 Determinants of the capitalization of R&D costs

The capitalization of R&D costs entails higher net earnings for the financial year concerned. However, owing to the permanence of accounting principles (Ding *et al.*, 2004), this increase in earnings will be realized in the long term only if the R&D expenses vary from one year to the next.

Very few studies have focused on the decision of whether or not to capitalize R&D costs, for a number of reasons. In the United States, capitalization has not been allowed since 1974 (except for the costs of developing software). In Europe, before the recent generalized adoption of international accounting standards, there were no homogeneous methods of accounting for R&D costs. Hoarau (1995) points out that accounting harmonization is not solely a matter of setting standards but that it must also involve the accounting practices of firms. Having clear standards is not enough; they must be adopted by firms. Further, Thibierge (2001) notes that there are significant differences (both in manner and detail) in the way intangible assets are presented in the financial statements of some European countries. Consequently, the interpretation of results is limited by the lack of details about R&D costs, such as new capitalizations for the year or the amount of subsidies received.

Daley and Vigeland (1983) investigate whether the capitalization of R&D costs is linked to variables capturing political visibility. Their study on a sample of American firms covers the year 1972. They chose that period because it preceded the beginning of the FASB's deliberations on the capitalization of R&D costs. Consequently, in 1972 accounting choices would not be influenced by any anticipated changes in accounting practices. These authors notice that companies that charge off their R&D costs are significantly larger, thus validating the hypothesis about political visibility. They point out that "while [political] costs may not be large on average, for larger firms far from covenants constraints it may be sufficient to cause avoidance of an accounting policy such as capitalization of R&D costs which was not widely followed" (p. 197).

A few European studies have looked at the political visibility hypothesis in connection with the decision to capitalize R&D costs. The results

obtained show no convergence. Thibierge (2001), based on a study of French and Spanish firms having closed their books in 1999 or 2000, affirms that size is not an explanatory variable for the amount of intangible assets entered in the balance sheet. This result is confirmed by Ding *et al.*'s study of French firms in 2000.¹⁵ Oswald (2000), in contrast, examined a sample of English firms over the 1993-1997 period, and proves that the variable "size" is significantly associated with capitalization policy. Large firms prefer to charge off their R&D costs.

The study by Landry and Callimaci (2003) is, to our knowledge, the only one that has analyzed the determinants of capitalizing R&D costs in Canadian firms. Their study covers the 1997-1999 period and uses a sample of 434 firm-year observations. For a given firm and year, their observations consist in noting the presence of R&D costs among the assets entered on the balance sheet, but without distinguishing them from such costs reported in previous years. Their study thus differs from the one discussed in this article, which focuses on new capitalizations. Landry and Callimaci (2003) show that large size, profitability, and the existence of an important stockholder (either a CEO or not) act as variables likely to favor the immediate charge-off of R&D costs. In contrast, long established firms with a heavy debt load and high operating cash flows are likely to favor the capitalization of R&D costs.

1.3 The influence CEOs on earnings management

Given the leeway CEOs enjoy when applying the criteria for capitalizing R&D costs, the idea of possible earnings management cannot be pushed aside.

Works on agency theory (for example, Jensen and Meckling, 1976) separate firms into two categories: firms controlled by their CEO (when no owner holds at least 5% of the shares) and firms controlled by the stockholder (in the case where a stockholder holds at least 20% of the shares or where the CEO holds at least 10% of the shares). When CEOs control their firms, they are likely to partly appropriate the firm's resources or to make non-optimal decisions. This theory is based on the premise that corporate stockholding should be dispersed, as is the case in the United States.

In countries where stockholding is much more concentrated (see La Porta, *et al.*, 1999), the CEO-

stockholder conflict is expressed in other terms. In Canada, for example, the principal stockholder is often also the CEO of his own firm. Non-optimal decisions are thus made to the detriment of minority stockholders. However, poorly managed firms can attract potential buyers. To counteract this possible threat, CEOs are motivated to manage accounting results so as to portray a more attractive financial situation. Fan and Wong (2002) confirm empirically that in certain East Asian firms, the quality of accounting results declines as the percentage of stocks held by CEOs rises. Similarly, Rakoto (2007) notes that Canadian firms whose CEOs are also important stockholders tend to choose a method that will allow firms to avoid adding impairment loss on goodwill to company results. Previous studies have not analyzed the extent to which stockholding by CEOs can lead to earnings management. For example, a CEO with a majority holding would have no fear of a takeover.

Besides their role as important shareholders, the influence of CEOs could also come into play when they act as chairman of the board and when they have many years of seniority—especially when compared with other members of the board.

2. Hypotheses, research plan, and data

This section discusses the hypotheses (2.1), measures of variables (2.2), research plan (2.3), data sources (2.4), and sample (2.5).

2.1 Hypotheses

In light of the theoretical foundations discussed in the preceding section, several hypotheses are advanced.

2.1.1 Political visibility

Political visibility could be a determinant of the capitalization of R&D costs, because of its important role in accounting choices.¹⁶ Several studies have used size as a variable for determining the influence of political visibility. For example, Watts and Zimmermann (1986) argue that large companies are more likely to be monitored and, consequently, they tend to lower their earnings. If the firm posts high earnings, regulatory agencies will tighten constraints on its operations; potential competitors might be drawn into its sector by high profitability; and, finally, unions will want to renegotiate salaries to obtain a better distribution of the firm's added value.

¹⁵ Ding *et al.* (2004) also test other determinants of the capitalization of R&D costs. They observe that firms in the high technology sector and those with a high beta coefficient are most likely to capitalize R&D costs. Among the other determinants tested, the debt level did not show any significant results.

¹⁶ See Watts and Zimmermann (1986); Dhaliwal *et al.* (1982); Daley and Vigeland (1983); Hagerman and Zmijewski (1981); Labelle (1990); Oswald (2000); Thibierge (2001); Ding *et al.* (2004).

A negative relation between political visibility and capitalization might be expected, as reported by Daley and Vigeland (1983); Oswald (2000), and Landry and Callimaci (2003). Thibierge (2001) and Ding *et al.* (2004) conclude that political visibility is not significant (but its sign is as predicted).

Further, political visibility probably has a significant impact on capitalization policies, given that certain Canadian firms (especially those in the pharmaceutical and biotechnology sectors) receive subsidies from both the federal and provincial governments. In some cases, these grants represent an important source of funding. Consequently, these firms are prompted to portray themselves as less profitable than they actually are.

This leads to the following hypothesis:

H1: Companies that present new capitalizations of R&D costs tend to be less politically visible than companies that charge off their R&D costs.

2.1.2 Debt constraints

A critical debt level could have an impact on the firm's policy regarding its capitalization of R&D costs. Capitalization can allow firms to retreat from the critical thresholds of ratios set in debt covenants. To skirt the risk of crossing thresholds established by debt covenants (thus entailing re-negotiation of their terms), CEOs can "optimize" the firm's results.

Previous articles seem to support this observation: Daley and Vigeland (1983), Labelle (1990), Oswald (2000), Thibierge (2001), Dichev and Skinner (2002), Landry and Callimaci (2003), and Ding *et al.* (2004) confirm that firms with the heaviest debt loads tend to minimize charges, thus avoiding non-compliance with the requirements of their debt contracts.

H2: Companies that present new capitalizations of R&D costs have a heavier debt load than companies that charge off R&D costs.

2.1.3 Influence of the CEO

Previous studies conclude that managers present company results as attractively as possible, in order to minimize interference from external stockholders (Williamson, 1967; Smith, 1976; Dhaliwal, 1980; Landry and Callimaci, 2003). This earnings management can take on even larger proportions when managers exert a strong influence over the board of directors (which is notably the case when a CEO is also chairman of the board or when he has many years of seniority).

At the start of his mandate, the CEO usually has little room to maneuver because, during this period, the board of directors is actively engaged in the firm's

strategic process (Mace, 1971) and monitors its actions closely. However, the CEO's influence grows with his tenure, especially when the length of his mandate surpasses that of other board members. The CEO is also very influential when he is chairman of the board (Hambrick and Fukutomi, 1991; Rakoto, 2007).

This gives rise to the following hypotheses:

H3: Companies whose CEOs are also chairmen of the board of directors are more likely to present new capitalizations of R&D costs.

and

H4: Companies whose CEOs have many years of seniority are more likely to present new capitalizations of R&D costs.

CEOs who are important stockholders are motivated to manage results upward in order to prevent takeovers and to facilitate access to the best debt covenant terms. The first scenario can occur only when the CEO holds less than the majority of the shares.

H5: Companies whose CEOs are important stockholders are more likely to charge off R&D costs.

However, in firms with concentrated ownership, even if important stockholders are not actively engaged in managing the firm, they are nevertheless well informed because they have greater access to internal information. Consequently, owing to oversight by important stockholders, it is less probable that directors can get away with accounting adjustments (Smith, 1976; Landry and Callimaci, 2003).

H6: Companies in which an important stockholder other than the CEO sits on the board of directors are more likely to charge off R&D costs.

The presence on the board of an important stockholder who is not an executive director is especially effective in counterbalancing the CEO's influence. The following supplementary hypotheses are thus advanced:

H6a: The presence on the board of an important stockholder other than the CEO moderates the existing relation between the CEO's influence on the board and the presentation of new capitalizations of R&D costs.

and

H6b: The presence on the board of an important stockholder other than the CEO moderates the relation between the presence of a CEO with an

important holding and the presentation of new capitalizations of R&D costs.

2.2 Measures of variables

In this study, the manager is defined as the top person in charge of the firm's business operations. According to the information circulars of the firm's targeted, this person is designated under the title of "chief executive officer" or "chief operating officer." The variables created in hypotheses H1 to H6 are operationalized in the rest of this section.

2.2.1 The dependent variable

The goal of this study is to analyze the determinants of new capitalizations of R&D costs in Canada. The dichotomous dependent variable "capitalization of R&D costs" is equal to:

(1) if the firm has capitalized R&D costs in a given year;

(0) if the firm has charged off the totality of R&D costs in a given year.

According to this measure, the same firm can receive code (1) for certain years and code (0) for others, depending on whether or not it decides to capitalize in each of the four years studied.

2.2.2 The independent variables

Consistent with the theory of political visibility, the variable *size* is largely used in studies on the choice of accounting methods. Size is measured by the logarithm of total accounting assets (LOGA).

The *debt load* represents the level of financial constraints borne by the company owing to its choices regarding financial debt and financial policy. It is measured by the weight of financial costs (WFIN), which is the ratio of financial costs over operating results.

The variable (PLUR) indicates the *plurality of the CEO's functions*. This dichotomous variable is equal to (1) if the CEO is also chairman of the board or to (0) otherwise.

The variable SENIORITY measures the *CEO's seniority*. It is the number of years the CEO has held his position.

The variable CEOMAJ designates a *CEO who is an important stockholder*. This dichotomous variable is equal to (1) if the CEO holds a block of 10% or more of the company's shares or to (0) otherwise.

The variable SHMAJ denotes the *presence of an important stockholder* on the board, other than an executive officer. This variable takes the value of (1) if an important stockholder with at least 10% of voting shares sits on the board of directors and (0) otherwise.

2.2.3 The control variables

Four control variables have been selected: listing on an American stock market, sector of activity, year, and capitalization of R&D costs in previous years. The choice and measure of these control variables are explained below.

In the United States there are strict standards for capitalizing R&D costs: the only costs admissible for capitalization are those spent on developing software. Foreign firms that seek financing on American markets must reconcile their financial statements with American principles, a process that can prove difficult. Thus, certain *firms listed on American stock markets* tend to charge off their R&D costs immediately in order to avoid reconciliation costs. The variable STMK is introduced to control for this fact. It is dichotomous and is equal to (1) if the firm is listed on the American market and (0) otherwise.

To ensure that the differences observed in accounting methods are attributable to the independent variables chosen, the effects of the *sector of activity* are controlled, for R&D expenses are, by nature, sector specific (Lev and Sougiannis, 1996). The variable IND has been codified using seven dichotomous variables, which represent the eight sectors of activity selected. The variable YR has been codified by three dichotomous variables which represent the four *years* of observation.

Finally, the influence of *previous capitalizations* is also controlled. The specificity of this study is that it focuses on the new capitalizations of the year. However, to ensure that a previous capitalization does not affect subsequent ones (i.e. that the firm is following a particular policy of capitalizing R&D costs), the variable PRECAP is introduced in the regression models. This dichotomous variable takes the value (1) if a firm has capitalized R&D costs on its balance sheet in a year previous to the year observed and (0) otherwise.

INSERT HERE TABLE 1

2.3 Research plan

The research hypotheses will be tested by both univariate and multivariate analyses. The univariate analysis consists in a Student's t-test where the sample is divided in two, depending on whether or not the firm has presented a new capitalization of R&D costs during a given year.

Given that the dependent variable is dichotomous and that the goal of this study is to identify the determinants of the capitalization of R&D costs, the multivariate analysis selected is the logistic regression. This regression has often been used in

similar studies of the determinants of firms' accounting choices.¹⁷

– Model 1 (firm *j* and year *t*, see the definition of the measure of variables in Table 1):

$$\begin{aligned} \text{CAP R\&D}_{jt} = & \alpha_1 + \beta_1 \text{LOGA}_{jt} + \beta_2 \text{WFIN}_{jt} + \beta_3 \\ & \text{PLUR}_{jt} + \beta_4 \text{SHMAJ}_{jt} \\ & + \beta_5 \text{PLUR}_{jt} * \text{SHMAJ}_{jt} + \beta_6 \text{SENIORITY}_{jt} + \beta_7 \\ & \text{MARK}_{jt} + \beta_8 \text{IND}_{jt} \\ & + \beta_9 \text{YR}_{jt} + \beta_{10} \text{PRECAP} \end{aligned}$$

Model 2 below is equivalent to model 1, when the variable PLUR is replaced by the variable CEOMAJ. The two variables measure the CEO's influence from two different perspectives: the CEO as chairman of the board and the CEO as an important stockholder in the firm. These two variables are handled separately because, in most cases (65%), an important stockholding CEO is also the chairman of the board.

- Model 2 (firm *j* and year *t*, see the definition and the measure of variables in table 1):

$$\begin{aligned} \text{CAP R\&D}_{jt} = & \alpha_1 + \beta_1 \text{LOGA}_{jt} + \beta_2 \text{WFIN}_{jt} + \beta_3 \\ & \text{CEOMAJ}_{jt} + \beta_4 \text{SHMAJ}_{jt} \\ & + \beta_5 \text{CEOMAJ}_{jt} * \text{SHMAJ}_{jt} + \beta_6 \text{SENIORITY}_{jt} + \\ & \beta_7 \text{MARK}_{jt} + \beta_8 \text{IND}_{jt} \\ & + \beta_9 \text{YR}_{jt} + \beta_{10} \text{PRECAP}_{jt} \end{aligned}$$

2.4 Sources of data

The firms included in the sample for this study were selected from the Stock Guide database. Accounting data, such as data on total assets, net earnings, and financial costs were also collected from this database. Detailed data on R&D costs, such as the amount capitalized, amortization, tax credits on investments, operating results, and information on ownership structure, were culled from financial statements and from the circulars available on the *SEDAR* website.¹⁸

As in Landry and Callimaci (2003), the R&D costs have been adjusted for investment tax credits: in Canada, R&D expenses are subsidized at both the

federal and provincial levels. For certain industries, such subsidies are a major source of financing.

Regarding information connected with the influence of the CEO—such as plurality of functions (a CEO who is also chairman of the board)—and with the structure of stockholding (whether the CEO is an important stockholder or not, whether or not another important stockholder sits on the board), these data were collected from the management proxy circulars available on the *SEDAR* website.

2.5 Sample

The sample is composed of Canadian firms operating in sectors of activity that are strongly committed to R&D and thus have high R&D costs. Following the procedure adopted by Landry and Callimaci (2003), each sector's level of R&D was measured by the ratio of R&D costs over the sales of the period chosen: 2000 to 2003.

The sample selected includes all the firms in the Stock Guide data base and all the sectors whose average ratio of R&D activity for the 2000 to 2003 period exceeds 25%. The initial sample included 154 firms, representing eight sectors of activity. However, 44 firms had to be withdrawn because the data needed to test the hypotheses for one or more of the years studied were not found in their proxy circulars or financial statements. Table 2 describes the final sample of 110 firms. For these firms, data for the 2000-2003 period were collected, producing a total of 440 firm-year observations. The sample covers all the sectors of activity presented in the Canadian study done by Landry and Callimaci (2003)—a good sign of the present study's representativity.

INSERT HERE TABLE 2

3. The results

This section presents the univariate tests (3.1), the multivariate tests (3.2), a sensitivity analysis of the results (3.3) and a synthesis of the results obtained and conclusion (3.4).

3.1 Univariate tests and analysis of collinearity between variables

According to Table 3 below, the 440 firm-year observations included in the sample show that 367 firms (83.4%) charge off all their R&D costs and 73 (16.6%) present a new capitalization. In comparison, in the sample of French firms used in Ding *et al.* (2004), 79.4% charge off all their R&D costs and 20.6% present new capitalizations for the year 2000. In the Canadian study by Landry and Callimaci (2003), the financial statements of 71.9% of the firms observed in the 1997-1999 period present R&D as assets in their balance sheets, whereas 28.1% of firms do not.

¹⁷ See the studies of Zmijewski and Hagerman (1981), Daley and Vigeland (1983), Bartov and Bodnar (1996), Oswald (2000), Thibierge (2001), and Landry and Callimaci (2003).

¹⁸ The official site of the Canadian Securities Administrators (CSA), which disseminates most public documents and information posted by public companies and investment funds, <http://www.sedar.com>

The frequency analysis shows a constant yearly decline in the relative number of firms reporting a new capitalization of R&D costs. The percentage declines from 21.8% in 2000 to 14.5% in 2003: a 33.5% drop.

INSERT TABLE 3 HERE

Analysis of Table 4 and comparison of the two groups of firms (firms that do or do not present new capitalizations) points to significant differences in the variables: weight of financial costs (WFIN); influence of a CEO who is an important stockholder (CEOMAJ); and seniority of the CEO. Another significant difference pertains to the presence on the board of an important stockholder other than the CEO (variable SHMAJ), but it goes in the opposite direction of that predicted by hypothesis H6. Some firms show a negative weight for financial costs because their operating results are in the deficit. The sensitivity analysis in section 3.3 below shows that withdrawing all the observations with a negative financial-cost weight does not modify the results obtained.

INSERT TABLE 4 HERE

The correlation matrix in Table 5 indicates that certain independent variables demonstrate a certain degree of collinearity. However, the correlation coefficients fall below the 0.67 threshold, above which a serious multicollinearity problem might exist.

INSERT HERE TABLE 5

3.2 Multivariate tests

According to Table 6, all the hypotheses are confirmed, except the combined hypotheses H3 and H6a (influence of the CEO who is also chairman of the board and moderating effect of the presence of an important stockholder other than the CEO) and hypothesis H6 (presence of an important stockholder other than the CEO).

INSERT HERE TABLE 6

3.3 Sensitivity analysis of results

Two sensitivity analyses have been carried out. The first consists in withdrawing from the tests all the observations for which the weight of financial costs is negative. The results obtained from univariate and multivariate tests are similar to the initial results.

The second sensitivity analysis consists in observing the influence of the CEO/important stockholder when there is a variation in his percentage of shares. Table 7 shows the results obtained when

the test (model 2 multivariate) was applied five times according to the following variations:

- Sample limited to firms in which the CEO's percentage of shares varies from 0% to 10%. The CEO is considered an important stockholder when he holds between 5% and 10% of the shares.
- Sample limited to firms in which the CEO's percentage of shares varies from 0% to 25%. Here the CEO is considered as an important stockholder when he holds between 11% and 25% of the shares.
- Sample limited to firms in which the CEO's percentage of shares varies from 0% to 50%. The CEO is then considered as an important stockholder when he holds between 26% and 50% of the shares.
- Sample limited to firms in which the CEO's percentage of shares varies from 0% to 75%. Here the CEO is considered as an important stockholder when he holds between 51% and 75% of the shares.
- All the firms in the initial sample. The CEO is then considered as an important stockholder when he holds more than 75% of the shares.

The results show that the influence of a CEO who is an important stockholder exists only when his percentage of shares is situated between 11% and 50% (models CEOMAJ 0—25% and CEOMAJ 0—50%).

INSERT HERE TABLE 7

3.4 Synthesis of the results obtained and conclusion

Table 8 sums up the results obtained.

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The negative relation between new capitalizations of R&D costs and the size of the firm observed validates the political visibility hypothesis. According to this hypothesis, if the firm reports high earnings, regulators can tighten constraints on its operations. The results show that large firms, which are more politically visible, seem inclined to charge off R&D costs in order to reduce political costs. These results coincide with those obtained by Daley and Vigeland (1983), Oswald (2000), and Landry and Callimaci (2003). Nonetheless, the political visibility hypothesis is more robust in the North American context. European countries seem to follow a different logic in dealing with R&D costs (Thibierge, 2001; Ding *et al.*, 2004).

The results also show that debt load is an important determinant of the policy applied to the capitalization of R&D costs. These results correspond to those obtained by Dhaliwal (1980), Daley and Vigeland (1983), Labelle (1990), Thibierge (2001), Oswald (2000), and Landry and Callimaci (2003), who show that the presence of contractual debt constraints prompt companies to manage their

accounting results. Firms that are about to exceed their debt covenant threshold tend to minimize their charges; they will thus be more likely to capitalize their R&D costs.

The results concerning the influence of the CEO are very interesting: the presence of a CEO who is an important stockholder will increase the chances R&D costs will be capitalized. Pushing the analysis a bit further, two elements come to light. First, in the case where the CEO has a weak holding (10% of the shares or less) or a majority holding (more than 50% of the shares), the results are not significant. This may mean that the CEO with a minority holding does not have the power to impose his own interests or that the CEO with a majority holding sees no threat of a takeover and finds no need to manage earnings. Second, when the CEO owns a large but not a majority holding (between 11% and 50%), the probability of capitalization is very strong. La Porta *et al.* (1999) and Shleifer and Vishny (1997) show that agency problems in countries with concentrated ownership, such as Canada, emerge instead as conflicts of interest between the dominant stockholder and the other stockholders.

The results of the study also prove that the CEOs who have many years of seniority prefer to capitalize R&D costs. As their seniority increases so does their influence over the board, which gives them more power to push for their own interests. Further, the CEO's influence on the board will be even stronger if his seniority surpasses that of the other directors (Mace, 1971).

The last observation concerns the presence of an important stockholder on the board. The results show that the presence of an important stockholder on the board moderates the influence of the CEO. It would seem that when external directors with large holdings sit on the board they can keep an eye on the CEO and consequently reduce his influence. From this perspective, the oversight of important stockholders helps to reduce the probability that R&D costs will be capitalized.¹⁹

This study provides a better understanding of choices of accounting methods. Its specific goal consists in pinpointing the determinants of new capitalizations (by controlling for the influence of capitalizations in previous years), and the results obtained can be transposed to other accounting treatments such as that of intellectual capital.

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¹⁹ This observation is similar to that of Smith (1976), who finds that because of oversight by important stockholders, it is less likely that CEOs will try to manage earnings.

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Table 1. Measure of selected variables

Code	Hypothesis and description of the variables	Measure of the variables	Sign expected
Cap R&D	Dependent variable : Decision to capitalize R&D costs	(1) if firm capitalizes R&D costs during a given year, (0) if firm charges off the R&D expenses	N.A.
LOGA	H1: Size	Logarithm of total assets	-
WFIN	H2: Weight of financial costs	Ratio financial costs over operating result	+
PLUR	H3: CEO is also chairman of the board	(1) if the CEO is also chairman of the board (0) otherwise	+
SENIORITY	H4: Seniority of CEO	CEO's years of seniority	+
CEOMAJ	H5: CEO is an important stockholder	(1) if CEO holds at least 10% of company's shares (0) otherwise	+
SHMAJ	H6: An important stockholder other than the CEO sits on board	(1) if an important stockholder (at least 10% of shares) sits on the board. (0) otherwise	-
STMK	Control variable: listing on American stock market	(1) if the firm is listed on an American stock market (0) otherwise	-
IND	Control variable: sector of activity	Seven dichotomous variables representing the eight sectors of activities	?
YR	Control variable: financial year	Three dichotomous variables representing the four years of the study	?
PRECAP	Control variable: capitalization of R&D costs in previous years	(1) if the firm has shown an R&D amount capitalized on its balance-sheet in previous years (0) otherwise	?

Table 2. Number of firms in final sample

Sector of activity	Code of sector	Number of firm selected	Percentage of initial sample (n = 154)
Biotechnology	96	37	84.1 %
Pharmaceuticals	97	11	78.6 %
Equipment, software, systems and services	98	11	64.7 %
Telecommunications and services	77	3	60.0 %
Automobiles	51	10	52.6 %
Other technologies	89	9	81.8 %
Software	87	23	69.7 %
Electric equipment	41	6	54.5 %
Total number of firms selected		110	71.4 %
Sector code is the code used in the Stock Guide data base.			

Table 3. Frequency of dependent variable

	2000		2001		2002		2003		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Cap 0	86	78,2	92	83,6	95	86,4	94	85,5	367	83,4
Cap 1	24	21,8	18	16,4	15	13,6	16	14,5	73	16,6

Cap 0 firms which charged off the totality of R&D costs in a given year;
 Cap 1 firms which capitalized the totality of R&D costs in a given year;

Table 4. Univariate test

FIRMS WHICH DO NOT PRESENT NEW CAPITALISATION OF R&D COSTS					FIRMS WHICH DO PRESENT NEW CAPITALIZATION OF R&D COSTS				Student's t-test						
Explanatory variables	N	Average	Standard deviation	Average standard errors	N	Average	Standard deviation	Average standard errors	F	Sig.	T	Df	Sig.	Average diff.	Standard deviation diff.
LOGA	367	4,609	0,713	0,037	73	4,557	0,896	0,104	8,532	0,004	0,462	91,025	0,323	0,051	0,111
WFIN	367	-0,017	0,619	0,032	73	6,777	28,847	3,376	87,420	0,000	-2,012	72,013	0,024	-6,795	3,376
PLUR	367	0,400	0,490	0,026	73	0,340	0,478	0,056	4,157	0,042	0,900	104,39	0,185	0,055	0,061
CEOMAJ	367	0,240	0,426	0,022	73	0,400	0,493	0,058	19,174	0,000	-2,592	94,576	0,005	-0,160	0,062
SENIORITY	367	5,320	5,655	0,295	73	6,960	5,589	0,654	2,888	0,090	-2,278	103,462	0,012	-1,635	0,718
SHMAJ	367	0,250	0,431	0,022	73	0,360	0,482	0,056	10,965	0,001	-1,826	96,204	0,035	-0,111	0,061

LOGA = Size measured by the logarithm of total assets; WFIN = Weight of financial costs : Financial costs over operating results; PLUR = 1 if CEO is chairman of the board, 0 otherwise; CEOMAJ = 1 if CEO is an important stockholder with at least 10% of the shares, 0 otherwise; SENIORITY = number of years CEO has held his position; SHMAJ = 1 if an important stockholder other than the CEO sits on the board and holds at least 10% of the shares, 0 otherwise.

Table 5. Correlation between the variables

	CAP	LOGA	WFIN	PLUR	CEOMAJ	ANCIEN- NETÉ	SHMAJ
CAP	1	-0,026	0,180**	-0,042	0,135**	0,033	0,094*
Sig. (one-sided)		0,292	0,000	0,188	0,002	0,244	0,025
N	440	440	440	440	440	440	440
LOGA	-0,026	1	0,324**	-0,050	-0,103*	0,081*	0,062
Sig. (one-sided)	0,295		0,000	0,149	0,016	0,045	0,096
N	440	440	440	440	440	440	440
WFIN	0,211**	0,236**	1	-0,071	0,020	0,073	-0,023
Sig. (one-sided)	0,000	0,000		0,069	0,340	0,063	0,315
N	440	440	440	440	440	440	440
PLUR	-0,042	-0,046	-0,072	1	0,317**	0,249**	-0,191**
Sig. (one-sided)	0,188	0,170	0,130		0,000	0,000	0,000
N	440	440	440	440	440	440	440
CEOMAJ	0,135**	-0,108*	-0,052	0,317**	1	0,570**	-0,065
Sig. (one-sided)	0,002	0,012	0,273	0,000		0,000	0,086
N	440	440	440	440	440	440	440
SENIORITY	0,107*	0,072	0,001	0,275**	0,412**	1	-0,160**
Sig. (one-sided)	0,012	0,066	0,492	0,000	0,000		0,000
N	440	440	440	440	440	440	440
SHMAJ	0,094*	0,071	-0,056	-0,191**	-0,065	-0,197**	1
Sig. (one-sided)	0,025	0,067	0,241	0,000	0,171	0,000	
N	440	440	440	440	440	440	440

* significant at 0.05 (one-sided tests)

** significant at 0.01(one-sided tests)

The lower left part shows the Pearson correlations

The upper right part shows the Spearman correlations.

CAP = 1 if the firms show a new capitalization in their financial statements, 0 otherwise; LOGA = Size measured by the logarithm total assets; WFIN = Weight of financial costs: Financial costs over operating results; PLUR = 1 if the CEO is chairman of the board, 0 otherwise; CEOMAJ = 1 if the CEO is an important stockholder with at least 10% of the shares, 0 otherwise; SENIORITY = Number of years CEO has held his position; SHMAJ = 1 if another important stockholder with at least 10% of the shares sits on the board, 0 otherwise.

Table 6. Multivariate tests (logistic regressions)

Explanatory variables	Sign expected	Model 1	Model 2
LOGA	-	-1,144 (0,004)	-1,164 (0,006)
WFIN	+	1,521 (0,010)	1,509 (0,021)
PLUR	+	0,282 (0,346)	
SHMAJ	-	1,744 (0,011)	2,274 (0,008)
PLUR*SHMAJ	-	-1,555 (0,260)	
CEOMAJ	+		2,336 (0,001)
CEOMAJ*SHMAJ	-		-2,667 (0,039)
SENIORITY	+	0,119 (0,011)	0,082 (0,088)
SENIORITY*SHMAJ	-	-0,124 (0,010)	-0,106 (0,048)
STMK	-	-0,113 (0,375)	-0,237 (0,409)
IND	?	Not significant	Not significant
YR	?	Not significant	Not significant
PRECAP	?	36,133 (0,494)	35,650 (0,494)
Constant	?	-29,663 (0,495)	-29,053 (0,495)
Chi ²		282,636 (0,000)	293,118 (0,000)
Correct percentage		94,3	95,2

For each model, the coefficient estimated for the independent variable is shown in the first line and the threshold of significance on the second line, between parentheses). The tests are one-sided.

Dependent variable: = 1 if firms show a new capitalization of R&D costs in their financial statements, 0 otherwise.

Independent variables: LOGA = size measured by the logarithm of total assets; WFIN = Weight of financial costs (Financial costs over operating results PLUR = 1 if the CEO is chairman of the board, 0 otherwise; SHMAJ = 1 if important stockholder with at least 10% of the shares, 0 otherwise; CEOMAJ = 1 if the CEO is an important stockholder with at least 10% of the shares, 0 otherwise; SENIORITY = number of years CEO has held his position.

Control variables: STMK = 1 if the firm is listed on an American stock exchange, 0 otherwise; IND = Seven dichotomous variables representing the eight sectors of activity; YR = Three dichotomous variable representing the four years studied; PRECAP = 1 if the firm has shown a capitalized R&D amount its balance-sheet in a previous year, 0 otherwise.

Table 7. Sensitivity analysis according to different thresholds of ownership (logistic regressions, model 2)

Explanatory variables	Sign expected	CEOMAJ 0-10 %	CEOMAJ 0-25 %	CEOMAJ 0-50 %	CEOMAJ 0-75 %	CEOMAJ 0-100 %
LOGA	-	-0,378 (0,050)	-0,257 (0,134)	-0,379 (0,046)	-0,377 (0,046)	-0,406 (0,035)
WFIN	+	1,610 (0,009)	1,622 (0,010)	1,741 (0,005)	1,766 (0,006)	1,640 (0,010)
SHMAJ	-	0,219 (0,263)	0,525 (0,074)	0,657 (0,031)	0,371 (0,134)	0,415 (0,108)
CEOMAJ	+	-1,822 (0,016)	0,922 (0,017)	2,213 (0,001)	0,923 (0,177)	21,362 (0,499)
CEOMAJ*SHMAJ	?	-1,751 (0,499)	-1,059 (0,110)	-2,235 (0,499)	-1,914 (0,499)	Limited number of observations
SENIORITY	+	0,045 (0,040)	0,029 (0,130)	0,018 (0,249)	0,025 (0,183)	0,032 (0,106)
STMK	-	-0,194 (0,304)	-0,274 (0,231)	-0,212 (0,285)	-0,079 (0,416)	-0,006 (0,408)
IND	?	Not significant	Not significant	Not significant	Not significant	Not significant
YR	?	Not significant	Not significant	Not significant	Not significant	Not significant
PRECAP	?	34,422 (0,418)	35,109 (0,455)	35,172 (0,428)	35,222 (0,419)	34,084 (0,418)
Constant	?	-27,677 (0,412)	-28,261 (0,408)	-28,663 (0,420)	-28,513 (0,433)	-27,199 (0,417)
Chi ²		92,2455 (0,000)	89,245 (0,000)	101,747 (0,000)	86,062 (0,000)	87,731 (0,000)
Correct percentage		84,5	84,3	86,6	83,9	85,0

For each model, coefficient estimated for the independent variable is shown on the first line and the threshold of significance on the second line, between parentheses. The tests are one-sided.

Independent variable CEOMAJ: CEOMAJ 0-10 % : the variable CEOMAJ = 1 if the CEO of the firm holds at least 10% of the shares, 0 otherwise; . CEOMAJ 0-25 % : the variable CEOMAJ = 1 if the CEO of the firm holds between 11 and 25% of the shares, 0 otherwise; CEOMAJ 0-50 % : the variable CEOMAJ = 1 if the CEO of the firm holds between 26 and 50% of the shares, 0 otherwise; CEOMAJ 0-75 % : la variable CEOMAJ = 1 if the CEO of the firm holds between 51 and 75 % of the shares, 0 otherwise; CEOMAJ 0-100 % : the variable CEOMAJ = 1 if the CEO of the firm holds more than 75 % of the shares, 0 otherwise.

Other variables : See table 7.

Table 8. Synthesis of the results obtained

Hypotheses	Variables	Sign expected	Relation obtained	Univariate test (threshold of significance)	Multivariate test (threshold of signific.)
H1	Size	-	-	N.S.	0,01
H2	Weight of financial costs	+	+	0,05	0,05
H3	CEO chairman of the board	+	+	N.S.	N.S.
H4	Seniority of CEO	+	+	0,05	0,10
H5	CEO important stockholder	+	+	0,01	0,01 (holding only between 11 and 50%)
H6	Important stockholder on the board	-	+	N.S.	N.S.
H6a	Presence of an important stockholder on the board moderates the CEO's influence over the board	-	-	N.A.	N.S.
H6b	Presence of an important stockholder on the board moderates the power of the CEO with important holdings.	-	-	N.A.	0,05

N.A. : not applicable ; N.S. : not significant