R&D spending and subsequent market returns. Does expensing versus capitalizing matter for European firms?

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Abstract

In our study, we investigate the consequences of the accounting choice regarding the treatment of R&D expenditures on subsequent stock returns. We use a sample of listed European firms, where the accounting regulations for R&D allow for the co-existence of two different accounting methods, expensing and/or capitalizing of R&D activities. Our data set consists of the following five countries: Austria, France, Germany, Italy and Spain. We employ firms in industries which engage in scientific innovation activities. Such industries are: Automobiles and Parts, Electronic and Electrical Equipment and finally Pharmaceuticals and Biotechnology.

For our research, the model we use is a Fama and French (1993) three factor asset-pricing type model. In this model we also include an additional R&D factor in order to capture any potential R&D-related effects. Moreover, we utilize two modified versions of the methodology used by Chan et al. (2007), firstly a cross-sectional approach and secondly, a pooled regression version of the model.

Furthermore, with the use of those models we have the following findings. For the firms that use both accounting methods in the same fiscal year, we find no evidence on an association between those activities and subsequent returns. The same finding occurs when we use the firms that expense their expenditures for R&D activities. We do find, though, statistically significant evidence on a negative association between R&D capitalization and subsequent market returns for European firms. This indicates that firms with R&D assets are not valued positively by market participants and, as a result, they have lower returns.

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1. Introduction

Firms, in their effort to be competitive, are forced to adopt strategies in order to increase their market share and their profitability. Investments in Research and Development play a vital role in the elaboration of such strategies. Therefore, Research and Development (R&D) expenditures are among the largest intangible investments of firms which belong to scientific research-intensive industries such as Automobiles, Pharmaceuticals and Electronic-Electrical equipment.

The question of how R&D investments affect firms and their performance is of considerable interest to economists and other researchers. For example, a significant amount of empirical research has been dedicated in the last years in order to assess the value relevance implications of R&D investments and also, the association between R&D investments and firm risk. For that reason, R&D investments have been studied from several different perspectives, by examining for example the association between R&D and subsequent market performance, the association of R&D and future market performance and the association of R&D with capital structure.

Up to now, there have been several relative studies based on UK and US data. However, there have not been many studies for European firms. Mostly, due to the fact, that the analysis is complicated by data availability problems. Unfortunately, the lack of such studies is because European countries are different in several important ways from US and UK countries.

Essentially, analysis is complicated by several specific problems that are closely related to the differences in capital market structure. Firstly, in many European countries public disclosure of annual R&D expenditures was not required according to local accounting standards until mandatory IFRS adoption in 2005. Therefore, Researchers before 2005 faced problems in sample selection because not all the companies report the amount of R&D expenditures in their financial statements. Secondly, in European countries, stock markets are smaller compared to those of the US and the UK and many firms are not publicly traded. Thirdly, there is lower presence of investors and a relatively looser discipline exerted by public stock markets. That leads firms in European countries not to have the pressure for quarterly results. Previous studies have shown, for example, how financial constraints on firms’ R&D and capital
investments are looser in European countries than in the UK and the US (Bond et al., 2003; Hall et al., 1999; Mulkay et al., 2000). These difficulties lead to smaller samples and limited data availability.

The aim of this study is to make an effort to fill this gap using a data set of firms which are publicly traded in European countries and more specific in Austria, France, Germany, Italy and Spain. Essentially, we assess the relation between R&D spending and market returns, depending on firms’ accounting treatments of such investments. Specifically we use a set of listed European firms to examine if there is a link between company’s R&D investments and their stock returns. Furthermore, we study the treatment of R&D, by examining whether the choice to capitalize R&D as opposed to expense has different market valuation implications.

In our study, the fact that the European firms, after IFRS introduction in 2005, can conditionally capitalize development costs creates an important differentiation from other research in US. We use actual data of the firms and not constructed or simulated data, as for example, Healy et al. (2002) and Lev and Sougiannis (1996) do for the US. More specifically, as final sample we use 136 European firms from Austria, France, Germany, Italy and Spain that are publicly traded and follow conclusively the IFRS accounting standards. Moreover, the chosen firms belong to Automobiles, Pharmaceuticals and Electronic-Electrical equipment industries, which are R&D intensive industries, due to the very nature of the activities in these sectors. Also, for this set of firms, we have information about the accounting choice they follow; if they expense R&D, capitalize R&D or they follow both methods simultaneously. So, for years 2005, 2006, 2007 we explore if there is a relation between R&D investments and firm market returns. In particular, we firstly examine the firms that report both R&D expenses and development cost capitalization in the same fiscal year. Secondly, we examine the firms that conditionally capitalize development costs. Finally, we examine the firms that report R&D expenses in their income statement.

In order to do so, we use two modified versions of the methodology used by Chan et al. (2007), firstly a cross-section OLS regression approach and secondly, a pooled cross-section OLS version of the model. In our analysis we use the Ordinary Least Squares (OLS) as the estimation method, in contrast to the GMM approach that Chan et al (2007) used. And we conclude that European firms which capitalize their R&D costs
seems to have lower returns while there is no evidence of any impact for the European firms in our sample that expense their R&D costs.

The rest of our study is organized as follows. Chapter 2 presents the different accounting treatments for R&D expenditure. Chapter 3 reviews the prior research on R&D and subsequent market performance in US and United Kingdom and also prior research based on firms in European countries. Chapter 4 includes the methodology we are going to use for our study, such as the research questions and the research design. Chapter 5 presents the data and reports the statistical tests with their results. Finally, chapter 6 summarizes the study findings and we provide a conclusion.

2. Different accounting treatments for R&D expenditure

From fiscal years beginning on or after the 1st of January 2005, all European firms, that are publicly traded, are obliged to prepare their annual reports based on International Financial Reporting Standards (or IFRS/IAS). In anticipation of this regulation and given the potential impact of the adoption, there has been a strong debate among the participants in the capital market and regulators on the quality of the IFRS (Ball, 2006). These discussions essentially focus on several specific standards. One of these standards is the International Accounting Standard (IAS) 38 which regulates the reporting of intangible assets, and as part of its prescriptions, the reporting for Research and Development (R&D) expenditures.

Specifically, IAS 38, while it mandates the expensing of research expenditures, it moreover requires the capitalization of development costs, if certain conditions are met. So, the basic issue in the debate on reporting R&D is if the managers must have the ability or discretion to capitalize R&D expenditures, or not. The supporters of capitalization believe and argue that it allows managers to signal private information

IAS 38 (paragraph 57) says that an intangible asset for development expenditure shall be recognized if and only if an entity can demonstrate all of the following a) the technical feasibility of completing the intangible asset so that, it will be available for use or sale; b) the intension to complete the intangible asset and use or sell it; c) its ability to use or sell the intangible asset; d)how the intangible asset will generate probable future economic benefits; e)the availability of adequate technical, financial and other recourses to complete the development and to use or sell the intangible asset.
about future performance of the firm, independently from the choice to capitalize or expense R&D expenditures. On the other side, the opponents of R&D capitalization believe that it generates opportunities for managers to manipulate earnings. That can be achieved by accelerating or delaying impairments of R&D expenditures of projects with a low probability of success (Healy et al., 2002).

Generally, based on the accounting treatment of R&D, there are two accounting options for European firms which invest in R&D. The first option is to treat the whole R&D amount as an expense. This means that the R&D expenses are presented in the income statement. The second option is to recognize development costs as intangible assets, if certain criteria are met, and again treat all research costs as expenses. In this way, capitalized development costs are presented on the balance sheet and they are amortized year by year. In contrast to European firms, for firms in the USA (according to SFAS 2) it is mandatory to present R&D expenses in the Income Statement, treating them as expenses.

Furthermore, in UK, even before IAS introduction in 2005, local accounting standards prescribed the mandatory expensing of the research cost while there was the permission to capitalize the development costs, if certain conditions are met. Up to now, despite this opportunity, the majority of UK firms are in favor of expensing instead of capitalizing the whole cost of R&D (Al-Horani et al., 2003).

3. Literature Review

A great number of studies have been made the previous years in finance and accounting field which indicate that firms view R&D costs as investments that are expected to return future benefits. Below, we present a literature review that refers to studies which examine the association between R&D and subsequent market returns in US and UK. Furthermore, we present prior studies which examine the relation between R&D and the book to market effect. And finally, we refer to prior studies that examine the R&D investments in European countries.
3.1. Subsequent market performance and R&D

A certain number of studies, which use different methodologies, indicate that the market values of the firm are related positively to R&D investments. Most of them referred to the USA and to the UK. Specifically, we mention studies of Ben-Zion (1978), who focused on the nature of Research and Development and the advertising expenditures. Ben-Zion created a model to test the relationship between market value, R&D and profitability and he concluded to a significant positive relationship. Also, Hirschey (1982), Hirschey and Weygandt (1985), Cockburn and Griliches (1988), Bublitz and Ettredge (1989), Hall (1993) and finally Chauvin and Hirschey (1993), by using different models found evidence of positive relation between R&D and subsequent market performance. In particular, Bublitz and Ettredge (1989) ended up to the conclusion that fluctuations in market values are positively related not only to innovations in R&D expenditures but also to the announcements which are related to R&D activity.

Furthermore, Sougiannis (1994) found that the long-run impact of R&D on market value consists of two effects: one indirect and one direct. The indirect effect is the capitalized value of realized R&D benefits reflected in earnings and expected to persist in the future. The direct effect relates to new R&D information conveyed directly by R&D variables. On average, the indirect effect is much greater than the direct, indicating the importance of earnings and implying that R&D variables are valued conditionally on earnings.

Additionally, Lev and Sougiannis (1996) found that R&D expenditures are positively related to a firm’s future returns. Specifically, they examined the value relevance of imputed R&D capitalization for US firms and found that the stock market treats R&D as an asset. A negative point in their research is that they had to hypothesize the effects of capitalization on R&D expensers. These effects are unobservable because R&D capitalization is not allowed in the USA. In the same spirit, Chan et al. (2001) conclude that the firms which report relatively high R&D expenditures earn excess returns after the upcoming three years. Concluding, Eberhart et al. (2004) found consistent evidence that firms experience significantly positive long-term abnormal operating performance which follows their R&D increases. Their findings suggest that R&D increases are
beneficial investments, and that the market is slow to recognize the extent of these benefits.

3.2. Subsequent market performance and R&D in UK

Green et al. (1996) studied the value relevance of recognized intangibles, based on UK firms in 1990s. They generally, supported the claim that recognized intangible assets are valued by the market. Also, Al-Horani et al. (2003) found evidence that the cross-section of the UK expected stock returns is positively related to R&D activity. Essentially, they concluded that the association between returns and R&D activity is significant even after controlling for market value of equity and book to market ratio. Additionally, the cross-sectional results are consistent with intangible assets resulting from Research and Development activities having higher risk than tangible assets.

3.3. R&D and the book to market effect

Several studies examined the R&D in relation to book to market ratio. Fama and French (1993, 1992) combined two easily measured variables, size and book to market equity, to capture the cross-sectional variation in average stock returns. They created a three factor model, including beta, firm size and the book to market ratio. Several researchers, such as Barth and Kasznik (1999), Lev and Sougiannis (1996) based on that three factor model by Fama and French, conducted studies including R&D as an additional factor. In this way they achieved to draw conclusion about R&D explanatory power.

In particular, Barth and Kasznik (1999) found that a higher value of book to market ratio indicates the existence of lower intangibles for a firm. This happens because many of the intangible assets even though they are reflected in the market value of equity, they are not recognized as accounting assets on the balance sheet. Additionally, a higher book to market ratio indicates lower growth and therefore the ratio is a variable competitor to intangibles.

Lev and Sougiannis (1996) documented a significant association between firms' R&D capital and subsequent stock returns, suggesting either a systematic mispricing of the shares for R&D intensive companies or a compensation for an extra-market risk
factor associated with R&D. Additionally, Lev and Sougiannis (1999) firstly presented that companies with low book to market ratio have a large R&D capital, while those with high book to market ratio have low R&D investment. Therefore, they concluded that the ratio of R&D capital to market value is closely associated with the book to market ratio. They used a Fama-French regression model of stock returns on lagged fundamentals to show that the R&D capital to market variable subsumes the role of the book to market ratio.

Finally, Al-Horani et al. (2003) found evidence that support allowing for Research and Development activity in constructing factor models of returns because this can be proved important. The explanatory power of factor models generally improves after controlling for R&D activity, particularly for portfolios of firms with no R&D activity. This result can be explained partially by the three factors in the Fama and French model capturing effects associated with Research and Development activity. The inclusion of the R&D factor effectively cancels out some of these effects. Overall, theirs results suggest that Research and Development is a relevant factor in modeling returns.

### 3.4. R&D in European countries

However, all the above studies are based on US and UK data and there have been only a few investigations for the continental countries in the European Union. The main reason for that is the fact that the analysis is complicated by data availability problems. Some of the studies that are referred to European countries are mentioned below.

Hall and Oriani (2005), studied the firms which are publicly traded in France, Germany, and Italy. They found that the relative value of R&D in France and Germany is remarkably similar to each other and to that in the US or the UK during the same period. In contrast, they found that R&D in publicly traded Italian firms is not valued by financial markets on average. However, they found that both French and Italian firms have high R&D valuations when no single shareholder holds more than one third of the firm, but on the other hand R&D is not valued at all in the remaining firms.

Furthermore, Cazavan-Jeny et al. (2007), based on the R&D accounting in France, found that firms which capitalize R&D expenditures spend less on R&D, have more volatile R&D efforts, are smaller and are poorer performers than firms that expense R&D expenditures. They also found that firms capitalize R&D outlays when they need
to meet or beat thresholds. Finally, they presented that the decision to capitalize R&D is generally associated with a negative or neutral impact on future performance even after controlling for self-selection. Also, Cazavan-Jeny and Jeanjean (2006) found that the capitalized R&D is negatively associated with stock prices and returns. The negative coefficient on capitalized R&D implies that investors are concerned and react negatively to capitalization of R&D. They also found that the firms which choose to capitalize (successful) R&D are smaller, highly leveraged, less profitable and have less growth opportunities. Taking into account these characteristics, they confirmed that capitalized R&D is not associated with higher prices and is related to lower returns.

Pozza et al. (2008) using a sample of all listed Italian firms, showed that companies tend to capitalize costs for earnings smoothing purposes and for reducing the risk of violating debt covenants, indicating that earnings management plays a significant role in the relation of R&D cost capitalization.

Finally, Parcharidis and Varsakelis (2007), using a sample of all Greek listed firms, found that the R&D investments have a negative influence on profitability for the year of the investment but they have a strong positive relation after two years.

Concluding, the papers which are most conceptually close to our study are Chan et al. (2007) and Al-Horani et al. (2003). Chan et al. (2007) explore the relation between R&D intensity and future market returns. Moreover, they answer the question if expensing versus capitalization matters. Specifically, their studies employ a large sample of Australian firms because of the Australian GAAP which permits firms to capitalize or expense their R&D expenditure. They examine separately the market impact of the R&D intensity of all active firms, capitalizers and expensers. They found that firms with higher R&D intensity perform better, regardless of the accounting method used. Also, they found evidence that firms which expense R&D outperform those which capitalize R&D, after controlling for R&D intensity. Al-Horani et al. (2003), as we previously stated, found that in the UK the expected stock returns are positively related to R&D activity. Essentially, they concluded that the explanatory power of the three factors Fama and French model, improves if we include an R&D factor.
4. Methodology

4.1. Research Questions

The European Commission directives, after adopting a regulation proposed by an accounting regulatory committee in order to identify the IASs for the European’s needs, were that all publicly traded companies that are governed by the law of a member state have to follow IFRS in their consolidated statements\(^2\). So, all the firms that belong to the European Union after January 1, 2005 are obliged to follow these regulations. In the European setting, the management of the firms based on this regulation can either expense or capitalize costs made for Research and Development.

By the resource-based view of a firm, we observe that firms select their resource allocation after estimating the significance of their needs according to it. Therefore, firms invest in activities where they have a significant comparative advantage, in terms of scale, scope or competencies (Barney, 2001, 1995, 1991; Peteraf, 1993; Wernerfelt, 1995, 1984). Using this resource-based view we expect companies that make costs for Research and Development to have higher returns because market evaluates this kind of information and reward them.

Firstly, in this way for our study, we use companies which undertake R&D activities and choose to use both methods of capitalizing and expensing in the same year for these costs. Thus, based on the previous arguments we want to observe which one of those two methods that companies are obliged to follow has the highest association with subsequent returns.

Firms which undertake R&D activities have to choose whether they are going to capitalize them in the balance sheet as intangible assets and specify the time period of the amortization or expense these costs in the income statement. Firms that decide to capitalize them, after the five conditions are met, signal to the market that are more confident about these costs and the market in turn process all these information and convey them to the share prices. Clearly this reasoning depends on the degree of market imperfections which exist. On the other hand we have the firms that expense these costs

at the time they occur which can be seen as an extreme form of the conservatism principle or because the needed five conditions cannot be met. But this action of immediate expensing unconsciously implies that those firms’ costs for R&D activities may have no future measurable benefits (Belkaoui, 1985).

Furthermore, we expect capitalized costs for R&D activities to have a larger and a positive influence compared to expensed costs for R&D activities. This is based on the assumption that capitalized costs could be associated with successful projects which are vehicles for value creation, unless the market considers development cost capitalization as earnings manipulation, whereas expensed R&D could be seen as non-profitable or non-completed R&D projects which are not considered as a vehicle for value creation (Cazavan-Jeny and Jeanjean, 2006).

According to all previous arguments and the resource-based point of view for the companies, we can also inquire whether the companies that choose to capitalize expenses for R&D activities in the balance sheet or expense them in the income statement will have higher returns. As we mentioned before, when a company chooses to capitalize its expenditure for R&D and displays it in its financial statements wants to signal good news. By capitalizing these costs a firm signals that it has moved on into the development phase, and therefore can prove with reasonable certainty that it will have positive economic results due to R&D.

On the other hand, we also examine the impact of choosing to expense R&D expenditures to subsequent returns. Companies expense costs from R&D activities because of not having another option and this usually happens for two reasons, either when the conditions for capitalizing them are not met or when they concern research costs which are always expensed. According to literature expensed R&D costs have a positive impact on subsequent returns. So, we expect in our study to find a positive relation between the expensed costs made for R&D activities and the returns.

4.2. Research Design

For our research we examine the cross-section relation of the returns conditional on the level of the R&D activity. In order to estimate the R&D intensity we use R&D/Total Assets as our proxy which is also used by Oswald and Zarowin (2007). Also, there are two other ways to estimate R&D intensity, once by dividing R&D with Market Value of
Equity as Chan et al. (2007) and Chan, Lakonishok and Sougiannis (2001) propose and the other alternative is by using the ratio of R&D/Sales as we see to Al-Horani et al. (2003). So, for our study we use all the companies that either capitalize or expense or do both in one fiscal year. Furthermore, we use two modified versions of the methodology used by Chan et al. (2007), firstly a cross-section OLS regression approach and secondly, a pooled cross-section OLS version of the model. In our analysis we use the Ordinary Least Squares (OLS) as the estimation method, in contrast to the GMM approach that Chan et al. (2007) used due to lack of observations. In order to correct for heteroskedasticity we use the White's covariance OLS estimator, White (1980).

4.2.i. Cross-Sectional Approach

To test for our first inquiry and see which of the two methods of treating R&D costs affects more the returns, we have a cross-section regression of the form of Eq. 1:

\[ RI_i = \beta_0 + \beta_1 \ln(MVE_i) + \beta_2 \ln(BM_i) + \beta_3(M_i) + \beta_4(R&D_{i}^{CAP}) + \beta_5(R&D_{i}^{EXP}) + \varepsilon_i \]  

(1),

where \( RI_i \) is the cumulative 12-month return, starting six months after the fiscal year end, which also includes dividends of firm \( i \), \( \ln(MVE_i) \) is the logarithm of market value of an equity of firm \( i \) that is a proxy for firm size, \( \ln(BM_i) \) is the logarithm of book to market value of firm \( i \) which is a measure of risk, \( M_i \) is the return of the corresponding market index for the stock of firm \( i \) in order to capture the systematic risk for the company, \( R&D_{i}^{CAP} \) is the yearly capitalization asset of firm \( i \), while \( R&D_{i}^{EXP} \) is the yearly expensed costs for R&D of firm \( i \).

According to our inquiry, we expect \( \beta_4 > 0 \) and in Eq. 1. That is, the coefficients on the R&D intensity measure should be positive, thereby indicating higher future returns for a greater R&D intensity from this group of companies.

Similarly, for firms adopting the capitalization method the model is given by Eq. 2 below:

\[ RI_i = \beta_0 + \beta_1 \ln(MVE_i) + \beta_2 \ln(BM_i) + \beta_3(M_i) + \beta_4(R&D_{i}^{CAP}) + \varepsilon_i \]  

(2),
while for firms adopting the expense method the model is given by Eq. 3 below:

$$R_{i} = \beta_{0} + \beta_{1} \ln(MVE_{i}) + \beta_{2} \ln(BM_{i}) + \beta_{3}(M_{i}) + \beta_{4}(R&D_{i}^{\text{EXP}}) + \epsilon_{i}$$ (3),

where $R&D_{i}^{C-\text{A}}$ is the reported capitalized R&D taken from the balance sheet for firms using the capitalization method and $R&D_{i}^{\text{EXP}}$ is the reported R&D expense taken from the income statement for firms using the expense method. According to our study, we expect $\beta_{i} > 0$ in Eq. 2 (Eq. 3). That is, the coefficients on the R&D intensity measure, based on capitalization method (expense method) should be positive.

More specifically, for the Return Index (RI) we take monthly returns and then estimate the cumulative annual return for each individual company. For calculating the annual cumulative returns we took the realized returns for a twelve month period formed in the beginning of July year $t$ until the end of June year $t+1$. Furthermore, for the Market Value of Equity (MVE) we use the 31 December value for each one year. Additionally, we have the Book to Market Value ratio (BM) which is estimated in excel individually for each company by dividing the Book Values at the end of every financial year with their respective Market Values at the last day of December. Also, for developing our model we use the respective Market Index ($M$) for each country instead of using beta due to data availability problems occurred while gathering the data. So, we get monthly values of the Market Index for the five European markets where our research is focused. We calculate the annual cumulative Market Index return in the same way as we did before for the cumulative annual Return Index. In this way, we take a twelve month period starting the first day of July at year $t$ and ending the last day of June at year $t+1$ and we add them to obtain the cumulative annual return.

Finally, for the R&D and the Total Assets we use Worldscope database to get the corresponding values. The companies, as we mentioned before, have the ability to disclose by two ways the costs made for Research and Development. Some of them treat them as expenses disclosing them to the income statement and others treat them as assets and disclose them to the balance sheet. For the firms that expense them or the expensers, we take the values at the end of each fiscal year shown on the account Research and Development expense. On the other hand we have the Research and
Development costs which are capitalized or the \textit{capitalizers}. For these values we use net development costs which are disclosed at the end of the financial year to the balance sheet. Both values either for the expensers or capitalizers are scaled by Total Assets.

\textbf{4.2.ii. Pooled Regression Approach}

In this part of our analysis we augment the cross-section approach by pooling our data set into an unbalanced panel structure with two dimensions, time where $T=3$ and cross-section where $N=136$. Here for testing for the group of companies that use both methods in the same fiscal year, we have a pooled cross-section OLS regression of the form of Eq. 4:

$$
RI_{it} = \beta_0 + \beta_1 \ln(MVE_{it}) + \beta_2 \ln(BM_{it}) + \beta_3 (M_{it}) \\
+ \beta_4 (R&D_{it}^{EXP}) + \beta_5 (R&D_{it}^{CAP}) \\
+ \sum_{j=1}^{L-1} \phi_j Dum_{ij}^{country} + \sum_{k=1}^{k-1} \eta_k Dum_{ik}^{year} + \epsilon_{it} \\
(4),
$$

where $i$ represents each firm (with $i = 1, 2, ..., 136$), $t$ represents each time period (with $t = 1, 2, 3$) and $\beta_0$ is homogeneous over time and across individuals intercept. Here, again we have $RI_{it}$ as the 12-month cumulative stock return of firm $i$ at time $t$, starting six months after the fiscal year end and also including dividends, $\ln(MVE_{it})$ is the logarithm of market value of an equity of firm $i$ at time $t$, $\ln(BM_{it})$ is the logarithm of book to market value of firm $i$ at time $t$, $M_{it}$ is the return of the corresponding market index for the stock of firm $i$ at time $t$ and $\ln(MVE_{it})$ is the yearly reported Research and Development (R&D) expense of firm $i$ at time $t$, while $\ln(MVE_{it})$ is the yearly reported capitalized development asset of firm $i$ at time $t$. In addition, we use Dummy variables to control for Year ($\sum_{k=1}^{k-1} \eta_k Dum_{ik}^{year}$) as well as for Country ($\sum_{j=1}^{L-1} \phi_j Dum_{ij}^{country}$) effects.

As we did previously, in the cross-section analysis, we use the general model of Eq. 4 where companies both capitalize and expense the reported Research and Development
costs, as well as models of Eq. 5-6 where we use companies that capitalize (Eq.5) or expense (Eq.6) in one fiscal year.

\[ RI_{it} = \beta_0 + \beta_1 \ln(MVE_{it}) + \beta_2 \ln(BM_{it}) + \beta_3(M_{it}) + \beta_4(R&D_{it}^{CAP}) + \sum_{j=1}^{k-1} \phi_j Dum_{itj}^\text{country} + \sum_{k=1}^{l-1} \eta_k Dum_{itjk}^\text{year} + \epsilon_{it} \]  

(5),

\[ RI_{it} = \beta_0 + \beta_1 \ln(MVE_{it}) + \beta_2 \ln(BM_{it}) + \beta_3(M_{it}) + \beta_4(R&D_{it}^{EXP}) + \sum_{j=1}^{k-1} \phi_j Dum_{itj}^\text{country} + \sum_{k=1}^{l-1} \eta_k Dum_{itjk}^\text{year} + \epsilon_{it} \]  

(6),

Similarly, we can test for our three inquires based on the estimated values of the coefficients \( \beta_4 \) and \( \beta_5 \) as we did on the previous part.

5. Data Analysis and Discussion

5.1. Data and sample

All the market based data used in this study are collected from Datastream database and all the financial statement data needed to form a Fama and French (1993) three factor asset-pricing type model to capture any potential R&D-related effects are gathered from Worldscope database. The sample comprises of firms from five European countries, which are: Austria, France, Germany, Italy and Spain, all listed in local stock exchanges with available data in the Datastream and Worldscope active files for any of the financial years 2005 to 2007. The choice of the beginning of the sample period is determined by the uniform accounting environment which prevails from January 1, 2005 due to the regulation adopted from the European Union for the mandatory use of IFRS in the financial statements.

Moreover, the entire sample was decreased because we employ firms in sectors which engage in scientific innovation activities due to their need to spend huge amounts
of capital for Research and Development activities. Additionally, this happens because they belong to very competitive industries where there is a growing demand from the consumers for new and developed products. So, the higher R&D intensive sectors are: Automobiles and Parts, Electronic and Electrical Equipment and finally Pharmaceuticals and Biotechnology. The original sample included 2,753 companies, but after adjustments based on the sector each company belongs, there remained 231. The final sample consists of companies that use IFRS from 2005 until 2007 and have all the required data for the Fama and French model such as Return Index, Market Value of Equity, Book to Market Value, Market Index and Research and Development costs either in the form of expenses in the income statement or in the form of a development cost asset in the balance sheet, depending on the accounting treatment used. Thus, according to these requirements the final sample size is reduced more with the companies now amounting up to 136.

Table 1. Description of the relative importance of R&D activities in Europe

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms with no R&amp;D activities</td>
<td>54</td>
<td>50</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>(39.71%)</td>
<td>(36.76%)</td>
<td>(31.62%)</td>
</tr>
<tr>
<td>Firms with R&amp;D activities</td>
<td>82</td>
<td>86</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>(60.29%)</td>
<td>(63.24%)</td>
<td>(68.38%)</td>
</tr>
<tr>
<td>Total number of firms</td>
<td>136</td>
<td>136</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>(100%)</td>
<td>(100%)</td>
<td>(100%)</td>
</tr>
<tr>
<td>Firms which adopt the capitalization method</td>
<td>43</td>
<td>45</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>(31.62%)</td>
<td>(33.09%)</td>
<td>(38.24%)</td>
</tr>
<tr>
<td>Firms which adopt the expense method</td>
<td>84</td>
<td>88</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>(61.76%)</td>
<td>(64.71%)</td>
<td>(65.44%)</td>
</tr>
<tr>
<td>Firms which adopt the capitalization-expense method in the same financial year</td>
<td>45</td>
<td>47</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>(33.09%)</td>
<td>(34.56%)</td>
<td>(35.29%)</td>
</tr>
</tbody>
</table>

Note: In Table 1 our sample is divided by year into five groups in column (a), so we have (1) firms with no R&D activities, (2) firms with R&D activities, (3) firms which have R&D activities and adopt the capitalization method, (4) firms which have R&D activities and adopt the expense method, (5) firms which have R&D activities and adopt the capitalization-expense method and in columns (b), (c) and (d) we have the fiscal years. In parentheses we have the percentage of firms in each grouping.
Table 2 reports selective descriptive statistics of the monthly returns for the sample firms. As we see the average of the reported monthly returns is -0.064 or -6.36% over the sample period. This negative return can be partly explained by the financial crisis that prevails in the markets.

5.2. Estimation and Interpretation

Table 3 report estimates of Eq. 1 using the cross-section OLS regression approach for 2007 fiscal year of firms which use both the capitalization and the expense method for the reported Research and Development costs. Our cross-sectional analysis is reduced only to 2007 fiscal year due to insufficient number of observations for years 2005 and 2006.
Table 3. Cross-Sectional OLS Regression for 2007 fiscal year of firms which use both the Capitalization and Expense method

<table>
<thead>
<tr>
<th>$\beta_i$</th>
<th>ln(MVE)</th>
<th>ln(BM)</th>
<th>$M$</th>
<th>$R&amp;D^{CAP}$</th>
<th>$R&amp;D^{EXP}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7749</td>
<td>-0.034</td>
<td>0.018</td>
<td>1.560</td>
<td>-1.189</td>
<td>0.547</td>
</tr>
<tr>
<td>(0.510)</td>
<td>(-0.819)</td>
<td>(0.167)</td>
<td>(0.441)</td>
<td>(-0.445)</td>
<td>(0.300)</td>
</tr>
</tbody>
</table>

Adjusted $R^2$ = 0.059  
Period: 2007  
Obs. adj = 34

Note: t-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level; adj Number of Observations after adjustments.

It is clear from Table 3 that our small sample (34 observations) of our cross-sectional analysis for fiscal year 2007, leads to a non statistically significant relationship between stock returns and the R&D spending as well as with the other control variables when we have firms which use both the capitalization and expense method. All coefficients are not statistically significant, with a very low adjusted $R^2 = 0.059$. From the estimated model we observe a negative sign for the R&D capitalization coefficient ($\beta_4 < 0$) and a positive one for the R&D expense coefficient ($\beta_5 > 0$). So, we can notice that only the firms using the expense method have a positive value to the coefficient, but due to lack of significance we cannot support any evidence of relationship between stock returns and R&D activity.

Table 4 reports the results of testing for the relation between the firms that choose to capitalize the R&D and the subsequent returns, based on the cross-section OLS regression approach on Eq.2. Here we have firms which use the capitalization method for the 2005, 2006 and 2007 fiscal years. Again, our small sample (14, 18 and 39 observations, respectively) of our cross-sectional analysis leads to a non statistically significant relationship between stock returns and the R&D spending as well as with most of the other control variables. For the fiscal year 2005 we find a significant positive relation between market return and stock return, while there is no statistically significant evidence for the years 2006 and 2007. Furthermore, we find a negative impact of book to market variable to the returns of the stock, for the 2006. According to our inquiry, we expect $\beta_4 > 0$ in Eq. 2. From the estimated models we observe that only
in 2006 there is a positive sign for $R&D^{\text{CAP}}$ while the opposite holds for 2005 and 2007. Thus, there is no significant evidence of relation between stock returns and $R&D^{\text{CAP}}$ activity.

Table 4. Cross-Sectional OLS Regressions for 2005, 2006 and 2007 fiscal years of firms which use the Capitalization method

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_0$</td>
<td>-1.058</td>
<td>0.101</td>
<td>0.997</td>
</tr>
<tr>
<td>ln(MVE)</td>
<td>-0.049</td>
<td>-0.013</td>
<td>-0.036</td>
</tr>
<tr>
<td>ln(BM)</td>
<td>0.055</td>
<td>-0.311**</td>
<td>-0.008</td>
</tr>
<tr>
<td>$M$</td>
<td>9.069**</td>
<td>1.524</td>
<td>2.170</td>
</tr>
<tr>
<td>$R&amp;D^{\text{CAP}}$</td>
<td>-0.447</td>
<td>1.530</td>
<td>-0.535</td>
</tr>
</tbody>
</table>

| Adjusted $R^2$ | 0.279 | 0.165 | 0.048 |
| Obs, adj       | 14    | 18    | 39    |

Note: $t$-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level; " adj Number of Observations after adjustments.

In the next Table 5 we report the results of examining whether the expensing of costs used for R&D activities has an effect on the returns of the firms, based on the cross-section OLS regression approach on Eq.3. Here we have firms which use the expense method for the 2005, 2006 and 2007 fiscal years. In this part of our analysis, we find some mixed evidence for the relationship between stock returns and the R&D spending based on expenses. Despite the fact that our sample remain small (25, 27 and 71 observations, respectively) we observe a significant negative sign for the 2006, while in the fiscal year 2007 we see a positive relation of the R&D expense and the returns. In addition, we find a significant positive relation between market return and stock return for the years 2005 and 2006, while there is a positive but not statistically significant evidence for the year 2007.
Table 5. Cross-Sectional OLS Regressions for 2005, 2006 and 2007 fiscal years of firms which use the Expense method

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_0$</td>
<td>-3.068**</td>
<td>0.230</td>
<td>-0.383</td>
</tr>
<tr>
<td></td>
<td>(-5.553)</td>
<td>(0.642)</td>
<td>(-0.472)</td>
</tr>
<tr>
<td>ln(MVE)</td>
<td>0.003</td>
<td>0.028</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td>(0.907)</td>
<td>(0.283)</td>
</tr>
<tr>
<td>ln(BM)</td>
<td>0.070</td>
<td>-0.202*</td>
<td>-0.024</td>
</tr>
<tr>
<td></td>
<td>(0.912)</td>
<td>(-1.941)</td>
<td>(-0.419)</td>
</tr>
<tr>
<td>$M$</td>
<td>14.663**</td>
<td>3.188***</td>
<td>0.137</td>
</tr>
<tr>
<td></td>
<td>(5.683)</td>
<td>(3.371)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>$R&amp;D^\text{Exp}$</td>
<td>-0.049</td>
<td>-0.980**</td>
<td>1.469***</td>
</tr>
<tr>
<td></td>
<td>(-0.047)</td>
<td>(-2.772)</td>
<td>(2.745)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.069</td>
<td>0.139</td>
<td>0.109</td>
</tr>
<tr>
<td>Obs. adj</td>
<td>25</td>
<td>27</td>
<td>71</td>
</tr>
</tbody>
</table>

Note: t-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level; adj Number of Observations after adjustments.

In the previous part we explore the cross-section relationship of the returns conditional on the level of the R&D activity. Accordingly to Chan et al. (2007), to assess the relation between R&D activities and subsequent returns for the whole time period of our sample, as well as to overcome the issue of the small sample lack of significance problem, we apply a version of pooled cross-section analysis to our research. In order to explore the robustness of the pooled cross-sectional model we use four alternative specifications (All Dummies, Year Dummies, Country Dummies and No Dummies) based on the inclusion of Dummy variables to control for Year ($\sum_{k=1}^{K} \eta_kDum_{ik}$) as well as for Country ($\sum_{j=1}^{L} \phi_jDum_{ij}$) effects.

Table 6 report estimates of Eq.4 using the pooled cross-section OLS regression approach for all fiscal years of firms which use both the capitalization and expense method for the reported Research and Development costs. Our analysis for companies which use both the two methods (Table 6) reduced only to the model without dummies and the one with the inclusion of the year dummy variables due to insufficient number of observations for the rest of the specifications. Based on the results of Table 6 we
found absence of a statistical significant relation between stock returns and R&D activity. We conclude to this result due to the small sample of firms with both capitalization and expense method for the reported Research and Development costs (only 44 firms).

Table 6. Pooled Cross-Sectional OLS Regressions for 2005, 2006 and 2007 fiscal years of firms which use both the Capitalization and Expense method

<table>
<thead>
<tr>
<th>$\beta_0$</th>
<th>ln(MVE)</th>
<th>ln(BM)</th>
<th>M</th>
<th>R&amp;D$^{CAP}$</th>
<th>R&amp;D$^{EXP}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.272</td>
<td>-0.019</td>
<td>-0.100</td>
<td>1.032***</td>
<td>-0.496</td>
<td>0.952</td>
</tr>
<tr>
<td>(0.595)</td>
<td>(-0.646)</td>
<td>(-1.121)</td>
<td>(7.591)</td>
<td>(-1.050)</td>
<td>(0.786)</td>
</tr>
</tbody>
</table>

Adjusted $R^2$: 0.170
Periods: 3
Firms: 44
Obs. adj: 65

<table>
<thead>
<tr>
<th>$\beta_0$</th>
<th>ln(MVE)</th>
<th>ln(BM)</th>
<th>M</th>
<th>R&amp;D$^{CAP}$</th>
<th>R&amp;D$^{EXP}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.459</td>
<td>-0.012</td>
<td>-0.099</td>
<td>1.802</td>
<td>-0.437</td>
<td>0.963</td>
</tr>
<tr>
<td>(0.412)</td>
<td>(-0.412)</td>
<td>(-1.113)</td>
<td>(0.659)</td>
<td>(-0.942)</td>
<td>(0.803)</td>
</tr>
</tbody>
</table>

Adjusted $R^2$: 0.170
Periods: 3
Firms: 44
Obs. adj: 65

Note: t-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level;
*** Significant at the 1% level; adj Number of Observations after adjustments. Part A is without Dummy variables while in part B we include only Year Dummies.

Table 7 report estimates of Eq.5 using the pooled cross-section OLS regression approach for all fiscal years of firms which use the capitalization method for the reported Research and Development costs. In this part, we use four alternative specifications based on the inclusion of the Dummy Variables. We observe a strong significant negative relation between the return and the level of the R&D activity. In all alternative estimations there is a negative robust sign of $\beta_4$ which provides evidence that European firms which capitalize their R&D costs observes lower future returns. This evidence, although contradictious to the results of Chan et al. (2007) are explained by the sample. In our research we use a small sample of European firms constructed from actual data, in contrast with other researchers which used simulated data, for
example, see Healy et al. (2002) and Lev and Sougiannis (1996). One other explanation is that the EU stock markets are substantially smaller than those in the US and UK, and many EU firms are not publicly traded, leading to a sample selection bias. But, on the other hand these results are consistent with the results of Cazavan-Jeny and Jeanjean (2006) where actual data for the study of the French market were used. Thus, in the French market was found a negative impact of R&D capitalization to the stock returns and more general to the value creation. This usually indicates that capitalization of R&D acts as a negative signal to the market participants and may be understood by investors as a sign of earnings manipulation. Finally, our estimates provide a strong and significant positive relation between market return and stock return for all specifications, except the one where we include only Time Dummies.

Table 7. Pooled Cross-Sectional OLS Regressions for 2005, 2006 and 2007 fiscal years of firms which use the Capitalization method

<table>
<thead>
<tr>
<th></th>
<th>All Dummies</th>
<th>Year Dummies</th>
<th>Country Dummies</th>
<th>No Dummies</th>
</tr>
</thead>
<tbody>
<tr>
<td>β0</td>
<td>1.868***</td>
<td>1.007</td>
<td>0.805**</td>
<td>0.585*</td>
</tr>
<tr>
<td></td>
<td>(3.071)</td>
<td>(1.539)</td>
<td>(2.136)</td>
<td>(1.712)</td>
</tr>
<tr>
<td>ln(MVE)</td>
<td>-0.040*</td>
<td>-0.034</td>
<td>-0.039</td>
<td>-0.035</td>
</tr>
<tr>
<td></td>
<td>(-1.656)</td>
<td>(-1.547)</td>
<td>(-1.587)</td>
<td>(-1.563)</td>
</tr>
<tr>
<td>ln(BM)</td>
<td>-0.051</td>
<td>-0.053</td>
<td>-0.047</td>
<td>-0.053</td>
</tr>
<tr>
<td></td>
<td>(-0.850)</td>
<td>(-0.847)</td>
<td>(-0.793)</td>
<td>(-0.888)</td>
</tr>
<tr>
<td>M</td>
<td>4.975***</td>
<td>2.359</td>
<td>1.127***</td>
<td>1.102***</td>
</tr>
<tr>
<td></td>
<td>(3.366)</td>
<td>(1.447)</td>
<td>(7.400)</td>
<td>(7.690)</td>
</tr>
<tr>
<td>R&amp;D_CAP</td>
<td>-0.518*</td>
<td>-0.502*</td>
<td>-0.549*</td>
<td>-0.540*</td>
</tr>
<tr>
<td></td>
<td>(-1.689)</td>
<td>(-1.891)</td>
<td>(-1.789)</td>
<td>(-1.951)</td>
</tr>
<tr>
<td>Year Dummy</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Country Dummy</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.303</td>
<td>0.316</td>
<td>0.294</td>
<td>0.312</td>
</tr>
<tr>
<td>Firms</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Periods</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Obs. ad</td>
<td>71</td>
<td>71</td>
<td>71</td>
<td>71</td>
</tr>
</tbody>
</table>

Note: t-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level; ad Number of Observations after adjustments.

In Table 8 below, we report estimates of Eq.6 using the pooled cross-section OLS regression approach for all fiscal years of firms which use the expense method for the reported Research and Development costs. In this part of our analysis, we use four
alternative specifications based on the inclusion of the Dummy Variables for Year and Country effect. Here, we observe a positive relation between the return and the level of the R&D activity, but there is no statistical significance at any accepted level. In all alternative estimations this lack of result can lead us to observe absence of evidence about the impact of the R&D intensity based on expenses to the stock returns of an EU firm. This result is consistent with prior studies (Lev and Sougiannis, 1996; Zhao, 2002). When we turn our analysis to the influence of the control factors, our estimates provide a strong and significant robust positive relation between market return and stock return for all specifications, except the one where we include only Time Dummies.

| Table 8. Pooled Cross-Sectional OLS Regressions for 2005, 2006 and 2007 fiscal years of firms which use the Expense method |
|----------------------------------|------------------|------------------|------------------|
|                                  | All Dummies      | Year Dummies     | Country Dummies  |
| $\beta_0$                       | 1.550***         | 0.309            | 0.335            |
|                                  | (3.667)          | (0.569)          | (1.055)          |
| $\ln(MVE)$                      | 0.007            | 0.009            | 0.006            |
|                                  | (0.426)          | (0.570)          | (0.363)          |
| $\ln(BM)$                       | -0.029           | -0.040           | -0.026           |
|                                  | (-0.617)         | (-0.874)         | (-0.523)         |
| $M$                              | 5.654***         | 2.247            | 0.988***         |
|                                  | (4.716)          | (1.532)          | (7.053)          |
| $R&D^{Exp}$                     | 0.647            | 0.548            | 0.626            |
|                                  | (1.290)          | (1.131)          | (1.192)          |
| Year Dummy                      | yes              | yes              | no               |
| Country Dummy                   | yes              | no               | yes              |
| Adjusted $R^2$                  | 0.290            | 0.297            | 0.279            |
| Firms                           | 76               | 76               | 76               |
| Period                          | 3                | 3                | 3                |
| Obs. ($^a$)                     | 123              | 123              | 123              |

Note: t-statistics in parentheses. *Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level; $^a$ Number of Observations after adjustments.

In summary, our results based on the cross-section analysis of 136 European firms, over the period 2005-2007, indicate lack of evidence for a relation between returns and R&D expenses and assets. When we use firms that use both the two accounting methods
for R&D costs we found no evidence of a relationship. The same result occurs when we use firms that apply the capitalization method. On the other hand, when we use firms that expense their R&D costs, we have mixed evidence for the impact of R&D costs on stock returns. All these outcomes suggest us to apply the pooled cross-sectional analysis to our data set in order to explore the association between R&D activities and future returns for the whole time period. Based to the pooled estimations we conclude to similar outcomes. First, when we use firms that use both the two accounting methods for R&D costs we found no evidence of any relationship between R&D and returns. The only strong evidence of a relation comes from the analysis where firms that apply the capitalization method are used. Here we found a robust strong evidence of a negative impact of the R&D costs to the returns of the EU firms, lead us to the economic implication that European firms which capitalize their R&D costs observes lower future returns. So, we can make the assumption that market considers development cost capitalization as earnings manipulation and prices it negatively. These results are consistent with prior research made for French firms by Cazavan-Jeny and Jeanjean (2006). Finally, when we apply the pooled regression to the data set of firms that use the expense method of valuation we found absence of any evidence about the impact of the R&D intensity based on expenses to the stock returns of an EU firm. A final conclusion, of the results based on the sample used for our study, is that firms which capitalize their R&D costs seems to have lower returns while there is no evidence of any impact on returns for firms that expense their R&D costs.

6. Conclusion

In our study, we tried to assess the relation between R&D spending and stock returns, depending on firms’ accounting treatments of such investments. We used a sample of listed European firms where the accounting regulations for R&D allow for the co-existence of two different accounting methods for R&D activities, according to IAS 38. In this way, we have the expense method by which the costs for R&D activities are disclosed in the income statement and the capitalization method by which the costs for R&D activities are disclosed as an asset in the balance sheet.

Specifically, the data set of firms we used consists of publicly traded companies in
Austria, France, Germany, Italy and Spain. Additionally, we employed firms which engaged in scientific innovation activities. Such industries are: the Automobile, the Pharmaceutical and the Electronic-Electrical equipment industries, which are highly R&D intensive.

However, our analysis was complicated due to data availability problems. Essentially, in many European countries public disclosure of annual R&D expenditures was not required according to local accounting standards until mandatory IFRS adoption in 2005. Therefore, we faced problems in sample selection because not all the companies report the amount of R&D expenditures in their financial statements. Furthermore, the small size of the stock markets, as compared to the United Kingdom and the United States, restricted the number of publicly traded companies that could be included in the sample.

So, with our models we examined the association between R&D and subsequent stock returns. Specifically, for capitalizers, we examined the relation between R&D as a capitalized development cost asset and subsequent stock returns. Moreover, for expensers, we examined the relation between R&D as an expense and subsequent stock returns. And finally, for those who use both accounting treatments for R&D, we examined the relation between both R&D capitalization and expensing and subsequent stock returns. In order to develop our model and check if the previously mentioned association holds, we used a Fama and French (1993) three factor asset-pricing type model, which not only included proxies for market risk \( (M) \), firm size \( (MVE) \), and risk \( (BM) \), but also we added an R&D factor to capture variation in returns that is associated with R&D activity. Additionally, we utilized two modified versions of the methodology used by Chan et al. (2007), firstly a cross-section OLS regression approach and secondly, a pooled cross-section OLS version of the model.

Summarizing, from our analysis we can observe that making use of either of the two regression approach methods the results are quite similar. There is insufficient evidence for a relation between stock returns and firms which use both accounting treatments for disclosing their R&D expenditures in the same fiscal year. The same result occurs when we use firms that apply the capitalization method. Also, mixed evidence for the impact of R&D costs on stock returns are found when firms expense their R&D costs with the cross-section regression approach. By applying the pooled cross-sectional regression analysis to our data the outcomes were similar. We found absence of evidence of any
relationship between R&D and returns. But, on the other hand, our analysis revealed strong evidence of a negative impact of the R&D costs to the returns of the European firms when those firms apply the capitalization method. And these findings are consistent with the ones of Cazavan-Jeny and Jeanjean (2006) study which was conducted based on French firms.

To conclude, this paper does not provide support for capitalization of R&D costs for European firms which want to have higher subsequent returns. This assumption is in contrast with a large number of previous studies around the world. Previous studies found a positive and a strong relation of R&D capitalization and future stock returns (Healy et al., 2002, Lev and Sougiannis, 1996). But for these studies simulated data were used. In contrast, Cazavan-Jeny and Jeanjean (2006) with the use of actual data, found a negative relation between capitalization of R&D costs and future returns. So, according to our study in Europe the capitalization of development assets is not considered to be good news, suggesting that investors do not value R&D assets positively and may be understood as earnings manipulation.
References


• Books
Appendix

- *Datastream Database, Items Used*

<table>
<thead>
<tr>
<th>Item</th>
<th>Datatype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Index</td>
<td>RI</td>
<td>The Return Index, according to Datastream, shows a theoretical growth in value of a share holding over a specified period, assuming that dividends are re-invested to purchase additional units of an equity at the closing price applicable on the ex-dividend date. For unit trusts, the closing bid price is used.</td>
</tr>
<tr>
<td>Market Value/Market Capitalization</td>
<td>MV</td>
<td>The Market Value of Equity on Datastream is the share price multiplied by the number of ordinary shares in issue. The amount in issue is updated whenever new tranches of stock are issued or after a capital change.</td>
</tr>
<tr>
<td>Associated Datastream Price Index</td>
<td>MI</td>
<td>The Associated Datastream Global Price Index return time series data for the Datastream Global price index associated with a given equity and it is available for all Datastream Global Index markets.</td>
</tr>
</tbody>
</table>

- *Worldscope Database, Items Used*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mnemonic</th>
<th>Worldscope Report Type</th>
<th>Datatype</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Equity</td>
<td>(WC03501)</td>
<td>Annual</td>
<td>Time series</td>
<td>Common Equity represents common shareholders' investment in a company. According to Worldscope, it includes but is not restricted to:</td>
</tr>
</tbody>
</table>
1. Common stock value, 2. Retained earnings, 3. Capital surplus, 4. Capital stock premium and 5. Cumulative gain or loss of foreign currency translation, if included in equity per FASB 52 treatment. Monetary correction-capital (03482) Goodwill written off (03491). For Non-U.S. Corporations preference stock which participates with the common/ordinary shares in the profits of the company. For Non-U.S. Corporations, if shareholders equity section is not delineated then the following additional accounts are included: 1. Appropriated and unappropriated retained earnings, 2. Net income for the year, if not included in retained earnings (majority share of income is only included), 3. Compulsory statutory/legal reserves without specific purpose, 4. Discretionary Reserves if other companies in that country include in their delineated shareholders' equity, 5. Negative Goodwill. It excludes: 1. Common treasury stocks, 2. Accumulated unpaid
preferred dividends, 3. For U.S. Corporations, excess of involuntary liquidating value for outstanding preferred stock over stated value is deducted, 4. Redeemable common stock (treated as preferred)

<table>
<thead>
<tr>
<th>Development Costs-Net</th>
<th>(WC02504)</th>
<th>Annual</th>
<th>Time series</th>
<th>According to Worldscope the values of net development costs represent the net book value of expenses related to the development of new products, for example, research and development expenditure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Development Expense</td>
<td>(WC01201)</td>
<td>Annual</td>
<td>Time series</td>
<td>According to Worldscope Research and Development Expense represents all direct and indirect costs related to the creation and development of new processes, techniques, applications and products with commercial possibilities. These costs can be categorized as: 1. Basic research, 2. Applied research, 3. Development costs of new products. It includes but is not restricted to: 1. Software Expense, 2. Amortization of Software Expense, 3. Design and Development Expense. It excludes: 1. Customer or government sponsored research for oil, gas, coal, drilling and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mining companies, purchase of mineral rights, 2. Engineering Expense, 3. Contributions by government, customers, partnerships or other corporations to the company's research and development expense.</td>
<td></td>
</tr>
</tbody>
</table>