**Capitalization vs Expensing and the Behavior of R&D Expenditures**

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Abstract

We examine the effect of capitalization vs expensing on UK firms’ R&D expenditures. Our investigation is motivated by the UK’s mandatory switch from UK GAAP to IFRS in 2005. Under UK GAAP, firms could elect to expense or capitalize development expenditures, but IFRS mandates capitalization. Thus, “capitalizers” maintained their accounting method, while “switchers” were required to change from expensing to capitalization. We examine the effect of the rule change on the amount of the two groups’ R&D expenditures, and we find that switching firms increased their R&D expenditures more than firms that continued to capitalize. We subject our results to numerous robustness tests, and across all of these tests, our results support the conclusion that the accounting method affects the amount that firms invest in R&D. Our results attest to the real effects of accounting policy on firms’ R&D investments.

**Capitalization vs Expensing and the Behavior of R&D Expenditures**

1. **Introduction**

In this paper, we examine the effect of capitalization vs expensing on the amount of UK firms’ R&D expenditures. We focus on the years immediately before and after the UK switched from UK GAAP to IFRS in 2005. Under UK GAAP, firms had the option to capitalize or expense development expenditures; under IFRS, development expenditures must be capitalized.[[1]](#footnote-1) Thus, firms that had capitalized development expenditures under UK GAAP continued to do so, while firms that had expensed them were required to switch to capitalization. We refer to these two groups as “capitalizers” and “switchers”, respectively. The accounting change, therefore, was a “quasi-experiment”, an exogenous event that affected some firms but not others. Based on this event, we compare the amount of capitalizers’ vs switchers’ R&D expenditures in the years immediately before vs after the UK switched to IFRS in 2005. By comparing how the R&D expenditures of the two groups changed at exactly the same time, we can control for any economy-wide effects or changes in other accounting rules or enforcement common to all firms.

Our research is important, because understanding the real effects of accounting policies is a fundamental issue for both academics and policymakers. While researchers have examined the economic consequences of various accounting policies, there is no reliable evidence on the effects of changes in R&D accounting rules on firms’ R&D investments. The accounting policy issue is especially important for R&D, because of concerns that the accounting method may affect the amount of firms’ R&D investments, and thereby affect innovation and economic growth. Because of its importance, there has been a large debate about accounting for R&D in the U.S. Moreover, R&D accounting is “one of the most pronounced differences between US GAAP and IFRS” (Chen, Gavious and Lev, 2017), and it is important for U.S. regulators to see the effects of R&D capitalization in a major capital market. By providing empirical evidence on this important issue, we answer the call for research by Roychowdhury, Shroff and Verdi (2019).

Researchers have been interested in the effects of capitalization vs expensing of R&D since at least the 1970’s, when the FASB issued SFAS No. 2, requiring U.S. companies to expense R&D expenditures.[[2]](#footnote-2) However, prior work was plagued by inconsistent and inadequate disclosures, often requiring hand collection, leading to small samples and resultant inconclusive results. For example, prior to SFAS 2 Dukes, Dyckman, and Elliott (1980) point out that there was no uniform definition of R&D expenditures that firms used, and Elliott, Richardson, Dyckman and Dukes (1984) point out that capitalizers often reported R&D amortization expense without reporting R&D expenditures, both of which make comparisons across firms difficult. Horowitz and Kolodny’s (1980) sample contained only 43 firms, while Dukes et al. (1980) used a matched sample of only 24 expensers and 23 capitalizers. Exacerbating the bad data and small sample problems were confounding economic events such as the energy crisis and recession around the time of SFAS 2. Because of these problems, this research produced inconsistent and unreliable results. The UK’s switch to IFRS provides an opportunity to reexamine these important questions on a larger sample in an important, major capital market. Because UK GAAP permitted both capitalization and expensing of development costs, the UK setting is not exactly identical to countries such as the U.S., where capitalization is generally not allowed. However, because the switch to IFRS mandated that firms switch methods, our tests provide the first empirical guidance for what the effects of such a mandatory change might be elsewhere. Thus, our results may be generalizable to other countries.

Why might capitalization vs expensing affect firms’ R&D expenditures? As long as a firm’s R&D expenditures are growing, expensing results in greater R&D expense than capitalization, so growing firms that expense their R&D might reduce their R&D expenditures to raise their net income, which may adversely affect innovation in the economy. While investors can estimate what R&D expense would be under capitalization (Lev and Sougiannis, 1996), the presence of contracts based on unadjusted accounting numbers (e.g., compensation) may motivate managers to focus on the actual expense. For example, Dukes et al. (1980) point out that managers of R&D capitalizing firms told the FASB that they would reduce R&D expenditures if SFAS 2 required expensing. Horowitz and Kolodny (1980) also found that firms believe that SFAS 2 might affect R&D expenditures. Consistent with these views, Stein’s (1989) model of managerial myopia assumes that managers pass up profitable investments to raise current earnings, and managers responding to Graham, Harvey, and Rajgopal’s (2005) survey acknowledged that they would forego positive NPV projects to boost net income. While these arguments are not specific to R&D, they imply that expensing may result in lower R&D expenditures than capitalization.

Contrary to this point of view, even if all R&D is expensed, a firm with a promising pipeline might be reluctant to cut development expenditures to raise current earnings. This is clearly the view of U.S. regulators, who do not view expensing as an impediment to investment. In this case, the switch to capitalization would have no effect on R&D expenditures. In the real world, however, many frictions, such as information asymmetry and imperfect alignment of manager’s and long-term shareholders’ incentives, may lead firms to forego some positive NPV projects (Stein, 2003). Thus, whether and how capitalization or expensing affects the amount of firms’ R&D expenditures is an important, unanswered question that we address.

As a first step, we investigate firms’ choices to capitalize vs expense under UK GAAP. Our Logit analysis shows that smaller, younger, more highly leveraged firms, firms that capitalize a greater portion of their development expenditures (as reported for capitalizers, and based on pro-forma disclosures for expensers in the first year of IFRS), and those firms not in steady-state with respect to their R&D programs – i.e., those benefitting most from capitalization’s expense deferral - were most likely to capitalize. By contrast, firms that chose to expense R&D under UK GAAP were larger and may have wanted to signal their financial strength by being willing to expense all of the R&D expenditures. Our analyses suggest that firms’ choice to capitalize or expense R&D depends on how they evaluate the tradeoff between capitalization’s benefit of the expense deferral vs its costs of potential write-offs and the negative signal about financial strength.

Next, we compare the two groups’ R&D expenditures before vs after the switch. Since our Logit analysis showed that capitalizers and expensers had different characteristics, we conduct our analysis on entropy balanced (Hainmueller, 2012) samples of capitalizers and switchers.[[3]](#footnote-3) We provide evidence that the parallel trends assumption is not violated, by showing that both groups had similar pre-treatment R&D expenditure growth. In the switch year, however, we find that switching firms increased their growth rate of R&D expenditures more than firms that continued to capitalize, attesting to the effect of the switch. We also conduct a number of supplemental tests. First, we find that switchers increased their R&D expenditure growth more than firms that continued to expense. Second, some firms were allowed to defer the switch to capitalization; we find that in the period when only the “early” switchers had switched, they increased their R&D expenditures more than “late” switchers. Third, we find that high growth switchers (proxied by the market-to-book ratio in the last year of UK GAAP) increased their R&D expenditures more than low growth switchers, consistent with the greater importance of the expense deferral for higher growth firms. Thus, all of our tests support the conclusion that the accounting method affects the amount that firms invest in R&D.

Finally, to understand why the accounting method matters, based on Roychowdhury et al. (2019), we examine the mechanisms through which capitalization affects R&D expenditures. First, we investigate the “profitability channel” and examine switcher firms’ remuneration reports in their last year of UK GAAP and their first year of IFRS. These reports, which are part of the annual report, provide information on firms’ executive compensation plans. We find no cases where the performance metric(s) used are adjusted for the impact of R&D accounting (expensing under UK GAAP and capitalizing under IFRS). Additionally, we find that a majority of firms use a profitability-based metric (e.g., profit, EPS, profit before tax, EBITDA) in the last year of UK GAAP for the annual bonus and the long-term incentive program. This evidence suggests that switchers under UK GAAP were concerned with firm profitability, *after R&D expense*, which is consistent with the switch to capitalization leading to an increase in R&D expenditures by its impact on profitability. Second, we investigate the “external information channel”. We find that switchers have a reduction in their bid-ask spreads relative to capitalizers, suggesting that switchers’ relative cost of capital declines, due to decline in information asymmetry between switching firms and the capital market. Finally, we investigate the “internal learning channel”, and we find that switchers improve their investment efficiency relative to capitalizers, consistent with switchers learning new information about the R&D investments from the adoption of capitalization. Thus, the effect of capitalization on R&D expenditures appears to work through multiple mechanisms.

We contribute to the accounting literature by addressing an important, unresolved issue that has interested researchers for decades: whether and how R&D accounting rules affect R&D investment. Our results attest to the real effects of accounting policy on firms’ R&D investments, and thus to the importance of accounting methods in this crucial context. We caveat, however, that a limitation of our research design is that a firm’s choice to capitalize vs expense under UK GAAP is endogenous. Since the determinants of this choice are unobservable and might be correlated with how R&D expenditures change after IFRS adoption, our results might be subject to endogeneity bias.

The rest of the paper is organized as follows. Section 2 reviews the literature on the effect of capitalization vs expensing on firms’ R&D expenditures. Section 3 discusses our hypotheses and tests. Section 4 describes our data and sample. Section 5 analyzes firms’ capitalize vs expense decisions under UK GAAP. Section 6 reports our test results. Section 7 investigates the mechanisms through which capitalization affects R&D expenditures. Section 8 concludes.

1. **Literature Review**

Our paper deals with the real effects of accounting rules, with specific emphasis on R&D. There is a large extant literature that examines the impact of accounting changes on managerial actions. A wide breadth of accounting rule changes have been examined. For example, Shroff (2017) examines the impact of forty-nine accounting changes on firm investments, and he finds evidence that complying with some changes in GAAP affects managers’ investment decisions. Additionally, in a comprehensive review of the literature, Roychowdhury et al. (2019) lead to a general conclusion that accounting does have real effects. Our paper contributes to this literature by focusing on accounting for R&D, which is important both because of its relation to innovation and economic growth, and because accounting for R&D is one of the major differences between US GAAP and IFRS.

In the 1970’s and 1980’s, there was much interest among researchers about the effect of capitalization vs expensing on firms’ R&D expenditures and firm valuation, due to the passage on SFAS 2 in 1974, which mandated expensing of virtually all R&D expenditures in the U.S. Dukes et al. (1980) and Horowitz and Kolodny (1980) examine the impact of SFAS 2 on firms’ R&D expenditures. Both studies use small samples (24 and 43 treatment firms, and matched control firms, respectively) Dukes et al. (1980) find no significant effects; in contrast, Horowitz and Kolodny (1980) find a significant decline in the R&D/Sales of the treatment firms relative to the control firms.

Elliott et al. (1984) attempt to reconcile the conflicting results in Dukes et al. (1980) vs Horowitz and Kolodny (1980), by focusing on size and listing differences between the firms in the two studies, and found that economic differences between the two groups might be responsible for the observed effects. For example, capitalizers had lower profitability in the years preceding SFAS 2, which was issued during a recession, so the accounting change may have exacerbated their problems. In the end, they conclude that while there is an association between SFAS 2 and declines in R&D expenditures for capitalizers, evidence of a decline for some capitalizers prior to SFAS 2, and the fact that some firms voluntarily switched to expensing before the mandatory date, suggest that association might not mean causation.

The above studies focused on R&D expenditures. Wasley and Linsmeier (1992) conduct an event study to examine security price effects surrounding SFAS 2, under the maintained hypothesis that if SFAS 2 affected market expectations about firms’ R&D, there should be a cross-sectional association between firms’ stock returns around the announcement of the accounting change and their subsequent declines in R&D expenditures. The importance of such a study is that it can pinpoint the stock market’s reaction to exactly the time it learned about the accounting change, thus mitigating the possibility that other factors drive the results. Finding such an association, they conclude that SFAS 2 did have an impact on firms’ R&D outlays, but only for OTC firms, not listed firms.

Overall, given the small samples and other methodological problems, previous research on the effect of R&D reporting on R&D behavior reached inconsistent and inconclusive results. In recent decades, because all U.S. firms must expense, and thus there is no variation to study that affects outcomes, interest in R&D accounting declined and has switched primarily to the use of cutting R&D expenditures for real earnings management. Baber, Fairfield, and Haggard (1991), Graham et al. (2005), and Gunny (2010) find that R&D is used for real earnings management, to meet benchmarks. Dechow and Sloan (1991) show that executives close to retirement reduce R&D expenditures to increase current earnings. Bushee (1998) finds that using R&D for real earnings management is concentrated among myopic investors. Zhong (2018) shows that increased transparency of R&D activities increases innovative efficiency. Our research differs from these papers, since we examine firms’ response to a change in accounting regulations, rather than their behavior within a given regime.

The UK’s switch to IFRS, requiring the capitalization of development costs, provides the opportunity to revisit the important questions from previous decades, in a major capital market with a larger sample and updated research design (such as better controls, entropy balancing, and parallel trends, discussed below) such that the results may be generalizable.

1. **Hypotheses and Tests**

To examine the effect of the UK’s switch to IFRS on the amount of firms’ R&D expenditures, we estimate the following model:

R&D Growth = 0 + ∑t tSWITCH\*IFRSt + ∑iΦiControli

+ firm fixed effects + year fixed effects +  (1)

R&D Growth is a measure of firm-year R&D expenditure growth (see below for a discussion as to how we measure the dependent variable). IFRSt are a sequence of indicator variables that each equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption); SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). We include the natural logarithm of market value of equity (MVE), TOBIN’s Q (sum of market value of equity and total debt, divided by the sum of book value of equity and total debt), Growth, Leverage, CFO, and cash and cash equivalents (CASHEQ), as control variables to capture factors that have been shown to affect R&D expenditures (Shroff, 2017). Standard errors are clustered by firm.[[4]](#footnote-4)

Our primary coefficients of interest are t,which capture the dynamic analysis. If the pre-treatment coefficients, β-4 through β-1 are zero, this implies that there is no difference in R&D expenditure growth between capitalizers and switchers during the UK GAAP period, providing evidence that the parallel trends assumption is not violated. If any of β0 through  are non-zero, then capitalization vs expensing has an effect on firms’ R&D expenditures, since the change from UK GAAP to IFRS affected capitalizers differently than it affected expensers. Since the switch from UK GAAP to IFRS was known well in advance, we expect that switchers increased their R&D expenditures in the first IFRS year (i.e., β0 > 0), but not necessarily after the new, higher level is reached (i.e., βt = 0, for t = 1, 3). However, firms may not have completely ratcheted up their expenditures immediately, so there may be a delayed increase after the initial IRFS year as well (i.e., βt > 0, for t = 1, 3). Thus, we state our hypothesis in null form.

H1: The accounting method, capitalization vs expensing, has no effect on the amount of firms’ R&D expenditures; i.e., t = 0, t=0, 3.

We test the null against the alternative t ≠ 0.

**4. Data and Sample**

Our sample consists of UK firms, because prior to the adoption of IFRS, UK GAAP permitted, but did not require, the capitalization and subsequent amortization of development expenditures.[[5]](#footnote-5) However, with the adoption of IFRS in 2005, capitalization of development expenditures became mandatory. Specifically, IAS 38 (para. 57) states that an intangible development asset shall be recognized if the firm could demonstrate the following conditions: (a) The technical feasibility of completing the intangible asset so that it will be available for the use or sale; (b) its intention 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 resources to complete the development and to use or sell the intangible asset; and (f) its ability to measure reliably the expenditure attributable to the intangible asset during its development [International Accounting Standard (IAS) 38, 1998]. Since the capitalization criteria are essentially the same under both reporting regimes, a firm that could have capitalized under UK GAAP but chose not to, would be mandated to capitalize under IFRS. Thus, by examining UK firms, we are able to compare the impact of mandatory capitalization on firms that expensed their R&D under UK GAAP with those firms who capitalized their R&D under UK GAAP.[[6]](#footnote-6)

Table 1 shows the formation of our sample. To construct our sample, we first obtain from Thomson Reuters Datastream those firms that disclosed either an R&D asset or R&D expense in any year t = 2001 - 2012.We begin in 2001 since 2005 was the first year of IFRS adoption and we use four years of data under UK GAAP. We finish in 2012 since 2009 is the last year of IFRS adoption in our R&D firms and we require four years of data under IFRS.[[7]](#footnote-7) From this initial download of firm-year observations we examine the notes to the financial statements for all observations with a positive value of R&D asset to ensure that the data relates to R&D and to record the amount of R&D capitalized and amortized in the period (firms with R&D expense but without an R&D asset are assumed to be expensers). This analysis provides us with 6,913 firm-year observations (1,072 firms).

We then remove firms that do not have data in both accounting regimes. Specifically, we remove 1,026 firm-year observations (326 firms) as they never adopted IFRS (i.e., they delisted before adoption of IFRS). We then remove 989 firm-year observations (215 firms) as they do not have any observations under UK GAAP (i.e., they did not exist prior to the adoption of IFRS).

The first step in creating our sample was to utilize the full sample of data over the maximum time-period to ensure we could obtain eight years of data per firm regardless of their IFRS adoption year. At this stage we identified the IFRS adoption year for the remaining firms and then deleted 1,279 firm-year observations outside of the eight-year window.[[8]](#footnote-8) For the remaining firms, we require that they have lagged R&D expenditures. We remove 266 firm-year observations that have missing or zero lagged R&D expenditures; this results in the removal of 3 firms that no longer have data in both regimes.[[9]](#footnote-9) We then remove 439 firm-year observations due to missing accounting and financial data needed to construct our variables (see below); this resulted in the removal of 20 firms that no longer have data in both regimes.

The next step in our sample construction is to identify our two primary sub-groups of firms: (1) those firms that always expensed under UK GAAP and then began to always capitalize under IFRS (‘Switchers’), and (2) those firms that always capitalized under UK GAAP and continued to always capitalize under IFRS (‘Capitalizers’). A number of firms did not fall into either of these two categories: 167 firms never began to capitalize under IFRS (‘Non-Switchers’), while 151 firms had a mixed policy of expensing and capitalizing in a particular regime. For our primary analysis, we deleted both of these groups (in supplemental tests, we include the non-switchers).

The final step in our sample construction is to create a balanced sample of switchers and capitalizers. As discussed below, we estimate a Logit model to determine the characteristics that influence a firm’s choice to capitalize under UK GAAP. Based on the significant factors that influence this decision, we use entropy balancing in our main tests. We balance in the initial year of the sample period and apply the entropy balance weight for the remaining years. To ensure that we are able to appropriately balance, we require switcher and capitalizer firms to exist for four years in each accounting regime. Our balanced sample has 800 firm-year observations (100 firms), of which there are 656 switcher firm-year observations (82 firms) and 144 capitalizer firm-year observations (18 firms).[[10]](#footnote-10)

An important assumption underlying our tests is that capitalization of eligible development expenditures is mandatory under IFRS. Consistent with this, the fact that so many expensers switched is *prima facie* evidence that enforcement was effective, and non-switchers did not simply choose to avoid capitalization. In addition, switchers’ pro-forma (as-if IFRS) capitalized amounts in the last UK GAAP year show that they chose to expense before IFRS. Thus, firms that continued to expense either had only research expenditures, or their development expenditures never met the conditions for capitalization. Since research vs development expenditures are not separately identified, we cannot know the reason for non-capitalization.[[11]](#footnote-11)

Table 2 shows the industry breakdown of both groups. In total there are eleven industries represented. For both switchers and capitalizers, the majority of the firms are concentrated in three industries: healthcare, industrial goods and services, and technology. Specifically, 87% of the switcher firms are in these three industries, whereas 78% of the capitalizer firms are in these three industries.

In order to calculate the impact of the accounting method on R&D expenditures, we need a measure of R&D expenditures or R&D intensity. As there is no agreed upon metric in the literature, we use the following measures:

RD\_Gwth = (RDt – RDt-1)/RDt-1

RD\_TA = (RDt – RDt-1)/TAt-1

RD\_Sales = (RDt – RDt-1)/Salest-1

We choose the measures because we are interested in the change in R&D expenditures in response to the accounting switch. Since a small value of RDt-1 results in an extreme growth rate, we also use two other common deflators, beginning total assets and sales.

Table 3 presents descriptive statistics for switchers and capitalizers during the UK GAAP and IFRS periods. The switchers (firms that expensed R&D under UK GAAP) are larger than firms that capitalized, based on share price, market value, sales, and assets. These differences are important, because they mean that we must control for size in our regressions. The differences in the R&D growth measures during the UK GAAP period are largely insignificant, implying that the two groups had similar R&D behavior. However, switchers had greater R&D growth in the IFRS period, consistent with the accounting change inducing their increased R&D investments. Capitalizers capitalize a greater percentage of the R&D expenditures. This may be due to the different mix of research vs development expenditures, since only the latter may be capitalized. Since our Logit model (below) shows that the firms in the two groups are different, it is not necessarily the case that they have similar R&D expenditures or intensity. Since the dependent variables have outliers, we winsorize the top and bottom 2.5% in all of our empirical analyses.

1. **Firms’ Choices to Capitalize vs Expense R&D Under UK GAAP**

In this section, we address an important issue that underlies our analyses: if capitalization improves net income, why some firms did not capitalize under UK GAAP, when they had the option to do so and could have reaped the benefits before the switch to IFRS. To understand firms’ decision to expense or capitalize R&D before mandatory capitalization, we took four approaches.

First, we spoke with a former senior technical partner from PwC, who pointed out that capitalization was seen as a sign of weakness, deleterious to the market’s perception of a firm’s financial strength: if the balance sheet was strong and earnings were good and stable, there was no need to capitalize. He also pointed out that the decision was influenced by industry membership, either because different types of development expenditures did or did not meet the requirements for capitalization, or because of the market’s negative perception of capitalization if industry peers expensed. He agreed that if a firm chose to expense R&D, it might spend less on R&D to meet earnings targets, and then upon switching to capitalization it would increase its R&D spending, since the extra costs did not hit the income statement. In this view, firms are concerned about the negative signal about financial strength from voluntary capitalization, and mandatory capitalization does not create the negative perception that voluntary capitalization does. So, firms that switched to capitalization under IFRS experienced an increase in spending on R&D.

The PwC partner’s signaling point is consistent with the common arguments in the large theoretical literature on signaling. One particular theoretical paper that is immediately applicable to our study of the expense/capitalization choice and its relation to earnings is Bagnoli and Watts (2005). In Bagnoli and Watts (2005) a firm, which is better informed than the market about its type (high or low type), has to choose between more or less conservative financial reporting policies. The firm cares about the market’s belief about its type. The market forms its beliefs about the firm’s type based on both the firm’s reported earnings and the firm’s accounting choice. Choosing a conservative accounting policy is a costly signal by the firm, because it lowers a firm’s reported earnings. Low type firms who choose conservative accounting are more likely to miss an earnings benchmark, and hence, the cost of choosing a conservative accounting is higher for low type firms than for high type firms. Thus, in equilibrium only firms who believe they are a sufficiently high type choose the conservative accounting policy. In our setting, conservative accounting is expensing, rather than capitalizing, R&D. Similar to Bagnoli and Watts’ model, no firm knows its type for sure (R&D is risky and *ex-post* even firms that believe they are good may have failed projects and report disappointing earnings), but firms that believe they are sufficiently high (low) type *ex-ante* are more likely to choose expensing (capitalization).[[12]](#footnote-12)

Second, we analyzed 71 firms’ comment letters sent to both the Accounting Standards Committee (ASC) in the UK and to the International Accounting Standards Committee (IASC).[[13]](#footnote-13) Most importantly, some firms are clearly concerned about the effect of expensing on profitability, consistent with the arguments cited above, that the mechanism through which R&D accounting affects expenditures is through income. For example, Westland Aircraft Limited commented that “… to do so [expense] may well distort the annual profits, because expenditure of this sort is not incurred evenly.” Bonas Webb Limited commented “…a company’s annual results could be effected by high annual write offs in respect of research and development expenditure giving an uneven trend of profits over a period of time.” Finally, Hawker Siddeley Group Limited commented “The position could well arise that UK companies would be constrained from entering into new major developments because of a write off requirement, which would certainly not be to the country’s advantage.” However, some firms raised concerns about the conditions for capitalization. For example, Royal Dutch/Shell Group suggest conditions should be stringent making capitalization unlikely; Unilever raised concerns about different applications of the standard making comparability difficult. These comments favor expensing. Additionally, Tricentrol International Limited states “…[the definitions of capitalization impose] insoluble problems for firms of auditors”, suggesting a concern about potential costs associated with capitalizing, again favoring expensing. Overall, our inference from these comment letters is that for some firms, the profit motive is dominant, so they prefer capitalization. Other firms are more concerned about the difficulty of capitalization, so they favor expensing.

Third, we examined all UK firms with R&D data from 1990-2004 to determine whether they switched either from capitalizing to expensing, or from expensing to capitalizing. During this time period, we identified 38 (25) firms that switched from capitalizing to expensing (expensing to capitalizing). To determine the link between the switch and profitability, we calculated the percentage change in reported net income in the last two years of their original accounting choice:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Capitalizing to Expensing |  | Expensing to Capitalizing |
| Number of Firms | 38 |  | 25 |
| Median % Change in NI | 2.46% |  | -3.07% |

We observe that the median percentage change in net income for firms switching from capitalizing to expensing is 2.46%. This suggests that these firms were increasing their profitability in the two years prior to changing their accounting policy, and so would be less concerned about the effect of expensing on profitability. In contrast, the median percentage change in net income for firms switching from expensing to capitalizing is -3.07%, suggesting that these firms are experiencing a decrease in their profitability and would therefore be concerned about the effect of expensing on profitability.[[14]](#footnote-14)

Fourth, we estimated a Logit model over the 1991-2004 period to statistically analyze firms’ capitalize vs expense decisions. Our Logit analysis begins with Oswald (2008), focusing on life cycle (size, M/B, age, steady-state), risk (earnings variability, beta) and profitability (positive vs negative earnings). To this model, we add R&D intensity and the percentage of development costs that the firm capitalizes, which directly relate to capitalization’s income benefit:

CAP = 0 + 1EARN\_VAR + 2EARN\_SIGN + 3SIZE + 4M/B

+ 5RD/TA + 6LEV + 7BETA + 8AGE + 9STATE + 10CAP%

+ industry fixed effects + year fixed effects +  (2)

CAP is an indicator variable equal to 1 if the firm capitalized its R&D under UK GAAP, 0 if the firm expensed its R&D under UK GAAP (mixed policy firms are included in the Logit estimation, using their particular method each year); EARN\_VAR is the variance of the firm’s earnings per share deflated by share price at the start of the fiscal year over 1990-2004; EARN\_SIGN is an indicator variable equal to 1 if earnings for the firm (converted to an ‘as-if-expense’ basis) is positive, 0 otherwise; SIZE is the natural logarithm of the firm’s market value of equity; M/B is market value of equity divided by book value of equity (converted to an ‘as-if-expense’ basis); RD/TA is R&D expenditures divided by total assets (converted to an ‘as-if-expense’ basis), a measure of R&D intensity (similar to Oswald (2008)); LEV is the firm’s leverage measured as debt divided by book value of equity (converted to an ‘as-if-expense’ basis)[[15]](#footnote-15); BETA is the firm’s beta; AGE is the firm’s age measured as the number of years between the date of incorporation and fiscal year-end; STATE is an indicator variable equal to 1 if the firm is estimated to be in steady-state with respect to its R&D program, 0 otherwise. Steady-state status is determined based on the absolute value of the difference between the amounts capitalized and amortized in a particular year scaled by the intangible R&D asset (reported for the capitalizers and estimated for the expensers). Firms in the lower half of the distribution by industry of this variable are classified as steady-state (STATE = 1) and firms in the upper half of the distribution by industry are classified as non-steady-state (STATE = 0). To estimate the amounts capitalized and amortized for the expensers, we estimate an R&D asset based on a capitalization percentage of 77% applied to yearly R&D expenditures and an amortization rate of 20%. The capitalization and amortization rates are from Oswald (2008). CAP% is the ratio of capitalized to total R&D expenditures. For expensers (who did not disclose this ratio under UK GAAP), we used the pro-forma capitalization data that they were required to disclose upon the switch to IFRS.[[16]](#footnote-16) All variables in equation (2), unless otherwise noted, are measured at fiscal year-end, and all explanatory variables are measured as the percentile ranking of each firm within its industry-year (Johnston, Leone, Ramnath and Yang, 2012).

The results of estimating equation (2) are shown in Table 4. Consistent with our expectations, firms benefitting most from capitalization’s effect on income - smaller firms, more highly levered firms, younger firms, firms that capitalized more of their development costs, and firms not in steady state with respect to their R&D programs - are more likely to capitalize. Conversely, older, larger firms, and firms with higher R&D intensity choose to expense.

The central messages of our analyses in this section are that firms’ choice to capitalize or expense R&D depends on how they evaluate the tradeoff between capitalization’s benefit of showing higher income vs its costs of possible write-offs (admission of failed projects) and the negative signal about financial strength. We conjecture that as firms switched to mandatory capitalization under IFRS, they increased their R&D expenditures which were previously reduced to mitigate any negative impact on profitability. This is what we now test.

**6. Test Results**

* 1. *Validating our Identification Strategy*

Our Logit analysis showed that there are differences between switchers and capitalizers in the UK GAAP period, potentially invalidating our identification strategy. To address this issue, we use entropy balancing (Hainmueller, 2012). Our approach is to match on the means of matching covariate distributions with a tolerance of 0.015 (Hainmueller and Xu, 2013). We match in the in the initial year before IFRS adoption in our sample, i.e. year t-4, and use the same entropy balance weights in all years. We use size, R&D intensity, leverage, age, steady-state, and capitalization percentage as matching covariates because they are statistically significant determinants of the capitalization choice in our Logit model in Table 4. We perform entropy balance weighting separately for each dependent variable. Table 5 shows descriptive statistics on the matching covariates. For brevity we only report the statistics for matching covariates in the base sample regression with RD\_Gwth as the dependent variable as the results are similar for the other regressions. The mean of the treatment and weighted control sample are now identical, confirming the efficacy of our entropy balancing procedure.

*6.2 Primary Tests*

Table 6 shows the primary regression results. We estimate equation (1) on a balanced panel over the eight years from four years before through three years after IFRS adoption (adoption year is year 0).[[17]](#footnote-17) Due to the outliers noted in Table 3, in this and all subsequent regressions, we winsorize 2.5% at the tails.[[18]](#footnote-18) For all three R&D metrics, all of the coefficients on SWITCH\*IFRS year are significantly positive, indicating that in the IFRS adoption year, switchers increased their R&D expenditure growth more than capitalizers. Moreover, the coefficients on SWITCH\*IFRS year are reasonable and indicate that the effect is economically important. For example, column 1 shows that the R&D expenditure growth rate for the switchers increased by 28% more than it did for the capitalizers. Columns 2 and 3 show that relative to total assets and sales, R&D expenditures increased by about 3%.[[19]](#footnote-19) In summary, our results support the hypothesis that the switch to capitalization resulted in an increase in R&D expenditure growth. Thus, the change to mandatory capitalization affected R&D investments.

In addition to the switch year effect, the results in Table 6 also address a number of important issues. First, for all three R&D metrics, all of the coefficients on SWITCH\*IFRS yeart in the pre-IFRS period (t= -3, -1) are indistinguishable from zero, indicating that the pre-treatment R&D growth of the two groups, capitalizers and switchers, are similar, providing evidence that the parallel trends assumption is not violated.[[20]](#footnote-20) The pre-IFRS results also indicate that switchers did not reduce their R&D expenditures in anticipation of the switch; i.e., the switch year increase was a real increase, not simply a postponement. Finally, all coefficients in the post switch years are also insignificant, indicating that the initial growth rate increase was not followed by further growth rate increases. The results for the pre and post switch periods are like “placebo” (falsification) tests ([Bertrand, Duflo, and Mullainathan, 2004)](#_ENREF_9), since we do not expect to find significant results if our hypothesis is correct that the switch to capitalization caused the increase in R&D expenditures. Overall, these results increase our confidence in our interpretation of our primary results: switching firms increased their R&D expenditures more than capitalizers due to the mandatory accounting change.[[21]](#footnote-21)

*6.3 Robustness Tests*

In our primary tests, we excluded firms that continued to expense R&D even under IFRS, because we could not identify whether these firms only had research expenditures and/or development expenditures that did not satisfy the capitalization criteria. For our first robustness test, we run equation (1) comparing these non-switchers to the switchers. Note that both of these groups started out with the same R&D policy, as expensers under UK GAAP, and then diverged under IFRS. Although we cannot be sure whether the non-switching firms had only research expenditures or had development expenditures that did not meet the capitalization conditions, if the R&D accounting method has the effects we have posited, the reason may not matter; what matters is the method, per se. That is, the coefficient on SWITCH\*IFRS year should be positive, if firms that switched increased their R&D investments in the IFRS period, compared with firms that continued to expense.

The results are shown in Table 7. Similar to Table 6, for all three R&D metrics, the coefficient of SWITCH\*IFRSyear is significantly positive, indicating that in the IFRS adoption year, switchers increased their R&D expenditure growth more than firms that continued to expense.

Earlier we pointed out that while LSE firms were required to adopt IFRS in 2005/2006, AIM firms were required to adopt IFRS in 2007/2008; i.e., firms were staggered in their switch years. In particular, by the end of 2006 only the early switchers had switched; the late switchers were still expensers. Using staggered adoption dates (Bertrand and Mullainathan, 2003; Christensen et al. 2017, Shroff 2020) is a common identification strategy. If capitalization motivates firms to increase their R&D expenditures, then early switchers should have greater R&D growth than late switchers in 2005/2006. Thus, for our second robustness test, we estimate the following model on switchers only, using 2005 and 2006 data, with an indicator variable POST that equals 1 if the firm has switched to IFRS, 0 otherwise:

R&D Growth = 0 + 1POST+ ∑iΦiControli + firm fixed effects

+ year fixed effects +  (3)

The results from estimating equation (3) are shown in Table 8. The coefficient on POST is positive and significant for all three R&D metrics, indicating that during 2005/2006 early switchers increased their R&D expenditure growth more than late switchers.

The early literature on the effects of capitalization on R&D expenditures emphasized the importance of the expense deferral, especially for higher growth firms. Thus, high growing switchers would be expected to increase their R&D expenditures more than low growing switchers. For our third robustness test, we estimate the following model on switchers only, with an indicator variable HIGH that equals 1 (0) for switcher firms that had above (below) the median M/B ratio in the last year of UK GAAP (we define growth by M/B because to define it by R&D expenditures would be tautological):

R&D Growth = 0 + ∑t tHIGH\*IFRSt + ∑iΦiControli + firm fixed effects

+ year fixed effects +  (4)

If capitalization works through R&D expenditure growth, we expect the coefficient on HIGH\*IFRS year to be significantly positive in the switch year, indicating that high growth switchers increased their R&D expenditures more than low growth switchers. The results are shown in Table 9. All three coefficients on HIGH\*IFRS year are significantly positive, indicating that high growth switchers increased their R&D expenditure growth more than low growth switchers.

Firms may have some discretion in what they classify as R&D expenditures. In particular, switching firms, in order to take advantage of the expense deferral to increase income, may have classified SG&A expenditures (which must be expensed), as R&D. In this case, the increase in R&D expenditures would be due to reclassification, not a real increase in investment. To examine this possibility, we estimated equation (1) with SG&A expenditures as the dependent variable. If reclassification of SG&A as R&D is responsible for the R&D expenditure increase that we have documented, then the coefficient on SWITCH\*IFRS year should be negative, as switchers’ SG&A expenditures should decline relative to capitalizers’. The results are shown in Table 10. None of the coefficients on SWITCH\*IFRS year are significant, indicating that reclassification of SG&A expenditures as R&D is not likely to be driving our main results.

Finally, to explore whether our results are robust to other concurrent economic effects, we estimated equation (1) controlling for the six other accounting changes most affected by the switch from UK GAAP to IFRS (Horton and Serafeim, 2010): accounting for leases, pensions, stock option compensation, deferred taxes, goodwill, and derivatives. We determine whether a firm was affected by any of the six changes by examining its reconciliation between the income statement and balance sheet reported in the last year of UK GAAP and the ‘as-if-IFRS’ restatement of the income statement and balance sheet. We estimate the following regression which includes OTH\_IFRS\_CHGj which are a sequence of indicator variables that equal 1 if a firm reported an impact from the particular accounting change (j = 1,6). These indicator variables are interacted with POST, an indicator variable that equals 1 if the firm has switched to IFRS, 0 otherwise. Note that the IFRS change indicators are not included as intercept dummies, because they are zero before IFRS, by definition.

R&D Growth = 0 + ∑t tSWITCH\*IFRSt + jjOTH\_IFRS\_CHGj\*POST

+ ∑iΦiControli + firm fixed effects + year fixed effects +  

Results are reported in Table 11. The coefficients on OTH\_IFRS\_CHG\*POST are mostly insignificant, implying that these accounting changes did not affect R&D expenditures. Most important, for all three R&D metrics, the coefficients on SWITCH\*IFRS year are significantly positive and similar to the results in Table 6. From this, we conclude that our results are robust to controlling for other IFRS changes.

Finally, to further explore the results in Table 7 (switchers vs non-switchers) we conducted three additional analyses that included the non-switchers (results not tabulated for brevity). First, we included these non-switchers with capitalizers, since both groups should be similar with respect to changes in their R&D expenditures. We find that switchers increased their R&D expenditures significantly more than non-switchers/capitalizers. As an alternative specification, we estimated equation (1) with 2 indicator variables, to distinguish non-switchers vs capitalizers, and non-switchers vs switchers. We find that that switchers increased R&D expenditures significantly more than capitalizers/non-switchers, and no difference in R&D change between non-switchers vs capitalizers. Finally, we combined switchers and non-switchers into one group, vs capitalizers. Since non-switchers should not increase their R&D expenditures, combining them with switchers "pollutes" the switchers, which should weaken our results. As expected, we find no significant difference in R&D growth between capitalizers and the combined non-switchers / switchers. All of these results support our primary analyses.

In summary, both our primary and supplementary tests in Tables 6 – 11 are strongly consistent and show that switchers increased their R&D expenditures more than firms that continued to capitalize. Thus, the accounting method affects firms’ R&D investments. Our results attest to the importance of capitalization vs expensing in determining firms’ R&D expenditures, and thus to the real effects of accounting policies.[[22]](#footnote-22)

1. **The Mechanism - Why the Switch to Capitalization Increased R&D Expenditures**

To understand why the switch to capitalization increased R&D expenditures, we investigated a number of mechanisms discussed by Roychowdhury et al. (2019). First, the use of accounting income in contracts and/or for valuation can lead to moral hazard by motivating managers to achieve financial reporting benchmarks, which could affect investment. For example, since compensation contracts and covenants are based on reported income, firms may spend less under expensing. Similarly, managers may focus on earnings if investors fixate on reported numbers (Stein, 1989), which would also cause them to spend less under expensing. We refer to this as the “profitability channel”. Second, capitalization can reduce adverse selection by reducing information asymmetry between the firm and the market, by disclosing more information (percentage of costs capitalized, amortization life, etc.). This would lower a firm’s cost of capital, resulting in increased investment. We refer to this as the “external information channel”.[[23]](#footnote-23) Finally, a new accounting method may reveal new information to the firm, thereby causing the firm to learn and improve its investment efficiency. We refer to this as the “internal learning channel”.[[24]](#footnote-24)

It is important to point out that these hypothesized mechanisms are consistent with switchers’ motivation to expense under UK GAAP discussed in Section 5. For example, if they expensed to signal financial strength even at the cost of foregone positive NPV investments, mandatory capitalization removed the negative signal of voluntary capitalization, enabling them to increase their R&D expenditures. If they expensed to avoid disclosure of proprietary information, the new information revealed to the market can lower adverse selection costs, again leading to increased R&D expenditures. By investigating these three channels, we follow recent papers such as Biddle, Hillary, and Verdi (2009), Shroff (2017), and Kajuter, Klassman, and Nienhaus (2019) that investigate multiple mechanisms, in an attempt to understand the way(s) that accounting information affects investment.

*7.1 Profitability Channel*

In order for capitalization to affect investment, contracts must focus on reported income, and not adjust out the effects of the accounting change. To provide evidence on this mechanism, we examined all switcher firms’ remuneration reports in the last year of UK GAAP and the first year of IFRS. These reports are contained in the annual report and provide information on firms’ executive compensation plans, usually including a discussion of the specific performance metric(s) used in the annual bonus and long-term incentive plans. Descriptive statistics from this review (untabulated for brevity) indicate that a large majority of firms are using a profit-based metric (e.g., profit, EPS, EBITDA etc.) for both annual bonus compensation and long-term incentive compensation.[[25]](#footnote-25) Most important, *not even one firm* reported adjusting the performance metric used for the impact of accounting for R&D. Additionally, 53% (30%) of the LSE (AIM) listed firms have virtually identical compensation plans in both the last year of UK GAAP and the first year of IFRS, indicating that these firms are not adjusting their compensation plans due to the impact of accounting for R&D (or for the impact of adopting IFRS as a whole); for the remaining firms there is no indication that the compensation plans have been changed due to the accounting for R&D. By documenting that switchers’ compensation contracts do not undo the effects of capitalization, we conclude managers are likely to be concerned about (the impact of expensing R&D on) profitability, consistent with the profitability channel. Recall that high vs low growth results in Table 9 also are consistent with this channel.

*7.2 External Information Channel (Reduction in Adverse Selection)*

To examine whether capitalization reduces information asymmetry (adverse selection) between the firm and the market, we compare the change in switchers’ vs capitalizers’ bid-ask spreads from the year before IFRS adoption (last year of UK GAAP) to the first IFRS year. Bid-ask spreads are a measure of liquidity, and a fundamental result in accounting research is that increased disclosure (information) increases liquidity, and thus reduces bid-ask spreads (Leuz and Verrecchia, 2000; Daske, Hail, Luez and Verdi, 2008; Balakrishnan, Millings, Kelly and Ljungqvist, 2014). Thus, if capitalization caused switchers to have increased liquidity, this should show up in their lower bid-ask spreads, relative to capitalizers.

Since we do not know exactly when the market learned the capitalization information for switchers, we measure bid-ask spreads and related variables over a year starting 3 months after year-end, to be confident that the information is incorporated in the spreads.

In addition to R&D capitalization, we control for the six other accounting changes most affected by the switch from UK GAAP to IFRS (Horton and Serafeim, 2010) that may have also affected the cost of capital (see Section 6.3), and we estimate the following regression model:

∆B-A Spreadi = 0 + 1SWITCH + ∑iΦiControli + jjOTH\_IFRS\_CHGj

+ year fixed effects +  (7)

We control for the change in return volatility, share volume, market value, and price. OTH\_IFRS\_CHGj are as defined in Section 6.3.

Table 12 reports the results of equation (7). The coefficient on SWITCH is significantly negative, indicating that switchers' bid-ask spreads fell relative to capitalizers, when the UK switched to IFRS. Since we control for the other IFRS changes, the relative decline in switchers’ spreads was most likely due to R&D capitalization. The coefficient on SWITCH, which represents the average change in switchers’ bid-ask spreads relative to capitalizers’ (controlling for the other regressors), shows that R&D capitalization was a major factor in the difference between the two groups. Thus, the bid-ask results in Table 12 are consistent with the external information channel.

*7.3 Internal Learning Channel*

Finally, following Badertscher, Shroff and White (2013), we investigate the internal learning channel by comparing the change in investment efficiency around IFRS adoption for capitalizers vs switchers, where investment efficiency is captured by the sensitivity of investment (R&D growth in our case) to sales growth. The model is:

R&D Growth = 0 + ∑t tSWITCH\*IFRSt + 4SWITCH\*POST\*SALES\_GROWTHt

+ 5POST\*SALES\_GROWTHt + 6SWITCH\*SALES\_GROWTHt

+ ∑iΦiControli + firm fixed effects + year fixed effects +  (8)

Our coefficient of interest is 4. If capitalization provides switchers with new information, we expect 4 to be positive, implying an increase in the sensitivity of their R&D investment to sales growth. The results are shown in Table 13. 4 is significantly positive for all three R&D metrics, indicating that switchers’ experienced an increase in investment efficiency relative to capitalizers, consistent with switchers learning about their internal R&D projects from the switch.[[26]](#footnote-26) This suggests that because expensers do not have to disclose information about the nature of their R&D expenditures, amortization, obsolescence, etc., they might not track this important information.[[27]](#footnote-27)

In summary, we find evidence consistent with the switch to capitalization leading to an increase in R&D expenditures through multiple mechanisms: profitability, external information, and internal learning channels.

**8. Conclusion**

We examine the effect of capitalization vs expensing on UK firms’ R&D expenditures. Our investigation is motivated by the UK’s mandatory switch from UK GAAP to IFRS in 2005. Under UK GAAP, firms could elect to expense or capitalize development expenditures, but IFRS mandates capitalization. Thus, “capitalizers” maintained their accounting method, while “switchers” were required to change from expensing to capitalization. Using a difference-in-difference design, we examine the effect of the rule change on the amount of the two groups’ R&D expenditures. Consistent with arguments that expensing’s deleterious effect on income causes firms to reduce their R&D outlays, we find that switching firms increased their R&D expenditures more than firms that continued to capitalize.

We subject our results to numerous robustness tests: including firms that continue to expense their R&D under IFRS, comparing early vs late switchers, high growth vs low growth switchers, examining R&D behavior in the last year before IFRS adoption, and examining the behavior of SG&A expenditures. Across all of these tests, our results support the conclusion that the accounting method affects the amount that firms invest in R&D. Moreover, we also find evidence that capitalization affects R&D expenditures thru multiple mechanisms, specifically through the profitability, external information, and internal learning channels, thereby adding to our understanding of how accounting affects real outcomes.

We contribute to the accounting literature by addressing an important, unresolved issue that has interested researchers for decades. Because of its importance, there has been a large debate about accounting for R&D in the U.S., and it is important for U.S. regulators to see the effects of R&D capitalization in a major capital market. We provide empirical evidence on this key issue. Our results attest to the real effects of accounting policy on firms’ R&D investments, and thus to the importance of accounting methods.

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**Table 1**

**Sample Observationsa**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | #Observations |  | #Firms |
| Initial Sample (2001 - 2012) |  | 6,913 |  | 1,072 |
|  |  |  |  |  |
| Remove: |  |  |  |  |
| UK GAAP Firms Only |  | (1,026) |  | (326) |
| IFRS Firms Only |  | (989) |  | (215) |
| Outside Eight Year Window |  | (1,279) |  | 0 |
| Missing / Zero Lagged R&D Expenditures |  | (266) |  | (3) |
| Missing Accounting / Financial Data |  | (439) |  | (20) |
|  |  |  |  |  |
| Remaining Sample |  | 2,914 |  | 508 |
|  |  |  |  |  |
| Remove: |  |  |  |  |
| Expensers under IFRS |  | (1,032) |  | (167) |
| Mixed R&D Policy |  | (685) |  | (151) |
| Entropy Balancing |  | (397) |  | (90) |
|  |  |  |  |  |
| Balanced sample: |  | 800 |  | 100 |
| Switchersb |  | 656 |  | 82 |
| Capitalizersb |  | 144 |  | 18 |

aThe sample consists of eight firm-year observations per firm of UK firms who disclosed either an R&D asset or R&D expense during the period 2001-2012. To obtain our balanced sample, we remove inappropriate observations and require lagged R&D and other accounting and financial data.

bSwitchers are firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS. Capitalizers are firms that always capitalized R&D under UK GAAP and IFRS.

**Table 2**

**Industry Membershipa**

|  |  |  |  |
| --- | --- | --- | --- |
| **Industry** | **Switchers** |  | **Capitalizers** |
|  |  |  |  |
| Chemicals | 2 |  | 1 |
|  |  |  |  |
| Construction & Materials | 2 |  | 1 |
|  |  |  |  |
| Financial Services | 0 |  | 1 |
|  |  |  |  |
| Food & Beverage | 2 |  | 0 |
|  |  |  |  |
| Healthcare | 9 |  | 3 |
|  |  |  |  |
| Industrial Goods & Services | 31 |  | 8 |
|  |  |  |  |
| Media | 1 |  | 0 |
|  |  |  |  |
| Personal & Household Goods | 2 |  | 1 |
|  |  |  |  |
| Technology | 31 |  | 3 |
|  |  |  |  |
|  |  |  |  |
| Travel & Leisure | 1 |  | 0 |
|  |  |  |  |
| Utilities | 1 |  | 0 |
|  |  |  |  |
| Total Number of Firms | 82 |  | 18 |

aThis table reports the number of firms in each industry for switchers and capitalizers. Industry definitions are based on Thomson Reuters Datastream’s level three sector names (INDM3). See Table 1 for the definition of switchers and capitalizers and the sample construction.

**Table 3**

**Descriptive Statisticsa**

**Panel A: Capitalizers**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **UK GAAP** | | | | |  | **IFRS** | | | | |  | **IFRS – UK GAAP** | | |
| **Variable** |  | **N** |  | **Mean** |  | **Median** |  | **N** |  | **Mean** |  | **Median** |  | **Mean diff** |  | **Median diff** |
| Share Price |  | 72 |  | 4.031 |  | 4.229 |  | 72 |  | 3.550 |  | 3.631 |  | -0.481 |  | -0.598 |
| MVE |  | 72 |  | 3.965 |  | 3.737 |  | 72 |  | 3.774 |  | 3.185 |  | -0.191 |  | -0.551\* |
| Sales |  | 72 |  | 10.509 |  | 10.455 |  | 72 |  | 10.587 |  | 9.928 |  | 0.078 |  | -0.527 |
| Assets |  | 72 |  | 10.751 |  | 10.457 |  | 72 |  | 10.951 |  | 10.567 |  | 0.200 |  | 0.110 |
| Earnings |  | 72 |  | 5.388 |  | 0.568 |  | 72 |  | 25.514 |  | 0.155 |  | 20.126 |  | -0.413 |
| Sales Growth |  | 72 |  | 0.150 |  | 0.076 |  | 72 |  | 0.127 |  | 0.111 |  | -0.024 |  | 0.035 |
| RD\_Gwth |  | 72 |  | 0.278 |  | 0.130 |  | 71 |  | 0.016 |  | -0.004 |  | -0.262\* |  | -0.134\*\* |
| RD\_TA |  | 72 |  | 0.010 |  | 0.003 |  | 72 |  | -0.002 |  | 0.000 |  | -0.012\*\* |  | -0.003\*\*\* |
| RD / Sales |  | 72 |  | 0.118 |  | 0.048 |  | 72 |  | 0.052 |  | 0.033 |  | -0.066\*\* |  | -0.015\* |
| CAP% |  | 72 |  | 0.588 |  | 0.519 |  | 67 |  | 0.670 |  | 0.859 |  | 0.082 |  | 0.340 |

**Panel B: Switchers**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **UK GAAP** | | | | |  | **IFRS** | | | | |  | **IFRS – UK GAAP** | | |
| **Variable** |  | **N** |  | **Mean** |  | **Median** |  | **N** |  | **Mean** |  | **Median** |  | **Mean diff** |  | **Median diff** |
| Share Price |  | 328 |  | 4.473 |  | 4.846 |  | 328 |  | 4.604 |  | 4.853 |  | 0.131 |  | 0.007 |
| MVE |  | 328 |  | 4.351 |  | 4.014 |  | 328 |  | 4.563 |  | 4.160 |  | 0.212 |  | 0.146 |
| Sales |  | 328 |  | 11.073 |  | 10.833 |  | 328 |  | 11.340 |  | 11.017 |  | 0.267 |  | 0.184\* |
| Assets |  | 328 |  | 11.065 |  | 10.936 |  | 328 |  | 11.414 |  | 11.056 |  | 0.348\*\* |  | 0.120\*\* |
| Earnings |  | 328 |  | 8.535 |  | 1.246 |  | 328 |  | 27.977 |  | 3.464 |  | 19.441\*\*\* |  | 2.218\*\*\* |
| Sales Growth |  | 328 |  | 0.098 |  | 0.057 |  | 328 |  | 0.106 |  | 0.095 |  | 0.009 |  | 0.038 |
| RD\_Gwth |  | 328 |  | 0.092 |  | 0.063 |  | 328 |  | 0.176 |  | 0.108 |  | 0.083\*\* |  | 0.045\*\* |
| RD\_TA |  | 328 |  | 0.002 |  | 0.002 |  | 328 |  | 0.011 |  | 0.004 |  | 0.010\*\*\* |  | 0.002\*\* |
| RD / Sales |  | 326 |  | 0.121 |  | 0.052 |  | 328 |  | 0.105 |  | 0.054 |  | 0.015\*\*\* |  | 0.001 |
| CAP% |  | 78 |  | 0.243 |  | 0.106 |  | 325 |  | 0.373 |  | 0.264 |  | 0.130\*\*\* |  | 0.1585\*\*\* |

**Table 3 - Continued**

**Descriptive Statisticsa**

**Panel C: Difference in Mean / Median Between Capitalizers and Switchers**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **UK GAAP** | | |  | **IFRS** | | |
| **Variable** |  | **Mean** |  | **Median** |  | **Mean** |  | **Median** |
| Share Price |  | -0.442\*\* |  | 0.617\*\*\* |  | -1.054\*\*\* |  | -1.222\*\*\* |
| MVE |  | -0.386\*\* |  | -0.278 |  | -0.788\*\*\* |  | -0.975\*\*\* |
| Sales |  | -0.564\*\* |  | -0.378\*\* |  | -0.753\*\*\* |  | -1.090\*\*\* |
| Assets |  | -0.315 |  | -0.479 |  | -0.462\* |  | -0.489\*\* |
| Earnings |  | -3.148 |  | -0.678 |  | -2.463 |  | -3.309\*\*\* |
| Sales Growth |  | 0.053 |  | 0.019 |  | 0.020 |  | 0.016 |
| RD\_Gwth |  | 0.186 |  | 0.0467\* |  | -0.160\*\* |  | -0.112\*\*\* |
| RD\_TA |  | 0.008 |  | 0.001 |  | -0.013\*\*\* |  | -0.004\*\*\* |
| RD / Sales |  | -0.003 |  | -0.004 |  | -0.053\*\*\* |  | -0.021\*\*\* |
| CAP% |  | 0.345\*\*\* |  | 0.413\*\*\* |  | 0.297\*\*\* |  | 0.595\*\*\* |

aThis table reports descriptive statistics for switchers and capitalizers for both the UK GAAP and IFRS time periods. See table 1 for the definition of switchers and capitalizers. Panel C compares the mean and median descriptive statistics between capitalizers and switchers by subtracting the reported value for the switchers (Panel B) from the reported value for the capitalizers (Panel A). The second and fourth (third and fifth) columns in Panel C reports the significance levels for t-tests (Wilcoxon tests) comparing the pooled sample mean (median) for the difference between groups.

Share Price is the natural logarithm of the firm’s share price; MVE is the natural logarithm of the firm’s market value of equity; Sales is the natural logarithm of the firm’s sales; Assets is the natural logarithm of the firm’s total assets; Earnings is net income (loss) in millions of pounds sterling; Sales Growth is the change in sales divided by lagged sales; RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures divided by lagged total assets; R&D / Sales is R&D expenditure divided by sales. CAP% is the ratio of capitalized to total development expenditures. For switchers (who did not disclose this ratio under UK GAAP), we used the pro-forma capitalization data that they were required to disclose upon the switch to IFRS; therefore CAP% is only calculated for one year.

All variables, unless otherwise noted, are measured at fiscal-year end.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 4**

**Determinants of the Decision to Capitalize Development Expendituresa**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Coefficient | t-statistic |
|  |  |  |  |
| EARN\_VAR |  | 0.001 | (0.26) |
|  |  |  |  |
| EARN\_SIGN |  | -0.358 | (-1.21) |
|  |  |  |  |
| SIZE |  | -0.011\* | (-1.93) |
|  |  |  |  |
| M/B |  | -0.008 | (-1.36) |
|  |  |  |  |
| RD/TA |  | -0.020\*\*\* | (-2.62) |
|  |  |  |  |
| LEV |  | 0.028\*\*\* | (4.13) |
|  |  |  |  |
| BETA |  | -0.007 | (-1.06) |
|  |  |  |  |
| AGE |  | -0.023\*\*\* | (-3.07) |
|  |  |  |  |
| STATE |  | -0.822\*\*\* | (-3.72) |
|  |  |  |  |
| CAP% |  | 0.033\*\*\* | (3.02) |
|  |  |  |  |
| Industry FE |  | Included | |
| Year FE |  | Included | |
| Wald chi square |  | 90.94 | |
| Prob > chi2 |  | 0.0000 | |
| Pseudo R-sq |  | 0.17 | |
| Observations |  | 1,589 | |

**Table 4 - Continued**

**Determinants of the Decision to Capitalize Development Expendituresa**

**a**This table reports the coefficient estimates and t-statistics from the following regression:

CAP = 0 + 1EARN\_VAR + 2EARN\_SIGN + 3SIZE + 4M/B + 5RD/TA + 6LEV + 7BETA

+ 8AGE + 9STATE + 10CAP% + industry fixed effects + year fixed effects + .

CAP is an indicator variable equal to 1 if the firm capitalized its R&D under UK GAAP, 0 if the firm expensed its R&D under UK GAAP; EARN\_VAR is the variance of the firm’s earnings per share deflated by share price at the start of the fiscal year over 1990-2004; EARN\_SIGN is an indicator variable equal to 1 if earnings for the firm (converted to an ‘as-if-expense’ basis) is positive, 0 otherwise; SIZE is the natural logarithm of the firm’s market value of equity; M/B is market value of equity divided by book value of equity (converted to an ‘as-if-expense’ basis); RD/TA is R&D expenditures divided by total assets (converted to an ‘as-if-expense’ basis); LEV is the firm’s leverage measured as debt divided by book value of equity (converted to an ‘as-if-expense’ basis); BETA is the firm's beta; AGE is the firm’s age measured as the number of years between the date of incorporation and fiscal year-end; STATE is an indicator variable equal to 1 if the firm is estimated to be in steady-state with respect to its R&D program, 0 otherwise. Steady-state status is determined based on the absolute value of the difference between the amounts capitalized and amortized in a particular year scaled by the intangible R&D asset (reported for the capitalizers and estimated for the expensers). Firms in the lower half of the distribution by industry of this variable are classified as steady-state (STATE = 1) and firms in the upper half of the distribution by industry are classified as non-steady-state (STATE=0). To estimate the amounts capitalized and amortized for the expensers, we estimate an R&D asset based on a capitalization percentage of 77% applied to yearly R&D expenditures and an amortization rate of 20%. The capitalization and amortization rates are from Oswald (2008). CAP% is the ratio of capitalized to total R&D expenditures. For expensers (who did not disclose this ratio under UK GAAP), we used the pro-forma capitalization data that they were required to disclose upon the switch to IFRS. Since we have CAP% for only this year, we assumed the same percentage for all years. All variables, unless otherwise noted, are measured at fiscal-year end, and all explanatory variables are measured as the percentile ranking of each firm within its industry-year.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 5**

**Entropy Balanced Samplesa**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Capitalizers** | | | | **Switchers** | | |
|  | **Mean** |  | |  | **Mean** |  |  |
| **Unbalanced treatment and control groups** | | | | | | | |
| MVE | 4.6330 |  |  | | 3.5380 |  |  |
| RD/TA | 0.0781 |  |  | | 0.1101 |  |  |
| LEV | 0.2551 |  |  | | 0.4054 |  |  |
| AGE | 35.4300 |  |  | | 32.2700 |  |  |
| STATE | 0.4902 |  |  | | 0.2667 |  |  |
| CAP% | 0.2180 |  |  | | 0.5554 |  |  |
|  |  |  |  | |  |  |  |
| **Entropy balanced treatment and control groups** | | | | | | | |
| MVE | 3.5380 |  |  | | 3.5380 |  |  |
| RD/TA | 0.1101 |  |  | | 0.1101 |  |  |
| LEV | 0.4054 |  |  | | 0.4054 |  |  |
| AGE | 32.2700 |  |  | | 32.2700 |  |  |
| STATE | 0.2667 |  |  | | 0.2667 |  |  |
| CAP% | 0.5554 |  |  | | 0.5554 |  |  |

**a**This table presents descriptive statistics on means of the matching covariates of switchers vs capitalizers (base sample for regression with RD\_Gwth as dependent variable) before and after entropy balancing. RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures. See Table 1 for the definition of switchers and capitalizers. See Table 4 for the definition of matching covariates.

**Table 6**

**Primary Regression Resultsa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | RD\_Gwth | RD\_TA | RD\_Sales |
|  |  |  |  |
| SWITCH\*IFRS year – 3 | 0.058 | -0.001 | -0.023 |
|  | (0.46) | (-0.07) | (-0.86) |
| SWITCH\*IFRS year – 2 | 0.116 | 0.013 | 0.014 |
|  | (0.98) | (1.34) | (1.49) |
| SWITCH\*IFRS year – 1 | 0.077 | -0.009 | -0.018 |
|  | (0.58) | (-0.54) | (-0.60) |
| SWITCH\*IFRS year | 0.284\* | 0.031\*\* | 0.027\*\* |
|  | (1.70) | (2.13) | (2.04) |
| SWITCH\*IFRS year + 1 | 0.185 | -0.002 | -0.007 |
|  | (0.90) | (-0.10) | (-0.27) |
| SWITCH\*IFRS year + 2 | 0.201 | 0.008 | 0.015 |
|  | (1.30) | (0.95) | (1.33) |
| SWITCH\*IFRS year + 3 | 0.158 | 0.016 | 0.017 |
|  | (0.90) | (1.44) | (0.83) |
| MVE | 0.173\*\*\* | 0.000 | 0.007 |
|  | (3.93) | (0.18) | (1.16) |
| TOBIN’s Q | -0.009 | 0.000 | 0.000 |
|  | (-0.75) | (0.43) | (0.09) |
| GROWTH | 0.531\* | 0.058\* | 0.044 |
|  | (1.74) | (1.95) | (1.01) |
| LEVERAGE | -1.942\* | -0.220\*\* | -0.112 |
|  | (-1.71) | (-2.14) | (-0.73) |
| CFO | -0.109 | 0.153 | 0.071 |
|  | (-0.11) | (1.27) | (0.45) |
| CASHEQ | -1.607 | -0.047 | 0.009 |
|  | (-1.37) | (-0.55) | (0.09) |
|  |  |  |  |
| Observations | 528 | 528 | 520 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.106 | 0.165 | 0.154 |

**Table 6 - Continued**

**Primary Regression Resultsa**

**a**This table reports the coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + ∑t tSWITCH\*IFRSt + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption).MVE is the natural logarithm of the firm’s market value of equity. TOBINS’s Q is the sum of market value of equity and total debt, divided by the sum of book value of equity and total debt; GROWTH is the change in total assets from period t-1 to t, scaled by lagged total assets; LEVERAGE is debt divided by book value of equity. CFO is cash flow from operations, scaled by average total assets from period t-1 to t; CASHEQ is cash and cash equivalents, scaled by average total assets from period t-1 to t. All variables, unless otherwise noted, are measured at fiscal year-end.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 7**

**Switchers vs Non-Switchersa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | RD\_Gwth | RD\_TA | RD\_Sales |
| SWITCH\*IFRS year - 3 | -0.001 | 0.003 | -0.003 |
|  | (-0.01) | (0.50) | (-0.27) |
| SWITCH\*IFRS year – 2 | 0.060 | 0.003 | 0.004 |
|  | (1.03) | (0.67) | (0.42) |
| SWITCH\*IFRS year – 1 | 0.030 | 0.007 | 0.003 |
|  | (0.52) | (1.09) | (0.18) |
| SWITCH\*IFRS year | 0.119\* | 0.012\*\* | 0.016\* |
|  | (1.88) | (2.06) | (1.66) |
| SWITCH\*IFRS year + 1 | 0.072 | 0.004 | -0.005 |
|  | (1.24) | (0.62) | (-0.39) |
| SWITCH\*IFRS year + 2 | 0.019 | 0.008 | 0.001 |
|  | (0.27) | (1.37) | (0.06) |
| SWITCH\*IFRS year + 3 | 0.113\* | 0.013\*\* | 0.009 |
|  | (1.70) | (2.00) | (0.63) |
| MVE | 0.064\*\*\* | 0.008\*\*\* | 0.023\*\*\* |
|  | (2.80) | (2.71) | (2.62) |
| TOBIN’s Q | -0.005 | 0.001 | 0.001 |
|  | (-1.12) | (1.08) | (0.56) |
| GROWTH | 0.302\*\*\* | 0.022\*\*\* | 0.011 |
|  | (5.22) | (2.71) | (0.44) |
| LEVERAGE | -0.602\*\* | -0.100\*\* | -0.073 |
|  | (-2.48) | (-2.17) | (-0.81) |
| CFO | 0.779\* | 0.182\*\* | 0.144 |
|  | (1.79) | (2.52) | (1.18) |
| CASHEQ | -1.107\*\*\* | -0.134\*\*\* | -0.311\*\* |
|  | (-3.04) | (-2.92) | (-2.47) |
|  |  |  |  |
| Observations | 944 | 984 | 992 |
| Firm\_FE | Included | Included | Included |
| Year\_FE | Included | Included | Included |
| Adj. R-squared | 0.160 | 0.211 | 0.0921 |

**Table 7 - Continued**

**Switchers vs Non-switchersa**

**a**This table reports the coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + ∑t tSWITCH\*IFRSt + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption). See Table 6 for the definition of the control variables.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 8**

**Early vs Late Switchersa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | RD\_Gwth | RD\_TA | RD\_Sales |
| POST | 0.350\*\*\* | 0.017\* | 0.022\* |
|  | (3.11) | (1.65) | (1.83) |
| MVE | -0.105 | 0.001 | 0.018 |
|  | (-0.61) | (0.10) | (0.77) |
| TOBIN’s Q | 0.022\* | 0.001 | 0.002 |
|  | (1.74) | (1.13) | (1.26) |
| GROWTH | 0.361\*\* | 0.022 | 0.015 |
|  | (2.44) | (1.53) | (0.41) |
| LEVERAGE | 0.171 | -0.015 | 0.113 |
|  | (0.26) | (-0.25) | (0.66) |
| CFO | 5.911\*\*\* | 0.326\* | 0.240 |
|  | (3.13) | (1.86) | (0.81) |
| CASHEQ | -3.753\*\* | -0.281 | -0.357 |
|  | (-2.40) | (-1.53) | (-1.59) |
|  |  |  |  |
| Observations | 160 | 160 | 160 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.121 | 0.385 | 0.141 |
|  |  |  |  |

**a**This table reports the coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + POST+ ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. POST is an indicator variable that equals 1 if the firm has switched to IFRS, 0 otherwise. See Table 6 for the definition of the control variables.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively

**Table 9**

**High Growth vs Low Growth Switchersa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | RD\_Gwth | RD\_TA | RD\_Sales |
|  |  |  |  |
| HIGH\*IFRS year - 3 | -0.009 | 0.004 | -0.001 |
|  | (-0.11) | (0.73) | (-0.06) |
| HIGH \*IFRS year – 2 | 0.004 | 0.006 | 0.003 |
|  | (0.06) | (0.87) | (0.43) |
| HIGH \*IFRS year – 1 | -0.046 | -0.004 | -0.009 |
|  | (-0.50) | (-0.39) | (-0.76) |
| HIGH \*IFRS year | 0.193\* | 0.012\* | 0.015\* |
|  | (1.73) | (1.88) | (1.71) |
| HIGH \*IFRS year + 1 | 0.038 | 0.000 | 0.002 |
|  | (0.37) | (0.02) | (0.15) |
| HIGH \*IFRS year + 2 | -0.005 | 0.003 | 0.005 |
|  | (-0.05) | (0.40) | (0.48) |
| HIGH \*IFRS year + 3 | 0.038 | 0.002 | -0.002 |
|  | (0.35) | (0.33) | (-0.15) |
| MVE | 0.021 | 0.001 | 0.002 |
|  | (0.69) | (0.27) | (0.74) |
| TOBIN’s Q | 0.003 | -0.000 | -0.000 |
|  | (0.55) | (-0.77) | (-0.67) |
| GROWTH | 0.578\*\*\* | 0.059\*\*\* | 0.052\*\*\* |
|  | (4.43) | (5.72) | (3.75) |
| LEVERAGE | -2.594\*\*\* | -0.224\*\*\* | -0.197\*\* |
|  | (-3.07) | (-3.00) | (-2.31) |
| CFO | 0.775 | 0.133\*\* | 0.032 |
|  | (1.17) | (2.07) | (0.37) |
| CASHEQ | -1.151\* | -0.062 | -0.063 |
|  | (-1.77) | (-1.24) | (-0.81) |
|  |  |  |  |
| Observations | 640 | 640 | 632 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.0805 | 0.151 | 0.139 |

**Table 9 - Continued**

**High Growth vs Low Growth Switchersa**

aThis table reports the coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + ∑t tHIGH\*IFRSt + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. HIGH is an indicator variable equal to 1 (0) for switching firms that had above (below) the median M/B ratio in the last year of UK GAAP. IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption). See Table 6 for the definition of the control variables.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 10**

**SG&A Expendituresa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | SGA\_Gwth | SGA\_TA | SGA\_Sales |
|  |  |  |  |
| SWITCH\*IFRS year – 3 | 0.066 | -0.000 | 0.034 |
|  | (0.87) | (-0.00) | (0.82) |
| SWITCH\*IFRS year – 2 | 0.031 | -0.002 | -0.037 |
|  | (0.38) | (-0.05) | (-0.55) |
| SWITCH\*IFRS year – 1 | 0.003 | -0.017 | -0.043 |
|  | (0.03) | (-0.42) | (-0.61) |
| SWITCH\*IFRS year | -0.002 | -0.065 | -0.068 |
|  | (-0.02) | (-1.47) | (-0.90) |
| SWITCH\*IFRS year + 1 | 0.055 | -0.026 | -0.018 |
|  | (0.52) | (-0.61) | (-0.27) |
| SWITCH\*IFRS year + 2 | 0.058 | -0.019 | -0.031 |
|  | (0.60) | (-0.45) | (-0.43) |
| SWITCH\*IFRS year + 3 | 0.047 | -0.008 | -0.003 |
|  | (0.49) | (-0.22) | (-0.04) |
| MVE | 0.061 | 0.022 | 0.070\*\* |
|  | (1.31) | (1.54) | (2.49) |
| TOBIN’s Q | -0.001 | -0.001 | -0.002 |
|  | (-0.17) | (-0.25) | (-0.46) |
| GROWTH | 0.313\*\*\* | 0.138\* | 0.035 |
|  | (3.10) | (1.92) | (0.40) |
| LEVERAGE | -2.417\*\*\* | -1.609\*\*\* | -3.192\*\*\* |
|  | (-3.36) | (-3.38) | (-3.49) |
| CFO | -0.115 | 0.481 | -0.022 |
|  | (-0.15) | (1.18) | (-0.03) |
| CASHEQ | -0.914\* | -0.407 | -0.703 |
|  | (-1.75) | (-1.48) | (-1.17) |
|  |  |  |  |
| Observations | 416 | 416 | 416 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.152 | 0.265 | 0.293 |

**Table 10 - Continued**

**SG&A Expendituresa**

aThis table reports the coefficient estimates and t-statistics from the following regression:

SG&A Growth = 0 + ∑t tSWITCH\*IFRSt + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (SG&A Growth) is measured as follows: SGA\_Gwth is the change in SG&A expenditures divided by lagged R&D expenditures; SGA\_TA is the change in SG&A expenditures scaled by lagged total assets; SGA\_Sales is the change in SG&A expenditures divided by lagged sales. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption). See Table 6 for the definition of the control variables.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 11**

**Other IFRS Changesa**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | RD\_Gwth | RD\_TA | RD\_Sales |
| SWITCH\*IFRS year – 3 | 0.096 | 0.002 | -0.021 |
|  | (0.69) | (0.10) | (-0.74) |
| SWITCH\*IFRS year – 2 | 0.177 | 0.017 | 0.017 |
|  | (1.35) | (1.59) | (1.59) |
| SWITCH\*IFRS year – 1 | 0.129 | -0.005 | -0.016 |
|  | (0.80) | (-0.26) | (-0.46) |
| SWITCH\*IFRS year | 0.447\*\* | 0.038\*\* | 0.034\* |
|  | (2.29) | (2.10) | (1.96) |
| SWITCH\*IFRS year + 1 | 0.295 | 0.003 | -0.003 |
|  | (1.40) | (0.17) | (-0.09) |
| SWITCH\*IFRS year + 2 | 0.272\* | 0.011 | 0.018 |
|  | (1.68) | (1.08) | (1.33) |
| SWITCH\*IFRS year + 3 | 0.196 | 0.018 | 0.018 |
|  | (1.23) | (1.64) | (0.90) |
| MVE | 0.224\*\*\* | 0.003 | 0.009\* |
|  | (4.32) | (1.21) | (1.77) |
| TOBIN’s Q | -0.010 | 0.000 | 0.000 |
|  | (-0.86) | (0.42) | (0.11) |
| GROWTH | 0.496 | 0.055\* | 0.041 |
|  | (1.54) | (1.78) | (0.89) |
| LEVERAGE | -2.661\*\* | -0.254\*\* | -0.144 |
|  | (-2.20) | (-2.20) | (-0.88) |
| CFO | -1.609 | 0.082 | 0.004 |
|  | (-1.29) | (0.49) | (0.02) |
| CASHEQ | -1.974 | -0.059 | 0.002 |
|  | (-1.59) | (-0.72) | (0.02) |
| LEASES\*POST | -0.013 | 0.001 | -0.006 |
|  | (-0.20) | (0.19) | (-0.94) |
| PENSIONS\*POST | 0.174\* | 0.008 | 0.007 |
|  | (1.85) | (0.90) | (0.70) |
| TAXATION\*POST | -0.330\*\*\* | -0.013 | -0.011 |
|  | (-3.87) | (-1.47) | (-1.03) |
| SB\_PAYMENTS\*POST | 0.065 | 0.006 | 0.006 |
|  | (0.73) | (0.73) | (0.60) |
| GOODWILL\*POST | 0.070 | 0.001 | -0.002 |
|  | (0.97) | (0.07) | (-0.24) |
| FIN\_INSTRUMENTS\*POST | -0.075 | -0.007 | -0.003 |
|  | (-0.85) | (-0.76) | (-0.40) |
|  |  |  |  |
| Observations | 520 | 520 | 512 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.132 | 0.171 | 0.161 |

**Table 11- Continued**

**Other IFRS Changesa**

**a**This table reports the coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + ∑t tSWITCH\*IFRSt + jjOTH\_IFRS\_CHGj\*POST + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption). OTH\_IFRS\_CHGj are a sequence of indicator variables that equal 1 if a firm reported an impact from switching from UK GAAP to IFRS in its reconciliation of its income statement and balance sheet for the last year of UK GAAP and the ‘as-if-IFRS’ restatement of the income statement and balance sheet. The six accounting changes relate to accounting for leases (LEASES), pensions (PENSIONS), deferred taxes (TAXATION), stock option compensation (SB\_PAYMENTS), goodwill (GOODWILL), and derivatives (FIN\_INSTRUMENTS). POST is an indicator variable that equals 1 if the firm has switched to IFRS, 0 otherwise. See Table 6 for the definition of the control variables.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 12**

**Bid Ask Spreadsa**

|  |  |
| --- | --- |
| VARIABLES | ΔBid\_Ask |
|  |  |
| SWITCH | -0.017\* |
|  | (-1.92) |
| ΔRetVOL | 0.110\*\* |
|  | (2.54) |
| ΔVOL | -3.355 |
|  | (-1.17) |
| ΔMV | -0.000\*\* |
|  | (-2.37) |
| ΔPRC | -2.37 |
|  | (0.000 |
| LEASES | 0.017\*\* |
|  | (2.35) |
| PENSIONS | -0.008 |
|  | (-0.81) |
| SB\_PAYMENTS | 0.012 |
|  | (1.18) |
| TAXATION | 0.015 |
|  | (1.35) |
| GOODWILL | -0.022\*\*\* |
|  | (-2.69) |
| FIN\_INSTRUMENTS | -0.008 |
|  | (-0.81) |
|  |  |
| Observations | 76 |
|  |  |
| Firm FE | No |
| Year FE | Included |
| Adj. R-squared | 0.419 |

**Table 12 – Continued**

**Bid Ask Spreadsa**

**a**This table reports the coefficient estimates and t-statistics from the following regression:

∆B-A Spreadi = 0 + 1SWITCH + ∑iΦiControli + ∑jjOTH\_IFRS\_CHGi

+ year fixed effects + 

The dependent variable (B-A Spreadi) is the change in the bid-ask spread, measured as the average daily bid-ask spread for the year ended three months after the first IFRS fiscal-year end minus the average daily bid-ask spread for the year ended three months after the last UK GAAP fiscal-year end. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). PRC is change in the average daily price; RetVol is the change in the average daily standard deviation of daily returns; Vol is the change in the average daily trading volume scaled by number of shares outstanding; MV is the change in the average daily market value of equity; PRC is the change in the average daily price. RetVol, Vol, PRC, MV are measured over the same period as the dependent variable.OTH\_IFRS\_CHGj are a sequence of indicator variables that equal 1 if a firm reported an impact from switching from UK GAAP to IFRS in its reconciliation of its income statement and balance sheet for the last year of UK GAAP and the ‘as-if-IFRS’ restatement of the income statement and balance sheet. The six accounting changes relate to accounting for leases (LEASES), pensions (PENSIONS), deferred taxes (TAXATION), stock option compensation (SB\_PAYMENTS), goodwill (GOODWILL), and derivatives (FIN\_INSTRUMENTS), research and development (R&D).

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

**Table 13**

**Investment Efficiencya**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| VARIABLES | RD\_Gwth | RD\_TA | RD\_Sales |
|  |  |  |  |
| SWITCH\*IFRS year – 3 | 0.077 | 0.001 | -0.018 |
|  | (0.68) | (0.09) | (-1.15) |
| SWITCH\*IFRS year – 2 | 0.093 | 0.008 | 0.003 |
|  | (0.88) | (1.02) | (0.31) |
| SWITCH\*IFRS year – 1 | 0.084 | -0.009 | -0.014 |
|  | (0.71) | (-0.67) | (-0.76) |
| SWITCH\*IFRS year | 0.263 | 0.027\* | 0.014 |
|  | (1.49) | (1.74) | (0.89) |
| SWITCH\*IFRS year + 1 | 0.168 | -0.005 | -0.018 |
|  | (0.86) | (-0.33) | (-0.70) |
| SWITCH\*IFRS year + 2 | 0.183 | 0.004 | 0.006 |
|  | (1.24) | (0.54) | (0.59) |
| SWITCH\*IFRS year + 3 | 0.135 | 0.011 | 0.006 |
|  | (0.81) | (1.16) | (0.45) |
| SWITCH\*POST\*SALES\_GROWTH | 0.284\* | 0.046\*\*\* | 0.109\*\* |
|  | (1.71) | (3.03) | (2.02) |
| POST\*SALES\_GROWTH | -0.112 | -0.021\*\*\* | -0.031\*\*\* |
|  | (-0.93) | (-3.09) | (-3.16) |
| SWITCH\*SALES\_GROWTH | -0.161\* | -0.024\*\* | -0.068\*\* |
|  | (-1.89) | (-2.07) | (-2.37) |
| MVE | 0.183\*\*\* | 0.002 | 0.009 |
|  | (3.78) | (0.83) | (1.53) |
| TOBIN’s Q | -0.013 | -0.000 | -0.001 |
|  | (-0.94) | (-0.33) | (-0.90) |
| GROWTH | 0.539\* | 0.057\*\* | 0.043 |
|  | (1.80) | (2.10) | (0.97) |
| LEVERAGE | -1.761 | -0.181\*\* | -0.080 |
|  | (-1.64) | (-2.10) | (-0.92) |
| CFO | -0.305 | 0.140 | 0.039 |
|  | (-0.27) | (1.12) | (0.25) |
| CASHEQ | -1.668 | -0.064 | -0.042 |
|  | (-1.42) | (-0.75) | (-0.42) |
|  |  |  |  |
| Observations | 528 | 528 | 520 |
| Firm FE | Included | Included | Included |
| Year FE | Included | Included | Included |
| Adj. R-squared | 0.108 | 0.204 | 0.269 |

**Table 13**

**Investment Efficiencya**

aThis table reportsthe coefficient estimates and t-statistics from the following regression: R&D Growth = 0 + ∑t tSWITCH\*IFRSt + 4SWITCH\*POST\*SALES\_GROWTHt

+ 5POST\*SALES\_GROWTHt + 6SWITCH\*SALES\_GROWTHt + ∑iΦiControli + firm fixed effects + year fixed effects + 

The dependent variable (R&D Growth) is measured as follows: RD\_Gwth is the change in R&D expenditures divided by lagged R&D expenditures; RD\_TA is the change in R&D expenditures scaled by lagged total assets; RD\_Sales is the change in R&D expenditures divided by lagged sales. SWITCH is an indicator variable that equals 1 for switchers (firms that switched from expensing R&D under UK GAAP to capitalizing R&D under IFRS), and 0 for capitalizers (firms that always capitalized under UK GAAP and IFRS). IFRSt are a sequence of indicator variables that equals 1 in the year t relative to IFRS period (2005 and beyond) and 0 otherwise, where t runs from -4 to +3 (i.e., 4 years before through 3 years after IFRS adoption). POST is an indicator variable that equals 1 if the firm has switched to IFRS, 0 otherwise. SALES\_GROWTH is the change in sales divided by lagged sales. See Table 6 for the definition of the control variables. All variables, unless otherwise noted, are measured at fiscal year-end.

Standard errors are clustered by firm.

\*, \*\* and \*\*\* indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

1. EU Regulation No. 1606/2002 required that the consolidated financial statements of European companies whose securities are traded on a regulated market (e.g., the London Stock Exchange) be prepared under IFRS for fiscal years beginning on or after January 1, 2005. The listing requirements of the Alternative Investment Market (AIM), which is not considered a regulated market by the EU, required European firms to adopt IFRS for fiscal years beginning on or after January 1, 2007. One of our AIM listed sample firms (Forbidden Technologies Plc) delayed adopting IFRS until their 2009 fiscal year. For brevity, we refer to the adoption year as 2005. We provide the detailed discussion of our data and sample (Section 4) and empirical tests (Section 6). As discussed below, only development expenditures may be capitalized. We use the term R&D to maintain consistency with the literature, and because both R and D expenditures are aggregated into one line item, so we cannot separately analyze them anyway. [↑](#footnote-ref-1)
2. *Statement of Financial Accounting Standard No. 2: Accounting for Research and Development Costs*, 1974. The one exception is SFAS No. 86, which allows capitalization of software development costs. [↑](#footnote-ref-2)
3. We also used propensity score matching and coarsened exact matching, with similar results (untabulated). [↑](#footnote-ref-3)
4. We have also run all of our tests with industry adjusted variables, and with standard errors clustered by industry, with very similar results. [↑](#footnote-ref-4)
5. Under UK GAAP, SSAP 13 (para. 25) states that development expenditures should be written off in the year of the expenditure, but it does allow for the deferral of these expenditures to future periods if the following conditions are met: (a) There is a clearly defined project; (b) The related expenditure is separately identifiable; (c) The outcome of the project is examined for its technical feasibility and its ultimate commercial viability considered in light of factors such as likely market conditions (including competing products), public opinion, and consumer and environmental legislation; (d) The aggregate of deferred development costs, any further development costs, and related production, selling and administrative costs is reasonably expected to be exceeded by related future sales or other revenues; and (e) Adequate resources exist, or are reasonably expected to be available, to enable the project to be completed and to provide any consequential increases in working capital [Statement of Standard Accounting Practice (SSAP) No. 13, 1989]. Any expenditures on research (pure or applied) must be expensed in the period incurred. In summary, the conditions are intended to ensure that an asset is indeed created by the R&D expenditures (this applies to IAS 38 as well). See section 5 for a discussion of the costs and benefits of capitalization under UK GAAP. [↑](#footnote-ref-5)
6. In both SSAP 13 and IAS 38 research expenditures must be expensed; only development expenditures may be capitalized, resulting in a development asset. We use the term R&D to maintain consistency with the literature. Furthermore, both R and D expenditures are aggregated into one line item, so we cannot separately analyze them anyway. While managers may have some discretion in classifying their expenditures, we do not believe that this biases our test results for many reasons. First, nothing has changed for UK GAAP capitalizers, so any bias story can’t be about them. If switchers exercise discretion to classify expenditures as R, it is difficult to understand why this would cause them to increase expenditures, since R must be expensed. Using discretion to classify expenditures as D allows switchers to take more advantage of the expense deferral, and they can increase their expenditures without suffering an income penalty, which is exactly what we predict. Thus, although we can't know for sure which component increased, it is hard to imagine that switchers increased R right at the time of the switch. [↑](#footnote-ref-6)
7. We choose 4 years on either side of IFRS adoption to ensure we have enough data for precise estimation of coefficients but also to be confident that any effects are due to mandatory capitalization and not to other changes. We also ran our tests on the three year window around IFRS adoption. Results (untabulated) are consistent with those in the paper. [↑](#footnote-ref-7)
8. For example, for a firm that adopted IFRS in 2005, we deleted the 2009-2012 firm-year observations. Similarly, for a firm that adopted IFRS in 2008, we deleted the 2001-2003 and 2012 firm-year observations. [↑](#footnote-ref-8)
9. Koh and Reeb (2015) discuss solutions to the problem of missing R&D observations, when R&D is the independent variable. However, in our paper, R&D is the dependent variable, so we cannot use their methods. [↑](#footnote-ref-9)
10. In supplemental tests, we include the non-switchers; we apply the same sample construction criteria as above to obtain a balanced sample. This results in 736 firm years (92 firms). [↑](#footnote-ref-10)
11. In order to understand why some expensers did not switch, we compared these non-switchers to the switchers by estimating a Logit model with the two groups, and by examining all 167 non-switchers’ R&D footnotes. While the Logit model (results, untabulated for brevity, are available from the authors on request) found some statistically significant differences between the two groups, industry membership was an important determinant of whether a firm switched to capitalization. The importance of industry membership was confirmed by our analysis of the non-switchers’ R&D footnotes, as firms in particular industries (e.g., Healthcare) explicitly mentioned that their development expenditures did not meet the capitalization conditions. [↑](#footnote-ref-11)
12. Another related paper is Miller and Rock (1985). Although their signaling mechanism is dividends, not conservative accounting, in both their paper and ours the need to signal results in lower investment. [↑](#footnote-ref-12)
13. Those sent to the ASC related to the following two exposure drafts: (1) ED 14 – Accounting for Research and Development (1975), and (2) ED 17 – Accounting for Research and Development – Revised (1976). ED 14 proposed immediate expensing, whereas ED 17 proposed mandatory capitalization. Those sent to the IASC related to following two exposure drafts: (1) ED 37 – International Accounting Standards Proposed Statement – Research and Development Activities (1991), and (2) ED 60 – Proposed International Accounting Standard – Intangible Assets (1997). ED 37 also proposed mandatory capitalization. ED 60 was soliciting opinions on three possible options including immediate expensing, the option to capitalize and mandatory capitalization. [↑](#footnote-ref-13)
14. Although their dividend signaling mechanism is different from ours (see footnote 12), this switching evidence is consistent with Miller and Rock (1985), who state: “the best evidence to look for dividend signaling may well be among firms falling into adversity, not because they then start signaling, but because they stop (pg. 1046). [↑](#footnote-ref-14)
15. As-if expense earnings equals reported earnings minus R&D capitalized in the year plus R&D amortized in the year. As-if expense book value of equity (assets) equals reported book value of equity (assets) minus the net R&D asset. [↑](#footnote-ref-15)
16. In the first year of using IFRS, firms were required to report comparative financial statements on an as-if IFRS basis for the prior year (i.e., the last year under UK GAAP). From these disclosures we are able to determine Expensers CAP% for the last year under UK GAAP. Since we have CAP% for only this year, we assumed the same percentage for all years. To validate this assumption, we examined the behavior of CAP%, and found that it varies very little over time for a given firm. Note that since we use expensers’ pro-forma CAP% in (2), the positive coefficient on CAP% is not tautological. [↑](#footnote-ref-16)
17. Note that year -4 is dropped because of collinearity, and that the number of observations differs slightly per regression, due to the differing data requirements. [↑](#footnote-ref-17)
18. We have also estimated our tests in Table 6 winsorizing at (1.5%, 2.5%) at the bottom and top, respectively. Due to large outliers at the top of the distribution, when we winsorize at less than 2.5% at the top, the SWITCH\*IFRS year coefficient is not always significant for all three R&D metrics. [↑](#footnote-ref-18)
19. Horowitz and Kolodny (1980) document that firms that were capitalizing prior to SFAS 2, have approximately a 1.5% decrease in their R&D/Sales, whereas firms that were expensing have approximately a 1% increase in R&D/Sales. This difference of approximately 2.5% is consistent in both magnitude and direction with our coefficient estimates of 3%. [↑](#footnote-ref-19)
20. As per Christensen, Hail and Leuz (2017), we also estimated a trend regression with both linear and quadratic terms over the 1991-2004 and 1998-2004 periods for each dependent variable: R&D Growth = β1 + β2TREND + β3TREND2 + β4SWITCH + β5SWITCH\*TREND + β6SWITCH\*TREND2 + β7MVE + β8M/B + firm fixed effects + year fixed effects + ԑ; TREND is a linear time trend that equals year minus 1991 or year minus 1998. The results, not reported in the interest of brevity, show insignificant coefficients on SWITCH\*TREND and SWITCH\*TREND2 for all R&D variables, providing further evidence that the parallel trends assumption is not violated. [↑](#footnote-ref-20)
21. Zhong (2018) also finds that R&D expenditures increased after the introduction of IFRS, but she does not compare capitalizers vs switchers. [↑](#footnote-ref-21)
22. It is possible that switching firms begin to overinvest, but based on the analysis of Miller and Rock (1985), we believe that the switchers under-invested under UK GAAP (see footnote 12). [↑](#footnote-ref-22)
23. Reduction in cost of capital could increase investment even without external financing, as more projects exceed the lower hurdle rate and are internally funded. It is important to keep this in mind for switchers, who are successful firms (Section 5) and may not need external financing. [↑](#footnote-ref-23)
24. Roychowdhury et al. (2019) also discuss an external learning channel where firms learn from peers, but this does not apply in our setting, because switchers could already have learned from their capitalizing peers before IFRS. [↑](#footnote-ref-24)
25. For LSE listed firms, 80% (67%) use a profit-based metric for the annual bonus (long term incentive) plan in the last year of UK GAAP. For the first year of IFRS, 84% (72%) of firms use a profit-based metric for the annual bonus (long term incentive) plan. For the AIM listed firms, 13 of the 16 firms (9 of the 12 firms) reporting the details of their annual bonus (long term incentive) plan, use a profit-based metric in the last year of UK GAAP. Similarly, in the first year of IFRS, 14 of the 19 firms (13 of the 16 firms) reporting details of their annual bonus (long term incentive) plan, use a profit-based metric. The widespread use of profit-based metrics is consistent with our conjecture that UK firms are concerned about the impact of expensing R&D on earnings. [↑](#footnote-ref-25)
26. Our result is consistent with Zhong (2018), who finds that R&D expenditures are more sensitive to investment opportunities for firms with high transparency (her Table 7). [↑](#footnote-ref-26)
27. In another example of learning from an accounting rule change, Mittelstaedt, Nichols and Regier (1995) find that firms learned about the value of their promised retiree health benefits when they had to recognize retiree health care liabilities upon adoption SFAS No. 106. [↑](#footnote-ref-27)