

## Accounting for R&D Expenditure: To Capitalize or Not to Capitalize?

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**Abstract:** This study investigates the effect of R&D capitalization on earnings variability. Investment in R&D plays a significant role in the world of business by leading to innovation, development, and the growth of business enterprises. However, the current accounting standards require corporations to expense the R&D costs as incurred. Accordingly, there has been a debate over the accounting treatment for such investment for decades. We calculate earnings (adjusted for R&D capitalization), as if the company's R&D expenditures were capitalized during the period and compare it with reported earnings in financial statements. We find that earnings reported in the financial statements are more variable when R&D spending changes significantly. It implies that financial reporting under R&D capitalization provides more reliable information. The findings of this study supports the argument that we should make changes from the current accounting treatment of R&D expensing to R&D capitalization, which may provide more value-relevant and reliable information on earnings.

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### 1. Introduction

Recently, the U.S. government changed its treatment of research and development (R&D) investments in the calculation of gross domestic product (GDP). Expenditures for private R&D are not currently included in the calculation of GDP. The U.S. Bureau of Economic Analysis (BEA) reported, however, that, beginning on July 31 2013, R&D expenditures will become a component of the U.S. GDP calculation.<sup>1</sup> The BEA estimates that the annual GDP growth would have been 2.7 percent higher between 1998 and 2007 if R&D expenditures had been treated as an investment in the U.S. national income and product accounts (BEA Report, 2010). The revision is significant in its national income and product accounts (NIPAs). It also shows that the U.S. government takes into account the importance of intangibles in our economy. Thus we revisit the ongoing debate on accounting treatment for R&D expenditure in a private sector.

Investment in R&D plays a significant role in the world of business by leading to innovation, development, and the growth of business enterprises. Bristol-Myers Squibb (a pharmaceutical company headquartered in New York City), for instance, spends a huge amount of money on its R&D activities (\$3.9 billion on R&D in 2012, approximately 22% of its revenue). Due to the nature of R&D activity, high spending on R&D is a predictor of long-term

performance for a company. In other words, R&D is intended to yield profit and/or revenues in the future. Nevertheless, the current accounting regime requires corporations to expense the R&D costs as incurred, in accordance with Statement of Financial Accounting Standards (SFAS) No. 2 (1974). It thus appears that there is a discrepancy between revenue and expense in current period because the revenue in current period may not match with expenses incurred at the same period. It also indicates that the financial statements in current period may not reflect future performance of a firm. Accordingly, the current study explores the ongoing debate on the treatment of R&D costs in business enterprises.

The debates on R&D costs are centered on the tradeoffs between reliability and relevance. Proponents of expensing R&D argue that expensing R&D provides more reliable information. Because there is uncertainty of future benefits from R&D, expensing such expenses as incurred may reduce uncertainty of future performance. Opponents of expensing R&D, on the other hand, state that R&D expenditures create future benefits and that capitalizing such costs would make more sense in financial reporting. The capitalization of R&D may provide more useful and relevant information for the information users. Accounting standards setters, however, have been more concerned about the reliability of future benefits from R&D investments. According to SFAS No. 2, prior studies failed to find a meaningful relationship between R&D expenditures and future benefits, as measured by revenues,

<sup>1</sup> Australia and Canada already implemented the similar change in calculating their GDPs in 2008.

earnings, and market share of sales (SFAS No. 2, 1974). SFAS No. 2, therefore, mandates that all R&D investments be expensed as incurred. Nevertheless, four decades after the initial adoption of SFAS No. 2, a large number of studies provide evidence that supports the capitalization of R&D costs.

This study presents evidence that earnings are distorted by expensing R&D costs and that earnings under R&D expensing create less-reliable information, as measured by the variability of future earnings. Thus, the current study supports arguments of prior studies that R&D capitalization provides more value-relevant financial reporting.

## 2. Debate in R&D and Earnings Variability

The debate in R&D accounting concerns the conservative reporting of R&D costs. Although companies expect to benefit from R&D investments gradually in the future, they must expense the costs in the period incurred. Expensing of R&D makes reported earnings lower than what they would have been if firms had capitalized their R&D investments. Thus, the reported earnings are biased and the bias may affect investors' decision making. Chambers et al. (2002) investigate whether the level and change of R&D costs are positively associated with future financial performance. The authors argue that the conservative accounting treatment for expensing R&D costs distorts earnings and book values, and that the investors may not be able to adjust this bias. Chambers et al. (2002) did not directly examine whether one way (R&D capitalization) is better than the other (R&D expensing). However, their findings support the R&D capitalization by providing evidence that investors fail to capture the distortion (or bias) in earnings under the current treatment of R&D costs (i.e., expensing).

Lev and Sougiannis (1996) also show the problems of current accounting treatment of R&D expenditures. The authors propose a method to

measure the effect of R&D capitalization on earnings and book values. They find evidence that the adjusted earnings and book values are associated with future stock returns. The findings of Lev and Sougiannis' study suggest that R&D costs bring future benefit, and, thus, capitalizing such costs would provide more value-relevant information to investors than would expensing the costs. This is the first influential study that provides empirical evidence that capitalizing R&D costs may provide earnings that is more value-relevant, which contradicts the view taken by SFAS No. 2.

Eberhart et al. (2004) examine the effect of a firm's R&D expenditure increase on the firm's long-term stock market performance and operating performance. They present evidence that firms with increase in their R&D investments experience positive long-term future stock returns. This finding indicates that investors understand the future benefits of the increase in firms' R&D investments and under-react to the news. Based on the nature of intangible investment, firms benefit from R&D investments progressively in the future. However, it is possible that the market is slow to recognize these long-term benefits because all the R&D expenditures are listed as expenses in the income statement rather than being recognized as assets that can bring future benefits to the firms in the balance sheets. The findings of this study also contradict the current Generally Accepted Accounting Principles (GAAP) for R&D expenditures, and support the findings of Lev and Sougiannis (1996).

In order to highlight the debates in the treatment of R&D, we briefly show the distortion in earnings by R&D expensing and compare the earnings reported in the financial statement with the earnings adjusted as if R&D was capitalized. Table 1 presents the financial data of Bristol-Myers Squibb (hereafter BMS) from fiscal years 1998 to 2004.

Table 1. R&D investments and adjusted earning if R&D is capitalized (millions)

Year	R&D	Earnings <sup>1</sup>	Earnings Adj <sup>2,3</sup>
1998	\$1,577	\$3,141	\$3,576
1999	1,843	4,167	4,762
2000	1,939	4,096	4,681
2001	4,955	2,043	5,248
2002	2,387	2,034	2,541
2003	2,279	3,106	3,390
2004	2,563	2,378	2,800

<sup>1</sup>Earnings: Income before extraordinary items; <sup>2</sup>First we calculate R&D amortization and capitalization as follows: R&D Amortization (Year = t):  $0.10*(R\&D_t + R\&D_{t-1} + \dots + R\&D_{t-9})$  and R&D Capitalization (Year = t):  $(0.9*R\&D_t + 0.8*R\&D_{t-1} + \dots + 0.1*R\&D_{t-8})$ ; <sup>3</sup>Earnings (adjusted) = Earnings (reported) + R&D (reported expense) - R&D Amortization.

The second and third columns of Table 1 show the amounts of its R&D costs and earnings, as reported in the annual reports. The last column of Table 1 shows Earnings (adjusted for R&D capitalization), as if the company's R&D expenditures were capitalized during the period. We follow the Lev and Sougiannis (1996) method to recalculate reported earnings for BMS. We also apply an annual depreciation rate of 10 percent for the capitalized R&D costs, as indicated in the U.S. Bureau of Economic Analysis (BEA) report for the pharmaceutical companies ("Depreciation of Business R&D Capital," Bureau of Economic Analysis and National Science Foundation, R&D Satellite Account Paper, 2012).

As expected, the reported earnings of the BMS stockholders' equity are lower than the values adjusted for R&D capitalization. In particular, the difference between the reported earnings and adjusted earnings is the largest in 2001, when the R&D spending increased significantly. This is due to the conservative treatment of R&D spending (e.g., expensing the costs when incurred). Capitalizing R&D costs focuses on the future benefit of R&D expenditures, and the adjusted earnings reflect the future benefits in the current period by recognizing R&D spending as an investment.

From an investor's standpoint, Figure 1 shows the distortion in return on equity (ROE) when the firm's R&D spending increases. In general, the adjusted ROE is higher than the reported ROE when R&D spending increases significantly. This implies that firms' performance measured by ROE is significantly distorted by R&D spending. As indicated in prior studies (e.g., Chambers et al., 2002), it is possible that investors may not be able to see through this distortion of conservative accounting and that the level of R&D investments is positively associated with stock returns in subsequent years (not the current year).

### 3. Results

We examine the effect of change in R&D spending on the quality of financial reporting, measured by variability of earnings. We collect

24,490 firm-year observations from the fiscal years between 1995 and 2008 with required financial data available. First, we partition our sample into quintiles based on the changes in R&D investments within each year and industry (two-digit SIC). Then we measure the variability of earnings for a future period (5 years), which proxies for the reliability of future earnings.

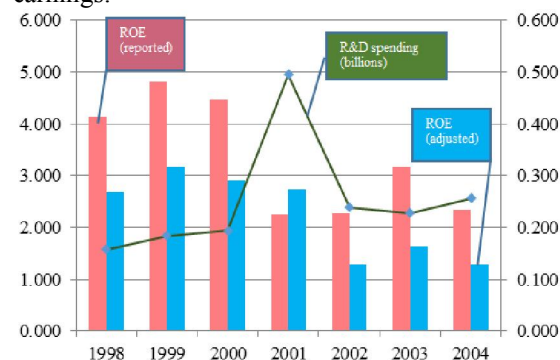


Figure 1. Effect of change in R&D on ROE

Table 2 presents the variability of earnings under two accounting regimes for R&D expenditure. EV is the variability of earnings as reported in the income statements, and EVadj is the variability of earnings adjusted for capitalizing R&D costs. EV is consistently higher than EVadj, meaning that the reported earnings are less reliable than the earnings adjusted for R&D capitalization. The relevant statistical test confirms the differences are significant. We interpret this as evidence that R&D expensing leads the future earnings that are less reliable when R&D investment changes significantly because Rank1 and Rank5 indicate the largest negative change and the largest positive change, respectively. This is due to the reported earnings fluctuating with R&D expensing as it is incurred. Earnings in the current period may not reflect future benefits because the change in R&D spending in current period changes earnings at the same time. Thus, Table 2 provides evidence that supports arguments of proponents of R&D capitalization.

Table 2. EV and EVadj by change in R&D Investments

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
$\Delta$ R&D	-0.379	-0.052	0.071	0.215	0.693
EV	0.175	0.116	0.105	0.122	0.180
EVadj	0.168	0.114	0.102	0.117	0.161
EV-EVadj	0.007	0.002	0.003	0.006	0.019
(t-test)	4.07*	1.47	2.65*	5.21*	11.31*
N	4893	4900	4903	4899	4895

EV is the variability of earnings as it is reported. EVadj is the variability of earnings as it is adjusted by R&D capitalization. EV-EVadj denotes the difference between EV and EVadj. \* indicates the significance level at 1%.

Figure 2 also provides evidence consistent with the results reported in Table 2. It shows that the difference between EV and EVadj creates a U-shape, which means that the differences in variability between reported earnings (EV) and adjusted earnings (EVadj) are extreme as R&D spending changes (Rank1 and Rank5). In summary, the findings in this study support the findings of prior studies that R&D capitalization provides more reliable earnings than does R&D expensing.

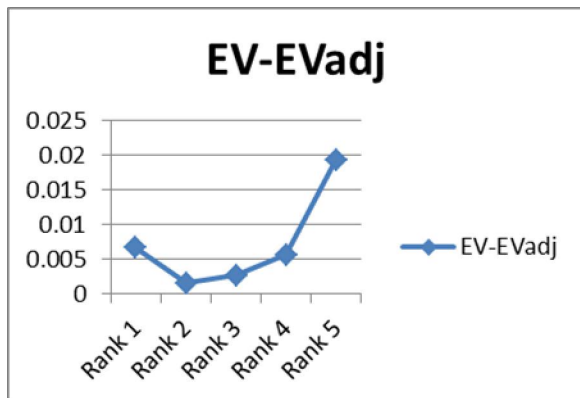


Figure 2. Difference between EV and EVadj by change in R&D Investments

#### 4. Discussions

R&D investment is critical in the world of business. It leads to the innovation of new products and services, job creation, and, eventually, economic growth. Further, the U.S. government is seeking ways to improve the measurement of the contribution that R&D investments make to our economy. Ben Bernanke, former chairman of the Federal Reserve Bank, addressed the importance of the government's role in measuring economic activity by R&D (Federal Reserve Bank Speech, 2011).

*“As someone who spends a lot of time monitoring the economy, let me put it in a plug for more work on finding better ways to measure innovation, R&D activity, and intangible capital. We will be more likely to promote innovative activity if we are able to measure it more effectively and document its role in economic growth.”*

In this regard, it is now time that accounting professions look for ways to improve the measures of firms' economic performance through R&D activities. We collect data of firms listed in the U.S. and measure the quality of financial reporting. The results show that financial reporting under R&D capitalization provides more value-relevant

information. The current study has implications for standards setters and regulators, as we move forward to the harmonization of accounting standards between International Financial Reporting Standards (IFRS) and the local accounting standards (Sadeghi et al., 2012). International Accounting Standards (IAS) 39 requires firms to expense their research costs as incurred. However, IAS 39 allows firms to capitalize their development costs. This is a step forward to the capitalization of all R&D costs and may provide somewhat more value-relevant information. But it may also lead firms to change their business practice. For example, firms may focus on their products in development stage than in research stage (Sadeghi et al., 2012). It may result in a significant unbalance between research activities and development activities.

The findings of this study suggest that we make changes from the current accounting treatment of R&D expensing to R&D capitalization, which may provide more value-relevant and reliable information on earnings. The current study focuses only on companies listed in the U.S. Future research should extend the sample countries and focus on the relevant issues of accounting for R&D investments in a specific accounting regime. There are many countries in which capitalizing of R&D costs is permitted after adoption of IFRS, and, thus, countries may provide a means to test such issues.<sup>2</sup> In any case, the calculation or estimation of the depreciation rate of R&D costs remains challenging and warrants further research.

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