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ACCOUNTING MATTERS

# Is it U.S. GAAP or IFRS? Understanding how R&D costs affect ratio analysis

Jean Turlington [a], Stephan Fafatas [b], Elizabeth Goad Oliver [b,*]

[a] *Investment Banking Analyst, Wells Fargo Securities, Graduate, Washington & Lee University (2016)*
[b] *Williams School of Commerce, Economics, & Politics, Washington & Lee University, Lexington, VA 24450, U.S.A.*

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**Abstract** While financial reporting standards under U.S. GAAP and IFRS are fundamentally similar, differences do exist that may affect our analysis of company financial statements. This is particularly true when comparing a U.S. company following U.S. GAAP to a firm that uses IFRS. To illustrate, we compare research and development (R&D) accounting methods under both sets of standards and illustrate how they affect the analysis of financial results of firms in a specific industry—automotive manufacturers. Our results provide insight into settings in which differences in R&D accounting may have the greatest impact on financial analysis.


## 1. Using a different accounting standard affects financial statements

While there are numerous standard setters in the accounting world, the majority of leading companies now use either U.S. GAAP or International Financial Reporting Standards (IFRS). For a short while around 2008, it looked as though the Securities and Exchange Commission (SEC) planned to move the U.S. toward the adoption of IFRS but now convergence of the two, rather than adoption, seems to be the more likely path. James Schnurr (2015), chief accountant of the SEC, in his speech at the Baruch College Financial Reporting Conference, stated that collaborations were currently the only way for convergence. In a different speech that year at the Brooklyn Law School, SEC Commissioner Kara M. Stein (2015) said that she was "not convinced of a need to abandon U.S. GAAP in favor of IFRS." During these collaborations, however, each body has adjusted the resulting standards to fit the perceived needs of its constituents. For example, while the standards on leases and revenue recognition both have many things in common, the differences are still very important. Understanding the differences is crucial. Even within U.S. GAAP and IFRS, there are choices that each company needs to make: what inventory flow system to adopt or what depreciation method to

* Corresponding author
*E-mail addresses:* jturlington@icloud.com (J. Turlington), sfafatas@wlu.edu (S. Fafatas), olivere@wlu.edu (E.G. Oliver)

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use. Both of these choices, as well as differing regulations, may affect the classic financial ratios that analysts and investors use to evaluate a company.

Whether a business executive thinking about expanding internationally, an analyst, or an individual investor, a solid understanding of the standards' influence on financial statements will permit that user to better interpret an individual company's results, allowing for across-standard comparison of company ratios. Financial statement analysis focuses on ratios since raw numbers from the income statement, balance sheet, and statement of cash flows do not provide the insights that ratios can. For example, Amazon's 2016 sales of $135 billion differs greatly from Barnes and Nobles' sales revenue of $4 billion, so using the raw numbers from financial statements to compare companies can be misleading. Ratios provide a cleaner view of the relative similarities and differences between firms and the changes in a company's performance over time.

To provide an example of how the differences in standards may affect a statement user's perception of companies' results, we look at research and development (R&D) costs for a sample of large firms in the automotive industry. This topic is particularly important since R&D accounting is viewed as "one of the most pronounced differences between GAAP and IFRS," (Chen, Gavious, & Lev, 2017, p. 678). Our analysis of R&D allows us to demonstrate various ways that standard differences affect the financial ratios. Since the standards continue to change and not everyone has the time to monitor them closely, we hope our explanations and examples will provide an entry path or a refresher in the differences between IFRS and U.S. GAAP—and why they matter.

## 2. What are some of the major differences?

The Big Four accounting firms publish information on the basic differences between the two sets of standards. Depending on the type of company being analyzed, some accounting will result in a higher impact on the ratios than others. Accounting rules change frequently, and keeping up with the changing rules can be a challenge for financial statement users. For example, two new standards concerning revenue recognition and leases were recently adopted by both the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB), and will affect both U.S. GAAP and IFRS.

In addition to new accounting rules, users should also be aware of existing differences in accounting methods between IFRS and U.S. GAAP standards. While dozens of differences exist, some of the more notable ones occur in accounting for operating assets. Easton, McAnally, Sommers, and Zhang (2018) noted that key variations in accounting rules related to operating assets affect inventory, PP&E, R&D, and the treatment of restructuring costs.

Keeping in mind that this list only relates to accounting for operating assets, one sees that gaining a full understanding of all differences between the two standards is a daunting task. While the two sets of standards are more similar than dissimilar, the subtle differences that do exist could have significant implications when attempting to compare companies operating under different accounting regulations.

Among operating assets, one of the most interesting differences from an analysis perspective is the accounting for R&D costs. As investments in new technology, intangibles, and other strategic assets continue to outpace investments in traditional physical assets (Laing, 2016), understanding how to account for R&D costs across standards seems particularly important. Of course, traditional technology companies like Apple and Microsoft have fueled the recent surge in R&D activity, as shown in Figure 1. Reported R&D at both companies is up dramatically since 2010.

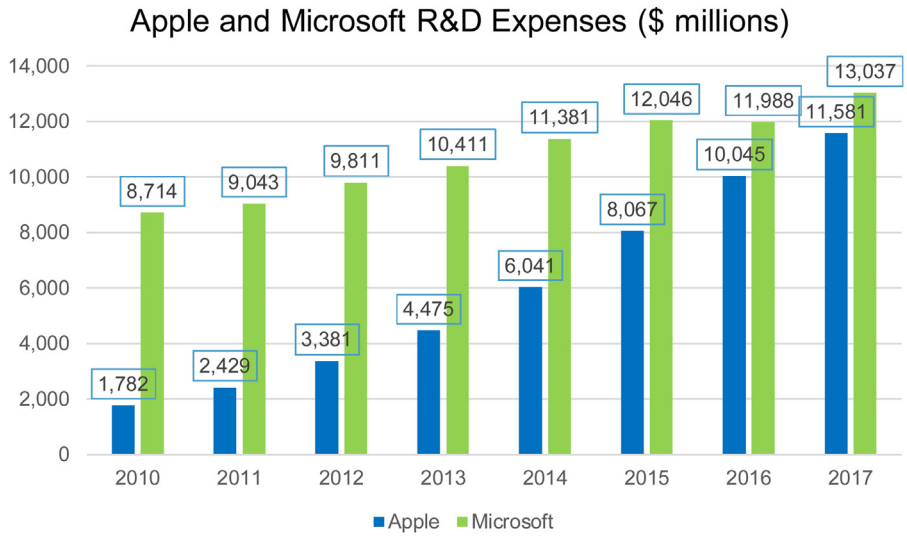
However, it is not just the tech companies driving investments in R&D activity as automakers General Motors and Ford both make the top 10 in total R&D spending among S&P 500 firms, according to a recent study (Molla, 2017).

## 3. Accounting for research and development costs

While U.S. GAAP and IFRS move toward convergence, the standards contain notable differences in rules concerning the accounting for research and development costs. For U.S. GAAP, the Accounting Standards Codification (ASC) provides guidance about R&D expenditures. ASC 730-10-25-1 states that, in general, research and development costs must be charged to expense as incurred. The ASC requires this because, with R&D expenditures, the "future benefits are at best uncertain. In other words, there is no indication that an economic resource has been created" (ASC 730-10-05-2)[1].

[1] https://www.irs.gov/pub/irs-utl/gbc_p_272_07_01_02.pdf

**Figure 1. R&D trends at Apple and Microsoft**




Source: Standard & Poor's Compustat database (www.compustat.com)

This inhibits the costs from satisfying the measurability test required to recognize them as an asset. As a result, companies immediately expense all of these costs on the income statement, which prevents them from influencing the balance sheet.

Conversely, IFRS allows for cost capitalization, but not immediately. IAS 38-54 states, "no intangible asset arising from research shall be recognized;" instead, it must be recognized as an expense when incurred.[2] Thus, activities classified as research are treated similarly under the two sets of standards. The key difference between the standards stems from the identification and treatment of development costs. Specifically, IAS 38-57 provides that an "intangible asset arising from research and development" may be recognized if all of the following are met: [2]

(a) Technical feasibility of completing the intangible asset so that it will be available for use or sale;

(b) Intention to complete the intangible asset and use or sell it;

(c) Ability to use or sell the intangible asset;

(d) How the intangible asset will generate probable future economic benefits. Among other things, the entity can demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself, or if it is to be used internally, the usefulness of the intangible asset;

(e) Availability of adequate technical, financial, and other resources to complete the development and to use or sell the intangible asset; and

(f) Ability to measure reliably the expenditure attributable to the intangible asset during its development.

At this point, the company considers the R&D as development rather than research. Once the project reaches the thresholds outlined in paragraph 57, the business capitalizes and amortizes the R&D expenditures on the balance sheet as a development cost intangible asset, creating the accounting difference with U.S. GAAP. Furthermore, the cash outflows related to development costs are recognized as investing activities on the statement of cash flows under IFRS, thus treating these outflows similarly to investments in traditional capital assets (PP&E).

To illustrate, we provide an example of development cost disclosure from BMW's 2016 annual report (see Figure 2). BMW outlines the general requirements necessary to capitalize development costs and provides information on the amortization period for these capitalized costs. Other sections of the annual report provide investors with a reconciliation of the R&D expense recorded on the income statement to the actual R&D expenditure for the year (see Figure 3). Here, we see that R&D expenditures exceed the amount of R&D expense recorded on the income statement by roughly 20% (€5,164 compared

[2] https://www.ifrs.org/issued-standards/list-of-standards/ias-38-intangible-assets/

**Figure 2. BMW development costs disclosure**

**Development costs** for vehicle and engine projects are capitalized at manufacturing cost, to the extent that attributable costs (including development-related overhead costs) can be measured reliably and both technical feasibility and successful marketing are assured. It must also be probable that the development expenditure will generate future economic benefits. Capitalized development costs are amortized systematically over the estimated product life (usually 4 to 11 years) following the start of production.

Source: BMW annual report (2016)

**Figure 3. BMW R&D reconciliation and analysis**

| In € million | 2016 | 2015 |
|---|---|---|
| Research and development expenses | 4,294 | 4,271 |
| Amortization | -1,222 | -1,166 |
| New expenditure for capitalized development costs | 2,092 | 2,064 |
| **Total R&D expenditure** | **5,164** | **5,169** |

Research and development expenditure totaled €5,164 million during the year under report, in line with the previous 12-month period (2015: €5,169 million; -0.0%). At 5.5%, the research and development expenditure ratio was also practically identical to that of the preceding year (2015: 5.6%). The ratio of capitalized development costs to total research and development expenditure for the period (capitalization ratio) was 40.5% (2015: 39.9%). Amortization of capitalized development costs totaled €1,222 million (2015: €1,166 million; +4.8%). Further information on research and development expenditure is provided in the "Report on Economic Position (Results of Operations)" and in → note 7 to the Group Financial Statements.

Source: BMW annual report (2016)

to €4,294), highlighting the importance of understanding the R&D accounting rules for IFRS companies. The annual report also includes an analysis of R&D outlays as a percentage of sales and a capitalization ratio (percentage of R&D costs that are capitalized in the period). These important disclosures help analysts understand BMW's activity during the period and provide information that may be used to make pro forma adjustments to U.S. GAAP reports if one wants to compare BMW to a U.S. peer.

Academic research explores the implications of the U.S. GAAP rules to fully expense R&D costs. Notably, Damodaran (1999) argued that classification of R&D expenses as capital expenditures, rather than operating expenses, paints a more accurate picture of the company's operations and financial position. These R&D costs create assets (resources) for firms if successfully completed and are thus similar to investments in PP&E.

Through analysis of expensing and capitalization, Damodaran demonstrated that both operating income and net income increase as a result of R&D expenditure capitalization. Profitability measures, such as return on equity (ROE), are also effected since expense capitalization will impact retained earnings and stockholders' equity on the balance sheet. This has no effect on firm cash flows, but separating R&D expenses from other operating expenses provides a "cleaner picture of what a firm is actually earning on its assets in place, and how much it is investing for future growth" (Damodaran, 1999, p. 17). Finally, Damodaran argued that reclassifying R&D expenses as capital expenditures may significantly affect the analyst's valuation of a firm for three main reasons:

1. Expected growth rates can be tied to a firm's investments in R&D;

2. Reclassifying R&D expenditures will affect operating margins; and

3. Computing terminal value requires making assumptions about growth and reinvestment rates, which would change if reclassified as capital expenditures.

While Damodaran (1999) studied the effects of fully capitalizing R&D costs, one implication is that knowledge of the R&D accounting rules under

**Table 1. Estimation criteria for IFRS sample firms**

| | BMW | Fiat | VW | Daimler | Avg. |
|---|---|---|---|---|---|
| Development Cap.% | 40.50% | 60.63% | 42.10% | 30.57% | 43.5% |
| Amortization years | 9.0 | 11.6 | 9.1 | 10.4 | 10.0 |

U.S. GAAP and IFRS is critical for understanding firm financial performance.

## 4. Adjusting R&D costs for financial analysis

Differences in accounting for R&D under U.S. GAAP and IFRS may affect our ability to compare the performance of U.S. firms with their international peers. To illustrate the issue, we examine a sample of companies from the automotive industry and walk through a series of adjustments that may allow more meaningful comparisons between firms that follow different standards. The automotive industry provides an interesting setting, as there are a handful of significant players in the U.S. market, as well as in Europe where IFRS methods apply. Companies in the industry invest heavily in R&D programs (e.g., Ford reported research and development expenses of $7.3 billion in their 2016 10-K) as customer preferences and regulatory standards continue to evolve.

The implications for capitalizing versus expensing development costs affect analysis of the amounts on the income statement, balance sheet, and statement of cash flows and the related ratios. To assess the influence of IFRS on the financial statements, we analyze three automakers that report under U.S. GAAP: Ford, GM, and Tesla.[3] We create adjusted amounts for margins based on R&D expense (R&D %), operating income (OI%), and earnings before interest, taxes, depreciation, and amortization (EBITDA%). We examine how these ratios—all calculated as a percentage of revenues—change under IFRS development cost capitalization assumptions. In addition, we show an adjusted ROE amount to gain a better sense of the implications for evaluating broader measures of firm performance. For comparison, the ratios of the U.S. GAAP firms are compared to amounts calculated for a sample of peers that report under IFRS. The IFRS sample includes BMW, Volkswagen (VW), Fiat-Chrysler (Fiat), and Daimler.

[3] The automobile industry also provides the setting for a teaching case on R&D differences between IFRS and U.S. GAAP (*Volvo Group — Research & Development Costs*, by Drake, Engel, Hirst, and McAnally, 2015). While the case focuses on accounting treatment of R&D costs, our study examines the resulting implications for financial statement analysis.

### 4.1. Approach

Prior research (e.g., Damodaran, 1999; Lev & Sougiannis, 1996; Palepu, Healy, & Bernard, 2004) provides guidance for creating adjusted financial statements that reflect capitalized R&D costs. We adopt a similar approach to convert the costs associated with R&D activities in our sample of U.S. automakers from U.S. GAAP to IFRS. Recall that under IFRS, only development costs are capitalized when incurred so while similar in spirit, our approach should yield different results than the full-capitalization methods used in prior studies.

Adjusting U.S. GAAP financial statements to reflect capitalized development costs requires a set of assumptions. We use information pulled from the annual reports of the IFRS sample firms for guidance on these criteria for estimating R&D adjustments. Specifically, we use the average development capitalization rate (i.e., percentage of R&D capitalized) and the average amortization period to estimate the amount of annual R&D investment that would be capitalized under IFRS, as well as the annual development amortization expense.

Table 1 shows the development capitalization rates and amortization periods for the sample IFRS automakers. The average rate of 43.5% is used to separate the annual R&D expense for the U.S. GAAP firms into research expense and capitalized development cost portions. For example, if a company reports $1,000 in R&D expense under U.S. GAAP, we estimate that $435 is capitalized under IFRS as an intangible development cost asset, and the remaining $565 is expensed. To determine the annual amortized portion (expense) of the development cost asset, we estimate an average amortization period, again using disclosure on development costs reported in the IFRS sample firms' annual reports. This amortization period is calculated by taking the inverse of the annual amortized development cost over the average gross total development costs for the year (2016 in our sample).

Information on the average amortization period is also included in Table 1. The average amortization period for the sample of IFRS firms is 10 years. Thus, continuing with the earlier example, the $435 capitalized development cost is expensed over 10 full years. We assume that the costs are incurred evenly throughout the year, so only 50% of the annual amortization expense is recorded in the first

year. Likewise, 50% of the annual amortization amount is expensed in the final year of the amortization window. For example, if $435 is capitalized in 2005, then applying this half-year model results in amortization expense amounts equal to $21.75 in 2005 (50% of $435/10), $43.5 in years 2006–14 and then $21.75 in 2015. The balance sheet value of the development cost intangible asset decreases each year as the amortization expense is recorded. At the end of 2005, the asset in our example is valued at $413.25 ($435–$21.75), $369.75 at the end of 2006 ($413.25–$43.5), and so on.

## 5. Results from adjusted financial statements

### 5.1. Common-sized analysis and income margins

Research indicates that investment in R&D activities is positively associated with future stock returns (e.g., Lev & Sougiannis, 1996). A classic approach to calculating R&D investment is to measure R&D expense as a percentage of total revenues. This common-size amount of R&D investment may then be compared to other companies in a firm's industry.

Table 2 shows common-size R&D amounts (R&D%) for U.S. GAAP and IFRS automakers in 2016, as well as common-size operating income (OI%) and EBITDA (EBITDA%). Not surprisingly, the R&D% amounts show that Tesla is investing much more in R&D activities compared to the other two U.S. GAAP firms. Furthermore, the transition from U.S. GAAP to IFRS has a much greater influence on the R&D% for Tesla than it does for Ford or GM. The reason for the significant decline in Tesla's R&D expense under IFRS is a function of the growth in R&D activities for the firm. R&D expenses for Tesla increased 16.2% from 2015 to 2016 and grew by over 50% the prior year. The rapid growth in R&D investment accentuates the effects of differences between IFRS and U.S. GAAP, while the lower levels of R&D growth at Ford and GM (R&D expense increased by about 8% at both) minimize the effect of the different accounting methods on earnings components. This occurs because the capitalization of development costs acts to delay expense recognition for a portion of current R&D activities. Thus, on average, we would expect R&D expense under U.S. GAAP to be higher (and income lower) as compared to IFRS. This will be the case as long as absolute R&D costs are growing over time. When growth in R&D investment slows, the R&D expense recorded under U.S. GAAP will begin to approximate the IFRS R&D amounts since current R&D costs will be closely related to

**Table 2. Select ratios for U.S. automakers under GAAP and adjusted for IFRS R&D accounting**

| | IFRS Firms | | | | | Ford | | GM | | Tesla | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | BMW | Fiat | VW | Daimler | Avg. | Reported | Adjusted | Reported | Adjusted | Reported | Adjusted |
| R&D expense% | 4.6% | 2.9% | 5.3% | 3.4% | 4.1% | 4.8% | 4.5% | 4.9% | 4.5% | **11.9%** | **8.3%** |
| Total R&D expenditures% | 5.5% | 3.8% | 6.3% | 4.9% | 5.1% | | | | | | |
| Operating income% | 10.0% | 4.4% | 3.3% | 7.9% | 6.4% | 5.3% | 5.6% | 5.7% | 5.9% | **−9.5%** | **−5.9%** |
| Net income% | 7.3% | 1.6% | 2.4% | 5.6% | 4.2% | 3.0% | 3.2% | 5.7% | 5.8% | −9.6% | −7.3% |
| EBITDA% | 15.3% | 9.6% | 9.6% | 11.5% | 11.5% | **11.3%** | **13.3%** | **12.0%** | **14.1%** | **5.2%** | **10.4%** |
| ROE | 15.3% | 10.0% | 5.7% | 15.3% | 11.6% | **15.9%** | **13.0%** | **22.5%** | **18.4%** | −23.1% | −14.8% |

Note: These results are calculated using 2016 financial results. Figures in bold highlight areas where differences between amounts calculated using the reported GAAP figures and those adjusted for IFRS R&D methods are most pronounced. We assume a 35% marginal tax rate to calculate adjusted net income and equity amounts that factor into ROE.

the research expense plus amortized portion of prior development costs.

Continuing with the R&D% results, we see that in both the reported and adjusted amounts the U.S. GAAP firms appear to invest more heavily—on average—in R&D activities than do their IFRS peers. However, this proves a bit misleading as the IFRS expense amounts do not include the current development costs capitalized as an intangible asset. A more consistent comparison of R&D investment is to look at the R&D% for U.S. GAAP firms against total R&D expenditures as a percentage of revenues (R&D expenditures%) for the IFRS firms. Total R&D expenditures represent a combination of current research costs (expensed as incurred) and capitalized development costs for the period. This is a more appropriate measure of current R&D investment under IFRS as it removes the amortization expense associated with prior development costs and adds the current development costs that are capitalized and thus to a large extent excluded from the income statement R&D amount. Interestingly, when we compare R&D expenditures% to R&D% we get a slightly different view of R&D activities for U.S. firms as compared to their peers following IFRS. The IFRS firms, on average, invest a greater percentage of their revenues on R&D activities. The exception is Fiat-Chrysler, whose investment in R&D expenditures of 3.8% is less than the R&D investment of any of the three U.S. GAAP firms (as measured by R&D%).

The decrease in R&D% as we move from U.S. GAAP to IFRS results in higher operating income, as well as after-tax earnings. Note that the adjusted OI% increases for each of the U.S. GAAP firms, with again the greatest effect on Tesla. Recall that total R&D expense under IFRS includes both current research costs and the amortized portion of the capitalized development costs. The timing difference between cash outflows for development costs and expense recognition may create a significant discrepancy in EBITDA amounts under U.S. GAAP and IFRS. This is notable since EBITDA is a popular measure of operating performance that is often referenced in credit risk analysis (debt-to-EBITDA) and valuation (enterprise value-to-EBITDA) multiples. The results for the EBITDA% adjustments in Table 2 show that EBITDA increases for the U.S. GAAP firms as we move to IFRS.[4] The effects are more significant than the income changes (OI%) and the difference is most pronounced for Tesla, who moves from an EBITDA% of 5.2% under U.S. GAAP to 10.4% under our estimated IFRS reporting amounts. The EBITDA% amount for Tesla remains below the levels of the two large U.S. automakers, but actually passes the amounts for Fiat and VW. Indeed the change in Tesla's EBITDA% appears so significant that one could envision a story for the company's high stock valuation that centers on the current adjusted EBITDA amount in conjunction with rapid future growth expectations. In addition to the Tesla results, the adjusted EBITDA% amounts for Ford and GM both move above the overall average for the sample of IFRS firms and higher than all but BMW on an individual basis.

## 5.2. Return on equity (ROE)

Return on equity is a measure of the firm's ability to generate a return on the capital provided by shareholders. This is a critical measure of firm success as, according to classic finance theory, shareholder value increases as ROE exceeds the required return on equity capital. However, ROE may be difficult to evaluate, and thus a less-valuable indicator of firm performance, when accounting method differences significantly affect the ratio's amounts. Since R&D accounting effects both the numerator (net income) and denominator (average stockholders' equity) of the ratio, it is important to understand the implications of R&D accounting under U.S. GAAP and IFRS on comparability of both statements across firms.

In terms of balance sheet amounts, capitalizing development costs has the following effects. First, assets increase by the intangible development cost asset. Second, stockholders' equity increases as retained earnings would reflect the cumulative effect of delaying the expense recognition of the capitalized development cost. The final adjustment can be calculated using this equation:

*After-tax effect on stockholders' equity = unamortized balance in the capitalized development asset account (1 − marginal tax rate)*

We assume a marginal tax rate equal to 35% for our illustration. The final adjustment represents a deferred tax liability created from an assumption that timing differences would exist between tax and financial reporting purposes. Mechanically, this deferred tax liability equals the unamortized balance in the development cost asset multiplied by the tax rate. Once again, this method is similar to a suggested approach outlined in prior research (e.g., Palepu et al., 2004). A detailed description of our calculations of the 2016 ending balances in Ford's

[4] Our calculation includes a simplifying assumption that the reported R&D for U.S. companies does not include depreciation expense. It is not possible to breakdown the reported R&D into separate components (salaries and wages, testing costs, depreciation, etc.). While this assumption may introduce some error in our calculations of EBITDA, it is likely that depreciation makes up a low amount of existing R&D relative to the other components.

**Table 3. Adjustment approach to calculate Ford's estimated R&D expense under IFRS**

| Year | GAAP | Adjusted (IFRS) | | | | |
|---|---|---|---|---|---|---|
| | R&D Reported | Research Expense | Development Cost | Amortization Expense included in 2016 | Total 2016 Amortization Expense* | Total 2016 R&D Expense** |
| 2006 | 7,200 | 4,068 | 3,132 | 157 | | |
| 2007 | 7,500 | 4,238 | 3,263 | 326 | | |
| 2008 | 7,300 | 4,125 | 3,176 | 318 | | |
| 2009 | 4,700 | 2,656 | 2,045 | 204 | | |
| 2010 | 5,000 | 2,825 | 2,175 | 218 | | |
| 2011 | 5,300 | 2,995 | 2,306 | 231 | | |
| 2012 | 5,500 | 3,108 | 2,393 | 239 | | |
| 2013 | 6,400 | 3,616 | 2,784 | 278 | | |
| 2014 | 6,700 | 3,786 | 2,915 | 291 | | |
| 2015 | 6,700 | 3,786 | 2,915 | 291 | | |
| 2016 | 7,300 | 4,125 | 3,176 | 159 | 2,712 | 6,837 |

Note: Reported R&D amounts are separated into a research component, which is expensed immediately, and a development component, which is capitalized at the rate indicated in Table 1 and amortized over a period of ten total years. Amortization expense for the first and final year of the amortization period are assumed to equal half-year totals, so a half-year assumption is made regarding timing of the development costs. Total amortization expense for 2016 (*) represents the sum of each annual amortization expense as it relates to that year's capitalized asset amount. Total 2016 R&D expense (**) equals the amortization expense amount plus the research expense amount.

development cost (asset), deferred tax liability, and stockholders' equity, presented in Tables 3 and 4, provides an illustration of the calculations.

Again, the difference in pretax earnings between U.S. GAAP and IFRS in our examples stems from the amount of R&D expense recorded during the current period. The prior examples on margins highlight pretax differences arising from the different approaches to accounting for R&D costs. This equation calculates the IFRS figure in the ROE ratio:

**Table 4. Adjustment approach to calculate Ford's balance sheet amounts under IFRS**

| Year | Capitalized Development Cost | Remaining Unamortized Balance | Ending 2016 Unamortized Balance |
|---|---|---|---|
| 2006 | 3,132 | 0% | — |
| 2007 | 3,263 | 5% | 163 |
| 2008 | 3,176 | 15% | 476 |
| 2009 | 2,045 | 25% | 511 |
| 2010 | 2,175 | 35% | 761 |
| 2011 | 2,306 | 45% | 1,037 |
| 2012 | 2,393 | 55% | 1,316 |
| 2013 | 2,784 | 65% | 1,810 |
| 2014 | 2,915 | 75% | 2,186 |
| 2015 | 2,915 | 85% | 2,477 |
| 2016 | 3,176 | 95% | 3,017 |
| Ending 2016 balance in development cost | | | 13,755 |
| Adjustment to deferred tax liability (at 35%) | | | 4,814 |
| Adjustment to stockholders' equity | | | 8,941 |

*IFRS income figure = pretax adjustments in R&D expense (1 − marginal tax rate)*

The result is that the net income effect is mitigated by the tax increases associated with lower current R&D expenses and higher pretax earnings.

Turning to our overall results presented in Table 2, we see that ROE decreases for both Ford and GM after adjusting the income statement and balance sheet to reflect IFRS treatment of R&D costs. The decrease in these amounts is fairly significant as Ford's ROE falls from 15.9% to 13.0% and GM's ROE drops from 22.5% to 18.4%. These amounts appear to be economically significant as the numbers are now much closer to the average ROE reported by IFRS firms (11.6%). Ford's ROE is higher than BMW and Daimler on an as-reported basis, but this reverses after the R&D adjustment to make the financials more comparable. Tesla's ROE also changes by a large amount, but this change is harder to interpret given the ratio remains negative.

It is important to note that the R&D adjustments for both GM and Ford resulted in a decrease in ROE. This is due to the balance sheet effect (increase in stockholders' equity) dominating the income effect (increase in net income). Thus, the overall effect on ROE from capitalizing development costs under IFRS is ambiguous as the methodology effects both numerator and denominator amounts. In the example Damodaran (1999) presented, Boeing's ROE increases significantly after capitalizing R&D costs. The reason for the different result in our example stems from growth rate in R&D investment. The

relatively low (8%) growth rate in R&D investment at Ford and GM yields a small change in net income compared to the change in equity. The case in Damodaran's (1999) example is quite different in that Boeing's R&D investment in 1997—the period of the study's adjustment for capitalized R&D costs—grew by over 60% compared to the prior year. Damodaran examined full capitalization of R&D costs from a theoretical view, whereas we focus on adjusting the financials for comparison purposes.

## 6. What affects the ratios

The illustration of adjusted financial statements and related ratios for Ford, GM, and Tesla highlights a few of the key implications for comparing companies using U.S. GAAP to peers that follow IFRS. It is important for analysts and investors to understand how differences in accounting methods affect the financial statements they are relying on for analysis. Accounting for R&D costs represents a key difference between the two sets of standards. Accordingly, analyzing firms in an industry with significant investments in R&D activities provides a challenge when both U.S. companies and those operating under IFRS are included in the analysis.

With respect to R&D costs, we see that a company will report lower R&D expense amounts on the income statement and higher income under IFRS as long as the company's R&D costs are growing (increasing over the prior year) and a portion of the R&D meets the classification requirements for a development cost.[5] Holding all else constant, the larger the R&D growth rate, the greater the difference between U.S. GAAP reported earnings and those adjusted to reflect IFRS R&D methods. Because a portion of the IFRS R&D expense is an amortized amount, the differences between U.S. GAAP and IFRS are accentuated when EBITDA, rather than accounting earnings, is used to gauge operating performance.

In terms of ROE, the results of adjusting financial statements to capitalize development costs are ambiguous. If R&D costs are stable then the capitalization process is expected to yield ROE amounts that are lower under IFRS. In cases in which the company is experiencing high growth in R&D costs, the earnings impact may outweigh the equity adjustment, increasing ROE.

[5] A one-time spike in R&D would also cause a difference in earnings under IFRS and GAAP.

## 7. If you want to delve deeper

To complicate things even further, not all countries outside the U.S. have adopted IFRS and, of those that have adopted it, some have opted to adapt some standards. Japan, for example, still has the Accounting Standards Board of Japan, and India follows Indian Accounting Standards. Both countries are moving toward convergence, but neither has instituted complete adoption. Beyond the standards themselves, cultural differences may cause companies in different localities to implement the standards in different ways because of the differing judgments required. Gordon, Greiner, Kohlbeck, Lin, and Skaife (2013, p. 145) pointed out that it "is well noted in prior literature that a country's accounting standards and practices are the result of a complex interaction of cultural, historical, economic, and institutional factors." While the investor or even the analyst cannot promise to consider equivalently prepared statements, knowing as many of the potential differences as possible can help the comparison provide results that are more valuable. As we have seen with R&D, the business model of the company will determine where the differences in U.S. GAAP and IFRS appear.

If you would like more detail about U.S. GAAP and IFRS, all of the major accounting firms provide up-to-date detailed analysis. Some of the most recent publications and online tools can be found at the following web addresses:

- BDO: https://www.bdo.global/getattachment/Services/Audit-Assurance/IFRS/Need-to-know/IFRS_NTK_USGaap_print.pdf.aspx?lang=en-GB
- Deloitte: https://www.iasplus.com/en-us/standards/ifrs-usgaap
- EY: http://www.ey.com/ul/en/accountinglink/publications-library-us-gaap-vs-ifrs-the-basics
- KPMG: https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/12/ifrs-us-gaap-2017.pdf
- PwC: https://www.pwc.com/us/en/cfodirect/assets/pdf/accounting-guides/pwc-ifrs-us-gaap-similarities-and-differences-2017.pdf
- RSM: http://rsmus.com/our-insights/ifrs-resource-center/us-gaap-vs-ifrs-comparisons-at-a-glance-series.html

These sources can help business executives, analysts, or investors examine accounting results and determine what kinds of differences the two major

sets of standards might cause in the numbers. Knowing early helps make better decisions.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## References


Chen, E., Gavious, I., & Lev, B. (2017). The positive externalities of IFRS R&D capitalization: Enhanced voluntary disclosure. *Review of Accounting Studies, 22*(2), 677—714.

Damodaran, A. (1999). *Research and development expenses: Implications for profitability measurement and valuation* [NYU Working Paper No. FIN-99-024].

Drake, M., Engel, E., Hirst, E., & McAnally, M. L. (2015). Volvo group — Research and development costs. In *Cases in financial reporting* (8th ed., pp. 163—174). Westmont, IL: Cambridge Business Publishers.

Easton, P., McAnally, M. L., Sommers, G., & Zhang, X. J. (2018). *Financial statement analysis and valuation* (5th ed.). Westmont, IL: Cambridge Business Publishers.

Gordon, E. A., Greiner, A., Kohlbeck, M. J., Lin, S., & Skaife, H. (2013). Challenges and opportunities in cross-country accounting research. *Accounting Horizons, 27*(1), 141—154.

Laing, J. R. (2016, June 11). A new book argues GAAP accounting is irrelevant. *Barron's*. Available at https://www.barrons.com/articles/a-new-book-argues-gaap-accounting-is-irrelevant-1465628965

Lev, B., & Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics, 21*(1), 107—138.

Molla, R. (2017, September 1). Tech companies spend more on R&D than any other companies in the U.S. *Recode*. Available at https://www.recode.net/2017/9/1/16236506/tech-amazon-apple-gdp-spending-productivity

Palepu, K., Healy, P., & Bernard, V. (2004). *Business analysis and valuation*. Mason, OH: Thomson/Southwestern.

Schnurr, J. (2015, May 7). *Remarks before the 2015 Baruch College Financial Reporting Conference*. Available at https://www.sec.gov/news/speech/schnurr-remarks-before-the-2015-baruch-college-financial-reporti.html

Stein, K. M. (2015, March 26). *International cooperation in a new data-driven world*. Available at https://www.sec.gov/news/speech/2015-spch032615kms.html