

On R&D Capitalization and Value Relevance: a Commentary

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Abstract

Studies that explore the empirical association between accounting numbers and price-based measures cannot, by themselves, lead to inferences regarding the usefulness of alternative accounting policies. The Boone and Raman (2001) paper is one among many studies that employ a "value-relevance" methodology (finding associations between prices or measures derived wherefrom and accounting numbers based on alternative treatments) in an attempt to derive implications for accounting policy formulation. This paper dwells on the reasons why no such implications can be drawn from association studies, and why, under the best of circumstances, such studies can illuminate only one corner of the black box: does the market behave as if it both 1) believes and 2) attaches some weight to information provided to it?

Preliminaries

In their paper, Boone and Raman (2001) purport to document information asymmetry effects associated with off-balance sheet (unrecorded) Research and Development (R&D) assets using a market microstructure methodology. What they actually document empirically is an association between proxies for liquidity and measures of R&D intensity. There is no independent proof or documentation that R&D intensity itself is associated with information asymmetry¹. Moreover, the documented association, by itself, sheds no light whatsoever on the desirability of current prescribed accounting treatments for R&D expenditures, nor does it imply any alternative accounting treatments are potentially more desirable from the standpoint of whatever social objective the authors could potentially (but do not) articulate. In their abstract the authors claim: "collectively, the evidence suggests that a potential harm (lower market liquidity) is associated with the current accounting treatment of R&D spending." Association of R&D intensity measures with liquidity measures cannot lead to suggestions regarding any potential social harm. It is one thing to document statistical associations among a variety of measures, and quite another to draw inferences regarding policy implications. Below, I shall elaborate on why one cannot make such inferences.

Boone and Raman (2001) is not the only study that employs a "value-relevance" methodology (finding associations between prices or measures derived wherefrom and

¹ Note that the kind of information asymmetry likely to affect liquidity as proxied by measures based on bid-ask spread is asymmetry between informed traders and uninformed traders, of which the market maker is one. It is not the kind of information asymmetry that exists between managers and those outside the firm such as caused by the managers' possession of private information. Since managers are barred from trading on inside information, there being privately endowed with information would have no impact on the bid-ask spreads or related measures of liquidity. See further discussion of this below in page 4.

accounting numbers based on alternative treatments) in an attempt to derive implications for accounting policy formulation (for a representative list of such papers, see Table 1 in Holthausen and Watts, 2000. Specific examples are Dhaliwal, Subramaniam, and Trezevan, 1994, and Aboody, 1996). The logic underlying these value relevance studies appears to proceed as follows. Prices are (or assumed to be) the best available reflection of fundamental value; accounting treatments that generate numbers more closely associated with prices (or measures derived from prices) are superior to accounting treatments that generate numbers less closely associated with prices (or measures derived from prices). This logic is problematic for a variety of reasons:

1. One cannot assess the usefulness or desirability of a given accounting treatment solely by means of association with prices or measures derived from prices (such as returns, abnormal returns, etc.)². The usefulness of accounting treatment A can only be assessed relative to an alternative accounting treatment, say B. But observing an association between accounting numbers generated by A with price-based measures and comparing that with the association with price-based measures of accounting numbers generated by B cannot lead to valid inferences regarding the superiority of A over B, or vice versa. Suppose A is the accounting treatment currently used. It will be associated with a current equilibrium price, say $P(A)$ as observed by the researcher. If an alternative treatment B was to be used, a different equilibrium price could be observed: $P(B)$. Note that were A and B to be associated with the same price $P(A) = P(B)$, then A and B are

² Association of accounting numbers generated by a given accounting treatment may provide some information, albeit not such as would address the question whether the treatment is useful or desirable. For example, a higher association between price and accounting information with capitalized R&D and between price and accounting information with expensed R&D may imply that price behaves as if cumulative R&D expenditures are considered as associated with future cash flows. But this observation, by itself, does not imply the usefulness or desirability of capitalizing R&D expenditures. Other considerations (such as uncertainty of future flows, potential legal liability, and efficiency) must weigh in.

perfect substitutes and the comparative desirability of one or the other is not an issue. Suppose, therefore, that $P(A)$ does not equal $P(B)$. In this case the relative desirability of A vs. B can be only determined by comparing two equilibria: the first is accounting system A associated with the price system $P(A)$, and the second is the accounting system B associated with the price system $P(B)$. The two equilibria must be compared with respect to some social objective function. Thus, without observing $P(B)$, we cannot assess the relative desirability of B by reference to $P(A)$, which will no longer prevail under the accounting system B. This paper provides us with an illustration. Suppose A represents the extant accounting treatment of expensing R&D, whereas B represents the capitalization and amortization of R&D. And suppose we find capitalized and amortized R&D to be more closely associated with prices (with proper controls) than if it were to be expensed. But the price with respect to which the association of capitalized and amortized R&D is measured is the price associated with the current system of expensing R&D. The proper comparison would be between the pair (expensing R&D, current prices) with the pair (capitalizing R&D, prices associated with capitalizing -- different from the prices associated with expensing). Current value-relevance studies cannot accomplish this task. And, If it is assumed that the price associated with capitalization is the same as the price associated with expensing, we should be indifferent to the two treatments and there would be no point in deliberating over the relative desirability of either.

2. It is now well known that prices contain not only information about fundamental values but also noise caused by trades that are not based on fundamental information (e.g., Grossman, 1995 and Krause and Smith, 1989). Liquidity trading, noise trading, capital movements from and into other sectors of the economy will cause prices

to diverge from fundamental values at different points of time. Thus, there is no a priori reason to expect that prices reflect fundamental values better than accounting numbers to begin with. In fact, as shown by Dontoh et al. (2001), prices reflect fundamental values more poorly than accounting numbers do.

3. The argument is circular. If accounting provides inputs used by market traders to decide on their demand for and supply of securities, and if markets are semi-strong efficient under the maintained hypothesis, the prices impound by definition the information content of the accounting numbers. Now, suppose it is assumed prices contain no information other than the accounting information (no non-accounting publicly available information, no private information or beliefs formed on the basis of non-accounting information.) In this case, prices cannot be viewed as a useful benchmark against which to evaluate accounting information: they will reflect no more than the accounting information itself plus noise possibly injected into them by liquidity or noise trading.

Therefore, if association is to furnish the criterion by which to assess usefulness of the accounting number, it must be the case that prices reflect fundamental values better than accounting information because of non-accounting information -- either publicly available from other sources or privately acquired by market traders -- that is reflected in prices but not in accounting numbers. In this case the association amounts to testing whether the accounting numbers reflect non-accounting information otherwise impounded in prices. But if prices were indeed a better reflection of fundamental value than accounting numbers because they contain the non-accounting information, there would be no demand for accounting numbers in the first place. Whatever the degree of

correlation between the accounting information and the non-accounting information imbedded in prices, whether high or low, the implication would be the same: accounting information is redundant in light of the non-accounting information, which, by the maintained hypothesis underlying the use of prices as benchmark, presumptively has made prices the best available reflection of fundamental value.

Finally, consider, in the interest of fairness, the following argument in favor of association tests. Non-accounting information imbedded in prices may not be correlated with accounting information, but it helps interpret and assess the reliability of the accounting information, and thus, high association may imply high degree of reliability, and hence, usefulness. To evaluate this argument, one needs to reflect on how non-accounting information perhaps can facilitate such interpretation of the reliability of accounting information. Since it does not duplicate the substantive content, the only way it can help assess the reliability of the accounting information is by facilitating the assessment of the environment under which the accounting information is generated. This environment would include managerial integrity and honesty, its incentives to manage or manipulate earnings, its skill in applying internal controls and in safeguarding the integrity of the information system, etc. Thus, under the best of circumstances, degrees of association between price and accounting information may shed some light on managerial incentives or skills, or how the managers may distort the application of accounting policy. Degrees of association, however, do not tell the tale of the desirability of accounting policy or treatments.

In light of this background, I shall discuss more in detail below the motivation, execution and conclusions of Boone and Raman.

INTRODUCTION AND MOTIVATION

At the outset, Boone and Raman claim that by requiring R&D spending be immediately expensed, Statement of Financial Accounting Standards No. 2 potentially creates a mismatch between costs and subsequent benefits. But this requires independent substantiation. It is as yet an unresolved empirical issue as to whether a sequence of amortizations of capitalized R&D expenditures is better correlated with revenue produced by R&D activities, than a sequence of expensed R&D expenditures. The correlation or matching of the sequence of R&D expenses and revenue depends on the stochastic processes of each of the two streams over time, which are firm- and circumstance-specific, and cannot be determined a priori as a premise. In Dontoh et al. (2001), accounting earnings are shown to be associated with a proxy for fundamental value more strongly in the case of intangible intensive industries than in the case of non-intangible intensive industries, and, furthermore, earnings (earnings changes) have a closer association with proxies for fundamental value than prices (price changes). This finding is inconsistent with the premise that R&D expensing creates a mismatch with subsequent benefits.

The second premise stated as a motivation (Boone and Raman, 2001) is: "potentially, these unrecorded R&D benefits could generate ex-ante inequity in the capital markets in the form of an information gap (asymmetry) between informed investors and other investors." This statement is puzzling. First, unrecorded benefits exist universally under generally accepted accounting principles. Economic assets (future cash inflows) are not recognized as accounting assets in both firms with R&D

expenditures and firms without; this is not an exclusive feature of R&D intensive firms. Second, if unrecorded assets are not visible to some investors, they are not visible to all investors. All investors have equal opportunity to acquire private information on the nature of these assets. In this sense, they are not different from unrecorded future benefits that are not recognized in accounting systems across all firms and industries. There is no reason to expect, a priori, that unrecorded R&D future benefits create any more information asymmetry than any other unrecorded future benefits. And, since investors and analysts have equal opportunity to generate information on these benefits, symmetry of information is more plausible than asymmetry. Third, the kind of unrecorded assets Boone and Raman (2001) are referring to, the capitalized and amortized past stream of R&D expenditures, are publicly available to all investors with minimal information processing just as it is available to Boone and Raman who compute the amounts based on information currently available in financial statements; this again militates against an a priori expectation of information asymmetry. Boone and Raman (2001) claim the fact that "investors with access to private information or the analytical ability to extract private information from publicly available data" potentially gives rise to information asymmetry. But since past R&D expenditures and past earnings are public information, Boone and Raman (2001) seem to be relying mostly on the differential analytical ability to extract private information from publicly available data to motivate information asymmetry. However, this service (of extracting information from publicly available data) can easily be provided to market participants by vendors with the analytical ability to do so; researchers conducting studies such as this demonstrate the feasibility of making this information widely available. Without a clear a priori reason for

expecting R&D expensing to create information asymmetry, we cannot accept for granted the premise that there exist information asymmetry effects associated with off-balance sheets (unrecorded) R&D assets that merit examination -- the stated purpose of this paper.

More importantly, Boone and Raman (2001) proceed to infer a policy implication: "in particular, our study seeks to examine a potential harm (lower market liquidity) associated with the current accounting treatment for R&D expenditures." There are two problems with this stated goal. First, the study design cannot lead to any inferences regarding the desirability of the accounting treatment for R&D expenditures. Capitalized and amortized R&D assets are computed based on information available from the same financial statements that display the effects of the current accounting treatment. Hence, as mentioned above, this is information that is available to the marketplace. The market liquidity observed (as a dependent variable) is one associated with the current accounting treatment. And just as in the case of treatments A and B discussed above as an illustration, an alternative accounting treatment for R&D expenditures -- the implied capitalization and amortization treatment that is presumably preferred by the authors, analogous to the abstract treatment B discussed above, could well be associated with a different market liquidity that the researchers do not observe. If it were the same, no harm would be associated with a current treatment relative to the alternative treatment. If it were different, we would have to compare the effects of the current accounting treatment along with its associated observed market liquidity, with the effect of capitalization and amortization with its associated liquidity (which, unfortunately, we cannot observe -- and nothing in the current research design allows us to infer it) with

respect to some agreed-upon social objective criteria. (See Ronen, 1974a pp. 80-82 and 1974b pp. 36-41). Indeed, it is very difficult to conjecture as to whether the liquidity associated with a capitalization and amortization would be higher or lower. The reasons for the potential ambiguity are subtle but concrete.

Suppose the Financial Accounting Standards Board (FASB) recommends capitalization and amortization. Clearly, this will not necessarily reflect the actual potential future benefits (after all, it is only the costs that are being capitalized and amortized). Given that the series of R&D expenditures is available in the footnotes, the only information content incremental to what exists under the hypothetically proposed FASB treatment of capitalization and amortization would be the amortization, which allegedly reflects private information of the managers regarding the potential useful life of the R&D expenditures. In other words, the amortization will reveal (partially) the managements' private information regarding the future flows to be generated as a result of the R&D effort. Unfortunately, such an argument suffers from two major disadvantages. First, even if the amortization truthfully reflects managements' private information, it is subjective, and associated with high degree of uncertainty by the very nature of the innovative R&D projects -- with respect to which there is no prior experience - and thus unreliable. The more important disadvantage is that such mandated private information will be strategically distorted to further management's own interests (as specified in compensation contracts). The main feature of this kind of private information is that it is not ex-post verifiable inasmuch as one cannot determine with certainty what particular projections of future cash flows the manager perceived at a prior point of time when embarking on the innovative R&D venture. Hence, truthful signaling

of the potential useful lives through amortization cannot be achieved. It would be equally impossible to elicit the truth through supplementary voluntary disclosures of the projected prospects. Since such voluntary disclosures are not perfectly verifiable ex-post there will be no truth-telling equilibrium in the sense of the manager telling the truth and the markets believing the truth when told (see Ronen & Yaari, forthcoming). Under these circumstances, the perceived increase in bias and uncertainty could lead to decreased market liquidity rather than increased market liquidity.

But even if we suppose that capitalization and amortization would have helped honestly and accurately convey the managements' private information regarding future cash flows with a consequent increase in market liquidity, it is not clear that this would have been socially desirable. In other words, even though it is not feasible, assume that, miraculously, the truth can be elicited either mandatorily or voluntarily from managements through an amortization schedule or through additional disclosures. Aside from the conventional argument of harming the comparative advantage of the company, disseminating truthful information about an innovative activity may well depress the incentives to generate information and engage in the innovative activity to begin with. This in turn, may depress innovation (see an analysis in the context of insider trading rules in Ronen, 1977).

As well known, one of the potent rewards for entrepreneurial and innovative activity is the ability to generate information and privately utilize it for gain. This is the logic underlying patent protection and other related incentives for entrepreneurial activities (see Ronen, 1983 pp.1-12). Hence, the net result of a hypothetical dissemination of truthful private information regarding future cash flows of R&D

expenditures may well be enhanced market liquidity, but also a depressed level of entrepreneurial and innovative activity. The calculus of trade-offs between the two, at best, is difficult to conduct a priori. Most likely, the harm to entrepreneurship more than offsets the benefits of hypothetically increased market liquidity.

There is yet another disadvantage to quantifying the potential benefits of R&D activity, even if it could be done truthfully. Once credible measures of R&D benefits become available, they are likely to become an argument in the compensation function of managers. But because such benefits are subject to a high degree of exogenous uncertainty, linking compensation to such measures will impose higher risk on risk averse managers. And since shareholders (acting as principal) may choose to structure compensation contracts so as to discourage risk-taking, the results could well be a depressed level of investment in R&D activities – contrary to a social objective of encouraging innovative activity and entrepreneurial investments in R&D ventures.

Boone and Raman cite Lev and Sougiannis (1996, p. 134) to the effect that "R&D capitalization would provide investors with "statistically reliable and economically relevant information". They use the citation purportedly to presume usefulness as the necessary condition (Lev 1988, p. 2) and proceed seemingly to test for a sufficient condition of equity as implied by mitigating information asymmetry. But the association of capitalized and amortized R&D expenditures with contemporaneous market prices or returns need not imply incremental relevant information beyond the numbers generated by the current expensing. An association of capitalized and amortized R&D expenditures with contemporaneous or future returns may be a simple result of greater uncertainty or risk associated with R&D intensity that is not captured by the standard measures of

systematic risk, book to market, etc. (see Chambers et al., 2001). Hence, neither usefulness (the presumed necessary condition) nor potential information asymmetry can be either assumed or inferred from existing studies. And, as I shall argue below, the results Boone and Raman (2001) document in their current study are consistent simply with higher uncertainty associated with R&D intensity, rather than information asymmetry. (The conceptual arguments as to why information asymmetry need not exist were explicated above.)

To summarize this introduction and motivation section, Boone and Raman (2001) have assumed that capitalized and amortized R&D expenditures imply information asymmetry. In fact, they need not. They assumed that an accounting treatment of capitalization and amortization would reduce information asymmetry. It need not. Boone and Raman (2001) assumed that under an accounting treatment of capitalization and amortization market liquidity would increase. It need not. And they assumed that capitalization and amortization with a potentially different associated observed market liquidity constitutes a Pareto improvement relative to R&D expensing coupled with its associated, currently observed market liquidity. There is no basis for this latter assumption either.

Financial reporting regulation and ex-ante equity

Boone and Raman attempt to justify their inquiry by invoking the notion of equity:

In a multi-person setting of diverse users with varying preferences, endowments, and objectives, usefulness is not an adequate basis for accounting regulation. Rather, the public interest criterion applied by accounting regulators (such as the FASB and the SEC)

is that of equity in the capital markets defined as ex-ante equity or equality of opportunity, i.e., equal access to value relevant information.

Unfortunately, the criterion of equity is neither desirable necessarily, nor feasible. Nor is there any evidence that it is the criterion applied by accounting regulators as the authors claim. The criterion of equity as defined in the above sentence may not be desirable because, if it were to be implemented, incentives to generate value relevant information in the pursuit of enlightened self-interest would be depressed, thus diminishing the total amount of value relevant information available in the economy, and correspondingly making resource allocation less efficient (Ronen, 1977). In fact, equality of opportunity should be operationalized not as equal access to value relevant information as quoted by the authors, but rather as equal opportunity to generate or acquire information. Under the latter criterion, each market participant will optimally decide on the amount of resources he or she is willing to devote to the generation of value-relevant information for personal gain. Competition among market participants will lead to an efficient resource allocation to information generation. Enforcing equal access by all to such information, once generated, will eliminate or at least depress the incentives to generate such information, thus leading to less efficient allocation of resources to information generation.

To the extent the outcome of economically motivated search and generation of information is such distribution of income and wealth as would be deemed unfair, and hence socially undesirable, it would be up to the legislative and executive branches of government to redistribute wealth by means of hopefully incentive-neutral fiscal and other policies that will not distort the incentives to generate information optimally. Such

redistribution initiatives naturally lie in the political science domain, where, as part of the democratic process, diverse interests and preferences of the population are weighted and combined into some social equilibrium (albeit by necessity imperfectly). And while the FASB may have the technical expertise to provide inputs to government with respect to effects of alternative accounting policies on wealth distribution, it certainly does not have the comparative advantage in identifying redistribution initiatives (see Ronen and Sorter, 1989, pp. 69-74).

But suppose for argument purposes that the criterion of equity as formulated by Boone and Raman (2001) is indeed desirable. Is it feasible? Unfortunately, it is not. What the arguments the authors make miss is the notion of an equilibrium. Simply stated, managers in possession of private information, which cannot be perfectly, verified ex-post, will not have the incentives to provide information truthfully, whether mandatorily or voluntarily (see Ronen and Yaari, forthcoming). Hence, "... bringing private information into the public domain through disclosure regulation" (see Boone and Raman, 2001) is simply not feasible with respect to private information that is not ex-post verifiable. And, in fact, private information on future benefits of R&D efforts and expenditures is not ex-post verifiable. Ex-post realizations of R&D benefits, even if they could be identified in isolation (which may be impossible in light of the jointness of factor inputs) cannot be used to verify the prior private information possessed by the manager: the ex-post realization may will diverge from the prior private expectation of the manager.

Nor is the criterion of equity implied in the objectives of financial statements as articulated in the conceptual framework. The conceptual framework specifies

characteristics of information disclosures that would result in an efficient resource allocation -- not necessarily a fair or equitable distribution. As indicated above, this aspect of social welfare must be left to the political process.

Hypotheses and Model Development

At the core of Boone and Raman's (2001) hypothesis is the presumption that not recording R&D assets in the balance sheet exacerbates information asymmetry and hence reduces market liquidity. As I had discussed above, there is no a priori reason to expect the recording of capitalized and amortized R&D expenditures to reduce information asymmetry.

Moreover, rather than information asymmetry, any potential association between capitalized and amortized R&D assets with measures of liquidity and depth may stem from the higher risk associated with R&D expenditures. And the higher the R&D expenditures (i.e. the higher the capitalized and amortized R&D assets used by Boone and Raman as an independent variable) the higher the risk and the higher the measure the authors use to proxy for information asymmetry. That is, the spread is increased beyond inventory and processing costs as a compensation for the increased price volatility that may be coincident with the greater (and hence more risky) R&D expenditures. This distinction between information asymmetry and risk is vitally important both for the formulation of hypotheses and for the interpretation of the results. The hypotheses could well have been formed along the line that: capitalized and amortized R&D assets, which reflect aggregates of past R&D expenditures are associated with higher uncertainty of future cash flows, and hence with higher potential price volatility, and consequently, with

higher spread and lower depth. This incorporates the first and second hypotheses of the authors. Similarly, Boone and Raman's third hypothesis: "for R&D-intensive firms, the change in market liquidity from one year to the next is negatively associated with a change in the magnitude of off-balance sheet R&D assets" is preserved with the interpretation that R&D assets reflect higher risk rather than information asymmetry.

Also, note that capitalizing past R&D expenditures to produce the measure of R&D assets introduced as independent variable in Boone and Raman's regressions, adds no incremental information content to the data already available in the past series of financial statements, i.e., past R&D expenditures and the past series of earnings used to compute the amortization. And since the amortization of the past R&D expenditures is determined by the researchers, then clearly the capitalized R&D assets do not reflect private information. Such a hypothesis and model therefore bear no relation to potential revelation of private information and have no implications for accounting policy.

Results

Boone and Raman confirm their first hypothesis only with respect to spread. That is, they find statistically significant association between market liquidity and the fact that a firm is an R&D-intensive firm: R&D intensive firms are associated with higher spread. They also confirm the second hypothesis in that they document a negative association between liquidity and the magnitude of their computed R&D assets (for both the spread and the depth measures). Boone and Raman additionally confirm the third hypothesis but only with respect to the spread: the change in the spread measure is associated with the change in the magnitude of the authors' computed unrecorded R&D assets.

But as I have indicated, all these results probably are more properly interpreted in terms of association between the higher risks reflected in larger R&D expenditures and diminished liquidity. Indeed, in response to my own remark (I was one of three external reviewers) to the authors to the effect that the association between market liquidity and the magnitude of off-balance sheet R&D assets may simply reflect higher investor uncertainty for R&D intensive firms, the authors have rerun the regression analyses using the ratio for R&D spending to sales instead of their own measure of assets as a test variable. They did not present a table showing these results, but they report that the R&D spending variable was significant in the level specification for R&D intensive firms: the R&D spending variable was positively associated with the spread; but the change in R&D spending was not significant in their model 3; i.e. it was not associated with the change in their liquidity measure. Boone and Raman (2001) conclude from this that their own test variable is more strongly associated with impaired market liquidity than the reported R&D spending variables. Unfortunately, Boone and Raman did not compare their test with one that utilizes a measure of R&D intensity on an equal footing. To elaborate, their own measure of information asymmetry, capitalized and amortized R&D expenditures, incorporates available information from past financial statements. Specifically, it is the aggregation of past R&D expenditures adjusted by amortization rates computed by relating back past expenditures to past earnings. To pit against this measure an alternative measure of R&D intensity (possibly reflecting risk) that preserves the same information content, the competing measure used should be the aggregate of past R&D expenditures without the amortization, and not merely the R&D spending

variable related to only the current year. Using the latter will not level the playing field. Similarly, just as their model 3's independent variable is the change in their measure of R&D assets, the corresponding independent variable in the competing test should be the change in the aggregate R&D expenditures. But whether adjusted for amortization or not, the authors' own measure as well as a simple aggregation of past R&D expenditures cannot be interpreted as a source of information asymmetry: both measures are publicly available or computable. Moreover, to the extent the diminishment in liquidity is due to the higher risk surrounding R&D intensity, then clearly no accounting implications are in order: no change in accounting policy will alter the amount of inherent business risk.

But even in light of the results of the test, conducted by Boone and Raman, wherein they utilize the current year R&D spending independent variable, the authors make a questionable inference. I do not have available to me the detailed results (which they do not present). However, it does not seem reasonable -- based on their reported finding that "the R&D spending variable was significant in model 2 (the level form model) at the .05 level for both 1995 and 1996; however, the change in R&D spending variable was not significant in model 3 (the change form model)" -- to conclude that "since the capitalized R&D variables (OBSRDA and its change) are more significant than the R&D spending variables, the results suggest that our test variables (and by implication the Lev & Sougiannis amortization rates) are more strongly associated with impaired market liquidity than the reported R&D spending variables."

This conclusion requires a test of "relative information content" that is based on the statistical significance of the difference between the adjusted R^2 s of their models, run once with their OBSRDA, and a second time with their computed ratio of R&D spending to sales (instead of OBSRDA) using procedures such as the likelihood ratio test as described by Vuong (1989) or the Biddle-Seow-Siegel test presented in Biddle et al. (1995). From the results reported, it does not appear that such a test was conducted.

Concluding Remarks

Studies that explore the empirical association between accounting numbers and price-based measures cannot, by themselves, lead to inferences regarding the usefulness of alternative accounting policies. One can only assess usefulness relative to well-specified social objectives. This commentary dwelled in some detail on the reasons for why one cannot make such inferences. The formulation of socially desirable accounting policy is a complicated endeavor that requires a normative approach -- one that deduces desirable accounting standards from agreed-upon objectives. In this process of deduction, one makes assumptions regarding the behavior of individuals and markets in the aggregate. Studies that test the descriptive validity of such assumptions may be required. Studies employing tests of association between accounting numbers and price-based measures, under the best of circumstances, can illuminate only one-corner of the black box. Namely, does the market behave as if it both 1) believes and 2) attaches some weight, to information provided to it? They shed no light on the desirability of alternative accounting policies.

The paper by Boone and Raman (2001) belongs to this genre of literature that examines the association between accounting numbers and stock price-based measures. In their concluding remarks, the authors state: ... Still, our findings suggest that the current accounting treatment of R&D spending may be associated with potential harm (diminished market liquidity) and that additional disclosures in the financial statements relating to the nature and future outcomes of a firm's R&D activities (rather than just the amount of R&D spending as a single aggregate item of disclosure as currently required by SFAS No. 2 (FASB, 1974) may help mitigate information asymmetry and improve market liquidity for R&D-intensive firms. ... our results provide additional evidence suggesting possible deficiencies in the extant financial reporting for R&D-intensive firms."

By now it should be apparent, in light of the prior discussion, why no accounting policy implications or suggestions of deficiencies in the extant financial reporting can be inferred from the Boone and Raman study, nor is there an independent documentation of the existence of information asymmetry, as opposed to higher risk associated with R&D efforts.

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