Empirical research on accounting choice

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Received 21 January 2000; received in revised form 31 January 2001

Abstract

We review research from the 1990s that examines the determinants and consequences of accounting choice, structuring our analysis around the three types of market imperfections that influence managers’ choices: agency costs, information asymmetries, and externalities affecting non-contracting parties. We conclude that research in the 1990s made limited progress in expanding our understanding of accounting choice because of limitations in research design and a focus on replication rather than extension of current knowledge. We discuss opportunities for future research, recommending the exploration of the economic implications of accounting choice by addressing the three different reasons why accounting matters. © 2001 Published by Elsevier Science B.V.

\textit{JEL classification:} M41 accounting

\textit{Keywords:} Capital markets; Accounting choice; Voluntary disclosure; Accounting judgments and estimates; Earnings manipulation
1. Introduction

Research on accounting choice addresses the fundamental question of whether accounting matters. With complete and perfect markets, there is no substantive role for financial disclosures and thus no demand for accounting or accounting regulation.\(^1\) However, in our world of imperfect and incomplete markets, the demand for accounting and accounting regulation implies that accounting disclosures and accounting-based contracts are efficient ways of addressing market imperfections.

To analyze the role of accounting, we need a definition of accounting choice. For the purpose of this review, we choose a broad definition:

An accounting choice is any decision whose primary purpose is to influence (either in form or substance) the output of the accounting system in a particular way, including not only financial statements published in accordance with GAAP, but also tax returns and regulatory filings.

This definition is broad enough to include the choice of LIFO vs. FIFO, the choice to structure a lease so that it qualifies for operating lease treatment, choices affecting the level of disclosure, and choices in the timing of adoption of new standards. We also include real decisions made primarily for the purpose of affecting the accounting numbers in this definition. Examples of real decisions include increasing production to reduce cost of goods sold by reducing per unit fixed costs and reducing R&D expenditures to increase earnings. Managerial intent is key to this definition of accounting choice, particularly with respect to real decisions; that is, whether the impetus behind the decision is to affect the output of the accounting system or whether the impetus derives from other motives. For example, does a firm reduce its R&D expenditures primarily in order to alter accounting disclosures or primarily because of lower expected future returns to the R&D investment?

Questions about the determinants and implications of accounting choice have motivated accounting research since at least the 1960s.\(^2\) Using our definition of accounting choice, we tabulate the research published in the 1990s and find that roughly 10 percent of papers in the three top accounting journals directly address questions relating to accounting choice.\(^3\) Even with this

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\(^1\) This fact has been recognized in previous literature; see, for example, Watts and Zimmerman (1979, 1986), Holthausen and Leftwich (1983).

\(^2\) The creation of the APB in 1960 provided impetus to this stream of research because the APB’s main goal was to achieve greater consistency and uniformity of accounting rules and disclosures. An analogy can be made to the FASB’s and IASC’s goals today.

\(^3\) The breakdown, based on our rough hand count, is 13 percent for the Journal of Accounting and Economics, 14 percent for the Journal of Accounting Research, and 5 percent for The Accounting Review.
scholarly attention and effort, our understanding of these questions remains limited despite improvements in research methods, data sources, and computing power. For example, there is still no consensus on what purposes accounting choices serve. For example, managers whose incentives are consistent with those of the firms’ owners may exercise accounting choices to convey private information to investors; other managers may use discretion opportunistically, possibly inflating earnings to increase their compensation.

In this paper, we provide a structure and approach for analyzing the outstanding issues relating to accounting choice in the context of research results to date. We review and summarize the results of research bearing on accounting choice, focusing on the 1990s, as the basis for our conclusions about the implications of this research. We also assess the extent to which knowledge of the importance of accounting choice has increased beyond that of the 1970s and 1980s. We then articulate our own conclusions about the importance and implications of accounting choice research, anticipating that our conclusions will be used as benchmarks for other, perhaps conflicting, points of view. Finally, we provide suggestions for future avenues of research into accounting choice.

We organize our review by classifying the accounting choice literature into three groups based on the market imperfection that makes accounting important in a given setting—agency costs, information asymmetries, and externalities affecting non-contracting parties. We interpret the three categories as follows. Agency costs are generally related to contractual issues such as managerial compensation and debt covenants. Information asymmetries generally are associated with the relation between (better informed) managers and (less well informed) investors. Finally, other externalities are generally related to third-party contractual and non-contractual relations.

This classification results from our hypothesis that accounting is important for at least three reasons. First, accounting plays a significant role in the contractual relations that form the modern corporation, presumably to mitigate agency costs (Jensen and Meckling, 1976; Smith and Warner, 1979; Watts and Zimmerman, 1986). Second, accounting provides an avenue through which managers disseminate privately held information, and the specific accounting method choice can play a key role in that communication process. Third, regulation of accounting affects the quality and quantity of financial

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5 We use the term ‘information asymmetry’ as shorthand for the presence of information asymmetries in conjunction with incomplete markets.
disclosures, which in turn have welfare and policy implications in the presence of externalities.

We believe this taxonomy provides useful insights into the existing accounting literature. The rationale for this approach is our belief that there are greater similarities among the problems and their solutions within each category than there are across categories. This allows researchers to analyze each category in isolation. Although the demarcations among the three categories are not precise, this heuristic is useful to simplify the analysis of complex relations absent a comprehensive theory.

Based on our review of prior work, we conclude that accounting research has made modest progress in advancing the state of knowledge beyond what was known in the 1970s and 1980s. As such, our conclusions are generally consistent with those of Holthausen and Leftwich (1983) and of Watts and Zimmerman (1990), reached more than a decade earlier.

We conclude that one reason for the lack of progress in the 1990s is that researchers generally focus on refining knowledge of specific accounting choices or on narrow problems that accounting choices are presumed to address. Consistent with the acknowledged complexity of the task, there have been few attempts to take an integrated perspective (i.e., multiple goals) on accounting choice. A second reason is that accounting research generally fails to distinguish appropriately between what is endogenous and exogenous (e.g., CEO departure is treated as exogenous and R&D funding is measured relative to CEO tenure). Finally, absent a theory, researchers apparently limit their inquiries to the pathological, and perhaps less frequent, use of accounting choice and ignore the major role of accounting in normal, day-to-day situations. Obviously, what is called for is a comprehensive theory that investigates the role of accounting in a world with market imperfections. However, such a comprehensive theory is currently unavailable and possibly unattainable.

We believe that there are opportunities for future research that will advance our knowledge of accounting choice. First, we suggest that evidence be gathered on whether the alleged attempts to manage financial disclosures by self-interested managers are successful; that is, what are the economic implications of the accounting choices? Second, we believe there should be more emphasis on the costs and benefits of addressing the three types of market imperfections driving accounting choice. We suspect that these costs and

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6Witness the decades long debate on purchase and pooling accounting for business combinations. Technically, the use of purchase or pooling accounting is not a choice but is dictated by the characteristics of the business combination. However, in practice, firms alter these characteristics to obtain the desired accounting treatment. Furthermore, proposed business combinations have been terminated when pooling treatment was not allowed. Another example is the recent debate about the accounting for executive stock options in which opponents claimed significant economic ramifications if stock options were expensed.
benefits vary over choices, over time, and across firms. Third, we suggest that researchers develop better theoretical models and more refined econometric techniques with the explicit goal of guiding empirical research and articulating expected results from such empirical research.

This paper proceeds as follows. The next section discusses reasons for accounting choice and Section 3 provides a taxonomy based on the motivation for the accounting choice. Section 4 discusses the results and implications of prior research, organized by the categories of accounting choice provided in Section 3. Section 5 outlines the impediments to progress in research into accounting choice. Finally, Section 6 provides suggestions for future research.

2. Reasons for accounting choice

Generally accepted accounting principles (GAAP) often require that judgment be exercised in preparing financial statements. For example, that judgment may relate to the amount of accounts receivable that are likely to be collected, the appropriate allocation pattern for the cost of equipment, or how long a marketable security is likely to be held.

In turn, exercising such judgments provides information to outsiders when information asymmetries are present. This is self-evident when the decision-maker (e.g., manager) is disinterested and objective, although issues of consistency and comparability inevitably arise. Accounting choice also may be beneficial because alternative accounting methods may not be perfect substitutes from an efficient contracting perspective (Watts and Zimmerman, 1986; Holthausen and Leftwich, 1983; Holthausen, 1990).

However, unconstrained accounting choice is likely to impose costs on financial statement users because preparers are likely to have incentives to convey self-serving information. For example, managers may choose accounting methods in self-interested attempts to increase the stock price prior to the expiration of stock options they hold. On the other hand, the same accounting choices may be motivated by managers’ objective assessment that the current stock price is undervalued (relative to their private information). In practice, it is difficult to distinguish between these two situations, but it is the presence of such mixed motives that makes the study of accounting choice interesting.

Because of these conflicting motives, contracting parties restrict the choices available to decision makers (Watts and Zimmerman, 1986). In addition, accounting regulators recently have voiced concerns about GAAP providing too much choice. The SEC Chairman has indicated enhanced SEC scrutiny of firms that announce major write-offs or participate in other practices consistent with earnings management (Levitt, 1998). Regulators must, therefore, understand the advantages and disadvantages of allowing choice and determine the 'optimal' level of discretion. Researchers find it interesting to explore why, for
example, GAAP permits distinct choices (e.g., LIFO/FIFO, purchase/pooling) rather than just providing for judgment in areas that are not dichotomous (e.g., revenue recognition). In addition, a theory of accounting discretion must also take into account the incentives and politics of standard setters (Watts and Zimmerman, 1979).

Although not all accounting choices involve earnings management, and the term earnings management extends beyond accounting choice, the implications of accounting choice to achieve a goal are consistent with the idea of earnings management.

We adopt the definition of earnings management suggested by Watts and Zimmerman (1990) in which they describe earnings management as occurring when managers exercise their discretion over the accounting numbers with or without restrictions. Such discretion can be either firm value maximizing or opportunistic. Rational managers would not engage in earnings management in the absence of expected benefits implying that managers do not believe that information markets are perfect. In order for earnings management to be successful the perceived frictions must exist and at least some users of accounting information must be either unable or unwilling to unravel completely the effects of the earnings management. For example, the posited use of earnings management to influence incentive compensation implicitly assumes that compensation committees may be unable or unwilling to undo completely the effect of such management on corporate profits, perhaps due to excessive costs. Similarly, political cost-based motivations implicitly assume that users of accounting information (e.g., trade unions or government agencies) may be unable to undo completely the effects of earnings management.

By contrast, one can imagine an accounting system that is entirely rule based, with no room for judgment. For example, such a system could specify that the allowance for uncollectibles is always 10% of receivables, that equipment is depreciated straight line over 5 years, and that all marketable securities are to be treated as if they were available for sale. Indeed, U.S. tax accounting has some of those characteristics. Despite the rigid and lengthy rules of the Internal Revenue Code, disputes over interpretation of the code are common. An obvious problem with a rigid accounting system is providing rules for all facts and circumstances. In addition, new situations arise regularly

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Alternative definitions of earnings management include those of Schipper (1999) and Healy and Wahlen (1999). Schipper defines earnings management as “implementation that impairs an element of decision usefulness or implementation that is inconsistent with the intent of the standard”. This modification abstracts from managerial intent. Healy and Wahlen, on the other hand, define earnings management as occurring when “managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers”.

(e.g., debt/equity hybrids, securitizations) requiring that new accounting rules be devised. In other words, accounting choice likely exists because it is impossible, or infeasible, to eliminate it. Accounting flexibility also mitigates managers’ attempts to obtain desired accounting results by means of (presumably costly) real decisions. Thus, the choice may be part of an optimal solution to an agency problem, even when it does not convey information. Finally, specific choices made can be informative, as suggested above, and such information is lost when the accounting system does not provide for judgment.

To assess the desirability and implications of discretionary accounting or accounting choice we need to examine the related costs and benefits. However, such costs and benefits have defied measurement, as discussed in more detail in Section 4. Indeed, researchers cannot identify, let alone quantify, all of the associated costs and benefits. Even such strong proponents of market solutions as Easterbrook and Fischel (1991) recognize that the “imposition of a standard format and time of disclosure facilitates comparative use of what is disclosed and helps to create an efficient disclosure language” (pp. 303–304), although they qualify this conclusion with “no one knows the optimal amount of standardization” (p. 304).

3. Classification of accounting choice

Our classification of the accounting choice literature is grounded in the economics of the firm and in the theories developed by Modigliani and Miller (1958) (MM). With complete and perfect markets, there is no role for accounting, much less for accounting choice. If accounting exists and is relevant to at least some economic decision-makers, then one or more of the MM conditions are violated. We use the MM conditions to derive a taxonomy to classify accounting choice issues by the purpose they serve or the problem they overcome. That is, we specify three categories of goals or motivations for accounting choice: contracting, asset pricing, and influencing external parties. This classification is consistent with the classifications of Watts and Zimmerman (1986) and Holthausen and Leftwich (1983).8

The first category of market imperfections stems from the presence of agency costs and the absence of complete markets (otherwise, one could solve the agency problem through state-contingent contracts). Accounting choice is determined to influence one or more of the firm’s contractual arrangements. Often, this category is termed the efficient contracting perspective (Watts and Zimmerman, 1986; Holthausen and Leftwich, 1983). Such contractual

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8The most apparent (but possibly semantic) distinction between our classification and the approach used by Watts and Zimmerman (1986) and Holthausen and Leftwich (1983) is due to their broad interpretation of costly contracting. Specifically, they view almost all market imperfections such as agency costs or moral hazard as manifestations of costly contracting.
arrangements include executive compensation agreements and debt covenants, the primary function of which is to alleviate agency costs by better aligning the incentives of the parties. However, depending on the structure of these contracts, ex post accounting choices may be made to increase compensation or to avoid covenant violation. In most situations, multiple accounting choices can be chosen singly or jointly to accomplish one or more goals. For example, FIFO for inventory, operating rather than capital leases, and pooling-of-interests accounting are each likely to increase reported earnings and, hence, earnings-based compensation. On the other hand, LIFO often reduces the present value of taxes and the LIFO conformity rule requires that if LIFO is used for tax purposes, then LIFO must be used for financial reporting purposes. Similarly, in allocating the purchase price in a taxable business combination, the allocations for tax and financial reporting purposes are generally the same. In other words, there are potential conflicts among multiple goals in the choice of accounting methods.

The second category of accounting choice, driven by information asymmetries, attempts to influence asset prices. The primary focus in this category is to overcome problems that arise when markets do not perfectly aggregate individually held information (for example because of trading restrictions resulting from insider trading laws, short selling constraints, risk aversion, or contractual restrictions on trading). Accounting choice may provide a mechanism by which better informed insiders can impart information to less well-informed parties about the timing, magnitude, and risk of future cash flows. However, accounting choices are also allegedly made by self-interested managers in the belief that higher earnings will result in higher stock prices, contributing to their compensation or reputation. For example, Levitt (1998) maintains that managers make accounting choices in order to meet analyst earnings forecasts and to avoid the negative stock price reaction that may accompany a missed forecast.

The third category is to influence external parties other than actual and potential owners of the firm. Examples of third parties include the Internal Revenue Service (IRS), government regulators (e.g., public utility commissions, the Federal Trade Commission, the Department of Justice), suppliers, competitors, and union negotiators. That is, by influencing the story told by the accounting numbers, managers hope to influence the decisions of these third parties.

Using this classification of accounting choice, we review recent research and draw inferences based on extant research in each of the categories.\(^9\) As

\(^9\) One criticism we will make is that much of the existing literature has focused on a particular method or goal, rather than considering trade-offs between multiple methods and/or goals. Nevertheless, in the literature review that follows (Section 4) we employ this classification by goal.
indicated in the introduction, this classification facilitates investigation of the issues within each category separately, simplifying the analysis of complex relations absent a comprehensive theory.

We intend this review to cover the major types of research on accounting choice during the 1990s but we acknowledge that our review is not all-inclusive. We focus on three accounting journals, the Journal of Accounting and Economics, the Accounting Review, and the Journal of Accounting Research. These three journals contain a sufficiently large sample that our conclusions can be generalized to the accounting choice literature. Although we review all papers in these journals, our intent was to gather a sample of the major categories of choice-based research; we do not necessarily include every article written on each category.

We do not address international accounting standards but focus only on the U.S., chiefly to limit the length of the paper. Recent work on international accounting standards suggests that differences in the historical development of legal structures and institutions across countries influence their accounting rules (Ball et al., 2000) introducing issues beyond the scope of this paper. We also exclude managerial choices about earnings announcements and other kinds of announcements involving accounting numbers.

Although our charge is to investigate empirical research on accounting choice, we believe that behavioral, experimental, and analytical branches of accounting research also contribute to our understanding of the role of accounting choice. Therefore, we include research using these methods together with the empirical research. However, our structure relies on the tenet of economic rationality. That is, we rely on market imperfections such as transactions cost, externalities, etc. to provide hypotheses for why accounting choice matters. Implicitly, we assume that individual decision makers are rational. Thus, we do not review behavioral research that relies on individual irrationality to explain the same phenomena.

4. Accounting choice research in the 1990s

We structure our review around the three primary motivations for accounting choice set forth in Section 3. After a brief discussion of prior literature reviews, we consider papers that address contractual motivations (including the effects of compensation agreements and debt contracts). The next subsection considers accounting choices motivated by asset pricing considerations. The final subsection discusses cases in which the impact on third parties other than potential investors (e.g., regulators) is the primary focus of the research.
4.1. Prior literature reviews

We review the literature from 1990 to the present because of previous relevant literature reviews. Although prior literature reviews do not focus exclusively on accounting choice, they include significant discussion of research addressing accounting choice. In order to place our analysis in its historical context, we first briefly summarize the relevant findings of several prior review articles, recognizing that this is not an all-inclusive list of literature reviews.

Much accounting research during the late 1960s and 1970s assumes that markets are efficient and examines the association between stock returns and accounting information. One of the main research questions of this period was whether investors could ‘see through’ alternative accounting practices, also referred to as cosmetic accounting choices, to the underlying firm economics (Lev and Ohlson, 1982). Under the assumption of efficient markets, most researchers hypothesized that absent effects on the firm’s cash flows, investors do not alter their assessment of share prices based on alternative accounting methods (e.g., full cost or successful efforts methods of accounting by oil and gas firms). Whereas early studies of discretionary changes in accounting techniques reported results consistent with efficient markets, studies in the late 1970s and early 1980s began to undermine this maintained hypothesis. However, the empirical results were generally consistent with many alternative hypotheses, most of which could be neither convincingly substantiated nor entirely eliminated (Lev and Ohlson, 1982; Dopuch, 1989). Both Dopuch (1989) and Bernard (1989) question whether research methods available in the 1980s were adequate to the task of ascertaining whether investors could ‘see through’ cosmetic accounting changes.

In the late 1970s, innovations in research relating to managers’ motives for the choice of accounting techniques and to the investigation of the effects of accounting choices on contractual arrangements provided an alternative approach to research on accounting choice (e.g., Watts and Zimmerman, 1979). The late 1970s and early 1980s thus witnessed increased empirical research in response to the Watts and Zimmerman (1978, 1979) positive theory of accounting. However, enthusiasm for this line of research also dissipated in the face of unconvincing results. Bernard (1989) concludes that the 26 studies of the economic consequences of mandated accounting changes published in three top accounting journals during the 1980s provided little or no evidence of associated stock price effects. These studies generally focus on detecting share price effects due to debt covenants, incentive compensation or political costs. Bernard suggests that mandated changes in accounting rules result in only small, perhaps undetectable, stock price affects and that discretionary accounting choices may, likewise, have small, perhaps undetectable, affects on stock prices (p. 80).
Holthausen and Leftwich (1983) (HL) find that firm size and leverage are the only two significant variables explaining choices of accounting techniques in their review of 14 papers that study the economic consequences of voluntary and mandatory choices of accounting techniques. HL recognize the limitations of the empirical work they review, particularly with respect to specification of both dependent and independent variables and the low power of the tests. HL’s expectations that the economic consequences may be too small for current research methods to detect were consistent with Bernard (1989).

Watts and Zimmerman (1990) review the positive accounting research in the 1980s. They point out that one of the deficiencies of positive accounting research is the failure to explain “both the ex ante choice of accepted set and the ex post choice of accounting method within the accepted set”. (p. 137) Likewise, they criticize most researchers as focusing on one accounting choice at a time when most managers seek a result that could be due to the combined effects of several choices (see Zmijewski and Hagerman, 1981, for an example of an early attempt to incorporate the latter into the research design). They itemize the common empirical problems in the studies to date, as we discuss later, and stress the importance of incorporating hypotheses of both economic efficiency and managerial opportunism in empirical tests of the theory.

These representative reviews do a good job of not only surveying the literature but also of critiquing it and making suggestions for future work. As a preview to what follows, however, we conclude that the literature has not made much progress during the 1990s in solving the problems of research on accounting choice.

4.2. Contractual motivations

Many contractual arrangements structured to mitigate internal (owner—manager) and external (bondholder—shareholder and current owner—potential owner) agency conflicts rely, at least in part, on financial accounting numbers. For example, management compensation contracts (e.g., Healy, 1985) and bond covenants (e.g., Smith and Warner, 1979) are frequently based on reported financial accounting numbers. Positive accounting theory (Watts and Zimmerman, 1978, 1986) provides the motivation for many studies of whether such contracts provide incentives to managers to choose among accounting methods to achieve desired financial reporting objectives. In general, researchers conclude that their results suggest that incentives work: managers select accounting methods to increase their compensation and to reduce the likelihood of bond covenant violations. On the surface, the research reported in this section provides the most consistent evidence of linkage between decision-makers’ incentives and their ultimate accounting decisions of the three sections. However, the inferences that can be drawn from these tests
have generally been overstated for reasons discussed in greater detail in Section 5.

4.2.1. Internal agency conflicts–executive compensation

Background. The impact of executive compensation contracts (particularly bonus plans) on firms’ accounting choices is one of the most thoroughly investigated areas of empirical accounting choice research. Managerial compensation typically consists of base salary and incentive compensation. Short-term bonus contracts are often tied to reported accounting performance measures such as net income, ROA and ROE, whereas longer-term incentive compensation is often tied to stock performance. This managerial compensation structure generates several interesting research questions on accounting method choice. One set of questions relates to why bonus contracts allow managerial accounting discretion. Dye and Verrecchia (1995) suggest that the reporting flexibility results in a more informative signal about firm performance. Evans and Sridhar (1996) offer a pragmatic justification: in their model, it is costly for the principal to eliminate all reporting flexibility. Thus, some flexibility and the associated increased compensation are a relatively low cost compromise. Finally, if agents can influence their compensation by managing either accruals or real transactions, then manipulating accruals may result in lower wealth losses to principals than manipulating real activity.

Efficient contracting provides another explanation for the existence of accounting choice in compensation contracts. Efficient contracting suggests that, although financial reporting discretion may allow managers to increase their compensation, such discretion also improves the alignment of their interests with those of shareholders (Watts and Zimmerman, 1986). For example, higher accounting earnings that drive higher compensation levels may also result in higher share values or lower probabilities of bond covenant violations. Moreover, in markets characterized by rational expectations, managers will not be able to increase their overall compensation by opportunistically choosing accounting methods because their total compensation package includes the anticipated effect of such choices. For example, by reducing base compensation appropriately the potential excess compensation that may result from affording agents reporting flexibility in their bonus contracts can be avoided without affecting incentives. Little evidence exists, however, on whether such adjustments to compensation packages are actually implemented.10 These hypotheses, although well founded in economic theory,

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10 Matsunaga (1995) documents that the value of executive compensation options granted is inversely related to the extent a firm is below its target level of income and positively related to the firm’s use of income increasing accounting methods. In a similar vein, Warfield et al. (1995) provide evidence that managerial ownership is inversely related to the magnitude of accounting accrual adjustments and positively related to the information content of earnings.
are difficult to test empirically because many of the necessary variables are not observable.

Evidence of managerial opportunism. In general, researchers interpret their results as providing evidence that managers take advantage of the discretion provided by compensation contracts to increase their compensation by managing reported earnings. Starting with Healy (1985), the standard argument has been that managers choose current discretionary accruals to maximize both this period’s bonus and the expected value of next period’s bonus. When earnings are expected to fall between the upper and lower bound, managers make income-increasing choices. When earnings are expected to be either above the upper bound or (significantly) below the lower bound, managers shift income to future periods to maximize multi-period compensation. Healy’s result on upper and lower bounds has become a benchmark for many subsequent compensation studies, despite shortcomings in his methodology. These shortcomings include using total accruals as the proxy for discretionary accruals and a selection bias in his portfolio formation procedure that may drive his results. Guidry et al. (1999) find support for the Healy bonus plan hypothesis using internal data from different business units within a single corporation. An advantage of their setting is that division managers’ actions are less affected by external agency conflicts and stock-based compensation.

On the other hand, Gaver et al. (1995) report evidence inconsistent with Healy; they find that when earnings before discretionary accruals fall below the lower bound, managers select income-increasing accruals (and vice versa). The authors suggest that an income-smoothing hypothesis better explains the evidence.

Holthausen et al. (1995) find support for the Healy hypothesis only at the upper bound. They find no evidence that managers manipulate earnings downward when earnings are below the minimum necessary to receive their bonus and thus reach different conclusions about managerial incentives around the lower bound. Holthausen et al. suggest that Healy’s methodology may account for his result on the lower bound. That is, Healy estimates the region of the bonus contract (upper bound, lower bound, or in between) at which the bonus was computed whereas Holthausen et al. have actual data on the bounds. Healy uses total accruals as a proxy for discretionary accruals whereas Holthausen et al. uses the modified Jones (1991) method to estimate discretionary accruals. Healy’s data are for the period 1930–1980 and Holthausen et al. claim that incentive bonus plans changed significantly in the 1970s and 1980s. Taken together, Holthausen et al. suggest that these features of Healy’s research design could explain the differences in empirical results at the lower bound between Healy and Holthausen et al.

Focusing on CEO cash compensation, Gaver and Gaver (1998) report that the compensation function is asymmetric: cash compensation is positively related to above the line earnings as long as earnings are positive whereas cash
compensation seems to be shielded from above the line losses. They find similar results for nonrecurring items, thus refining the initial Healy (1985) results and suggesting that managers have significant incentives as to when to recognize gains and losses. However, as we discuss in Section 5, the models used to detect accruals management are not very powerful. As a result, what is labeled accruals management in the above studies may, in fact, be evidence of actual performance. Moreover, the purpose of incentive contracts is to align the incentives of the agent with those of the principal and excluding that purpose from the analysis, as most research does, can create inference problems. That is, researchers implicitly assume that managers manipulating earnings in an apparent attempt to maximize their compensation are not acting in the best interests of shareholders. If, however, the incentive compensation contract is structured to align managers' interests with those of shareholders, such actions might well be beneficial to shareholders.

Ittner et al. (1997) expand the Healy analysis by investigating the extent to which CEO bonus contracts also are based on non-financial measures. They report that reliance on non-financial measures increases with the noise of financial measures, with regulation, with corporate innovation, and with corporate quality strategies. Chen and Lee (1995) find that the choice between taking a write-down in oil and gas properties or changing to the successful efforts method is associated with the pre-write-down level of accounting income and that executive bonuses for both write down and switching firms are likewise associated with accounting net income. Firms with accounting losses before a write-down were more likely to take a write-down, which is interpreted as consistent with Healy's (1985) lower bound hypothesis. However, these authors fail to explore alternative explanations for the results. For example, the managers may engage in what has come to be known as 'big bath' behavior. That is, when earnings are already below expectations or are negative for a period, some managers allegedly write-off (perhaps prematurely) as many costs as possible in that period with the intention of claiming they are 'clearing the decks' to facilitate improved future performance (Elliott and Shaw, 1988; Strong and Meyer, 1987). There is evidence that investors react positively to such announcements (Elliott and Shaw, 1988; Francis et al., 1996). This failure to consider alternative hypotheses illustrates the type of myopia that has come to be associated with many economic consequences studies.

Finally, in an effort to test the underlying rationale of efficient contracting for the bonus plan hypothesis literature, Clinch and Magliolo (1993) (CM) consider whether accounting 'window dressing', in the absence of cash flow effects, impacts CEO compensation for a sample of bank holding companies. CM partitions earnings into three components (operating earnings and discretionary non-operating earnings with and without cash flow implications). They find no evidence that income from discretionary transactions unaccompanied by cash flows affects compensation. They also detect no distinction
between the positive association with compensation of operating income and discretionary items with cash flow effects, that is, between permanent and transitory earnings. However, there are several significant problems with the CM study that complicate interpretation of their results. First, the power of their tests is low due to small sample size and imprecise data definitions. Second, they point out that they cannot discount alternative explanations for the discretionary actions taken by management that the authors assume are due to earnings management. Third, CM cannot disprove that the actions taken by management are optimal economically (e.g., the sale of the credit card portfolio or of the headquarters building may maximize firm value rather than just executive compensation). Finally, they also cannot disprove that the actions may optimally address tax and/or regulatory concerns.

Several studies document that incoming CEOs apparently have an incentive to decrease earnings in the year of the executive change and increase earnings the following year (Strong and Meyer, 1987; Elliott and Shaw, 1988; Pourciau, 1993; Francis et al., 1996), presumably to enhance the incoming CEO’s reputation. In a similar vein, Dechow and Sloan (1991) find that CEOs spend less on research and development during their final years in office, presumably because of the short-term incentives that result from bonus contracts (although CEO stock ownership may mitigate this effect). They conclude that accounting based contracts can induce managers to take actions that increase their bonus compensation but reduce shareholders’ wealth (by more than the bonus amount).

Problems with endogeneity. Murphy and Zimmerman (1993) suggest that the conditioning events used in Dechow and Sloan (1991) are likely to be related to the analyzed events. They find that alleged turnover-related changes in research and development, advertising, capital expenditures, and accounting accruals are due mostly to poor performance rather than to direct managerial discretion. Thus, the CEO departure and the observed reductions in R&D, advertising, and capital expenditures are not likely to be independent events. Murphy and Zimmerman report that, to the extent that outgoing or incoming managers exercise discretion over these variables, the discretion is limited to firms where the CEO’s departure is preceded by poor performance, suggesting that poor performance may have led to both CEO departure and lower R&D investments.

Lewellen et al. (1996) find that when firms provide voluntary disclosure of stock performance compared to benchmarks, the benchmarks are chosen to maximize relative reporting-firm performance, presumably with the goal of enhancing the managers’ perceived performance. However, the authors provide no evidence on whether such a ploy has a discernible impact on stock prices, management compensation or CEO reputation. Perhaps more problematic is the authors’ failure to explore alternative explanations for the observed, or at
least hypothesized, behavior. That is, they set up a story and simultaneously construct a test of the story with no well-specified alternative hypothesis.

Dechow et al. (1996) examine the characteristics of firms lobbying against the 1993 Exposure Draft on stock-based compensation to infer the incentives for these firms to lobby. They find no evidence that the opposition was driven by firm size, by concerns about debt covenant violations, or by fears that the new standard would raise the cost of capital for firms contemplating raising capital. They conclude that the opposition was driven by compensation concerns. But they do not explore what other events of the time, firm characteristics, or management incentives might potentially explain the observed behavior that they attribute to compensation concerns.

Although the goal of incentive-based compensation is to align managers’ interests with those of shareholders, improperly constructed bonus contracts may result in perverse outcomes when actions taken by managers result in wealth reductions for shareholders. Klassen (1997) finds that, when divesting major assets, companies with high tax rates and low inside ownership trade-off larger taxable gains (or lower losses) for financial reporting gains. Presumably, this trade-off is motivated by bonus considerations. In fact, what may seem like a trade-off of earnings at the expense of higher cash taxes may in fact result from differences in proceeds across divestiture methods. To the extent these events are endogenous, inappropriate inferences result.

The evidence we summarize above suggests not only that incentives created by bonus contracts result in management actions, but that they also may have adverse consequences to shareholders. However, these inferences must be tempered for several reasons. First, the contract itself is endogenous. Thus, the obvious opportunities for self-serving behavior should have been anticipated and priced. Second, other checks and balances exist. For example, if appropriate, the compensation committee of the board of directors has the authority to make adjustments to bonuses. Third, the models used to detect accruals management are not very powerful and may not be able to differentiate between accruals management and real performance (we discuss this issue in Section 5). Fourth, the above studies implicitly take the conditioning event as exogenous. For example, Dechow and Sloan (1991) measure research and development expenditures relative to a (exogenously) given CEO replacement. Similarly, Klassen (1997) takes the proceeds of alternative divestiture methods as given, but the causality may run in the opposite direction, as suggested by Murphy and Zimmerman (1993). Fifth, only part of the compensation function, usually the cash bonus is analyzed, without considering the effect on total compensation (including stock ownership). Sixth, managerial opportunism is usually defined as maximizing the current period’s net income whereas there are different forms of managerial opportunism. Thus, important aspects of incentive compensation are excluded from the analysis. Finally, alternative explanations are not explored; as noted
above, managerial behavioral that is interpreted as opportunistic might as easily be interpreted as value maximizing in at least some of the above settings. Therefore, we remain skeptical of the validity of the inferences drawn from this literature.

Managerial opportunism vs value maximization. Christie and Zimmerman (1994) adopt a somewhat different approach in attempting to differentiate between opportunistic and value maximizing behavior. They select a sample of takeover targets, arguing that these firms are likely to have had inefficient management that eventually led to changes in corporate control. The authors find that, compared to their surviving industry peers, the takeover targets had a higher frequency of income increasing accounting methods for up to 11 years prior to the corporate control action. However, they also find that the incidence of managerial opportunism in accounting choice was low relative to the frequency with which managers chose accounting methods to maximize firm value. The results lead them to the conclusion that maximizing firm value is more important in accounting choice for the takeover targets than is managerial opportunism and, because their sample was chosen to maximize the probability of finding opportunism, they believe that opportunism would be even less important in a random sample of firms, at least for the three choices they studied: depreciation, investment tax credit, and inventory. However, alternative interpretations are consistent with these results. First, the surviving firms may not be free of opportunistic accounting method choice, thus affecting their comparison. More importantly, it is also plausible that the evidence is due to a selection bias: managers of the treatment sample tried to convey the impression to investors that their stock was undervalued, but were unsuccessful in this effort and were subsequently subject to a control contest. Thus, what looks like an opportunistic method choice may be, in fact, just the opposite.

Summary. The literature suggests that managers exploit their accounting discretion to take advantage of the incentives provided by bonus plans. However, little is known about whether such manipulations actually result in higher payouts, or about the impact of earnings management on other corporate goals. For example, the literature does not provide evidence on whether this discretion comes at the expense of shareholders, or whether it is part of a deliberate attempt to align managers’ incentives with those of shareholders, possibly at the expense of other claim holders. Thus, what is needed is more evidence on the impact of accounting discretion on the goals and on the trade-offs between compensation and other goals.

4.2.2. External agency conflicts–bond covenants

Debt contracts are another widely researched contractual use of accounting information. As in the case of compensation contracts, an interesting question is why lending agreements rely on reported accounting numbers and why these contracts allow companies discretion to select and change accounting methods
subsequent to the debt issuance. Generally, it is assumed that ‘floating GAAP’ is used because it is less costly to monitor (e.g., legal costs) and because of the difficulty in specifying ‘frozen GAAP’. Another posited advantage of floating GAAP is that it imposes fewer restrictions on corporate activities, particularly investments (see, for example, Smith and Warner, 1979; Holthausen and Leftwich, 1983; Watts and Zimmerman, 1986). However, we are not aware of direct empirical tests of this latter conjecture.

Researchers use two approaches to test the impact of bond covenants on accounting method choices. First, researchers hypothesize that managers select or change accounting methods to avoid covenant violations; this has become known as the ‘debt hypothesis’. There are two groups of studies within the category of work investigating the accounting method choices made due to debt covenants: the first tries to explain accounting choices with closeness to debt covenants and the second focuses on firms that have violated debt covenants. Second, researchers have investigated which firms are more likely to be adversely affected by mandated accounting changes by analyzing stock price reactions around the announcement of, or the lobbying behavior prior to, mandated accounting changes. The latter approach fell out of favor in the 1980s.

Most work investigating the debt hypothesis in the 1980s used crude proxies such as the leverage ratio for the proximity of the firm to violation of its debt covenants. However, Lys (1984) documents that because leverage is determined endogenously, it is a poor proxy for default risk, unless there is a control for the risk of the underlying assets. On the other hand, Duke and Hunt (1990) determine that the debt to equity ratio is a good proxy for the closeness to some covenant violations, including retained earnings, net tangible assets and working capital, but not for other covenants. In the 1990s researchers began studying firms that actually violated covenants in order to avoid the use of proxies.

Healy and Palepu (1990) examine whether managers make accounting changes to avoid violating the dividend constraint in debt covenants. They measure the proximity of the firm to violation of the debt covenant as the ratio of funds available for dividends to dividends paid. They find no difference in the frequency of accounting changes by the sample firms compared to a control group. On the other hand, they find that firms close to violating the dividend constraint cut and even omit dividends, raising the question of whether firms make accounting decisions in response to potential covenant violations only when there is no lower cost solution.

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11 ‘Floating GAAP’ refers to the use of current accounting rules for computing financial terms in debt contracts. ‘Frozen GAAP’, on the other hand, refers to the use of rules that were in place at the time of the contract signing to compute the financial terms in the contract, regardless of any subsequent accounting rule changes.
Sweeney (1994) finds that managers of firms approaching debt covenant default (most often net worth or working capital restrictions) respond with income-increasing accounting changes. She examines a sample of firms that actually defaulted by violating debt covenants together with a matched firm control sample. She reports that the defaulting firms made more accounting changes in the period leading up to default and that a higher percentage of these changes were income increasing compared to the control group. The defaulting group also made more cash-increasing accounting changes (i.e., LIFO-related and pension-related changes). However, only 40% of the default firms made accounting changes during the period surrounding default and cross-sectional analysis fails to provide statistically significant evidence that default firms engage in income-increasing accounting changes. Sweeney also reports mixed evidence on the influence of taxes (cash outflows) on accounting changes. Three firms increased taxes by accounting choices and four firms chose not to switch to FIFO because of the tax costs. The main contribution of Sweeney’s study is the use of real variables for default rather than proxies. However, her results are mixed and do not justify the strong inferences drawn in the paper. In addition, the sample has a self-selection bias (i.e., only firms that defaulted), a caveat acknowledged by the author.

DeAngelo et al. (1994) test the apparent importance of actual debt covenant violations on accounting choices. They select a sample of 76 financially troubled firms that reduced dividends, 29 of which did so due to binding debt covenants. They hypothesize that firms facing potentially binding debt covenants have greater incentives to make income-increasing accounting choices than firms without such binding debt covenants. They find no statistical difference in the accounting choices made by the two groups of firms and conclude that the accounting choices reflected the firms’ financial difficulties rather than attempts to either avoid debt covenant violation or mask the financial difficulties. As with Sweeney (1994), the sample is subject to selection bias, and the results of tests of the debt covenant hypothesis are mixed. The authors explicitly note that because the sample firms renegotiated many of their contracts over the period of the study, it is difficult to associate any evidence of accounting manipulation with any one contractual concern such as debt covenants.

DeFond and Jiambalvo (1994) also examine a sample of firms that reported debt covenant violations for accounting choices consistent with the debt hypothesis that firms approaching covenant violation will choose income-increasing accounting methods. They assess whether the sample firms manipulate accruals rather than making specific accounting method changes, hypothesizing that accrual manipulation is less expensive than accounting method changes. They find that in the year preceding and in the year of the violation, abnormal total accruals and abnormal working capital accruals are both significantly positive, consistent with the debt hypothesis. Although their
results are robust to various measures of abnormal accruals, such estimates are subject to measurement error, detracting from the claimed results, and, of course their sample suffers from selection bias because successful manipulators of accruals are not included, a problem inevitable in such a research design.

Moving away from the study of firms in default, Haw et al. (1991) examine a specific accounting choice with real economic impact, the decision as to when to settle an over-funded defined benefit pension plan, which leads to a current period gain for the firm. The authors find that firms appear to have two motives in determining the timing of the settlement: first, to offset a decline in earnings from other sources (which they believe may be related to compensation contracts), and second, to mitigate restrictive debt covenant constraints. They estimate the closeness to violation of the debt covenants for both sample and control firms and find that the sample firms were closer. However, they do not estimate the impact of the settlement on the debt covenant that was close to violation or even whether the settlement affected the debt covenant (e.g., a working capital covenant would probably not be affected). In addition, the results are over-interpreted; the results are consistent with firms trying to manage debt covenants violations but they do not indicate that was the purpose of the settlement as claimed by the authors. In contrast to the above studies, Chase and Coffman (1994) present evidence that the choice of investment accounting by colleges and universities is not affected by the level of debt.

Approaching choice from a different perspective, Chung et al. (1993) investigate the trade-offs between use of GAAP and non-GAAP accounting methods in lending contracts. For a subset of small oil and gas firms the authors find that creditors exhibit a greater reliance on (non-GAAP) reserve recognition accounting than on historical book values. Also taking a somewhat different perspective and using a sample of oil and gas firms, Malmquist (1990) examines whether these firms apparently choose full cost or successful efforts accounting due to efficient contracting considerations or because of apparently opportunistic motives. Although subject to the usual caveats about the endogeneity of incentive compensation contracts and the use of the debt to equity ratio as a proxy for debt covenants, Malmquist concludes that his results are consistent with efficient contracting and inconsistent with opportunistic behavior. Of course, measuring efficiency in contracting or firm value maximization is virtually impossible. The efficient contracting explanation becomes the alternative hypothesis but only by default; that is tests provide no evidence in support of opportunistic behavior so the author assumes that the results are due to efficient contracting.

Finally, Francis (1990) analyzes economic trade-offs between costs of covenant violation and costs of covenant compliance and finds that managers choose the cost-minimizing course of action. Other studies using debt
covenants to explain accounting choice generally do not incorporate this trade-off in the analysis. In other words, most empirical studies of accounting choice that test whether the choice is driven by debt covenants assume that the association of a relatively high leverage ratio and a particular accounting choice is sufficient for concluding that the choice was driven by debt contracting concerns. Francis provides evidence that such simple assumptions may be inappropriate.

In summary, the evidence on whether accounting choices are motivated by debt covenant concerns is inconclusive. The claimed results of most of the above studies, while consistent with the debt covenant hypothesis, are also consistent with other hypotheses. However, some progress was made in the 1990s in moving beyond the use of the debt to equity ratio as the proxy for proximity to covenant violation and in the consideration of alternative hypotheses, particularly that of efficient contracting rather than opportunism as the explanation for the accounting choice. Therefore, although we cannot draw definitive inferences about the impact of debt covenants on accounting choice, there is certainly a significant amount of data suggesting a relation between accounting choice and violation of debt covenants.

4.3. Asset pricing motivations

Another category of accounting choice literature examines the association between accounting numbers and stock prices or returns, examining whether accounting method choice affects equity valuation or the cost of capital. Managers’ choices of accounting methods, consistent with the goal of influencing stock prices, can take several forms; managers may maximize earnings in a given period, smooth earnings over time, avoid losses, or avoid earnings declines (among other strategies). The mechanism for influencing price is not, in general, well articulated, but these studies have their roots in the association between earnings and share prices first documented by Ball and Brown (1968). A significant portion of this research also tests for market efficiency by examining whether accounting choices that have no direct cash flow implications are associated with changes in stock prices. Results that are apparently inconsistent with market efficiency are explained in several ways. These include investor irrationality (e.g., investors mechanically respond to levels or changes in earnings regardless of source), manager signaling (e.g., managers provide private information through their accounting choices that influence the beliefs of rational investors), and contractual motivations (e.g., managers avoid violating debt covenants, thereby maximizing the value of the firm). These alternative explanations make it difficult to reject a maintained hypothesis of market efficiency. Even when there are direct cash flow implications from the accounting choice, as with the LIFO/FIFO decision, the market reaction to the increased cash flow can be tempered by other
considerations (e.g., avoiding debt covenant violations), making it difficult to draw strong inferences.

Several papers seek evidence on whether earnings management influences share prices by focusing on specific situations in which the incentives are arguably unambiguous, rather than relying on less well-defined goals such as smoothing earnings, maximizing earnings, or avoiding losses. Perry and Williams (1994) consider managers’ accounting choices in the year preceding the public announcement of management’s intention to initiate a management buyout and find, in contrast to DeAngelo (1986), evidence that management manipulates discretionary accruals to understate earnings, presumably in the hope of reducing the share price. The authors conclude that the difference in results between the earlier DeAngelo study and theirs is caused by differences in sample composition. Neither study examines whether the earnings management resulted in a lower price paid in the MBO. Nor did either study consider the conflicting incentive of managers to increase earnings in order to impress lenders and increase the amount of debt that could be obtained for these often highly levered transactions. Finally, neither paper considers the implications if the buyout is related to the financial situation that led to the earnings manipulations.

Erickson and Wang (1999) analyze firms using stock as a mode of payment in acquisitions. They hypothesize that such bidders will manage earnings upwards via discretionary accruals in an attempt to increase the share price and thereby decrease the number of shares that must be issued to complete the deal. They find evidence consistent with their expectations: bidders relying on stock as consideration manage earnings upward as measured with abnormal accruals whereas bidders in non-stock deals do not. However, their results are unconvincing because the research design does not allow one to test whether the earnings management was successful.

Erickson and Wang also use fairness opinions as a rationale for the earnings management but the range of what constitutes a ‘fair’ price in a fairness opinion overwhelms any documented association between stock price and earnings. That is, investment banks provide a range of ‘fair’ prices that can be plus or minus 25–50% around the midpoint of the range. The size of the range would encompass any variation in price that could be otherwise ascribed to earnings management. Like Perry and Williams (1994) and many studies on the economic consequences of accounting choice, they identify a situation in which they believe earnings management is plausible for the opportunistic manager. However, they do not explore alternative plausible explanations. Firms undertaking MBOs or equity financed acquisitions of other firms have self-selected into those groups on the basis of unidentified and little understood characteristics, so the results of such studies must be interpreted cautiously.

Consistent with SEC Chairman Arthur Levitt’s (1998) expressed concerns, Kasznik (1999) finds that managers who issue earnings forecasts manage
reported earnings toward their forecasts. He reports that firms with managers that overestimated earnings have significant levels of positive discretionary accruals. Management ostensibly makes such choices to avoid the negative market reaction anticipated from the announcement of earnings that fall short of the target or expected earnings. However, the incentives among the sample firms to manage accruals upward are also consistent with the compensation and debt hypotheses.

4.3.1. Disclosure policies

Botosan (1997) provides an innovation from prior work on accounting choice by examining whether managers that choose higher levels of disclosure level experience lower costs of capital. For firms with low security analyst following, she finds a negative association between the level of disclosure, as measured with a self-constructed quality of disclosure index, and the cost of capital, after controlling for firm size and beta. Botosan interprets this result as suggesting a trade-off between corporate disclosures and alternative sources of information. Although Botosan notes that her results may not be generalizable because the sample data are for one industry and one time period, the larger caveats about her results pertain to estimation error in both the dependent (cost of capital) and independent variables (disclosure index).

In another study on disclosure policy, Sengupta (1998) finds results similar to Botosan’s (1997) for the cost of debt, using a measure of corporate disclosure practices provided by the Association of Investment Management and Research (AIMR). Although interesting and innovative studies, both Botosan and Sengupta suffer from a lack of analysis of the costs of disclosure which is necessary to explain why, if higher disclosure levels results in lower costs of capital, all firms do not select the highest possible disclosure level. One obvious answer is that such behavior is constrained by other motives such as third-party effects (e.g., concerns about disclosing information to competitors or regulators). However, such alternative motives are not analyzed and further work in this area is needed.

The degree of flexibility permitted in segment disclosures has been an issue for regulators since before SFAS 14 (1978) with firms often arguing that the benefits of informing the capital markets about firm value are smaller than the costs of aiding competitors with the information. Hayes and Lundholm (1996) model segment disclosures that are observed by both the capital markets and competitors and determine that the firm’s value is highest when it discloses that all segments have similar results, thus providing little information to the competitors. Harris (1998) reports empirical results consistent with Hayes and Lundholm; that is, operations in less competitive industries are less likely to be reported as industry segments. She also reports that firms cite fear of competitive harm as a disincentive to detailed segment reporting and the desire to protect abnormal profits and market share in less competitive industries.
Balakrishnan et al. (1990) find that the geographic segment data enhance the predictive ability of annual income and sales for firms with significant foreign operations; however, these geographic disclosures are infrequent and unreliable. In a related study, Boatsman et al. (1993) conclude that although geographic segment disclosures are apparently used in valuing common stock, the association with returns is highly contextual, resulting in little convincing evidence of a significant impact on security valuation.

Analysts have consistently criticized the quality and inadequacy of segment disclosures (AICPA, 1994; AIMR, 1993) as well as the lack of consistent application of the requirements of SFAS 14. As a result, in 1997 the FASB issued a new standard on segment reporting, SFAS 131, requiring disclosures on segment reporting that are consistent with the firm’s internal reporting organization. To date, we are aware of no research that investigates the impact of this new standard on the degree of management discretion or on the ‘quality’ of segment disclosures.

In one of the few studies of environmental liability disclosures, Barth and McNichols (1994) find that reported estimates of environmental liabilities provide explanatory power incremental to recognized assets and liabilities in explaining firms’ market value of equity. Furthermore, the authors interpret their results as suggesting that investors assess a greater environmental liability than that recognized by the sample firms. However, the results are also consistent with many alternative hypotheses and subject to potentially significant model specification problems limiting convincing inferences (Holthausen, 1994). Regardless, the size and importance of environmental liabilities provide sufficient motivation for this early investigation and for further work to refine the results.

Frost and Kinney (1996) compare the levels of disclosure of foreign registrants and U.S. firms. Despite the lower level of disclosure by foreign firms (e.g., fewer interim reports), they find little difference in the correlations between earnings and stock returns between the two groups of firms, leading them to conclude that foreign registrants report less because they feel the benefits of increased disclosure are not worth the costs. Their study is mainly descriptive and the results are consistent with many other unexamined hypotheses, including self-selection bias and alternative sources of financial information. Furthermore, the link between disclosures and the cost of capital is not developed.

In summary, results on whether the level of disclosure affects the cost of capital are mixed; evidence does not support an unequivocal decrease in the cost of capital as a result of increased disclosure. More study is necessary to understand the relative costs and benefits of increased disclosure.

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12 The model specification problems included measurement error in the explanatory variables and correlated omitted variables.
4.3.2. Earnings management

Another group of studies examine whether managers act as if they believe users of financial reporting data can be misled into interpreting reported accounting earnings as equivalent to economic profitability. Gaver et al. (1995) find evidence that when earnings before discretionary accruals fall below the lower bound (in a bonus plan) managers select income-increasing accruals (and vice versa). This contradicts Healy’s (1985) bonus hypothesis, and the authors suggest that an income-smoothing hypothesis better explains the evidence. In a related study, DeFond and Park (1997) present evidence that when current earnings are poor and expected future earnings are good, managers, motivated by concerns over job security, borrow earnings from the future for use in the current period (and vice versa). The managers accomplish this income smoothing using discretionary accruals. The authors note that their results are dependent on the accuracy of their estimates of both expected earnings and discretionary accruals and that they may also be due to sample selection bias.

Burgstahler and Dichev (1997) report that managers apparently manage earnings to avoid earnings decreases and losses. They rely on a transactions cost theory rather than efficient contracting or managerial opportunism to explain their results. That is, they suggest terms of transactions with stakeholders are more favorable for firms with higher rather than lower earnings (see Bowen et al., 1995 for further discussion of this point) and also that investors are not fully rational in assessing the information content of reported earnings, consistent with prospect theory.

The above studies all report evidence of earnings management via choices of accounting methods but none document any associated price reactions to these choices. In other words, these studies do not explore whether these accounting choices have economic implications. Barth et al. (1999), on the other hand, find that firms with a time series of increasing earnings have higher price earnings multiples after controlling for risk and growth, than firms without an increasing earnings pattern. This evidence is consistent with the success of earnings management, however, Barth et al. do not explicitly test for earnings management and do not attribute the earnings pattern as necessarily due to earnings management. Davis (1990), in a partial replication and extension of the Hong et al. (1978) study of the purchase and pooling choice, finds that acquiring firms that use the purchase method enjoy positive abnormal returns over the period extending from before the announcement of the business combination to after its consummation. Acquiring firms using the pooling method enjoy only normal market returns. His results are consistent with those of Hong et al.

4.3.3. Market efficiency

Results of tests for market efficiency during the period through the 1970s generally find evidence supporting market efficiency. Research during the 1980s
and into the 1990s often assumes market efficiency and provides other economic explanations for evidence that ostensibly conflicted with expectations under market efficiency (e.g., the efficient contracting theory articulated in Watts and Zimmerman, 1986). During the 1990s, more research found evidence inconsistent with market efficiency and concludes that investors are not necessarily rational, often drawing on the behavioral finance literature for support (e.g., Lakonishok et al., 1994).

Recent examples of research based on the efficient markets hypothesis include Beaver and Engel (1996), who find that capital markets are able to decompose the allowance for loan losses (in the banking industry) into a non-discretionary portion (which is negatively priced) and a discretionary component (which is positively priced). They interpret their results as providing evidence of the capital market effects of managers’ discretionary reporting behavior. In this instance, the discretionary behavior relates to an estimation or judgment of the amount of loan losses that are reported in a given period. The authors estimate the nondiscretionary component of the loan loss allowance account and then test for and find that the two components of the allowance for loan losses are priced differently. They acknowledge that their results do not contribute to an understanding of the numerous potential incentives for such behavior and also that their results are contingent on the appropriate decomposition of the allowance for loan losses as well as specification of the valuation model.

Subramanyam (1996) concludes that, on average, the market values discretionary accruals because managerial discretion improves the association of earnings with economic value by either smoothing income to reflect its persistence and improve its predictability, or by communicating private information. However, he notes that he cannot dismiss either measurement error in the estimation of discretionary accruals or mispricing by an inefficient market as alternative explanations.

Hand et al. (1990) provide evidence supporting market efficiency in their study of insubstance defeasances. They find that, on average, stock (bond) prices respond negatively (positively), as expected, to insubstance defeasance. However, bond prices respond positively to the reduction in risk inherent in the defeasance, but at a lower level than expected. Stock prices respond negatively to the information about future cash flows implied by the defeasance. Because some firms defease to window-dress their earnings, some to avoid bond covenant restrictions, and some defease as a use for excess cash on hand, these different reasons arguably could all affect investors’ perceptions negatively. Hand et al. acknowledge that their results are also consistent with alternative explanations.

In summary, although the above research represents only a portion of recent work in accounting as well as other disciplines that examines market efficiency, this research is consistent with the rest of the work in that there is neither clear
evidence that markets are inefficient nor unequivocal evidence that they are not. Most research supporting both conclusions is subject to the criticism that interpretation of the results is conditional on both the proper specification of the returns generating process and of the event under consideration. As a result, it is difficult to draw strong inferences about the implications of accounting choices for asset prices.

4.4. Motivation due to impact on third parties

The final category of motivations for accounting choice that we discuss in this section is that of influencing third parties. In situations where third parties use accounting-based information, or information that must conform with reported accounting numbers, firms may have an incentive to manage those numbers due to potential affects of their disclosure policies on third parties. The most common hypotheses considered here are that firms select accounting methods to reduce or defer taxes and to avoid potential regulation—sometimes referred to as political costs. This section considers these two classes of motivations in turn.

4.4.1. Taxes

The tax portion of the accounting choice literature considers whether firms choose accounting methods to minimize the present value of taxes. Generally, evidence of tax-minimizing choices is not surprising, and evidence inconsistent with tax-minimization is interpreted as implying the presence of other offsetting considerations.

This literature reflects the issues faced by all accounting choice research. That is, we start with what appears to be a straightforward choice. For example, for firms facing (probable) increases in inventory costs, the choice of LIFO results in (probable) incremental cash inflows due to tax savings and value-maximizing managers would thus be expected to choose LIFO. However, in the presence of conflicting goals, managers may not choose LIFO and there is a substantial literature that explores managers’ choice of accounting methods when there are tax implications.

One branch of research into tax-based motivations for accounting choice is structured around changes in tax rates. For example, Dhaliwal and Wang (1992) report evidence that affected firms adjusted accounting numbers by shifting permanent and timing differences across periods to minimize the tax impact of the alternative minimum tax (AMT). Boynton et al. (1992) examine whether firms identified as potentially subject to the AMT provisions manipulate discretionary accruals to reduce the impact of AMT. They find that the response varied by firm size with only smaller firms manipulating discretionary accruals. Their results are less convincing than those of Dhaliwal and Wang for several reasons, including their use of estimated discretionary
accruals (not all discretionary accruals affect the book-tax difference) and the small sample size.

Guenther (1994) explores the impact of a decrease in tax rates resulting from the Tax Reform Act of 1986 (TRA’86) on firms’ manipulation of discretionary current (taxable) financial reporting accruals. These firms are all accrual-based for both tax and financial reporting purposes. He finds that firms shift net income from the higher to the lower taxed periods by means of current accruals.

Another branch of the tax-based accounting research examines the effect of tax rate changes on the accounting choices of multinational corporations (MNCs). In particular, TRA’86 caused MNCs to shift income into the U.S. and those firms with greater flexibility to shift more income did, in fact, do so (Harris, 1993; Klassen et al., 1993). In addition, U.S. MNCs facing average foreign tax rates in excess of the U.S. tax rate exhibit stronger evidence of tax-motivated income shifting than other U.S. MNCs (Collins et al., 1998). However, Harris is unable to reject an alternative hypothesis, namely that U.S. MNCs outperformed other MNCs during that period. Furthermore, Klassen et al. cannot provide a convincing explanation for why MNCs reversed their actions and shifted income out of the U.S. after TRA’86. Klassen et al. rely on the standard, default explanation that non-tax costs of income shifting must have increased after TRA’86.

Jacob (1996) extends Harris (1993) by distinguishing the amount of cross-border income shifting due to decisions on the location of reported income (including the physical location of operations) from the amount due to manipulation of intrafirm international transfer prices. He concludes that transfer prices provide an effective means for shifting income across regimes.

The research discussed above focuses on the change in tax rates, and considers a wide variety of accounting choices. However, only tax motives are analyzed, and non-tax issues are left unmodeled. As such, this research suffers from the absence of a reasonable alternative hypothesis—absent other motives it is hard to understand why managers would not minimize the present value of the tax payments. This inference is further strengthened in cases where no book/tax conformity exists.

A second line of research into the effect of taxes on accounting choice takes the accounting choice as its starting point. This research has focused predominantly on the choice between LIFO and FIFO, in large part because of the requirement of book/tax conformity for firms that adopt LIFO for tax purposes. Results of studies prior to the 1990s have been inconclusive and often anomalous. Stock price reactions have not been consistently positive in reaction to the LIFO adoption announcement (assuming tax savings and associated cash inflows) nor have the announcement period returns for the first earnings announcement been consistently negative or zero. Tse (1990) is representative of the inconsistent results that have been reported since the early
FIFO/LIFO research in the 1970s. Tse analyzes the announcement period market reaction to income generated by liquidating LIFO inventory (with the underlying assumption that inventory liquidations are strategic and planned by management) and, in general, finds no consistent reaction. However, when he controls for the estimated tax rates of firms, he finds that firms with low tax rates experience a positive market reaction to the liquidation income.

Such inconsistencies in adoption studies were not resolved by Hand (1993), whose results are also inconclusive in terms of managers’ incentives and the markets’ reaction. Kang (1993) explains Hand’s results by modeling the LIFO adoption decision. That is, the fact that firms switch to LIFO indicates that the tax savings are greater than the switching costs and vice versa. If investors have rational expectations, there should be no market reaction to the announcement of a switch (or no switch).

More inconsistent results on the LIFO/FIFO issue are reported by Jennings et al. (1996) in their attempt to determine whether LIFO enhances the income statement to the detriment of the balance sheet. They find that both LIFO income statements and balance sheets are more highly associated with equity values than non-LIFO financial statements.

Hand (1995) re-examines three LIFO anomalies: (1) that voluntary LIFO adopters in 1974 had reliably negative mean excess stock returns at the first annual earnings announcement; (2) that firms that publicly disclosed LIFO adoptions in advance also earned negative returns; and (3) that S&P analysts systematically overestimated LIFO earnings and systematically underestimated the earnings reduction from adopting LIFO. Hand refutes the first anomaly, is unable to refute the second, and finds that investors discount the S&P forecasts appropriately. Because he cannot explain the second anomaly, he concludes that the excess stock returns appear to reflect both sophisticated and unsophisticated responses to information on LIFO adopters. He also concludes that the difficulty in disentangling the two responses may explain why prior work has failed to produce more convincing results.

Cloyd et al. (1996) take a different approach to examining the effect of tax considerations on a firm’s accounting choices. Rather than examining the trade-off between tax costs and non-tax benefits, they test whether firms that have chosen an aggressive tax treatment also choose a corresponding financial reporting treatment in order to exhibit conformity and increase the probability that the IRS will allow the tax treatment if challenged, even though book-tax conformity is not required. They find that firms choose a conforming financial reporting method when the tax savings apparently outweigh the estimated non-tax costs. The authors conclude that they have identified an additional variable, the tax accounting method, that managers may consider in making accounting choices.

In another study examining the implications of book-tax conformity, Guenther et al. (1997) select a sample of publicly traded firms that were forced
by TRA’86 to change from the cash to accrual method for tax purposes as well as a matching control sample of accrual tax method firms. They report that the cash basis firms significantly increased the level of deferred financial statement income after they were forced to become accrual basis taxpayers.

As discussed above, the weakness of much of this literature is that it considers the tax motivation in isolation, rather than considering the trade-off between tax and non-tax considerations, leaving interpretation of the results difficult. However, some studies, observing managerial behavior inconsistent with the simple model of minimization of the present value of the tax liability, do find alternative explanations for managerial behavior. These non-tax factors include tax costs to other contracting parties due to deferred revenue recognition and accelerated expense recognition (Scholes et al., 1992); the impact on debt covenants of shifting income into net operating loss years (Maydew, 1997); increased cash flow and smoother earnings (Maydew et al., 1999); the effect on earnings used for performance measurement; and the effect on equity valuation (Klassen et al., 1993).

For example, in the LIFO/FIFO literature, Dhaliwal et al. (1994) use a multivariate model that analyzes the LIFO liquidation decision and find that tax minimization, earnings management and debt covenants all provide incentives to dip into LIFO layers. Multiple incentives have also been studied in the context of the choice of the divestiture form chosen (sale or spin-off). Evidence suggests that managers with low inside ownership realize larger gains and smaller losses, implying that managers trade off taxes for financial reporting goals (Klassen, 1997).

In summary, the tax-related accounting choice research reports evidence that firms make accounting choices in order to reduce their tax burden (and thus increase their cash flows). This result is not surprising because taxes are likely to be a ‘first order effect’ and tax-savings a benefit that managers are not likely to forgo. The evidence with respect to the stock market effects of these actions is mixed, however. The mixed results may be due in part to the low power of the cross-sectional tests and to the difficulty in distinguishing among multiple incentives to shift income. More importantly, tax research only recently has started considering additional and often competing motivations for accounting choice, perhaps because of the difficulty in explaining negative results when taxes alone are considered.

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13 However, even this analysis is, in their words, a partial equilibrium analysis because the firm’s goal to increase earnings can take many forms, not necessarily the liquidation of LIFO inventory.

14 An important question in these papers is comparability of the transactions because the proceeds of the divestiture may be a function of the type of divestiture.
4.4.2. Regulation

Most of the research into the effect of regulation on accounting choice is based on industry-specific regulations. One line of research focuses on accounting responses to specific constraints (such as the capital adequacy ratio guidelines in the banking industry). Another approach considers more indirect effects, such as the political costs of appearing to be ‘overly’ profitable.\textsuperscript{15} Overall this literature suggests that managers choose accounting methods and procedures to increase shareholder wealth.

One cluster of research focuses on the regulatory costs imposed by capital adequacy ratio guidelines in the banking industry. There is evidence that managers attempt to avoid such costs by adjusting loan loss provisions, loan charge-offs and securities gains and losses (Moyer, 1990); by manipulating accruals (Kim and Kross, 1998); and by adopting voluntary regulatory accounting principles (Blacconiere et al., 1991). Moyer (1990), however, finds no support for the more general political sensitivity hypothesis (i.e., that banks want to lower income to offset unusually large revenues). A common problem for these studies is that they have to estimate the regulatory capital ratios, and the distance from the required level of regulatory capital, thus introducing measurement error into the analysis. The authors’ interpretation of their results imply that banking regulatory authorities make and change the regulations on capital requirements without considering the incentive effects on the financial institutions.

In the insurance industry, Petroni (1992) finds that insurers bias downward their loss reserves when they are ‘close’ to receiving regulatory attention (she also finds evidence that poor performance in general leads to an overstatement of asset values). Similarly, Adiel (1996) finds that insurers enter into costly financial reinsurance transactions to reduce regulatory costs. In summary, the regulation literature generally concludes that managers select accounting methods to avoid regulatory intervention. Implicitly, this research suggests that there are information costs in the political process such that there is some probability that the regulators will not detect or adjust for the accounting manipulation. One important avenue to expand this research is to explicitly model the costs of regulatory intervention and the manner in which the regulation is enforced. Currently, most of the research assumes that the costs of intervention are infinite and that the regulation is uniformly enforced. However, evidence suggests that bank regulation is not uniformly enforced and that regulators are much more lenient towards large banks.\textsuperscript{16} Such

\textsuperscript{15} Consider, for instance, the incentives of oil firms in the 1970s when faced with the possibility of a ‘windfall profits tax’.

\textsuperscript{16} This effect is often referred too as ‘too big to fail’; see, for example, the September 1984 testimony of the Comptroller of the Currency before Congress (O’Hara and Shaw, 1990) and Bishop (1996).
an extension would allow the testing of richer hypotheses, for example, by analyzing how manager of affected firms trade off regulatory consideration with other motives, such as compensation, tax, and capital structure issues.

With respect to price-regulated industries, the literature finds that managers select accounting numbers and procedures to increase cash flows to shareholders, even when this reduces earnings or increases liabilities. For example, Eldenburg and Soderstrom (1996) provide evidence that under regulation, hospitals overestimated budgeted contractual adjustments that allowed them to shift costs among payers. Further, they report that after deregulation volume and cost biasing decreased while overestimation of contractual adjustment increased. Similarly, D’Souza (1998) investigates the adoption of SFAS 106 by regulated electric utilities and finds that managers that faced greater uncertainties about future rate recoveries had greater incentives to use discretionary choices that maximize recoveries.

With respect to non-regulated industries, several papers identify specific situations in which there is a clear motive for earnings management. However, since the papers only focus on one motive, a general reservation is the implicit assumption that the targeted audience is unable or unwilling to compensate for the effect of the accounting choice. For example, Jones (1991) finds that discretionary accruals are income decreasing in the year of import relief investigations by the International Trade Commission (ITC). The ITC is interested in earnings before taxes as one of the measures of injury to a firm so firms claiming injury by foreign competition have clear incentives to reduce their earnings. Similarly, Key (1997) considers the cable industry during periods of Congressional scrutiny. Her evidence is consistent with managerial incentives to mitigate the effects of political scrutiny and potential industry regulation.

Han and Wang (1998) investigate accruals of oil firms during the 1990 Persian Gulf crisis when gasoline prices rose sharply. They find that oil and gas firms likely to profit from the associated rise in gasoline prices used income-decreasing accruals and reported good news late. They attribute this behavior to an attempt to reduce political costs. Hall and Stammerjohann (1997) report that relative to a control group of oil corporations, managers of oil firms facing potentially large damage awards chose income decreasing non-working capital accruals.

Blacconiere and Patten (1994) examine the effect of disclosure on asset pricing using a sample of chemical firms at the time of Union Carbide’s Bhopal chemical leak. Their results indicate that firms with more extensive environmental disclosures in their financial reports prior to the leak experienced a less negative reaction than firms with less extensive disclosures, suggesting that investors consider such disclosures as a positive sign of the firm managing its exposure to future regulatory cost.
Most studies of accounting choice are predicated on the assumption that managers make the accounting choice in order to influence an outcome beneficial to the firm or themselves. However, because their actions are based on probability assessments, the results are not always as expected. For example, Feroz et al. (1991) study the impact of SEC enforcement actions on the market value of the firm and provide examples of alleged accounting choices that have negative consequences to the firm and probably its managers. Disclosures of reporting violations (e.g., overstatement of accounts receivable due to premature revenue recognition) were associated with an average two-day negative abnormal return of 13%.

As in the tax literature, issues of multiple incentives and multiple accounting methods complicate interpretation of the results of research on regulation. Two papers, Beatty et al. (1995) and Collins et al. (1995), explore the multiple incentives faced by banks to manage their earnings together with the multiple methods used to accomplish these incentives. Although we do not want to detract from the impact of the methodological innovations of these two papers, we note that the lack of an underlying theory of earnings management impacts their research design. For example, Collins et al. use a time-series mean level of earnings as the benchmark for detecting earnings management. Beatty et al. use a cross-sectional mean and a size-adjusted mean (to compare banks of approximately the same size). These are crude benchmarks that could influence interpretation of the results.

Beatty et al. (1995) examine accounting choices made by banks in a simultaneous equation model that incorporates the influence of taxes, regulatory capital and accounting earnings as incentives for managing five accounting choices. To make the econometrics tractable, the authors assume that large portions of both earnings and capital (debt and equity) are exogenous, thus focusing attention on the portion of the each that can be managed in the short term. These distinctions between discretionary and non-discretionary components introduce additional measurement error. Their results are mixed on the jointness of the decision to manage primary capital ratios, earnings and taxes. That is, some accounting items (e.g., loan charge-offs, loan loss provisions) are products of joint decisions and others are not. Beatty et al. conclude that banks’ accounting accruals, investment and financing decisions are interdependent and cannot be studied effectively in isolation.

Collins et al. (1995) likewise examine the relations among similar incentives and banks’ decisions to raise capital via one or more of seven capital raising alternatives. They find cross-sectional differences in banks’ responses to capital, earnings and tax incentives, some of which are partially explained by the banks’ size, growth and profitability. The authors acknowledge that their model is only partially specified and provides only indications of the mutual relations among their goals and the hypothesized explanatory variables.
An interesting element of much of the regulatory research is that evidence is so consistent with expectations. In addition, an implicit hypothesis in much of this literature is that third parties, including regulators, are either not willing (perhaps due to absence of incentives) or not able (perhaps due to excessive costs) to undo the accounting manipulations. Perhaps third parties have less confidence than researchers in their ability to detect accounting manipulation. Because these manipulations are so easily and predictably detected (by researchers), the results raise the question of how effective can they be?

5. Impediments to progress

We believe that in the last decade researchers have made only modest progress toward improved understanding of the implications of accounting choice and we describe several reasons for this lack of progress. In this section we discuss the research design difficulties directly as well as the more innovative work that has tried to advance our understanding of accounting choice.

5.1. Multiple method choices

Most of the work discussed in Section 4 examines the choice of a particular accounting method within the context of the goals driving the accounting choice, whereas managers may make multiple accounting method choices to accomplish a specific goal. As a result, examining only one choice at a time may obscure the overall effect obtained through a portfolio of choices. The most common method used in the literature to avoid this problem is to examine the net effect of all accounting choices on the accruals of the firm for the period under consideration. For example, as discussed in Section 4.3, both DeAngelo (1986) and Perry and Williams (1994) investigate the use of discretionary accruals to manage earnings in the period prior to a management buyout. Similarly, Erickson and Wang (1999) examine whether firms manage discretionary accruals to affect earnings in the period prior to stock-for-stock acquisition. The research design in all three papers considers discretionary accruals in total, thus aggregating the (income) effects of numerous accounting choices and (at least partially) overcoming the problems caused by multiple method choices.17

To the extent that the use of discretionary accruals serves as a solution to the problem of multiple method choices, it becomes important to determine whether existing research methods are powerful enough to detect earnings

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17 It is not surprising that these papers suffer from other impediments discussed in this section. For example, none of the three papers considers the additional impacts of the accounting choices on taxes or debt covenants.
management when and only when it exists. Dechow et al. (1995) compare the ability of several accrual-based models to detect earnings management. Their results indicate that these models generally detect earnings management, albeit with low power. Guay et al. (1996) also examine the results of five discretionary accrual models benchmarked against a random decomposition model. Their results are mixed but provide no strong evidence that any of the models are effective at identifying non-discretionary components of accruals. More importantly, they find that the models, on average, do not outperform the random decomposition models. However, Healy (1996) questions the interpretation of their results for at least three reasons. First, Guay et al. partition firms by whether earnings management is opportunistic or based on performance measurement. This is a difficult distinction and is likely to be time varying and unlikely to be mutually exclusive. Second, the authors dichotomize earnings shocks as persistent or transitory, another difficult distinction. Finally, Guay et al. implicitly assume strong form market efficiency so that investors can ‘see through’ the earnings management. The only convincing conclusion appears to be that relying on existing accruals models to solve the problem of multiple method choices may result in serious inference problems.

Kang and Sivaramakrishnan (1995) propose an instrumental variables approach to measuring the discretionary and non-discretionary portions of the accruals (or the managed vs. non-managed portion of earnings) and demonstrate the superiority of their model to the Jones (1991) benchmark model for detecting earnings management. However, their approach has not been thoroughly tested or widely adopted by other researchers, primarily because of problems designing appropriate applications for the simultaneous equations approach.

The ability to detect earnings management is an important issue because most hypotheses about the implications of accounting choice rely on the premise that the interested parties are unable (or possibly unwilling) to detect the effect of accounting method choice, accounting procedures and accounting estimates on the reported numbers. This premise is not without support; Hirst and Hopkins (1998) find that security analysts value companies with earnings management that was disclosed in the income statement differently from similar companies with earnings management disclosed (less conveniently?) in the statement of changes in equity. However, given the difficulty researchers have had using statistical techniques to detect earnings management, it is not implausible that third parties lack confidence in their ability to identify earnings management and take appropriate corrective action.18

18 Moreover, we suspect that the results are affected by a self-selection bias. If geography (placement of the financial statement) matters, why do not all firms take advantage of this reporting discretion?
There are therefore at least three approaches to dealing with the multiple methods problem. The first is to continue using the discretionary accruals method. The second approach is to continue to develop and test more powerful techniques for the detection of earnings management (such as the Kang and Sivaramakrishnan (1995) instrumental variables approach). The third approach is to return to basics and use our expertise as accountants to measure multi-dimensional accounting choice directly via the financial statements. This approach would be an extension of that used in papers such as Hagerman and Zmijewski (1979) and Zmijewski and Hagerman (1981) which simultaneously consider four specific accounting choices (LIFO vs. FIFO, straight-line vs. accelerated depreciation, the amortization period of past service pension costs, and flow-through vs. deferral method for the investment tax credit).

A comparison of the literature in the 1990s to the summaries of prior reviews leads us to conclude that little progress was made using the first two, primarily econometric approaches. Therefore, we suggest that accountants focus on the third approach, which relies on their comparative advantage.

5.2. Multiple motivations

In addition to the problem of addressing multiple accounting choices, generally as reflected in accruals, there is also the issue of multiple, and potentially conflicting, motivations for the accounting choices. Most of the work discussed in Section 4 focuses on a single motive for accounting choice decisions. For example, the compensation literature focuses on the question of whether managers use accounting discretion to maximize their compensation. Implicitly, the results suggest that managers' actions come at the expense of shareholders. But if this is so, why do compensation contracts allow discretion? One plausible answer is that managers' actions are not only anticipated, but also desirable from shareholders' perspective. For example, the same accounting choices that maximize managers' compensation may also decrease bond covenant violations or increase asset valuations. However, such motives are typically not included in the analysis. By focusing on one goal at a time, much of the literature misses the more interesting question of the interactions between and trade-offs among goals. Moreover, it is not clear whether the conclusions are attributable to the specific motivation being analyzed; generally results consistent with one hypothesis are consistent with many. For example, what may appear to be an opportunistic choice of an earnings increasing accounting method choice (to benefit managers at the expense of other stakeholders in the firm), may be in fact a response to avoid a bond covenant violation (and thus benefits all other stakeholders at the
expense of the creditors). Finally, with only few exceptions, research in the 1990s generally focuses on motives identified in the 1970s and 1980s—typically the usual suspects are rounded up. However, we suspect that new insights may be gained by investigating additional motives.

The problem of multiple conflicts can be viewed, in turn, as a special case of the familiar ‘correlated omitted variable’ problem in econometrics. For example, if firms with compensation contracts that depend on earnings are also more likely to have high political costs, then a compensation study could find a relationship between compensation contracts and accounting choice, even if the accounting choices are in fact driven by political considerations.

The usual solution to this problem is to add control variables. However, this solution as it is applied to accounting choice research suffers from at least three drawbacks. First, researchers often rely on coarse or inappropriate proxies to measure the role of the omitted determinants of accounting choice. For example, in compensation studies, leverage and size variables have been used to proxy for bond covenant effects and political costs.

Second, inference problems are likely to arise when analyzing multiple motivations using proxies with differing amounts of measurement error, particularly when the underlying effects are correlated. In such instances, the proxy with the least amount of measurement error is likely to dominate, even when its true effect may not be the most important. For example, assume that political costs and compensation motivations are correlated, but that accounting choices are driven by political costs. Nevertheless, if size is used as a (noisy) proxy for political costs while the researcher is able to measure the design of the compensation contract with great precision, then a regression of accounting choice on size and compensation contract design will load on the more precise (but less economically important) compensation variable, rather than the economically significant (but noisy) proxy for political costs. Little, if any, progress has been made in addressing these concerns.

Finally, the problem of multiple motivations is further compounded by the absence of linearity. Specifically, discussion of the correlated omitted variable issue often (at least implicitly) assumes that the variables (both those included

19 Consistent with this view, Christie and Zimmerman (1994) argue that “many of the empirical regularities interpreted as evidence of opportunism can also be interpreted as occurring for efficiency reasons” (539).

20 For example, Bowen et al. (1995) consider the impact of ongoing implicit claims between a firm and its customers, suppliers, employees and short-term creditors. They find that the extent of such claims are significant in explaining cross-sectional variation in inventory and depreciation method (more claims imply long-run income-increasing choices). Thus, while the construct validity of their implicit claims measures needs to be tested, it is an attempt to expand the scope of the motives for accounting choice.

21 Of course, this also begs the question as to whether the compensation contracts are specifically designed to minimize political costs.
and those omitted) are linear and that the omitted variable is additively separable from the variable of interest. These assumptions are made to facilitate research design. However, there is no evidence that such assumptions are justified.

Even those papers that consider multiple motivations generally treat them independently. In practice, of course, managers face a variety of conflicts, which will not, in general, suggest consistent courses of actions. Under these circumstances, firms must make trade-offs among the various goals.

5.2.1. Evidence of progress

Several papers have made progress in examining the effects of multiple motivations. For example, under SAB 51, firms have a choice between recording equity carve-out gains as non-operating gain (loss) or as a direct increase (decrease) to shareholder’s equity. Hand and Skantz (1998) analyze firms’ decisions about the treatment of such gains using a binomial logistic regression. Their methodology assumes that the choice is a function of a linear combination of proxies for different motives. In particular, they consider efficient contracting (using firm size to proxy for political costs and leverage to proxy for debt covenant effects), income management (using unexpected operating income as the proxy), and information signaling (using unexpected future operating earnings as the proxy). They find, in their setting, that all four motives (political cost, debt-covenants, earnings management and information signaling) have predictive power for firms’ choices about SAB 51. As the authors point out, however, their setting involves one fairly visible accounting choice, and it may be difficult to generalize their inferences to “choices with small effects that are ‘buried’ in operating earnings”. In addition, their use of primarily linear combinations (although they do consider a few cross effects such as firm size multiplied by the size of the carve-out gain) implicitly assumes that the various motives are independent of one another.

Francis et al. (1996) examine discretionary asset write-offs and find that managerial incentives to increase compensation and to smooth earnings are both important determinants of write-offs for assets with more ambiguous values for which there is greater flexibility in the choice of both timing and amount of the write-off. In addition, the market reacts negatively to write-offs that are more likely to be associated with real declines in asset values than it does to write-offs that are more likely due to management discretion.

If the omitted correlated variable enters into the ‘true’ model in a linear and additively separable manner, then given the direction of the correlation between the included and the omitted variables, one can estimate the effect of the bias on the coefficient of the included variables. This is straightforward, however, only because of the simple relation assumed between included and omitted variables.
Robinson and Shane (1990) illustrate the difficulties in identifying, let alone quantifying, the costs and benefits associated with the accounting choice of purchase or pooling. They report that pooling firms pay a higher acquisition premium than purchase firms consistent with greater benefits accruing to the acquiring firm under pooling. But they cannot consider all of the possible costs and benefits (e.g., the restriction on sales of assets in a pooling has never been mentioned in an empirical study to the best of our knowledge) and note that a competing explanation is that the higher bid resulted in the pooling, not vice versa.

Balsam et al. (1995) investigate whether a firm’s change in return on assets (assumed to be a proxy for earnings management) and the tightness of the firm’s debt covenants determine the timing of adoption of new FASB regulations. They find that the adoption timing of income-decreasing regulations is not affected by either of these variables, but that both variables help predict the adoption timing of income-increasing regulations. This suggests that firms, on average, adopt income-increasing regulations in the year in which their change in return on assets would have been the lowest and in which the increase in the tightness of debt covenants is the greatest. The two hypotheses are tested independently, implicitly assuming no relationship between them. Because the two explanatory variables are likely correlated, it is difficult to distinguish whether the two sets of results are actually separate, or whether they are two manifestations of the same relation.

Bartov (1993) uses an incremental approach to address this problem. He analyzes two motives, earnings smoothing and debt-to-equity considerations, for corporate management of accounting earnings through asset sales. The smoothing goal is consistent with several conflicts, including contracting (both compensation and bond covenants), asset pricing, and political costs. He finds that both motives are present and cannot be separated. In particular, after controlling for one of the two motives (through proxies) he finds that the other motive is still significant.

While Bartov uses a statistical approach to determine the incremental impact of a given motive, Guenther et al. (1997) analyze the impact of economic incentives to achieve the same goal. In particular, they examine firms that are required to switch from cash to accrual accounting for tax purposes. These firms’ motivations are the same before and after the switch, except for their tax motives. This setting therefore provides a way of determining the incremental effect of the tax motive on the firms’ behavior. They find that there is an increase in income deferrals for both financial and tax reporting after the switch. Thus, even though these firms still face incentives (based on compensation contracts, debt contracts, and asset pricing) to report higher income, the additional incentive (to report low income to the tax authorities) causes them to reach a new equilibrium with lower reported earnings, consistent with Sweeney (1994).
5.2.2. Multiple methods and motivations

In an effort to consider both multiple motivations and multiple methods, Hunt et al. (1996) report that the use of a simultaneous equations approach to study managers’ adjustments of interacting accounting measures (LIFO inventory management, depreciation, and other current accruals) that meet multiple objectives (income smoothing, minimizing debt-related costs and minimizing taxes) may lead to different conclusions about the role played by individual incentives. For example, they find that their sample firms manage LIFO inventories to smooth earnings and lower debt-related costs but not to minimize taxes. This last result is in contrast with more traditional models, such as Dhaliwal et al. (1994), that consider only one motivation and one method at a time. Hunt et al. interpret this result as implying that managers, on average, forgo incremental tax savings (which could be gained by managing inventories) in order to smooth reported earnings and to lower current and future covenant-related costs. This methodological refinement has not achieved general acceptance by other researchers, possibly because it requires explicit assumptions about the costs and effectiveness of various accounting choices (assumptions, which are made only implicitly in much of the accounting choice research).\(^{23}\)

Finally, Christie (1990) approaches the multiple motivations from a different perspective by aggregating the results of 17 studies on accounting method choice with the goal of increasing the power of the test. He finds six variables, including several related to compensation and debt covenants, are significant in explaining accounting choice. However, as Leftwich (1990) points out, the contribution of the tests is limited since the relationship between Christie’s empirical regularities and the underlying theory is not well understood. For example, Leftwich notes, little doubt remains about whether accounting choice and size are related. However, there is no such thing as a ‘size hypothesis’; the interesting question is not whether size matters, but why.

We feel that the key to making further progress on the multiple motivations issue is first to continue to consider the existence of multiple motivations (e.g., Bartov, 1993), rather than ignoring them as many papers have. However, it is also important to advance beyond using simple linear proxies by exploring the underlying relations among different motivations. Methodologies such as that used by Hunt et al. (1996) should be refined and expanded and other empirical methods should be developed. Analytical methods can also play an important role in this process, by providing benchmark models of the interactions of specific accounting policies with various, perhaps conflicting, accounting motivations. For example, could we model the expected behavior of a manager in a situation where the choice that maximizes expected future incentive compensation also increases the probability of debt covenant violations?

\(^{23}\)See also the discussion of Beatty et al. (1995) and Collins et al. (1995) in Section 4.4.2.
5.3. Methodological issues

Empirical studies of accounting choice are subject to the standard econometric problems faced by most accounting researchers (e.g., simultaneity, errors-in-variables, omitted variables) and, therefore, often result in low power and unreliable tests. These problems are exacerbated by the inherent endogeneity of the choices that are made, not only of accounting methods, but also of firm financial structure, organizational structure, contracts, etc. For example, most studies of whether accounting choice is influenced by debt covenants treat the covenants as exogenous rather than as choice variables. In contrast, Skinner (1993) studies the relations among the firm’s investment opportunities, the nature of its compensation and debt contracts, and firm characteristics such as financial leverage, size, performance and accounting choices. He finds evidence that the firm’s investment opportunity set (ios) influences the structure of its compensation plans and debt contracts and thus indirectly influences its accounting choices. In addition, he reports that there is an association between the firm’s ios and its accounting choices after controlling for the contractual characteristics of the firm. Skinner interprets his results as indicating that prior evidence on the size, debt and bonus plan hypotheses cannot be disregarded on the basis that prior studies did not control for the ios. However, his research design provides for a richer exploration of the interrelationships among the variables affecting accounting choice, although necessarily incorporating proxies for most of the key variables.

Likewise, Begley and Feltham (1999) control for the endogeneity of both incentive variables and debt covenants. They report different implications for the form of the debt covenants conditional on the type of incentive variable (e.g., cash compensation vs. stock holdings). These results illustrate that changes in accounting policy choices or differences in choices across firms may be driven by underlying economic differences in the firms, either cross-sectionally or through time. Of course, these differences are difficult to discern. These problems were discussed 10 years ago with respect to tests of positive accounting theory and little progress has been made in the interim (Watts and Zimmerman, 1990).

Another common impediment to accounting choice research is the self-selection bias inherent in the sample. Researchers cannot undo the choices that have been made and examine the firm in a controlled environment. Although some research has restated financial results in pursuit of consistency across firms, the researcher cannot overcome the potential information impact of the choice of the accounting method.

As discussed in Section 4.2, researchers often rely on crude proxies to measure the determinants of accounting choice. For example, bond covenant effects are typically estimated using leverage. However, leverage is determined
endogenously and may not proxy for the actual distance to bond covenant constraints (Lys, 1984). Indeed, there is evidence that leverage likely proxies for other effects (Press and Weintrop, 1990). Therefore, as has been suggested repeatedly, research results would benefit from examining actual covenants rather than using proxies (e.g., Williams, 1989). It would also be worthwhile to consider the default process itself in greater detail (see, for example, Smith, 1993).

The research question in many studies of accounting choice has been imprecisely, or perhaps inappropriately, stated. Instead of asking what drives the accounting choice, the research question is whether the accounting choice is consistent with one or more posited incentives. The finding that it is consistent with one incentive does not preclude its being consistent with alternative incentives. Another way of putting this is that researchers have not been successful, on average, at distinguishing between managerial opportunism, shareholder wealth maximization, and information motivation. Rees et al. (1996) provide a counterexample to this criticism by assessing two alternative hypotheses as explanations for abnormal negative accruals in the year of an asset write-down, that is, managerial opportunism and signaling real performance. They interpret their results as indicating that managers do not seem to be acting opportunistically in generating abnormal negative accruals, but instead, that the negative accruals reflect the real economic circumstances of the firm and that the increased negative accruals provide important information to investors.

5.4. Narrow scope of the research on the costs and benefits of accounting choice

Research in the 1970s and 1980s had minimal success in resolving the question of whether markets are efficient with respect to cosmetic accounting choices. More recent research has likewise met with little success in assessing the costs and benefits of discretion in accounting. Academics frequently argue that it is sufficient in well-functioning markets for information to be disclosed, because rational investors will process the information appropriately (e.g., Dechow and Skinner, 2000). However, not all empirical evidence is consistent with this position. For example, Hopkins (1996) finds that buy-side analysts value firms with hybrid financial instruments classified as debt more highly than buy-side analysts value the same firms with hybrid financial instruments classified as equity.

Assessments of the positive and negative attributes of accounting discretion for different constituents under various circumstances have generally been context-dependent. Amir and Ziv (1997) conclude that managers use the permitted discretion in adopting SFAS 106 to convey private information to the market. Further, they find that the market reacts more favorably to early adopters than to disclosers and more favorably to both than to mandatory date
adopters, thus supporting the value of accounting choice for the dissemination of private information to investors.

SFAS 86 on software capitalization provides enough flexibility for those who wish to capitalize development costs to do so and for those who wish to expense such costs to do so. In addition, investors can easily undo software capitalization. Despite this flexibility, an industry group lobbied to abolish the rule. This is particularly curious given that Aboody and Lev (1998) find that the capitalization disclosures are positively associated with both stock prices and returns as well as with future reported earnings. This is an example of a situation worth exploring; that is, what is the economic incentive for an industry trade group to reduce the flexibility in financial reporting?

Pricing studies, on the other hand, suggest that accounting matters: using disclosures, managers can convey inside information and reduce the cost of capital. However, these studies suffer from a lack of analysis of the costs of disclosures which is necessary to explain why, if disclosures or higher disclosure levels result in higher prices or lower cost of capital, all firms do not select the highest possible disclosure level. Obviously, there must be costs involved. But then, the analysis of such benefits can only be performed omitting the costs under very restrictive conditions (e.g., when the benefits are entirely independent of the costs).

In summary, empirical tests of the benefits of accounting choice yield mixed results. Likewise, there is little convincing research and no consensus that the benefits of increased disclosure outweigh the costs. More evidence on these issues is needed.

5.5. Lack of theoretical guidance

In much of the literature, the environment in which choices are made and the mechanism by which they have an impact, are not well articulated. This is perhaps most noticeable in the asset pricing area, where mispricing is often implicitly assumed. Similarly, in the contracting research (e.g., compensation, bond covenants) there is often an assumption that contracts are exogenous. The natural place to seek a solution to these problems is in analytical research that may suggest more appropriate research designs.

Unfortunately, consistent with the failure of empirical studies to provide convincing evidence on the costs and benefits of accounting choice, analytical research has also tried to address the issue with little generalizable success.24 Most of the analytical research in this area focuses on disclosure policy. For example, Penno and Watts (1991) model the disclosure issue as a conflict between the

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24 To be fair, there may exist analytical studies outside the period and journals we have surveyed that address the issues raised above. However, what became clear to us is, that if such research exists, its impact on empirical research on accounting choice has been minimal.
manager who wants to maximize investors’ perceived value of the firm and the auditor who desires to minimize investors’ valuation errors. Because the disclosure decision of the manager and the auditor is a function not only of the size of the item being considered for disclosure but also of the internal information known by both auditor and manager that bears on the item, Penno and Watts conclude that bright line thresholds for disclosure are not appropriate.

Baiman and Verrecchia (1996) model the costs and benefits of increased disclosure and find that more disclosure results in less information about the manager’s action being impounded in price so that price-based performance measures become less efficient, agency problems increase, and output falls. More disclosure also reduces the manager’s insider-trading profits. However, the cost of capital decreases with more disclosure so there are trade-offs.

Wagenhofer (1990) develops a model in which a firm determines its disclosure policy based on two conflicting objectives: one to maximize the market price of the firm and the second to discourage both market entry by a competitor and the imposition of political costs. Wagenhofer demonstrates that there is always a full disclosure equilibrium but there are also partial disclosure equilibria. In other words, the result is conditional on the information to be disclosed, the level of potential political cost, and the likelihood of the competitor’s entry.

Bartov and Bodnar (1996) address the issue of accounting choice directly by examining the impact of information asymmetry on the choice. They posit a shareholder value-maximizing manager who chooses more informative accounting methods to reduce the degree of information asymmetry among market participants. However, the choice is affected by offsetting preparation and proprietary costs so managers choose based on maximizing net benefits. They test this hypothesis empirically and find results consistent with their hypothesis.

Dye and Verrecchia (1995) show that the decision to grant accounting method choice discretion to the agent depends on the type of conflict that is being analyzed. That is, managers face two different agency problems. The first, or internal, occurs between current shareholders and management. The second, or external, agency problem, occurs between current and future shareholders. When there is only an internal agency problem, allowing the manager broad discretion is optimal because it generates more information and thus reduces the cost of controlling the manager. Such discretion, however, increases current shareholders’ ability to motivate management to take advantage of the future shareholders. As a result, managerial discretion in accounting choice exacerbates the conflicts between current and future shareholders, even though it reduces agency conflicts between current shareholders and management. Dye and Verrecchia suggest that analyzing the effect of allowing accounting choice relative to only one conflict at a time may result in inappropriate inferences. Furthermore, these effects are not independent or even additively separable.
The Dye and Verrecchia example is a special case of the more general problem of multiple conflicts/incentives discussed in Section 5.2. That is, if the objective of the accounting method choice is to maximize firm value, and firm value is affected by multiple conflicts, then researchers may draw erroneous conclusions by analyzing the relation between individual conflicts and accounting methods choice.

6. Conclusions and suggestions for future work

We do not want to leave the impression that researchers have gained no knowledge of the role and the importance of accounting choice. Rather, our concern is that progress has slowed. In part, this is due to unambitious attempts to expand the field. For example, testing the implications of one more accounting standard adds very little to the cumulative knowledge. A more intransigent problem is the difficulty in specifying research designs that accommodate the complexity of the task at hand: that is, the simultaneous impact of multiple choices, multiple goals and econometric complications. Rather than continue to replicate well-known results in slightly different settings, we feel that it is important for researchers to grapple with these more difficult, and at heart, more fundamental issues. We have three specific recommendations for future research.

First, research results fail to provide compelling evidence of the implications of alternative accounting methods and we recommend more efforts to determine the nature of such implications. The literature provides ample circumstantial evidence that accounting choice matters but little direct evidence. For example, the literature documents that managers make accounting choices consistent with bonus maximization, but does not determine whether this behavior results in increased cash payouts. Even if such evidence were produced, the next step would be to ascertain whether expected total compensation increases and whether this result was intended and/or anticipated by the contracting parties. That is, if accounting choice has such potential wealth implications, then contracting parties should price accounting choice. One (modest) attempt at this issue was made by Healy et al. (1987) for the case of managerial compensation, but more is needed.25 Another avenue is to investigate the costs companies are willing to incur to maintain accounting method choice discretion. A first attempt at this approach can be found in Beatty et al. (2000), and we encourage more exploration of this issue.

Similarly, there is no consistent evidence supporting claimed valuation differences due to accounting methods. We do not know whether this is

because accounting differences do not affect firm valuation or because empirical methods are inadequate to detect any such effect. Although much existing research is tied to stock returns, accounting numbers generally explain only a small portion of the variability in stock returns, raising the question of whether this is the appropriate place to look for an effect. Despite extensive academic research, the process by which security prices are set, including the influence of accounting data, remains unknown.

Second, because accounting is used for many purposes, we have argued that it is inappropriate to analyze one accounting issue or even one goal in isolation. Ideally, one would have a comprehensive theory of accounting choice, but such a theory is presently not available, and its development does not appear imminent because of the complexities inherent in such a model. Analytical models can help provide guidance to researchers in structuring the empirical experiments, in identifying appropriate variables, and in formulating alternative hypotheses. At present, most analytical models are so abstract as to offer only limited guidance to empiricists. We do not want to give the impression that we underestimate the complexity of this task. Furthermore, we are cautiously optimistic that progress toward the necessary theoretical improvements can be made.

Absent such a comprehensive theory, progress could still be made if researchers would expand the focus within a category as described in Section 3. Thus, rather than narrowly analyzing the implications of accounting choice on bond covenants, researchers should expand and analyze the implications for (internal) contracting. For example, how do the features of existing bond covenants influence the structure of the incentive compensation contract. What can we infer about the expectations of the board of directors by examining such relations? In general, we believe that analysis within a category is justified because the commonalities of issues are much more pronounced within a category than across categories.

Third, to make further progress in providing more compelling tests of accounting choice, researchers should develop more powerful statistical techniques and improve research designs. The literature has begun this process by examining the adequacy of existing statistical methods. Such efforts should be expanded with testing of more alternative models.

We do not want to suggest that research must address every concern raised in this survey in order to be considered successful. We recognize that many of the problems are complex and pose difficult research design issues. We do feel, however, that the field has become too conservative with too many researchers content to justify a methodology because others have used it. Greater efforts to employ new methodologies and more acceptance of such methodologies could advance the field. Recent work by Hunt et al. (1996), Beatty et al. (1995) and Kang and Sivaramakrishnan (1995) provides good examples of extending the methodological boundaries with the application of simultaneous equations and
instrumental variables techniques to accounting problems. New (or at least untested by accounting researchers) methodologies should be explored if we are to move forward. This means that accounting researchers must stay abreast of new developments and new applications in research design.

In addition, we also believe that researchers should make better use of their expertise as accountants. Both small sample studies and field studies would fit into this approach. Although the smaller sample sizes raise issues of generalizability, we feel that this approach would complement existing large sample studies and provide greater insight into the underlying causes of the empirically observed effects.

Large sample studies continue to play an important role because small sample studies exacerbate the problem of determining whether the results are due to unusual or pathological cases rather than to the general use of accounting in ‘normal’ day-to-day circumstances. This problem is also aggravated by a publication bias driven by the fact that papers without results are generally less likely to be published. Furthermore, published research may not test the ex ante hypothesis; that is, authors may vary research design and variable definitions until significant results are found (Christie, 1990). The implications of this bias are not clear. There may be even fewer cases of statistically significant results on accounting choices than is apparent from the publication records. Perhaps all that is being documented is noise.

Fundamentally, we believe it is necessary to step back from the current research agenda, and to develop the ‘infrastructure’ surrounding the field. In a sense, the accounting choice field has been a victim of its own perceived success, and has outrun the development of theories, statistical techniques and research design that are necessary to support it. We therefore are calling for a return to work in these basic areas, before the field is able to advance further.

Academic accounting research must ultimately address the fundamental questions of whether, under what circumstances, and how accounting choice matters. These questions are difficult because of the complexity of the environment in which accounting choices are made. There may be many (difficult to observe and measure) effects and motivations surrounding each choice. While we have undoubtedly made some progress on these questions, most of that progress occurred in the 1970s and 1980s. We hope that our review will provide an impetus to more vigorous pursuit of these fundamental questions.

References


