THE CHALLENGES OF IMPROVING REVENUE-RECOGNITION STANDARD FOR MULTIPLE-ELEMENT FIRMS: EVIDENCE FROM THE SOFTWARE INDUSTRY (SOP 97-2)

A Dissertation

by

ANUP SRIVASTAVA

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2008

Major Subject: Accounting

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ABSTRACT

The Challenges of Improving Revenue-Recognition Standard for Multiple-Element Firms: Evidence from the Software Industry (SOP 97-2). (May 2008)

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Chair of Advisory Committee: Dr. Edward P. Swanson

I investigated whether implementing SOP 97-2, the revenue-recognition standard for the software industry, reduces earnings informativeness. This standard is particularly important for two reasons: First, its provisions coincide with provisions of SAB 101, the current general revenue-recognition standard. Second, the software industry provides a laboratory setting for examining multiple-element firms, whose revenue-recognition challenges keep mounting as more and more firms bundle multiple products and services. I found that implementing SOP 97-2 leads to additional revenue deferrals and a decline in earnings informativeness. However, the market prices these deferrals as revenues, as if these amounts had not been deferred. Moreover, the proforma earnings, which I calculated by undoing the revenue deferrals, more strongly correspond with market returns than do the reported earnings. My findings indicate that the accounting numbers calculated using the pre-SOP 97-2 revenue-recognition rules more strongly correspond with market returns than do those calculated using SOP 97-2. My findings should interest FASB in its project on developing a new revenue-recognition standard.

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I. INTRODUCTION

Revenue typically represents the largest and most value-relevant item in firms' financial statements (FASB 2002). However, as more and more firms adopt a "relationship marketing" approach (Galbraith 2002, Ghosh and Balachander 2007) by bundling multiple products and services, revenue-recognition challenges keep mounting (FASB 2002). Consider a software firm that delivers its base software on the contract signing date and delivers integration services, maintenance, and software upgrades at different times over the next 24 months. How does this firm determine revenues at any time before the completion of this contract? Such a problem challenges both financial statement preparers and standard setters (FASB 2002) and has figured prominently in FASB's deliberations on creating a new revenue-recognition standard (FASB/IASB 2007).[1]

The challenges of creating revenue-recognition standards for firms that bundle multiple products and services (the "multiple-element" firms) differ from those of other firms in at least one significant aspect – estimating revenues for partial deliveries of multiple-element firms requires greater subjective assessments. Consider the above example. How does this firm allocate aggregate contract value to individual elements that are not sold separately? And how does it decide whether a delivered element provides functional value to a customer pending delivery of another element? Estimating

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This dissertation follows the style of *The Accounting Review*.

[1] FASB's advisory council has identified this agenda item as FASB's highest priority project (FASAC 2006). FASAC has also recommended a review of the software industry's revenue-recognition rules.

revenues based on the concept of completion of the earnings process (SFAC No. 5) necessitates such assessments.

Nevertheless, the current revenue-recognition standards impose strict objectivity and verifiability conditions rather than rely on managers' subjective assessments. The current standards require that multiple-element firms should defer revenue recognition in its entirety even when firms have 1) delivered some elements substantially, but not completely; 2) delivered some elements completely, but cannot objectively apportion the contract value to these elements; and 3) delivered some elements completely, but cannot establish their functionality pending delivery of other elements. In this study, I examine whether such strict objectivity and verifiability conditions reduce multiple-element firms' earnings informativeness.[2] On the one hand, such conditions might improve the earnings informativeness of firms that had previously exploited relatively obscure verifiability conditions to front-load revenue recognition. On the other hand, this "all or nothing" approach can force a firm to defer its entire revenues even when it has partially or completely delivered elements of significant economic value. For example, the current rules preclude Apple Inc. from recognizing any revenue on the day it sells an iPhone.

To investigate the effects of the multiple-element attribute of current standards, I examine the effects of implementing SOP 97-2, rather than those of implementing SAB

[2] This question remains unexamined. The current standards (i.e., SOP 97-2 [AICPA 1996] for the software industry and SAB 101[SEC 1999] for the other industries) affect firms' revenue-recognition practices in two distinct ways: (1) through the completion of product-delivery requirement and (2) through additional compliance requirements for multiple-element contracts. Zhang (2005) examines the effects of the first aspect in isolation and Altamuro, Beatty, and Weber (2005) examine the simultaneous effects of both aspects. However, the distinct effect of the second aspect remains unexamined.

101. Although SEC enacted SAB 101 three years after AICPA enacted SOP 97-2 and the revenue-recognition requirements of SAB 101 virtually coincide with those of SOP 97-2,[3] I use the earlier standard for three reasons: first, SAB 101 codified the multiple-element rules of SOP 97-2 and also introduced delivery and earnings-completion requirements to those industries that were not formally covered by these rules earlier. Therefore, empirical effects of implementing SAB 101 could arise from reasons other than its multiple-element attribute (Moffeit and Eikner 2003). In contrast, because SOP 91-1, which preceded SOP 97-2, already required software firms to comply with delivery and earnings-completion based conditions, the empirical effects of implementing SOP 97-2 would arise only from its multiple-element attribute (Carmichael 1998).

Second, software firms exemplify multiple-element firms. At a minimum, almost all software firms provide future updates, upgrades, and extended maintenance support in addition to base software. A significant number of software firms also provide additional services such as customization, integration, and training.

Third, because SAB 101 applies rules originally designed for the software industry to other industries, some might argue that the SEC misapplied SOP 97-2 rules (FASB 2002). Specifically, AICPA created SOP 97-2 to prevent software firms from prematurely recognizing revenues from multiple-element contracts (Carmichael 1998). Therefore, implementing SOP 97-2 might improve software firms' earnings

[3] Both SOP 97-2 and SAB 101 build upon the concepts of earnings process completion and revenue realizability (SFAC No. 5). Both require compliance with four necessary conditions before firms can recognize revenues: (1) a formal arrangement, (2) completion of delivery, (3) determinable fees, and (4) revenue realizability.

informativeness; nevertheless, this premise remains unexamined. While Altamuro et al. (2005) report a general decline in earnings informativeness upon implementing SAB 101, their sample of SAB 101 affected firms is unlikely to include software firms because SOP 97-2 preceded SAB 101.

I use three different research designs to examine my research question. First, I use a before-and-after design to examine whether the market returns more strongly correspond with pre-SOP 97-2 earnings or with SOP 97-2 implementation year's earnings. I find that the market returns more strongly correspond with former than with latter, which suggests that implementing SOP 97-2 reduces earnings-returns association.

My second research design controls for the possibility that the above inter-temporal decline in earnings-returns association occurs due to factors other than the SOP 97-2 implementation. I capitalize on balance sheet changes that result from implementing stringent SOP 97-2 rules – the additional revenue deferrals, which I call SOP 97-2-created deferrals. Under SOP 97-2 provisions, firms report these deferrals as unearned or deferred revenues (i.e., as a current liability). However, under the prior regime, firms would not have deferred these additional amounts and would have recognized them as revenues. Therefore, I examine: Does the market price SOP 97-2-created deferrals as revenues (consistent with the prior regime) or as current liabilities (consistent with SOP 97-2)? Unlike the before-and-after design, this design enables me to directly compare the two accounting methods using only the implementation year data. I find that the market prices the SOP 97-2-created deferrals as revenues and not as

current liabilities. This finding supports the notion that the market prices earnings as if the prior accounting regime still prevails and SOP 97-2 had not been implemented.

I provide further evidence on the above notion by using a third research design. I examine whether the proforma earnings (i.e., the earnings that would have been reported had SOP 97-2 not been implemented) are more informative than the reported earnings. I calculate proforma revenues and earnings by adding back SOP 97-2-created deferrals. I find that the proforma earnings more strongly relate with market returns than do the reported earnings.

I contribute to the literature by documenting that SOP 97-2 reduces earnings informativeness of the software firms. My findings suggest that a standard that requires highly objective and verifiable support for multiple-element firms' revenue assessments reduces earnings informativeness, perhaps because estimating revenues for such firms necessitates subjective assessments. My findings also dispel the notion that implementing the current general standard (i.e., SAB 101) in non-software industries reduces earnings informativess because the SEC misapplied SOP 97-2 rules to such non-intended industries.

My findings might interest the FASB in its revenue-recognition standard project (FASB/IASB 2007). Standard setters' decisions often involve trade-offs between relevance and reliability. AICPA created SOP 97-2 to improve multiple-element firms' earnings reliability by requiring such firms to defer revenues when they cannot objectively and verifiably determine the extent of completion of the earnings process.

My results suggest that a more timely recognition of such deferred amounts might convey more useful information to financial statement users.

The rest of the paper proceeds as follows. Section II provides background information on SOP 97-2, Section III develops the hypotheses, Section IV describes the sample, the research design, and the results, and Section V presents some concluding remarks.

II. BACKGROUND INFORMATION ON SOP 97-2

Appendix A describes the changes in firms' revenue recognition practices due to the implementation of SOP 91-1, SOP 97-2, and SAB 101. Each of these three revenue recognition standards builds upon the concept of completion of the earnings process (SFAC No. 5). However, only SOP 97-2 provides the ideal setting to examine the exclusive effects of the multiple-element attribute of current standards, because: 1) SOP 91-1 did not include the current multiple-element rules; and 2) most of the SAB 101 implementation effects arise from delivery-based revenue-recognition requirements, rather than from its multiple-element rules. For example, the most common changes from implementing SAB 101 include: 1) recognizing revenues for FOB goods only after a firm transfers title of goods, 2) recognizing research fees over the contracted period rather than upfront, and 3) recognizing revenues on layaways only after the customer takes possession of the goods. Because of these changes, the pharmaceutical industry is among the most SAB 101 affected industries (Moffeit and Eikner 2003; Altamuro et al. 2005), even though pharmaceutical firms do not assume significant multiple-element obligations.

In this section, I describe the circumstances that led to creation of SOP 97-2 and the reasons for its likely effects. In the mid 1990s, when many software firms were growing rapidly and reporting losses, investors began to rely on revenues rather than on earnings to value these firms (e.g., Damodaran 2002; Bowen, Davis, and Rajgopal 2002). Stock prices frequently reacted even if a firm met its earnings target, but missed its revenue-growth target (Ertimur and Livnat 2003). Consequently, some software firms

began to bend accounting rules to report higher revenues. Notably, some software firms would recognize entire revenues from a multiple-element contract even before they delivered all the contracted elements (Carmichael 1998). The mid-1990s also witnessed numerous revenue-related accounting restatements (e.g., GAO 2003, Palmrose, Scholz, and Wahlen 2004). The SEC initiated enforcement actions against firms that recognized revenues prematurely (e.g., COSO 1999). As revenue recognition became the SEC's priority, it requested that AICPA create stringent revenue recognition rules for the software industry.

SOP 91-1, which specified the then applicable revenue-recognition rules, did not provide explicit guidance on when to recognize revenues for undelivered elements in a multiple-element contract. Specifically, the SOP 91-1 rules did not provide clear guidance on: 1) how to estimate "significance" of undelivered elements; and 2) how to account for software upgrades, which firms provide on a "when-and-if-available" basis. Since SOP 91-1 had become effective, most software firms had begun bundling more products and services in the same revenue arrangements by capitalizing on progress in internet and distributed computing technologies (Choi and Whinston 1999; Fuerderer et al. 1999). At a minimum, most software firms had begun providing extended maintenance support through online updates and upgrades.

AICPA created SOP 97-2 to require software firms to defer recognizing a portion of revenues corresponding to their undelivered elements (MacDonald 1996). In order to achieve such revenue deferrals, AICPA added more elaborate and stringent conditions before firms could recognize revenues from multiple-element contracts. For example,

SOP 97-2 added a more stringent interpretation of the delivery condition and introduced a new vendor specific objective evidence (VSOE) requirement. The delivery condition requires that all other elements essential for the functioning of the delivered element should also have been delivered. The VSOE condition requires that a firm should first establish the fair value of each element based solely on the firm's own pricing records.[4] Importantly, if a firm cannot establish fair value of just one element, the firm might not be able to objectively apportion the aggregate contract value to any other element. This might cause deferral of entire revenues from the contract (Carmichael 1998).

The importance of these conditions can be illustrated using the example of the software firm described earlier. In order to recognize revenue for the base software on its delivery date, the firm should 1) establish each element's fair value based on the firm's own prior transactions and 2) ensure that the base software provides functional without additional services. If the firm cannot meet either of these two conditions, it should defer recognizing revenues corresponding to base software until (1) it meets both conditions; or (2) it delivers all other elements.[5]

When AICPA issued an exposure draft of SOP 97-2 and invited comments, several respondents protested against VSOE and delivery conditions (see Appendix B

[4] The criteria used in practice to establish VSOE are stringent. A firm should provide evidence from at least 30 prior randomly selected transactions and 85% of such transactions should have been priced within 15% of the median price (Sondhi 2006). This requirement is excessively stringent for firms that customize products, have high technological obsolescence rates, or use dynamic pricing.

[5] Despite customers' outcry, Apple Inc. recently asked its customers to pay a nominal fee of $ 1.99 to download a software patch for the computers it had sold earlier. Otherwise, its auditors would question its policy of not deferring a portion of revenues for an undelivered element. Earlier, Apple tried defending its accounting choice by claiming that it could not estimate fair values of future patches at the time of the original sale. However, in such situations, the current standard requires firms to defer entire revenues from the contract (Reily 2007).

for typical responses). For example, PWC stated, “VSOE of fair value will lead to deferral of all revenues, even in situations where software products having clear value and immediate utility to customer have been delivered.” An academician felt that requiring a firm to defer recognition of entire revenue from a multiple-element contract only because the firm could not meet just one criterion for just one element, amounts to “stopping all traffic on a freeway because one car is broken down.” Lucent said: “services compose between 1% and 15% of total revenue… the company would be forced to defer 100% of revenue until 100% of services were performed.” Massachusetts Society of CPAs called this an “all or nothing” approach.

III. HYPOTHESIS DEVELOPMENT

As described above, in 1996, AICPA enacted SOP 97-2 to prevent multiple-element software firms from recognizing revenues prematurely and to require them to defer recognizing a portion of revenues corresponding to their undelivered elements. In other words, SOP 97-2 requires firms to follow an element-by-element approach, by recognizing revenues for an element only after objectively and verifiably determining its completion of earnings process. This might improve earnings informativeness of firms that took advantage of relatively obscure rules of SOP 91-1 to prematurely recognize revenues.

Nevertheless, as described earlier, SOP 97-2's requirements characterize an "all or nothing" approach. This approach may force firms to defer revenue recognition in its entirety even when firms have partially or completely delivered elements of significant economic value. Furthermore, the rules of SOP 97-2 are so elaborate and comprehensive that they border on audit standard setting (Carmichael 1998).[6] These elaborate rules may reduce accounting discretion that managers use to communicate value-relevant information (e.g., Healy and Wahlen 1999, Fields, Lys, and Vincent 2001). Indeed, Altamuro et al. (2005) find that implementing SOP 97-2 rules in a broader industry setting reduces earnings informativeness. I examine whether their finding holds in the software industry, that is: 1) in the multiple-element context and 2) in the industry for

[6] The underlying rules of SOP 97-2 are simple and intuitive. Nevertheless, their application to a variety of situations requires long and complex guidance. For example, KPMG's and PWC's technical guidance to assist software firms in implementing SOP 97-2 rules run 332 pages (KPMG 2005) and 500 pages (PWC 2005) long.

which these rules were originally created. I test the following hypothesis using market association tests:[7]

H1: *Implementing SOP 97-2 leads to a decline in association between earnings and market returns.*

I examine the above question using a before-and-after design. However, this design suffers from a limitation: inter-temporal changes could arise from factors other than those due to the SOP 97-2 implementation.[8] Business practices of high-tech firms have been highly susceptible to changes since the mid-1990s (e.g., McAfee and Brynjolfsson, 2007). In order to control for any inter-temporal effects, I directly examine whether the market prices the implementation year's financial statement components consistent with the pre-SOP 97-2 or the post-SOP 97-2 method.

Implementing SOP 97-2 leads to additional revenue deferrals (i.e., the SOP 97-2-created deferrals) that firms report as current liabilities. However, based on the earlier accounting method, firms would not have deferred these additional amounts and would have recognized them as revenues. Accordingly, I examine whether the market considers SOP 97-2-created deferrals as revenues or as current liabilities, using the following hypothesis.

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[7] Beaver (1972) suggests that "(the accounting) method which is more highly impounded (in securities prices) ought to be the method reported in financial statements." Lev and Ohlson (1982) state that providing information for valuation should be accounting's "desirable" property. Kothari (2001) defines earnings informativeness as the association between accounting earnings and market returns. Barth, Beaver, and Landsman (2001) suggest that examining how well accounting numbers relate with prices provides "fruitful insights" to standard setters.

[8] For example, Zhang (2005) finds that passage of time improved earnings informativeness of the non-SOP 91-1-affected control group (76% of her software-firms sample). To control for inter-temporal effects, both Zhang (2005) and Altamuro et al. (2005) use non-affected firm samples as control groups.

H2: *The market prices SOP 97-2-created deferred revenues more similarly to how it prices revenues than to how it prices current liabilities.*

If the above test indicates that the market prices SOP 97-2-created deferrals as revenues and not as current liabilities, it might indicate that the market prices earnings as if SOP 97-2 had not been implemented. I directly examine this notion. First, I calculate proforma revenues by adding back SOP 97-2-created deferrals because absent SOP 97-2, these amounts would not have been deferred. Then, I assume that the software firms report costs that do not match revenues (Morris 1992, Zhang 2005, Mulford 2006).[9] Accordingly, I calculate proforma earnings by adding back SOP 97-2-created deferrals. Next, I examine whether the market returns more strongly correspond with proforma earnings (consistent with pre-SOP 97-2 method) than with reported earnings (consistent with SOP 97-2). I use the following hypothesis:

H3: *Proforma earnings are more strongly associated with market returns than are reported earnings.*

[9] SFAS 86 (FASB 1985) allows a firm to capitalize its software development costs after it establishes software' technological feasibility. Nevertheless, Mulford (2006) finds that on average, software firms expense more than 90% of their development costs in the period in which these costs are incurred. For example, despite deferring iPhone's sales revenues, Apple expenses engineering, sales, and marketing costs as they are incurred.

IV. SAMPLE SELECTION, RESEARCH DESIGN AND RESULTS

Sample Selection

SOP 97-2 applies to all firms whose products contain a significant software component. Such firms belong to different industries and not just the software industry. However, to select my sample, I focused on firms in the software industry (having SIC codes beginning with 737) because SOP 97-2 definitely applies to these firms. Within these firms, I focused on pre-packaged software firms (SIC code 7372) and integrated software and services firms (SIC code 7373), which not only comprise more than 90% of all firms in the software industry, but routinely use multiple-element contracts. The other smaller software sub-industries, which comprise the remaining 10% of software firms, might include pure services firms and might not reflect characteristics of multiple-element firms.

I derived my sample from the Compustat database using the sample selection procedure described in Table 1. For testing H1, I assumed that firms implemented SOP 97-2 rules in the same years as AICPA required them to do so (i.e., the "prescribed implementation years").[10] To the extent this assumption is violated, it would bias against my finding significant results. I needed data on changes in stock prices, sales, assets, and earnings for the following two years: the year prior to the implementation year and the implementation year. Therefore, I retained 408 firms with SIC codes 7372 and 7373 with

[10] Compustat defines fiscal year based on the month of May. However, SOP 97-2 defines prescribed implementation year based on a December cut-off. For firms with fiscal years ending in June through November, the prescribed implementation year corresponds to Compustat fiscal year 1999, and 1998 for the others.

valid data for each of the above variables for each of the three years ending with the implementation year.

To test H2 and H3, I hand-collected data on deferred-revenue accounts for the following four years: a) two years prior to the implementation year, to determine the "normal" level of firms' deferred-revenue accounts; b) the implementation year; and c) the year after the implementation year. The SOP 97-2 implementation years could correspond to Compustat fiscal years 1998 or 1999, depending on firms' fiscal year-end months. Hence, I retained 423 firms with SIC codes 7372 and 7373 with revenue and assets data available in Compustat for each of the fiscal years 1996-2000 (i.e., 1998−2 to 1999+1).

For these 423 firms, I gathered data from the firms' 10-K filings. I obtained data on deferred-revenue accounts from the liability section of balance sheets or from footnotes that provide details on smaller liabilities. I looked for words such as "deferred revenue," "unearned income," "customer advances," and "billings in excess of revenue." I further dropped 137 firms that did not provide details on deferred-revenue accounts. This filter left me with 286 firms.

Next, I examined the "revenue recognition" section in the "significant accounting policies" footnotes and also performed a keyword search for SOP 97-2, to determine the fiscal years in which firms first implemented the SOP 97-2 rules.[11] I could not determine

[11]To ascertain the SOP 97-2 implementation year, I looked for explicit disclosures in firms' 10-K filings. If a firm didn't explicitly disclose its implementation year, I examined changes in its revenue-recognition policy.

implementation years for 35 firms, which left me with 251 firms that constitute my sample for testing H2 and H3.

Normal and SOP 97-2-Created Deferred Revenue

I partitioned the implementation year's deferred-revenue accounts into *normal deferred revenue* and *SOP 97-2-created deferred revenue* components. Deferred-revenue account refers to those cash receipts from customers, which pending conversion to revenues, are reported as liabilities. I assumed that (1) implementing SOP 97-2 did not affect firms' cash operating cycles and (2) firms had incentives to recognize revenues early. Therefore, any increase in the deferred-revenue account in the SOP 97-2 implementation year would likely reflect additional revenue-recognition restrictions. I calculated each firm's deferred revenue to sales ratios for the two years prior to the implementation year. I called their average the *normal ratio.* Then, I multiplied each firm's *normal ratio* with its reported revenue in the implementation year. I called this product the *normal deferred revenue*. This component represents the deferred-revenue account if SOP 97-2 had not been implemented. Then, I subtracted the *normal deferred revenue* from the reported deferred-revenue account, and called the residual the *SOP 97-2-created deferred revenue*. Hence, I used firms' own prior operating ratios to partition the deferred-revenue account into *normal deferred revenue* and *SOP 97-2-created deferred revenue* components.

Descriptive Statistics

Tables 1 and 2 present the descriptive statistics of 408 firms (for testing H1) and 251 firms (for testing H2 and H3) in the implementation year. I discuss the descriptive

statistics of 251 firms; those of the 408 firms are similar. Table 1 Panel B shows that the sample of 251 firms is comprised of 187 prepackaged software firms (75%) and 64 systems integrators (25%). Table 1 Panel C shows that only 4 firms (2%) implemented SOP 97-2 earlier than the prescribed year; 219 (87%) implemented in the prescribed year; and the remaining 28 (11%) implemented later than the prescribed year (many firms restated their accounts due to late implementation). Table 1 Panel D shows that 72% of the sample firms implemented SOP 97-2 in 1998, 23% in 1999, and the remaining 5% in 1997 and 2000. Table 2 Panel B shows that the sample firms had average assets of $ 337 million (median $50 million). However, they had much higher average market value of $ 1,966 million (median $ 85 million), which suggests that investors had high growth expectations from these firms. Note the high coefficient of variation (ratio of standard deviation to mean) that reaches 800% for some variables. This shows large variation in the sample firms' characteristics. The average age of the firms was 12 years (median 11 years). However, firms' revenues grew at an average rate of 46% (median 18%). The average ROA was negative and more than half of the sample firms incurred losses. The average *SOP 97-2-created deferred revenue* to assets (revenue) ratio was 1.66% (2.31%).

Univariate Tests on Deferred-Revenue Accounts

I first confirmed that implementing SOP 97-2 significantly increased software firms' deferred revenues and that this increase did not reflect a time trend. I used revenue (Compustat DATA 12) to deflate the deferred revenues because if the cash operating cycle remains unchanged, the deferred revenues should increase

proportionately with revenues. Nevertheless, I also used alternate deflators of assets (DATA 6) and market value (common shares outstanding [DATA25] × closing price [DATA199]).

Table 3 Panel A shows that upon implementing SOP 97-2 rules, the deferred revenue to revenue ratio increased for approximately two-thirds of the sample firms. In value terms, this ratio increased by an average of 2.3% (calculated as $Ratio_t - Ratio_{t-1}$). This change, on average, represents a 42% increase over the prior year's ratio (calculated as $(Ratio_t - Ratio_{t-1})/Ratio_{t-1}$). All these increases are statistically significant. I obtained similar results using alternate deflators of assets and market value. I also estimated changes in the year before and the year after the SOP 97-2 implementation and found that they are not significant. Therefore, I conclude that the increases in the deferred-revenue accounts in the implementation year do not reflect a time trend.

Systems integrators (e.g., IBM) are more likely to defer additional revenues upon SOP 97-2 implementation than the prepackaged software firms (e.g., Microsoft). Systems integrators provide multiple additional services, such as customization, integration, training, and maintenance, along with their base software. Their base software typically doesn't function without customization and integration services. Therefore, they face a greater difficulty in meeting the delivery condition in the early phases of a project. Moreover, because they customize their software to buyers' specifications, they lack a history of substantially similar prior transactions. Accordingly, they face a greater difficulty in establishing VSOE.

Table 3 Panel B shows that implementing SOP 97-2 rules increased deferred-revenue to revenue ratios of both prepackaged software firms and systems integrators. For prepackaged software firms, this ratio increased by 2.1% from the earlier level of 12.1%. This change, on average, represents a 36% increase over the pre-implementation year ratio. For systems integrators, this ratio increased by 3.0% from the earlier level of 7.0%. This change, on average, represents a 61% increase over the pre-implementation year ratio. This percent increase for the systems integrators exceeds the percent increase for the pre-packaged software firms, which suggests that the greater the difficulty in estimating the earnings completion process, the greater the increase in deferred-revenue accounts upon SOP 97-2 implementation.

Discussion - univariate tests on deferred-revenue accounts

The magnitude of increase in deferred-revenue accounts is not as dramatic as some respondents expected. The average increase in deferred-revenue accounts amounts to 2.3% of revenues. This magnitude does not support some respondents' expectation of large revenue deferrals (e.g., read PWC's and Lucent's comments in Appendix B). One possible reason for this less consequential effect could be that instead of deferring entire revenues, firms started using construction accounting rules (SOP 81-1 [AICPA 1981]) more often. These rules allow firms to recognize revenues ratably proportional to passage of time or to provision of ancillary services. For example, Apple Inc. uses this method to reconize its iPhone sales revenues ratably over the service period. Therefore, the difference between the pre-SOP 97-2 method and the post-SOP 97-2 method could

reflect: (i) the difference between SOP 91-1 and SOP 97-2 rules; and (ii) a greater use of construction accounting.

Nonetheless, recognizing revenues ratably based on construction accounting does not reflect the discrete value-delivery attribute of the software industry. For example, a software firm does not continually deliver its base software, which is typically the most valuable item in its multiple-element contract. It is fully uploaded all at once. Similarly, Apple Inc. delivers its iPhone in one discrete transaction. This discrete value-delivery attribute also manifests in the software industry's milestone-based billing practices. Consequently, a mismatch between timeliness of value-delivery events and revenue-recognition might adversely affect multiple-element firms' earnings informativenes.

Testing Hypothesis H1

To investigate SOP 97-2's effects on earnings informativeness, I examined changes in the earnings response coefficient (ERC) and the revenue response coefficient (RRC) in the prescribed implementation year relative to those in the prior year (Kothari 2001, Altamuro et al. 2005, Zhang 2005). I regressed excess buy-and-hold returns over fiscal year (measured by percent change in end-of-the-year stock prices [DATA199] minus risk-free return [CRSP RF]) on changes in revenues (DATA 12) and net incomes (DATA 172). I deflated the latter two variables by beginning assets (DATA 6). I controlled for firm size (log of assets), Fama-French factors (i.e., excess market return [CRSP VWRETD – CRSP RF], high minus low growth [CRSP HML], small minus big size [CRSP SMB], and momentum [CRSP UMD]), and sub-industry and year fixed effects. I used the following regression:

$$Excess\_BHR_{it} = \beta_{01} + \beta_{02} \times After + \beta_{11} \times \Delta NetIncome_{it} + \beta_{12} \times After \times \Delta NetIncome_{it} + \beta_{21} \times \Delta Revenue_{it} + \beta_{22} \times After \times \Delta Revenue_{it} + \Sigma \beta_{s1} \times Controls_{it} + \Sigma \beta_{s2} \times After \times Controls_{it} + \varepsilon_{it} \quad (1)$$

where

Δ = one-year change;

After = dummy variables set to 1 for observations in the prescribed implementation year, and 0 for the year prior to that year;

i = 1 to 408 firms; and

t = the prescribed implementation year and the year prior to that year.

A negative β_{12} and β_{22} would indicate that ERC and RRC, respectively, decline due to implementation of SOP 97-2 rules.

Results for hypothesis H1

Table 4 Panel A (equation 1) shows that β_{12} is significantly negative. This indicates that ERC declined when firms implemented the SOP 97-2 rules. Furthermore, the summation of fixed effect and the interaction effects ($\beta_{02} + \beta_{12}$) of implementing SOP 97-2 is significantly negative. This result suggests that implementing SOP 97-2 rules deteriorates earnings informativeness in the software industry. However, β_{22} is not significantly negative.

These results are consistent with Altamuro et al. (2006) and are contrary to the notion that implementing SAB 101 guidelines (i.e., the SOP 97-2 rules) deteriorates earnings informativeness because they have been misapplied in a set of non-intended

industries. On the contrary, these results support Healy and Wahlen (1999) and Fields, Lys, and Vincent (2001). Note the significantly positive coefficient on revenues despite controlling for net income. This indicates that for growth firms, revenues provide incremental value-relevant information beyond the information provided by earnings.

Testing Hypothesis H2

To test H2, I examined whether the market prices *SOP 97-2-created deferred revenues* more similarly to how it prices the revenues than to how it prices *normal deferred revenues*. I regressed excess buy-and-hold returns for the SOP 97-2 implementation year on *SOP 97-2-created deferred revenues* and changes in *normal deferred revenues* and reported revenues. I controlled for changes in net incomes and deflated all dollar-denominated variables by beginning assets. I also controlled for firm size (log of assets) and firm age, which I estimated using incorporation-year data obtained from the firms' 10K filings. In addition, I controlled for Fama-French factors, and sub-industry fixed effects and year fixed effects. I used the following regression:

$$Excess\_BHR_{it} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_t$$
$$+ \beta_2 \times SOP97\text{-}2CreatedDeferredRevenue_{it}$$
$$+ \beta_3 \times \Delta Revenue_{it} + \beta_4 \times \Delta NetIncome_{it}$$
$$+ \Sigma \beta_s \times Controls_{it} + \varepsilon_{it} \quad (2)$$

where

Δ = one-year change;

i = 1 to 251 firms; and

t = the SOP 97-2 implementation year.

A positive β_2 that significantly differs from β_1 but not from β_3 might indicate that the market considers *SOP 97-2-created deferred revenues* as revenues and not as current liability.

Upon implementing SOP 97-2, the subsequent year's earnings would include the effects of the implementation year's *SOP 97-2-created deferred revenues*. However, based on the pre-SOP 97-2 method, these revenues would not be deferred and the subsequent year's earnings would not include the effects of these deferrals. If the market considers *SOP 97-2-created deferred revenues* as revenues, the market would price the subsequent years' earnings as if these earnings did not include the effects of SOP 97-2-created deferrals. In other words, the market would price subsequent year's earnings as if by subtracting the portion of earnings that resulted from late recognition of the *SOP 97-2-created deferred revenues*. I examined this notion using the following test.

Let t represent the implementation year and let t+1 represent the subsequent year. Typically, returns in year t+1 should be associated with changes in earnings as follows:

$$R_{it+1} = \beta_1 + \beta_{20} \times \Delta E_{it+1}^{*} + \varepsilon_{it+1} \qquad (3)$$

where, R_{t+1} is the return, and ΔE^{*}_{t+1} is the unobserved change in earnings, absent any SOP 97-2-created deferral. Based on the *pre-SOP 97-2* method, ΔE_{t+1}, which is observed, overstates ΔE^{*}_{t+1} due to the implementation year's *SOP 97-2-created deferred revenues* ($SOPCDR_t$), as follows:

$$\Delta E_{it+1} = \Delta E_{it+1}^{*} + Margin \times SOPCDR_{it} \qquad (4)$$

where margin represents net income to revenue ratio. Accordingly, the unobserved change in earnings, based on the *pre-SOP 97-2* method, would be as follows:

$$\Delta E_{it+1}^{*} = \Delta E_{it+1} - Margin \times SOPCDR_{it} \quad (5)$$

Putting this in equation (3) gives:

$$R_{it+1} = \beta_1 + \beta_{20} \times (\Delta E_{it+1} - Margin \times SOPCDR_{it}) + \varepsilon_{it+1} \quad (6)$$

$$R_{it+1} = \beta_1 - \beta_2 \times SOPCDR_{it} + \beta_{20} \times \Delta E_{it+1} + \varepsilon_{it+1} \quad (7)$$

Therefore, controlling for changes in reported earnings in year t+1, if the association between returns in year t+1 and $SOPCDR_t$ (i.e., β_2 in equation 7) is negative, it would indicate that the market prices the subsequent years' earnings as if by "adjusting" for the portion of earnings that result from late recognition of the *SOPCDR*. Accordingly, I tested H2 based on combined tests of equation (1) and equation (8) below:

$$Excess\_BHR_{it+1} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_t$$
$$+ \beta_2 \times SOP97\text{-}2CreatedDeferredRevenue_{it}$$
$$+ \beta_3 \times \Delta Revenue_{it+1} + \beta_4 \times \Delta NetIncome_{it+1}$$
$$+ \Sigma \beta_s \times Controls_{it+1} + \varepsilon_{it+1} \quad (8)$$

where

Δ = one-year change;

i = 1 to 251 firms;

t = the SOP 97-2 implementation year; and

$t+1$ = the year subsequent to the SOP 97-2 implementation year.

Results for hypothesis H2

The first column of Table 5 Panel A (equation 2) shows that the contemporaneous returns are not significantly associated with increases in deferred-

revenue accounts. This could be because, on one hand, increases in deferred-revenue accounts signal future revenues; on the other, they represent increases in current liabilities. However, the results in the second column show that disaggregating the deferred-revenue account into *SOP 97-2-created deferred revenues* and *normal deferred revenues* results in a positive coefficient on *SOP 97-2-created deferred revenues*. Importantly, this coefficient significantly differs from the coefficient on *normal deferred revenues*, but not from the coefficient on reported revenues. This result suggests that the market considers *SOP 97-2-created deferred revenues* as revenues and not as *normal deferred revenues*.

The first two columns of Table 5 Panel B (equation 8) show that the subsequent year's returns are unrelated to the implementation year's aggregate deferred revenues as well as to its components (*normal deferred revenue* and *SOP 97-2-created deferred revenues*). However, the third column shows that controlling for the subsequent year's reported revenues and net income, the coefficient on implementation year's *SOP 97-2-created deferred revenues* becomes negative. This negative sign suggests that the market prices the subsequent-year earnings as if by subtracting the portion of earnings that results from prior year's *SOP 97-2-created deferred revenues*. Therefore, both the implementation and the subsequent years' results support the premise that the pre-SOP 97-2 accounting method more strongly corresponds with market returns.

I also regressed the market value at the end of the implementation year on disaggregated balance sheet items. I deflated all dollar-denominated variables by the number of outstanding shares. Untabulated results show that the coefficients on assets

and liabilities are predictably positive and negative, respectively. Moreover, the coefficient on *normal deferred revenue* is predictably negative and does not differ significantly from that on current liabilities. On the contrary, the coefficient on *SOP 97-2-created deferred revenues* is positive and significantly differs from that on current liabilities. Therefore, I obtained similar results using the balance-sheet items as those obtained using the income-statement items.

Testing Hypothesis H3

To test H3, I examined whether a regression specification using proforma earnings more strongly corresponds with market returns than does the specification using reported earnings. I calculate proforma revenues and proforma earnings by adding back *SOP 97-2-created deferred revenues*. I used the following regression:

$$Excess\_BHR_{it} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_t + \beta_2 \times \Delta ProformaRevenue_{it} + \beta_4 \times \Delta ProformaNetIncome_{it} + \Sigma \beta_s \times Controls_{it} + \varepsilon_{it} \quad (9)$$

where

Δ = one-year change;

$\Delta ProformaRevenue = \Delta Revenue + SOP\ 97\text{-}2\text{-}created\ deferred\ revenues$;

$\Delta ProformaNetIncome = \Delta NetIncome + SOP\ 97\text{-}2\text{-}created\ deferred\ revenues$;

i = 1 to 251 firms;

t = the SOP 97-2 implementation year.

I used the same control factors as described in equation 2. I examined whether adjusted R-square of equation 9 exceeds that of equation 2.

Results for hypothesis H3

The third column of Table 5 Panel A shows that using proforma accounting numbers results in a better specified model. Vuong test shows that the adjusted R-square of specification using the proforma numbers exceeds that of specification using the reported numbers. This suggests that if SOP 97-2 had not been implemented, the accounting numbers would more strongly correspond with market returns than do the reported numbers.

The results of the three hypotheses, using three different research designs, suggest that the numbers calculated using pre-SOP 97-2 revenue-recognition rules more strongly correspond with market returns than do those using SOP 97-2.[12] Therefore, my study complements Altamuro et al. (2005) by documenting that implementing SOP 97-2 reduces earnings informativeness in the software industry, the industry for which these rules were originally created. More importantly, my results suggest that implementing the current revenue-recognition standard reduces earnings informativeness of multiple-element firms.

Supplementary Question 1: Naïve Reaction

Did implementing SOP 97-2 cause any adverse capital market consequences? Some market participants feared that reporting lower earnings (upon implementing SOP

[12]Alternatively, these results could indicate that investors prefer to compare financial statements, which are prepared using the same accounting rules (Sunder 1973). This explanation however, is less likely because I measure returns before earnings are announced.

97-2) could adversely affect firms' financial position and fund-raising abilities.[13] Effectively, they feared that prices might not accurately reflect the mechanical earnings-decreasing effects of SOP 97-2 -created deferrals. Prior studies (e.g., Lev and Ohlson 1982, Hirshleifer and Teoh 2003) concluded that the *naïve reaction* or *functional fixation* hypothesis cannot be entirely dismissed.

The difference between reported earnings and earnings based on the pre-SOP 97-2 method would arise primarily because of SOP 97-2-created deferrals. The above market participants' concerns would be valid if the market prices earnings as they are reported and correspondingly, prices SOP 97-2-created deferrals as current liabilities. However, my results suggest that the market prices the SOP 97-2-created deferrals as revenues and not as current liabilities. Therefore, I do not find statistical support for the notion that reporting lower earnings upon implementing SOP 97-2 leads to adverse capital market consequences.

Supplementary Question 2: Aggressive Revenue-Recognition Before SOP 97-2 Was Enacted

Were the software firms systematically recognizing revenues prematurely before AICPA enacted SOP 97-2? AICPA formulated stringent revenue-recognition rules based on this premise (Carmichael 1998). Accordingly, implementing SOP 97-2 rules would "correct" those software firms' revenue-recognition timeliness that had been recognizing revenues prematurely. Such "correction" would result in additional revenue deferrals;

[13] For example, Haushahn Systems in its response letter states, "…would have a substantial negative impact on our financial position." Ascential Software Corp. states in its 1998 10-K filing, "…will have a material adverse affect on the Company's revenues, gross margins and operating results. As a result, future capital raising efforts may also be adversely affected."

the higher the correction, the greater the additional revenue deferrals. In other words, reporting increases in deferred-revenues accounts might signal firms' prior aggressive revenue-recognition practices. Prior studies have documented that stock prices decline when firms reveal use of aggressive accounting practices.[14] I would find support for this premise if (1) stock-prices decline when firms report increases in deferred-revenues accounts; or (2) the magnitude of these price-declines increases with rules-created deferrals.

I calculated 7-day cumulative returns surrounding the days when firms reported the details on deferred-revenue accounts: the earnings announcement dates (Compustat RDQE of 4th quarter) and the 10-K filing dates (hand collected). Then, I used the following regression:

$$\begin{aligned} \textit{7-dayReturn}_{it} &= \beta_{01} + \beta_{02} \times \textit{DummyIncrease}_t \\ &+ \beta_1 \times \Delta\textit{NormalDeferredRevenue}_{it} \\ &+ \beta_{21} \times \textit{SOP97-2CreatedDeferredRevenue}_{it} \\ &+ \beta_{22} \times \textit{DummyIncrease}_t \times \textit{SOP97-2CreatedDeferredRevenue}_{it} \\ &+ \beta_3 \times \Delta\textit{Revenue}_{it} + \beta_4 \times \Delta\textit{NetIncome}_{it} \\ &+ \beta_5 \times \textit{7-dayMarketReturn}_t + \Sigma\, \beta_s \times \textit{Controls}_{it} + \varepsilon_{it} \end{aligned} \quad (10)$$

Where

Δ = one-year change;

DummyIncrease = dummy variables set to 1 for observations with positive *SOP 97-2-created deferred revenues*, and 0 otherwise;

[14] For example, when firms announce: (1) SEC's AAER investigations (Feroz, Park, and Pastena 1991); and (2) accounting restatements (Palmrose, Richardson, and Scholz 2004).

i = 1 to 212 firms; and

t = the SOP 97-2 implementation year

I controlled for market returns, size, age, and firm and sub-industry fixed-effects.[15] A negative β_{02} or β_{22} would support AICPA's premise. A negative β_{02} might indicate that prices decline when firms reveal increases in deferred-revenue accounts. And a negative β_{22} might indicate that these price-declines increase with magnitude of increases in deferred-revenue accounts.

The results, presented in Table 6, show that neither β_{02} nor β_{22} is significantly negative. Therefore, I do not find statistical support for the premise that firms systematically recognized revenues prematurely before AICPA enacted SOP 97-2.

Supplementary Question 3: Firm Disclosures

How did investors obtain information to distinguish SOP 97-2-created deferred revenues from normal deferred revenues? I examined one possible source of investor information – firms' narrative disclosures in their 10-K filings. SEC rules require firms to discuss the effects of implementing a new accounting rule, such as SOP 97-2, both before and after its implementation: (1) *before* its implementation, SAB 74 (SEC 1987) requires firms to discuss the likely changes; and (2) *after* its implementation, MD&A rules (SEC 1989) require firms to discuss the material changes in line-items, especially if these changes relate to revenue items. Moreover, academic research predicts that firms will increase their narrative disclosures when accounting rules reduce firms' accounting discretion (Dye 1985, Kasznik 1996).

[15] Ideally, I should use analysts' forecasts to estimate revenue and earnings surprises. However, I could not find analysts' forecasts in the IBES database for most of my sample firms.

Table 7 Panel A presents a sample of the *before* disclosures. In their 10-K filings, most firms described that they planned to implement SOP 97-2 in their next fiscal year. However, they did not provide many details about forthcoming accounting changes. Most firms stated that they did not expect significant changes from implementing the SOP 97-2 rules. Table 7 Panel B presents a sample of the *after* disclosures. Similar to the *before* disclosures, most firms did not provide many details on SOP 97-2 effects. Firms typically stated: "No material effect to the company's operation or financial position taken as a whole," (e.g., Nyfix Inc.). Very few firms quantified the effects of implementing SOP 97-2 rules. Therefore, I conjecture that the market relied on non-financial sources to distinguish between the two deferred-revenue components. How the market prices these two components differently remains a topic for future research.

V. CONCLUSIONS

Revenue is among the largest and most value-relevant items in firms' financial statements. However, it is not easy to determine revenues for firms that use the "customer-centric" and "relationship marketing" approach (i.e., those firms that bundle multiple products and services and deliver them over extended periods). As more and more firms adopt a relationship-marketing approach, the complexity of revenue-recognition issues increases.

The dilemma for standard setters remains: What is the optimum level of objectivity and verifiability requirements that would enhance the two important "qualitative characteristics" of financial statements: relevance and reliability (FASB 2005)? Standard setters' rules-making processes often involve trade-offs between these two characteristics. On the one hand, if standard setters make rules too conservative, by requiring firms to comply with highly objective and verifiable conditions, revenues may not reflect economic performance in a timely manner (affects relevance). On the other hand, if standard setters make the rules too lax, firms can use this freedom to recognize revenues prematurely (affects reliability).

Standard setters would have faced a similar dilemma when they formulated SOP 97-2. In response to software firms' perceived premature revenue-recognition practices, AICPA increased objectivity and verifiability requirements before firms could recognize revenues from multiple-element contracts. However, estimating whether a multiple-element firm has "earned" revenues routinely involves subjective estimates. For example: 1) in allocating aggregate contract value to various elements that are not sold

separately and 2) in deciding whether an element provides functional value pending delivery of another element. Nevertheless, SOP 97-2 requires a firm to defer recognizing entire revenues when it cannot objectively and verifiably determine the extent of earned revenues from a multiple-element contract.

I find that implementing SOP 97-2 increases revenue deferrals and reduces software firms' earnings informativeness. In other words, imposing highly objective and verifiable conditions before firms can recognize revenues from multiple-element contracts leads to deferral of revenues, which managers would have otherwise recognized using subjective estimates. My finding suggests that recognizing such deferred amounts in a timely manner conveys more useful information to financial statement users.

My findings should be useful to FASB in its current deliberations (FASB/IASB 2007). FASB is evaluating alternative revenue-recognition approaches, which include: (1) the measurement model (i.e., the fair-value approach) and (2) the allocation model (i.e., the customer-consideration approach). The latter model is constructively similar to the earnings-completion model. My study suggests that imposing highly objective conditions for multiple-element revenue recognition could lead to economic effects similar to those from SOP 97-2 implementation.

Admittedly, I have examined only one criterion – how accounting numbers correspond with securities prices – among several that guide the standard setters' decisions. Holthausen and Watts (2001) conclude that evaluating accounting rules using only the relevance criterion does not adequately describe the rules-setting process.

Nevertheless, Barth et al. (2001) argue that share prices reflect accounting numbers, only if the relevant information is measured and reflected reliably in the accounting numbers.

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APPENDIX A

SIGNIFICANT CHANGES IN REVENUE-RECOGNITION PRACTICES UPON IMPLEMENTING SOP 91-1, SOP 97-2 AND SAB 101*

Panel A: SOP 91-1 implementation in the software industry

Revenue recognition criteria		
Before	**After**	**Significant changes in industry practices**
A 1983, survey results showed a substantial diversity in revenue recognition practices ranging from the very conservative (on customer payment) to the decidedly aggressive (immediately on contract signing). 15% of the companies used contract signing-date to recognize entire revenues.	1. Delivered or performed 2. Realizable	• License with no vendor obligations: Recognize revenue upon delivery of the software. • License with insignificant vendor obligations: Accrue costs of insignificant obligations or defer a pro-rata portion of revenue and recognize it ratably as the costs are incurred. • License with significant vendor obligations: Recognize revenue according to the contract accounting method or as a service transaction • Post-contract support: Recognize revenue over the period during which the services are provided.

Panel B: SOP 97-2 implementation in the software industry

Revenue recognition criteria		
Before	**After**	**Significant changes in industry practices**
1. Delivered or performed	1. Evidence of arrangement 2. Delivered or performed (expanded definition)	• Element-by-element revenue recognition • If functionality of a delivered element requires delivery of another element, then revenues for that element should be deferred. Otherwise, firm should recognize entire revenues ratably (SOP 81-1). • If the contract promises a "when-and-if available" element, such as an unspecified upgrade, such an element creates a contingency that should be accounted as a separate element.
2. Realizable	3. Realizable 4. Determinable fees	• Firm should objectively and verifiably determine fair values of all elements based on its own prior transactions. Otherwise it should defer revenues in its entirety or recognize them ratably (SOP 81-1).

Panel C: SAB 101/SAB 104 implementation in the non-software industries

Revenue-recognition criteria		
Before	**After**	**Significant changes in industry practices ‡**
Several industry-specific and general standards	1. Evidence of arrangement 2. Delivered or performed† 3. Realizable 4. Determinable fees† †Multiple-element conditions later clarified through SAB 104 (SEC 2000) and EITF00-21 (FASB 2002)	• Licensing arrangements: Delivery and revenue recognition don't occur until the term of the license begins. • Layaway programs: Sellers should not record revenue until the product is delivered to the customer. • Upfront fees: Even if nonrefundable, these fees should be deferred and recognized over the term of the agreement. • Setup services: Should be recognized on a straight-line basis over the term of the contract, even if most of the costs are incurred up front. • Contingent rent: Income contingent on a factor other than time should be recorded only when the contingency is resolved. • Rental income: Retailers can recognize only the rental income from leased or licensed departments, not that department's revenues. ‡92% of firms that changed their revenue-recognition practices did it to comply with the new delivery condition.

*References: Lowell (1994), Carmichael (1998), Osterland (2000), and Moffeit and Eikner (2003).

APPENDIX B

REPRESENTATIVE COMMENTS RECEIVED BY AICPA ON THE DRAFT SOP 97-2*

Respondent/Issue	Quote from the comment letters
Firm should defer recognizing revenues corresponding to a delivered element if it cannot establish that element's VSOE	
Pricewaterhouse	We are troubled that in some multiple element arrangements the ED's requirements for VSOE of fair value will lead to deferral of all revenue, even in situations where software products having clear value and immediate utility to customer have been delivered. At first blush, this seems unduly harsh.
BriarCliff College	Deferring revenue recognition for all other elements in a multiple element arrangement because one element in bundle could not be fairly valued seems too conservative. This is like stopping all traffic on freeway because one car is broken down.
Lucent Corp	We are troubled by the underlying assumption that all software companies can and do market all of their products separately. There are some software companies which actively bundle their products and services…..these companies may not be able to comply with VSOE evidence criteria.
Candle Corporation	Due to many pricing considerations and variables described above, the permutations and competitive pricing makes it impractical to meet VSOE requirements
Massachusetts Society of CPAs	We believe that the concept of VSOE may in fact be quite difficult for software companies to actually apply in their business….An "all or nothing" approach can significantly swing revenues…..
Firm cannot recognize revenue corresponding to a delivered element until it delivers all elements essential for the functioning of that element	
Lucent Technologies	All of the criteria to recognize revenue may be met for the most significant elements, yet all of the revenue would have to be deferred solely because… products sold in bundled package. E.g. services compose between 1% and 15% of total revenue… the company would be forced to defer 100% of revenue until 100% of services were performed….
Pricewaterhouse	If for example, the vendor never sells training services on a discrete basis, the ED would seem to require deferral of all revenue from the arrangement until the delivery of ancillary training services are completed. In many circumstances, we do not believe such accounting would be appropriate.
Firm should allocate and defer recognizing revenues corresponding to specified upgrades. If the firm cannot determine the amount to allocate, it should defer entire revenues from the contract	
Hausahn Systems and Engineers	…Since we do not charge for upgrades, it is unclear whether we would have to allocate…
Arthur Anderson	SOP should be expanded with a discussion of how to determine VSOE of fair value of an upgrade right
Lucent Technologies	… We believe that it would be inappropriate to defer the entire amount of software revenue as a result of specifies upgrade/enhancement that is not of significance to the transaction.

Respondent/Issue	**Quote from the comment letters**
Firm should defer revenues for the entire amount at risk due to acceptance/warranty/performance clause/right of return:	
Arthur Anderson	We believe that routine acceptance clauses should not preclude revenue recognition at delivery.
I2 Technologies	In large enterprise software offerings where customer is spending million of dollars for mission critical software, the customer often rightfully requires a warranty for a year or more. ….I believe this should not impair revenue recognition
Implementing SOP 97-2 rules might lead to violation of matching principle	
Lucent Technologies	Bulk of costs will already have been expensed…while revenue will not be recognized until all elements are delivered….this could be a departure from matching principle and could be very misleading
Hausahn Systems and Engineers	In our case, approximately 90% of baseline development costs are expensed as period cost. Deferral of revenue will probably result in a lack of matching revenue and expense.
Firm should recognize license revenues ratably over the service period if it cannot establish VSOE for the license	
Inso Corp	If sufficient VSOE does not exist to allocate the license fee to the separate elements, the entire arrangement fee should be recognized ratably over the period during which PCS is expected to be provided.
California Society of CPAs	To impose the "separate" pricing criteria is not realistic and will generally preclude revenue recognition on initial delivery …..
Firms might find it difficult to establish VSOE based primarily on prior transactions	
California Society of CPAs	We are concerned with the ability to estimate the extent to which that price protection will be required ….given that much of the software industry is known for its short product cycles and intense competition.
Inso Corporation	We believe the concept of VSOE may be difficult for software companies to apply in practice….concept of fair value is the value a willing buyer will spend.

Respondent/Issue	**Quote from the comment letters**
Firm should defer revenues for collections beyond a 12-month period	
Arthur Anderson	It is unclear…. 1. revenues should be recognized on cash basis. 2. beyond 12 months be recognized in the (later) period when they become due and within 12 months recognized at delivery 3. In the period they become due within 12 months Cash basis is inconsistent with other areas of revenue recognition (e.g. real estate .. when entire revenue is recognized on down payment)
J. D. Edwards	Revenue would be understated if all of the vendor obligations have been met and only negotiated payment terms remain.
Firm should defer revenues for the entire amount of coupons issued instead of accruing only the costs of expected redemption	
Mysoftware Company	We would have to defer 100% of the revenues of the free products in redemption and coupon implementations… We have been accruing the redemption costs rather than defer revenues.
Software Publishers Association	The accounting used for coupons in the retail/grocery industry should be considered whereby the seller recognizes revenue and estimated costs of providing the additional software products are accrued.

*I obtained copies of comment letters from the AICPA library.

APPENDIX C

DEFINITIONS OF VARIABLES

Assets	=	Compustat DATA6
Revenue	=	Compustat DATA12
Net income	=	Compustat DATA172
Market value	=	Common shares outstanding (Compustat DATA25) × fiscal year end closing price (Compustat DATA199).
Age (in years)	=	Fiscal year – year of incorporation. I obtained incorporation date from the 10-K filings.
Implementation year	=	Fiscal year in which firm starts applying the SOP 97-2 revenue-recognition rules. I obtained this information from firm's 10-K filings by studying the "revenue recognition" section in the "significant accounting policies" footnote.
Prescribed implementation year	=	Firms' fiscal years beginning after December 15, 1997. For firms with fiscal year ending June to November, the prescribed year was fiscal year (Compustat YEARA) 1999. For all other firms, the prescribed year was fiscal year 1998.
After	=	Dummy variables set to 1 for observations in the prescribed implementation year, and 0 for the year prior to that year.
Return on assets	=	Net income (Compustat DATA172) / Total assets (DATA6).
Return on equity	=	[Share price (Compustat DATA199) – Lag(Share price)]/Lag(share price).
Revenue to assets ratio	=	Revenue (Compustat DATA12) / Total Assets (DATA6).
Deferred Revenue	=	Deferred revenue account. I obtained information on this account from the liabilities section and the footnotes in firms' 10-K filings. I searched for terms including: "deferred revenue," "unearned income," and "billings in excess of revenue".
Normal deferred revenue ratio	=	The average of Deferred Revenue/ Revenue ratio for the two years prior to the implementation year.
Normal deferred revenue	=	Normal deferred revenue ratio × Revenue. This represents the deferred revenue account had SOP 97-2 not been implemented.
SOP 97-2-created deferred revenue	=	Reported deferred revenue – normal deferred revenue. This represents changes in deferred-revenue accounts that result from SOP 97-2 implementation.
DummyIncrease	=	Dummy variables set to 1 for observations with positive SOP 97-2-created deferred revenues; and 0 otherwise.
Proforma Revenue	=	Revenue + SOP 97-2-created deferred revenues. Represents revenues had SOP 97-2 not been implemented.
Proforma Net Income	=	Net Income + SOP 97-2-created deferred revenues. Represents net income had SOP 97-2 not been implemented.
Excess_BHR	=	Excess buy and hold return [Return on equity – returns for the risk-free securities (CRSP RF)] over the fiscal year.
Excess market return	=	[Cumulated monthly returns for value-weighted index (CRSP VWRETD) – those for the risk-free securities (CRSP RF)] over the fiscal year.
High minus low	=	[Cumulated monthly returns for the high-growth portfolios – those for the low-growth portfolios (CRSP HML)] over the fiscal year.

Small minus big	=	[Cumulated monthly returns for the small-cap portfolios – those for the big-cap portfolios (CRSP SMB)] over the fiscal year.
Momentum	=	[Cumulated monthly returns for the high-prior-returns portfolio – those for the low-prior-returns portfolios (CRSP UMD)] over the fiscal year.
7-Day_MAR	=	Cumulated daily returns over the 7-trading-days period (–3 to +3) surrounding the event days (CRSP RET) – the market return for the same period (CRSP VWRETD).
Earnings announcement date	=	Compustat RDQE for fourth quarter (Compustat QTR) of the fiscal year.
10-K filing date	=	Dates stamped on 10-K filings, obtained from SEC EDGAR database.

All regression variables are winsorized at 5% and 95% levels, on a replacement basis.

TABLE 1
Sample derivation and distribution

Panel A: Sample selection

	Distinct firms H1	Distinct firms H2 and H3
First Stage (Compustat)		
Firms in compustat with 4-digit SIC code = 7372 or 7373 and data available for *any* fiscal years 1996-2000	1,007	1007
Less: Firms that do not have continuous data for revenue, assets, and closing price for *each* of the three years ending in the prescribed implementation year	−599	
Final sample (H1)	**408**	
Less: Firms that do not have revenue and assets data for *each* of the fiscal years 1996-2000		−584
Base sample for hand collection (H2 and H3)		423
Second Stage (Hand-collected from10-K filings)		
Less: Firms not in software industry (e.g. a holding company)		−20
Less: Foreign filers		−37
Less: Firms with no data on deferred revenue		−55
Less: Firms with GVKEYs above 66,500 that have no electronic 10-K filings in early years of the sample period		−25
Filtered sample (H2 and H3)		286
Third stage (Implementation year can be determined)		
Filtered sample		286
Firms for which implementation year could not be determined		−35
Final Sample (H2 and H3)		**251**
Supplementary test 2 (CRSP data is available)		
Filtered sample		251
Firms for which CRSP data is not available		−39
Final Sample (Supplementary test 2)		**212**

TABLE 1 CONTINUED

Panel B: Distribution of sample firms

Break-down of final sample	Distinct firms H1	Percent of sample	Distinct firms H2 and H3	Percent of sample
Prepackaged software firms (SIC code 7372)	302	74%	187	75%
Integrated systems design firms (SIC code 7373)	106	26%	64	25%
Total firm-years	408	100%	251	100%

Panel C: Distribution by implementation fiscal-years (H2 and H3 sample)

	Distinct firms H2 and H3	Percent of sample
Firms that adopted SOP 97-2 in the prescribed year	219	87%
Firms that adopted early	4	2%
Firms that adopted late	28	11%
Total firm-years	251	100%

Panel D: Distribution by implementation fiscal-years (corresponding to Compustat YEARA)

Implementation year (Prescribed: for H1) (Actual: for H2 and H3)	Distinct firms H1	Percent of sample	Distinct firms H2 and H3	Percent of sample
1997			4	2%
1998	303	74%	181	72%
1999	105	26%	59	23%
2000			7	3%
Total firm-years	408	100%	251	100%

TABLE 2
Descriptive Statistics

Panel A: Descriptive statistics for sample firms in the *prescribed* implementation year (H1:408 firms)

	Mean	Standard deviation	First quartile	Median	Third quartile
Firm demographics					
Assets in $M	500	3,427	11	37	145
Revenue in $M	461	3,087	12	36	139
Market value in $M	2,272	25,037	17	55	316
Net income in $M	43	460	-5	0	6
Net income as % of lag assets	-26%	155%	-25%	-2%	11%
Return on equity in %	27%	153%	-47%	-9%	48%
Revenue growth in %	38%	209%	-8%	14%	41%

Panel B: Descriptive statistics for sample firms in the *actual* implementation year (H2 and H3:251 firms)

	Mean	Standard deviation	First quartile	Median	Third quartile
Firm demographics					
Assets in $M	337	1,634	16	50	161
Revenue in $M	276	1,185	17	47	138
Market value in $M	1,966	17,281	23	85	409
Net income in $M	32	301	(7)	0	7
Deferred Revenue in $M	37	222	1	5	15
Age in years	12	9	6	11	16
Net income as % of lag assets	-11%	40%	-23%	0%	12%
Return on equity in %	35%	145%	-44%	-3%	55%
Revenue growth in %	46%	195%	-6%	18%	46%
SOP 97-2-created deferred revenue as % of lag assets	1.66%	7.78%	-2.41%	0.84%	5.13%
Percent change in deferred revenue to revenue ratio over the prior years' level	42.1%	84.2%	-0.08%	12.2%	60.3%

TABLE 3
Change in deferred-revenue account upon SOP 97-2 implementation

Panel A: Changes in deferred-revenue account in the following four years: The two years before the implementation year, the implementation year, and the year after the implementation year

					Difference		Comparing individual instances		
	Mean	25 Percentile	Median	75 Percentile	Means *t*-test* (*p*-value)	Median Wilcoxon* (*p*-value)	Change is positive	No change	Change is negative
Deferred-revenue as a percent of assets									
Two years before the implementation year	10.0%	2.6%	7.7%	14.5%					
					0.4% (0.35)	0.9% (0.21)	47%	0%	53%
One year before the implementation year	10.4%	3.7%	8.6%	14.5%					
					2.1% (0.01)	**2.2% (0.01)**	**66%**	**0%**	**34%**
The implementation year	12.5%	5.1%	10.8%	17.0%					
					-0.7% (0.45)	-1.6% (0.18)	48%	0%	52%
The year after the implementation year	11.8%	4.7%	9.2%	17.4%					
Deferred-revenue as a percent of revenue									
Two years before the implementation year	10.4%	2.9%	7.9%	15.0%					
					0.5% (0.30)	1.7% (0.19)	46%	0%	54%
One year before the implementation year	10.9%	3.7%	9.6%	15.3%					
					2.3% (0.01)	**2.1% (0.01)**	**67%**	**0%**	**33%**
The implementation year	13.2%	6.0%	11.7%	18.4%					
					-0.2% (0.85)	-0.2% (0.39)	49%	0%	51%
The year after the implementation year	13.0%	5.6%	11.5%	18.5%					

* One-tailed tests

TABLE 3 CONTINUED

Panel A continued

					Difference		Comparing individual instances		
	Mean	25 Percentile	Median	75 Percentile	Means *t*-test* (*p*-value)	Median Wilcoxon* (*p*-value)	Change is positive	No change	Change is negative
Deferred-revenue as a percent of market value									
Two years before the implementation year	5.2%	0.9%	2.7%	6.6%					
					0.8% (0.12)	1.6% (0.06)	53%	0%	47%
One year before the implementation year	6.0%	1.4%	3.3%	8.8%					
					3.4% (0.01)	**2.2% (0.01)**	**65%**	**1%**	**34%**
The implementation year	9.4%	1.8%	5.5%	11.6%					
					-2.9% (0.01)	-2.5% (0.01)	33%	2%	65%
The year after the implementation year	6.9%	1.1%	3.0%	8.8%					

* One-tailed tests

TABLE 3 CONTINUED

Panel B: Changes in deferred revenue by industry sub-classification

					Difference		Comparing individual instances		
	Mean	25 Percentile	Median	75 Percentile	Means *t*-test* (*p*-value)	Median Wilcoxon* (*p*-value)	Change is positive	No change	Change is negative
Deferred-revenue as percent of revenue for prepackaged software firms (SIC code 7372), which assume less complex multiple-element obligations									
Two years before the implementation year	11.5%	4.3%	10.3%	15.8%	0.6%	0.5%			
					(0.36)	(0.23)	48%	0%	52%
One year before the implementation year	12.1%	4.9%	10.8%	17.6%	**2.1%**	**2.2%**			
					(0.01)	**(0.01)**	**65%**	**0%**	**35%**
The implementation year	14.2%	7.3%	13.0%	18.6%	-0.1%	-0.2%			
					(0.95)	(0.94)	49%	0%	51%
The year after the implementation year	14.1%	7.2%	12.8%	19.1%					
Change in deferred revenue to revenue ratio (implementation year) as a percent of previous year's ratio = **36.3%** significant at *p*-level of **0.01**									
Deferred-revenue as percent of revenue for integrated systems design firms(SIC code 7373), which assume more complex multiple-element obligations									
Two years before the implementation year	7.1%	1.1%	4.2%	7.4%	-0.1%	-0.1%			
					(0.95)	(0.69)	40%	0%	60%
One year before the implementation year	7.0%	1.5%	4.1%	9.9%	**3.0%**	**2.3%**			
					(0.02)	**(0.03)**	**73%**	**0%**	**26%**
The implementation year	10.0%	3.1%	6.4%	13.5%	-0.3%	-0.5%			
					(0.85)	(0.63)	52%	0%	48%
The year after the implementation year	9.7%	2.3%	5.9%	14.4%					
Change in deferred revenue to revenue ratio (implementation year) as a percent of previous year's ratio = **60.5%** significant at *p*-level of **0.01**									
Differential effect of SOP 97-2 on the two industry subgroups									
Change in deferred revenue to revenue ratio (implementation year) as a percent of previous year's ratio = **24.2%** significant at *p*-level of **0.03**									

* One-tailed tests

TABLE 4
Whether earnings informativeness declines upon SOP 97-2 implementation

Panel A: Earnings Response Coefficient (ERC) compared for the following two years: the year before the prescribed implementation year and the prescribed implementation year

$$Excess\_BHR_{it} = \beta_{01} + \beta_{01} \times After + \beta_{11} \times \Delta NetIncome_{it} + \beta_{12} \times After \times \Delta NetIncome_{it} + \beta_{21} \times \Delta Revenue_{it} + \beta_{22} \times After \times \Delta Revenue_{it} + \Sigma \beta_{s1} \times Controls_{it} + \Sigma \beta_{s2} \times After \times Controls_{it} + \varepsilon_{it}$$

Variable	**Predicted sign**	**Estimate**	***p*-value***
Intercept		0.638	0.222
After (β_{02})		-1.019	0.219
Change in net income	+	0.446	0.001
After × Change in net income (β_{12})	−	**-0.241**	**0.094**
Change in revenue	+	0.504	0.001
After × Change in revenue (β_{22})	−	**0.025**	**0.856**
Controls for Fama-French factors, Momentum, Size, and Year- and Sub-industry fixed effects			Yes
Total number of observations (N)			816
Number of distinct firms			408
F-Value			8.35
Probability			0.001
Ftest*: $\beta_{02} + \beta_{12} = 0$			**0.067**
Ftest*: $\beta_{02} + \beta_{22} = 0$			**0.122**

All dollar denominated variables are deflated by beginning assets.

* one-tailed tests for directional hypotheses

TABLE 5
Whether the market considers the SOP 97-2-created deferred revenues as revenues or as current liability

Panel A: The implementation year

$$Excess\_BHR_{it} = \beta_0 + \beta_1 \times \Delta DeferredRevenue_{it} + \beta_2 \times \Delta Revenue_{it} + \beta_4 \times \Delta NetIncome_{it} + \Sigma\, \beta_s \times Controls_{it} + \varepsilon_{it} \quad (1)$$

$$Excess\_BHR_{it} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_{it} + \beta_2 \times SOP97\text{-}2CreatedDeferredRevenue_{it} + \beta_3 \times \Delta Revenue_{it} + \beta_4 \times \Delta NetIncome_{it} + \Sigma\, \beta_s \times Controls_{it} + \varepsilon_{it} \quad (2)$$

$$Excess\_BHR_{it} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_{it} + \beta_2 \times \Delta ProformaRevenue_{it} + \beta_4 \times \Delta ProformaNetIncome_{it} + \Sigma\, \beta_s \times Controls_{it} + \varepsilon_{it} \quad (3)$$

		(1)		***(2)***		***(3)***	
		Reported accounting numbers		***Disaggregated deferred-revenue account***		***Proforma accounting numbers***	
Variable	**Predicted sign**	**Estimate**	***p*-value***	**Estimate**	***p*-value***	**Estimate**	***p*-value***
Intercept		-0.368	0.564	-0.372	0.555	-0.391	0.532
Change in deferred revenue	+	**0.155**	**0.378**				
Change in normal deferred revenue (β_1)	+/–			**-0.776**	**0.155**	-0.711	0.153
SOP 97-2-created deferred revenue (β_2)	+			**1.138**	**0.074**		
Change in revenue (β_3)	+	0.750	0.001	**0.774**	**0.001**		
Change in net income	+	0.622	0.001	0.617	0.001		
Proforma-change in revenue	+					0.754	0.001
Proforma-change in net income	+					0.606	0.001
Controls for Fama-French factors, Momentum, Size, Age, and Year- and Sub-industry fixed effects			Yes		Yes		Yes
Total number of observations (N)			251		251		251
Adjusted R-squared			**17.4%**		21.0%		**21.3%**
F-Value			4.92		5.58		6.03
Probability			0.001		0.001		0.001
Second Specification:							
Ftest*: $\beta_1 = \beta_2$					**0.006**		
Ftest*: $\beta_2 = \beta_3$					**0.333**		
First and Third Specifications:							
Vuong-test*: R-square using reported numbers (1) = R-square using proforma numbers (3)							**0.072**

All dollar denominated variables are deflated by beginning assets.

* One-tailed tests for directional hypotheses

TABLE 5 CONTINUED

Panel B: The year after the implementation year

$$Excess\_BHR_{it+1} = \beta_0 + \beta_1 \times \Delta DeferredRevenue_{it} + \beta_2 \times \Delta Revenue_{it+1} + \beta_3 \times \Delta NetIncome_{it+1} + \Sigma \beta_s \times Controls_{it+1} + \varepsilon_{it+1} \quad (1)$$

$$Excess\_BHR_{it+1} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_{it} + \beta_2 \times SOP97\text{-}2CreatedDeferredRevenue_{it} + \Sigma \beta_s \times Controls_{it+1} + \varepsilon_{it+1} \quad (2)$$

$$Excess\_BHR_{it+1} = \beta_0 + \beta_1 \times \Delta NormalDeferredRevenue_{it} + \beta_2 \times SOP97\text{-}2CreatedDeferredRevenue_{it} + \beta_3 \times \Delta Revenue_{it+1} + \beta_4 \times \Delta NetIncome_{it+1} + \Sigma \beta_s \times Controls_{it+1} + \varepsilon_{it+1} \quad (3)$$

		(1)		**(2)**		**(3)**	
		Aggregated implementation year's deferred-revenue account		***Disaggregated implementation year's deferred-revenue account***		***Disaggregated implementation year's deferred-revenue account, controlling for subsequent year's earnings***	
Variable	**Predicted sign**	**Estimate**	***p*-value***	**Estimate**	***p*-value***	**Estimate**	***p*-value***
Intercept		-0.693	0.367	0.071	0.933	-0.480	0.536
Change in deferred revenue(t)	+/−	**-0.514**	**0.470**				
Change in normal deferred revenue(t)	+/−			-0.488	0.573	-0.471	0.555
SOP 97-2-created deferred revenue(t)	−			**-0.640**	**0.597**	**-1.939**	**0.043**
Change in revenue(t+1)	+	0.292	0.033			0.305	0.028
Change in net income(t+1)	+	1.538	0.001			1.599	0.001
Controls for Fama-French factors, Momentum, Size, Age, and Year- and Sub-industry fixed effects			Yes		Yes		Yes
Total number of observations (N)			251		251		251
F-Value			9.81		5.82		9.26
Probability			0.001		0.001		0.001

All dollar denominated variables are deflated by beginning assets.

* one-tailed tests for directional hypotheses

TABLE 6
Whether the stock prices decline when firms report increases in deferred-revenue accounts upon SOP 97-2 implementation

$$7\text{-}dayReturn_{it} = \beta_{01} + \beta_{02} \times DummyIncrease_t + \beta_1 \times \Delta NormalDeferredRevenue_{it}$$
$$+ \beta_{21} \times SOP97\text{-}2CreatedDeferredRevenue_{it} + \beta_{22} \times DummyIncrease_t \times SOP97\text{-}2CreatedDeferredRevenue_{it}$$
$$+ \beta_3 \times \Delta Revenue_{it} + \beta_4 \times \Delta NetIncome_{it} + \beta_5 \times 7\text{-}dayMarketReturn_t + \Sigma \beta_s \times Controls_{it} + \varepsilon_{it}$$

Variable	Predicted sign	*7-trading days surrounding 10-K filing dates* Estimate	*p*-value	*7-trading days surrounding earnings announcement dates* Estimate	*p*-value
Intercept	+/–	-0.183	0.047	0.123	0.144
Dummy Increase (β_{02})	**–**	**0.026**	**0.337**	**0.021**	**0.418**
Change in normal deferred revenue	+/–	-0.010	0.935	0.004	0.970
Rules-created deferred revenue	+/–	-0.512	0.136	0.205	0.512
Dummy Increase × SOP97-2-created deferred revenue (β_{22})	**–**	**0.686**	**0.103**	**-0.190**	**0.624**
Change in revenue	+	0.055	0.041	0.001	0.485
Change in net income	+	0.034	0.186	-0.038	0.137
7-dayMarketReturn		1.704	0.001	0.613	0.030
Controls for Size, Age, and Year- and Sub-industry fixed effects			Yes		Yes
Total number of observations (N)			212		212
Adjusted R-squared			9.8%		0. 9%
F-Value			2.760		1.150
Probability			0.001		0.322

All firm-specific variables are deflated by beginning assets.

TABLE 7
Effects of SOP 97-2 – representative disclosures from firms' 10-K filings, before and after SOP 97-2 implementation

Panel A: Firms' discussions on the expected effects of SOP 97-2 *before* implementation (SAB 74 compliance)

Name of firm	Compustat fiscal year	Quote from the 10K filings
Most firms expected no significant effect (typical response, almost 90% of firms)		
Pegasystems Inc.	1997	Beginning in 1998, the Company will be required to adopt the provisions of SOP 97-2, "Software Revenue Recognition." The implementation of the statement is not estimated to have a significant impact on the Company.
Some firms expressed uncertainty on new rules or their effects		
Citrix Systems Inc.	1997	……. the impact on the future financial results of the Company is not currently determinable.
HNC Software Inc.	1997	…. could lead to unanticipated changes in the Company's current revenue recognition practices, and such changes could be material to the Company's financial statements.
Some firms expected significant deferral of revenues		
Ascential Software Corp	1997	The implementation may, in certain circumstances, result in the deferral of software license revenues that would have been recognized upon delivery of the related software under preceding accounting standards.
Veritas Software Corp.	1997	The criteria for recognizing revenue under SOP 97-2 are generally more rigorous than the previous accounting standard and, in some cases, significantly more rigorous.
Acme Comm Corp	1997	This standard is expected to result in more conservative revenue recognition on software transactions than was allowed under previous guidance.
A few firms planned to change their contracts to align with SOP 97-2 rules		
Global Med Technologies Inc.	1997	Management's current plans to address the revenue recognition requirements of SOP 97-2 include substantial revisions to Wyndgate's current standard terms and conditions included as part of Wyndgate's SAFETRACE(R) software license agreements.
A few firms expected that implementing SOP 97-2 rules would adversely affect firm's fund raising plans		
Ascential Software Corp.	1997	Failure to effectively address the revenue recognition requirements of SOP 97-2 and future revenue recognition guidance regarding the software industry will have a material adverse affect on the Company's revenues, gross margins and operating results. As a result, future capital raising efforts may also be adversely affected.

TABLE 7 CONTINUED

Panel B: Firm's discussion on the effects of SOP 97-2 *after* implementation (MD&A rules compliance)

Name of firm	Compustat fiscal year	Quote from the 10K filings
Most firms found no material effect (typical response, almost 90% of firms)		
Nyfix Inc.	1998	The Company adopted SOP 97-2 in 1998 and the effect was not material to the Company's operations or financial position taken as a whole.
Some firms mentioned that implementing SOP 97-2 rules led to deferral of revenues		
Electronic Arts Inc.	1998	The implementation has, in certain circumstances, resulted in the deferral of certain revenues associated with the Company's revenue promotions and products with multiple deliverable elements
Intrusion Inc.	1998	The most significant impact of SOP 97-2 on the Company's revenue recognition accounting policies is that for software contracts with multiple elements, revenue will generally be recognized later than under past practices under SOP 91-1.
Intellisync Corp.	1999	The implementation has, in certain circumstances, resulted in the deferral of software license revenues that would have been recognized upon delivery of the related software under prior accounting standards.
A few firms blamed SOP 97-2 for their poor performance		
Aspyra Inc.	1998	Although the Company has been profitable in each of its last six previous fiscal years, its 1998 fiscal year resulted in a loss primarily attributable to the implementation of a new accounting method, SOP 97-2
Softech Inc.	1998	Due to stricter requirements for recognizing revenue from the sale of software products, implementation of the provisions of SOP 97-2 had the effect of reducing revenue in fiscal 1999; however, quantifying the impact of this change in accounting was not practical.

TABLE 7 CONTINUED

Panel B continued

Name of firm	Compustat fiscal year	Quote from the 10K filings
Very few firms quantified the SOP 97-2 implementation effects		
Reynolds & Reynolds	1998	The implementation of this pronouncement reduced the Automotive Group's computer systems products revenues $17,936, gross profit $11,205, operating income $10,624 and net income $6,204 or $.08 per diluted share during the six months ended March 31, 1999
ASA International Ltd.	1998	The effect of adopting SOP 97-2 on the 1998 Statement of Operations was to decrease income before income taxes and net income by approximately $446,000 and $174,000, respectively.
Clickaction Inc.	1998	Under SOP 97-2, the Company is required to defer revenue related to certain promotional product offerings based on the relative fair value of undelivered products included in the promotional offering. As of December 31, 1998, the Company recorded approximately $599,000 of deferred revenue related to such promotional product offerings
A few firms restated their accounts due to late implementation of SOP 97-2 rules		
Cape Systems Group Inc.	1998 and 1999	The Company has adjusted its accounting for revenue recognition of certain software license fees and related post contract customer support revenue for the years ended July 31, 1999 and 1998 because the Company determined that information with respect to separate pricing for each of the multiple elements is not available.
Peritus Software Services Inc.	1998	The balance of the 1998 restatements relate primarily to the Company's incorrect interpretation of the complex provisions regarding recognition of revenue for combined software/services arrangements under Statement of Position ("SOP") 97- 2, "Software Revenue Recognition,"

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Publications:

1. McAnally, M. L., Srivastava, A., and Weaver, C. 2008. "Executive stock options, missed earnings targets and earnings management." *The Accounting Review* 83(1): 185-216.
2. Efendi, J., Srivastava, A., and E. P. Swanson. 2007. "Why do corporate managers misstate financial statements? The role of in-the-money options and other incentives." *The Journal of Financial Economics* 85(3): 667-708.

Scholarships:

- Deloitte Fellowship of $ 25,000
- Regents' Scholarship
- Mays Business School Dean's Scholarship for meritorious performance
- National Talent Search Scholarship awarded by Government of India