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## Where Are We with Long-Term Contract Accounting?

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**SYNOPSIS:** In response to practices by major U.S. corporations, the SEC and the FASB initiated major revenue recognition projects. This commentary examines the accounting for long-term contracts, an aspect of revenue recognition often overlooked in academic research. The exploratory study reported here describes current practices and disclosures about long-term contracts by *Fortune* 500 corporations, examines the level of comparability in these disclosures, and provides explanations for current practices.

**Data Availability:** Data used in this paper came from publicly available sources. A list of the firms analyzed is available from the authors upon request.

### INTRODUCTION

Recent revelations on corporate revenue recognition practices for long-term contracts cite Halliburton, Raytheon, and EDS, among others. For example, it was reported that Halliburton increased revenue by \$434 million during 1998–2001 by booking cost overruns on construction projects before clients agreed to pay for them (Warren 2003). Shareholder lawsuits and the U.S. Securities and Exchange Commission's (SEC) formal investigation begun in late 2002 focused on this practice, partially because Halliburton did not immediately disclose it. In 1998, the practice added \$55 million to the bottom line, equaling 7 percent of Halliburton's after-tax profits (Kahn 2003). In September 2003, the SEC opened a formal investigation of Raytheon's use of a units-of-completion method that accelerated revenue recognition in its aircraft business (Squeo and Burns 2003). As to EDS, after taking a \$2.24 billion charge that "erased \$2.9 billion in unbilled contract revenue, added \$1.1 billion in deferred costs and recognized \$400 million in accrued losses" (McWilliams 2003), in October 2003 the company adopted a more conservative revenue recognition method for long-term contracts.

These types of revelations helped motivate the SEC to actively investigate corporate revenue recognition practices. After examining the financial reports of all *Fortune* 500 firms for accounting irregularities, in February 2003 the SEC sent comment letters to more than 350 of these companies.

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In those letters, the SEC “frequently requested clarification of how companies recognize revenue,” and “asked companies to expand significantly their revenue recognition accounting policy disclosures” (SEC 2003). The Financial Accounting Standards Board (FASB) also added a revenue recognition project to its agenda (FASB 2002).

However, the area of revenue recognition and the accounting for long-term contracts has received little recent academic inspection. This commentary discusses an exploratory study that describes current practices and disclosures about long-term contracts by *Fortune* 500 corporations, examines the level of comparability in these disclosures, and provides explanations for current practices. There are at least three important outcomes of this analysis:

1. Both the SEC and FASB are closely examining revenue recognition. Efforts to improve corporate revenue recognition policies and disclosures depend in part on a better understanding of current long-term contract revenue recognition practices and disclosures.
2. Examining current practices within and between industries increases our knowledge of how current standards are implemented in different situations. This enables an assessment of how well the qualitative attribute of comparability fares in long-term contract accounting, with potential implications for future revenue recognition accounting standards.
3. Examining possible influences associated with providing basic disclosures or choice of methods can aid in explaining variations observed in practice. This examination may also identify systematic issues that could be addressed by the SEC or the FASB.

Although many firms provide detailed information in their financial statements, we observed poor compliance with basic disclosure requirements of the SEC and U.S. Generally Accepted Accounting Principles (GAAP), and noncomparability within two major industry sectors. This dovetails with recent SEC findings of widespread noncompliance and lack of transparency in revenue recognition, financial reporting, and disclosure.

## BACKGROUND

### Accounting Standards

Many firms provide goods and services under contracts covering long periods of time. When a contract’s term extends across accounting periods, a firm must determine how and when to recognize revenue and expenses. American Institute of Certified Public Accountants (AICPA) Statement of Position (SOP) No. 81-1 (AICPA 1981) and Accounting Research Bulletin (ARB) No. 45 (AICPA 1955) provide most of the authoritative guidance for the accounting of long-term contracts.<sup>1</sup>

ARB No. 45 allows both the percentage-of-completion method (PCM) and the completed-contract method (CCM) in accounting for long-term contracts. However, whenever possible, ARB No. 45 prefers the use of PCM. In order to implement PCM, ARB No. 45, para. 4, recommends either the cost-to-cost method or, alternatively, “such other measures of progress toward completion as may be appropriate having due regard to work performed.”

Citing the diversity of methods applied under ARB No. 45, SOP No. 81-1 provides guidance on the application of ARB No. 45 (SOP No. 81-1, paras. 5 and 44). SOP No. 81-1 also expands the principles of ARB No. 45 beyond construction to contracts for producing a range of other goods and services.

<sup>1</sup> Other relevant guidance in this area includes the AICPA *Audit and Industry Guide for Construction Contractors* (updated in 2001), SEC Accounting Series Release No. 164, *Notice of Adoption of Amendments to Regulation S-X to Provide for Improved Disclosures Related to Defense and Other Long-Term Contract Activities* (SEC 1974), ARB No. 43, *Chapter II* (AICPA 1953), Statement of Financial Accounting Concepts No.5, paragraph 84, item c (FASB 1984), and *Current Accounting and Disclosure Issues* (SEC 2001).

Although GAAP allows both PCM and CCM, the method used must be disclosed and, when both are used, firms must explain the circumstances in which each is used (SOP No. 81-1, para. 21). SOP No. 81-1 discusses the use of input and output methods to estimate the extent a contract is complete when using PCM.

Adopted in 1999, SEC Staff Accounting Bulletin (SAB) No. 101, *Revenue Recognition in Financial Statements*, clarifies several revenue recognition issues, but does not directly address long-term contract accounting. In addition, it reiterates SEC support for existing GAAP, specifically mentioning ARB No. 45 and SOP No. 81-1, and emphasizes the importance of disclosing revenue recognition policies.

### **Input Measures**

Input measures evaluate progress based on efforts and resources applied to a contract, and include the cost-to-cost method and the efforts-expended method. The *cost-to-cost method* estimates the percentage complete based on a ratio of costs incurred to date over expected total contract costs. The *efforts-expended method* compares measures such as labor hours, labor dollars, machine hours, or quantities of material consumed to date to the total quantity estimated for the entire project. Significant drawbacks to input methods are their indirect nature and their reliance on assumptions regarding future productivity (SOP No. 81-1, para. 47).

### **Output Measures**

Conversely, output measures measure progress based on the number of units completed or on important events such as completion of the excavation phase. Output measures include the units-of-production method, the units-of-delivery method, and the performance (or contract) milestone method. The *units-of-production method* measures the progress on a contract by comparing the number of distinct units completed with the total units under contract. Similarly, the *units-of-delivery method* uses units completed and accepted by the customer. The *performance milestones method* (or contract milestone method) measures progress using important events such as completion of excavation or erection of facilities. When output measures can be established, they are preferred because output methods are considered more direct and objective than input methods (SOP No. 81-1, para. 47).

The use of either input or output methods “requires the exercise of judgment and the careful tailoring of the measure to the circumstances” (SOP No. 81-1, para. 47). Although SOP No. 81-1 allows firms discretion in their choice, para. 43 notes that “meaningful measurement of the extent of progress toward completion is essential” as it affects both revenue and gross profit for the period. The method(s) selected “should be applied consistently to all contracts having similar characteristics,” and the method(s) “of measuring the extent of progress toward completion should be disclosed” (SOP No. 81-1, para. 45).

### **Prior Research**

Although many accounting practitioner articles, such as Phelan (2003), discuss various accounting and tax aspects of long-term contracts and construction accounting, relatively little empirical research exists on long-term contract accounting. In an early study, Freeman (1976) found that one-third of the 43 surveyed companies using PCM did not state how they applied it. Freeman (1976) intended a comprehensive analysis, but was precluded by the lack of disclosure and his concern that the data provided by firms appeared very incomplete and often misleading. Freeman’s (1976) call for more adequate disclosure predated SOP No. 81-1, which became effective in 1981.

Trotman (1982) discusses accounting for construction contracts in Australia, Canada, the United Kingdom, the United States, and under International Accounting Standards. He suggests that one should evaluate standards for long-term contract accounting using the qualitative criteria of relevance, reliability, comparability, and consistency in FASB’s 1980 Statement of Financial Accounting



Concepts (SFAC) No. 1. Although Trotman (1982, 163) concludes that PCM is best for representational faithfulness (a component of reliability) and relevance, he notes that when considering verifiability (another component of reliability), with PCM, “the potential for manipulation, poor judgment, and errors certainly exists.” Trotman (1982) argues that emphasizing consistency should increase verifiability and reliability. For PCM to be reliable, firms must develop and consistently apply strong accounting policies that are adequately disclosed. Criticisms of Halliburton and Raytheon include their lack of consistency in applying PCM and of timely disclosure (Squeo and Burns 2003; Warren 2003).

Several studies in the 1980s tried to assess the adequacy and effectiveness of SOP No. 81-1's new rules. Concerned over lack of comparability, Desmarais (1983) notes that while SOP No. 81-1 is a great improvement, it allows many free choices that enable companies in the same line of business to use different methods to calculate PCM. Desmarais (1983, 56) complained “that the lack of disclosure standards is truly astonishing” and that the subjectivity allowed in the rules could mislead users of financial statements. Orlando (1984) documents construction firms going bankrupt while reporting a profit using PCM due to erroneous estimates and misleading positive cash flows associated with contract billings. Trotman and Zimmer (1986) found that even relatively expert users of financial statements (bank loan officers) may not understand the disparate results generated from different construction accounting methods such as PCM and CCM.

Trotman (1980, 141) examined “the impact of the firm's capital structure on management's choice of accounting methods for long-term construction contracts.” After studying 49 firms listed on the Sydney Stock Exchange, Trotman (1980) reported that when controlling for size, companies using the more conservative CCM had lower debt-equity ratios than firms using PCM.

A few other studies, such as Hickok (1985), focus on the use of CCM versus PCM and the methods used to account for PCM. In recent years, two studies annually survey practice in this area, but do not analyze the quality of firms' financial disclosures. The Construction Financial Management Association's (CFMA) unscientific annual survey of the construction industry finds that 95 percent used PCM and 84 percent used the cost-to-cost method to calculate PCM (CFMA 2000). For long-term contracts, the AICPA's annual survey of 600 firms' accounting practices finds PCM and the units-of-delivery method (a form of PCM) used by between 93 percent and 98 percent of firms in recent years (AICPA 2001, 2000, 1997).

This predominance of PCM is not surprising since the Revenue Reconciliation Act of 1989 requires almost all companies to recognize revenue and income under PCM for tax purposes (Seago and Davis 1999). Before this legislation, Wheeler and Outslay (1986) vividly documented how General Dynamics Corporation used choices then allowed for PCM and CCM to report simultaneously strong GAAP net income and conversely large losses for tax purposes. They suggested that only “the most sophisticated readers of financial statements” could fully understand how General Dynamics showed an overall positive GAAP net income from 1973–1984 by using PCM, while paying no federal taxes and accumulating a net operating loss tax carry-forward of \$3.1 billion by using CCM for tax purposes (Wheeler and Outslay 1986, 773).

### RESEARCH QUESTIONS

Because concerns exist about how revenue is recognized for long-term contracts under U.S. GAAP, this commentary reports on our study of current practice in accounting for long-term contracts and their disclosures. This study provides evidence on the following aspects of long-term contract accounting:

- RQ1:** What is current practice and are firms reporting the basic required disclosures?
- RQ2:** Does comparability exist between or within industries?
- RQ3:** What factors might influence whether firms report the basic required disclosures?
- RQ4:** For firms reporting the basic required disclosures for long-term contracts, what factors might influence the choice of method(s) used to calculate PCM?

### SAMPLE SELECTION AND METHODOLOGY

Because the SEC directs many of its recent concerns and initiatives toward the *Fortune* 500, we examined all *Fortune* 500 organizations with SEC 10-K filings for the 2000 fiscal year. We accessed SEC filings and other company data using EDGAR (<http://www.sec.gov>) and Thomson Research (previously known as Global Access).

Each firm was checked to determine if it reported accounting for long-term contracts by searching each 10-K or other referenced SEC filing with keywords, such as “percentage of completion,” “percentage-of-completion,” “completed contract,” “completed-contract,” “long term contract,” “long-term contract,” “construction contract,” and “construction.” Although many firms used these terms in various contexts, such as inventory, few companies actually recognized revenue under the study’s criteria.

By focusing on revenue recognition for long-term contracts subject to ARB No. 45 and SOP No. 81-1, we excluded long-term contracts with specialized accounting rules, including software (SOP No. 97-2 and SOP No. 98-9), real estate (SFAS No. 66), and firms now under some of the new rules required by SAB No. 101 rather than SOP No. 81-1. We also excluded firms exempt from SEC filing, such as mutual insurance companies.

To ensure that we identified all relevant firms in the sample, a second person checked all *Fortune* 500 companies with the same first two digits of the primary SIC code as firms initially selected. This person examined those firms’ revenue recognition footnotes. Whenever it was unclear whether a firm should be included in the sample, one or two other persons reviewed the data before making a final decision. At least two individuals read all disclosures relating to long-term contracts for firms in the final sample.

## RESULTS

### Overview

The final sample includes the 55 *Fortune* 500 companies that reported long-term contracts and met the study’s criteria. Using SIC codes to categorize companies, 27 manufacturing firms represent 49 percent of the sample. Table 1 summarizes the sample by industry, reports descriptive statistics on size, and summarizes basic disclosure compliance. These 27 manufacturing firms had significantly larger average revenues ( $p = .036$ ) than the other 28 sample firms; although not significant, manufacturing firms also reported larger average net income and assets. However, the results must be interpreted cautiously due to the relatively small sample size, the imperfections of SIC codes, and the skewed distributions of the firm size variables. All 55 firms had Big 5 auditors: PricewaterhouseCoopers had 15 clients, followed by Andersen (14), Ernst & Young (11), Deloitte & Touche (9), and KPMG (6). Finally, 50 sample firms were traded on the New York Stock Exchange.

### RQ1: What is current practice and are firms reporting the basic required disclosures?

We used SEC pronouncements and the authoritative literature, including ARB No. 45 and SOP No. 81-1, to identify four key issues that guided our investigation of current practice and our identification of the basic required disclosures for long-term contract accounting:

- 1) Does a firm report whether it uses PCM or CCM?
- 2) If a firm uses CCM, does it state why?
- 3) If a firm uses PCM, does it state the method(s) used to calculate the percentage completed?
- 4) If a firm uses multiple methods, does it state in what circumstances each method is used?

### Issue 1: PCM versus CCM

Firms are to disclose whether they use PCM or CCM to account for their long-term contracts. Table 2 indicates that all 55 firms reported using PCM. One reported using both CCM and PCM. This is consistent with GAAP’s preference for PCM, tax rules for using PCM, and AICPA (2001) findings.

TABLE 1  
Firm Size and Disclosure Compliance by Industry

Industry (based on Primary SIC Code)	Number of Firms (% of total)	Average Revenue (in millions)	Average Net Income (in millions)	Average Assets (in millions)	Provides Basic Required Disclosures?	
					Yes (%)	No (%)
Construction	7 (12.7)	\$ 5,403	\$183	\$ 3,691	5 (71)	2 (29)
Chemicals and Petroleum	5 (9.0)	12,525	557	9,330	4 (80)	1 (20)
Manufacturing	27 (49.1)	24,644*	990	28,790	16 (59)	11 (41)
Communications and Public Utilities	8 (14.6)	10,608	969	26,976	6 (75)	2 (25)
Services and Misc. Retail <sup>a</sup>	8 (14.6)	8,340	408	6,547	6 (75)	2 (25)
All firms	55 (100)	\$16,680	\$760	\$20,327	37 (67)	18 (33)

\* The only significant industry size difference was that average revenue for Manufacturing is significantly larger when compared against all other firms as a group (ANOVA, significant at .036).

<sup>a</sup> This group is composed of firms from three somewhat disparate SIC groups: Engineering, Accounting, Research, Management, and Related Services (4 in SIC 87xx); Business Services (3 in SIC 737x); and Miscellaneous Retail (1 in SIC 5984).

**TABLE 2**  
**Methods Used to Account for Long-Term Contracts in Fortune 500 by Industry**

Sample by Industry (Based on Primary SIC Code)	Number of Firms	Completed Contract Method	Percentage of Completion Method							Total Methods Used	
			Output Methods		Input Methods			Method Used Not Disclosed			
			Units-of- Delivery	Units-of- Production	Milestones Achieved	Total Output	Cost-to- Cost		Efforts- Expended		Total Input
Construction	7	0				0	5	2	7	2	9*
Chemicals and Petroleum	5	0	1	1		2	1	1	2	1	5
Manufacturing	27	1	13		5	18	15	2	17	7	43**
Communications and Public Utilities	8	0				0	5	1	6	2	8
Services and Misc. Retail	8	0				0	6		6	2	8
All firms	55	1	14	1	5	20	32	6	38	14	73

\* Two companies reported using two different methods.

\*\* Twelve companies reported multiple methods; nine used two methods, two used three methods, and one used four methods.

### **Issue 2: Why CCM Is Used**

GAAP states that firms must explain why they use CCM instead of PCM. In the sample, only ITT Industries uses both PCM and CCM, but ITT does not discuss the conditions under which CCM was used. ITT Industries (2001, F-9) uses CCM or PCM methods—units-of-delivery, milestone achievement, or cost-to-cost—“depending on the type of contract and contract terms and conditions.” Such vague wording adds nothing to our understanding of ITT’s long-term contract accounting methods.

### **Issue 3: Method(s) Used to Calculate PCM**

Firms must disclose the method they use to calculate or measure PCM under GAAP and SEC (2001) guidance. Given that sample firms deemed their long-term contracts to be material enough to disclose in general and to indicate revenue recognition using some form of PCM, we expected these firms to clearly indicate the method(s) they used to determine the percentage completed. Table 2 indicates that 41 of the 55 PCM firms specified the method(s) they used to calculate PCM, but 14 firms (25 percent) failed to comply with the standards and did not disclose their specific method(s) to estimate PCM.

Firms that made disclosures cited the use of many different methods to calculate PCM. Input methods were almost twice as popular as output methods in practice (38 to 20). The cost-to-cost method, used by 32 firms (58 percent), was the most popular method both in the input category and overall. The most popular output method was the units-of-delivery method (14 firms).

The common use of the cost-to-cost method may be a legacy of the cost monitoring format once required by the Department of Defense. Now known as Earned Value Management (EVMS),<sup>2</sup> this format uses budgeted and actual costs to determine periodic cost and schedule variances and to compare cumulative costs to total budgeted cost. Because of its ability to address both budget and deadline, the method is widely used in a variety of industries and a variation of it is programmed into many commercially available software packages (Singletary 1996). However, while the cost-to-cost method is most supported, the format allows estimates to be based on other methods, such as milestones and engineering hours.

Fourteen firms (25 percent) did not clearly state how they calculated PCM, a finding slightly below the one-third of PCM firms not disclosing their methods reported by Freeman (1976). Four firms used an undisclosed PCM for some contracts and a disclosed method, typically cost-to-cost, for other contracts. Of the remaining ten firms not disclosing how they derived their PCM numbers, Conoco’s (2001, 68) statement is typical: “revenues from construction service contracts are recorded on a percentage-of-completion method.” A few firms categorized as using an undisclosed PCM provided unclear, confusing, or meaningless descriptions. For example, Foster Wheeler (2001, 27) uses PCM “determined on a variation of the efforts-expended and the cost-to-cost methods.” Baker Hughes (2001, 30) states that it uses PCM “using measurements of progress toward completion for the products and services being provided.” Halliburton (2001, 28) writes that it uses PCM for “revenue from engineering and construction contracts ... using measurements of progress toward completion appropriate for the work performed.”

### **Issue 4: Explaining When Multiple Methods are Used**

Although most companies used a single method to account for long-term contracts, 14 firms used multiple methods. Six firms using multiple methods clearly stated both the methods and the

<sup>2</sup> EVMS is still required on certain U.S. federal government contracts (see <http://www.acq.osd.mil/pm>). EVMS is also called Earned Value Analysis, Earned Value Management System Guidelines, and Earned Value Management Control Systems.



situations in which each method was used, as required by GAAP.<sup>3</sup> Complying firms indicated that their choice of method depended on the particular business segment and/or type of contract. For example, Raytheon uses the units-of-delivery method for airplanes, but otherwise uses the cost-to-cost method. In apparent noncompliance, eight firms did not adequately disclose the PCM method(s) used.

#### ***Are the Basic Required Disclosures Made?***

This study requires that firms comply with all four identified issues in order to be seen as providing the basic required disclosures. When combined, the analysis in Table 2 found that 18 (33 percent) of the 55 companies did not report at least the basic required disclosures. We identify shortcomings in the areas of why CCM is used (one firm), the method used to calculate PCM (14 firms), and explaining when multiple methods are used (eight firms). Due to multiple infractions by some firms, 18 companies accounted for 23 violations.

#### **RQ2: Does comparability in long-term contract accounting exist between or within industries?**

Consistency in accounting practices within industries promotes comparability and facilitates industry analysis. The Conceptual Framework defines comparability as “the quality of information that enables users to identify similarities in and differences between two sets of economic phenomena” (SFAC No. 2, FASB 1980, 9). However, GAAP allows firms great discretion in choosing how to calculate PCM. Different accounting may be justified when contracts involve varied sources, processes, or markets, or when competitive strategy, such as level of customization, is important. Moreover, some operations lend themselves to output measures, such as units of delivery in a contract for several airplanes. Other types of businesses may have less clarity in defining progress toward contract completion, leading to the use of an input measure (SOP No. 81-1, para. 47). However, these issues should not normally lead to widespread *intra*-industry accounting choice differences that impair comparability. We investigate whether comparability exists between or within industries in the accounting for long-term contracts.

Methods used varied between industries, as expected given the variety in the sample. However, current practice exhibits a lack of comparability within two industry sectors—Manufacturing, and Chemicals and Petroleum—that comprise two-thirds of the sample firms. Each of the five Chemicals and Petroleum firms reports use of a different method.

Manufacturing (SIC 3xxx) is the largest and most varied industry group. Little comparability exists within the Manufacturing group. It is almost evenly split between 18 firms using output methods and 17 firms using input methods, with some firms using multiple methods. The most common methods were cost-to-cost (15 firms) and the units-of-delivery (13 firms). There was little comparability in Manufacturing even within the more narrowly defined four-digit SIC codes. A part of this lack of comparability may relate to the fact that 12 of the 27 firms (44 percent) use multiple methods. The use of multiple methods is concentrated in the Manufacturing industry; we observe a correlation of 0.428 ( $p = .001$ ) between indicator variables for multiple versus single method and Manufacturing versus other industry.

Comparability prevailed in the other three industry groups to the extent that when disclosed, firms used only input methods, especially cost-to-cost. Indeed, the cost-to-cost method was most popular in all industries except Chemicals and Petroleum, where only one firm used it.

<sup>3</sup> SAB No. 101 (SEC 1999, part B, Question 1) also states that “if a company has different policies for different types of revenue transactions ... the policy for each material type of transaction should be disclosed.”

### RQ3: What factors might influence whether firms report the basic required disclosures?

We investigated whether providing the basic required disclosures relates to several variables suggested by research on disclosure in the accounting literature. Because the dependent variable, Disclosure, is dichotomous (coded 1 if basic disclosures provided, 0 otherwise), we used logistic regression. Logistic regression is similar to regular regression, but it examines the tendency of selected factors (independent variables) to influence a dichotomous dependent variable. Early approaches found a corporate governance variable (suggested by Carcello et al. 2002) and an auditor independence variable (suggested by Frankel et al. 2002; Carcello et al. 2002) to be insignificant. Therefore, our main model tested the relationship between disclosure and size, leverage, industry, and diversification.

We employed a backward stepwise mode to ascertain the model with the best fit and to retain the variables contributing to the model's significance. Table 3 indicates that the actual model was significant at  $p = .014$ ; however, the results should be interpreted cautiously as test statistics are "modestly miscalibrated" with small sample sizes (Stone and Rasp 1991, 184).

The logistic regression model provides insight into possible factors influencing whether firms provide required disclosures for long-term contracts. The primary explanatory variable in the model is leverage, defined as the debt-to-equity ratio, following Trotman (1980). While prior studies are inconsistent on the effect of leverage on disclosure, some theorize that highly leveraged corporations will disclose more information in order to reduce agency costs and increase confidence among creditors (Archambault and Archambault 2003). This notion suggests that because debt holders can use restrictive debt covenants to protect themselves, managers are motivated to increase disclosures in order to reduce their agency costs. Our data on firms with long-term contracts provide support for this idea—firms with higher debt equity ratios were more likely to provide the basic required disclosures ( $p = .054$ ). The other variables were not significant.

### RQ4: For firms reporting the basic required disclosures for long-term contracts, what factors might influence the choice of method(s) used to calculate PCM?

When they can be established, SOP No. 81-1 prefers output methods because they are likely to be more direct, objective, and reliable than input methods (para. 47). We checked for any pattern in the choice of methods by the 37 firms providing the basic required disclosures. Given the limited number of firms, we used relatively coarse granularity for analysis, dividing these firms into three groups: those only using input methods (26 firms), those using both input and output methods (four firms), and those only using output methods (seven firms). The small and uneven sizes of the groups provide at best some preliminary evidence on firm characteristics, reported in Table 4.

**TABLE 3**  
**Logistic Regression Model Results**  
**Predicting whether Firms Provide Basic Required Disclosures**

	<u>Expected Sign</u>	<u>Coefficient</u>	<u>Significance</u>
Intercept		3.946	.270
Size (Ln of Firm Revenues)	+	-.564	.183
Leverage (Debt Equity Ratio)		.606	.054
Industry (Manufacturing = 1, Other = 0)		-1.067	.146
Diversification (# of Firm's SIC Codes)	+	.286	.152

Hosmer and Lemeshow's Goodness of Fit Test of Model: Chi-squared = 19.250,  $p = .014$

Dependent Variable = Provided (1) or Did Not Provide (0) basic required disclosures.  
The model is based on the 53 firms with complete data.

**TABLE 4**  
**Characteristics of Firms Providing the Basic Required Disclosures**  
**Separated by their Choice of Accounting Methods to Calculate PCM**

	<u>Firms Used Only Input Methods</u>	<u>Firms Used Both Input and Output Methods</u>	<u>Firms Used Only Output Methods</u>
Number of Firms	26	4	7
Size: Firm Revenues (in millions)	16,737.6	15,656.5	18,578.3
Size: Firm Income (in millions)	822.9	656.5	557.8
Size: Firm Assets (in millions)	22,516.9	19,486.0	13,780.3
Leverage: Debt Equity Ratio	2.806	1.905	2.333
Industry: Manufacturing Firms	7	4	5
Industry: Non-Manufacturing Firms	19	0	2
Diversification: # of SIC Codes	4.65	7.00	4.71
Corporate Governance: # of Audit Committee Meetings	4.19	4.75	5.29

Firms using only output methods had the most revenues, while those using strictly input methods had the largest income and asset base. Trotman (1980) found that firms with higher debt-to-equity ratios are more likely to choose PCM than CCM, perhaps because more highly leveraged firms tend to favor less conservative accounting methods. In our sample, input-only firms had the highest debt-to-equity ratios. This is consistent with the position that input methods can be less conservative (or more subjective) than output methods. Some believe that more active audit committees will lead to more conservative financial reporting. Although not significant with our small sample size, we found that firms using only output methods had more audit committee meetings than companies using only input methods (5.3 versus 4.2).

### CONCLUSION

This exploratory study of the current practices used in accounting for long-term contracts identifies three concerns:

- While many firms provided detailed information, one-third of the firms did not provide the basic disclosures required by the SEC and GAAP.
- The study found that firms within the same industry often chose different methods. This lack of comparability was especially prominent in two industry sectors accounting for two-thirds of sample firms.
- Even though SOP No. 81-1 prefers output methods when they can be established, input methods are used twice as often.

The latter two findings may relate to the fact that GAAP for long-term contracts allows firms considerable flexibility in selecting accounting methods.

Encouragingly, the study found some firms voluntarily addressing problems in this area. For example, Ashland's 2001 10-K reports that one of its construction subsidiaries intentionally overstated earnings for a two-year period, primarily by improperly recognizing revenues and failing to recognize certain costs. Ashland's internal auditors discovered the problem and the management involved was replaced. Unfortunately, other firms, such as Raytheon and Halliburton, continue to be under suspicion for manipulating their revenue recognition from long-term contracts.

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