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DETERMINANTS OF THE CHOICE BETWEEN COMPREHENSIVE AND PARTIAL INCOME TAX ALLOCATION: THE CASE OF THE DOMESTIC INTERNATIONAL SALES CORPORATION

By

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ABSTRACT

DETERMINANTS OF THE CHOICE BETWEEN COMPREHENSIVE AND PARTIAL INCOME TAX ALLOCATION: THE CASE OF THE DOMESTIC INTERNATIONAL SALES CORPORATION

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The purpose of this study was to examine firms' motivations for choosing between comprehensive and partial allocation--alternative accounting methods for the extent of interperiod tax allocation. Based on the predictions of 'positive accounting theory', firms' choice was hypothesized to be related to variables that surrogate for potential debt covenant violations and their political visibility. In addition, auditors' preferences were hypothesized to affect the choice.

Domestic international sales corporations, a special type of corporation legislated into the Internal Revenue Code in 1971 to stimulate exports, provided a unique data set to empirically examine the determinants of the accounting choice. The legislation allowed an indefinite deferral of income taxes on a portion of the DISC's export earnings. However, for financial reporting, some firms provided taxes on those earnings (comprehensive allocators), whereas others did not (partial allocators).

The empirical analysis was conducted on a sample of 320 firms that had a DISC operational in 1972, 1973, or 1974. Statistical tests were performed in both univariate and multiple regression frameworks. Overall, the results indicate support

for the debt covenant and auditor preference hypotheses, but only partial support for the political cost hypotheses. Consistent with the theory, firms with higher leverage and lower interest coverage ratios are observed to adopt partial allocation, an income-increasing method. However, a similar hypothesis based on dividend restrictions is not supported. In addition, no support is found for the hypothesis that because public debt involves higher renegotiation costs, firms with public debt are more likely to use partial allocation. Also consistent with the theory, firms with higher political costs manifest through higher effective tax rates are observed to adopt comprehensive allocation, an income-decreasing alternative. However, support for this hypothesis is weak. Another political cost hypothesis based on firm size is not supported. Finally, strong support is found for the hypothesis that firms' accounting method choice is related to the preferences of their auditors, a relatively new finding in the accounting method choice literature. The results generally were consistent across alternative definitions of the explanatory variables and sub-samples of firms by industry classification and the year when the DISC became operational.

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Chapter One

INTRODUCTION AND OVERVIEW

Accounting for income taxes has been one of the most debated and controversial areas in financial reporting since the 1940s [Rayburn, 1986]. Accounting Principles Board Opinion No. 11 (APB 11), *Accounting for Income Taxes* [AICPA, 1967], was issued in 1967 to resolve the controversies in this area. However, its issuance intensified the debate [Nair and Weygandt, 1981; Beresford et al., 1983], and several pronouncements subsequently were issued to amend, interpret, and/or supplement APB 11.[1] The primary criticisms of APB 11 and the related pronouncements were their underlying concepts, the complexity of their requirements, and the interpretation of the results generated under them. Because of this controversy, the Financial Accounting Standards Board (FASB) recently reconsidered the entire area of accounting for income taxes. In December 1987, Statement of Financial Accounting Standards No. 96 (SFAS 96), *Accounting for Income Taxes* [FASB, 1987], was issued, superseding APB 11 and most related pronouncements on the subject.[2,3]

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[1]For example, APB Opinions 16, 23, and 24, FASB Statements 31 and 37, FASB Interpretations 22, 25, 29, and 32, and FASB Technical Bulletins 81-2, 83-1, 84-2, 84-3, and 86-1 are some of the many pronouncements issued after APB 11 to deal with various aspects of the accounting for income taxes controversy.

[2]See SFAS 96, Appendix D for an exhaustive list of amendments made to the existing pronouncements.

There are many contentious issues in the accounting for income taxes debate, such as interperiod tax allocation, discounting, accounting for net operating losses and interim periods, and the allocation of income taxes to members of a consolidated group. The focus of this study is on interperiod tax allocation because much of the controversy surrounding accounting for income taxes centers on this issue [Beresford, et al., 1983]. In addition, researchers (e.g., Beaver and Dukes [1972]) have noted that interperiod tax allocation is an 'attractive' research issue because it affects a large number of firms, unlike certain other industry-specific accounting controversies (e.g., full-cost v. successful efforts accounting).

The interperiod tax allocation problem results primarily from differences in the timing of transactions that affect both pretax accounting income and taxable income which creates temporary differences. Two questions arise with respect to this problem: 1) how much to allocate (the 'extent of allocation'--comprehensive or partial), and 2) how to allocate (the 'method of recording the allocation'--

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[3]SFAS 96 has itself become the subject of much controversy for some of the very problems it sought to remedy, namely complexity and interpretation of the results (see FASB Status Report No. 203, dated July 14, 1989). These problems have caused the effective date for the statement, originally set for fiscal years beginning after December 15, 1988, to be postponed thrice: first to fiscal years beginning after December 15, 1989 (FASB Statement No. 100, *Accounting for Income Taxes--Deferral of the Effective Date of FASB Statement No. 96,* issued in December 1988), second to the fourth quarter of 1990 (see FASB Status Report No. 204, dated August 7, 1989), and again to fiscal years beginning after December 15, 1991 (see FASB Statement No. 103, *Accounting for Income Taxes--Deferral of the Effective Date of FASB Statement No. 96.* See also Wolk, Martin, and Nichols [1989] and Chaney and Jeter [1989] for a discussion of the theoretical problems under SFAS 96.

deferred, liability, or net-of-tax). This study focuses on the extent of allocation question.

Although both SFAS 96 and APB 11 generally require comprehensive allocation of deferred taxes, they provide an exception for transactions that satisfy the 'indefinite reversal' criteria described in APB Opinion No. 23 (APB 23), *Accounting for Income Taxes--Special Areas* [AICPA, 1972]. Transactions to which these criteria apply are similar to other temporary differences except that the reversal of the initial differences between taxable income and pretax accounting income may be unpredictable, primarily because the tax consequences of the transactions are controlled by the enterprise and frequently require management to take specific actions before the differences will reverse. One such transaction is the undistributed earnings of subsidiaries. Firms can choose between providing deferred taxes on all of the indefinitely deferred income (comprehensive allocation) and providing deferred taxes on only a portion (including zero) of such income (partial allocation), depending on whether the transfer of the subsidiary's earnings to the parent is imminent or relatively certain or it is management's intention to reinvest those earnings indefinitely. However, this choice has no obvious cash flow implications for the firm.[4]

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[4]A voluntary accounting method choice that can have an 'obvious' impact on a firm's cash flow is the choice between LIFO and FIFO inventory costing methods through its impact on taxable earnings. It is possible that for such accounting method choices, the contracting theory motivations (discussed later) may be in the nature of second-order effects.

The purpose of this study is to empirically analyze whether, in the absence of explicit cash flow effects, firms' choice between comprehensive and partial allocation is related to their constraints on contractual agreements (e.g., debt covenants), their political visibility, and the preferences of their auditors. Several hypotheses regarding the determinants of the accounting method choice are tested empirically. The hypotheses primarily are derived from the predictions of positive accounting theory that is driven by contracting cost (agency theory) and political cost arguments. These arguments have been used to investigate management's motivation in choosing between different accounting methods permissible under generally accepted accounting principles (GAAP) for apparently similar transactions. Holthausen and Leftwich [1983, p. 77] summarize the implications of these arguments for firms' accounting method choice as follows:

> Accounting choices have economic consequences if changes in the rules used to calculate accounting numbers alter the distribution of firms' cash flows or the wealth of parties who use those numbers for contracting and decision making.

In the past decade, several studies have examined the determinants of firms' voluntary choice of accounting methods (and related questions).[5] These studies have uncovered empirical regularities consistent with the contracting and political cost arguments. The results indicate that firms' debt/equity ratios (a proxy for potential debt covenant violations), existence of accounting earnings-based bonus plans, and firm size (a surrogate for political sensitivity) are related to their

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[5]See Watts and Zimmerman [1986], Holthausen and Leftwich [1983], and Kelly [1983] for a review of these studies.

accounting procedure choice.[6] This study extends this line of research to the issue of the extent of interperiod tax allocation, thereby providing evidence on the robustness of the prior findings to another accounting method choice and contributing to the external validity of those results. Examination of an accounting method choice not studied before is motivated by Christie [1989]:

> In the early stages of a literature, one is typically more interested in regularities than anomalies. ... Given the reviews and methodological analyses by Ball and Foster (1982), Holthausen and Leftwich (1983), Watts and Zimmerman (1986), and Christie (1987) and the results in this paper, it seems reasonable to characterize the contracting and size literature as being in the 'finding regularities' phase. *Regularities are currently more valuable than anomalies* ... (emphasis supplied).

Second, this study differs from most prior accounting choice studies that use only firm size to test the political cost hypothesis.[7] Ball and Foster [1982], among others, have criticized that approach on the grounds that firm size may proxy for omitted variables, such as industry-membership. Empirical evidence (e.g., Bowen, Noreen, and Lacey [1981]; Zimmerman [1983]) indeed suggests that such aggregate measures as firm size may not adequately proxy for firms' political costs. In this study, in addition to firm size, the firm's effective tax rate is used as a surrogate for

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[6]Christie [1990] conducts formal tests of whether positive accounting theory can explain choice of accounting procedures. Based on results aggregated across several studies, he concludes that the data support the contracting and size hypotheses.

[7]Hagerman and Zmijewski [1979] also examined risk, capital intensity, and concentration ratios as possible surrogates of political costs.

political costs.[8] This is based on evidence linking the politicization of U.S. firms' effective tax rates and subsequent wealth transfers resulting therefrom. The use of the effective tax rate variable is particularly relevant in this study because the choice of the extent of interperiod tax allocation directly impacted the firm's reported effective tax rate.

Finally, the auditor's role in firms' accounting method choice is examined in this study. The low explanatory power of the typical accounting method choice models based solely on the contracting and political cost arguments suggests a potential omitted variables problem. One such variable is auditor preferences which virtually has been ignored in prior research.[9]

Domestic International Sales Corporations (DISCs), a special type of corporation legislated into the Internal Revenue Code in 1971 to stimulate exports, provide a unique data set to examine the determinants of firms' extent of tax allocation choice. In general, a DISC is a nontaxable entity, the profits of which are taxed to its shareholders when distributed or deemed to be distributed. Each year a portion of the DISC's export profits is deemed to be distributed to its shareholders, thereby subjecting that income to current U.S. taxation. However, U.S. income tax can generally be deferred indefinitely on the remainder of the DISC's export profits. Since DISCs have been formed generally as subsidiaries of

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[8]El-Gazzar, Lilien, and Pastena [1986] and Wong [1988] also used effective tax rates as a political cost variable. However, El-Gazzar, et al. were concerned with management's choices in accounting for leases and Wong with New Zealand firms' choice in accounting for export tax credits.

[9]Studies by Trombley [1989] and Thornton [1986] are exceptions.

existing corporations and their indefinitely deferred earnings satisfy the indefinite reversal criteria of APB 23, firms that set up DISCs could choose between comprehensive and partial allocation of taxes on that portion of DISC earnings. For financial reporting purposes, some firms did not provide taxes on the indefinitely deferred DISC earnings (hereafter the 'partial allocators'), while other firms did record deferred taxes on those earnings (hereafter the 'comprehensive allocators'). Thus, different financial reporting practices were followed by firms for a similar transaction, providing an opportunity to examine firms' motivation for choosing among alternative methods.

The empirical analysis is performed on a sample of 320 firms that had a DISC operational in fiscal years ending in 1972, 1973 or 1974, and for which tax allocation information with respect to the DISC's earnings was available. Based on tax footnote disclosures in the financial statements, 82 firms were classified as comprehensive allocators and 238 as partial allocators. Because of the difficulties encountered in identifying the year in which the DISC was operational, two sets of analyses are performed: 1) on all firms assuming they had the DISC operational in fiscal year 1972, the first year DISCs became available, and 2) on all firms for the year the DISC actually became operational based on the firm's footnote disclosures in its financial statements. In both analyses, data for the year prior to the year the DISC became (or was assumed to become) operational is used. For example, in analysis (1) above, fiscal 1971 data is used. In addition, analysis also

is performed on sub-samples of firms by industry classification and by year the DISC became operational.

The empirical analysis employed statistical tests in both univariate and multiple regression frameworks. The univariate analysis is conducted using both parametric and non-parametric tests and it indicates that firms' DISC accounting method choice is related to variables that surrogate for potential debt covenant violations and political costs and their auditors' preferences. Relative to comprehensive allocators, partial allocators have higher leverage and lower interest coverage ratios, which is consistent with the hypotheses that firms closer to potentially violating possible debt covenants will adopt an income-increasing accounting method. Also consistent with the debt covenant arguments, relative to comprehensive allocators, partial allocators pay out a greater proportion of their inventory of payable funds as dividends but this difference is not statistically significant. Similarly, no support is found for the hypothesis that because public debt is costlier to renegotiate, firms with public debt are more likely to use an income-increasing accounting method. The results of the political cost hypotheses are mixed. Whereas support is found for the hypothesis that firms bearing higher political costs as manifested by higher effective tax rates are more likely to choose income-reducing accounting methods, no support is found for the firm size variable as a significant factor in firms' DISC accounting method choice. Finally, strong support is found for an association between auditor preferences and firms' adoption

of the DISC accounting method, which is a relatively new result in the accounting method choice literature.

These results hold for both data sets (1971 data for all firms and data for the year when the DISC actually became operational) and across alternative definitions of the variables. The DISC accounting method choice is not independent of the sample firms' industry membership based on one-digit SIC codes. Nearly 86 percent of the sample firms are either durable or nondurable goods manufacturers. The analysis is repeated on sub-sample by industry membership and the above results hold for the durable manufacturers but are weaker for the nondurable manufacturers.

As expected, some of the independent variables are correlated with each other (e.g., the debt covenant-based variables--leverage and interest coverage). Because the univariate analysis ignores these correlations, thereby suffering from the correlated omitted variables problem, those results must be interpreted with caution. To overcome this limitation, the data is also analyzed in a multiple regression framework using both logistic and the ordinary least squares procedures. The results of the regression analysis generally corroborate the univariate results discussed above.

The rest of this study is organized as follows: the institutional background of interperiod tax allocation under GAAP and of DISCs is discussed in chapter two, a summary of the theoretical framework and a review of previous research is provided in chapter three, the hypotheses are developed in chapter four, the

experimental design and data used to test the hypotheses are described in chapter five, the results of the analysis are discussed in chapter six, and the study's implications are summarized in chapter seven.

Chapter Two

INSTITUTIONAL BACKGROUND

In this chapter the institutional details regarding interperiod tax allocation under GAAP and the entity DISC are provided in order to better appreciate the environment within which the accounting method choice is studied. First, the interperiod tax allocation problem is explained followed by a brief historical perspective on the evolution of the authoritative literature governing the problem. Next, the statutory provisions governing the formation and operation of DISCs are reviewed.

2.1 Interperiod Tax Allocation under GAAP

2.1.1 The Problem

A primary objective in accounting for income taxes is to determine the tax expense[1] amount on a firm's financial statement. The taxes currently payable by an entity are based on its taxable income, which is determined under the U.S. and foreign tax laws.[2] A firm's pretax financial accounting income, on the other hand, is determined under generally accepted accounting principles (GAAP), a different set of measurement rules than the tax laws. When a firm's taxable income for a

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[1]In this study, all references to taxes, such as in 'tax expense', 'tax payable', 'tax liability', etc., are to *federal income* taxes, unless otherwise mentioned.

[2]Specifically, the income taxes currently payable is determined by multiplying the taxable income by the statutory tax rate(s) and adjusting the resulting amount for tax surcharges and credits.

period is equal to its financial accounting income, the calculation of tax expense is relatively straightforward: tax expense should equal taxes currently payable. However, financial reporting income usually differs from taxable income because of the vastly different objectives of the tax laws and GAAP, as underscored by the U.S. Supreme Court in its decision in *Thor Power Tool Co. v. Commissioner of Income Tax*[3]

> The primary goal of financial accounting is to provide useful information to management, shareholders, creditors, and others properly interested; the major responsibility of the accountant is to protect these parties from being misled. The primary goal of the income tax system, in contrast, is the equitable collection of revenue; the major responsibility of the Internal Revenue Service is to protect the public fisc. Consistently with its goals and responsibilities, financial accounting has as its foundation the principle of conservatism, with its corollary that "possible errors in measurement [should] be in the direction of understatement rather than overstatement of net income and net assets." In view of the Treasury's markedly different goals and responsibilities, understatement of income is not destined to be its guiding light. ...
>
> Financial accounting ... is hospitable to estimates, probabilities, and reasonable certainties; the tax law with its mandate to preserve the revenue, can give no quarter to uncertainty. ...
>
> 'Generally accepted accounting principles' tolerate a range of 'reasonable' treatments, leaving the choice among alternatives to management. ... [However], variances of this sort ... are questionable in a tax system.

Because of the diversity in objectives, the Court concluded that "any presumptive equivalency between tax and financial accounting would be unacceptable."

The Court pointed to the numerous differences in treatment accorded to expense and revenue recognition as evidence of the differing objectives between the

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[3]439 U.S. 522, 79-1 USTC ¶ 9139 (USSC, 1979). Footnotes and references to other court cases in the quoted material have been omitted.

tax laws and accounting principles. For example, the judicially created *claim of right* doctrine has been invoked to require the immediate recognition of certain prepaid income for tax purposes, even though under GAAP such income would not be accrued until later so that revenues and expenses may be better matched.[4] Similarly, the 'wherewithal-to-pay' rationale has been used to convert accrual-basis taxpayers into cash-basis taxpayers. The Court also observed that its prior decisions "demonstrated that divergence between the tax laws and accounting principles is especially common when a taxpayer seeks a current deduction for estimated future expenses or losses."[5]

The different objectives that result in different treatment of transactions generally give rise to different amounts of pretax accounting income and taxable income. These differences can be broadly categorized as temporary and permanent. A *temporary difference* is the difference between the tax basis of an asset or a liability and its reported amount in the statement of financial position (balance sheet) that will result in taxable or deductible amounts in future years

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[4]The claim of right doctrine was developed by the Supreme Court in *North American Oil Consolidated Co. v. Burnet*, 286 U.S. 417, 3 USTC ¶ 943 (USSC, 1932) in which it was held that an accrual-basis taxpayer must recognize contested income when received, even though its rights to the income have not been fixed. Under current law, prepaid interest, rent, and warranty incomes are always taxable in the year received.

[5]For example, the Supreme Court has previously denied a current deduction for provisions against contingent liabilities for 1) non-performance of guaranties (*Commissioner v. Hansen*, 360 U.S. 446, 59-2 USTC ¶ 9533 (USSC, 1959)), 2) contested lawsuits (*Lucas v. American Code Co.*, 280 U.S. 445, 2 USTC ¶ 453 (USSC, 1930)), and unearned commissions on expected insurance policy cancellations (*Brown v. Helvering*, 291 U.S. 193, 4 USTC ¶ 1223 (USSC, 1934)).

without regard to other future events (SFAS 96, para. 10). A subset of temporary differences is referred to as *timing differences*.[6] These differences originate in one period and reverse in a later period(s). For example, a timing difference occurs when for tax purposes income from the sale of goods on an installment basis is recognized when installment payments are received,[7] whereas for financial accounting purposes the income is recognized when the goods are sold.

In contrast, transactions or events that affect financial reporting income but not taxable income give rise to permanent differences.[8] These differences arise solely as a matter of statute and will never involve compensating differences in a later period(s), unless there is a change in the law; hence, these differences do not reverse. For example, interest earned on certain municipal obligations is not taxable [I.R.C., § 103], whereas fines and penalties are not deductible in computing taxable income [I.R.C., § 162(f)].

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[6]This was the term used in APB 11. SFAS 96 changed the terminology under the rationale that the term timing difference is too narrow in scope. It does not cover events such as increases in the tax basis of assets because of indexing for inflation or business combinations accounted for by the purchase method, which also create differences between the tax basis of an asset or liability and its reported amount in the financial statements. The term 'temporary difference' is more comprehensive and covers these differences as well. However, for the purpose of this study, the distinction is not critical; hence the terms temporary and timing differences are used interchangeably.

[7]Under § 453 of the Internal Revenue Code of 1986 (I.R.C.).

[8]SFAS 96 does not use the term 'permanent difference'; instead such differences are referred to as "events that do not have tax consequences." These events "do not give rise to temporary differences" (see the definition of 'temporary differences' in SFAS 96, para. 206).

There is general agreement that in the case of permanent differences, the tax expense on financial statements should equal taxes payable. However, there is little consensus on what should be the tax expense amount in the presence of temporary differences. One alternative is to apply the same method as for permanent differences, i.e., report the taxes currently payable as the tax expense. This alternative is referred to as the **flow through** method,[9] and under it the tax consequences of all temporary differences are ignored, i.e., no tax allocation is made.[10] The alternative to using taxes currently payable as the tax expense amount is referred to as **interperiod tax allocation**.[11] Under this alternative, the tax effects of individual transactions or events are recognized in computing the tax expense of the period in which they affect financial reporting income.

There are strong theoretical arguments for and against both the flow-through approach and interperiod tax allocation. These are elaborated in Appendix

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[9]'Flow through' is also used to describe one of the alternative methods for accounting for the investment tax credit ('deferral' being the other method)--see APB Opinions 2 and 4, *Accounting for the "Investment Credit."* However, references to the flow through method in this study do not apply to accounting for the investment tax credit.

[10]Some proponents of this method would disclose the potential future tax consequences of the temporary differences in notes to the financial statements [Rosenfield and Dent, 1983].

[11]A related argument, some contend, that must be settled before deciding on whether or not to allocate is whether income tax is an expense or a distribution of income (see Beresford, et al., [1983, pp. 24-27]). The authoritative position has been that income taxes are an expense (e.g., APB 11, para. 13(b)). The basic argument opposing that view is that, unlike the causal relationship that exists between incurring expenses and earning revenue through increased output of goods and/or services, there is no logical relationship between taxes and benefits received from government.

A. Briefly, most accountants believe that of the two alternatives, interperiod tax allocation is the more desirable given the accrual accounting model and its focus on transactions that have present and future cash consequences, as well as the definition of assets and liabilities under that model.[12] This view concurs with that of the FASB, which believes that both current and deferred tax consequences must be recognized for events that have been recognized in the financial statements:

> In the Board's view, an assumption inherent in an enterprise's statement of financial position prepared in accordance with generally accepted accounting principles is that the reported amounts of assets and liabilities will be recovered and settled, respectively. The Board believes that assumption *creates a requirement under accrual accounting to recognize the deferred tax consequences of temporary differences*, ... (SFAS 96, para.79, emphasis supplied).

In general, two questions arise with respect to the interperiod tax allocation problem: 1) how much to allocate (the 'extent of allocation'), and 2) how to allocate (the 'method of allocation'). Given that allocation is decided upon, the first question is concerned with whether all, or only some, temporary differences require allocation. The two alternative approaches to this question are **comprehensive allocation** and **partial allocation** (see Beresford, et al., [1983]). The 'comprehensive' method requires interperiod tax allocation for *all* temporary differences. 'Partial allocation' is an intermediate approach that requires

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[12]*Assets* are defined as probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events. *Liabilities* are defined as probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events. See FASB Concepts Statement No. 6, *Elements of Financial Statements*.

interperiod tax allocation for only some temporary differences. An important issue under partial allocation is to identify which differences require allocation.

The second question is concerned with the method of allocation. If it is assumed that some interperiod tax allocation is required, the focus under this question is on issues of measurement and nature of the balance sheet accounts that result from allocation. Three methods are mentioned in the literature (see Beresford et al., [1983]): deferred, liability, and net-of-tax.[13] This research focuses on the first question--the extent of allocation. However, an overview of all components of the interperiod tax allocation problem is provided in Figure 1.

2.1.2 Historical Development

The historical development of the authoritative pronouncements governing interperiod tax allocation under GAAP is discussed in detail by Rayburn [1986] and Beresford et al., [1983]. This section summarizes the major historical landmarks as well as recent developments in this area.

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[13]Under the deferred method, tax effects of temporary differences are calculated using the tax rates and laws in effect when those differences originate. This method emphasizes the income statement. The balance sheet effect of a timing difference is viewed as a deferred credit or charge to be allocated to future periods, instead of as a receivable or payable.

Under the liability method, tax effects of temporary differences are calculated using the tax rates and laws expected to be in effect when those differences reverse. This method emphasizes the balance sheet and the resulting amounts are viewed as assets and liabilities in the usual sense.

The net-of-tax method accounts for the tax effects of temporary differences as a reduction in related assets or liabilities. Under this method, the amount of the tax effect of the difference is calculated using either the deferred or the liability method.

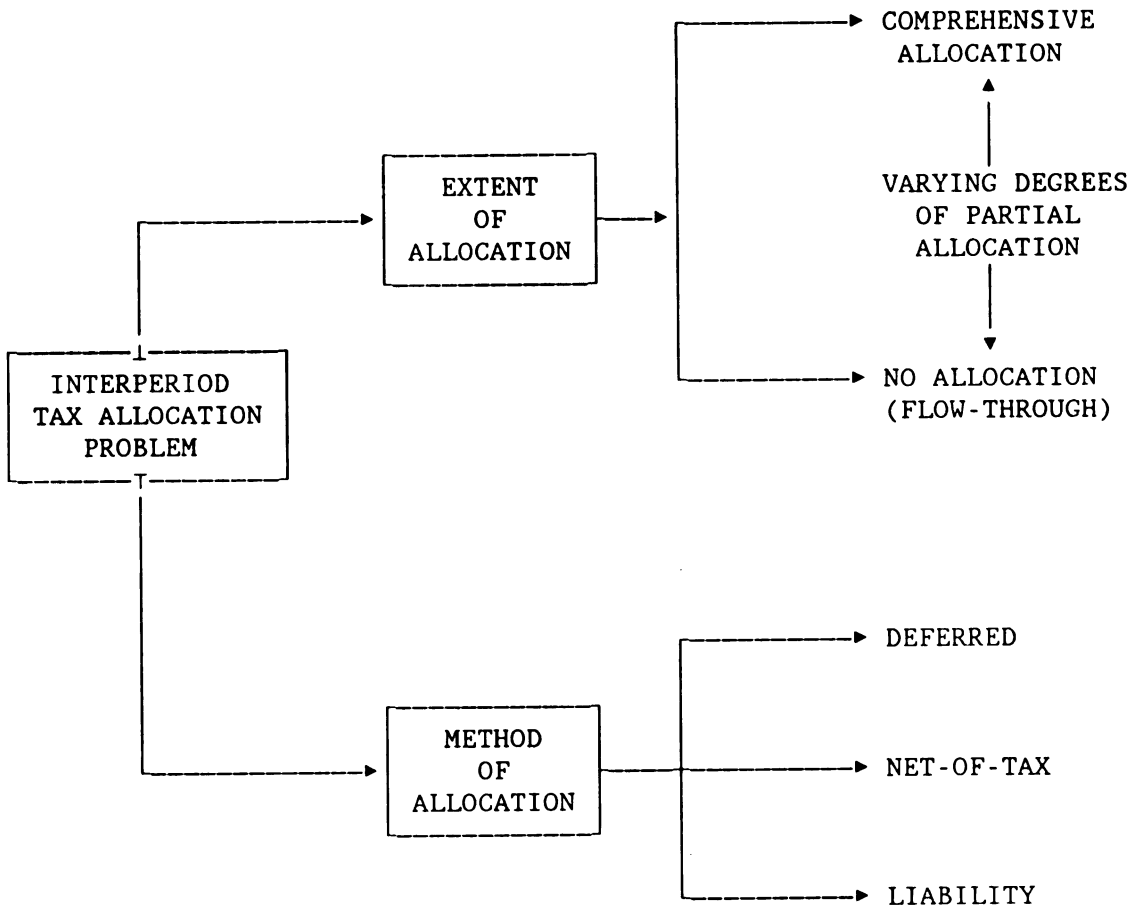

Figure 1

OVERVIEW OF THE INTERPERIOD TAX ALLOCATION PROBLEM

Prior to the 1940s, income tax allocation was not an issue primarily because of low tax rates resulting in immaterial tax consequences of book-tax differences. Accounting Research Bulletin No. 18 (ARB 18), *Unamortized Discount and Redemption Premium on Bonds Refunded*, issued in 1942, was the first official pronouncement to introduce the concept of interperiod tax allocation, without specifically using that term, to be applied by either the net-of-tax or the liability method.

ARB 23, *Accounting for Income Taxes*, issued in 1944, made two major contributions: 1) it introduced the idea of timing differences, and 2) it concluded that income taxes are an expense. ARB 23 required interperiod tax allocation for short-term timing differences (i.e., partial allocation) using the net-of-tax or liability method. In ARB 42, *Emergency Facilities--Depreciation, Amortization, and Income Taxes*, issued in 1952, a clear preference for the liability method was indicated for the first time, but the net-of-tax approach also was permitted.

With the issuance in 1954 of ARB 44, *Declining-balance Depreciation*, we have the beginning of the extent of allocation (partial or comprehensive) controversy. Although ARB 44 recommended partial allocation, the concept of comprehensive allocation gained support and ARB 44 (revised) was issued generally requiring comprehensive allocation for the first time. The net-of-tax presentation of timing differences expected to continue indefinitely was permitted.

With ARB 51, *Consolidated Financial Statements*, issued in 1959, evolved the idea of the 'indefinite reversal criteria'. The bulletin required a parent company

to provide deferred taxes on the undistributed earnings of its subsidiaries when those earnings were included in its consolidated income, except if those earnings would remain permanently invested in the subsidiary or distributed in a tax-free liquidation.

Because of the growing controversy in this area, Accounting Research Study No. 9 (ARS 9), *Interperiod Allocation of Corporate Income Taxes*, was conducted in 1966 to evaluate the various issues.[14] This was followed in 1967 by APB 11, *Accounting for Income Taxes*, the first extensive pronouncement on income taxes. Under APB 11 comprehensive allocation was required for all temporary differences (excluding five special areas to be addressed later) using the deferred method.

In 1972, APB Opinion No. 23, *Accounting for Income Taxes--Special Areas*, was issued to address three of the five items excluded by APB 11: 1) undistributed earnings of subsidiaries and corporate joint ventures, 2) 'general reserves' of stock savings and loan associations, and 3) amounts designated as 'policyholders' surplus' by stock life insurance companies.

APB 23 officially introduced the 'indefinite reversal criteria' under which interperiod tax allocation was required for the above items unless management did not expect the differences to reverse, or the differences will not reverse for an indefinite future period. Hence, unlike the APB 11 mandate of comprehensive

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[14]ARS 9 recommended comprehensive allocation using the deferred method for deferred tax debits and the liability method for deferred tax credits. It also recommended discounting long-term deferred tax liabilities, which was proscribed by APB Opinion No. 10, *Omnibus Opinion--1966*. Note, ARS's are not official pronouncements; rather they are advisory in nature.

allocation, managerial discretion was permitted in deciding whether the differences were temporary or permanent, based on facts and circumstances. Managerial discretion was allowed because it was believed that "the tax consequences of these events are controlled by the taxpayer and frequently require that the taxpayer take specific action before the initial difference reverses" (APB 23, para. 6).

Several other pronouncements on accounting for income taxes subsequently were issued because the controversy continued to grow. For example, there were attempts to extend the indefinite reversal criteria to other types of temporary differences for which an enterprise may also have 'control' over the tax consequences. However, the FASB rejected those attempts stating that APB 23 "was not established to provide general criteria on the applicability of the indefinite reversal rule beyond the specific areas mentioned in it."[15]

The continuing debate on income taxes led the FASB to add to its technical agenda in January 1982 a project to reconsider all aspects of accounting for income taxes. As a result of that project, a FASB Research Report, *Accounting for Income Taxes: A Review of Alternatives* [Beresford et al., 1983], was issued. This study contains an explanation of the major issues in the area and a discussion of the various accounting and reporting alternatives for each issue. This study formed the basis for the FASB Statement No. 96 (SFAS 96), *Accounting for Income Taxes*, issued in December 1987.

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[15]See FASB Interpretation No. 22, *Applicability of Indefinite Reversal Criteria to Timing Differences* [FASB, 1978].

SFAS 96 also requires comprehensive allocation for all temporary differences, but using the liability method. The Exposure Draft that led to SFAS 96 had proposed recognition of a deferred tax liability for APB 23 items as well. However, there was widespread disagreement with that proposal and the APB 23 items became the 'principal focus' of most comments received by the FASB [Liebtag, 1987]. In the final statement, the FASB decided to retain the exception to comprehensive allocation for the APB 23 items. However, the Board stated that "[i]t continues to believe that the deferred tax liability for those temporary differences should be recognized" (SFAS 96, para. 96). Based on the thrust of these comments and the FASB's beliefs, it appears that the extent of allocation issue in particular, and accounting for income taxes generally, remain an unsettled area.

2.1.3 Motivation for Research on Extent of Interperiod Tax Allocation

The selection of the extent of interperiod allocation as the research issue is motivated by several factors. First, there has been a phenomenal growth over time in firms' deferred tax balances as documented in several studies.[16] The findings in

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[16]For example, Davidson, Skelton, and Weil [1977] examined the deferred tax credit account for 3,108 firms on COMPUSTAT for the period 1954 to 1973, and found that 79% of the changes in these accounts were increases. In dollars, the growth was even more dramatic--87% of the total dollar changes were increases. Lantz, Snyir, and Williams [1977] present evidence consistent with the findings of Davidson et al., [1977]. Wheeler and Outslay [1985], in a survey of regulated and non-regulated corporations, report that during 1977 to 1982 deferred tax credits as a percentage of total assets increased from 4.7 to 6.2% and as a percentage of owners' equity rose from 12 to 16.8%. Growing deferred tax balances have attracted considerable attention and criticism in the popular press as well (e.g., Carmichael [1982]; McGoldrick [1984]).

these studies suggest that deferred taxes are simply rolling over instead of being drawn down. An important factor contributing to this development is the general requirement of comprehensive allocation,[17] which raises questions about its appropriateness. Second, different approaches to this issue have been taken in other countries.[18] In contrast with the international trend, the U.S. has shifted from partial to comprehensive allocation.[19] This creates potential problems for multinational firms and has led to more calls for international harmonization of

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One would expect that this problem has only increased with the significant reduction in the depreciable lives of most assets under the Accelerated Cost Recovery System (ACRS) introduced by the Economic Recovery Tax Act of 1981. This is because most firms' temporary differences are due to depreciation (e.g., of the 600 firms surveyed by *Accounting Trends and Techniques* during 1974-84, depreciation was the most frequently cited reason for temporary differences for each of those years--ranging from 76% to 84% of the companies surveyed).

[17]Wheeler and Outslay [1985] provide some evidence in support of this statement. In their survey, respondents were asked the question whether the comprehensive allocation method resulted in the creation of deferred tax accounts in which reversal was postponed indefinitely. Of the non-regulated companies, 76% agreed that it did whereas only 12% of the regulated companies agreed with the statement. Based on an examination of the written comments accompanying the responses, the authors find that the agreement rate of the regulated companies was low because they focused on 'turn around' (individual changes). However, the thrust of the growth-in-deferred-taxes argument is on 'reversal' (aggregate changes).

[18]For example, in the U.K. partial allocation is now *required* for all temporary differences [Accounting Standards Committee, 1985]. In addition, the International Accounting Standard No. 12 permits either partial or comprehensive allocation--tax allocation is allowed but not required for temporary differences that will not reverse for at least three years [International Accounting Standards Committee, 1979].

[19]See Rayburn [1986] for a chronological review of the authoritative literature on interperiod tax allocation showing this movement.

accounting standards.[20] Third, a major criticism of APB 11 and related pronouncements was that the deferred tax amount measured and reported under them did not meet the definitions of liabilities and assets in Concepts Statement 6. Although SFAS 96 removes that inconsistency by requiring an asset and liability approach, other conflicts between SFAS 96 and the FASB's conceptual framework remain.[21] Finally, even though SFAS 96 was the result of a comprehensive reconsideration of APB 11 and related pronouncements, the controversy over the extent of allocation remains unresolved.

2.2 Domestic International Sales Corporations

In this section the legislative intent and the statutory provisions governing the establishment and operation of Domestic International Sales Corporations (DISCs)

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[20]See, for example, D. Beresford's (Chairman, FASB) recent statement endorsing the internationalization of accounting standards (FASB Status Report No. 195, dated June 27, 1988, pp. 3-6).

[21]For example, FASB Concepts Statement No. 1, *Objectives of Financial Reporting by Business Enterprises*, emphasizes that financial reporting should help users assess the amounts, timing, and uncertainty of an enterprise's net cash flows. It is contended that by focusing more on amounts that are actually to be paid, partial allocation provides better information on prospective cash flows [Beresford, 1982]. However, SFAS 96 requires the continued use of comprehensive allocation, which emphasizes internal consistency but not prospective cash flows.

Second, SFAS 96 requires that no future income or expense be assumed (paragraphs 14 and 15). However, this position is completely different from the FASB's position in its recently issued pension accounting standard (SFAS 87) which relies extensively on assumptions about future events. In addition, as pointed out by the AICPA's Accounting Standards Executive Committee (AcSEC), estimates and assumptions about the future are widely used in accounting and not allowing for their use would hurt the relevance and usefulness of the results under SFAS 96 [Liebtag, 1987].

from their inception to the present are discussed in an attempt to fully understand the institutional setting within which the accounting method choice is studied.

2.2.1 Legislative Intent and Overview of I.R.C. Provisions

Under provisions originally established by the Revenue Act of 1971 [U.S. Congress, 1971], a new type of tax entity, the DISC, could be formed for tax years beginning on or after January 1, 1972. The purpose of the DISC provisions[22] was to stimulate U.S. exports and thereby help resolve the acute balance of payment problem being faced by the U.S. In addition, these provisions were aimed at removing two sources of discrimination against U.S. exporters. First, U.S. corporations engaged in export activities were subject to U.S. income tax currently on their foreign earnings regardless of whether these earnings were retained abroad or repatriated to the U.S. However, U.S. corporations producing and selling abroad could defer U.S. income tax on their foreign earnings as long as they were retained abroad. Second, most trading partners of the U.S. provided export incentives in the form of a refund of the value added taxes (VAT) paid by exporters and by not imposing income taxes on their foreign earnings. In contrast, the U.S. did not provide any direct subsidies to exporters. These objectives of stimulating exports and removing discrimination were accomplished by allowing an indefinite deferral of U.S. income tax on a portion of the export profits generated by DISCs.

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[22]See the House and Senate Reports on the Revenue Act of 1971 [U.S. Congress, House, 1971; U.S. Congress, Senate, 1971].

The primary statutory provisions affecting DISCs are contained in I.R.C. sections 991 to 997. Briefly, given the Congressional intent to increase exports, the key requirement for DISC status is that substantially all of its gross receipts and assets must be export-related. If disqualification occurs, the DISC benefits are lost and prior years' benefits must be recaptured. In general, the DISC itself is a nontaxable entity, but its profits are taxed to its stockholders when distributed or deemed to be distributed. Each year, a portion of the DISC's export profits is deemed distributed to its shareholders, thereby subjecting that income to current U.S. taxation. However, U.S. income tax can generally be deferred indefinitely on the remaining portion of the DISC's export profits unless one of the following events take place: the income is actually distributed, the corporation ceases to qualify as a DISC, its DISC election is terminated or revoked, or it is liquidated. The portion of DISC earnings deferred from tax has varied over time from 50 percent of its export income to 42.5 percent of incremental export income. Notwithstanding the indefinite tax deferral allowed by statute, for financial reporting purposes some firms provided for taxes on the indefinitely deferred DISC earnings, whereas others did not. The resulting interaction between the DISC provisions and the interperiod tax allocation problem explored earlier is summarized in Figure 2.

Due to international disputes about the legality of DISCs, the Deficit Reduction Act of 1984[23] [U.S. Congress, 1984] essentially eliminated the tax incentives to set up DISCs by imposing on DISC shareholders an interest charge

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[23]This law is also referred to as the *Tax Reform Act of 1984.*

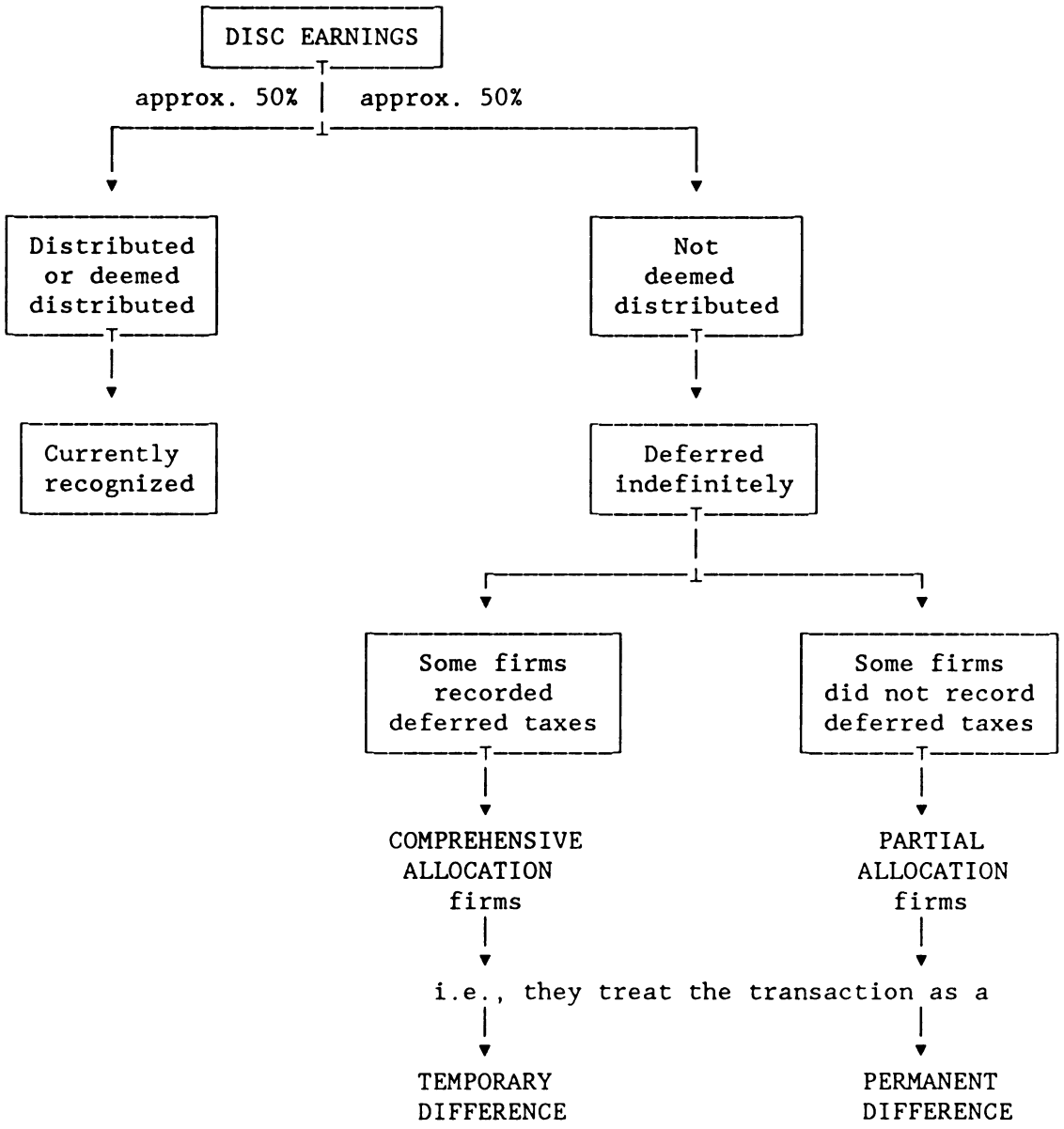

Figure 2

DISCs AND INTERPERIOD TAX ALLOCATION

on the deferred income. The 1984 Act also permanently exempted from tax the accumulated tax-deferred earnings of DISCs. This had important financial reporting implications for firms that had previously recorded deferred taxes on the indefinitely deferred DISC income (comprehensive allocation firms). The permanent tax exemption meant that those deferred taxes would never have to be paid. Hence, the deferred taxes were required to be reversed. In many cases, the reversal had a significant impact on the firms' incomes. The important I.R.C. provisions affecting DISCs are discussed next.

2.2.2 Qualifications of a DISC

A DISC is a domestic corporation created under the laws of any of the States or the District of Columbia. To qualify for the special benefits of indefinite tax deferral, a DISC is required to:

(i) satisfy the 'gross receipts' and 'gross assets' tests (described below),

(ii) have only one class of stock with a par or stated value of at least $2,500, and

(iii) elect to be treated as a DISC [I.R.C., § 992(a)(1)].

In addition, a DISC is required to have a bank account and maintain separate books and records [I.R.C., Reg. § 1.992-1]. However, not every domestic corporation qualifies for DISC status. For example, tax-exempt organizations, personal holding companies, banks and certain other financial institutions, insurance companies, and mutual funds are ineligible [I.R.C., § 992(d)].

The purpose of the gross receipts and assets tests is to limit the DISC to export related activity. The *gross receipts* test requires that at least 95 percent of the DISC's gross receipts consist of 'qualified export receipts' [I.R.C., § 992(a)(1)(A)]. In general, export receipts are considered qualified if they are derived from the sale or lease for use outside the United States of 'export property', or from providing services connected with the sale or lease of such export property, or from the sale of 'qualified export assets' [I.R.C., § 993(a)(1)].

To qualify as export property, the property must be: 1) manufactured, produced, grown, or extracted in the U.S. by someone other than the DISC, 2) held for sale or lease for use outside the U.S., and 3) made primarily (at least 50 percent of its fair market value) from U.S. components (the 'foreign content test') [I.R.C., § 993(c)(1)]. Thus, property manufactured, produced, grown, or extracted by a DISC and later sold or leased for use outside the United States does not qualify as export property. Also, generally, exports intended for ultimate use in the U.S. or exports subsidized by the U.S. government, intangibles such as patents, goodwill and trademarks, and property determined by the President (by Executive order) to be in short supply, do not qualify as export property [I.R.C., §§ 993(a)(2), (c)(2) and (c)(3)]. Further, the Tax Reduction Act of 1975 [U.S. Congress, 1975] made energy resources such as oil, gas, and certain minerals ineligible for DISC benefits.

The *gross assets* test requires that at least 95 percent of the DISC's assets be 'qualified export assets' [I.R.C., § 992(a)(1)(B)]. Export assets that qualify include

export property (discussed above), necessary operational equipment and supplies, receivables from export sales, reasonable working capital requirements, producers' loans, certain obligations of the Export-Import Bank or the Foreign Credit Insurance Association, and obligations of domestic corporations used solely to finance export sales under agreement with the Export-Import Bank [I.R.C., § 993(b)].

Failure to meet any of the above qualifications results in detrimental tax consequences for the corporation. Not only are DISC benefits lost for the year in which the disqualification occurred, but benefits received in all previous years must be recaptured [I.R.C., § 995(b)(2)(A)]. Recapture of the accumulated DISC benefits is spread over a period equal to two years for each year the DISC is in existence (up to a maximum of 10 years) [I.R.C., § 995(b)(2)(B)].

2.2.3 Portion of DISC Income Deferred from Tax

Since their enactment in 1972, DISC provisions underwent major modifications three times. The thrust of each change was to reduce the benefits allowed to DISC stockholders in the form of tax deferral. Hence, the portion of DISC income deferred indefinitely from tax has varied over time. Because this variation could potentially influence firms' choice of accounting method for the DISC, a sample selection criteria was imposed such that the study period spanned only one tax regime.

From 1972 to 1976, a DISC was deemed to have distributed to its stockholders 50 percent of its export profits and 100 percent of non-export profits,

thereby subjecting that income to current U.S. tax in the stockholders' hands. Thus, during this period, the available tax deferral was limited to 50 percent of DISC export profits. The sample firms used in this study were required to have a DISC operational in fiscal years ending 1972, 1973, or 1974. Hence, the study period is contained within this period and the subsequent legislative changes only affected the DISC benefits outside the study period.

The Tax Reduction Act of 1975 [U.S. Congress, 1975] made the first change in DISC benefits. This Act eliminated DISC benefits for profits from the export of depletable energy products such as oil, gas, and certain minerals. However, the portion of DISC profits sheltered from U.S. tax by exporting other products remained at a maximum of 50 percent.

The most important change to the DISC provisions was brought about by the Tax Reform Act of 1976 [U.S. Congress, 1976] under which tax deferral was allowed only for *incremental* export income. This change was motivated primarily by revenue considerations and because Congress believed that providing an export incentive for all exports made the DISC legislation less effective.[24]

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[24]See U.S. Congress, Joint Committee on Taxation [1976]. It is ironic that when the DISC legislation was originally introduced in 1971, the House [U.S. Congress, House, 1971] had recommended the incremental approach under the rationale that the DISC benefits should be given only to those firms that help correct the adverse balance of payments position by *increasing* their exports. However, the Senate [U.S. Congress, Senate, 1971] rejected the House proposal on grounds of equity and administrative complexity, granting instead deferred tax treatment to one-half of the export profits of the DISC. The Senate proposal was enacted into law.

Under this incremental rule, the DISC's adjusted taxable income[25] for the current year attributable to the non-incremental portion of the current year's export receipts was deemed to be distributed to the DISC's shareholders; hence not entitled to deferral. However, as before, deferral was permitted on 50 percent of the DISC's remaining adjusted taxable income (i.e., the income attributable to the *incremental* export receipts).[26] The non-incremental portion was set at 67 percent of the average export gross receipts in a moving four-year base period consisting of the fourth, fifth, sixth, and seventh years preceding the current year.[27] For

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[25]The *adjusted taxable income* of the DISC was defined as the current year's taxable income reduced by producer's loan interest, gain on the sale of certain property of the DISC, etc.--amounts considered 'deemed distributions' as before [I.R.C., § 995(e), prior to deletion by the Deficit Reduction Act of 1984].

[26]Small DISCs--those with adjusted taxable income of $100,000 or less in the current year--were exempted from the incremental rule. This exemption was subject to a phase-out such that DISCs with taxable incomes of $150,000 or more did not receive any exemption. See U.S. Congress, Joint Committee on Taxation [1976].

[27]The deemed distribution (dividend) due to non-incremental export receipts (DD^{NI}) in year t was computed thus:

$$DD_t^{NI} = ATI_t \times \frac{(0.67) \times (EGR_t^B)}{EGR_t}$$

where:

ATI = adjusted taxable income
EGR = export gross receipts
EGR^B = base-period EGR = ¼ (Σ_iEGR), where i = t−4, ..., t−7.

To illustrate, suppose that in 1980 a DISC had EGR of $13,400 and ATI of $500. Assume also that the DISC was established in 1974 and had EGR's of $0 in 1973, $2,000 in 1974, $6,000 in 1975, and $8,000 in 1976. Then:

$$EGR^B = ¼ (0 + 2000 + 6000 + 8000) = \$4,000$$

example, for taxable years beginning in 1983, the base period years were 1976 to 1979.[28] Thus, under the 1976 Act, DISC benefits were limited to 50 percent of the taxable income attributable to incremental export gross receipts.

The Tax Equity and Fiscal Responsibility Act of 1982 [U.S. Congress, 1982] further reduced DISC benefits by increasing the incremental portion of DISC income deemed distributed to 57.5 percent. This provision resulted in limiting deferral of U.S. tax on at most 42.5 percent of a DISC's incremental export profits.

2.2.4 Removal of DISCs

Ever since DISCs were enacted into law, they had been a source of contention between the United States and several signatories to the General Agreement on Trade and Tariffs (GATT). These countries claimed that DISCs violated GATT by providing U.S. businesses an illegal export subsidy. In 1976, a GATT panel upheld this claim because no interest was charged on the taxes deferred by DISCs [U.S. Congress, Joint Committee on Taxation, 1984].

$$DD^{NI} = 500 \times \frac{(0.67) \times (4000)}{13400} = \$100$$

$$DD^{I} = 0.50\ (500 - 100) = \$200.$$

Thus, the total deemed distribution of the DISC in 1980 is $300, and the income eligible for deferral is $200. (Example adapted from U.S. Congress, Joint Committee on Taxation [1976]).

[28]For taxable years beginning before January 1, 1980, the base period years were the DISC's taxable years beginning in 1972, 1973, 1974, and 1975 [I.R.C., Reg. § 1.995-6].

The primary complaint of the GATT members was that DISCs did not serve any economic purpose except to provide tax deferral to U.S. businesses. The U.S. defended DISCs on the grounds that they provided U.S. exporters with tax treatment that approximated its European trading partners' territorial tax systems, which generally do not impose taxes on profits earned abroad. In contrast, the U.S. uses a worldwide or 'global' tax system which subjects U.S. taxpayers to U.S. income tax on their worldwide income, resulting in double taxation if the foreign source income is subject to foreign taxes as well. The primary mechanism in the I.R.C. that mitigates the hardship of double taxation is the foreign tax credit. In the case of DISCs, double taxation was partly avoided by allowing an indefinite tax deferral on a portion of export income (discussed earlier).

The dispute over DISCs peaked in 1981 when the European Community requested from the GATT Council permission to retaliate against the U.S. The charge that DISCs were an illegal export subsidy and the threat of retaliatory action convinced the U.S. Congress that continuation of DISCs could potentially lead to the isolation of the U.S. in international trade. Thus, in 1982, while not conceding that DISCs violated GATT, the U.S. made a commitment to propose legislation addressing the concerns of the GATT members. The result of that commitment was to generally replace the system of DISCs by the system of Foreign Sales Corporations (FSCs) in the Deficit Reduction Act of 1984.

FSCs differ from DISCs in several important ways: 1) FSCs are foreign corporations; DISCs were domestic, 2) FSCs must have a foreign presence,

economic substance, and must perform activities outside the U.S.; DISCs were not required to meet any such requirements--they were essentially 'paper corporations', and 3) FSCs provide for permanent exemption of a portion of their export income from U.S. taxation; DISCs provided for an indefinite deferral of U.S. taxes. These differences were designed to satisfy GATT.

However, Congress was cognizant of the fact that the FSC requirements would impose undue burden on small exporters. Hence, the 1984 Act did not abolish DISCs per se; instead it continues the deferral treatment on income attributable to $10 million or less of qualified export receipts.[29] Deemed distributions relating to the incremental rule and to one-half of the DISC's income are eliminated, i.e., substantially all of the DISC's income attributable to the $10 million or less of qualified export receipts can now be deferred.[30] But an interest charge at a rate tied to the T-bill rate is now imposed on DISC shareholders on the deferred amounts [I.R.C., § 995(f)].

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[29]I.R.C., § 995(b)(1)(E). If export receipts exceed $10 million, the DISC would not be disqualified; there would only be no deferral of income associated with the excess export receipts.

[30]However, to make DISCs comparable with FSCs, one-seventeenth of the excess of DISC income over certain deemed distributions is deemed distributed [I.R.C., § 995(b)(1)(F)].

2.2.5 Permanent Exemption of DISC Deferred Taxes

The 1984 Act also provided that the accumulated tax-deferred income of DISCs would be permanently exempt from taxation.[31] This resulted in a windfall for corporation with DISCs. As Table 2.1 shows, over the 12-year period beginning in 1972, the tax-sheltered DISC earnings were estimated at about $28.15 billion, which translates into an estimated $13.19 billion in forgiven deferred taxes.[32]

Although the permanent exemption benefited all DISC firms, it had important financial reporting implications for the comprehensive allocators. The FASB required these firms to report the effects of the 1984 Act by reversing the previously provided deferred taxes and showing that amount 1) as a reduction of income tax expense of the current year, 2) in one interim period only rather than as an adjustment of the estimated annual effective tax rate, and 3) not as an extraordinary item.[33] This resulted in significant income boosts for some firms.[34]

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[31]Specifically, this was achieved by treating that income as 'previously taxed income' and, therefore, exempt from taxation (see § 805(b)(2) of the Deficit Reduction Act of 1984 [U.S. Congress, 1984]).

[32]The deferred taxes forgiven is computed at the top marginal statutory tax rate--48 percent during 1972-78 and 46 percent during 1979-84. The *Wall Street Journal* [June 7, 1984], however, reported the accumulated tax-sheltered DISC earnings to be estimated at $24.4 billion, resulting in $9.8 billion in taxes forgiven.

[33]See FASB Technical Bulletin No. 84-2, *Accounting for the Effects of the Tax Reform Act of 1984 on Deferred Income Taxes Relating to Domestic International Sales Corporations* [FASB, September 18, 1984].

[34]For example, in fiscal 1985, Digital Equipment Corp. showed an increase of $63.25 million in its after-tax income due to the reversal of the DISC taxes. This benefit represented 14.68 percent of its 1985 income before-taxes. In addition, Digital showed a benefit from DISCs of $8.9 million in fiscal 1984. See also *Business Week* [August 27, 1984, pp. 77-78] for the effects on some other firms.

Table 2.1

DISC DEFERRALS[a]

Tax Year[b]	Number of returns	DISC taxable income	Amount deemed distributed[c]	Tax deferred income[d]
	(1)	(2)	(3)	(3) - (2)
1972	2,826	$ 1,566	$ 776	$ 800
1973	4,162	3,149	1,579	1570
1974	5,498	4,783	2,416	2367
1975	6,431	4,772	2,420	2352
1976	6,911	5,071	3,499	1572
1977	6,665	5,234	3,715	1519
1978	7,208	6,427	4,360	2067
1979	7,933	8,461	5,397	3064
1980	8,665	9,875	6,270	3605
1981	9,408	10,952	7,187	3765
1982	9,663	10,156	7,080	3076
1983	9,898	10,082	7,692	2390
				28147

[a]All figures are estimates based on samples--money amounts are in millions of dollars.

[b]Tax year refers to accounting periods ended between July of one year and June of the following year. However, for 1972, the effective date of the legislation was January 1, 1972; therefore, they include only part-year accounting periods for some corporations.

[c]Estimates include small amounts of distributions considered received by stockholders from prior years' DISC taxable income.

[d]Tax deferred income amounts were inferred from the IRS data.

Source: Internal Revenue Service, Statistics of Income Bulletin, Vol 6, No. 2 (Washington D.C.: Fall 1986).

On the other hand, without the tax forgiveness, the partial allocators would have seen their earnings fall because they would have to *pay* taxes on the accumulated DISC earnings for which previously they had not set aside reserves. For many firms the earnings drop would have been very significant.[35]

While the 1984 tax forgiveness and the resulting reversals reported by some firms are not the events of interest in this study, they nevertheless highlight the importance of the financial reporting choice faced by firms, the length of time for which it was available, and the material dollar amounts involved.

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[35]For example, as of December 31, 1983, Boeing Co. and McDonnell Douglas Corp. had undistributed DISC earnings of $331 million and $323 million, respectively, for which federal income taxes had not been provided. This represented 69.7 percent and 74.2 percent, respectively, of their 1983 pretax earnings.

Chapter Three

THEORETICAL FRAMEWORK AND PREVIOUS RESEARCH

In this chapter, the evolution of positive accounting theory--the basis for the hypotheses developed and tested in this thesis--is summarized. Next, a review of the relevant literature, especially studies empirically testing the theory's propositions, is provided. The literature review is deliberately kept brief in this chapter with relevant research cited and discussed later as it applies. Both the theory and the literature outlined in this chapter have been extensively reviewed in Holthausen and Leftwich [1983] and Watts and Zimmerman [1986]. The following discussion draws heavily on their work.

3.1 Positive Accounting Theory

3.1.1 Its Genesis

Up until the late 1970s, the empirical financial accounting literature following Ball and Brown [1968] focused on accounting's role in providing information for security valuation (the 'information perspective'). Borrowing from developments in finance, this literature was founded on a belief in the efficient market hypothesis (EMH) and has demonstrated the potential usefulness of accounting earnings by documenting its association with stock prices (the 'information content of earnings'

studies).[1] However, this information perspective did not provide any predictions or explanations for accounting method choices that have no direct cash flow effects (i.e., accounting choices other than inventory methods). Instead, an extension of the information perspective to its logical extreme resulted in an accounting irrelevance proposition: in an efficient market, non-tax related accounting method choices are irrelevant because they do not have any cash flow effects.

In contrast to the irrelevance hypothesis, Watts and Zimmerman [1978] introduced contracting and political cost arguments to offer a potential explanation for why firms' accounting method choices have economic consequences. These arguments came to be referred as **positive accounting theory**[2] and spawned another stream of empirical financial accounting literature that has focused on explaining variations in accounting practice across firms and industries.

A critical assumption underlying these arguments is the existence of positive costs, broadly referred to as 'contracting costs', in markets and the political arena. Contracting costs include transaction costs, agency costs, bankruptcy costs, and information costs. These costs are borne by various parties to the firm and are tied to the firm's accounting method choices. Thus, even tax-neutral choices of accounting procedures have a cash-flow effect and can cause wealth transfers to

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[1]See Ball and Foster [1982], Lev and Ohlson [1982], and Watts and Zimmerman [1986, pp. 37-155] for a review of this literature.

[2]These arguments also have been referred to as 'economic consequence theories' [Holthausen and Leftwich, 1983], and 'contracting and size theories' [Christie, 1990].

take place. Holthausen and Leftwich [1983, p. 81] summarize the importance of the positive contracting cost assumption as follows:

> A world with zero contracting and monitoring costs yields an accounting irrelevance proposition analogous to the Miller-Modigliani capital structure and dividend irrelevance propositions in finance. The value of a firm is invariant to the choice of accounting rules in such a world because users of accounting numbers can unbundle the accounting package offered to them by corporations (i.e., they can costlessly restate the financial statements using whatever measurement rules they choose). ... Strictly speaking, there is no role for accounting in a world with costless contracting and monitoring.

The positive contracting cost assumption borrows from important developments in finance (regarding firms' capital structure) and the industrial organization literature in economics. The capital structure debate in finance is rooted in Modigliani and Miller's [1958] classical argument that in the absence of bankruptcy costs and corporate taxes, the value of the firm is independent of its capital structure. With the introduction of corporate taxation (which subsidizes interest), the value of the firm is maximized with 100 percent debt financing. However, observed systematic variations in firms' capital structures (debt-equity ratios) across industries and over time led to alternative explanations. Among them are Jensen and Meckling's [1976] contracting explanations based on positive bankruptcy and agency costs of debt. Because accounting numbers are used in the contracts aimed at reducing these costs, the contracting explanations include a role for accounting procedures in determining firm value.

The industrial organization literature in economics is concerned, in part, with theories of the political process. For a long time, one view of the political process

was that politicians are motivated in improving social welfare (the 'public interest hypothesis'). More recently, however, economists modeled politicians similar to other market participants as being motivated by self-interest (e.g., Stigler [1971]; Peltzman [1976]). Assumed in this self-interest theory is the existence of positive information, lobbying, and coalition costs, which are part of contracting costs. The existence of these costs and the resulting wealth transfers under the self-interest theory include a role for accounting method choice because accounting numbers are employed in the political process, thereby providing an incentive for managing reported numbers via the choice of accounting methods.

3.1.2 The Theory and its Implications for Accounting Method Choice

The objective of positive accounting theory is to explain and predict accounting practice [Watts and Zimmerman, 1986, p. 2]. The *agency theory* arguments used in the capital structure debate in finance offer one potential explanation for variations in accounting procedures (practice). In this theory, firms are not viewed as having a separate existence but rather as being a 'nexus of contracts' between self-interested individuals (managers, stockholders, and bondholders), each seeking to maximize utility (welfare) dependent upon the firm's performance and continued existence. The conflicting interests of these parties give rise to incentives to transfer wealth from other parties connected with the firm (agency costs), which, in turn, reduce firm value and hurt the firm's chance of survival. This induces the parties to write contracts restricting their actions, thus reducing agency costs and increasing the firm's value and its chance of survival.

The literature exploring these conflicts has developed along two dimensions: 1) the literature devoted to the 'positive' aspects of agency theory as discussed in Jensen and Meckling [1976]--also referred to as the *property rights literature*, and 2) the mathematical principal-agent literature dealing with the 'normative' aspects of agency theory as reviewed in Baiman [1982]. Both dimensions are concerned with the same phenomenon--the agent's actions in the presence of moral hazard and asymmetric information[3]--and are highly complementary. However, they differ in that the former uses less formal models but has helped in generating empirically testable hypotheses (external validity), while the latter uses formal mathematical models and emphasizes analytical rigor (internal validity).[4] The discussion here is limited to the positive agency theory (property rights) literature since the proposed hypotheses are derived from that literature.

Two well known sources of agency conflict are between 1) bondholders and stockholders, and 2) managers and suppliers of outside capital. Contracts between bondholders and stockholders contain a variety of restrictions on stockholders'

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[3]The moral hazard problem arises because the agent's (manager's) action choices are not observed. Asymmetric information results from the agent possessing private information not known to the principal (stockholders).

[4]Specifically, the positive agency theory perspective assumes the existing contracts between managers, stockholders, and bondholders are efficient and investigates the incentives faced by these parties. In contrast, the normative agency theory perspective is concerned with how to structure contracts between agents (managers) and principals (stockholders) that would induce the agent to expend the optimal amount of effort such that the principal's welfare is maximized [Jensen and Meckling, 1976].

Raviv [1985, p. 245], however, notes that "there is only one theory, it is positive and devoted to the same issue. ... Both streams of the literature attempt to minimize agency costs or equivalently to design Pareto-efficient contracts."

ability to transfer wealth from bondholders to themselves. These restrictions are known as bond covenants and are analyzed by Smith and Warner [1979]. Management compensation contracts are written to align the divergent interests of managers and stockholders.

The bond covenants and compensation agreements are important in accounting method choice studies because accounting typically plays a crucial role in these contracts. Restrictions are placed on parties' actions in terms of accounting numbers (e.g., the use of debt-equity ratios in lending agreements; the use of accounting earnings in management incentive schemes). Violation of these restrictions imposes costs on the shareholders and managers (e.g., debt renegotiation costs). Because alternative accounting procedures can affect the calculation of the numbers on which these restrictions are based, the choice of accounting procedures can have a cash-flow and valuation effect. This linkage between a firm's and firm managers' cash flows and accounting procedures under costly contracting provides a potential motivation for managers not to be indifferent among tax-neutral accounting procedures that do not affect the firm's political costs.

A second potential explanation for variations in accounting procedures relies on political cost arguments that originate from the disclosure regulation debate in economics. Early rationales for corporate disclosure regulation (e.g., the 'naive investor' theory, the 'functional fixation' hypothesis,[5] and the 'market failures'

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[5]According to the 'naive investor' theory, investors untrained in accounting cannot interpret reported earnings of firms that use different accounting practices. Under the 'functional fixation' hypothesis, individual investors fixated on, say

rationale[6]) assumed that such regulation is aimed at improving social welfare (the 'public interest hypothesis'). However, using implications of the efficient markets hypothesis and other arguments, these rationales reduce to claims about relative costs and benefits of private and governmentally regulated production of information, which are empirical issues.

Observed inconsistencies between regulators' seeming lack of concern with assessing the costs and benefits of regulation[7] and the public interest hypothesis, led to the assumption that politicians and regulators, like individuals in general, act in their self-interest rather than being motivated by social welfare considerations. Under the self-interest assumption, the political process is viewed as "a competition among individuals for wealth transfers" [Watts and Zimmerman, 1986, p. 224]. Politicians and regulators are hypothesized to affect wealth transfers by "solving perceived or actual crises" [Watts and Zimmerman, 1986, p. 242]. Accounting numbers are used not only in identifying the crises, but also in subsequent

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earnings, interpret the earnings of firms the same way, regardless of the accounting procedures used to calculate them. Under both theories, protection of investors is used to justify regulating disclosure requirements. This inability of investors to discriminate among accounting numbers also is referred to as the 'mechanistic' view of accounting choice.

[6]The 'market failure' rationale is concerned with the socially non-optimal production of a good. An accounting market failure is said to exist when the information contained in accounting reports is non-optimal in a Pareto sense. Under this rationale, government regulation is posited to cure the non-optimality.

[7]See, for example, SEC's Accounting Series Release (ASR) 190. In ASR 190, the SEC justified current replacement cost disclosures by large corporations on the ground that the "benefits of disclosure clearly outweigh the costs" without providing any evidence to support that claim.

regulation aimed at solving the crises. Specifically, firms' 'reported' profits are suggested to influence the actions of Congress and regulatory agencies. For example, the 1980 windfall profit tax imposed on oil companies was largely motivated by the monopoly-like profits amassed by these firms during the 1970s; the transfer from individuals to corporations of $120 billion in tax burden over five years by the 1986 Tax Reform Act was partially prompted by reports of large profitable corporations not paying taxes (this is discussed in more detail later).

Since accounting procedures affect the numbers used in the political process, politically sensitive firms are not indifferent between tax-neutral accounting methods. Specifically, positive accounting theory hypothesizes that firms subject to potential wealth transfers in the political process can reduce their political visibility by adopting earnings-reducing procedures.

Summary. The positive accounting theory seeks to explain why firms choose different accounting procedures. The theory is based on the assumption that contracting in markets, within firms, and in the political arena is costly. In such a world, accounting numbers have economic consequences by affecting the firm's and firm managers' cash flows. This cash flow linkage provides a motivation for firms not to be indifferent to the choice of accounting procedures. The theory yields empirically testable predictions driven by the positive contracting costs assumption. Studies testing those predictions are thus of interest and are discussed next.

3.2 Previous Research

The positive accounting theory outlined above has been used to provide explanations for various observed phenomenon: stock price effects of voluntary and mandatory accounting method changes,[8] lobbying behavior in response to proposed accounting standards,[9] early versus late adoption of accounting standards,[10] and voluntary accounting method choices. Many researchers have addressed these phenomena.[11]

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[8]For example, Holthausen [1981] looks at the stock price impact of voluntarily switching from accelerated to straight-line depreciation, whereas Leftwich [1981] and Lys [1984] investigate the stock price impact of mandatory accounting changes (business combinations and oil and gas accounting, respectively). While Holthausen [1981] finds no support for either the leverage or the bonus scheme hypotheses, Leftwich [1981] and Lys [1984] find limited support for the leverage hypothesis.

Watts and Zimmerman [1986, pp. 284-311] critique these studies and conclude that 1) voluntary accounting change announcements are unlikely to have stock price effects because of market expectations, and 2) generally stock price based tests of positive accounting theory (relative to the choice studies) are unlikely to find support for the theory's predictions because the magnitude of the cash flow effects of accounting changes is possibly small relative to the value of the firm. See also Lev and Ohlson [1982], and Holthausen and Leftwich [1983] for a review of these studies.

[9]For example, Watts and Zimmerman [1978] examine the factors likely to affect corporate lobbying for accounting standards by investigating managers' submissions on FASB's Discussion Memorandum on General Price Level Adjustments (GPLA). They find support for the size hypothesis, but their results appear to be driven by the large firms in the oil industry. See McKee et al. [1984] for a critique of the Watts and Zimmerman [1978] study.

[10]For example, Ayres [1986] studies the economic factors associated with the early v. late adoption of FASB Statement No. 52 regarding foreign currency translation.

[11]See Holthausen and Leftwich [1983], Kelly [1983], and Watts and Zimmerman [1986] for a review.

Since the question investigated in this study deals with the voluntary choice of an accounting technique, studies investigating this phenomenon are the focus of the following review. Other works dealing with methodological issues are considered later (in chapters 4 and 5).

3.2.1 Voluntary Accounting Method Choice Studies

The voluntary accounting method choices analyzed in prior studies include interest capitalization v. expensing, research and development capitalization v. expensing, depreciation methods, inventory valuation methods, investment tax credit methods, amortization period of pension costs, and oil and gas accounting methods. Since none of these studies has looked at the extent of interperiod tax allocation choice, this research attempts to fill that void.

Bowen, Noreen, and Lacey [1981] examine the determinants of the corporate decision to capitalize interest costs for capital projects that increase current period's reported earnings. They hypothesize that interest capitalizers are more likely to have 1) management compensation explicitly linked to accounting earnings (bonus scheme hypothesis), 2) more binding dividend constraints, 3) lower interest coverage ratios, and 4) higher leverage. They also hypothesize that larger firms (especially in the politically sensitive oil industry) are less likely to capitalize interest. They use a 'matched-pairs' design (firms matched on industry) and conduct both univariate and multivariate tests of their hypotheses. They find evidence consistent with the three debt variables (dividend constraint, interest coverage, and leverage), but no support for the bonus scheme hypothesis. Also for firms outside the oil

industry, the results of the political costs (size) hypothesis are contrary to expectations.

Daley and Vigeland [1983] examine why some firms, prior to 1974 when the FASB mandated the expensing of research and development (R&D) costs,[12] capitalized R&D costs, thereby increasing current period reported earnings. In addition to the three leverage hypotheses used in Bowen et al. [1981], they hypothesize that R&D capitalizers will tend to have more public debt as a proportion of total debt in their capital structure. They conduct both univariate and multivariate analyses and find that coefficients of all independent variables have the predicted sign and are statistically significant, except the interest coverage ratio. Further, contrary to expectations, the size variable is significant only for the small firms sub-sample. Also, in a matched-pairs analysis (firms matched on industry), only the public and non-public leverage coefficients were significant.

Dhaliwal, Salamon, and Smith [1982] examine the determinants of the choice of depreciation methods adopted by firms. Apart from size and leverage, they also use 'firm control' as an independent variable. They predict that a manager-controlled firm is more likely to use accelerated depreciation for tax purposes and straight-line for financial accounting purposes, thereby shifting reported earnings from later periods to earlier periods, whereas an owner-controlled firm is more likely to use accelerated depreciation for both tax and financial reporting

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[12]See FASB Statement No. 2, *Accounting for Research and Development Costs.*

purposes.[13] They find the debt-equity and firm control variables are statistically significant at conventional levels; the size variable is significant only at the 0.15 level.

Hagerman and Zmijewski [1979] examine the determinants of four accounting method choices: the accounting for inventory (LIFO v. FIFO), depreciation (accelerated v. straight-line), investment tax credit (flow-through v. deferred), and pension costs (short v. long amortization period). They dichotomize these choices as either income-increasing or -decreasing policies and test whether a firm's income policy is a function of size, risk, capital intensity, and concentration ratio (surrogates for political sensitivity), and the existence of a management incentive compensation scheme. Their results are not consistent across all accounting choices; size and concentration ratio always have the predicted sign and are significant twice,[14] but the other explanatory variables are not always significant and even switch signs.

Finally, there are three studies [Dhaliwal, 1980; Lilien and Pastena, 1982; Johnson and Ramanan, 1988] that deal with the choice between full cost (FC) and

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[13]A firm was classified as management-controlled is no single block of stock greater than five percent was controlled by any party. A firm was classified as owner-controlled if one party owned 10 percent or more of the voting stock and exercised active control, or if one party owned 20 percent or more of the voting stock.

[14]Firm size is significant for the depreciation and investment tax credit accounting method choices, whereas concentration ratio is significant for the inventory and investment tax credit accounting method choices.

successful efforts (SE) for oil and gas accounting.[15] Because the results of these studies are generally similar, discussion is limited to Johnson and Ramanan [1988] since it is the most recent. Johnson and Ramanan compare a sample of firms that changed from SE to FC between 1970 and 1976 with firms that retained the SE method throughout that period. They overcome a limitation of previous oil and gas accounting studies--a 'static ex-post' research design--by conducting a logit analysis for the years -2, -1, 0, and +1, where year 0 corresponds to the year of FC adoption. Of the explanatory variables examined by them (size, leverage, interest coverage, ratio of dividends to inventory of funds available, and two surrogates for 'drilling intensity'), only leverage and one of the drilling intensity surrogates were significant.

The above voluntary accounting choice studies have tested the hypotheses emanating from positive accounting theory and have found some empirical regularities. Overall, the evidence indicates that there exists a relationship between firms' accounting method choice on the one hand and surrogate measures of debt covenant violations, political costs (firm size), and management compensation (bonus plans) on the other. However, the evidence is not consistent across different accounting choices and time periods. This is particularly true of the firm

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[15]The two methods differ in their treatment of exploration costs for 'dry' wells (i.e., wells that do not produce commercially profitable deposits). Under the FC method, all exploration costs for 'dry' as well as 'wet' wells are capitalized and amortized against the cash flows generated from the wet wells. Under SE accounting, exploration costs of only the wet wells are capitalized and amortized; costs associated with the dry wells are immediately expensed. Usually, reported income in the current period is lower under the SE method.

size and bonus plan hypotheses. Further, the independent variables together explain only small proportions of the total cross-sectional variation in firms' choices among alternative accounting procedures permissible under GAAP.

The above shortcomings suggest two courses of action. First, in order to determine the robustness of prior findings, the hypotheses need to be tested with respect to other accounting procedure choices. This is consistent with Christie's [1990] observation that because the positive accounting literature is in its early stages, 'finding regularities' is important. This study fills that need by investigating a voluntary choice not studied before. Second, in order to increase the proportion of the variability explained by these hypotheses more powerful tests are required. Recent research suggests that using other surrogates for political costs together with firm size [Wong, 1988], could potentially provide more powerful tests of the predictive ability of positive accounting theory. In this study, this is accomplished by including firms' effective tax rate as an additional variable to capture firms' political costs. Finally, to increase the cross-sectional variability explained by these models, increased emphasis must be paid to omitted variables. In this study, the role of auditors is included in addition to the debt covenant and political cost variables.

3.2.2 The Interperiod Tax Allocation Literature

Although interperiod tax allocation has not been studied within the positive accounting theory framework, there exists a substantial body of literature on the

issue. In the interest of completeness, this literature is discussed here, but only briefly because it does not directly relate to the purpose of this study.

The existing literature on interperiod tax allocation can be classified along two dimensions--theoretical and quasi-empirical. In the theoretical literature, arguments for and against nearly every facet of the interperiod tax allocation problem, including the extent of allocation, can be found.[16] This literature consists mostly of ad hoc reasoning that is not backed by analytical models or empirical evidence and thus not useful in generating hypotheses about the variations in accounting practices. It is possible that the conceptual merits of these methods may drive the choice of firms. However, as in prior accounting method choice studies, it is hypothesized that more practical considerations (e.g., potential violation of debt covenants and political costs) govern firms' selection of accounting procedures. For these reasons, the theoretical literature is not discussed here; instead the portion of this literature dealing with the extent of allocation, the issue relevant to this study, is included in Appendix A.

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[16]See Beresford et al., [1983] for an overview of this literature. Detailed arguments for and against the interperiod tax allocation alternatives--flow-through, comprehensive allocation, and partial allocation--can be found in Rosenfield and Dent [1983], Defliese [1983], and Beresford [1982], respectively, and are summarized in Appendix A.

The quasi-empirical[17] literature documents the growth of deferred tax balances (e.g., Davidson et al. [1977]).[18] While these studies alert us to the problem of interpreting the deferred tax balances arising from the use of current accounting techniques, they do not explain or predict accounting practice.

Beaver and Dukes [1972; 1973] are examples of early empirical research on interperiod tax allocation. Both studies used the relation between accounting earnings and stock prices to assess the 'desirability' of alternative accounting procedures. However, they did not attempt to explain or predict accounting practice with respect to interperiod tax allocation, which is the primary purpose of this research.[19]

3.3 Limitations of the Theory and Research

The positive accounting theory outlined in this chapter and the studies (discussed above) empirically testing the theory's propositions suffer from various limitations. The more general of these limitations are discussed here, while specific

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[17]These studies are labeled 'quasi-empirical' because they do not involve hypothesis formulation and testing, which is normally associated with 'empirical' accounting studies. Literally speaking, these studies are empirical. An alternative label for these studies could be 'non-experimental'.

[18]See chapter two, section 2.1.3 for the findings in this and other related studies.

[19]It should be noted that desirability of alternative accounting procedures is a normative question that is designed to yield prescriptions. While positive accounting theory is concerned with explaining and predicting accounting practice, it does not render normative questions unimportant [Watts and Zimmerman, 1986, p. 9].

limitations that apply to the hypotheses tested in this study are discussed in the next chapter.

An important limitation is that the positive accounting theory is not fully formulated. The incomplete nature of the theory is partly manifest in the low explanatory power (R-squares) of models based solely on contracting and political cost arguments. One factor contributing to the low R-squares could be that of all the explicit and implicit contracts entered into by a firm, the literature to date has largely concentrated on debt contracts and bonus agreements because they are observable.[20] Including other contracts may increase the theory's explanatory power. Another factor that may account for the low R-squares is that the theory "is a theory of extremes (e.g., 'closeness' to covenants) which therefore cannot explain the choices of the mass of firms not near the extremes" [Christie, 1990].

Other limitations can be broadly classified as measurement issues and omitted variables problems.

3.3.1 Measurement issues -- dependent variable

A potential avenue for increasing the theory's predictive ability is to use a portfolio of accounting choices instead of a single procedure choice as the dependent variable. In prior research, this has been attempted in two ways: 1) by using an income strategy approach, and 2) by using net accounting accruals.

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[20]Liberty and Zimmerman [1986] is an exception. They examine managers' accounting method choices around labor union contract negotiations. These contracts differ from debt contracts and bonus agreements in that the accounting numbers are believed to affect the process only implicitly.

The income strategy argument. Studies using the choice of a single accounting procedure as the dependent variable implicitly assume that the selection of accounting procedures is independent of one another. Zmijewski and Hagerman [1981] (Z-H) hypothesize that it is unlikely that managers choose each accounting policy independently; rather, "management will adopt a multi-dimensional income strategy for the firm, with each policy being one dimension of that decision" (p. 133). Hence, Z-H use the firm's 'income strategy' as the dependent variable in their model explaining firms' choice of accounting procedures.[21] If managers in fact choose accounting procedures on a portfolio basis, Z-H's approach would provide more powerful tests of positive accounting theory [Watts and Zimmerman, 1986, p. 248].

There are two problems with the income strategy approach. First, it is impossible to measure the exact impact of the various accounting procedures used by the firm. Hence, "arbitrary assumptions of each accounting choice's importance in determining [the firm's] overall income strategy, as opposed to the actual dollar impact for each firm" become necessary [Holthausen and Leftwich, 1983, p. 93]. This may have led to the low explanatory power of Z-H's cross-sectional model and its failure to predict significantly better than the naive prediction that the firm will

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[21]Z-H combine the effect of four accounting method choices (depreciation, inventory, pension costs and investment tax credit) to form strategies based on whether the effect of these choices is income-increasing or income-decreasing.

choose the most common strategy.[22] Second, theoretically *all* accounting choices of the firm should be considered simultaneously. However, this makes the task extremely formidable. For these reasons, other accounting choice studies have focused on single procedures, and I do likewise in this research.

The use of net accruals. An alternative to using the firm's income strategy is to use its net accounting accruals as the dependent variable (e.g., Healy [1985]; Liberty and Zimmerman [1986]). Like the income strategy approach, net accruals capture in one measure the aggregate net effect of all accounting procedure choices. Hence, they overcome the deficiency of single procedure choice studies and can potentially provide more powerful tests of the positive accounting theory. However, as Watts and Zimmerman [1989, p. 9] point out, "[the] use of accounting accruals as a summary measure of accounting method choice suffers from a lack of control of what accruals would have been in the absence of managerial accounting discretion." Without a model of accruals, this measure is, at best, a noisy surrogate for managerial opportunism, making it unclear whether the approach is indeed 'better' than single method choice studies.

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[22]Press and Weintrop [1990] replicate the Z-H study using 1985 data on a sample of 83 firms (Z-H used 1975 data for 300 firms) with marginally improved R-square and percentage of firms correctly classified. Relative to the naive policy of picking the most common strategy, Press and Weintrop's models incorporating the leverage variable are significantly better at the .11 level (compared with .25 in Z-H).

3.3.2 Measurement and Specification issues -- independent variables

The fundamental issue here is that although positive accounting theory is founded on the existence of contracting and monitoring costs in the market and political processes, the magnitude of these costs and their variation across firms are not taken into account in empirical tests of the theory. These costs are treated as unobservable and such proxy variables as leverage and firm size are employed instead. However, using proxy variables creates interpretation problems both when test results are statistically significant and when they are not [Leftwich, 1990].

Another problem is that generally the variables that proxy for the contracting and political costs are specified as a linear function of the accounting method choice studied. However, potential interactions among the independent variables which are thus ignored, call into question the linear specification. For example, avoiding costly debt contract violations motivates the choice of income-increasing accounting methods to relax the contract constraints, whereas the political process provides incentives to reduce reported earnings for some firms. These opposing incentives require managers to trade-off between contracting and political costs before selecting among accounting procedures. The final choice would depend upon the relative magnitude of the costs involved. But as Watts and Zimmerman [1986, p. 243] admit,

> Little is known about the relative magnitude of political, regulatory, and contracting costs. Hence the parameters of managements' decisions and how they vary across firms cannot, a priori, be specified. However, empirical evidence indicates that the selection of accounting procedures varies with variables that are likely to be related to political costs and contracting costs. Thus some statements and predictions can be made as to the trade-off of political costs and contracting costs.

3.3.3 Omitted Variables Issues

Correlated omitted variables. As with any theory, it is possible that the contracting and size variables hypothesized to influence accounting method choice might surrogate for other omitted variables correlated with the included variables. For example, the firm's production-investment opportunity set (of which leverage and size are characteristics) may drive its contracts of which the accounting system is a part. In this scenario, the choice of accounting procedures is endogenously determined with the firm's production and investment decisions. This is also referred to as the 'endogeneity argument', and under it the focus shifts from ex-post managerial opportunism to ex-ante efficiency reasons (maximization of firm value) as the driving force behind accounting method choice (see Watts and Zimmerman [1989]).

While positive accounting theory admits both rationales to co-exist, most of the empirical tests of the theory take the firm's observed contracts as given and focus on the ex-post choice of accounting methods. This approach implicitly assumes that managers behave opportunistically and does not control for differences in the ex-ante set of acceptable accounting methods available to them.

Other omitted variables. As discussed before, variables based on debt contracts and bonus agreements have been included in the models. However, other explicit and implicit firm contracts (e.g., sales contracts, union contracts,[23] etc.) as well as intra-firm transactions (e.g., transfer pricing; cost allocations [Ball, 1987]) also use accounting numbers and thus influence the choice of accounting methods, but are omitted in most studies.

[23]Liberty and Zimmerman [1986], however, fail to find support for the hypothesis that managers manipulate reported earnings during labor union contract negotiations.

Chapter Four

HYPOTHESIS DEVELOPMENT

The purpose of this chapter is to develop empirically testable hypotheses regarding the determinants of firms' choice of methods in accounting for the extent of interperiod tax allocation. The hypotheses are formulated within the positive accounting theory framework presented in the previous chapter. Before the hypotheses are developed, it is necessary to understand the financial statement effects of comprehensive and partial allocation.

4.1 Financial Statement Effects

Under comprehensive allocation, a firm with a DISC records deferred taxes on the indefinitely deferred DISC earnings. This increases the income tax expense and decreases net income after taxes because of the higher income tax expense. The balance sheet effects of this method are to decrease retained earnings as a result of the lower net income and increase the deferred tax balance. In contrast, the use of partial allocation results in a comparatively lower income tax expense, higher net income after taxes, higher retained earnings, and a lower deferred tax balance. This analysis assumes that the deferred tax account has a credit balance, which is usually the case. Figure 3 contains a summary of these effects.

	Comprehensive Allocation	Partial Allocation
A. Income Statement Effects		
Income tax expense	Higher	Lower
Net income (after tax)	Lower	Higher
B. Balance Sheet Effects		
Retained earnings	Lower	Higher
Deferred tax	Higher	Lower

Figure 3

FINANCIAL STATEMENT EFFECTS OF
COMPREHENSIVE VS. PARTIAL ALLOCATION

4.2 The Debt Covenant Hypotheses

These hypotheses are based on predictions from the bondholder-stockholder conflict mentioned in the previous chapter. Recall that the bondholder-stockholder relationship entails conflict because decisions and actions beneficial to stockholders may be detrimental to bondholders. Specifically, the conflict arises because wealth can be transferred from bondholders to stockholders by paying dividends, diluting the claims of existing bondholders by issuing additional debt of equal or higher priority (claim dilution), pursuing a higher variance project than anticipated by the bondholders (asset substitution), and reducing planned investment (under-investment). With risky debt outstanding, the result of these actions is an overall reduction in firm value, i.e., the bondholders' loss is greater than the stockholders' gain.

Under the assumption of non-zero contracting and monitoring costs, financial contracts (e.g., bond indentures or lending agreements) can increase firm value by controlling this conflict.[1] Control is accomplished by inserting covenants in these

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[1]A competing hypothesis regarding how the bondholder-stockholder conflict is controlled is that external markets (e.g., the market for corporate control) or the possibility of restructuring the firm's claims provide stockholders with the necessary incentives to maximize the value of the firm (rather than just the value of equity), rendering the choice of financial contracts irrelevant to the value of the firm. However, Smith and Warner [1979] argue that since restrictive covenants are persistently observed in loan agreements, even though they are costly to contract and monitor, the competing hypothesis should be rejected, i.e., external markets do not eliminate the bondholder-stockholder conflict. Leftwich [1983, p. 26, footnote 5] succinctly summarizes the argument as follows: "If external markets eliminated the potential conflict of interest, there would be no demand for costly bond covenants."

contracts restricting the different types of stockholder/management activities aimed at transferring wealth from bondholders to stockholders.

Smith and Warner [1979] classify observed bond covenants into four categories:[2]

1. Production-investment covenants which restrict the firm from investing in other businesses, disposing of its assets, and engaging in mergers. These covenants are considered inefficient because they are costly to monitor; hence they are not frequently observed.
2. Dividend covenants which are established by defining an 'inventory of payable funds', also referred to as unrestricted retained earnings (URE), and limiting the distribution of dividends to a maximum proportion (up to 100 percent) of this inventory.
3. Financing policy-related covenants which restrict or prohibit the firm from issuing any additional debt and/or altering the priority of existing debt if it does not meet specified debt-equity and interest coverage ratios. These covenants prevent stockholders from diluting the claim of bondholders on the firm's assets.

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[2]See also *Commentaries on Indentures* (*Commentaries*) [American Bar Foundation, 1971] for a discussion of typical bond covenants. The *Commentaries* were written by leading experts in the field with the intent to standardize the non-negotiable provisions ('boiler plates') used in lending agreements. These boiler plates are highly representative of what is observed in actual practice and are used frequently in lending agreements.

4. Bonding covenants which require the firm to provide audited annual financial statements, the specification of accounting techniques, the purchase of liability insurance, and periodically a signed statement from the firm's officers indicating compliance with all of its obligations under the agreement. These covenants lower the firm's monitoring costs.

Of the various types of bond covenants discussed above, financing-related constraints and/or restrictions on payment of dividends are most frequently observed.[3] Evidence to this effect has been found in previous research (e.g., Shevlin [1987]).

The constraints imposed by these restrictive covenants are written in terms of accounting numbers, specifically numbers reflecting the firm's performance and its financial position, such as net income, working capital, current ratios, and tangible net worth. Hence, alternative accounting methods and procedures used to compute these numbers can potentially impact the level of these constraints. The constraint levels are a matter of concern to the firm because if the covenants are violated, the firm is considered to be in 'technical default'. This entitles the bondholders to either accelerate the maturity of the debt or renegotiate the lending agreement. Alternatively, the firm can change its production, investment or financing activities so as to avoid covenant violations in the first place. Either course of action is costly.

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[3]A potential reason for this occurrence could be that these covenants involve lower monitoring costs than, say, covenants regarding production-investment decisions of firms [Smith and Warner, 1979].

The definitions of accounting numbers in covenants use generally accepted accounting principles (GAAP) as a benchmark [Fogelson, 1978; Leftwich, 1981]. Deviations from GAAP take the form of specific inclusions and exclusions, but generally are found in private debt agreements rather than public debt issues [Leftwich, 1983]. "For public debt issues, other than stating that they should be consistent with GAAP, covenants frequently do not specify how the accounting numbers will be computed" [Smith and Warner, 1979, p. 144]. Hence, if alternative methods to account for a transaction exist within GAAP, and the bond indentures do not specify the use of any one of them (or preclude the use of one or more of them), managers' choice of accounting techniques can have an impact on the contractual constraints contained in the lending agreements.

Based on an application of the agency theory arguments and given the financial statement effects of using comprehensive v. partial allocation methods, it can be argued that firms concerned with violating debt covenants may choose partial allocation to avoid the negative impact of comprehensive allocation on earnings, leverage, and interest coverage. Thus, under costly contracting, it is hypothesized that firms observed using partial allocation are closer to their covenants. Specifically, the formal debt-covenant related hypotheses are (all hypotheses are stated in the alternate form with the corresponding null hypotheses being the complement thereof):

H_1 : Ceteris paribus, firms that have higher leverage (debt-equity ratios) are more likely to use partial allocation.

H_2 : Ceteris paribus, firms that have lower interest coverage ratios are more likely to use partial allocation.

H_3 : Ceteris paribus, firms that have a higher ratio of dividends paid to the inventory of funds available for the payment of dividends are more likely to use partial allocation.

In prior research (e.g., Leftwich [1981]; Holthausen [1981]) it has been argued that renegotiation and default costs associated with public debt are usually higher than private debt because public debt is more widely-held.[4] Hence, firms with relatively more public debt are more likely to be concerned about covenant violations that may necessitate costly renegotiation and are more likely to adopt accounting procedures that would avoid such violations. This suggests the following hypothesis for this study:

H_4 : Ceteris paribus, firms with more public debt in their capital structure are more likely to use partial allocation.

The above hypotheses are based on several assumptions which warrant further discussion. First, it is assumed that breaches of debt covenants are costly. Instead of defaulting on the loan, the firm may renegotiate or repurchase (call) the debt, or change its operations (production, investment, financing activities). However, these alternatives also are costly. Leftwich [1981, p. 7] hypothesizes that

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[4]It should be noted that under the *Trust Indenture Act* of 1939, issues of debt to the public require the appointment of a trustee for the debtholders and an indenture agreement between the firm and trustee. The higher renegotiation costs with widely-held public debt arise because any alterations to the indenture agreement cannot be approved by the trustee without obtaining the concurrence of a majority (usually two-thirds) of the holders of the outstanding bonds. Private debt indentures, on the other hand, can be modified by mutual agreement between the firm and the (usually) small number of lenders.

these costs are the lower of renegotiating the agreement, redeeming the debt, defaulting on the loan, or changing the firm's operations to avoid covenant violations. In the absence of specific knowledge or documentation of the magnitude of these costs, it is assumed for the purpose of this study that they are significant, i.e., it is in the firm's interest to avoid covenant breaches. Another element of costs involved is information production costs. The thesis of this study is that if flexibility exists within GAAP, such as between partial and comprehensive allocation of taxes for indefinite deferrals, then accounting procedure choice affords the firm yet another possibility of avoiding covenant violations. This implicitly assumes that information production costs (e.g., bookkeeping) are not materially different between recording deferred taxes on a partial or comprehensive basis.

Second, it is assumed that the debt covenant variables used in the study adequately proxy for the firm's closeness to its constraints or the amount of 'slack' that exists in the covenants. This assumption is supported by Press and Weintrop [1990] who find measures of proximity to leverage constraints to be significantly correlated with leverage. To the extent this assumption is not met, however, the explanatory power of these hypotheses is reduced. In this context, the leverage hypothesis, which is concerned with the debt-equity ratio, requires special mention. Equity, the denominator in that ratio, is certainly affected by the choice between partial and comprehensive allocation through the impact on retained earnings. However, it is not clear that debt, the numerator, will always be affected since deferred taxes may not be considered as debt in the covenants. In examining

private lending agreements and the *Commentaries* [ABF, 1971], Leftwich [1983, p. 34] found that:

> Some definitions of liabilities include deferred taxes. Almost as frequently, others exclude "reserves for deferred income taxes and other reserves to the extent such reserves do not constitute an obligation."

If deferred taxes are not defined as liabilities, differences in debt-equity ratios of firms using partial and comprehensive allocation are reduced which, in turn, reduces the explanatory power of this hypothesis.

Third, it is assumed that there is no cross-sectional variation in the constraints proxied by the debt covenant variables. It is possible, however, for such variation to exist, for example, across industries. DeAngelo and Masulis' [1980] analysis suggests that optimal leverage ratios are likely to differ across industries because of differences in non-debt tax shields (e.g., depreciation). To the extent cross-sectional variation in the constraints exists, measurement error is induced.

Fourth, another assumption underlying the debt covenant hypotheses is that loan agreements do not specify which method will be used for the extent of interperiod tax allocation, and/or do not include rules to adjust the reported amounts for the extent of allocation method choice. This assumption is justified, at least for the public debt issues, since they generally rely on GAAP as a benchmark to reduce the costs of monitoring the firm's covenants [Smith and Warner, 1979]. However, Leftwich [1983] provides evidence that the negotiated set of measurement rules in private lending agreements often differ from GAAP

and that the differences are aimed at reducing management's flexibility to choose accounting rules favoring stockholders over bondholders.

Finally, for the sake of simplicity, the debt covenant hypotheses also assume that there is no conflict of interest within bondholder groups when different classes of debt are issued by the firm (e.g., between junior and senior debtholders). Similarly, it is assumed that in the conflict between bondholders and stockholders the manager acts to maximize the stockholders' wealth, i.e., he aligns his interest with that of the stockholders. This is a simplifying assumption, of course; in reality, assuming separation of ownership and control and that both parties are utility (wealth) maximizers, there is a conflict of interest between managers and stockholders [Jensen and Meckling, 1976].[5]

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[5]Typically, management compensation contracts are used to minimize the agency costs resulting from the manager-stockholder conflict. Of the different elements observed in managers' compensation packages, bonus awards often are explicitly based on accounting numbers. Hence, another hypothesis emanating from the contracting cost arguments is that the existence of accounting earnings-based bonus schemes creates incentives for managers to choose income-increasing accounting procedures. Most prior accounting method choice studies have tested this hypothesis by using a dichotomous dummy variable (0/1) for the existence or non-existence of accounting earnings-based bonus plans. The results have been mixed because Healy [1985] found that depending on how earnings are defined in specific plans, certain accounting decisions would not affect the managers' bonus awards. Hence, it is not surprising that Hagerman and Zmijewski [1979] and Bowen et al. [1981] found no significant association between the existence of accounting earnings-based bonus plans and the accounting choices examined in those studies.

Healy's [1985] finding that 52.7 percent of the total observations in his study defined bonus awards on earnings *before* taxes has important implications for this study because the choice between comprehensive and partial allocation affects only income *after* taxes. To determine the impact of this problem in this study, the bonus plan disclosures in the financial statements and 10K's of the sample firms were examined. Of the 35 firms that specifically mentioned the definition of

4.3 Political Costs Hypotheses

4.3.1 The Firm Size Hypothesis

As discussed before, evidence suggests that the political process creates incentives for firms to choose between accounting methods. Specifically, firms which are more 'politically sensitive' are more likely to adopt accounting procedures that reduce reported earnings and/or defer them to later periods. Watts and Zimmerman [1978] argue that firms' political sensitivity varies directly with their size. The notion that large firms are associated with monopoly power and concentration of wealth has existed for quite some time. This belief has resulted in large firms becoming the target of public criticism and action leading to added political costs in the form of higher levels of regulation (e.g., the anti-trust laws) and taxation (e.g., the excess profits tax).[6]

Following Watts and Zimmerman [1978], most prior accounting method choice studies use firm size to proxy for political sensitivity. Larger firms are hypothesized to adopt earnings-decreasing accounting procedures to reduce their visibility and the attendant political costs. Because earnings under comprehensive

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earnings used in the computation of bonus, 34 firms used a before-tax basis and only one firm an after-tax basis. Hence, the bonus hypothesis was not pursued further.

[6]An example of corporate managers' awareness and concern for these beliefs is borne out in the following remark of O.A. Beech, Chairman of the Board, Beech Aircraft Corporation, in his letter to shareholders in the company's 1975 annual report: "It has become common practice by certain groups to encourage greater regulation and tax liabilities on large corporations which is detrimental to our nation's economic structure."

allocation are smaller than under partial allocation, it is hypothesized that larger firms are more likely to adopt comprehensive allocation. Formally,

> H_5 : Ceteris paribus, larger firms are more likely to use comprehensive allocation.

Although some studies' results support the size hypothesis,[7] there are conceptual problems as well as empirical evidence that is inconsistent with this hypothesis. Conceptually, it can be argued that because of greater resources at their command, larger firms can lobby for more favorable treatment and thus can prove to be "powerful adversaries in the political process" [Watts and Zimmerman, 1986, p. 239]. The fact that large firms frequently are observed *receiving* wealth transfers, especially when in financial distress (e.g., the loan guarantee to Chrysler Corporation), provides some credence to that argument.

Besides the conceptual problems, there is empirical evidence inconsistent with the size hypothesis. For example, Bowen et al.'s [1981] results for firms outside the oil industry are opposite of what is predicted by the size hypothesis--larger firms in their sample capitalized interest, an income-*increasing* accounting procedure. Similarly, El-Gazzar et al. [1986] find that firms' choice among lease accounting methods is the opposite of that predicted by the size hypothesis--larger firms used the operating method, an income-*increasing* approach. After partitioning their sample into large- and small-firm sub-samples, Daley and Vigeland [1983] found that the size variable was significant only in their small-firm sub-sample, a

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[7]See Watts and Zimmerman [1986, Table 11.4, pp. 258-259] and Christie [1990, Table 1].

result contrary to the size hypothesis. Finally, Johnson and Ramanan [1988] find no significance for the size variable, though it has the predicted sign. This evidence suggests that firm size may not adequately proxy for political costs. For these reasons, Holthausen and Leftwich [1983] and Watts and Zimmerman [1986], among others, recommend that future research should try to develop 'better' (more refined) proxies for political costs.

4.3.2 The Effective Tax Rate Hypothesis

A direct way by which wealth can be transferred from corporations is via the tax system [Watts and Zimmerman, 1986, p. 235]. Because taxes are one element of the total political costs borne by firms, firms' effective tax rates (ETRs) provide an alternate proxy for political costs. Assuming taxes are not systematically offset by the nontax components of political costs, such as regulation, quotas, and tariffs, higher ETRs would be indicative of higher political costs. Based on the firm size hypothesis discussed earlier, this would also imply that larger firms would have higher ETRs. Zimmerman [1983] empirically tested this implication for all firms on COMPUSTAT spanning the period 1946-1981 and found some supporting evidence. Although a monotonically increasing relationship between ETRs and firm size was not observed, Zimmerman found that the 50 largest firms in his sample had higher ETRs than the other firms (the 'threshold effect'). However, this relationship held only for certain industries and over certain time periods.[8]

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[8]The overall results appear to have been driven by the oil and gas firms included in his sample.

Given the earlier discussion regarding higher political costs providing incentives for firms to adopt accounting procedures that reduce reported earnings and/or defer them to later periods, it can be argued that firms with higher ETRs are more likely to use income-reducing accounting methods. El-Gazzar et al. [1986] tested this hypothesis in the context of accounting for leases. Consistent with the hypothesis, they found that firms with higher ETRs were more likely to capitalize leases--an income-reducing accounting procedure.[9]

Because comprehensive allocation relative to partial allocation results in lower net income due to a higher income tax expense, the implication of the above discussion for this study is that firms with higher ETRs are more likely to choose comprehensive allocation, i.e., a positive relationship between ETRs and comprehensive allocation would be expected.

There is another argument, however, that suggests a negative relationship between ETRs and comprehensive allocation is possible. This argument focuses on the impact the use of comprehensive v. partial allocation has on the computation of firms' reported ETR on the financial statements and the important role played by ETRs during the 1970s and 1980s in affecting significant wealth transfers from U.S. corporations, making them nontrivially concerned about the computation of ETRs and the accounting methods affecting the computation. The following events

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[9]Income is lower early in the lease life when leases are capitalized because the interest and depreciation deductions are greater than the rental expense under the operating method.

culminating with the Tax Reform Act of 1986 document the role of ETRs in affecting corporations' tax burdens.

Tax reform has been discussed in the U.S. since the 1930s [McIntyre, 1984]. Calls for tax reform have arisen from the public's dissatisfaction with the tax system which is perceived as inequitable, inefficient, and replete with special interest loopholes. A factor cited as 'evidence' of the inequity and inefficiency of the tax code is the steady decline over three decades in the corporate share of the nation's tax burden (from 25 percent in the 1950s to just over six percent in 1983 [U.S. Congress, Joint Committee on Taxation, 1984, Table 6]). An important tool used to analyze this decline is corporate ETRs.

ETRs have been used as instruments in tax policy debates for quite some time. For example, the minimum tax provisions introduced by the Tax Reform Act of 1969 were based on claims that profitable corporations were able to use tax preferences to lower their ETRs.[10] The TRA of 1976 made the minimum tax provisions much stiffer, once again based on declining corporate ETRs.[11] Similarly, the relatively lower ETRs of mutual savings banks compared to commercial banks was the basis for the change in the bad debt reserve provisions in the TRA of

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[10]See Senate Report 91-552 on the Tax Reform Act of 1969.

[11]See the Joint Committee's Explanation of the Tax Reform Act of 1976.

1969.[12] ETRs also played a major role in the repeal of the statutory depletion allowance for oil companies.[13]

The 1980s, in particular, witnessed a proliferation of studies on corporate ETRs followed by extensive debates on their proper use and computation. ETR studies have been conducted by Congress (Joint Committee on Taxation), the government (U.S. Department of Treasury), a labor-funded public interest group (Citizens for Tax Justice), and academics (both economists and accountants), among others. These studies consistently show that there is significant cross-sectional and inter-temporal variation of ETRs between and within industries, with some firms seemingly paying little or nothing in income tax. These studies also show that ETRs have declined over time. The collective evidence of these studies provided much of the political stimulus for the largest corporate tax increase in history--an estimated $120 billion over five years--enacted by the Tax Reform Act of 1986.[14] Most of these studies generally compute ETR as the ratio of the taxes currently payable to pretax income.

Since 1973, the SEC's Accounting Series Release No. 149 (ASR 149) [SEC, 1973] has required corporations to disclose in financial statements the ETR indicated by the income statement (hereafter, 'reported ETR') and reconcile the difference between their reported ETR and the applicable statutory federal income

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[12]See the House Report 91-413 on the Tax Reform Act of 1969.

[13]See the *Wall Street Journal*, December 3, 1974, p.4, col.2.

[14]See, for example, Birnbaum and Murray [1987], Spooner [1986], and Fullerton [1986] for statements to this effect.

tax rate. Under ASR 149, the reported ETR is computed by dividing the income tax expense per books by the pretax income per books, where the income tax expense is the sum of the taxes currently payable and deferred taxes.

As discussed in chapter two, for most companies deferred taxes constitute a significant portion of each year's income tax expense. By excluding deferred taxes from the numerator, ETRs computed in studies such as the Joint Committee on Taxation or the Citizens for Tax Justice are much lower than the reported ETRs for most companies. For example, Citizens for Tax Justice computed Boeing's 1983 and 1984 ETR at -9.3 and -3.2 percent, respectively, whereas in its financial statements Boeing's reported ETRs (which included deferred taxes in their computation) were 25 and 31 percent for 1983 and 1984.

Given the publicity corporate ETRs have been receiving, firms were concerned about the exclusion of deferred taxes in their computation. There is some evidence of this concern in firms' responses to the Citizens for Tax Justice's study. For example, AT&T issued a statement saying "... this group's studies ... are flawed. They misread financial statements and *fail to take into account deferred taxes* (emphasis supplied)."[15] Union Pacific responded that "... (the) whole study is a pile of bunk."[16] Finally, Egger [1985, pp. 956-958], an economist for the

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[15]The statement appeared in the *Daily Tax Reporter* (Washington D.C.: Bureau of National Affairs, July 18, 1986), No. 138, p. G-3.

[16]Statement of John R. Mendenhall, vice president for taxes at Union Pacific, quoted in Birnbaum and Murray [1987, p. 12].

corporate-backed Institute for Research on the Economics of Taxation, analyzed the Citizens for Tax Justice study as follows:

> The first problem is with the report's measure of "effective tax rate." ... [T]here is nothing amusing about CTJ's ignoring rapidly accumulating deferred tax liabilities and its confusing the corporation's current payment with its total tax burden. ... A deferred tax is a *postponed* tax, not an excused tax. It is a liability, an obligation which must be paid sometime in the future. ... By dismissing rapidly rising corporate liabilities to pay future taxes but relying on the income concept that gives rise to them, CTJ produces a highly misleading, indeed meaningless, measure of corporate tax rates (emphasis in original).

Given the preceding discussion of the politicization of ETRs and the resulting wealth transfer from corporations, it can be argued that firms with low ETRs have incentives to minimize public antagonism. One way to do so is by focusing on their reported ETRs and adopting accounting procedures that increase their reported ETR. The choice between comprehensive and partial tax allocation with respect to the indefinitely deferred portion of DISC earnings provided one such opportunity. Because comprehensive allocation relative to partial allocation results in higher income tax expense, thus a higher reported ETR, it can be argued that firms with lower ETRs are more likely to adopt comprehensive allocation, i.e., a negative relationship between ETRs and comprehensive allocation is possible.

The above discussion suggests that firms' accounting method choice is related to their ETR but because of the competing arguments presented above, the direction of this relationship is not specified. Formally,

H_6 : Ceteris paribus, firms' choice between comprehensive and partial allocation is related to their effective tax rate.

The political cost hypotheses formulated above also warrant further discussion. First, as Holthausen and Leftwich [1983, p. 88] mention, "[t]he causal link between political visibility and accounting numbers is more tentative than any of the other causal links in the economic consequences literature." This is because the linkage is not based on explicit contracts, such as loan agreements and compensation contracts, between the firm and the other parties in the political process (politicians, voters, etc.).

Second, as Ball and Foster [1982] point out, there are construct validity problems associated with the use of size as a proxy for political costs. Size has been used to operationalize many seemingly different and competing constructs, such as competitive advantage, information production costs, management ability and advice, and political costs. In view of this, they caution against making inferences if the size variable is found to be statistically significant, unless it can be shown that "an inference from firm size to political costs is a credible one" in the context of this study [Ball and Foster, 1982, p. 191]. Finally, size could be a proxy for omitted variables such as industry membership (e.g., the oil industry in the 1970s).

Third, the ability of effective tax rates to proxy for political costs has been shown to vary across time and with industry classification [Zimmerman, 1983]. It is possible that one of the two arguments put forth above may dominate over the other in the time period covered by the study.

4.4 The Auditor Hypothesis

The preceding hypotheses are based on contracting and political cost arguments with a focus on how the economic consequences of those costs on managers, stockholders, and bondholders affect the firm's choice of accounting methods. However, there are other parties, such as auditors, that also are involved in the firm's financial reporting decisions and their preferences may affect the firm's choice of accounting methods. Most prior accounting method choice studies have ignored the role of these other parties.

Auditors frequently are observed lobbying on proposed standards. Their preference for certain accounting methods over others may exist for a variety of reasons. Watts and Zimmerman [1986, pp. 312-327] suggest two such reasons. First, assuming wealth maximization, auditors are likely to support standards that increase accounting complexity because that will increase their audit fees.[17] Second, as indicated previously, because accounting standards can impose costs on firms, the standard setting process provides an opportunity for auditors to provide another service to their clients, namely lobbying. Thus, auditors may lobby for standards that increase their clients' wealth (and thereby the auditors' wealth).

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[17]Simunic [1980] provides indirect empirical support for this proposition by observing a positive correlation between audit fees and accounting complexity. Complexity is measured in terms of the extent of the client's decentralization (the number of subsidiaries) and diversification (number of 2-digit SIC codes the auditee operates in and the ratio of the auditee's foreign assets to total assets). It is possible that this positive relationship may not necessarily hold in the 1980's and later years because the intense competition for audit services has placed greater burden on audit firms to cut costs and reduce their fees.

Thornton [1986] advances the sunk cost argument according to which auditing firms support (lobby for) a particular accounting standard because of the expertise developed in that area and their desire to capitalize on the sunk costs incurred in developing the expertise.

The preceding discussion only suggests why auditors may lobby for accounting standards. Although presently strong theoretical arguments do not exist for why preferences of auditors may influence their clients' choice of accounting methods, several factors are likely. It is possible that when dealing with a complex standard, such as that of accounting for income taxes, firms may defer to their auditor's expertise and advice. This may reduce the cost of implementation of the standard for the firm. It also is possible that where managers are indifferent to the choice of accounting methods, they may go along with the auditor's stated preference for a particular accounting method [Trombley, 1989].

As discussed before, the tax allocation issue was extremely controversial. Circumstantial evidence suggests that auditing firms had strong opinions on the extent of allocation they believed was appropriate. Opinion among the big-8 auditing firms appeared to be polarized between Price Waterhouse (PW) on the one hand and Arthur Andersen (AA) on the other. Whereas PW supported partial allocation, AA favored comprehensive allocation.

PW's opinion was based on a study of 100 of its large client-corporations. The study entitled *Is Generally Accepted Accounting for Income Taxes Possibly*

Misleading Investors? was widely quoted in the financial press[18] and in comment letters by other audit firms and corporations to the APB.[19] AA's strong support for comprehensive allocation was well known. This support was expressed in journal articles, letters to the APB, and in the pivotal role played by AA on the APB.[20] In view of this evidence, the following hypotheses are proposed:

H_{7a}: Ceteris paribus, Arthur Andersen's clients are more likely to follow comprehensive allocation.

H_{7b}: Ceteris paribus, Price Waterhouse's clients are more likely to follow partial allocation.

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[18]For example, condensed versions of the study were published in *The Wall Street Journal* (July 21, 1967) and the *Financial Executive* (September 1967, pp. 70-75).

[19]Unlike the comment letters to the FASB, comment letters on exposure drafts of APB Opinions are not systematically housed anywhere. After making several personal contacts with the then members of the APB and others involved in the accounting for income taxes controversy, the comment letters on APB 11 were traced to the Chicago office of Arthur Andersen. I gratefully acknowledge their allowing me access to those files.

[20]Based on anecdotal evidence it appears that Mr. George Catlett, then partner of Arthur Andersen, was intensely involved in the accounting for income taxes debate. This was borne out by a selected reading of several thousand pages of letters and inter-office memoranda between AA personnel and Mr. Catlett that were found in the files of Arthur Andersen.

Chapter Five

EXPERIMENTAL DESIGN AND SAMPLE SELECTION

The purpose of this chapter is to describe the empirical procedures employed to test the DISC accounting method choice hypotheses developed in the previous chapter. First, an overview of the experimental design used to conduct the study is provided; second, the sample selection procedures used to identify the DISC firms are described; third, the variables of interest in the study are defined and measurement issues affecting them are discussed; and finally, the statistical tests used to analyze the data are presented.

5.1 Experimental Design

The empirical analyses in this study are performed in a cross-sectional framework by comparing firms using different accounting methods for their indefinitely deferred DISC earnings. The type of experiment conducted here is generally referred to as 'quasi-experimental', and the test design employed is a 'passive observational method' (see Cook and Campbell [1979]). In an ideal experiment, subjects (firms) would be randomly assigned to treatment and control groups (i.e., different accounting methods in an accounting method choice study). In this study, as in most empirical accounting research involving accounting method choice studies, firms self-select into either group, rendering random assignment impossible; hence the label 'quasi-experimental'. Further, because observations are

taken and variables measured as they occur without any experimental intervention, the design is considered as one involving passive observation.

Before the formal model and the statistical tests used in this study are presented, the sample selection procedures followed to identify the sample firms are described.

5.2 Sample Selection and Data

Table 5.1 summarizes the sample selection procedure followed in this study and described below. Firms with DISCs first were identified from the 1972, 1973, and 1974 annual report files of the National Automated Accounting Research System (NAARS) database.[1] Since DISCs first became available for tax years beginning January 1, 1972, the 1972 file was the appropriate starting point. The search was limited to three years so that the study period was contained in one tax regime[2] and because of data collection costs.[3] After eliminating companies with

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[1]The NAARS database, jointly developed by the AICPA and Mead Data Central Corp., contains the complete financial portion of the annual reports of over 3,600 (3,300 in 1972) publicly traded companies including most Fortune 1,000 companies, those listed on the NYSE and AMEX, and O-T-C companies indicated by the Federal Reserve Board to be on the margin.

The keywords used to identify the sample firms were 'DISC', 'D.I.S.C.', and 'Domestic International Sales Corporation'.

[2]See chapter two, section 2.2.3 for an elaboration on this issue.

[3]NAARS only makes available online only the last five years' annual report files. Special charges have to be paid for accessing each file not online for each day of use.

Table 5.1

SAMPLE SELECTION

Firms with DISCs identified from NAARS	491	firms
Less: Firms not on the Annual COMPUSTAT (Industrial or Research) files	(142)	
Less: Firms for which DISC accounting method not determinable[a]	(29)	
Final Sample[b]	320	firms

[a]Sample firms are categorized as comprehensive allocators and partial allocators based on the extent to which they provided taxes on their indefinitely deferred DISC earnings (see section 5.2 for details).

[b]See Appendix B for a list of the firms.

irrelevant references to DISCs (e.g., 'computer discs', 'laser discs', etc.)[4] and companies with DISCs in multiple years (i.e., firms that appeared on more than one NAARS file), 491 companies were identified as having a DISC(s) in at least one of the three years examined.

A potential problem with any keyword search is the possibility that the keywords employed may not identify all qualifying firms on the database. This may seem especially likely in this study, given the number of income tax returns filed by DISCs during 1972-74 (see Table 2.1).[5] One explanation for the large number of DISC tax returns relative to the sample size in this study is that several of the sample firms established more than one DISC and each DISC was required to file a separate tax return.[6] Another explanation for the discrepancy is that a large number of tax returns were filed by DISCs, the majority stockholders of which were

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[4]Although an exact count of such references was not maintained, the number was very small.

[5]I.R.C., § 6011(c)(2) requires a DISC to file an income tax return even though it is a non-taxable entity.

[6]For example, it is stated in Macmillan, Inc.'s fiscal 1973 financial statements that "[t]he Company has *several* Domestic International Sales Corporations (DISC) for the distribution of certain products to overseas markets" (Note 20; emphasis supplied). Other sample firms making similar disclosures include Great Northern Nekoosa Corp., Outboard Marine Corp., TRE Corp., Universal Corp., and VSI Corp. It is possible that these firms may have adopted a different accounting method (tax allocation policy) for each DISC. However, no statement to that effect was made by any of the sample firms; hence, the use of different accounting methods for each DISC is considered unlikely.

either small corporations or noncorporate entities.[7] Given the sample selection procedure adopted in this study, it is unlikely that such DISCs would be included. However, in an attempt to assure that the keyword search did not result in the omission of significantly material DISCs, the 1972 annual reports and 10K's of 30 companies randomly selected from the Fortune 100 corporations, not already included in the sample, were examined.[8] None of the companies examined made any disclosure regarding a DISC.

Because financial data was required for the study and initial identification of the sample itself was costly, firms not listed on Standard and Poor's annual COMPUSTAT tapes were deleted to minimize further data collection costs. This requirement resulted in the deletion of 142 firms. The use of current COMPUSTAT tapes to obtain early 1970's financial data in conjunction with old NAARS files for identification of the initial sample could result in a failure to obtain a match, either if firms changed names or underwent reorganizations, bankruptcy, etc. To avoid these problems, two procedures were followed. First,

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[7]Of the total number of DISC tax returns shown in Table 2.1, the proportion filed by such entities was about 65% in 1972, 58% in 1973, and 66% in 1974 [IRS, 1980]. For this calculation, a corporation was considered 'small' if it had assets under $5 million in 1972 or 1973, and under $10 million in 1974. These amounts roughly correspond to the minimum total assets of the sample firms in this study.

[8]The companies were selected from the 500 largest industrial corporations ranked on the basis of sales in 1972 [*Fortune*, May 1973]. Of the 30 companies, information was available on 24.

This procedure was believed to be appropriate because Treasury studies show that "large U.S. corporations with DISC subsidiaries were the primary beneficiaries of the DISC provisions" [Hartzok, 1980], which implies that larger firms are more likely to have a DISC than smaller firms.

MOODY'S Industrial manuals were consulted for name changes because COMPUSTAT does not systematically maintain such information on its firms.[9] Second, the annual COMPUSTAT *Research* file was used in addition to the other Industrial files so as to include firms deleted from those other files due to acquisition/merger, bankruptcy, liquidation, etc.[10]

Next, the annual reports of the remaining firms were analyzed to determine the extent to which they provided taxes on the indefinitely deferred DISC income. Twenty-nine firms were deleted because their disclosures were inadequate for determining their DISC accounting method. The final sample consisted of 320 firms. These are listed in Appendix B together with their 4-digit SIC code, exchange listing, COMPUSTAT file listing, CUSIP number, auditor, DISC-year (discussed in section 5.4.4), and the DISC accounting method (discussed in the next section).

Descriptive data on the distribution of various financial variables for the sample firms is presented in Table 5.2. All figures are based on fiscal 1971 data

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[9]The 1979 and 1988 editions of MOODY'S were examined. The two volumes cover all name changes that took place between 1969 and 1987 for companies listed in previous editions of MOODY'S. This procedure enabled the retention of 45 firms that would otherwise have been dropped. This procedure would not have captured name changes of firms included in COMPUSTAT but not covered by MOODY'S. However, the number of such occurrences should be small because MOODY'S is generally the more exhaustive of the two.

[10]The fact that 141 firms in the study (about 44 percent of the total sample) are on the Research file also reduces a potential 'survivorship bias' in the sample. However, a problem that could arise is if firms' DISC accounting method choice is systematically related to their COMPUSTAT listing. As discussed later, that does not appear to be the case.

Table 5.2

DESCRIPTIVE STATISTICS -- Financial Variables[a]

Variable[b]	Minimum	25%	Median	75%	Maximum	Mean	Std.Dev.	Skew	Kurt	N
TA	4.316	25.504	74.252	249.519	6887.800	295.081	636.799	5.32	41.49	307
LTD	0.000	2.081	11.836	49.036	983.461	63.854	145.934	3.77	15.54	307
TD	0.164	9.821	28.670	103.106	3627.700	140.294	336.855	5.51	42.69	307
COMEQ	2.115	12.787	39.449	140.020	2801.800	138.884	274.140	4.83	34.22	307
MVE	3.326	21.054	66.129	215.230	11405.500	291.275	843.637	8.78	103.07	304
DTX	0.000	0.000	0.411	2.698	265.152	5.543	18.766	9.65	123.01	306
SAL	0.000	30.128	97.157	329.520	9425.300	350.106	791.140	6.46	60.57	307
IBIT	-92.571	1.615	5.481	18.775	792.100	22.399	63.536	7.65	80.33	282
NI	-155.850	0.851	3.205	11.536	471.800	11.757	36.419	7.14	86.56	306
ROE	-1.353	0.050	0.089	0.122	0.294	0.080	0.109	-7.87	98.71	307
ROA	-0.241	0.021	0.037	0.057	0.201	0.040	0.040	-0.64	10.26	307

[a]In millions of dollars or as a percentage. Based on 1971 data for all firms.

[b]Variables with COMPUSTAT item numbers in parentheses are:

TA = Total assets (6)
LTD = Long-term debt (9)
TD = Total debt (9 + 5)
COMEQ = Common equity (60)
MVE = Market value of equity (25 * 24)
DTX = Deferred taxes - balance sheet (74).
SAL = Net sales (12)
IBIT = Income before income taxes (18 + 49 + 16)
NI = Net income (18 + 48)
ROE = Return on equity ((18 - 19) / 60)
ROA = Return on assets (18 / (6 + 7 - 8)

and dollar amounts are in millions. The median sample firm has \$74.3 in total assets, \$39.4 in book value of equity, \$66.1 in market capitalization, and \$97.2 in sales. The median firm's funded (long-term) debt is only \$11.8 whereas its total indebtedness is \$28.7. The median firm's income before taxes is \$5.5 whereas its net income is a low \$3.2. More than five percent of the sample firms have net losses. Overall, the sample appears to have a few very large firms (e.g., General Electric, Merck, Westinghouse Electric, RCA, Boeing, International Harvestor, and Polaroid) relative to the sample as the mean values of all variables mentioned above (except book value of equity) exceed that of even the firm in the 75th percentile (column Q3 in Table 5.2).

5.3 Variable Definitions and Measurement Issues

A model to empirically test the DISC accounting method choice hypotheses developed in the previous chapter may be expressed as follows:

$$y = X\beta + \epsilon \tag{5.1}$$

where y is a $(n \times 1)$ column vector of dependent variable observations (the DISC accounting method choice), X is a $(n \times k)$ matrix of independent variable observations, β is a $(k \times 1)$ column vector of unknown parameters, and ϵ is a $(n \times 1)$ column vector of errors.[11] The definition, measurement issues, and data

[11]The sources of error are 1) specification error arising from the omission of relevant variables in the model and 2) measurement error in the variables.

problems associated with the dependent variable are discussed first followed by the independent variables.

5.3.1 Classification of DISC Accounting Method -- The Dependent Variable

As discussed before, the DISC itself was a non-taxable entity, but its export-related profits were taxed to its stockholders when distributed or deemed distributed. DISC stockholders were typically other U.S. corporations (i.e., DISCs were formed as subsidiaries of these corporations, hereafter referred to as 'DISC firms') [IRS, 1986], that were statutorily permitted to indefinitely defer taxes on approximately 50 percent of the DISC's export profits. For financial reporting purposes, three possibilities existed with respect to the indefinitely deferred DISC income:[12]

1) the DISC firm provided for deferred taxes on *all* of the indefinitely deferred DISC earnings, or

2) the DISC firm did not provide for deferred taxes on *any* of the indefinitely deferred DISC earnings, or

3) the DISC firm provided deferred taxes on a *portion* (less than 100 percent) of the indefinitely deferred DISC earnings.

[12]Recall that these choices arise because the indefinite reversal criteria of APB 23 applies to the DISC transaction, thereby excluding it from the mandate of comprehensive allocation under APB 11 (see chapter two, section 2.1).

In general, firms followed either method 1) and are labeled **comprehensive allocators** or method 2) and are labeled **partial allocators.**[13]

The primary source of information for classifying the sample firms into comprehensive and partial allocators was the disclosures made in the tax footnotes to their financial statements. Tax footnote disclosures are mainly governed by Accounting Series Release No. 149 (ASR 149) [SEC, 1973] that requires SEC registrants to disclose in their financial statements 1) components of the income tax expense, 2) reasons for timing differences between book and tax reporting resulting in deferred taxes, and 3) a reconciliation between the effective income tax rate (ETR) indicated by the income statement and the statutory Federal income tax rate [SEC, 1973].[14] Under the ASR 149 requirements, the expected disclosure by comprehensive and partial allocators was as follows:

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[13]This conjecture is consistent with Marocco [1985] and disclosures made by the sample firms in this study. Although none of the sample firms specifically indicated that they followed method 3) above, that possibility exists since all firms did not clearly state that they were following method 1) or 2).

The label 'partial allocation' was preferred to 'flow through' simply because under APB 11 these firms had to provide deferred taxes on most other timing differences, i.e., they provided deferred taxes on some but not all timing differences which is the *partial allocation* approach, not *flow-through*.

[14]Note that ASR 149 was applicable to financial statements for periods ending on or after December 28, 1973. Hence, the detailed disclosures required by ASR 149 were not available for many of the sample firms for 1972, creating several problems that are discussed later.

Type of Firm	Nature of Book-tax Difference	Type of Disclosure
COMPREHENSIVE ALLOCATOR	Timing Difference	Source of Deferred Tax
PARTIAL ALLOCATOR	Permanent Difference	Adjustment in ETR Reconciliation

Actual disclosures by the sample firms, however, varied considerably, ranging from mere statements in the footnotes (e.g., GCA Corp. and Great Northern Nekoosa Corp.) to detailed dollar effects of the DISC accounting choice (e.g., Gardner-Denver Co., Banner Industries, Inc., and Reed Tool Co.). For illustrative purposes, examples of some types of DISC disclosures (specifically, of companies mentioned as examples above and later in the text) are provided in Appendix C.

One type of disclosure observed frequently deserves special mention because of its apparent contradiction with the expected disclosures. Several sample firms presented the DISC tax effect both as a timing difference (implying comprehensive allocation) and as a permanent difference (implying partial allocation). This apparent contradiction, however, disappears if the DISC had a different fiscal year than its parent corporation and the parent was a partial allocator.[15] In that case,

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[15]The Treasury estimated that "approximately 60 percent of all DISCs owned by U.S. corporations have accounting periods lagging slightly behind their parent's accounting period" [Hartzok, 1980]. Because the timing of the taxability of DISC income to the parent corporation depended on the DISC accounting period ending with or within the accounting period of the parent, the effect of lagging the DISC's accounting period was to postpone by as much as one year the inclusion of the DISC income, such as dividends, in the parent's gross income, thereby delaying the payment of taxes on that income.

deferred taxes would be provided on the currently taxable DISC earnings (the deemed distributions) and the parent's ETR would be reduced by the indefinitely deferred DISC earnings. Some sample firms explicitly stated that their DISC had a different fiscal year (e.g., Ionics, Inc.), whereas a different fiscal year for the DISC was inferred for the others (e.g., Reed Tool Co.). All of these firms were classified as partial allocators.

The DISC accounting method classification procedures discussed above resulted in 82 firms (about 26 percent of the sample) being classified as comprehensive allocators and 238 firms (about 74 percent of the sample) as partial allocators.

5.3.2 The Independent Variables

The variables hypothesized to explain firms' DISC accounting choice are the contracting cost variables (leverage, interest coverage, and dividend payout constraints, and extent of public debt), the political cost variables (effective tax rate, size, and capital intensity), and firms' auditor. Data to measure these variables were generally obtained from COMPUSTAT, annual reports, 10K's, and/or MOODY'S. In this section the definition of these variables and the manner in which various measurement issues were resolved are discussed. Unless otherwise stated, all computations are based on fiscal 1971 data.

Leverage Constraint (LEV). The LEV variable is used as a surrogate for proximity to debt covenant restrictions (the slack that exists in the firms' leverage constraint) and/or the probability of default on debt agreements. Since the

constraints often are specified in terms of net tangible assets or tangible net worth, two measures of LEV are used in this study and are computed as follows:

$$LEV = \begin{cases} LTD / COMEQ \\ TD / NTA \end{cases}$$

where:

LTD = long-term debt
COMEQ = book value of equity
TD = total debt
NTA = net tangible assets.

In addition to these two summary leverage measures, sensitivity of leverage to other definitions is examined. These other definitions and the results of the sensitivity analysis is discussed below.

Ideally, capturing the proximity to debt covenant restrictions would require computing measures using the actual limitations specified in the debt contracts. However, in the absence of easy accessibility to such information, it is assumed that the higher the LEV variable, the closer the firm is to violating its covenants.[16] Because the use of partial relative to comprehensive allocation results in higher net income thereby increasing the denominator of the LEV variable, firms concerned with violating their covenants are more likely to choose partial allocation (i.e., a positive relationship between LEV and partial allocation is hypothesized).

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[16]Support for this assumption is found in Press and Weintrop [1990] who found other measures of proximity to leverage constraints based on an actual examination of debt contracts to be significantly correlated with leverage. However, if LEV measures proximity to debt covenant constraints or default probability with error, parameter estimates are biased and inconsistent with the degree of bias and inconsistency related to the variance of the measurement error (the "errors-in-variables problem," see Pindyck and Rubinfeld [1981, p. 177]).

LEV has been defined in several different ways in prior accounting choice studies (see Table 5.3). Although a ratio of debt to net tangible assets or net worth is always used, differences arise in the specification of the numerator and thedenominator of the ratio. Some studies use total debt in the numerator (e.g., Zmijewski and Hagerman [1981]), whereas others use only long-term debt (e.g., Dhaliwal [1980]). Following Smith and Warner [1979], some studies adjust the numerator for capitalized lease obligations (e.g., Bowen et al. [1981]) and others adjust the numerator for preferred stock on the premise that it is a form of 'junior' debt (e.g., Johnson and Ramanan [1988]). LEV1 to LEV6 are based on previous studies and LEV7 is computed after adjusting for both capitalized lease obligations and preferred stock (see Panel A of Table 5.3).

Another conceivable adjustment in the specification of LEV, although not made in any previous accounting method choice study, could be for deferred taxes. Foster [1986, pp. 75-80], among others, notes the considerable confusion that prevails over the nature of deferred taxes which have been variously viewed as debt, equity, and neither debt nor equity. Adjusting LEV for deferred taxes is of particular interest in this study because the DISC accounting method choice directly impacts a firm's deferred tax balance. Following Leftwich's [1983] finding that some debt contracts include deferred taxes in debt, LEV8 to LEV11 also were computed for the sample firms (see Panel A of Table 5.3).

Variations in the denominator of LEV are less frequent with the central issue being whether to use a book value-based measure (net tangible assets or

Table 5.3

LEVERAGE MEASURES

Panel A: Book Value Measures

Variable	Definition[a]	Study Using the Definition
LEV1	LTD / BVE1	Lilien and Pastena [1982][b]
LEV1A	LTD / BVE2	Dhaliwal [1980]
LEV2	(LTD+CLO) / BVE1	El-Gazzar, et al. [1986][b]
LEV2A	(LTD+CLO) / BVE2	
LEV3	(LTD-CLO) /NTA	Bowen, et al. [1981][c]
LEV4	TD / NTA	Zmijewski and Hagerman [1981]
LEV5	(LTD+PREFEQ) / NTA	Johnson and Ramanan [1988]
LEV6	(LTD-PUB-CLO) / NTA	Daley and Vigeland [1983]
LEV7	(LTD+PREFEQ-CLO) / NTA	
LEV8	(LTD+DTX) / NTA	
LEV9	(LTD+DTX-CLO) / NTA	
LEV10	(LTD+DTX+PREFEQ) / NTA	
LEV11	(LTD+DTX+PREFEQ-CLO) / NTA	

Panel B: Market Value Measures

Variable	Definition[a]	Study Using the Definition
LEVM1	LTD / MVE	Lys [1984][d]
LEVM1A	LTD / (MVE+LTD)	Chow [1982]
LEVM2	(LTD+CLO) / MVE	
LEVM3	(LTD-CLO) / MVE	
LEVM4	TD / MVE	
LEVM5	(LTD+PREFEQ) / MVE	Collins, et al. [1981]
LEVM6	(LTD-PUB-CLO) / MVE	
LEVM7	(LTD+PREFEQ-CLO) / MVE	
LEVM8	(LTD+DTX) / MVE	
LEVM9	(LTD+DTX-CLO) / MVE	
LEVM10	(LTD+DTX+PREFEQ) / MVE	
LEVM11	(LTD+DTX+PREFEQ-CLO) / MVE	

[a]Variables with COMPUSTAT item numbers in parentheses are:

LTD = Long-term debt (9)
BVE1 = Common equity (60)
BVE2 = BVE1 + Pref stock (60+130)
NTA = Net tangible assets (6-33)
TD = Total debt (9+5)
PREFEQ = Preferred stock (130)
DTX = Deferred taxes - B/S (74)
PUB = Public debt
CLO = Capitalized lease obligations (84)
MVE = Market value of equity (25*24)

[b]It is not clear whether they used common equity or (common equity + preferred stock) as their definition of 'book value of equity'.

[c]They used the reciprocal of LEV3 in their study. For consistency with the other leverage measures, debt is included in the numerator.

[d]It is not clear whether he used total debt or long-term debt in the numerator.

tangible net worth per books) or the firm's market capitalization. As Table 5.3 shows, market value of equity is used in the denominator primarily in stock market studies of mandated accounting procedures. This specification is based on modern finance theory that generally regards market values as more pertinent than book values. The various market value-based leverage measures (labeled LEVM) used in prior studies and others constructed to mirror the book value-based measures are listed in Panel B of Table 5.3. No previous study documents the sensitivity of their results to alternative definitions of leverage.[17]

Descriptive statistics for the various LEV measures of the sample firms are presented in Table 5.4. LEV1 to LEV2A are virtually alike with median (mean) values ranging between 0.31 to 0.32 (0.37 to 0.45). Note that the maximum values of these leverage measures can exceed 1.0 because they use BVE in the denominator. That is indeed the case for some sample firms (maximum values > 2.8) and results in the higher mean values as compared to measures that use NTA in the denominator. LEV3 to LEV11 (except LEV4) all have fairly similar magnitudes and range. Their median (mean) values lie between 0.11 (0.13) for LEV6 to 0.19 (0.20) for LEV10. Note that LEV3 to LEV11 are comparable with each other since they all use net tangible assets as the denominator. Similarly the pairs LEV1 and LEV2 and LEV1A and LEV2A are comparable. LEV4 is different from all of the other LEV measures in that it considers the total

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[17]Press and Weintrop [1990] is an exception but they also do not consider all the definitions of leverage included here, primarily the measures that include deferred taxes.

Table 5.4

DESCRIPTIVE STATISTICS -- LEVERAGE MEASURES[a]

Panel A: Book Value Measures

Variable[b]	N	Mean	Std Dev	Median	Minimum	Maximum
LEV1	307	0.401	0.395	0.321	0.000	2.828
LEV1A	307	0.386	0.373	0.316	0.000	2.828
LEV2	296	0.424	0.455	0.319	0.000	3.756
LEV2A	296	0.407	0.418	0.312	0.000	3.027
LEV3	285	0.168	0.122	0.164	0.000	0.584
LEV4	296	0.432	0.169	0.432	0.010	0.955
LEV5	296	0.188	0.132	0.184	0.000	0.584
LEV6	272	0.128	0.105	0.107	0.000	0.481
LEV7	285	0.177	0.129	0.173	0.000	0.584
LEV8	295	0.194	0.132	0.189	0.000	0.609
LEV9	285	0.183	0.128	0.177	0.000	0.609
LEV10	295	0.203	0.138	0.196	0.000	0.611
LEV11	285	0.193	0.134	0.187	0.000	0.611

Panel B: Market Value Measures (maximum not reset)

Variable[b]	N	Mean	Std Dev	Median	Minimum	Maximum
LEVM1	304	0.365	0.663	0.179	0.000	7.302
LEVM1A	304	0.200	0.178	0.152	0.000	0.880
LEVM2	293	0.381	0.687	0.178	0.000	7.302
LEVM3	293	0.346	0.667	0.169	0.000	7.302
LEVM4	304	0.824	1.180	0.501	0.017	11.025
LEVM5	304	0.391	0.736	0.179	0.000	8.679
LEVM6	282	0.269	0.520	0.135	0.000	6.388
LEVM7	293	0.372	0.741	0.169	0.000	8.679
LEVM8	303	0.392	0.702	0.193	0.000	8.029
LEVM9	293	0.374	0.705	0.180	0.000	8.029
LEVM10	303	0.418	0.776	0.194	0.000	9.406
LEVM11	293	0.401	0.781	0.188	0.000	9.406

[a]Based on 1971 data for all firms.

[b]See Table 5.3 for the variable definitions.

indebtedness of the firm (current + long-term). Its distribution for the sample firms is remarkably well-behaved (median and mean = 0.43).

Pearson product-moment correlations among all the book value-based measures were also computed and are presented in Panel A of Table 5.5. The correlations generally exceed 0.8 (except for LEV4 and LEV6) and they are all statistically significant at less than the 0.001 level.[18]

From the above analysis it appears that for this sample the alternative specifications of book value-based leverage measures (LEV) are essentially similar to each other and insensitive to whether capitalized lease obligations, preferred stock, and/or deferred taxes are considered debt. Hence, for subsequent analysis, only two book value-based measures, LEV1 and LEV4, are retained. These measures were chosen because of their 1) simplicity, 2) ability to capture two quite different specifications of leverage, namely the use of long-term debt v. total indebtedness in the numerator and the use of net worth (the debt-equity concept) v. net tangible assets in the denominator, and 3) relatively lower correlations with each other.

Analysis of the market value-based leverage measures reveals generally higher mean values than the book value-based measures but the median values of the two groups are generally comparable (except LEV1, LEV1A, and LEV2). Note

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[18]Spearman rank correlations were also computed and are of similar magnitudes and highly significant statistically. In all subsequent correlation analysis as well, both Pearson and Spearman correlations were computed. However, only the Pearson correlation results will be presented unless the Spearman correlations are qualitatively different.

Table 5.5

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS -- LEVERAGE VARIABLES[a]

Panel A: Book Value Measures

Variable[b]	LEV1	LEV1A	LEV2	LEV2A	LEV3	LEV4	LEV5	LEV6	LEV7	LEV8	LEV9	LEV10	LEV11
LEV1	1.000[c]												
	307												
LEV1A	0.988	1.000											
	307	307											
LEV2	0.966	0.943	1.000										
	296	296	296										
LEV2A	0.971	0.971	0.987	1.000									
	296	296	296	296									
LEV3	0.832	0.850	0.724	0.760	1.000								
	285	285	285	285	285								
LEV4	0.758	0.763	0.719	0.736	0.699	1.000							
	296	296	285	285	285	296							
LEV5	0.875	0.867	0.824	0.833	0.952	0.702	1.000						
	296	296	285	285	285	296	296						
LEV6	0.699	0.729	0.606	0.649	0.815	0.588	0.759	1.000					
	272	272	272	272	272	272	272	272					
LEV7	0.835	0.834	0.734	0.751	0.982	0.689	0.974	0.784	1.000				
	285	285	285	285	285	285	285	272	285				
LEV8	0.859	0.870	0.808	0.835	0.958	0.687	0.973	0.781	0.945	1.000			
	295	295	285	285	285	295	295	272	285	295			
LEV9	0.820	0.838	0.718	0.754	0.989	0.675	0.947	0.807	0.971	0.973	1.000		
	285	285	285	285	285	285	285	272	285	285	285		
LEV10	0.860	0.854	0.813	0.823	0.942	0.678	0.991	0.753	0.962	0.985	0.956	1.000	
	295	295	285	285	285	295	295	272	285	295	285	295	
LEV11	0.825	0.824	0.729	0.747	0.974	0.667	0.969	0.779	0.990	0.962	0.983	0.976	1.000
	285	285	285	285	285	285	285	272	285	285	285	285	285

Table 5.5 (cont'd.)

Panel B: Market Value Measures (maximum values not reset)

Variable[b]	LEVM1	LEVM1A	LEVM2	LEVM3	LEVM4	LEVM5	LEVM6	LEVM7	LEVM8	LEVM9	LEVM10	LEVM11
LEVM1	1.000[c]											
	304											
LEVM1A	0.782	1.000										
	304	304										
LEVM2	0.993	0.796	1.000									
	293	293	293									
LEVM3	0.993	0.759	0.973	1.000								
	293	293	293	293								
LEVM4	0.914	0.757	0.912	0.905	1.000							
	304	304	293	293	304							
LEVM5	0.993	0.765	0.987	0.986	0.908	1.000						
	304	304	293	293	304	304						
LEVM6	0.924	0.717	0.906	0.930	0.857	0.890	1.000					
	282	282	282	282	282	282	282					
LEVM7	0.987	0.744	0.969	0.993	0.900	0.994	0.896	1.000				
	293	293	293	293	293	293	282	293				
LEVM8	0.997	0.782	0.991	0.990	0.907	0.993	0.913	0.987	1.000			
	303	303	293	293	303	303	282	293	303			
LEVM9	0.992	0.761	0.974	0.997	0.900	0.987	0.920	0.993	0.993	1.000		
	293	293	293	293	293	293	282	293	293	293		
LEVM10	0.990	0.764	0.984	0.982	0.900	0.998	0.881	0.992	0.994	0.988	1.000	
	303	303	293	293	303	303	282	293	303	293	303	
LEVM11	0.985	0.746	0.968	0.989	0.894	0.993	0.887	0.998	0.989	0.993	0.995	1.000
	293	293	293	293	293	293	282	293	293	293	293	293

[a]Based on 1971 data for all firms.

[b]See Table 5.3 for the variable definitions.

[c]Numbers in the first line are the correlation coefficients, in the second line are the number of observations. The null hypothesis of zero correlation between the row variable and the column variable is rejected in each case at the .0001 level.

that because all the market value-based leverage measures (LEVM) were defined using a debt-equity concept, their values need not lie between 0 and 1. The LEVM measures (except LEVM1A) for some sample firms indeed exceed 1.0 causing them to be positively skewed. Pearson product-moment correlations among these measures generally exceed 0.9 (except for LEVM1A) and are statistically significant at less than the 0.001 level (see Panel B of Table 5.5).[19] As with the book value-based measures, it appears that for this sample that the various market value-based leverage measures are essentially similar.

Although, for comparative purposes, the subsequent analysis also was performed using LEVM1A, those results are not emphasized because the use of market value-based leverage measures in a voluntary accounting method choice study is generally questionable, given that debt targets are set in terms of book values rather than market values (e.g., Smith and Warner [1979]; *Commentaries* [American Bar Foundation, 1971]).[20]

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[19]LEVM measures were also computed by resetting values greater than five to five. This reduced the skewness and the resulting means were lower but there was no change in the correlations.

[20]Myers [1977] explains theoretically why the use of book rather than market values in setting target debt ratios "makes sense." Following Miller and Modigliani, the market value of a firm can be viewed as consisting of 1) the present value of the assets in place and 2) the present value of future growth opportunities. Because a significant part of many firms' market values are accounted for by the present value of future growth opportunities, Myers argues that a greater proportion of debt will be supported by assets in place. Hence the use of book values in lending agreements.

Interest Coverage (INTCOV). As discussed before, some debt contracts prohibit firms from issuing additional debt unless a minimum prescribed ratio between income and interest charges is maintained. The interest coverage ratio (INTCOV) is used as a proxy for this 'earnings test' and is computed here as follows:[21]

$$INTCOV = (IBEI + INT) / INT$$

where:

IBEI = income before extraordinary items and discontinued operations but after taxes and minority interest
INT = interest expense.

It is assumed that the lower the INTCOV, the more likely the firm is to violate its interest coverage constraint. Because the use of partial relative to comprehensive allocation results in higher income after taxes, firms concerned with violating their interest constraints are more likely to adopt partial allocation. That is, a negative relationship between INTCOV and partial allocation method choice is hypothesized.

Firms with negative INTCOV (primarily because of negative IBEI) were reset to zero. Three firms with INTCOV greater than 100 were reset to 100. In addition, INTCOV of firms with zero INT (10 firms) was reset to 100 provided IBEI was positive (nine of the above 10 firms).[22] The recoding procedures adopted

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[21]The definition of INTCOV is similar to that employed in prior research (e.g., Bowen et al. [1981]) and is the after-tax definition of interest coverage in COMPUSTAT.

[22]These procedures are similar to those employed in prior accounting research (e.g., Daley and Vigeland [1983]; Shevlin [1987]; Wong [1988]).

here substantially reduced the skewness of the distribution (from 13.71 to 3.45), although it still remains positively skewed (median = 3.58; mean = 10.89). Sensitivity of the results to the recoding procedures was examined and is reported later.

Dividend Constraint (DCOV). As discussed before, restrictions on dividend payments are placed on firms in terms of an inventory of payable funds. Unlike the use of LEV as a proxy variable for closeness to debt covenant restrictions, a more direct test of the nearness to possible dividend covenant violations was motivated by Smith and Warner [1979, pp. 131-136] and is computed here as follows:

DCOV = CDIV / URE

where:

CDIV = common dividends
URE = unrestricted retained earnings.

URE represents the maximum amount of dividends that a company can pay its shareholders without violating its most restrictive (debt) covenants. As Bowen et al. [1981, p. 165] point out, "[i]ntuitively, the inverse of the dividend constraint measure (DCOV) is the number of years that the current level of dividends can be paid out of the current allowable dividend pool." In other words, the higher the DCOV ratio, the more likely the firm is to violate the dividend constraint. Because the use of partial relative to comprehensive allocation results in higher net income, thereby increasing the denominator of DCOV, a positive relationship between DCOV and partial allocation method choice is hypothesized. However, to increase

the power of the test, data on the existence of dividend constraints was also collected and appropriate coding procedures for DCOV was used as discussed below.

Data for URE was hand-collected from MOODY'S and verified from annual reports and 10K's where possible.[23] For the 15 firms with zero URE, DCOV was coded three, a value greater than the maximum DCOV value of any of the sample firms with positive URE (their DCOV was 2.89). For the 77 firms with no dividend restrictions mentioned, DCOV was coded zero.[24] If these firms are not included, the sample size drops to only 166 firms. For the 52 firms with a dividend restriction mentioned but a measure of URE not available, two procedures were followed: 1) the firms were omitted from the tests (DCOV1), and 2) the firms were included with their dividend constraint measure computed by substituting retained earnings (RE) for URE if RE was positive or coding it three if RE was zero or negative (DCOV2).[25]

The median value of DCOV1 (DCOV2) is a low 0.06 (0.05) whereas the mean is 0.39 (0.33). Since the distributions of DCOV1 and DCOV2 are virtually similar, primarily DCOV2 is used in the subsequent tests as it results in a higher sample size.

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[23]The earliest year for which URE data is available on COMPUSTAT is 1974.

[24]The assumption here is that either there is no restriction or if one exists it is immaterial. In either case coding DCOV zero is appropriate.

[25]The recoding procedure used here is similar to prior research (e.g., Bowen et al. [1981]).

Public Debt (PLEV). As discussed before, because of differing renegotiation costs, a separate leverage constraint variable was computed for the extent of public debt in the firm's capital structure as follows:

PLEV = PUB / NTA

where:

PUB = public debt
NTA = net tangible assets.

Data for PUB was hand-collected from MOODY'S and verified from annual reports and 10K's where possible. Over 68 percent of the sample firms had either zero or immaterial amounts of PUB. This motivated the use of a dummy variable (PLEVDUM) which was coded one if the firms had positive PUB and zero otherwise. Both PLEV and PLEVDUM were used in the subsequent analysis but the results were insensitive to the definition used.

As with the LEV variable, a positive relationship between PLEV and partial allocation method choice is hypothesized because the larger the PLEV ratio, the higher are the renegotiation costs a firm is likely to incur if it is in violation of its covenants.

Firm Size (SIZE). In most accounting research typically net sales or total assets are used as measures of firm size. However, Watts and Zimmerman [1986, p. 239] argue that "a better proxy for the negative/positive wealth transfers is a firm's accounting earnings instead of firm size (total sales or assets)." In this study, total assets, sales, net income as well as market and book value of equity were used as measures of firm size.

Descriptive data for these SIZE measures reveals that they are all highly skewed (see Table 5.2). Logarithmic transformations were made resulting in substantially reduced skewness levels. As expected, all of these SIZE measures are very similar, with the Pearson product-moment correlations exceeding 0.7 (0.8 when transformed, see Table 5.6). Hence, in the subsequent analysis only LSAL is used to proxy firm size. For sensitivity purposes, results using LTA and LNI were also obtained and are discussed later.

Effective Tax Rate (ETR). As discussed before, choice of the DISC accounting method affects the firm's reported ETR in its financial statements which is generally computed as follows:

$$ETR = TOTTX / IBIT$$

where:

TOTTX = total income tax expense per books
IBIT = net operating income before income taxes, minority interest, and extraordinary items (i.e., IBEI + MI + TOTTX).[26]

Henceforth, this measure of effective tax rate is referred to as ETR1. In addition, two other ETR measures also were computed as follows:

$$ETR2 = [TOTTX - (DTX_t - DTX_{t-1})] / IBIT$$

$$ETR3 = [TOTTX - (DTX_t - DTX_{t-1})] / [IBIT - (DTX_t - DTX_{t-1}) \div 0.48]$$

where:

DTX_t = balance sheet deferred tax amount in year t.

ETR2 corresponds to the effective tax rate measure used in studies such as the CTJ and JCT. This measure removes the current portion of deferred taxes from

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[26]This is also the COMPUSTAT definition of pre-tax income.

Table 5.6

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS -- SIZE VARIABLES[a]

Panel A: Raw Measures

Variable[b]	TA	COMEQ	MVE	SAL	NI
TA	1.000[c]				
	307				
COMEQ	0.970	1.000			
	307	307			
MVE	0.814	0.841	1.000		
	304	304	304		
SAL	0.966	0.933	0.815	1.000	
	307	307	304	307	
NI	0.716	0.777	0.846	0.724	1.000
	306	306	303	306	306

Panel B: Logarithmic Measures

Variable[b]	LTA	LCOMEQ	LMVE	LSAL	LNI
LTA	1.000[c]				
	307				
LCOMEQ	0.977	1.000			
	307	307			
LMVE	0.848	0.892	1.000		
	304	304	304		
LSAL	0.970	0.944	0.816	1.000	
	306	306	303	306	
LNI	0.883	0.905	0.916	0.877	1.000
	277	277	274	277	277

[a]Based on 1971 data for all firms.

[b]See Table 5.2 for the variable definitions.

[c]Numbers in the first line are the correlation coefficients and in the second line are the number of observations. The null hypothesis of zero correlation between the row variable and the column variable is rejected in each case at the .0001 level.

the tax expense amount, thus leaving only taxes currently payable in the numerator. ETR3 is an attempt to derive the firm's effective tax rate using its taxable income. However, given that we do not have access to individual firms' tax returns, taxableincome is approximated from financial statements by making an adjustment for the change in the grossed up amount of deferred taxes in the denominator.[27] It should be pointed out that ETR2 and ETR3 are not affected by the DISC accounting method choice.

Because IBIT is not available on the 135-item COMPUSTAT tapes, it was estimated as above. In addition to the 13 firms with missing IBEI data, 25 firms had missing data for MI. For these firms, MI was coded zero.[28] However, all three distributions are highly skewed--ETR1 and ETR2 are positively skewed, whereas ETR3 is negatively skewed. The various adjustments made to 'improve' the distributions and the sensitivity of the results to those adjustments is reported later.

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[27]The following example is presented to clarify the rationale for the adjustments. Suppose for a given year a firm's book income before taxes is $100, its taxable income is $60, and the maximum statutory tax rate is 48 percent. Then $48 ($100 × 0.48) is the income tax expense per books, whereas $29 ($60 × 0.48) is the tax currently payable per the tax return. The difference between the two, $19 ($48 − $29), is the amount of taxes deferred. Given the firm's book income and tax expense, its taxable income may be approximated thus: [100 − (19÷0.48)] = $60.

Note that this is a highly simplified example. In reality, the firm's actual marginal tax rate must be used. In addition, there are several other problems that arise when computing taxable income from financial statements (e.g., Wheeler and Outslay [1986]).

[28]Excluding these firms made no difference in the distributions of the three ETR measures. This was not unexpected because over 95 percent of the sample firms have less than $0.5 million in minority interest, with over 75 percent having zero MI.

Auditor (AUD). As discussed before, firms' auditors are hypothesized to affect the DISC accounting choice. Because data on the AUD variable is qualitative, dummy variables are employed and were coded as follows:

$$\text{AUDDUM1} = \begin{cases} 1 \text{ if auditor is AA} \\ 0 \text{ otherwise} \end{cases}$$

$$\text{AUDDUM2} = \begin{cases} 1 \text{ if auditor is PW} \\ 0 \text{ otherwise} \end{cases}$$

where:

AA = Arthur Andersen
PW = Price Waterhouse.

Two dummy variables were used instead of one categorical variable because the predicted effect on the DISC accounting method choice is in opposite directions for these variables--AUDDUM1 is expected to be negatively correlated with partial allocation whereas AUDDUM2 is expected to have a positive correlation.

AUDDUM1 has a mean of 0.216 implying that 21.6 percent of the sample firms had Arthur Andersen as their auditor. Similarly, 9.7 percent of the sample firms were audited by Price Waterhouse. Data on the AUD variable was obtained from NAARS and MOODY'S and verified with their annual reports and 10K's where possible. For descriptive purposes, a breakdown of the sample firms' auditors by the DISC accounting method choice is provided in Table 5.7. Almost 90 percent of the sample firms had a 'big-8' auditor. The remaining firms (about 11 percent) were grouped together under 'other'.

Table 5.7

AUDITOR ANALYSIS[a]

Auditor[b]	DISC Acct. Method[c] C	P	Total	Percent Total
AA	24 (34.78)[d]	45 (65.22)	69	21.56
AY	7 (20.59)	27 (79.41)	34	10.63
CL	8 (26.67)	22 (73.33)	30	9.38
DH	8 (27.59)	21 (72.41)	29	9.06
EE	13 (28.89)	32 (71.11)	45	14.06
PM	12 (32.43)	25 (67.57)	37	11.56
PW	2 (6.45)	29 (93.55)	31	9.69
TR	2 (20.00)	8 (80.00)	10	3.13
Other	6 (17.14)	29 (82.86)	35	10.94
Total	82 (25.63)	238 (74.38)	320	100.00

[a]Based on 1971 data for all firms.

[b]where:

AA=Arthur Andersen & Co
AY=Arthur Young
CL=Coopers & Lybrand (also Lybrand, Ross Bros. & Montgomery)
DH=Deloitte Haskins & Sells (also Haskins & Sells)
EE=Ernst & Ernst
PM=Peat, Marwick, Mitchell & Co
PW=Price Waterhouse & Co
TR=Touche Ross.

[b]C=comprehensive allocators, P=partial allocators.

[c]Row percentages in parentheses.

Definitions of the independent variables and descriptive statistics on their distributions are summarized in Table 5.8.

5.4 Within Sample Profile Analysis

Preliminary analysis was conducted to determine if the sample selection procedure resulted in different subsets of firms. Accordingly, the sample firms were classified by their 1) industry membership (SIC code), 2) stock exchange listing, 3) COMPUSTAT file listing, and 4) the year when the DISC was operational. The association between firms' DISC accounting method choice and these classification criteria was analyzed by means of the Pearson chi-square statistic that tests the null hypothesis of independence between the row and column variables in a contingency table. For large n, this statistic is distributed approximately as χ^2.

5.4.1 Industry Membership

Generally, the use of 4-digit SIC codes is considered desirable to analyze industry effects. However, the sample firms fell in 153 different 4-digit SIC classifications, making it virtually impossible to draw meaningful inferences.[29] However, for descriptive purposes, the sample firms' 4-digit SIC class and their DISC accounting method are presented in Appendix D.

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[29]Similarly, analysis by 2-digit SIC codes was not performed because the sample firms fell in 37 different 2-digit SIC categories.

Table 5.8

DESCRIPTIVE STATISTICS -- Independent Variables[a]

Variable[b]	Minimum	25%	Median	75%	Maximum	Mean	Std.Dev.	Skew	Kurt	N
LEV1	0.000	0.106	0.321	0.528	2.828	0.401	0.395	2.06	6.57	307
LEV4	0.010	0.322	0.432	0.537	0.955	0.431	0.169	0.29	0.03	296
LEVM1	0.000	0.053	0.179	0.434	5.000	0.352	0.550	4.86	34.32	304
PLEVDUM	0.000	0.000	0.000	1.000	1.000	0.319	0.467	0.78	-1.40	320
INTCOV	0.000	2.108	3.406	6.702	100.000	10.394	21.327	3.45	11.25	307
DCOV2	0.000	0.000	0.049	0.224	3.000	0.327	0.735	2.95	7.67	295
LSAL	1.027	3.427	4.583	5.799	9.151	4.670	1.542	0.23	-0.51	306
ETR1	-1.517	0.432	0.471	0.496	4.858	0.465	0.392	6.86	80.42	282
ETR2	-1.483	0.365	0.451	0.488	4.315	0.419	0.388	3.21	44.12	275
ETR3	-32.630	0.429	0.471	0.496	3.017	0.293	2.151	-13.91	206.07	275
AUDDUM1	0.000	0.000	0.000	0.000	1.000	0.216	0.412	1.39	-0.07	320
AUDDUM2	0.000	0.000	0.000	0.000	1.000	0.097	0.296	2.74	5.53	320

[a]Based on 1971 data for all firms.

[b]Variable definition with COMPUSTAT item numbers in parentheses where appropriate are:

LEV1 = LTD / COMEQ

LEV4 = TD / NTA

INTCOV = { (IBE1 + INT) / INT
0 if INTCOV < 0
100 if INTCOV >100

DCOV2 = { CDIV / URE
CDIV / RE if dividend restriction mentioned but URE not quantified
0 if no dividend restriction mentioned
3 if URE = 0

Table 5.8 (cont'd.)

PLEVDUM	=	{ if PUB > 0 ; 0 otherwise
ETR1	=	TOTTX / IBIT, where IBIT = IBEI + MI + TOTTX
ETR2	=	[TOTTX − (DTX_t − DTX_{t-1})] / IBIT
ETR3	=	[TOTTX − (DTX_t − DTX_{t-1})] / [IBIT − (DTX_t − DTX_{t-1}) ÷ 0.48]
AUDDUM1	=	{ 1 ifAUD=Arthur Andersen ; 0 otherwise
AUDDUM2	=	{ 1 If AUD =Price Waterhouse ; 0 otherwise

To analyze the association of industry membership with the DISC accounting method choice, the sample firms were classified by one-digit SIC codes.[30] As Panel A of Table 5.9 shows, industry #2 (non-durable manufacturing) and industry #3 (durable manufacturing) account for nearly 86 percent of the sample firms, which is not surprising given the nature of the DISC legislation (see chapter 2, section 2.2 for details). The null hypothesis of no association between sample firms' DISC accounting method choice and industry membership is not rejected (Pearson chi-square=11.34; p=0.12), but the test is weak because of low expected frequencies in many cells.[31] Hence, the analysis was repeated by combining industry #1, 4, 5, 6, 7, and 8 into one group ('other'), and a strong relationship between accounting method and industry membership was observed (Pearson chi-square=9.36; p=0.009 -- see Table 5.9, Panel B). For this reason, a control for industry membership is exercised in the subsequent analysis.

5.4.2 Exchange Listing

As Table 5.10 indicates, about 77 percent of the sample firms are listed on the NYSE, followed by 21.5 percent on the AMEX, with only 1.5 percent of the sample being OTC firms. The null hypothesis of no association between DISC accounting method and exchange listing was not rejected (Pearson chi-square=1.17;

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[30]Although this classification scheme is crude and unlikely to result in portfolios of entirely homogeneous firms, it is similar to that used in prior accounting research (e.g., Zimmerman [1983]).

[31]The χ^2 is a large sample test and its validity requires that expected frequency of each cell be at least five [Bhattacharyya and Johnson, 1977, pp. 424-433]. In Panel A of Table 5.2, 56 percent of the cells have expected frequencies less than five.

Table 5.9

INDUSTRY ANALYSIS[a]

Panel A: Sample Firms by One-digit SIC Codes

One-digit SIC code[b]	Industry name	DISC Acct. Method[c] C	P	Total	Percent Total
1	Extractive resources (mining, petroleum, construction)	3 (23.08)[d]	10 (76.92)	13	4.06
2	Non-durable manufacturing (food, textiles, paper, chemical)	24 (38.10)	39 (61.90)	63	19.69
3	Durable manufacturing (iron & steel, machinery, autos)	43 (20.38)	168 (79.62)	211	65.94
4	Communications & transportation (railroads, trucking, airlines)	2 (50.00)	2 (50.00)	4	1.25
5	Trade (wholesale and retail)	6 (35.29)	11 (64.71)	17	5.31
6	Financial services (banks, insurance, other)	0 (0.00)	1 (100.00)	1	0.31
7	Miscellaneous services (hotels, advertising, other)	3 (37.50)	5 (62.50)	8	2.50
8	Professional services (health, engineering, other)	1 (33.33)	2 (66.67)	3	0.94
	Total	82 (25.63)	238 (74.38)	320	100.00

Computed Chi-square = 11.342 (p = 0.124).

Table 5.9 (cont'd.)

Panel B: Manufacturing v. Other

Industry name (one-digit SIC code)[b]	DISC Acct. Method[c] C	P	Total	Percent Total
Manufacturing non-durables (2)	24 (20.38)[d]	39 (79.62)	63	19.69
Manufacturing durables (3)	43 (38.10)	168 (61.90)	211	65.94
Other (1, 4, 5, 6, 7, 8)	15 (32.61)	31 (67.39)	46	14.38
Total	82 25.63	238 74.38	320	100.00

Computed Chi-square = 9.364 (p = 0.009).

[a]Based on 1971 data for all firms.

[b]Included in Industry #1 is one firm with SIC code 900 (Zapata Corp., classified as a partial allocator). Included in Industry #2 are refineries (SIC code 29XX) which may be properly classified as industry #1 (extractive resources) firms. However, the sample firms do not include any refineries and so none were reclassified.

[c]C=comprehensive allocators, P=partial allocators.

[d]Row percentages in parentheses.

Table 5.10

SAMPLE FIRMS BY EXCHANGE LISTING

Exchange[a]	DISC Acct. Method[b] C	P	Total	Percent Total
AMEX	15 (21.74)[c]	54 (78.26)	69	21.56
NYSE	65 (26.42)	181 (73.58)	246	76.88
OTC	2 (40.00)	3 (60.00)	5	1.56
Total	82 25.63	238 74.38	320	100.00

Computed chi-square = 1.171 (p = 0.557).

[a]AMEX=American Stock Exchange, NYSE=New York Stock Exchange, OTC=Over-the-counter stocks.

[b]C=comprehensive allocators, P=partial allocators.

[c]Row percentages in parentheses.

p=0.56). This could, in part, be due to the small frequency of AMEX and OTC firms in the sample which, in turn, is primarily due to the COMPUSTAT listing requirement. Most of the 142 firms deleted because of that requirement were AMEX or OTC firms. However, there is no *a priori* reason to expect the DISC accounting method choice to be related to exchange listing other than if exchange listing surrogates for firm size.[32] As discussed before, firm size is hypothesized to influence the DISC accounting method choice, hence it is included as an explanatory variable in this study. Deletion of non-COMPUSTAT firms causes another inference problem: those firms' DISC accounting method choice could be systematically different from the sample firms; hence, inferences from this study may not be extrapolated to non-COMPUSTAT firms.[33]

5.4.3 COMPUSTAT Listing

As Table 5.11 indicates, the sample firms are almost evenly divided between the Industrial files (56 percent) and the Research file (44 percent). Firms on the Research file are those that did not 'survive' due to acquisition/merger, bankruptcy, liquidation, etc. However, there does not appear to be any relationship between

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[32]Prior research (e.g., Grant [1980]) has documented differential information content of annual earnings announcements between samples of OTC and NYSE firms on the premise that reduced levels of information are available for smaller firms (i.e., OTC firms).

[33]Again, there is no *a priori* reason for such a difference to exists other than firm size--firms not on COMPUSTAT are likely to be much smaller. However, even the inclusion of firm size as an explanatory variable is unlikely to compensate for this selection bias.

Table 5.11

SAMPLE FIRMS BY COMPUSTAT LISTING[a]

COMPUSTAT Listing[b]	DISC Acct. Method[c] C	P	Total	Percent Total
CI	46 (25.70)[d]	133 (74.30)	179	55.94
CR	36 (25.53)	105 (74.47)	141	44.06
Total	82 25.63	238 74.38	320 100.00	100.00

Computed Chi-square = 0.001 (p = 0.973).
Fisher's Exact Test (1-tail) p = 0.539
(2-tail) p = 1.000.[e]

[a]Based on 1971 data for all firms.

[b]where:

CI = Annual COMPUSTAT (Primary, Supplementary and Tertiary) *Industrial* files which cover approximately 2,400 companies.

CR = Annual COMPUSTAT *Research* file which covers approximately 1700 companies deleted from the Industrial files due to acquisition/merger, bankruptcy, liquidation, delisting, or inconsistent reporting.

[c]C=comprehensive allocators, P=partial allocators.

[d]Row percentages in parentheses.

[e]Fisher's exact test is based on an evaluation of the conditional probabilities assuming the marginal totals are fixed and yields the probability of observing a table that gives at least as much evidence of association as the one actually observed, given the null hypothesis is true.

the sample firms' DISC accounting method choice and their survivorship status (Pearson chi-square=0.001; p=0.97).

5.4.4 Year When DISC Operational ('DISC Year')

Ideally, in an accounting method choice study, the factors hypothesized to affect that choice should be examined prior to when the choice is exercised by the sample firms. This approach precludes the reduction and/or elimination of differences between firms hypothesized to be related to the accounting method choice decision, thereby allowing for more powerful tests. The implication for this study would be to use 1971 data, given that DISCs first became available on January 1, 1972. However, over 55 percent of the sample firms were identified from the 1973 and 1974 files of NAARS, indicating that all sample firms did not set up DISCs in 1972.[34] Alternatively it is possible that although some of these sample firms set up DISCs in 1972, disclosures in the annual reports were made later either because:

1) the DISC was not operational until later, or

2) although operational in 1972, the DISC was not disclosed in the annual report because ASR 149 was not in effect until December 1973, or because the ASR 149 requirements were not implemented, or

3) the DISC was not material until later.

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[34]The increase in the number of DISC tax returns from 1972 to 1973 and again from 1973 to 1974 (see Table 2.1) also provides support for this conjecture.

To investigate this issue further, annual reports and 10K's for the five year period beginning with fiscal 1972 of all sample firms listed on the NYSE were examined.[35] Unfortunately, there was no consistency in the nature and location of the DISC disclosures. In some cases, while the disclosure indicated that the DISC was *established* before the year first listed on NAARS, it was not clear that the DISC was also *operational* in that earlier year (e.g., AAR Corp.). The DISC year for such firms was assumed to be the year listed on NAARS. On the other hand, disclosures by some firms clearly indicated that the DISC was both established and operational in an earlier year (e.g., Reed Tool Co.), in which case, the firm's DISC year was recoded to that earlier year. Despite this additional check, 141 firms in the sample could have a DISC year earlier than the year indicated in Appendix B. Because of this uncertainty, the analysis for all firms was performed using:

1) fiscal 1971 data for all firms assuming that the DISC was set up and operational in 1972, and

2) data for the fiscal year immediately preceding the year in which the DISC was found (or assumed) to be operational.

As Table 5.12 shows, after recoding as above, 144 firms (45 percent of the sample) were determined to have their DISC year in 1972, 126 firms (about 39 percent) in 1973, and 50 firms (about 16 percent) in 1974. The null hypothesis of no association between the sample firms' DISC year and their DISC accounting

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[35]The search was limited to NYSE firms because of data availability. Further, the NYSE firms constitute nearly 77 percent of the total sample (see Table 5.10).

Table 5.12

SAMPLE FIRMS BY YEAR WHEN DISC OPERATIONAL

DISC Year[a]	DISC Acct. Method[b] C	P	Total	Percent Total
1972	20 (13.89)[c]	124 (86.11)	144	45.00
1973	40 (31.75)	86 (68.25)	126	39.38
1974	22 (44.00)	28 (56.00)	50	15.63
Total	82 (25.63)	238 (74.38)	320	100.00

Computed chi-square = 21.742 (p = 0.000).

[a]The year in which the DISC became (or was assumed to become) operational. This year does not always match the year when the firm was first listed on NAARS (see section 5.3 for details).

[b]C=comprehensive allocators, P=partial allocators.

[c]Row percentages in parentheses.

method is rejected at less than the 0.001 level (Pearson chi-square=21.47). The proportion of comprehensive allocators to partial allocators is about 1:6 in 1972, 1:2 in 1973, and almost 1:1 in 1974. This association motivates separate analysis by DISC year in addition to the analysis for the pooled sample.

The dramatically increasing proportion of comprehensive allocators relative to partial allocators also raised the possibility of firms switching accounting methods. The five-year search of the annual reports and 10K's of the sample firms on NYSE (discussed above), revealed that of the 246 NYSE firms examined, 10 switched accounting methods (nine from partial to comprehensive allocation and one from comprehensive to partial allocation).

5.5 Statistical Procedures

5.5.1 Univariate Analysis

As an initial step, univariate tests of the relationship between the accounting method choice and contracting and political costs variables were conducted using both the parametric Student's *t*-test and the non-parametric Wilcoxon rank-sum test.[36]

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[36]The Wilcoxon rank-sum test is equivalent to the Mann-Whitney U test. Both these tests are identical to the Kruskal-Wallis one-way analysis of variance test for comparing k treatments if k=2. See Bhattacharyya and Johnson [1977] and Conover [1980] for a further discussion of these tests.

The Student's *t*-statistic tests for the equality of means x_1 and x_2 between two independent normally distributed samples with n_1 and n_2 observations and is computed as follows:

$$t = (\bar{x}_1 - \bar{x}_2) / \sqrt{s_p^2(1/n_1 + 1/n_2)}$$

where s_p^2 is the pooled variance and computed as follows:

$$s_p^2 = \{(n_1-1)s_1^2 + (n_2-1)s_2^2\} / (n_1+n_2-2)$$

where s_1^2 and s_2^2 are the sample variances of the groups. Note that this t-statistic depends on the assumption that the population variances of the two groups, σ_1^2 and σ_2^2 are equal. A folded form of the *F*-statistic, F', is used to test the assumption of equal variances, where:

$$F' = (\text{larger of } s_1^2, s_2^2) / (\text{smaller of } s_1^2, s_2^2)$$

If the null hypothesis of equal variances is rejected at a two-tail probability level of .10 or less, then the following t-statistic is used:

$$t = (\bar{x}_1 - \bar{x}_2) / \sqrt{(s_1^2/n_1 + s_2^2/n_2)}$$

However, both specifications of the t-statistic assume that the underlying population distribution is approximately normal. Nonparametric procedures overcome the normality assumption by being 'distribution-free'. Because most variables used in the study are skewed (see Table 5.8) and the Kolmogorov-Smirnoff test for the null hypothesis of normality is rejected for most variables, the nonparametric Wilcoxon rank-sum test also is used. The test consists of ranking all observations in the combined sample and then determining the sum of ranks of the sample with the smaller size. The Wilcoxon rank-sum statistic tests the null

hypothesis that the two samples with n_1 and n_2 observations are drawn from an identical population. Because both n_1 and n_2 are large, the normal approximations to the rank-sum statistic is used and is computed as follows:

$$Z = \frac{W_1 - n_1(n_1 + n_2 + 1)/2}{\sqrt{n_1 n_2(n_1 + n_2 + 1) / 12}}$$

where W_1 denotes the rank-sum of the sample with n_1 observations.

However, the univariate analysis ignores correlations between the predictor (independent) variables. To the extent these correlations are significant, observed univariate differences must be interpreted with caution. This also motivates a multivariate regression approach which overcomes the above problem and enables examination of the joint explanatory power of the contracting and political costs variables. The main focus will be on the multivariate analysis.

5.5.2 Multivariate Analysis

Recall from equation (5.1) and the subsequent discussion that the complete model to be estimated in this study is

$$\begin{array}{lccccccc} y_i = b_0 + b_1 LEV_i + b_2 INTCOV_i + b_3 DCOV_i + b_4 PLEV_i + b_5 SIZE_i \\ \text{(Predicted sign)} \quad (+) \quad (-) \quad (+) \quad (+) \quad (-) \\ + b_6 ETR_i + b_7 AUDDUM1_i + b_8 AUDDUM2_i + u_i \\ (?) \quad (-) \quad (+) \end{array}$$

where:

y_i = 1 if the firm uses partial allocation, and zero otherwise, and LEV_i, $INTCOV_i$, $DCOV_i$, $PLEV_i$, $SIZE_i$, ETR_i, and $AUDDUM_i$ are the predictor variables for firm i corresponding to the contracting costs, political costs, and auditor hypotheses.

The dependent variable y (the DISC accounting method) is not continuous but represents a discrete choice between comprehensive and partial allocation.[37] The objective in models of this type is to predict the *likelihood* (probability) that a particular choice will be observed, given the factors hypothesized to affect that choice. The three common forms of the probability function most frequently used to estimate a model with a binary dependent variable are 1) the linear probability model, 2) the probit model, and 3) the logit model [Amemiya, 1981].

The *linear probability model* may be expressed in the usual regression framework as:

$$y_i = x_i\beta + \epsilon_i \tag{5.3}$$

with $E(\epsilon_i) = 0$. Here x_i is the $(1 \times k)$ vector of independent variables for sample observation i. The conditional expectation $E(y_i \mid x_i) = x_i\beta$ and can be interpreted as the probability that the event will occur given the x_i. The predicted value of y from the regression model, $\hat{y}_i = x_i\hat{\beta}$ then yields the estimated probability that the event will occur given the x_i. The major defect of the linear probability model is that $\hat{y}_i$ is not constrained to lie between 0 and 1 as a probability should. Although this defect can be corrected by defining $\hat{y}_i = 1$ if $\hat{y}_i > 1$ and $\hat{y}_i = 0$ if $\hat{y}_i < 0$, "the procedure produces unrealistic kinks at the truncation points" [Amemiya, 1981, p. 1486]. In addition, because y_i takes on only two values (0 or 1), the error term in equation (5.3), ϵ_i is not normally distributed and $Var(\epsilon_i) = E(y_i)[1 - E(y_i)]$. The

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[37]Models involving dependent variables specified in this manner are called 'discrete choice models', 'qualitative response models', or 'categorical models'.

heteroscedastic error term causes the OLS estimates of β to be inefficient. The inefficiency problem can be remedied by using weighted least squares. However, the problem remains that $E(y_i|x)$ can lie outside the admissible (0,1) interval.

The *probit* and *logit* are nonlinear models that overcome the major limitation of the linear probability model by using a cumulative probability function (an S-shaped curve) which is bounded in the interval (0,1) such that $0 \leq E(y_i|x) \leq 1$. The theoretical rationale for these two models is summarized below and is largely based on Maddala [1983, pp. 22-27]. Assume there is an underlying response variable y_i^* defined by the following relationship

$$y_i^* = x_i\beta + \epsilon_i \tag{5.4}$$

Instead of observing y_i^*, however, what is observed in practice is:

$$y = \begin{cases} 1 \text{ if } y_i^* > 0 \\ 0 \text{ otherwise} \end{cases} \tag{5.5}$$

From (5.4) and (5.5) we get

$$\begin{aligned} Prob(y_i = 1) &= Prob(\epsilon_i > x_i\beta) \\ &= 1 - F(-x_i\beta) \end{aligned}$$

where F is the cumulative distribution function for ϵ. Observed values of y may be viewed as realizations from a binomial process with probabilities given by (5.5) and varying from trial to trial depending on x_i. The likelihood function can then be expressed as

$$L = \prod_{y_i=0} F(-x_i\beta) \prod_{y_i=1} [1 - F(-x_i\beta)] \tag{5.6}$$

The functional form of F in (5.6) depends on the assumptions made about ϵ_i and provides the point of departure between the probit and the logit models.

In the probit model, ϵ_i are assumed to be independently normally distributed with mean 0 and variance σ^2 and

$$F(-x_i\beta) = \int_{-\infty}^{-x_i\beta/\sigma} \{1 / (2\pi)^{1/2}\} \exp(-t^2/2)dt \qquad (5.7)$$

In the logit model, the cumulative distribution of ϵ_i is the logistic and

$$F(-x_i\beta) = \frac{\exp(-x_i\beta)}{1 + \exp(-x_i\beta)} = \frac{1}{1 + \exp(x_i\beta)} \qquad (5.8)$$

Maximum likelihood estimates of β can be obtained by first substituting in (5.6) the assumed cumulative distribution of F, then simplifying the expression by taking logs, and then differentiating the log likelihood function with respect to β. The resulting equations being nonlinear in β have to be solved using an iterative procedure such as Newton-Raphson or the scoring method.

The choice between probit and logit should be based on theoretical grounds but "well-developed theory to determine the exact functional form [to be used] appears to be lacking" [Kmenta, 1986, p. 555]. However, in univariate dichotomous models, such as (5.2) estimated in this study, probit and logit usually give similar results except if the data is heavily concentrated in the tails [Amemiya, 1981]. The logit model is used in this study primarily because "... it represents a close approximation to the cumulative normal and is simpler to work with" [Kmenta, 1986, p. 555].

In addition to the logit analysis, OLS regression results are also presented despite the theoretical problems of OLS discussed before. This is primarily because Noreen [1988] provides simulation evidence demonstrating that OLS performs as well as probit for sample sizes of 50 or 100 when using accounting data typically used as explanatory variables in accounting choice studies.

Chapter Six

ANALYSIS OF RESULTS

This chapter presents the results of the tests conducted to examine the possible motivations for firms to choose between comprehensive and partial allocation of taxes with respect to the indefinitely deferred DISC income. Recall there are two sets of data collected--1971 data for all firms and data for the year in which the DISC became (was assumed to become) operational ('DISC-year' data). First, the results of the univariate analysis for the complete sample on both data sets is presented. Second, the cross-correlations between the independent variables are discussed. Third, the results of the multiple regression analysis the logit and OLS procedures are evaluated. Finally, sensitivity of the results to partitioning the sample by industry membership and DISC-year are examined.

6.1 Univariate Analysis

In this section univariate differences between the comprehensive and partial allocators for each of the explanatory variables hypothesized to affect firms' DISC accounting method choice are analyzed. The significance tests for differences are performed using both the parametric Student's *t*-test and the nonparametric Wilcoxon rank-sum test described earlier. The results of the analysis are summarized in Table 6.1.

Table 6.1

UNIVARIATE STATISTICS

		1971 Data					DISC-Year Data				
			Mean (Std. Dev.)		Statistic for Difference between Means			Mean (Std. Dev.)		Statistic for Difference between Means[c]	
Variable	Hypothesis	N	C	P	t	Z	N	C	P	t	Z
LEV 1	C < P	307	0.340 (0.338)	0.422 (0.412)	-1.75**	-1.64*	312	0.326 (0.294)	0.419 (0.406)	-2.19**	-1.63*
LEV 4	C < P	307	0.399 (0.151)	0.442 (0.171)	-2.02**	-1.85**	312	0.406 (0.146)	0.448 (0.163)	-2.04**	-1.81**
INTCOV	C > P	293	14.633 (25.243)	9.579 (20.226)	1.58*	2.00**	302	17.309 (27.827)	9.687 (19.095)	2.23**	2.71***
DCOV 2	C < P	295	0.283 (0.615)	0.342 (0.775)	-0.68	1.21	308	0.378 (0.809)	0.402 (0.860)	-0.22	0.99
PLEVDUM	C < P	320	0.317 (0.468)	0.319 (0.467)	-0.04	-0.04	320	0.305 (0.463)	0.319 (0.467)	-0.24	-0.24
LSAL	C > P	307	4.648 (1.355)	4.677 (1.604)	-0.15	0.07	312	4.838 (1.357)	4.741 (1.607)	0.52	0.63
ETR 1	?	307	0.465 (0.110)	0.446 (0.132)	1.21	2.60***	312	0.463 (0.067)	0.441 (0.115)	2.07**	1.82*
ETR 2	?	300	0.437 (0.141)	0.407 (0.171)	1.52	2.13**	300	0.439 (0.112)	0.410 (0.158)	1.74*	1.31
ETR 3	?	300	0.459 (0.106)	0.441 (0.149)	1.15	2.64***	300	0.458 (0.069)	0.439 (0.127)	1.58	1.88*
AUDDUM 1	C > P	320	0.293 (0.458)	0.189 (0.392)	1.97**	1.96**	320	0.305 (0.463)	0.189 (0.392)	2.03**	2.18**
AUDDUM 2	C < P	320	0.024 (0.155)	0.122 (0.328)	-3.57***	-2.57***	320	0.024 (0.155)	0.118 (0.323)	-3.45***	-2.49***
NDURDUM	?	320	0.293 (0.458)	0.164 (0.371)	2.30**	2.53**	320	0.293 (0.458)	0.164 (0.371)	2.30**	2.53**
DURDUM	?	320	0.524 (0.502)	0.706 (0.457)	-3.02***	-2.99***	320	0.524 (0.502)	0.706 (0.457)	-3.02***	-2.99***

Table 6.1 (cont'd.)

[a]See Table 5.8 for variable definitions.

[b]C = comprehensive allocator; P = partial allocator.

[c]The t-statistic is adjusted for differences in variances if an F-test indicates that the hypothesis of equal variances between two groups for a specific variable can be rejected at the 0.05 level. The Z-statistic is based on the normal approximation of the Wilcoxon rank-sum test.

* Significant at the .10 level (one-tail test; two-tail test for ETR).
** Significant at the .05 level (one-tail test; two-tail test for ETR and NDURDUM).
*** Significant at the .01 level (one-tail test; two-tail test for ETR and DURDUM).

Leverage Constraint (LEV). Based on 1971 data, partial allocators have higher leverage than comprehensive allocators--the mean LEV1 (LEV4) for the two groups was 0.42 (0.44) and 0.34 (0.40), respectively. This finding is consistent with the hypothesis that firms with higher leverage are nearer to possible debt covenant violations and, hence, more likely to choose income-increasing accounting procedures (i.e., partial allocation) in order to relax those constraints. The *t*-test indicates that the difference between the mean leverage of the two groups is statistically significant at less than the .05 level. The Wilcoxon *Z*-statistic is also significant at less than the .05 (.01) level for LEV1 (LEV4).[1]

The mean market value-based leverage measure (LEVM1) is 0.31 for the comprehensive allocators and 0.38 for the partial allocators. While this difference is in the hypothesized direction, it is not statistically significant (*t*-statistic = −1.04; Wilcoxon *Z*-statistic = −0.96). Since LEVM1 was affected by some extreme values (see Table 5.4), the tests were rerun after setting values of LEVM1 greater than five to five, with no difference in the results. These results for LEVM1 are not surprising in view of the fact that debt covenants are written in terms of book-values and not market-value based measures of leverage.

Based on DISC-year data, results for LEV1, LEV4, and LEVM1 are similar to those presented above. Consistent with the hypothesis, partial allocators have

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[1]There were 11 firms with missing data for intangible assets (IA) which affects the computation of LEV4. These firms were included for the univariate tests by coding IA as zero. The results are unaffected if these firms are instead omitted.

higher leverage in their capital structures than comprehensive allocators. The difference in the mean LEV1 and LEV4 between the two groups is in the hypothesized direction and remains statistically significant. However, as before, the difference in the mean LEVM1 of the two groups is not significant.

Interest Coverage (INTCOV). Based on 1971 data, comprehensive allocators have a mean INTCOV ratio of 14.63, while that of the partial allocators is 9.6. This is consistent with the hypothesis that firms with lower interest coverage are more likely to violate their interest covenants and, hence, more likely to choose an income-increasing accounting method (i.e., partial allocation). The *t*-statistic for the difference between the means of the two groups is significant at less than the .10 level, whereas the Wilcoxon *Z*-statistic is significant at the .05 level.

In the above computation, INTCOVs greater than 100 were reset to 100. Three firms were affected by this procedure. In addition, 10 firms had zero interest expense. However, nine of the 10 firms had positive IBEI and their INTCOV was reset to 100; if these nine firms are omitted instead, the difference between the two groups becomes more statistically significant (*t*-statistic=2.22 and Wilcoxon *Z*-statistic=2.17, both significant at less than .05).[2]

Based on DISC-year data, the mean INTCOV ratio of the comprehensive allocators is 17.3, whereas that of the partial allocators is 9.7. This difference again is in the hypothesized direction and more significant than using 1971 data--the *t*-

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[2]Recall from chapter 5, section 5.2.2, that these recoding procedures were necessary to reduce the skewness in the distribution and are similar to those employed in prior research.

statistic (Wilcoxon *Z*-statistic) is 2.23 (2.71), which is significant at less than the .05 (.01) level. In these computations, resetting procedures similar to those described for the 1971 data were used.[3]

Dividend Constraint (DCOV). Based on 1971 data, relative to partial allocators, comprehensive allocators pay out a smaller proportion of their inventory of payable funds (unrestricted retained earnings, URE) as dividends--the mean DCOV ratio of the comprehensive allocators is 0.28 while that of the partial allocators is 0.34. This is consistent with the hypothesis that firms with higher DCOV ratio are closer to possible dividend covenant violations and, hence, more likely to adopt income-increasing accounting methods (i.e., partial allocation) to relax those covenants. However, the observed difference in the mean DCOV ratio of the two groups is not statistically significant.

Recall that there were 52 firms with dividend restrictions mentioned but not quantified. The DCOV ratio of these firms was computed by substituting retained earnings (RE) for URE if RE was positive, or coding DCOV three if RE was zero or negative. There is virtually no change in the results if these firms are omitted instead--the difference in the mean DCOV ratio of the two groups remains in the hypothesized direction but is not significant.[4]

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[3]The skewness of the distribution was reduced substantially from 15.8 to 3.3. Without resetting, INTCOV ranged from −10.9 to 1676.7, resulting in large variances for the two groups and an insignificant *t*-statistic, although the Wilcoxon *Z*-statistic remained significant at less than the .01 level.

[4]In addition, recall that for the 77 firms with no dividend constraints, the DCOV ratio was coded zero. If these firms are omitted instead, the mean DCOV for both groups is relatively higher (0.43 and 0.63, respectively), is in the

Based on DISC-year data, the mean DCOV ratio of both groups is relatively higher and the difference between the means is in the hypothesized direction but again is not statistically significant.

Public Debt (PLEVDUM). A dummy variable was used for the existence of public debt and was coded one if the firms had public debt outstanding and zero otherwise. The means of a dummy variable offer a convenient interpretation because they simply represent the frequency with which the phenomenon occurs. Accordingly, based on 1971 data, 31.7 percent of the comprehensive allocators compared with 31.9 percent of the partial allocators had public debt outstanding. This difference is consistent with the hypothesis that because public debt is costlier to renegotiate, firms with public debt are more likely to be concerned about possible debt covenant violations and, hence, choose an income-increasing accounting method (i.e., partial allocation). However, the difference between the two groups is statistically insignificant.

Because the use of a dummy variable ignores the dollar magnitude of public debt, PLEV also was computed as a ratio of the amount of public debt to 1) net tangible assets (NTA) and 2) total debt (TD). Under both measures, partial allocators were found to have a greater proportion of public debt in their capital structure than comprehensive allocators which is in the hypothesized direction but

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hypothesized direction, but not statistically significant (although the t-statistic for the difference is relatively higher than if these firms are included, -1.43 v. -0.67).

the difference between the two groups remains statistically insignificant. Similar conclusions are reached with DISC-year data.

Firm Size (SIZE). Firm size was measured as the log of net sales (LSAL) to reduce skewness. There is virtually no difference in the size of comprehensive and partial allocators. Based on 1971 data, comprehensive allocators are found to be marginally smaller than partial allocators, which is inconsistent with the political cost hypothesis that larger firms will choose an income-decreasing accounting method (i.e., comprehensive allocation). However, based on DISC-year data, comprehensive allocators are observed to be marginally larger than partial allocators, which is consistent with the political cost hypothesis. Neither of these differences is statistically significant. Sensitivity of the results to the measure of firm size was tested by using the log of total assets and the log of net income with no change in the results.

Effective Tax Rate (ETR). Based on 1971 data, the mean ETR1 for the comprehensive allocators is 46.5 percent compared with 44.6 percent for the partial allocators. The *t*-statistic does not indicate that this difference is statistically significant. However, the Wilcoxon *Z*-statistic is significant at less than the .01 level. Generally, similar conclusions can be reached when comparing ETR2 and ETR3 for the two groups. These results are consistent with the tax-based political cost hypothesis that higher effective tax rates are indicative of greater political costs

borne by firms which induces the selection of income-reducing accounting procedures (i.e., comprehensive allocation).[5]

As Table 5.8 indicates, the distribution of all three ETR measures is highly skewed. Two observations in particular are strange and may be largely responsible for the skewness. AVC Corp. has the highest ETR1 and ETR2 (4.8 and 4.3, respectively) but the lowest ETR3 (−32.6). Control Data Corp.'s ETR1 and ETR2 are nearly −1.0 but its ETR3 is −12.3. Both firms are partial allocators and dropping them substantially increases the mean ETR3 of the partial allocators from 24.7 to 45.4 percent. Dropping the two firms also reduces much of the skewness of all three ETR measures, but the statistical significance is not affected.

Because of the well-known difficulties that arise in interpreting effective tax rates of less than zero and greater than one, the analysis also was conducted by constraining each of the ETR measures to lie in the (0,1) interval. Relative to partial allocators, comprehensive allocators continue to have larger mean ETRs. The *t*-statistics for the difference between the two groups are marginally higher than before but remain insignificant. The Wilcoxon *Z*-statistics continue to be significant at the same levels.

Based on DISC-year data, the overall conclusions reached earlier remain unaltered--comprehensive allocators have higher effective tax rates than partial allocators indicating support for the tax-based political cost hypothesis. However,

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[5]Recall that there are 25 firms with missing minority interest (MI). These firms were included in the above analysis with their MI set to zero. However, there is no change in the results if these firms are omitted instead.

there are two exceptions: 1) the *t*-statistics for the differences between the mean effective tax rates for the two groups using ETR1 and ETR2 are now statistically significant at .05 and .10 level, respectively and 2) the Wilcoxon *Z*-statistic is significant at the .10 level for ETR1 and ETR3 but insignificant for ETR2.

Auditor (AUDDUM). Two separate dummy variables for the auditor influence on the DISC accounting method choice were set up as follows: AUDDUM1 was coded one if the sample firm's auditor was Arthur Andersen and zero otherwise; AUDDUM2 was coded one if the sample firm's auditor was Price Waterhouse and zero otherwise.

As before, the means of AUDDUM1 imply that, based on 1971 data, 29.3 percent of the comprehensive allocators compared with 18.9 percent of the partial allocators were audited by Arthur Andersen. Similarly, the means for AUDDUM2 imply that Price Waterhouse was the auditor for 12.2 percent of the partial allocators compared with only 2.4 percent of the comprehensive allocators. Both the *t*-statistic and the *Z*-statistic indicate that these differences are statistically significant at the .05 level for AUDDUM1 and at the .01 level for AUDDUM2. The results are virtually identical when DISC-year data is used.

These results strongly indicate the presence of an auditor influence on firms' DISC accounting method choice, which is a relatively new finding in the accounting method choice literature.[6] Consistent with Price Waterhouse's position favoring

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[6]An alternative explanation for these results is that client preferences influence auditors' positions. That explanation is not compelling in this case because the auditors' positions on accounting for income taxes was known about

partial allocation, five times as many of its clients with DISCs used partial allocation as used comprehensive allocation. Similarly, consistent with Arthur Andersen's stated preference for comprehensive allocation, nearly twice as many of its clients with DISCs used comprehensive allocation as used partial allocation.

Industry Membership. As discussed before, the DISC accounting method choice of the sample firms is not independent of their industry membership based on one-digit SIC codes. This is further corroborated by the univariate tests. Whereas nearly 30 percent of all comprehensive allocators can be classified as non-durable goods manufacturers (industry #2), only 16 percent of the partial allocators fall in this industry group. This difference is statistically significant at the .05 level.[7] However, just the opposite pattern exists for durable goods manufacturers--nearly 71 percent of all partial allocators fall in this industry group compared with just over 52 percent of all comprehensive allocators. This difference is statistically significant at the .01 level. These results are identical for 1971 data and the DISC-year data indicating that there was no change in the industry membership of firms which had 1973 or 1974 as their DISC-years.

Summary. The univariate tests of differences between comprehensive and partial allocation provide some support for the costly contracting-based hypotheses emanating from positive accounting theory. Consistent with those hypotheses, firms

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1965-66, long before DISCs became available in 1972.

[7]The significance levels for the industry differences are based on two-tail tests because *a priori* there are no directional expectations for firms to differ in their DISC accounting method choice based on their industry classification.

with higher leverage and lower interest coverage are found to adopt an income-increasing accounting method. However, a similar hypothesis based on dividend restrictions is not supported. In addition, no support is found for the hypothesis that firms with the presence of public debt or with a relatively higher proportion of public debt in their capital structure are more likely to use an income-increasing accounting method. The results of the political cost hypotheses are mixed--firm size is not found to be a significant factor in firms' DISC accounting method choice. However, results of the effective tax rate variable support the hypothesis that firms bearing higher political costs as manifested by higher effective tax rates are more likely to choose income-reducing accounting methods. Finally, strong support is found for the auditor influence on firms' DISC accounting method choice, which is a relatively new result in the accounting method choice literature.

6.2 Multiple Regression Analysis

The univariate analysis discussed in the previous section ignores correlations among the independent variables. Based on the theoretical framework presented earlier, variables used to operationalize the contracting and political cost hypotheses are expected to be correlated. If these variables are indeed correlated, it becomes imperative to examine their joint effect on the DISC accounting method choice in

a multiple regression framework. Their inclusion in the regression model also is necessary to avoid a correlated omitted variables problem.[8]

Pearson product-moment correlations among the independent variables for all sample firms using 1971 data and DISC-year data, respectively, are presented in panels A and B of Table 6.2.[9,10] As the signs, magnitudes, and statistical significance of the cross-correlations in the two matrices are virtually similar, the discussion here focuses on panel A (all firms using 1971 data).

The correlations among the contracting cost variables are consistent with the positive accounting theory predictions. As expected, all three leverage measures are negatively correlated with interest coverage but positively correlated with the dividend constraint variable and the public debt dummy. These correlations are statistically significant and range from 0.25 to 0.36. Given the magnitude of these correlations, it is unlikely that the simultaneous inclusion of the leverage, interest coverage, and dividend constraint variables in the regression model will result in a multicollinearity problem. Interestingly, the correlations between leverage and the

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[8]Omission of correlated variables in a regression model results in biased parameter estimates. This bias does not disappear even as the sample size grows large making the parameter estimates inconsistent as well [Pindyck and Rubinfeld, 1981, pp. 128-130].

[9]Spearman rank correlations were also computed but are not presented because they are qualitatively similar to the Pearson correlations. Mention is made in the text where the Spearman correlations differ substantially in magnitude or statistical significance.

[10]Cross-correlations with LTA (the third measure of firm size used in the study) are not presented because they are virtually identical to the cross-correlations with LSAL and the correlation between LTA and LSAL is 0.97.

Table 6.2

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS[a]

Panel A: All Firms - 1971 Data

Variable[b]	LEV1	LEV4	LEVM1	INTCOV	DCOV2	PLEVDUM	LSAL	LNI	ETR1	ETR2	ETR3	AUDDUM1	AUDDUM2	NDURDUM	DURDUM
LEV1	1.000														
	306														
LEV4	0.758*	1.000													
	306	306													
LEVM1	0.730*	0.531*	1.000												
	303	303	303												
INTCOV	-0.336*	-0.483*	-0.239*	1.000											
	306	306	303	319											
DCOV2	0.279*	0.182*	0.243*	-0.188*	1.000										
	295	295	294	308	308										
PLEVDUM	0.363*	0.307*	0.319*	-0.217*	-0.020	1.000									
	306	306	303	319	308	319									
LSAL	0.262*	0.225*	0.271*	-0.197*	0.003	0.563*	1.000								
	305	305	302	305	294	305	305								
LNI	0.091	0.008	0.042	-0.023	-0.097	0.463*	0.877*	1.000							
	277	277	274	277	266	277	277	277							
ETR1	-0.111	-0.043	-0.098	0.125@	-0.372*	-0.062	-0.153*	-0.128@	1.000						
	306	306	303	319	308	319	305	277	319						
ETR2	-0.163*	-0.088	-0.135@	0.112@	-0.252*	-0.155*	-0.187*	-0.139@	0.729*	1.000					
	306	306	303	319	308	319	305	277	319	319					
ETR3	-0.119@	-0.094	-0.169*	0.084	-0.316*	-0.035	-0.074	-0.172*	0.560*	0.605*	1.000				
	306	306	303	319	308	319	305	277	319	319	319				
AUDDUM1	0.066	0.076	-0.047	-0.042	0.070	0.064	0.063	0.064	-0.059	-0.036	-0.056	1.000			
	306	306	303	319	308	319	305	277	319	319	319	319			
AUDDUM2	-0.043	-0.035	0.057	-0.081	-0.042	0.092	0.067	0.073	-0.002	-0.003	0.045	-0.172*	1.000		
	306	306	303	319	308	319	305	277	319	319	319	319	319		
NDURDUM	0.061	-0.004	0.020	-0.050	0.093	0.183*	0.169*	0.140@	-0.115@	-0.087	-0.051	-0.031	-0.003	1.000	
	306	306	303	319	308	319	305	277	319	319	319	319	319	319	
DURDUM	-0.150*	-0.133@	-0.060	0.111@	-0.114@	-0.214*	-0.154*	-0.125@	0.169*	0.140@	0.096	0.041	-0.031	-0.688*	1.000
	306	306	303	319	308	319	305	277	319	319	319	319	319	319	319

Table 6.2 (cont'd.)

Panel B: All Firms - DISC-Year Data

Variable[b]	LEV1	LEV4	LEVM1	INTCOV	DCOV2	PLEVDUM	LSAL	LNI	ETR1	ETR2	ETR3	AUDDUM1	AUDDUM2	NDURDUM	DURDUM
LEV1	1.000 312														
LEV4	0.747* 312	1.000 312													
LEVM1	0.725* 311	0.518* 311	1.000 311												
INTCOV	-0.353* 312	-0.509* 312	-0.236* 311	1.000 320											
DCOV2	0.290* 300	0.223* 300	0.257* 299	-0.172* 308	1.000 308										
PLEVDUM	0.375* 312	0.300* 312	0.319* 311	-0.224* 320	0.011 308	1.000 320									
LSAL	0.269* 312	0.247* 312	0.256* 311	-0.169* 312	-0.044 300	0.565* 312	1.000 312								
LNI	0.120@ 297	0.046 297	0.074 296	0.001 297	-0.112 285	0.480* 297	0.893* 297	1.000 297							
ETR1	-0.124@ 312	-0.091 312	-0.110 311	0.128@ 320	-0.342* 308	-0.047 320	-0.136@ 312	-0.208* 297	1.000 320						
ETR2	-0.162* 312	-0.070 312	-0.108 311	0.097 320	-0.260* 308	-0.101 320	-0.173* 312	-0.207* 297	0.564* 320	1.000 320					
ETR3	-0.093 312	-0.055 312	-0.069 311	0.072 320	-0.283* 308	-0.033 320	-0.104 312	-0.174* 297	0.645* 320	0.750* 320	1.000 320				
AUDDUM1	0.040 312	0.019 312	-0.059 311	-0.037 320	0.037 308	0.047 320	0.055 312	0.065 297	-0.010 320	-0.001 320	-0.046 320	1.000 320			
AUDDUM2	-0.060 312	-0.070 312	0.021 311	-0.067 320	-0.042 308	0.058 320	0.038 312	0.048 297	-0.008 320	0.036 320	0.020 320	-0.170* 320	1.000 320		
NDURDUM	0.099 312	0.030 312	0.011 311	-0.056 320	0.083 308	0.171* 320	0.165* 312	0.168* 297	-0.130@ 320	-0.045 320	-0.103 320	-0.033 320	0.002 320	1.000 320	
DURDUM	-0.150* 312	-0.142@ 312	-0.058 311	0.136@ 320	-0.039 308	-0.207* 320	-0.142@ 312	-0.147@ 297	0.122@ 320	0.046 320	0.116@ 320	0.029 320	-0.017 320	-0.688* 320	1.000 320

Table 6.2 (cont'd.)

[a]Numbers in the first line are the correlation coefficients and in the second line are the number of observations. A '*' (@) indicates that the null hypothesis of zero correlation between the row variable and the column variable is rejected at the .01 (.05) level.

[b]See Table 5.8 for variable definitions.

two industry dummies are lower than 0.15 and not statistically significant for the non-durable goods manufacturers. For this reason, no control for cross-sectional variations in leverage for firms in different industries was exercised.

Firm size is significantly negatively correlated with the effective tax rate measures (except the correlation between LSAL and ETR3) although the magnitude of these correlations generally is less than 0.20.[11] The negative correlation implies that for this sample as a whole larger firms have lower ETRs, which is inconsistent with the tax-based political cost hypothesis. However, this finding should be interpreted with caution because the ability of the effective tax rate to proxy for political costs is known to vary with time and across industry groups [Zimmerman, 1983]. Firm size also is significantly positively correlated with leverage and the public debt dummy. The latter correlation is consistent with the claim that accessing capital markets and borrowing from the public is associated with higher costs and requires greater resources, which larger firms may be better able to afford.

The correlation between firm size and industry classification also is of interest because of the frequently mentioned argument that firm size could be a proxy for industry membership (e.g., Ball and Foster [1982]). In this sample, firm size is positively correlated with non-durable goods manufacturers but negatively correlated with durable goods manufacturers. Given these correlations and the income effect of the DISC accounting method choice, the finding presented earlier

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[11]Spearman rank correlations are greater than 0.20 but less than 0.30.

that a greater proportion of the non-durable goods manufacturers (which are comparatively larger) chose comprehensive allocation (which results in lower income) is consistent with the political cost argument that larger firms have greater incentive to adopt income-decreasing accounting procedures. Similarly, the finding that a greater proportion of durable goods manufacturers (which are comparatively smaller) are partial allocators would be consistent with that argument. The observed correlations between firm size and industry membership, as well as the association between sample firms' DISC accounting method choice and their industry membership, warrant the inclusion of industry as a control variable in the multiple regression model.

Turning to the auditor variable, the cross-correlations of particular interest are those between the auditor dummies and 1) the contracting and political cost variables, and 2) the industry dummies. A finding of significant correlations between the auditor dummies and the contracting and/or political cost variables would complicate the analysis because that finding would be consistent with the argument that all these variables are proxies for some common construct. However, that problem is not present in this sample because both auditor dummies have statistically insignificant correlations with all of the contracting and political cost variables, with the magnitude of the cross-correlations being less than 0.10. The low correlations also suggest that the auditor may indeed be an important and relevant omitted variable in an accounting method choice model.

The absence of an association between auditor and industry classification (correlations are lower than 0.05) also is important in interpreting the results of this study. Generally, it is believed that the big-8 auditors, in particular, tend to specialize in certain industry groups in order to distinguish themselves from the other auditing firms. Hence, it could be argued that the earlier finding of a strong auditor influence on firms' DISC accounting method choice could simply be because of an industry effect, which, incidentally, also is strongly present in this sample. However, the cross-correlations between the auditor variables and industry classification are less than 0.05, suggesting that it is unlikely that the auditor variable is a proxy for an industry effect.[12]

6.2.1 The Logit Model and Its Evaluation

The multiple regression analysis is performed using the logistic model described earlier. The dependent variable is binary and takes on the value one if the sample firm is a partial allocator and zero otherwise. The independent variables--leverage, interest coverage, dividend constraint, public debt dummy, firm size, effective tax rate, and auditor dummies--are as defined before. In addition, industry dummies are used as control variables.

The results of the logit analysis are evaluated in three ways. First, the significance of each independent variable (parameter) is evaluated by testing the null hypothesis that the parameter is zero. The test is performed using the

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[12]Note, that the lack of a significant correlation also could be due to the restrictive definition of industry used in this study.

asymptotic t-statistic calculated by dividing the maximum likelihood estimate of the parameter by its standard error.

Second, the joint significance of all variables in the logit models is examined via the *likelihood ratio test* (see Kmenta [1986, pp. 550-556]). The test statistic for this asymptotic test is

$$LR = -2[L(\hat{\omega}) - L(\hat{\Omega})]$$

which is approximately distributed as chi-square with k degrees of freedom, where, in general, k is the number of explanatory variables in the model. $L(\hat{\omega})$ is the maximum value of the log likelihood function (equation (5.6)) under the constraint that all parameters, β's, other than the constant (intercept), are equal to zero, and $L(\hat{\Omega})$ is the maximum value of the unconstrained log likelihood function. The null hypothesis that all coefficients in the constrained model are zero is rejected at a significance level of α if $LR > \chi^2_{(k,\alpha)}$.

Third, the classificatory success of the logit models is evaluated against the *proportional chance criterion* (C_{pro}) suggested by Morrison [1969].[13] Formally,

$$C_{pro} = \alpha^2 + (1 - \alpha^2)$$

where α is the proportion of observations in Group 1 and $(1 - \alpha)$ is the proportion of observations in Group 2. The term α^2 is the product of the conditional

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[13]Another technique that also could be used for this purpose is discriminant analysis, which is based on the assumption that the underlying variables are jointly normally distributed with equal covariance matrices. Because some of the explanatory variables in this study are qualitative (i.e., the data is not multivariate normal), the logistic model is preferred over linear discriminant analysis. See Press and Wilson [1978] for further discussion on this issue.

probability of correct assignment given that the observation was classified in Group 1 and the probability that the classification of the observation was into Group 1. Similarly, $(1 - \alpha^2)$ is the product of the two probabilities related to Group 2.

An alternative to C_{pro} is to use the *maximum chance criterion* (C_{max}) under which all sample observations are naively assigned to the larger of the two groups. Formally,

$$C_{max} = \max (\alpha, 1 - \alpha)$$

with α as defined before.

The choice between the two classificatory criteria depends on the objective of the research. Morrison [1969, p. 158] advocates that C_{max} is the appropriate benchmark to use if the sole objective is to maximize the percentage correctly classified. However, he points out that:

> Usually a discriminant analysis is run because someone wishes to correctly identify members of *both* groups. ... [However] the discriminant function defies the odds by classifying an individual in the smaller group. The chance criterion should take this into account. Therefore, in most situations C_{pro} should be used.

Because in this study the classification of both comprehensive and partial allocators is of interest, C_{pro} is used as the benchmark for evaluating the performance of the logit models.

Finally, to evaluate the "goodness-of-fit" of the logit models, the likelihood ratio index (LRI) is computed as follows:

$$LRI = 1 - [L(\hat{\Omega}) / L(\hat{\omega})]$$

where $L(\hat{\Omega})$ and $L(\hat{\omega})$ are defined as before. The *LRI* is a scalar measure similar to the R-square in the standard regression model and provides an indication of the logit model's explanatory power. It can be shown that $0 \leq LRI \leq 1$ and better the fit of the model, the closer the *LRI* will be to one [Kmenta, 1986, pp. 555-556].[14]

6.2.2 The Logit Regression Results

The logit results for the full sample are presented separately using 1971 data in Table 6.3 and using DISC-year data in Table 6.4. Models 1, 2, and 3, respectively, correspond to the three effective tax rate measures (ETR1, ETR2, and ETR3 defined earlier). Panel A in each table presents the results of the three models based on LEV1 as the leverage measure, whereas the panel B results are based on LEV4 as the leverage measure. In the first row, the maximum likelihood parameter estimates of the variables are presented followed by the related asymptotic *t*-statistic in the second row. Also presented in the table are 1) the chi-square statistic (based on the likelihood ratio test discussed earlier) which tests the null hypothesis that all coefficients (except the intercept) are equal to zero, and 2) the percentage of firms correctly classified by the logit models.

As Table 6.3 indicates, based on 1971 data, if leverage is defined as LEV1 both leverage and interest coverage are significant in the hypothesized direction at the .10 level for all models. However, if leverage is defined as LEV4, the leverage variable becomes significant at .05 level, whereas interest coverage becomes

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[14]See also Amemiya [1981, pp. 1502-1507] and Maddala [1983, pp. 37-41] for several other goodness-of-fit measures.

Table 6.3

LOGIT REGRESSION MODELS (All Firms -- 1971 Data)[a]

Panel A: LEV = LTD/COMEQ

Model[b]	INTERCEPT	LEV	INTCOV	DCOV2	PLEVDUM	LSAL	ETR	AUDDUM1	AUDDUM2	NDURDUM	DURDUM	Chi-Square[c]	% Correctly Classified	LRI[d]
1	0.901	0.749	-0.010	0.021	-0.043	0.022	-1.632	-0.730	1.618	-0.115	1.129	33.73	75.2	.100
	1.03	1.51*	-1.49*	0.10	-0.10	0.20	-1.28	-2.20**	2.11**	-0.24	2.81***			
2	0.648	0.710	-0.010	0.029	-0.062	0.019	-1.017	-0.716	1.613	-0.141	1.084	33.32	74.8	.099
	0.83	1.43*	-1.55*	0.14	-0.17	0.17	-1.12	-2.17**	2.10**	-0.32	2.73***			
3	0.665	0.742	-0.010	0.020	-0.049	0.025	-1.115	-0.719	1.688	-0.129	1.096	33.20	74.5	.099
	0.83	1.49*	-1.54*	0.10	-0.14	0.22	-1.07	-2.17**	2.19**	-0.28	2.75***			

Panel B: LEV = LTD/NTA

Model[b]	INTERCEPT	LEV	INTCOV	DCOV2	PLEVDUM	LSAL	ETR	AUDDUM1	AUDDUM2	NDURDUM	DURDUM	Chi-Square[c]	% Correctly Classified	LRI[d]
1	0.142	2.428	-0.005	0.035	-0.024	0.016	-1.844	-0.473	1.632	0.023	1.237	35.92	75.5	.107
	0.14	2.11**	-0.74	0.17	-0.00	0.14	-1.42	-2.22**	2.12**	0.00	2.98***			
2	-0.130	1.286	-0.006	0.044	-0.044	0.013	-0.078	-0.724	1.622	-0.014	1.177	35.26	74.5	.105
	-0.14	2.00**	-0.83**	0.22	-0.10	0.10	-1.18	-2.17**	2.11**	-0.00	2.89***			
3	-0.130	2.353	-0.006	0.035	-0.023	0.020	-1.181	-0.729	1.725	-0.001	1.189	35.13	75.5	.105
	-0.14	2.05**	-0.81	0.17	-0.00	0.17	-1.13	-2.19**	2.22**	-0.00	2.91***			

[a] n = 294. The first line reports the coefficient estimates and the second line the associated asymptotic *t*-statistics.
* indicates significance at the .10 level.
** indicates significance at the .05 level.
*** indicates significance at the .01 level.

[b] Models 1, 2, and 3 correspond to the three effective tax rate measures, ETR1, ETR2, and ETR3, respectively.

[c] The chi-square statistic is based on the likelihood ratio test which tests the null hypothesis that all the coefficients (except the intercept) are zero. It is significant at less than the .01 level for all models above.

[d] LRI is the likelihood ratio index and is defined as [1 - (log likelihood at convergence / log likelihood under the constraint β=0)]. It is similar to the R^2 statistic in the standard regression model and provides an indication of the "goodness of fit" of the logit model.

insignificant in all models. Variables for the dividend constraint measure, the public debt dummy, and firm size are insignificant in all models, regardless of whether LEV1 or LEV4 is used. Both auditor dummies are significant at less than the .05 level and in the hypothesized direction. The industry dummy for durable goods manufacturers is highly significant at less than the 0.01 level. However, the dummy for nondurable goods manufacturers is not significant at conventional levels even though it was significant in the univariate analysis. The high correlation between the two industry dummies (−0.68) and the large standard errors of NDURDUM indicates that multicollinearity may be causing NDURDUM to be insignificant in the multiple regression model. To investigate this possibility, the models also were estimated by dropping the industry dummies one at a time. When NDURDUM is dropped, DURDUM becomes more significant than before (*t*-statistics exceed 3.7 compared with about 2.8 when both variables are included in the model). However, the chi-square test statistic for the overall logit model and the percent of firms correctly classified remains largely unaffected. The joint significance of the two auditor dummies and the durables industry dummy indicates that both variables provide incremental explanatory power over each other and is further evidence of a lack of auditor-industry association in this sample.

The chi-square statistic indicates that the null hypothesis that all coefficients (except the intercept) in the model are zero is rejected in each model at less than the .001 level. The proportion of firms correctly classified by the models varies from 74.8 to 75.5 percent compared with the proportional chance criterion, C_{pro}, of

61.7 percent.[15] The percent correctly predicted by the model significantly exceeds C_{pro} at the .001 level.[16] The likelihood ratio index is around .10 for the various models.

Turning to the logit results for the full sample based on DISC-year data (see Table 6.4), the results generally remain similar to those based on 1971 data. However, when LEV1 is used as the definition of leverage, interest coverage is significant at less than the .01 level for all models (compared with significance at the .10 level using 1971 data) and leverage itself is now significant at .05 (instead of .10) in models 1 and 3. When LEV4 is used as the definition of leverage, interest coverage becomes significant at the .05 level for all models (compared with no significance using 1971 data) although leverage itself is now significant at .10 level compared with the .05 level earlier. Both auditor dummies are significant at the .05 level as before and DURDUM is significant at the .01 level for all models. The dividend constraint measure, public debt dummy, firm size, and the nondurable industry dummy remain insignificant as before. The chi-square statistic

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[15]Note, under the most successful naive model, C_{max}, all firms would be classified as partial allocators (the larger of the two groups) and thus achieve a success rate of 74.1 percent. Although the classification success achieved by the logit models is marginally higher, it is not significantly different from C_{max}.

[16]The Z-statistic for proportions was used for the significance test and it ranges from 4.62 (when 74.8 percent is used as the correct classification rate) to 4.86 (when 75.5 percent is used as the correct classification rate).

The test statistic transforms proportions into standard normal measures and is computed as follows:

$$Z = (p - C_i) / \sqrt{[C_i(1 - C_i)]/N}$$

where p is the observed correct classification rate and C_i is the chance criterion employed as the benchmark.

Table 6.4

LOGIT REGRESSION MODELS (All Firms -- DISC-Year Data)[a]

Panel A: LEV = LTD/COMEQ

Model[b]	INTERCEPT	LEV	INTCOV	DCOV2	PLEVDUM	LSAL	ETR	AUDDUM1	AUDDUM2	NDURDUM	DURDUM	Chi-Square[c]	% Correctly Classified	IRI[d]
1	1.973	0.895	-0.016	-0.087	0.024	-0.082	-2.643	-0.710	1.551	-0.181	1.117	39.64	76.0	.117
	1.85	1.66**	-2.41***	-0.41	0.00	-0.69	-1.59	-2.17**	2.02**	-0.40	2.79***			
2	1.060	0.869	-0.016	-0.077	0.032	-0.072	-0.723	-0.731	1.548	-0.151	1.075	37.46	75.7	.110
	1.31	1.62*	-2.47***	-0.37	0.10	-0.62	-0.79	-2.25**	2.02**	-0.33	2.72***			
3	1.221	0.898	-0.016	-0.083	0.032	-0.071	-1.139	-0.745	1.561	-0.151	1.113	37.91	76.3	.112
	1.45	1.67**	-2.48***	-0.40	0.10	-0.61	-1.03	-2.29**	2.03**	-0.33	2.80***			

Panel B: LEV = LTD/NTA

Model[b]	INTERCEPT	LEV	INTCOV	DCOV2	PLEVDUM	LSAL	ETR	AUDDUM1	AUDDUM2	NDURDUM	DURDUM	Chi-Square[c]	% Correctly Classified	IRI[d]
1	1.426	1.913	-0.013	-0.058	0.119	-0.087	-2.745	-0.674	1.569	-0.078	1.163	39.19	75.7	.115
	1.22	1.62*	-1.88**	-0.28	0.32	-0.73	-1.62	-2.05**	2.03**	-0.17	2.86***			
2	0.550	1.906	-0.014	-0.054	0.123	-0.081	-0.883	-0.689	1.582	-0.051	1.118	37.21	75.3	.110
	0.60	1.63*	-1.93**	-0.26	0.33	-0.69	-0.97	-2.11**	2.05**	-0.10	2.71***			
3	0.659	1.920	-0.014	-0.054	0.133	-0.076	-1.200	-0.707	1.594	-0.056	1.155	37.48	75.0	.110
	0.69	1.64*	-1.95**	-0.26	0.35	-0.65	-1.09	-2.17**	2.06**	-0.10	2.87***			

[a] n = 300. The first line reports the coefficient estimates and the second line the associated asymptotic t-statistics.
* indicates significance at the .10 level.
** indicates significance at the .05 level.
*** indicates significance at the .01 level.

[b] Models 1, 2, and 3 correspond to the three effective tax rate measures, ETR1, ETR2, and ETR3, respectively.

[c] The chi-square statistic is based on the likelihood ratio test which tests the null hypothesis that all the coefficients (except the intercept) are zero. It is significant at less than the .01 level for all models above.

[d] IRI is the likelihood ratio index and is defined as [1 - (log likelihood at convergence / log likelihood under the constraint β=0)]. It is similar to the R^2 statistic in the standard regression model and provides an indication of the "goodness of fit" of the logit model.

rejects the null hypothesis that all coefficients (except the intercept) in the model are zero at less than the .001 level in each model. The proportion of firms correctly classified is marginally higher in each model and ranges from 75 to 76percent which significantly exceeds the C_{pro} of 62.2 percent at the .001 level.[17] The likelihood ratio index is between .11 and .12, which is marginally higher than using 1971 data.

6.2.3 OLS Regression Results

For comparative purposes, the regression analysis also was performed using ordinary least squares. Recall that although OLS is inappropriate when the dependent variable is binary, simulation evidence indicates that when using data typically used in accounting method choice studies, OLS performs as well as the nonlinear models [Noreen, 1988]. Indeed, results of the OLS regressions are qualitatively similar to the logit regression results and, hence, not presented separately.

Briefly, based on 1971 data for all firms, the parameter estimates for leverage, interest coverage, the auditor dummies, and the manufacturing nondurables dummy have the hypothesized signs and are statistically significant at .10 level or better. As before, the dividend constraint variable and the public debt dummy are not significant although they have the expected sign. The sign on the

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[17]The *Z*-statistic ranges from 4.57 (when 75 percent is used as the correct classification rate) to 4.93 (when 76 percent is used as the correct classification rate). Note, however, that C_{max} is 74.7 percent and the classification success achieved by the logit models, though marginally higher, is not statistically significantly different from C_{max}.

effective tax rate variable, regardless of the measure used, is consistent with the tax-based political cost hypothesis but is not statistically significant. Finally, the sign on the firm size variable is contrary to the hypothesized direction but is not statistically significant. The F-statistic indicates that the null hypothesis that all parameter estimates (except the intercept) are zero is rejected in each case at less than .001 level. The adjusted R-square range from .06 to .08.

Based on DISC-year data, all of the above results hold. The adjusted R-squares are comparatively higher and range from .08 to .095, which is similar to the pattern observed with the likelihood ratio index computed for the logit models.

6.3 Sample Partitioned by Industry

As discussed in chapter five (section 5.4.1), sample firms' DISC accounting method choice is not independent of their industry classification based on one-digit SIC codes. Hence, to examine the sensitivity of the earlier results to firms' industry membership, the analysis was repeated separately on the manufacturing durables (SIC 3xxx) and the manufacturing nondurables (SIC 2xxx). The results are presented in Table 6.5.

As panel A of Table 6.5 shows, results for the manufacturing durables generally are consistent with the results for the entire sample. Relative to partial allocators, comprehensive allocators have lower leverage but higher interest coverage ratios. These differences are consistent with the debt covenant-based hypotheses and statistically significant regardless of whether 1971 data or DISC-

Table 6.5

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Panel A: Manufacturing Durables (SIC Code 3XXX) Only

		1971 Data					DISC-Year Data				
			Mean (Std. Dev.)		Statistic for Difference between Means			Mean (Std. Dev.)		Statistic for Difference between Means[c]	
Variable	Hypothesis	N	C	P	t	Z	N	C	P	t	Z
LEV 1	C < P	193	0.298 (0.292)	0.399 (0.406)	-1.77**	-1.54*	198	0.292 (0.292)	0.385 (0.409)	-1.64*	-1.41*
LEV 4	C < P	193	0.379 (0.148)	0.437 (0.166)	-2.00**	-1.85**	198	0.385 (0.417)	0.438 (0.158)	-1.93**	-1.71**
INTCOV	C > P	193	19.614 (28.925)	10.964 (23.094)	1.73**	2.85***	198	24.582 (32.295)	11.230 (22.017)	2.47***	3.08***
DCOV 2	C < P	187	0.278 (0.332)	0.579 (0.749)	-0.48	0.25	192	0.332 (0.741)	0.333 (0.771)	-0.01	0.07
PLEVDUM	C < P	193	0.231 (0.427)	0.279 (0.450)	-0.61	-0.61	198	0.225 (0.423)	0.272 (0.446)	-0.60	-0.60
LSAL	C > P	193	4.524 (1.329)	5.589 (1.657)	-0.23	-0.00	198	4.640 (1.632)	4.663 (1.632)	-0.08	0.17
ETR 1	?	193	0.488 (0.095)	0.459 (0.139)	1.62	1.82*	198	0.464 (0.051)	0.452 (0.118)	0.98	1.00
ETR 2	?	193	0.461 (0.140)	0.406 (0.192)	1.99**	2.34**	198	0.421 (0.125)	0.401 (0.174)	0.87	1.48
ETR 3	?	193	0.450 (0.116)	0.439 (0.170)	0.48	1.54	198	0.439 (0.117)	0.439 (0.152)	0.03	0.89
AUDDUM 1	C > P	193	0.385 (0.493)	0.188 (0.392)	2.31**	2.60***	198	0.375 (0.490)	0.190 (0.393)	2.21**	2.49***
AUDDUM 2	C < P	193	0.000 (0.000)	0.110 (0.314)	-2.19**	-2.16**	198	0.000 (0.000)	0.120 (0.326)	-2.33***	-2.30**

Table 6.5 (cont'd.)

Panel B: Manufacturing Nondurables (SIC Code 2xxx) Only

		1971 Data					DISC-Year Data				
			Mean (Std. Dev.)		Statistic for Difference between Means			Mean (Std. Dev.)		Statistic for Difference between Means[c]	
Variable	Hypothesis	N	C	P	t	Z	N	C	P	t	Z
LEV 1	C < P	57	0.401 (0.281)	0.486 (0.406)	-0.93	-0.41	59	0.395 (0.281)	0.520 (0.416)	-1.37*	-0.92
LEV 4	C < P	57	0.417 (0.149)	0.438 (0.151)	-0.50	-0.09	59	0.427 (0.145)	0.459 (0.149)	-0.81	-0.42
INTCOV	C > P	57	9.825 (21.558)	8.021 (12.245)	0.36	-1.32	59	12.776 (24.940)	6.944 (9.810)	1.05	0.67
DCOV 2	C < P	53	0.314 (0.640)	0.405 (0.842)	-0.42	0.96	54	0.312 (0.632)	0.391 (0.763)	-0.40	1.41
PLEVDUM	C < P	57	0.455 (0.510)	0.571 (0.502)	-0.85	-0.84	59	0.409 (0.503)	0.541 (0.505)	-0.97	-0.96
LSAL	C > P	57	5.137 (1.269)	5.272 (1.515)	-0.35	-0.58	59	5.340 (1.240)	5.266 (1.511)	0.19	0.10
ETR 1	?	57	0.450 (0.112)	0.431 (0.069)	0.71	2.27**	59	0.456 (0.052)	0.414 (0.097)	2.21**	2.33**
ETR 2	?	57	0.397 (0.125)	0.390 (0.116)	0.23	0.89	59	0.414 (0.084)	0.392 (0.180)	0.65	0.82
ETR 3	?	57	0.485 (0.099)	0.415 (0.102)	2.53**	2.71***	59	0.450 (0.065)	0.386 (0.136)	2.45**	2.28**
AUDDUM 1	C > P	57	0.136 (0.351)	0.200 (0.406)	-0.61	-0.60	59	0.136 (0.351)	0.216 (0.417)	-0.75	-0.74
AUDDUM 2	C < P	57	0.091 (0.294)	0.114 (0.323)	-0.28	-0.26	59	0.091 (0.294)	0.108 (0.315)	-0.21	-0.19

Table 6.5 (cont'd.)

[a]See Table 5.8 for variable definitions.

[b]C = comprehensive allocator; P = partial allocator.

[c]The t-statistic is adjusted for differences in variances if an F-test indicates that the hypothesis of equal variances between two groups for a specific variable can be rejected at the 0.05 level. The Z-statistic is based on the normal approximation of the Wilcoxon rank-sum test.

* Significant at the .10 level (one-tail test; two-tail test for ETR).
** Significant at the .05 level (one-tail test; two-tail test for ETR and NDURDUM).
*** Significant at the .01 level (one-tail test; two-tail test for ETR and DURDUM).

year data is used.[18] In addition, of the manufacturing durable firms audited byArthur Andersen, a significantly greater proportion used comprehensive allocation than partial allocation. In contrast, all of the manufacturing durable firms audited by Price Waterhouse followed partial allocation. These differences are in the hypothesized direction and statistically significant at the .05 level or better. Further, consistent with the tax-based political cost hypothesis, comprehensive allocators have a higher effective tax rate than partial allocators but the statistical significance of these differences is mixed.[19] Partial allocators also are found to pay out a greater proportion of their inventory of payable funds in dividends and more often have publicly-placed debt than comprehensive allocators. Although these differences are consistent with the covenant-based and renegotiation cost hypotheses, they are not statistically significant. Finally, contrary to expectations, comprehensive allocators are smaller than partial allocators although the mean difference in LSAL for the two groups is not statistically significant.

As panel B of Table 6.5 shows, the results for the manufacturing nondurable firms are generally consistent with the debt covenant-based, tax-based political cost, and the auditor explanations. However, with the exception of the effective tax rate measures which are generally statistically significant, the results are not as strong

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[18]LEV1 (LEV4) is generally significant at the .10 (.05) level, whereas INTCOV is generally significant at the .01 level.

[19]Based on 1971 data, the difference between the mean ETR1 (ETR2) of the two groups is significant at the .10 (.05) level, but ETR3 is not significantly different for the two groups. Based on DISC-year data, none of the three ETR measures are significantly different for the two groups of firms.

as those for the manufacturing durable firms. A potential explanation for the weak results for the manufacturing nondurables could be the small sample size (n = 63) of firms in this industry class.[20]

Overall, the industry analysis suggests that the observed associations between DISC accounting method choice and the contracting, political cost and auditor explanations are fairly robust.

6.4 Sample Partitioned by DISC-Year

Because the sample firms' DISC accounting method choice is not independent of the year in which the DISC was operational ('DISC-year'--see chapter 5, section 5.4.4), the analysis was repeated separately for each of the three DISC-years (1972, 1973, and 1974) included in this study. The results are presented in Table 6.6. In general, the results for the three years individually are similar to the results for the entire sample and indicate support for the debt covenant, political cost, and auditor influence hypotheses regarding firms' choice of accounting method for DISCs. The variations in the results across the three years are described below.

The DISC-years 1972 and 1973 are generally comparable with two exceptions. First, consistent with the hypothesis, comprehensive allocators have a higher INTCOV ratio than partial allocators in both 1972 and 1973 and the

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[20]The number of firms on which the univariate statistics (Table 6.5, panel B) are based varies from 53 to 59 instead of 63 because of missing data for some of the variables.

Table 6.6

UNIVARIATE STATISTICS - BY DISC-YEAR

Panel A: 1972 DISC-Year Firms Only

Variable	Hypothesis	Mean (Std. Dev.) C	Mean (Std. Dev.) P	Statistic for Difference between Means t	Statistic for Difference between Means Z
LEV 1	C < P	0.309 (0.331)	0.397 (0.344)	-1.01	-1.24
LEV 4	C < P	0.363 (0.164)	0.444 (0.151)	-2.10**	-1.87**
INTCOV	C > P	25.606 (35.638)	8.507 (16.800)	2.00**	2.66***
DCOV 2	C < P	0.419 (0.751)	0.303 (0.740)	0.61	1.07
PLEVDUM	C < P	0.278 (0.461)	0.345 (0.477)	-0.56	-0.55
LSAL	C > P	4.664 (1.399)	4.722 (1.586)	-0.15	-0.19
ETR 1	?	0.472 (0.041)	0.435 (0.136)	2.35**	1.73*
ETR 2	?	0.415 (0.139)	0.380 (0.187)	0.76	1.53
ETR 3	?	0.443 (0.124)	0.418 (0.173)	0.60	1.58
AUDDUM 1	C > P	0.278 (0.461)	0.216 (0.413)	0.59	0.58
AUDDUM 2	C < P	0.000 (0.000)	0.147 (0.355)	-1.75**	-1.73**
NDURDUM	?	0.278 (0.461)	0.216 (0.413)	0.59	0.58
DURDUM	?	0.667 (0.485)	0.655 (0.477)	0.09	0.09

Table 6.6 (cont'd.)

Panel B: 1973 DISC-Year Firms Only

Variable	Hypothesis	Mean (Std. Dev) C	Mean (Std. Dev) P	Statistic for Difference between Means t	Statistic for Difference between Means Z
LEV 1	C < P	0.333 (0.276)	0.464 (0.498)	-1.86**	-0.99
LEV 4	C < P	0.405 (0.130)	0.467 (0.182)	-2.13**	-1.79**
INTCOV	C > P	14.281 (22.520)	11.731 (23.480)	0.56	1.08
DCOV 2	C < P	0.308 (0.729)	0.429 (0.889)	-0.72	0.59
PLEVDUM	C < P	0.289 (0.460)	0.325 (0.471)	-0.39	-0.39
LSAL	C > P	4.685 (1.295)	4.751 (1.551)	-0.23	-0.12
ETR 1	?	0.474 (0.077)	0.449 (0.072)	1.69*	1.85*
ETR 2	?	0.458 (0.128)	0.419 (0.154)	1.39	1.30
ETR 3	?	0.469 (0.070)	0.433 (0.108)	2.18**	2.12**
AUDDUM 1	C > P	0.421 (0.500)	0.145 (0.354)	3.07***	3.33***
AUDDUM 2	C < P	0.026 (0.162)	0.084 (0.280)	-1.44*	-1.18
NDURDUM	?	0.237 (0.431)	0.145 (0.354)	1.24	1.23
DURDUM	?	0.553 (0.504)	0.735 (0.444)	-2.01**	-1.98**

Table 6.6 (cont'd.)

Panel C: 1974 DISC-Year Firms Only

Variable	Hypothesis	Mean (Std. Dev.) C	Mean (Std. Dev.) P	Statistic for Difference between Means t	Statistic for Difference between Means Z
LEV 1	C < P	0.356 (0.306)	0.467 (0.336)	-1.18	-1.17
LEV 4	C < P	0.455 (0.148)	0.469 (0.111)	-0.37	-0.59
INTCOV	C > P	15.676 (29.025)	8.422 (11.794)	1.08	0.48
DCOV 2	C < P	0.112 (0.143)	0.314 (0.644)	-1.52*	-0.62
PLEVDUM	C < P	0.381 (0.498)	0.346 (0.485)	0.24	0.23
LSAL	C > P	5.382 (1.342)	5.317 (1.633)	0.15	0.37
ETR 1	?	0.435 (0.060)	0.455 (0.109)	-0.77	-0.89
ETR 2	?	0.361 (0.147)	0.395 (0.158)	-0.74	-1.12
ETR 3	?	0.384 (0.144)	0.432 (0.140)	-1.17	-1.32
AUDDUM 1	C > P	0.143 (0.359)	0.192 (0.402)	-0.44	-0.43
AUDDUM 2	C < P	0.048 (0.218)	0.115 (0.326)	-0.85	-0.80
NDURDUM	?	0.381 (0.498)	0.000 (0.000)	3.91***	3.40***
DURDUM	?	0.333 (0.483)	0.808 (0.402)	-3.68***	-3.25***

Table 6.6 (cont'd.)

[a]See Table 5.8 for variable definitions.

[b]C = comprehensive allocator; P = partial allocator.

[c]The t-statistic is adjusted for differences in variances if an F-test indicates that the hypothesis of equal variances between two groups for a specific variable can be rejected at the 0.05 level. The Z-statistic is based on the normal approximation of the Wilcoxon rank-sum test.

* Significant at the .10 level (one-tail test; two-tail test for ETR).
** Significant at the .05 level (one-tail test; two-tail test for ETR and NDURDUM).
*** Significant at the .01 level (one-tail test; two-tail test for ETR and DURDUM).

difference between the two groups is statistically significant at the .05 level or better in 1972 but is not significant in 1973. Second, consistent with the tax-based political cost hypothesis, comprehensive allocators have higher effective tax rates than partial allocators in both 1972 and 1973, regardless of the effective tax rate measure used. However, whereas ETR3 is statistically significant in 1973, it is not significant in 1972. Third, consistent with the auditor influence hypothesis, a greater proportion of Arthur Andersen's clients are comprehensive allocators than partial allocators. This difference is statistically significant at the .01 level in 1973 but is not significant in 1972. Finally, whereas the dummy for manufacturing durables is significant in 1973, it is not significant in 1972.

The results for the DISC-year 1974 are similar to the other years for the debt covenant-based hypotheses but not statistically significant. The results for the political cost hypotheses are in the opposite direction--comprehensive allocators are observed to be larger and have a lower effective tax rate than the partial allocators. However, the differences are not statistically significant.

Chapter Seven

SUMMARY AND CONCLUSIONS

In this chapter, the purpose of the study, the research hypotheses examined, the data used for the purpose, and the results of the empirical analyses are briefly summarized. Next, suggestions for future research are made.

7.1 Summary of the Study and the Results

The purpose of this study was to examine firms' motivations for choosing between comprehensive and partial allocation--alternative methods for the extent of interperiod tax allocation. In the absence of explicit cash flow effects, firms' accounting method choice was hypothesized to be related to variables that surrogate for potential debt covenant violations and their political visibility, and the preferences of their auditors. These hypotheses (except the auditor preference hypothesis) were derived from the predictions of positive accounting theory that is based on contracting cost and political cost arguments. Because accounting numbers are used in debt covenants and the political process, these arguments suggest that the choice of accounting methods have economic consequences for firms and their managers and, hence, firms are not indifferent to their accounting procedure choice.

Domestic international sales corporations (DISC), a special type of corporation legislated into the Internal Revenue Code in 1971 to stimulate exports,

provided a unique data set to empirically examine the determinants of the extent of tax allocation choice. The legislation allowed an indefinite deferral of income taxes on a portion of the DISC's export earnings. However, for financial reporting purposes, some firms provided taxes on those earnings (comprehensive allocators), whereas others did not (partial allocators).

The empirical analysis was conducted on a sample of 320 firms that had a DISC operational in 1972, 1973, or 1974. Statistical tests were conducted in both univariate and multiple regression frameworks. Overall, the results indicate support for the debt covenant and auditor preference hypotheses but only partial support for the political cost hypotheses. Consistent with the theory, firms with higher leverage and lower interest coverage ratios are observed to adopt partial allocation, an income-increasing accounting choice. However, a similar hypothesis based on dividend restrictions is not supported. In addition, no support is found for the hypothesis that because public debt involves higher renegotiation costs, firms with public debt (or a greater proportion of public debt in their capital structure) are more likely to use an income-increasing alternative. Also consistent with the theory, firms with higher political costs manifest through higher effective tax rates are observed to adopt comprehensive allocation, an income-decreasing alternative. However, support for this hypothesis is weak. Another political cost hypothesis based on firm size is not supported. Finally, strong support is found for the hypothesis that firms' accounting method choice is related to the preferences of their auditors, a relatively new finding in the accounting method choice literature.

The results generally were consistent across different statistical tests, alternative definitions of the explanatory variables, and sub-samples of firms by industry classification and the year when the DISC became operational.

7.2 Suggestions for Future Research

7.2.1 The DISC tax forgiveness

An extremely important aspect of the DISC legislation was the permanent forgiveness in 1984 of the indefinitely deferred DISC taxes. The revenue loss to the Treasury as a result of the forgiveness was estimated to be between $10 billion and $13 billion and was characterized by the financial press as a 'windfall' for U.S. exporters. It should be noted that the tax forgiveness benefitted *all* firms with indefinitely deferred DISC earnings, regardless of whether they provided taxes on those earnings in their financial statements. However, comprehensive allocators got a one-time earnings boost from the reversal of those taxes now permanently exempt.

An extension of this research would be to examine the stock market reaction to the DISC tax forgiveness. This examination is potentially interesting for two reasons. First, it would provide an insight into the market's perception of deferred taxes to help resolve an old debate: are deferred taxes a liability, stockholders' equity or something else? Even though under SFAS 96 the presumption would be that deferred taxes are a liability, it is an empirical question because we do not know that they will be perceived as such just because they are labelled a liability

under GAAP. Second, the comparison of the market reactions of comprehensive and partial allocators to the tax forgiveness can provide additional insight into the functional fixation hypothesis that appears to have gained renewed interest (e.g., Hand [1990]).

7.2.2 Accounting Method Changes and Auditor Switches

This study was concerned with firms' motivations for *adopting* an accounting method in the presence of alternatives. A strong influence of auditor preference was found to exist. A further examination of this relationship would be to find out whether firms with DISCs subsequently changed accounting methods or switched auditors in order to align the accounting method followed by them with the stated preferences of their auditors.

7.2.3 Early v. Late Adopters of DISCs

The data in this study shows that firms that could benefit from the DISC legislation did not set up a DISC or make it operational as soon as that option became available. Several questions arise in this regard. First, why did some firms set up DISCs early and others late? Second, were the early adopters somehow different than the late adopters?

APPENDICES

Appendix A

EXTENT OF TAX ALLOCATION:

The Conceptual Merits of the Alternative Approaches

Tax allocation is really a two-part controversy: 1) whether or not to allocate, and 2) how much to allocate if allocation is agreed upon. The first part of the controversy is labeled the choice between the *flow-through approach* (no allocation) and *interperiod tax allocation*. The second part of the controversy deals with the two approaches to interperiod tax allocation--*comprehensive allocation* (considers all book-tax differences) and *partial allocation* (considers some, not all, book-tax differences).

For purposes of the following discussion, the two parts of the controversy are collapsed into one with flow-through, comprehensive, and partial allocation being viewed as three alternatives to the extent of tax allocation question. All three approaches have strong theoretical merits. Detailed arguments are contained in Beresford et al., [1983] from which the following discussion draws heavily.

A.1 Flow-through Method

The flow-through method eliminates deferred taxes entirely by not requiring interperiod tax allocation for any temporary difference. Under flow-through, reported tax expense for the period equals taxes currently payable or refundable as determined by the tax return. However, supporters of this method would require disclosure of the differences in

Appendix A (cont'd.)

the tax bases of assets and liabilities and the amounts at which they appear in the balance sheet [Rosenfield and Dent, 1983].

At the core of the arguments supporting this method is the view that the income tax expense shown on the income statement is functionally related only to taxable income and not accounting income because this expense arises only when, and if, an entity has taxable income. In addition, this expense arises from the aggregation of all taxable income and tax deductible items. However, "[i]nterperiod tax allocation necessarily assumes the taxation of individual transactions and events, even though no transaction or event by itself gives rise to tax assessment" [Beresford et al., 1983, p. 20].

Supporters of flow-through also find simplicity and accuracy to be its major appeal [McGoldrick, 1984]. They argue that investors would not have to guess a company's earnings and tax expense for a given period. Further, footnote disclosure of relevant information regarding the future (e.g., temporary differences and changes in the tax laws and regulations) would enable investors to assess future cash flows.

A major flaw with the flow-through approach, as Defliese [1983, p. 95] points out, is that it essentially results in cash-basis accounting and "[t]o revert to cash basis accounting would be a retrogression and a complete abdication of financial reporting objectives by the profession." Second, the tax consequences of certain transactions (e.g., installment sales) are clearly identifiable and measurable, and the difference in the timing of the tax consequences of those transactions for financial reporting and taxation is generally of short duration. Hence, in these

Appendix A (cont'd.)

cases, interperiod tax allocation may provide a better indication of future cash flows and the resulting deferred tax account could be meaningfully interpreted. For these reasons, the official position in the U.S., starting with ARB 23 issued in 1944, has required interperiod tax allocation. The theoretical merits and demerits of the two alternative approaches to interperiod tax allocation--comprehensive or partial--are discussed next.

A.2 Comprehensive Allocation

Under the comprehensive approach, interperiod tax allocation must be applied to all temporary differences. This method is the complete opposite of flow-through. Both APB 11 and SFAS 96 require comprehensive allocation with the exception for transactions satisfying the indefinite reversal criteria under APB 23.

The underlying theory for this allocation procedure is that income tax expense recognized in a given period for financial reporting purposes should be based on current or past transactions. Hence, offsetting temporary differences contingent on the happening of some future event (e.g., future asset purchases that may help offset any reversing difference) are ignored. The rationale for ignoring recurring temporary differences is not because the tax effects of those differences cannot be measured, but because the tax effects of each transaction or event should be recognized separately.

Supporters of comprehensive allocation question the economic assumptions on which partial allocation is based. They contend that

Appendix A (cont'd.)

partial allocation assumes continued economic prosperity and growth. It also assumes that repeal of favorable tax regulations that created the differences in the first place will not occur and other contingencies will not arise. These assumptions may not be met. In any case, they are subjective.

Proponents of comprehensive allocation also argue that deferred taxes arising from temporary differences are similar to other balance sheet accounts (e.g., accounts payable) that roll over. Since there is no debate whether or not accounts payable should be recorded on the balance sheet, then why the disagreement over deferred taxes?

Other arguments advanced to support comprehensive allocation include: 1) it results in more reliable information and consistent accounting by eliminating the need for judgement, thereby improving comparability of financial reports, 2) it conforms with the principle of matching revenues and expenses more thoroughly and consistently, 3) it reports more fairly a company's total capitalization because deferred taxes are viewed as a source of capital, and 4) it 'softens' otherwise inflated profits caused by the use of the historical cost convention.

A.3 Partial Allocation

Partial allocation is an intermediate position between flow through and comprehensive allocation. Under this approach, interperiod tax allocation applies to some temporary differences but not others. An important issue with partial allocation is to identify which temporary differences require interperiod allocation.

Appendix A (cont'd.)

Proponents of this approach would allocate taxes on those differences that are reasonably expected to result in income tax payments within a relatively short time period, say five years (APB 11, para. 26). They would exclude temporary differences that give rise to an indefinite postponement of taxes or continuing tax reductions since these transactions involve contingencies that are remote at best and mere disclosure is sufficient.

Advocates of partial allocation also suggest that deferred taxes are quite different from other roll-over accounts (e.g., Nair and Weygandt [1981]). For example, accounts payable balances roll over, but individual items within that account are affected by specific transactions--goods are received, new obligations incurred, and cash paid. In contrast, deferred taxes do not involve any transactions--no cash is paid, the amounts are not owed to anyone, and there is no specific date on which they will become payable. Deferred taxes are perpetual interest-free loans owed to no one.

Other arguments advanced against comprehensive allocation and in support of partial allocation include: 1) comprehensive allocation contradicts economic reality as witnessed by the unrealistic magnitude of deferred tax balances on corporate balance sheets, and 2) comprehensive allocation results in misleading comparisons between companies because it conceals the economic reality of tax deferral that varies significantly among companies.

Appendix A (cont'd.)

A.4 Summary

Although theoretically the flow-through approach is an available alternative to interperiod tax allocation, realistically it appears that some allocation will be required. Hence, the choice is reduced to the two alternatives under interperiod tax allocation--comprehensive and partial allocation. Both have strong conceptual merits. Comprehensive allocation stresses internal consistency and adherence to the accrual accounting model by focusing on individual transactions. Partial allocation stresses economic reality and representational faithfulness by focusing on the nature and aggregate amounts of deferred taxes.

Appendix B

SAMPLE FIRM INFORMATION

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
AAR CORP	5080	NYSE	CI	000361	AA	73	P
AVC CORP	3714	AMEX	CR	002280	PW	73	P
ACME-CLEVELAND CORP	3541	NYSE	CI	004626	EW	73	P
AFFILIATED HOSPITAL PRDS	3069	AMEX	CR	008230	EW	73	P
AIKEN INDUSTRIES INC	3664	AMEX	CR	008788	DH	73	C
AIRPAX ELECTRONICS INC	3679	AMEX	CR	009446	CL	73	P
AJAX MAGNETHERMIC CORP	3560	AMEX	CR	009644	DH	72	P
ALCON LABORATORIES INC	2830	NYSE	CR	013896	AA	72	P
ALLEN GROUP	3714	NYSE	CI	017634	CL	73	P
ALLERGAN PHARMACEUTICALS INC	2830	NYSE	CR	018492	CL	72	P
ALLIED PRODUCTS	3523	NYSE	CI	019411	AA	73	C
AMERACE CORP	3041	NYSE	CR	023519	EW	72	C
AMERICAN BRANDS INC-DEL	2111	NYSE	CI	024703	CL	72	P
AMERICAN HOIST & DERRICK CO	5070	NYSE	CI	026573	TR	72	P
AMERICAN HOSPITAL SUPPLY	3841	NYSE	CR	026681	TR	72	P
AMETEK INC	3621	NYSE	CI	031105	AY	73	C
ANALOG DEVICES	3674	NYSE	CI	032654	AY	72	P
ANDERSON, GREENWOOD & CO	3494	NYSE	CR	033849	AA	72	P
ANGELICA CORP	7200	NYSE	CI	034663	AA	73	C
ANGLO ENERGY INC (Anglo Co Ltd)	1381	AMEX	CI	035053	PW	74	P
ANSUL CO	3560	NYSE	CR	036627	PW	72	P
ARO CORP	3540	NYSE	CR	042627	AY	73	P
ARROW ELECTRONICS INC	5065	NYSE	CI	042735	OR	72	P
AUGAT INC	3679	NYSE	CI	051042	DH	72	P
AUTOMATED BLDG COMPONENTS	3490	AMEX	CR	052807	DH	74	C
BAV LIQUIDATING CORP (Bates Mfg Co)	1211	NYSE	CR	055900	PM	73	P
BALLY MFG CORP	7990	NYSE	CI	058732	AY	72	P
BANNER INDUSTRIES INC	3560	NYSE	CI	066545	AA	73	P
BARD (C.R.) INC	3841	NYSE	CI	067383	AA	72	P
BECOR WESTERN INC (Bucyrus-Erie Co)	3530	NYSE	CR	075873	TR	72	P
BEECH AIRCRAFT CORP	3721	NYSE	CR	076635	EW	72	C
BEKER INDUSTRIES	2870	NYSE	CR	077266	AA	72	P
BELL & HOWELL CO	3688	NYSE	CI	077851	AA	72	C
BERTEA CORP	3728	AMEX	CR	085815	AY	72	P
BETZ LABORATORIES INC	2890	OTC	CI	087779	EW	73	C
BOEING CO	3721	NYSE	CI	097023	TR	72	P
BROOKS & PERKINS INC	3443	AMEX	CR	114331	EW	72	P
BROWN & SHARPE MFG CO	3540	NYSE	CI	115223	CL	74	C
BROWNING-FERRIS INDS	4953	NYSE	CI	115885	AA	74	P
BRUNSWICK CORP	3510	NYSE	CI	117043	AA	72	C

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
CRS SIRRINE INC (CRS Design Associates Inc)	8911	NYSE	CI	126270	TR	73	P
CAMERON IRON WORKS	3533	NYSE	CI	133429	AA	72	P
CAMPBELL INDS	3730	AMEX	CR	134357	PM	73	P
CARLISLE COS INC (Carlisle Corp)	3069	NYSE	CI	142339	PM	74	P
CARPENTER TECHNOLOGY	3312	NYSE	CI	144285	CL	73	P
CARRIER CORP	3580	NYSE	CR	144465	AA	72	P
CATERPILLAR INC (Caterpillar Tractor Co)	3531	NYSE	CI	149123	PW	72	P
CENTRAL SOYA CO	2048	NYSE	CR	155177	AY	73	C
CERTIFIED CORP	3990	AMEX	CR	156897	AY	72	P
CETEC CORP (Computer Equipment Corp)	3651	AMEX	CR	157186	AA	73	P
CHESAPEAKE CORP (Chesapeake Corp of Virginia)	2621	NYSE	CI	165159	CL	72	C
CHROMALLOY AMERICAN CORP	3470	NYSE	CR	171106	PM	73	C
CINCINNATI MILACRON INC	3541	NYSE	CI	172172	EW	72	P
CLARK EQUIPMENT CO	3537	NYSE	CI	181396	PW	72	P
COFFEE-MAT CORP	3580	AMEX	CR	192180	AY	73	P
COHU INC	3825	AMEX	CI	192576	AY	74	P
COLECO INDS	3942	NYSE	CI	193378	PW	72	P
COLEMAN CO INC	3949	NYSE	CI	193558	EW	72	P
COLT INDUSTRIES INC-DEL	3728	NYSE	CI	196864	AA	73	P
COMMERCIAL METALS CO	5051	NYSE	CI	201723	TR	73	C
COMMERCIAL SOLVENTS CORP	2890	NYSE	CR	202381	AY	72	P
COMPO INDS	2200	AMEX	CR	204525	TR	72	C
COMPUGRAPHIC CORP	3555	NYSE	CI	204900	AA	72	P
CONCORD FABRICS INC	2200	AMEX	CI	206219	OR	72	P
CONDEC CORP-OLD	3711	AMEX	CR	206741	AY	73	P
CONGOLEUM CORP (Bath Industries Inc)	3079	NYSE	CR	207192	AA	72	P
CONSYNE CORP	3843	AMEX	CR	210729	PW	72	P
CONTROL DATA CORP	3680	NYSE	CI	212363	PM	72	P
COOK INTERNATIONAL INC (Cook Industries Inc)	7399	AMEX	CR	216174	PM	73	P
CORENCO CORP	2070	AMEX	CR	218687	AY	72	P
CORNELIUS CO	3580	AMEX	CR	219093	EW	72	P
CORNING GLASS WORKS	3220	NYSE	CI	219327	PW	72	P
CRAIG CORP	5411	NYSE	CI	224174	PM	73	P
CROSS (A.T.) & CO -CL A	3950	AMEX	CI	227478	EW	72	P
CUMMINS ENGINE	3510	NYSE	CI	231021	AA	72	P
CURTIS NOLL CORP	5012	NYSE	CR	231507	EW	72	C
CURTISS-WRIGHT CORP	3390	NYSE	CI	231561	CL	72	P
CUTTER LABORATORIES INC-CL A	3841	AMEX	CR	232219	PW	72	P
DAN RIVER INC	2200	NYSE	CR	235773	PM	74	C
DANIEL INDUSTRIES	3823	NYSE	CI	236235	PW	72	P

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
DATAPRODUCTS CORP	3688	AMEX	CI	238107	AY	73	P
DEN-TAL-EZ INC	3843	AMEX	CR	248209	OR	72	P
DENTSPLY INTERNATIONAL INC	3843	NYSE	CR	249028	PW	73	P
DEXTER CORP	2800	NYSE	CI	252165	CL	72	C
DICK (A.B.) CO	3570	NYSE	CR	253034	AA	72	P
DIGITAL EQUIPMENT	3680	NYSE	CI	253849	CL	74	C
DISNEY (WALT) COMPANY	7990	NYSE	CI	254687	PW	73	P
DISSTON INC	3420	NYSE	CR	254700	AA	73	P
DONALDSON CO INC	3564	NYSE	CI	257651	EW	73	P
DOVER CORP	3530	NYSE	CI	260003	PM	74	C
DRESSER INDUSTRIES INC	3530	NYSE	CI	261597	AA	72	P
DYNEER CORP (Aspro Inc)	3714	AMEX	CR	268163	EW	74	C
EECO INC (Electronic Engg Co of CA)	3689	AMEX	CI	268420	AY	72	P
EG&G INC	8911	NYSE	CI	268457	AA	73	C
E-SYSTEMS INC	3664	NYSE	CI	269157	EW	73	P
EAGLE-PICHER INDS	3714	NYSE	CI	269803	PM	73	P
EDO CORP	3664	NYSE	CI	281347	PM	73	P
EGAN MACHINERY CO	3550	AMEX	CR	282255	CL	73	P
ELCO CORP	3679	AMEX	CR	284371	OR	73	P
EMERSON ELECTRIC CO	3621	NYSE	CI	291011	PM	74	P
ENGELHARD CORP (Engelhard Mineral & Chem)	3330	NYSE	CI	292845	PM	72	C
ENSTAR CORP-DEL (Alaska Interstate Co)	1311	NYSE	CR	293582	PM	72	P
ENVIROTECH CORP	3558	NYSE	CR	294098	DH	73	P
EX-CELL-O CORP	3714	NYSE	CR	300587	PM	73	C
FMC CORP	2800	NYSE	CI	302491	PM	72	P
FEDERAL-MOGUL CORP	3714	NYSE	CI	313549	EW	74	P
FEDERAL SIGNAL CORP (Federal Sign & Signal Corp)	3711	NYSE	CI	313855	AA	73	P
FIELDCREST CANNON (Fieldcrest Mills Inc)	2211	NYSE	CI	316549	AY	73	P
FLUKE (JOHN) MFG CO	3825	AMEX	CI	343856	OR	73	C
FOSTER WHEELER CORP	1600	NYSE	CI	350244	OR	72	P
FOXBORO CO	3823	NYSE	CI	351604	TR	72	P
GAF CORP	2860	NYSE	CI	361428	DH	72	P
GCA CORP	3550	NYSE	CI	361556	AY	73	C
GALAXY CARPET MILLS	2272	AMEX	CI	363171	DH	73	P
GARDNER-DENVER CO	3560	NYSE	CR	365550	AA	73	C
GEARHART INDUSTRIES INC (Gearhart-Owen Inds Inc)	1389	NYSE	CI	368298	OR	74	P
GENERAL DYNAMICS CORP	3721	NYSE	CI	369550	AA	73	P
GENERAL ELECTRIC CO	3600	NYSE	CI	369604	PM	74	P
GEORGIA-PACIFIC CORP	2400	NYSE	CI	373298	AA	72	C

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
GLASROCK MEDICAL SERVICES (Glasrock Products)	7394	AMEX	CR	377118	AA	73	C
GLEASON CORP (Gleason Works)	3541	NYSE	CI	377339	EW	72	P
GLOUCESTER ENGINEERING INC	3550	AMEX	CR	379702	OR	73	P
GORMAN-RUPP CO	3561	AMEX	CI	383082	EW	72	C
GRANITEVILLE CO	2200	NYSE	CR	387478	OR	73	C
GREAT LAKES CHEMICAL CORP	2800	NYSE	CI	390568	EW	72	P
GREAT NORTHERN NEKOOSA CORP	2621	NYSE	CI	391090	AA	72	P
GROLIER INC	2731	NYSE	CI	398784	PM	72	P
GROW GROUP INC (Grow Chemical Corp)	2851	NYSE	CI	399820	EW	73	P
GUARDIAN INDUSTRIES	3211	NYSE	CR	401370	CL	73	P
GULTON INDUSTRIES INC	3651	NYSE	CR	402784	OR	73	P
HALLIBURTON CO	1389	NYSE	CI	406216	AA	74	C
HAMMERMILL PAPER CO	5110	NYSE	CR	408306	PW	73	P
HAMMOND CORP	3931	NYSE	CR	408360	CL	73	P
HARNISCHFEGER INDUSTRIES INC	3550	NYSE	CI	413345	PW	72	P
HARRIS CORP (Harris-Intertype Corp)	3663	NYSE	CI	413875	EW	72	P
HAZELTINE CORP	3663	NYSE	CR	421596	OR	72	P
HEWLETT-PACKARD CO	3680	NYSE	CI	428236	OR	72	C
HEXCEL CORP	3460	NYSE	CI	428290	AA	73	P
HIPOTRONICS INC	3825	AMEX	CI	433515	PM	73	P
HOFFMAN ELECTRONICS CORP	3664	NYSE	CR	434434	AA	72	C
HOMESTAKE MINING	1040	NYSE	CI	437614	DH	73	C
HOST INTERNATIONAL INC	5812	NYSE	CR	441074	DH	73	C
HUGHES TOOL CO	3533	NYSE	CR	444492	DH	73	P
HUNT (PHILIP A.) CHEMICAL	3861	NYSE	CR	445582	OR	72	P
I-T-E IMPERIAL CORP	3610	NYSE	CR	450420	AA	72	P
ILLINOIS TOOL WORKS	3714	NYSE	CI	452308	AA	73	C
INMONT CORP	2890	NYSE	CR	457641	PW	73	C
INOLEX CORP (Wilson Pharmaceutical & Chem)	2830	AMEX	CR	457648	CL	73	P
INSTRON CORP	3829	AMEX	CI	457776	AY	72	P
INTL FOODSERVICE CORP	5140	AMEX	CR	459528	OR	72	P
INTL PAPER CO	2631	NYSE	CI	460146	AA	74	C
IONICS INC	2086	AMEX	CI	462218	TR	72	P
ITEK CORP	3550	NYSE	CR	465632	AA	72	P
JEANNETTE CORP	3231	AMEX	CR	472214	CL	74	P
JOHNSTON IND-DEL (Geon Industries Inc)	2221	NYSE	CI	479368	AA	72	P
JOY MFG CO	3530	NYSE	CR	481196	PW	72	P
KANE-MILLER CORP	2010	NYSE	CR	484098	OR	72	P
KAWECKI BERYLCO INDS INC	1090	NYSE	CR	486386	DH	73	C
KING RADIO CORP	3664	AMEX	CR	495620	AA	72	C
KIRSCH CO	2510	NYSE	CR	497656	AA	72	P

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
KOLLMORGEN CORP	3621	NYSE	CI	500440	OR	72	P
LA POINTE INDUSTRIES	3663	AMEX	CI	503840	OR	72	P
LEE PHARMACEUTICALS	2844	AMEX	CI	524038	DH	73	C
LEEDS & NORTHRUP CO	3823	NYSE	CR	524192	CL	74	P
LEESONA CORP	3550	NYSE	CR	524462	EW	72	P
LEVI STRAUSS & CO	2300	NYSE	CR	527364	OR	72	P
LIONEL CORP	5945	AMEX	CI	536257	PW	72	P
LOCKHEED CORP (Lockheed Aircraft Corp)	3760	NYSE	CI	539821	AY	73	P
LOEWS CORP	6199	NYSE	CI	540424	DH	73	P
LOUISIANA-PACIFIC CORP	2421	NYSE	CI	546347	AA	73	P
LOWENSTEIN (M.) CORP	2200	NYSE	CR	547779	DH	73	C
LYKES CORP-DEL (Lykes-Youngstown Corp)	3310	NYSE	CR	550890	PW	74	P
M/A-COM INC (Microwave Associates Inc)	3674	NYSE	CI	552618	PW	72	P
MACMILLAN INC	2731	NYSE	CI	554790	DH	72	P
MALLINCKRODT INC (Mallinckrodt Chemical Works)	2890	OTC	CR	561229	PW	72	P
MANPOWER INC (Parker Pen Co)	7360	NYSE	CR	564182	AA	74	C
MANVILLE CORP (Johns-Manville Corp)	3290	NYSE	CI	565020	CL	72	P
MARATHON MFG CO	3533	NYSE	CR	565821	AY	72	P
MAREMONT CORP	3714	NYSE	CR	566472	AA	73	P
MARK CONTROLS CORP-OLD	3822	NYSE	CR	570385	AA	72	P
MASS MERCHANDISERS INC (Napco Industries Inc)	5122	NYSE	CR	575418	OR	72	P
MCDONNELL DOUGLAS CORP	3721	NYSE	CI	580169	EW	72	P
MCGRAW-EDISON CO	3610	NYSE	CR	580628	AA	72	P
MCLOUTH STEEL CORP	3310	OTC	CR	582273	EW	74	P
MEASUREX CORP	3823	NYSE	CI	583432	CL	72	P
MERCK & CO	2834	NYSE	CI	589331	AA	72	P
MIDLAND-ROSS CORP	3560	NYSE	CR	597715	EW	73	P
MILGO ELECTRONIC CORP	3661	NYSE	CR	599734	AA	72	P
MILLIPORE CORP	3811	NYSE	CI	601073	CL	72	C
MILTON ROY CO	3561	NYSE	CI	602108	OR	73	P
MISSOURI BEEF PACKERS INC	2010	AMEX	CR	606011	AY	73	P
MOHAWK RUBBER CO	3011	NYSE	CR	608302	EW	74	P
MONARCH MACHINE TOOL CO	3541	NYSE	CI	609150	CL	73	P
MONSANTO CO	2800	NYSE	CI	611662	DH	73	P
MOOG INC -CL A	3728	AMEX	CI	615394	PM	73	P
NARCO SCIENTIFIC INC	3841	NYSE	CR	630854	PW	72	P
NARDA MICROWAVE CORP	3679	AMEX	CR	630871	OR	73	P
NASHUA CORP	5081	NYSE	CI	631226	PW	72	P
NATIONAL-STANDARD CO	3310	NYSE	CI	637742	PM	73	P

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
NAVISTAR INTERNATIONAL (International Harvestor Co)	3711	NYSE	CI	638901	DH	73	P
NEPTUNE INTERNATIONAL CORP	4950	NYSE	CR	640745	PM	74	C
NEW ENGLAND NUCLEAR CORP	2810	NYSE	CR	644171	OR	74	C
NORRIS INDUSTRIES INC	3714	NYSE	CR	656389	DH	74	P
NORTHROP CORP	3721	NYSE	CI	666807	EW	72	C
NORTON CO	3290	NYSE	CI	668605	AY	73	P
OAK INDUSTRIES INC	3822	NYSE	CI	671400	AA	73	P
OCCIDENTAL PETROLEUM CORP	1311	NYSE	CI	674599	AA	74	P
OGDEN CORP	7340	NYSE	CI	676346	DH	73	P
OLIN CORP	2800	NYSE	CI	680665	PM	72	P
OUTBOARD MARINE CORP	3510	NYSE	CI	690020	AA	73	C
PACCAR INC	3711	OTC	CI	693718	EW	74	C
PALL CORP	3590	AMEX	CI	696429	OR	73	P
PARK ELECTROCHEMICAL CORP	3679	NYSE	CI	700416	TR	74	P
PEABODY INTERNATIONAL CORP (Peabody-Galion Corp)	8911	NYSE	CR	704562	PM	73	P
PEAVEY CO	2040	NYSE	CR	705041	PM	74	C
PENNWALT CORP	2800	NYSE	CI	709317	AA	73	P
PERTEC COMPUTER CORP (Pertec Corp)	3684	NYSE	CR	715361	AA	72	P
PITTSTON CO	4513	NYSE	CI	725701	PM	72	P
PITTWAY CORP	3666	AMEX	CI	725786	PW	74	P
PNEUMATIC SCALE CORP	3550	AMEX	CI	730162	EW	72	C
PNEUMO CORP	5411	NYSE	CR	730196	EW	74	C
POLAROID CORP	3861	NYSE	CI	731095	PM	73	P
POPE & TALBOT INC	2421	NYSE	CI	732827	AY	73	C
PORTEC INC	3531	NYSE	CI	736202	OR	72	P
PROLER INTERNATIONAL CORP (Proler Steel Corp)	3312	NYSE	CI	743396	CL	73	P
PULLMAN INC	1600	NYSE	CR	745791	AY	72	P
PUREX INDUSTRIES INC (Purex Corp Ltd)	2840	NYSE	CR	746252	PW	73	P
QUANEX CORP (Michigan Seamless Tube Co)	3312	NYSE	CI	747620	PM	73	C
RCA CORP	3600	NYSE	CR	749285	AY	74	P
RANCO INC	3822	NYSE	CR	752159	CL	73	P
RAYCHEM CORP	3640	NYSE	CI	754603	AY	73	P
RAYTHEON CO	3664	NYSE	CI	755111	CL	73	P
REED TOOL CO	3533	NYSE	CR	758260	AY	73	P
REICHHOLD CHEMICALS INC	2820	NYSE	CR	759200	PM	74	C
RELIANCE ELECTRIC CO	3610	NYSE	CR	759457	EW	72	P
REXNORD INC	3560	NYSE	CR	761688	AA	74	P
RIEGEL TEXTILE CORP	2200	NYSE	CR	766481	AA	73	C
ROCKWELL INTERNATIONAL CORP	3721	NYSE	CI	774347	DH	73	P
ROGERS CORP	3679	AMEX	CI	775133	CL	72	P
ROHM & HAAS CO	2821	NYSE	CI	775371	PM	72	P

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
ST JOE MINERALS CORP	1211	NYSE	CR	790155	DH	72	P
SCIENTIFIC-ATLANTA INC	3663	NYSE	CI	808655	AA	73	C
SCOTT & FETZER CO	3630	NYSE	CR	809367	CL	73	P
SCOTT PAPER CO	2621	NYSE	CI	809877	PW	72	P
SEQUA CORP -CL A (Sun Chemical Corp)	3490	NYSE	CI	817320	AA	72	P
SERVO CORP OF AMERICA	3743	AMEX	CI	817698	AA	72	P
SETON CO	3100	AMEX	CR	817814	OR	73	P
SIGMA INSTRUMENTS	3679	AMEX	CR	826588	EW	72	P
SIGNODE CORP	3490	NYSE	CR	826690	AA	73	C
SIMMONDS PRECISION PRODS INC	3823	NYSE	CR	828675	PM	74	P
SINGER CO	3664	NYSE	CI	829302	PM	73	P
SMITH INTERNATIONAL INC	3533	NYSE	CI	832110	AA	72	P
SNAP-ON TOOLS CORP	3420	NYSE	CI	833034	OR	74	P
SOLA BASIC INDUSTRIES INC	3679	NYSE	CR	834086	TR	74	P
SPECTRA-PHYSICS	3811	NYSE	CR	847567	AY	72	P
SPEED-O-PRINT BUS MACHINES	5081	AMEX	CI	847660	AA	73	C
SPENCER FOODS INC	2010	AMEX	CR	847889	DH	73	P
STANDARD PRODUCTS CO	3714	NYSE	CI	853836	AA	73	C
STANRAY CORP	3743	NYSE	CR	854701	AA	72	P
STAUFFER CHEMICAL CO	2800	NYSE	CR	857721	DH	72	P
STEELMET INC	5093	AMEX	CR	858263	OR	72	P
STONE CONTAINER CORP	2631	NYSE	CI	861589	OR	74	C
STORAGE TECHNOLOGY CORP	3684	NYSE	CI	862111	AA	72	P
SULLAIR CORP	3560	NYSE	CR	865112	AA	73	P
SUNDSTRAND CORP	3728	NYSE	CI	867323	OR	72	P
SYSTRON-DONNER CORP	3820	NYSE	CR	872056	PM	73	P
TRE CORP	3720	NYSE	CR	872628	PM	73	P
TRW INC	3760	NYSE	CI	872649	EW	73	P
TAB PRODUCTS	2522	AMEX	CI	873197	PW	73	P
TECUMSEH PRODUCTS CO	3585	OTC	CI	878895	OR	73	P
TEKTRONIX INC	3825	NYSE	CI	879131	DH	72	P
TELEDYNE INC	3724	NYSE	CI	879335	AA	73	C
TERADYNE INC	3825	NYSE	CI	880770	CL	73	C
TEXSTAR CORP	3714	AMEX	CR	883118	PM	73	C
TEXTRON INC	3720	NYSE	CI	883203	AY	72	P
THERMO ELECTRON CORP	3560	NYSE	CI	883556	AA	73	C
THIOKOL CORP	2820	NYSE	CR	884102	AY	73	C
THOMAS INDUSTRIES INC	3640	NYSE	CI	884425	EW	74	P
TIMES MIRROR CO-DEL	2711	NYSE	CI	887360	EW	72	C
TORO CO	3520	NYSE	CI	891092	PM	72	P
TRAFALGAR INDUSTRIES INC (Flagstaff Corp)	1211	AMEX	CR	892711	PM	74	P
TROPICANA PRODUCTS INC	2030	NYSE	CR	897090	EW	73	C
TUFTCO CORP	3550	AMEX	CR	899041	EW	73	P
UOP INC (Universal Oil Products Co)	3350	NYSE	CR	903200	AA	72	P

Appendix B (cont'd.)

Firm name (old name)[a]	SIC code[b]	Exch-ange[c]	COMPU-STAT[d]	CUSP[e]	Audi-tor[f]	DISC Yr[g]	Acct Meth[h]
UNION CAMP CORP	2621	NYSE	CI	905530	DH	72	P
UNITED AIRCRAFT PRODUCTS INC	3720	AMEX	CR	909313	CL	73	C
UNITED INDUSTRIAL CORP	3665	NYSE	CI	910671	EW	72	P
UNITED MERCHANTS & MFRS INC	2211	NYSE	CI	910858	OR	74	C
UNITED TECHNOLOGIES CORP (United Aircraft Corp)	3724	NYSE	CI	913017	PW	72	P
UNITEK CORP	3843	AMEX	CR	913249	AY	72	P
UNITRODE CORP	3674	NYSE	CI	913283	CL	74	C
UNIVERSAL CORP-VA (Universal Leaf Tobacco Co)	5150	NYSE	CI	913456	AY	74	C
VLN CORP	3690	AMEX	CR	918254	PM	72	C
VSI CORP	3728	NYSE	CR	918314	AA	73	C
VALMAC INDUSTRIES INC	2016	AMEX	CR	920228	EW	74	C
VARIAN ASSOCIATES INC	3670	NYSE	CI	922204	CL	72	P
VETCO INC (Vetco Offshore Inds Inc)	3533	NYSE	CR	925496	DH	73	P
VULCAN CORP	3069	AMEX	CI	929092	OR	72	P
WAGNER ELECTRIC CORP	3714	AMEX	CR	930455	CL	72	P
WALLACE-MURRAY CORP	3430	NYSE	CR	932355	AA	73	C
WANG LABORATORIES -CL B	3680	AMEX	CI	933696	EW	74	P
WARNER & SWASEY CO	3540	NYSE	CR	934408	EW	74	P
WARNER COMMUNICATIONS INC	7810	NYSE	CI	934436	AY	72	P
WATKINS-JOHNSON	3664	NYSE	CI	942486	DH	72	C
WEATHERHEAD CO	3714	NYSE	CR	947151	EW	73	P
WESTERN PUBLISHING INC	2731	NYSE	CR	959265	CL	72	P
WESTINGHOUSE ELECTRIC CORP	3664	NYSE	CI	960402	PW	73	P
WESTVACO CORP	2621	NYSE	CI	961548	PW	74	C
WEYERHAEUSER CO	2421	NYSE	CI	962166	AA	72	P
WHITE CONSOLIDATED INDS INC	3630	NYSE	CR	963626	EW	72	P
WHITEHALL CORP (Whitehall Electronics Corp)	3811	NYSE	CI	965010	EW	72	P
WILL ROSS INC	2830	NYSE	CR	969088	EW	73	P
WILLCOX & GIBBS INC	5063	NYSE	CI	969207	DH	72	P
WILLIAMS COS INC	4922	NYSE	CI	969457	AY	74	C
WINNEBAGO INDUSTRIES	3716	NYSE	CI	974637	OR	73	P
WOLVERINE WORLD WIDE	3140	NYSE	CI	978097	EW	72	P
WOOD INDUSTRIES INC	3550	AMEX	CR	978403	PW	74	P
WYNN'S INTERNATIONAL INC	3585	NYSE	CI	983195	AY	72	P
ZAPATA CORP	900	NYSE	CI	989070	AA	74	P
ZENITH ELECTRONICS CORP (Zenith Radio Corp)	3651	NYSE	CI	989349	AA	73	C

[a]The "firm name" is the name by which the sample firm is listed on COMPUSTAT. The "old name" is the name by which the firm was listed on NAARS. Name changes were determined from MOODY's Industrial manuals.

Appendix B (cont'd.)

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[b]The four-digit primary industry classification numbers assigned to the firms by COMPUSTAT. These conform as nearly as possible to the Office of Management and Budget's Industry Classification (SIC) Codes.

[c]AMEX=American Stock Exchange, NYSE=New York Stock Exchange, OTC=Over-the-counter stocks.

[d]CI=Annual COMPUSTAT Industrial files, CR=Annual COMPUSTAT Research file.

[e]Unique six-digit company identification number conforming to the CUSIP numbering system.

[f]where:

AA=Arthur Andersen & Co
AY=Arthur Young
CL=Coopers & Lybrand (also Lybrand, Ross Bros. & Montgomery)
DH=Deloitte Haskins & Sells (also Haskins & Sells)
EE=Ernst & Ernst
PM=Peat, Marwick, Mitchell & Co
PW=Price Waterhouse & Co
TR=Touche Ross
OR=Other.

[g]The year in which the DISC became (or was assumed to become) operational.

[h]C = comprehensive allocator, P = partial allocator.

Appendix C

EXAMPLES OF DISC DISCLOSURES

Presented in this Appendix are examples of disclosures made by some sample firms regarding their domestic international sales corporation(s) (DISC). Disclosures were primarily made in the tax footnote and/or the accounting policies footnote to the financial statements. Relevant portions of the footnotes are in italics and bolded for emphasis. In some cases, the entire footnote is not presented if considered unnecessary. It should be noted that these examples are merely illustrative and by no means exhaustive of the variety of disclosures encountered.

The disclosures have been divided as follows:

Appendix C (cont'd.)

C.1 Examples of Disclosures by Comprehensive Allocators

GCA CORPORATION
Notes to Consolidated Financial Statements
FYE September 30, 1973

1. Major accounting policies

Income taxes: Prepaid and deferred tax accounting is used to recognize timing differences between tax and financial reporting for certain expense items. In addition, ***deferred taxes have been provided for the portion of income of the Company's domestic international sales corporation (DISC) that is eligible for tax deferral.***

GARDNER-DENVER CO.
Notes to Consolidated Financial Statements
FYE December 31, 1973

Note (4) Income Taxes

Income tax expense for 1973 is composed of the following elements:

	Current	Deferred	Total
U.S. Federal	$15,721,000	$2,242,000	$17,963,000
Foreign	4,502,000	--	4,502,000
State & local	1,235,000	--	1,235,000
	$21,458,000	$2,242,000	$23,700,000

Deferred taxes above result from timing differences in the recognition of revenue and expense for tax and financial statement purposes. The major sources of these differences in 1973 and the related tax effect of each is as follows:

	Tax Effect
Income on installment sales deferred for tax purposes	$ 260,000
Tax on portion of income from Domestic International Sales Corporation (DISC) deferred for tax purposes	***1,887,000***
Other net	95,000
	$2,242,000

Appendix C (cont'd.)

Gardner-Denver Co. (FYE 1973) **Page 2**

The total effective income tax, rate on consolidated pre-tax income is 46.7%, which differs from the expected U.S. Federal income tax rate of 48% for the following reasons:

	Amount	% of Pre-tax income
Expected income tax at at statutory rate	$24,346,000	48.0%
Increase (reduction) in taxes resulting from		
• Benefits attributable to lower statutory tax rate of Western Hemisphere Corporation	(802,000)	(1.6)
• Foreign income, subject to foreign taxes, but not expected to be subject to additional U.S. tax	(294,000)	(.6)
• State and local income taxes, net of Federal income tax benefit	642,000	1.3
• Amortization of prior years' investment credits	(160,000)	(.3)
• Misc. items, net	(32,000)	(.1)
	$23,700,000	46.7%

It is expected that the cash outlay of income taxes with respect to the years 1974 through 1976 will be less than income tax expense for these years.

At December 31, 1973, unremitted income for which U.S. taxes have not been provided totaled $24,700.000. Under existing U.S. income tax laws foreign income tax credits would be available to substantially offset any U.S. taxes.

Appendix C (cont'd.)

C.2 Examples of Disclosures by Partial Allocators

GREAT NORTHERN NEKOOSA CORPORATION
Accounting Policies
FYE December 31, 1972

Deferred Taxes on Income:

Income taxes are provided on net income as reported in the statement of income regardless of when such taxes are payable. That portion of the annual tax provision not currently payable, primarily resulting from the use of accelerated depreciation, is deferred.

The Company has formed two domestic international sales corporation (DISC) subsidiaries to take advantage of legislation permitting federal income taxes on one-half of the income of qualified export sales to be deferred indefinitely, under certain conditions. Since the company meets these conditions, no provision was made in 1972 for $363,000 in taxes otherwise payable.

BANNER INDUSTRIES, INC.
Notes to consolidated Financial Statements
FYE June 30, 1974

Note 8. Federal Income Taxes:

The consolidated Federal income tax provision in the accompanying consolidated statement of income differs from the statutory rate as follows:

	1974	1973
Income before taxes on income	$5,725,741	$4,896,731
Less - State income taxes	(255,000)	(176,000)
Income before Federal income taxes	$5,470,741	$4,720,731
Tax provision, at Statutory rates	$2,602,000	$2,283,000
Tax effect of foreign operating included above not deductible	176,000	34,000
Investment tax credit	(138,000)	(95,000)
Tax effect of Domestic International Sales Corporation	***(104,000)***	***(82,000)***
Other, net	9,000	(43,000)
Provision for Federal income taxes	$2,545,000	$2,097,000

Appendix C (cont'd.)

Banner Industries, Inc. (FYE 1974) **Page 2**

Deferred tax expense results from timing differences in the recognition of income and expenses for tax and financial statement purposes. The sources of these items are summarized as follows:

	1974	1973
Depreciation	$275,000	$180,000
Accrued expenses	(329,000)	(37,000)
Other, net	(50,000)	19,000
	(104,000)	162,000

The Company does not currently provide for Federal income taxes on undistributed earnings of its foreign subsidiary since it is the Company's intention to have the subsidiary utilize such earnings for capital expansion and/or debt payment.

Appendix C (cont'd.)

C.3 Examples of Disclosures by DISCs with FYE Different from Parent Corporation

IONICS, INC.
Notes to Consolidated Financial Statements
FYE December 31, 1973

Note e. Income taxes:

The Company and its subsidiaries file separate income tax returns. Deferred taxes arise from timing differences between tax and financial statement reporting as follows:

	Year Ended December 31 1973	1972
Undistributed earnings of foreign investees	$ 60,900	$ 21,900
Long-term contracts	234,900	(32,200)
Gain on retirement of debt	(6,400)	55,300
Utilization of loss carryforward of subsidiary	41,800	44,000
Different year-end of Ionics Disc. Inc.	***(9,800)***	***$35,600***
Exercise of stock options	19,600	
Miscellaneous	(12,300)	(10,600)
	$328,700	$114,000

Total income tax expense was $515,900 for 1973 and $350,400 for 1972. These amounts were less than those which would be obtained by applying the United States federal income tax rate of 48% to income before taxes, as follows:

	Year Ended December 31 1973	1972
Indefinite deferral of Disc income	***$28,400***	***$35,600***
Investment credit (flow-through method)	10,000	11,000
State taxes (net of federal tax effects)	(39,100)	(26,800)
Other	6,400	4,000
	$5,700	$23,800

Appendix C (cont'd.)

REED TOOL CO.
Notes to Consolidated Statement of Operations
FYE December 31, 1974

Note D.

The provisions for federal income taxes are based on the Company and its eligible subsidiaries filing a consolidated federal income tax return. ...

Income taxes on continuing operations included in the consolidated statement of operations are as follows:

	Year Ended December 31, (in thousands of dollars)		
	1972	1973	1974
Current	$1,564	$2,925	$3,247
Deferred	(164)	(740)	39
	$1,400	$2,185	$3,286

Deferred income taxes represent federal income taxes and current income taxes include state and foreign income taxes of $164.000 in 1973 and $580.000 in 1974.

Deferred income taxes result from timing differences in the recognition of revenue and expense for tax and financial statement purposes. The sources of these differences in 1973 and 1974 from continuing operations and the tax effect of each were as follows:

	Year Ended December 31, (In thousands of dollars)	
	1973	1974
Excess of tax over book depreciation	$ 335	$ 308
Income from change in inventory method for tax purposes	--	(222)
Deferred compensation not deductible for tax purposes until paid	(71)	(180)

Appendix C (cont'd.)

REED TOOL CO. (FYE 1974) **Page 2**

Deferred income of a Domestic International Sales Corporation	***$ 45***	***$ 156***
Accrued expenses not deductible	27	(90)
Deferred charges expensed currently for tax purposes	74	75
Proceeds from settlement of Company's suit against the former principal stockholder recognized for financial statement purposes in prior years	(963)	--
Inventory reserve deducted for financial statement purposes in years different than for tax purposes	(150)	--
Other	(37)	$ (8)
	$(740)	$ 39

Differences in 1973 and 1974 between the Company's effective income tax rate reflected in the provision for income taxes on continuing operations and the amount resulting from application of the statutory federal income tax rate of 48% to income from continuing operations before income taxes are shown below:

	Year Ended December 31, (In thousands of dollars)	
	1973	1974
Provision for income taxes at statutory rate	$2,294	$4,138
Increase (reductions) resulting from:		
Investment tax credits	(95)	(607)
Nontaxable income of a Domestic International Sales Corporation	***(45)***	***(141)***
Excess of allowable tax depletion over book depletion on mineral deposits	(119)	(118)
Other	150	14
Provision for income taxes	$2,185	$3,286

Appendix C (cont'd.)

C.4 Examples of Disclosures for Year when DISC Established/Operational

AAR CORP
Notes to Consolidated Financial Statements
FYE May 31, 1973

Income Taxes

In accordance with the provisions of the Revenue Act of 1971, the Company ***established*** a Domestic International Sales Corporation ("DISC") ***in 1972***. Under the provisions of the Revenue Act, 50% of the DISC's earnings are not subject to taxation until distributed to the parent company. As it is the Company's intention to permanently reinvest such earnings to finance international expansion, no Federal income taxes have been provided on the earnings to be retained by the DISC.

Benefits of the investment tax credit ...

Appendix D

INDUSTRY CLASSIFICATION OF SAMPLE FIRMS

SIC-Code	Industry name[a]	DISC Acc. Meth.[b] C	P	Total
900	Fishing, hunting, trapping	0	1	1
1040	Gold and silver ores	1	0	1
1090	Miscellaneous metal ores	1	0	1
1211	Bituminous coal and lignite	0	3	3
1311	Crude petroleum and natural gas	0	2	2
1381	Drilling oil and gas wells	0	1	1
1389	Oil, gas field services, nec	1	1	2
1600	Construction - not bldg constr	0	2	2
2010	Meat products	0	3	3
2016	Poultry dressing plants	1	0	1
2030	Can, preserve fruit, vegetable	1	0	1
2040	Grain mill products	1	0	1
2048	Prep feeds for animals, nec	1	0	1
2070	Fats and oils	0	1	1
2086	Bottled and canned soft drinks	0	1	1
2111	Cigarettes	0	1	1
2200	Textile mill products	5	1	6
2211	BRD woven fabric mill, cotton	1	1	2
2221	BRD woven fabrc man-made silk	0	1	1
2272	Tufted carpets and rugs	0	1	1
2300	Apparel and other finished pds	0	1	1
2400	Lumber and wood pds, ex furn	1	0	1
2421	Saw mills, planning mills, gen	1	2	3
2510	Household furniture	0	1	1
2522	Metal office furniture	0	1	1
2621	Paper mills, ex bldg paper	2	3	5
2631	Paper board mills	2	0	2
2711	Newspaper: pubg, pubg & print	1	0	1
2731	Books: pubg, pubg & printing	0	3	3
2800	Chemicals and allied products	1	6	7
2810	Indl inorganic chemicals	1	0	1
2820	Plastic matl, synthetic resin	2	0	2
2821	Plastics, resins, elastomers	0	1	1
2830		0	4	4
2834	Pharmaceutical preparation	0	1	1
2840	Soap, detergent, toilet preps	0	1	1
2844	Perfume, cosmetic, toilet prep	1	0	1
2851	Paints, varnishes, lacquers	0	1	1
2860	Industrial organic chemicals	0	1	1
2870	Agriculture chemicals	0	1	1
2890	Misc chemical products	2	2	4
3011	Tires and inner tubes	0	1	1

Appendix D (cont'd.)

SIC-Code	Industry name[a]	DISC Acc. Meth.[b] C	P	Total
3041		1	0	1
3069	Fabricated rubber pds, nec	0	3	3
3079	Misc plastics products	0	1	1
3100	Leather and leather products	0	1	1
3140	Footwear, except rubber	0	1	1
3211	Flat glass	0	1	1
3220		0	1	1
3231		0	1	1
3290	Abrasive, asbestos, misc, mineral	0	2	2
3310	Blast furnaces and steel works	0	3	3
3312	Blast furnaces and rolling mills	1	2	3
3330	Prim smelt, refin nonfer metal	1	0	1
3350	Rolling and draw nonfer metal	0	1	1
3390	Misc primary metal products	0	1	1
3420	Cutlery, hand tools, gen hardware	0	2	2
3430	Heating eq, plumbing fixture	1	0	1
3443	Fabricated plate work	0	1	1
3460	Metal forgings and stampings	0	1	1
3470	Coating, engraving, allied services	1	0	1
3490	Misc fabricated metal products	2	1	3
3494	Valve, pipe fittings, ex brass	0	1	1
3510	Engines and turbines	2	1	3
3520	Farm and garden machinery and equip	0	1	1
3523	Farm machinery and equipment	1	0	1
3530	Constr, mining, matl handle equip	1	3	4
3531	Contruction machinery and equip	0	2	2
3533	Oil field machinery and equip	0	6	6
3537	Indl trucks, tractors, trailers	0	1	1
3540	Metal working machinery and equip	1	2	3
3541	Machine tools, metal cutting	0	4	4
3550	Special industry machinery	2	7	9
3555	Printing trades machy, equip	0	1	1
3558	Pollution control machinery	0	1	1
3560	General industrial mach and equip	2	6	8
3561	Pumps and pumping equipment	1	1	2
3564	Blowers, exhaust, ventilation fans	0	1	1
3570	Office, computing, accounting mach	0	1	1
3580	Refrig and service ind machine	0	3	3
3585	Air cond, heating, refrig equip	0	2	2
3590	Misc machinery, ex electrical	0	1	1
3600	Elec, electr mach, equip, supply	0	2	2
3610	Elec transmissions and distr equip	0	3	3
3621	Motors and generators	1	2	3
3630	Household appliances	0	2	2
3640	Electric lighting, wiring, equip	0	2	2
3651	Radio and TV receiving sets	1	2	3
3661	Tele and telegraph apparatus	0	1	1

Appendix D (cont'd.)

SIC-Code	Industry name[a]	DISC Acc. Meth.[b] C	P	Total
3663	Radio, TV comm equip, apparatus	1	3	4
3664	Search, navigate, guide sys, equip	4	5	9
3665	Training equip and simulators	0	1	1
3666	Alarm and signalling products	0	1	1
3670	Electronic comp, accessories	0	1	1
3674	Semi-conductor, related device	1	2	3
3679	Electronic components, nec	0	8	8
3680	Electronic computing equip	2	2	4
3684	Computer disk and tape drives	0	2	2
3688	Computer peripherals	1	1	2
3689	Computer equipment, nec	0	1	1
3690	Misc elec machy, equip, supplies	1	0	1
3711	Motor vehicles and car bodies	1	3	4
3714	Motor vehicle part, accessory	5	8	13
3716	Motor homes	0	1	1
3720	Aircraft and parts	1	2	3
3721	Aircraft	2	4	6
3724	Aircraft engine, engine parts	1	1	2
3728	Aircraft parts, aux equip, nec	1	4	5
3730	Ship and boat bldg and repairing	0	1	1
3743	Railroad equipment	0	2	2
3760	Guided missiles and space vehicles	0	2	2
3811	Engr, lab and research equipment	1	2	3
3820	Measuring, controlling instr	0	1	1
3822	Automatic regulating controls	0	3	3
3823	Industrial measurement instr	0	5	5
3825	Elec meas and test instruments	2	3	5
3829	Meas and controlling dev, nec	0	1	1
3841	Surgical, med instr, apparatus	0	4	4
3843	Dental equipment and supplies	0	4	4
3861	Photographic equip and supplies	0	2	2
3931	Musical instruments	0	1	1
3942	Dolls	0	1	1
3949	Sporting and athletic goods, nec	0	1	1
3950	Pens, pencils, other office matl	0	1	1
3990	Misc manufacturing industries	0	1	1
4513	Air courier services	0	1	1
4922	Natural gas transmission	1	0	1
4950	Sanitary services	1	0	1
4953	Refuse systems	0	1	1
5012		1	0	1
5051	Metal service centers - whsl	1	0	1
5063	Elec apparatus and equip - whsl	0	1	1
5065	Electronic parts and equip - whsl	0	1	1
5070	Hardware, plum, heat equip - whsl	0	1	1
5080	Machinery and equipment - whsl	0	1	1
5081	Comml machines and equip - whsl	1	1	2

Appendix D (cont'd.)

SIC-Code	Industry name[a]	DISC Acc. Meth.[b] C	P	Total
5093		0	1	1
5110	Paper and paper products - whsl	0	1	1
5122	Drugs and proprietary - whsl	0	1	1
5140	Groceries and related pds - whsl	0	1	1
5150	Farm-product raw matl - whsl	1	0	1
5411	Grocery stores	1	1	2
5812	Eating places	1	0	1
5945	Hobby, toy, game shops	0	1	1
6199	Finance-services	0	1	1
7200	Personal services	1	0	1
7340	Svcs to dwellings, other buildings	0	1	1
7360	Personnel supply services	1	0	1
7394	Equip rental and leasing services	1	0	1
7399	Business services, nec	0	1	1
7810	Motion picture prodn, services	0	1	1
7990	Misc amusement and rec services	0	2	2
8911	Engr, architect, survey services	1	2	3
	Total	82	238	320

[a]As per Appendix B of the Standard & Poor's COMPUSTAT manual (April 11, 1988).

[b]C=comprehensive allocators, P=partial allocators.

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