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Voluntary Accounting Policy Choices of Lower -Level Firms in Multi -Firm Organizations.

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VOLUNTARY ACCOUNTING POLICY CHOICES OF LOWER-LEVEL FIRMS IN MULTI-FIRM ORGANIZATIONS

A Dissertation

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of the Louisiana State University and
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ABSTRACT

This study investigates the determinants of accounting choices for subsidiary firms in multi-firm organizations. A "subsidiary" is defined as either a company that is controlled (i.e., more than 50 percent ownership) by another corporation (its "parent") or is a firm under the parent company's influence (i.e., between 20 and 50 percent ownership). Previous studies focus exclusively on the parent company; hence little is known about making accounting procedure choices for subsidiaries. As a separate legal entity, a subsidiary's accounting policies should be of interest to its creditors, regulators, and noncontrolling minority-interest shareholders.

The accounting procedure choices investigated are depreciation and inventory. The sample was comprised of 96 subsidiary-parent matches for depreciation methods and 36 subsidiary-parent matches for inventory methods drawn from the period ranging from 1982 to 1997. Two sets of empirical models were evaluated. First, single firm models that ignore the nature of the parent-subsidiary relationship but, rather, focus solely on the characteristics of the subsidiary firm. Second, multi-firm models were evaluated that expand the single firm model by including variables that capture certain aspects of the parent-subsidiary relationship. Statistically significant results were found for some of the following variables that measure the multi-firm aspect of the subsidiary's accounting choice: (1) the parent company's choice, (2) the percentage ownership held by the parent, and (3) when the subsidiary was acquired from another parent company. In addition, this study contributes by identifying the level of proportional ownership that signals, on average, the exercise of parental influence over the subsidiary's choice.

CHAPTER 1

INTRODUCTION

The purpose of this study is to examine the accounting choices made by partially owned subsidiaries and unconsolidated subsidiaries in multi-firm organizations. Multi-firm organizations have at least two firms that are linked through ownership (i.e., a parent and subsidiary). While previous accounting choice studies focus on the parent company's choice, I am restricting the analysis to the partially owned subsidiary firm's accounting choice. A subsidiary firm is either a partially owned subsidiary or a firm under the parent company's influence (i.e., unconsolidated).[1]

Because a subsidiary can contribute significantly to the financial results of the multi-firm organization (e.g., American Airlines and its parent, AMR Corp.), a subsidiary's accounting choices can affect the parent's consolidated financial results. Moreover, since the study's focus is on partially owned subsidiaries, understanding their accounting choices should be of interest to the subsidiary's noncontrolling equity interest owners. The analysis is conducted using a sample of partially owned subsidiaries (i.e., more than 20%, but less than 100% owned) between 1978 and 1997 for which separate financial statements are available. Both consolidated and unconsolidated subsidiaries will be analyzed. The statistical analysis will be

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[1] Technically the terms "parent" and "subsidiary" refer to relationships where control by one entity (the parent) is exercised over the other (the subsidiary). When such control is nonexistent it may be more appropriate to use the terms "investor" and "investee." For convenience, however, parent and subsidiary are used in practice and in accounting literature. I intend to follow this convention in this study.

conducted in two stages. First, regressing the subsidiary's accounting choice on a set of explanatory variables peculiar to the single-firm organization, which I refer to as the single firm model (SFM) throughout the study. This test follows the format traditionally used in accounting choice studies. The second stage of analysis introduces variables that capture the nature of the parent-subsidiary relationship, referred to throughout the study as the multi-firm model (MFM). Figure 1 summarizes the general approach to the study, and Table 1 presents definitions for the items in Figure 1.

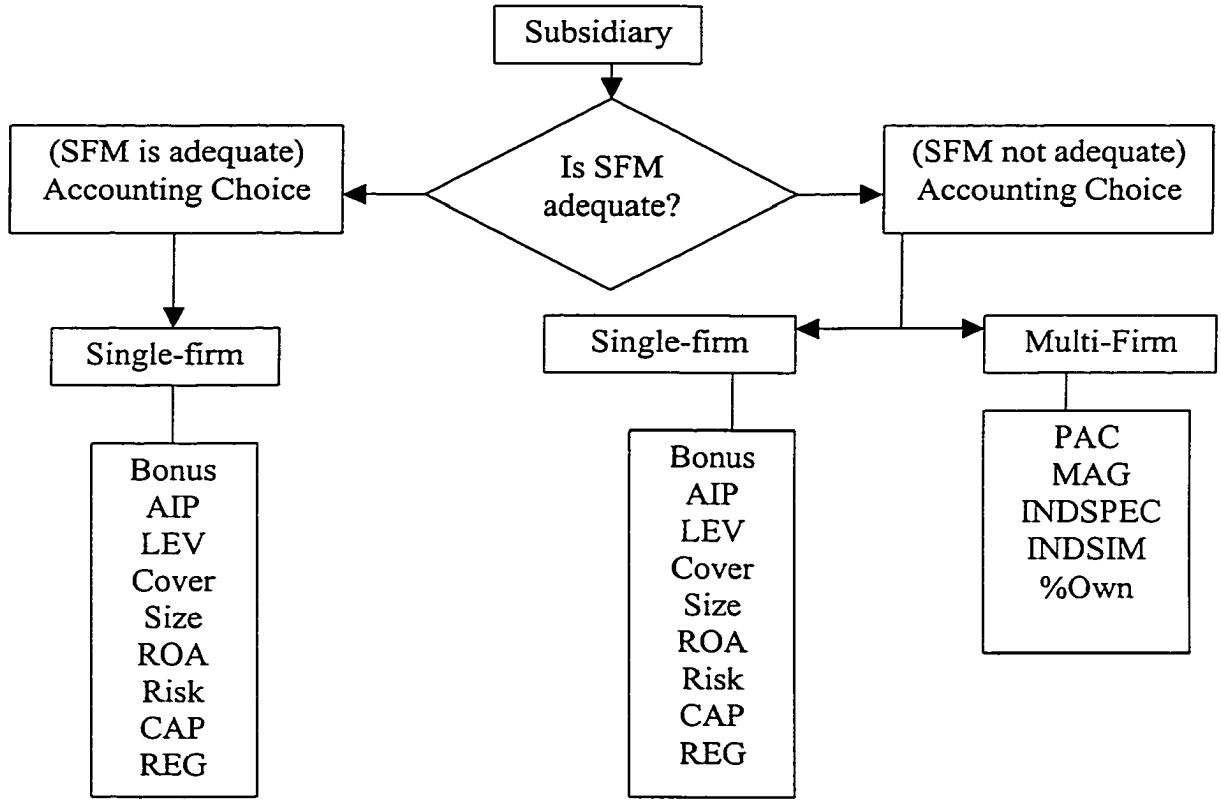

Figure 1. Study of Accounting Choice for Subsidiary Firms

Subsidiary corporations may choose accounting methods that differ from those of their parent company for a variety of reasons. The variables used in this study to

help explain the subsidiary's accounting choices are classified as either single-firm (SF) variables or multi-firm (MF) variables. The single-firm model (SFM) includes the following variables suggested by the extant literature that may affect a single-firm organization's accounting choice: (1) the existence of accounting-based bonus plans (Bonus), (2) the firm's assets-in-place (AIP), (3) leverage (LEV),

Table 1
Legend of Accounting Choice Variables

j	=	j^{th} accounting policy choice,
AC^j	=	Accounting choice is measured as 1, and 0 otherwise, if the firm's j^{th} choice is income increasing. The accounting policy choices to be examined are depreciation (straight-line = 1), and Inventory (FIFO & Weighted Avg. = 1) zero otherwise,
Single-firm (SF) variables		
Bonus	=	Bonus for CEO that is dependent on accounting income is measured as 1 if it exists, 0 otherwise,
AIP	=	Assets-in-place is measured by (total book value of assets - the book value of intangible assets) divided by size, 4-year average,
LEV	=	Leverage is measured by long-term debt ÷ assets, 4-year average,
Cover	=	Interest coverage is the operating income before depreciation ÷ interest expense, 4-year average,
Size	=	Size is measured by the market value of equity + the book value of debt, 4-year average,
ROA	=	Performance is measured as the average return on assets, 4-year average,
Risk	=	Risk or uncertainty is measured by the standard deviation of return on assets, 4-year average,
REG	=	Regulation is measured as, 1 if parent or firm is regulated, 0 otherwise,
CAP	=	Consensus industry accounting policy choice after omitting the second-level firm's choice, measured as, 1 when average ≥ 60% and - Holthausen 1 when average <= 40%, 0 otherwise,
TLCF	=	Used in inventory choice model. 1 if tax-loss carry forward, 0 otherwise,
INFL	=	Used in inventory choice model. 1 if average inflation is 3% or more for previous five years, -1 if average deflation is 3% or more for previous five years, and 0 otherwise.

Table 1 Continued

Multi-firm (MF) variables		
PAC	=	Parent's choice, measured as 1 for incoming increasing and 0 otherwise,
MAG	=	Magnitude of control costs is measured as, as the subsidiary operating income before depreciation ÷ the same income measure of the parent, 4-year average,
INDSPEC	=	Industry knowledge specialization is measured by 1, and 0 otherwise, if there is a difference in the four digit SIC group between the parent and the subsidiary and the coding of knowledge specialization at the subsidiary is identified by the classification of industries by Christie, Joye, and Watts (1998),
INDSIM	=	Industry similarity between the parent and the subsidiary is measured as a 1 if the parent's primary 2 digit SIC group matches the subsidiary's 2 digit SIC group, and 0 otherwise,
%Own	=	Proportional ownership of the subsidiary by the parent, measured variously as over 1 when over 50%, 40%, 30%, and 25% and also continuously in various models,
PREV	=	Previous ownership, is measured as 1 when acquired subsidiary was previously owned by another parent prior to acquisition of current parent (data supplied by Securities Data Corporation),
AQUIR	=	Subsidiary acquired by parent is measured as 1, 0 otherwise.
PACREG	=	Interaction term, REG x PAC.

(4) Interest coverage (Cover), (5) size, (6) performance (ROA), (7) Risk, (8) industry consensus accounting procedure (CAP), and (9) regulation (REG).

Because the accounting choices under investigation are of partially owned subsidiaries, various aspects and issues of the multi-firm organization also need to be considered. Multi-firm variables posited to affect the subsidiary's accounting choice are the parent's accounting choice (PAC), the magnitude of subsidiary related-control costs (MAG), industry specialization (INDSPEC), parent-subsidiary similarity (INDSIM), and the proportion of ownership that the parent has in the subsidiary (%Own). As a separate legal entity, a subsidiary's accounting policies should be of

interest to creditors and regulators and will certainly be of interest to the noncontrolling minority-interest shareholders.

The question that derives from the foregoing discussion is "what motivates some subsidiaries to align their accounting choices with those of the parent entity while others do not?" Hence, the primary research questions are

> Does a single firm model of accounting choice for depreciation and inventory procedures work equally well for both subsidiary and parent companies? Can further explanatory power be obtained for the subsidiary's procedural choices by including the salient aspects of the parent-subsidiary relationship in the accounting-choice model?

To address these questions, accounting choices for depreciation and inventory are investigated using a model derived from Skinner's (1993) study of accounting choice. These two accounting method choices are selected because, (1) they are typically associated with large effects on earnings (Pincus 1994, Christie and Zimmerman 1994), (2) they are choices available to today's managers (unlike investment tax credits which were eliminated in the Tax Reform Act of 1986), (3) the data for these analyses are available, and (4) previous parent-level studies have investigated the determinants of these procedural choices. Moreover, since these particular accounting procedure choices have been analyzed in earlier studies, the base single-firm model is well established such that the analysis can be directed at the incremental contribution of the multi-firm characteristics under study.

In summary, the primary contribution of this study to the accounting choice literature is the investigation the accounting choice of subsidiary firms in the multi-

firm organization. Understanding the accounting procedure choice of the subsidiary firm in a multi-firm organization is important because much of the economic activity in large firms is conducted at the subsidiary level. If the accounting choice literature addresses only issues that are specific to parent-level firms, multi-firm organization accounting choice may not be completely understood by investors, standard setters, educators, and regulators. In the remainder of the paper, the following topics are discussed in the noted chapters: Background Literature and Theory (2), Research Hypotheses, Data and Methods (3), Empirical Test Results (4), and Summary and Conclusions (5).

CHAPTER 2

BACKGROUND LITERATURE AND THEORY

Positive accounting theory assumes that implied and explicit contracts generate demand for accounting numbers that the outcomes of the contracts change with accounting numbers and that differences in contractual outcomes affect firm value (Christie 1990). Given the importance of accounting method choices on accounting earnings, positive accounting studies have devoted a considerable amount of attention toward understanding the rationale behind accounting choices made by firm managers. This chapter begins with a discussion of efficient contracting for the firm that results in value-maximizing behavior by the contracting parties when selecting an accounting procedure. Subsequently, the positive accounting literature is reviewed to develop a single firm model of accounting choice that serves as a base model for study. In chapter 3 the SFM is expanded to incorporate pertinent variables to specify the economics of choosing a subsidiary's accounting procedure in a multi-firm environment. The literature review focuses on prior studies of discrete accounting choice for depreciation and inventory methods in order to lay the empirical groundwork for this study. Studies of discrete measures of and changes in accounting procedure choice are included because these studies provide the most direct evidence of the determinants of discrete accounting procedure choice.

Efficient Contracting

Efficient contracts minimize contracting costs within the organization. Watts and Zimmerman define contracting costs as follows:

> Contracting costs consist of transaction costs (e.g., brokerage fees), agency costs (e.g., monitoring costs, bonding costs, and the residual loss from dysfunctional decisions), information costs (e.g., the costs of becoming informed), renegotiation costs (e.g., the costs of rewriting existing contracts because the extant contract is made obsolete by some unforeseen event), and bankruptcy costs (e.g., the legal costs of bankruptcy and the costs of dysfunctional decisions). (1990, 134)

Watts and Zimmerman (1986, 1990) posit that accounting choices are made to maximize firm value in response to efficient compensation contracts that are designed *ex ante* to minimize contracting costs in the organization. Managers are allowed leeway in choosing accounting procedures because they are best informed as to which procedures are efficient in maximizing value. Similarly, Demski, Patell, and Wolfson (1984) argue that managers are best able to efficiently select accounting choices. Skinner notes that:

> if there are efficiency-based costs and benefits to particular accounting choices, managers are likely to best know which accounting procedure choices maximize the value of the firm ... managers are likely to have the best information about which accounting procedures minimize the firm's potential cost in the political/regulatory process, or about which accounting methods provide the best way of motivating employees (1993, 411)

Smith and Watts (1982); Holthausen (1990); Christie and Zimmerman (1994); DeAngelo, and DeAngelo, and Skinner (1994) make similar arguments for efficient accounting method choices by management *ex post* of managerial contracts. The efficient contracting argument is important to this study because it creates predictable demands for accounting procedure choice.

Previous Literature

Three accounting choice hypotheses are the primary focus of previous literature on discrete accounting procedure choice. The three hypotheses are (1) the

bonus plan, (2) debt, and (3) political cost hypotheses (Watts and Zimmerman 1986, 1990). Tables 2, 3, and 4 summarize the previous literature on discrete accounting procedure choice. A fourth hypothesis, based on the accepted set, is also discussed in this section.

• Bonus Plan Hypothesis: The bonus plan hypothesis (Healy 1985) posits that managers choose income-increasing accounting methods to maximize accounting-based incentive compensation, *ex post* of execution of the management compensation contract. In a field-study of the achievability of annual profit center budget targets, Merchant and Manzoni (1989) infer from the data from fifty-four profit centers in twelve corporations that "budget targets are set to be achievable an average of eight or nine years out of ten" (539). This empirical evidence appears to significantly temper the potential for accounting-based bonus plans to have a significant income-increasing effect in the subsidiary firm.

As shown in Tables 2, 3, and 4, the bonus plan hypothesis is supported by empirical evidence in positive coefficients for income-increasing methods in Hagerman and Zmijewski (1979) (depreciation), Zmijewski and Hagerman (1981) (7 strategy), and Skinner (1993) (depreciation and strategy). Some studies provide inconsistent evidence with the bonus plan hypothesis (Hagerman and Zmijewski 1979 [inventory], Hunt 1985 [inventory], Press and Weintrop 1990 [strategy]). The inconsistent evidence for the bonus plan hypothesis is in insignificant coefficients (significance greater than 10%) and not from statistically significant income-decreasing coefficients.

Table 2
Previous Regression Results of Discrete Depreciation Procedure Choice
The results are stated in terms of the sign on the coefficient and the 1-tailed significance level, except for assets-in-place (AIP), which is reported as a 2-tailed significance level.

Study	Bonus	AIP	LEV	Cover	Size	ROA	Risk	Source
Hagerman and Zmijewski (1979)	+0.039	--	--	--	-0.016	--	-0.008	Table 5
Dhaliwal, Salamon and Smith (1982)	--	--	+0.002	--	-0.15	--	--	Table 5
Dhaliwal (1988)	--	--	+0.011	--	-0.049	--	$+0.025^{L*R}$ $+0.113^{S*R}$	Table 5
Niehaus (1989)	--	--	+0.021	--	-0.231	--	--	Table 7, Equation 1
Knoeber and McKee (1991)	--	--	-0.483	--	-0.039	--	--	Table 3, Model 2
Skinner (1993)	+0.001	-0.271	+0.169	--	-0.000	+0.115	-0.166	Table 7, Panel A, Regression 5
Christie and Zimmerman (1994)	--	--	+0.000	+0.218	-0.000	--	+0.024	Table 3, Years -6 to -1

Table 2 Continued

Study	Bonus	AIP	LEV	Cover	Size	ROA	Risk	Source
Bowen, DuCharme, & Shores (1995)	--	--	+0.226	--	+0.999	+0.059	$+0.059^{D\_ROA}$	Table 6, Panel C, Year 1993

L*R is the interaction between leverage and risk. S*R is the interaction between size and risk. D_ROA is a dummy variable for the second through ninth rank deciles of industry ROA, and 0 otherwise.

Table 3
Previous Regression Results of Discrete Inventory Procedure Choice
The results are stated in terms of the sign on the coefficient and the 1-tailed significance level, except for assets-in-place (AIP), which is reported as a 2-tailed significance level.

Study	Bonus	AIP	LEV	Cover	Size	ROA	Risk	Source
Hagerman and Zmijewski (1979)	-0.463	--	--	--	-0.141		+0.063	Table 5
Hunt (1985)	+0.439	--	+0.214	-0.064	--	--	--	Table 9, Version 1
Lee and Hsieh (1985)	--	--	-0.148	--	+0.362	--	-0.032	Table 5, Analysis 6
Caster and Simon (1986)	--	--	+0.413	--	--	--	--	Table 1, Full Model
Niehaus (1989)	--	--	-0.216	--	+0.933	--	--	Table 6, Equation 4
Lindahl (1989)	--	--	+0.005	--	-0.080	--	+0.31	Table 5
Cushing and LeClere (1992)	--	--	+* >10	--	-* 01	--	--	Table 3, Model 3

Table 3 Continued

Kuo (1993)	--	--	+0.096	--	-0.000	--	$+0.143^{L*R}$ $+0.464^{S*R}$	Table 5, Equation 1
Skinner (1993)	--	--	+0.341	--	-0.000	+0.055	-0.492	Table 6, Regression 10
Christie and Zimmerman (1994)	--	--	+0.000	-0.448	-0.000	-0.460	+0.000	Table 4, Years –6 to -1
Bowen, DuCharme, & Shores (1995)	--	--	-0.555	--	-0.000	$+0.437^{D\_ROA}$	--	Table 5, Panel C, Year 1993

* $^{>10}$ Reported significance is greater than 10%, * ^{01} Reported significance is less than or equal to 1%,
L*R is the interaction between leverage and risk. S*R is the interaction between size and risk. D_ROA is a dummy variable for the second through ninth rank deciles of industry ROA, and 0 otherwise.

Table 4
Previous Regression Results of Discrete Strategies of Procedure Choice
The results are stated in terms of the sign on the coefficient and the 1-tailed significance level, except for assets-in-place (AIP), which is reported as a 2-tailed significance level.

Study	Bonus	AIP	LEV	Cover	Size	ROA	Risk	Source
Zmijewski and Hagerman (1981)	+0.02	--	+0.023	--	-0.003	--	-0.302	Table 2, 7 Strategy
Ronen and Aharoni (1989)	--	--	--	--	-0.026	--	--	Table 2, Regression 2
Press and Winthrop (1990)	+0.441	--	+0.011	--	-0.008	--	+0.379	Table 10, Case 4
Skinner (1993)	+0.002	-0.163	+0.041	--	-0.058	-0.400	-0.255	Table 7, Panel C, Regression 5
Bowen, DuCharme, & Shores (1995)	--	--	+0.248	--	-0.003	$+0.247^{D\_ROA}$	--	Table 4, Panel C, Year 1993

D_ROA is a dummy variable for the second through ninth rank deciles of industry ROA, and 0 otherwise.

• Debt Hypothesis: The debt hypothesis posits that managers choose income-increasing methods to reduce the cost of debt-covenant violations (Watts and Zimmerman 1986, 1990). A relationship between debt-covenants and leverage is posited by Watts and Zimmerman (1978), and a positive relationship between leverage and the existence of binding debt covenants is hypothesized by Collins, Rozeff, and Dhaliwal (1981); Dhaliwal (1980); and Holthausen (1980) as noted by Zmijewski and Hagerman (1981). As shown in Tables 2 through 4, the debt hypothesis is supported by empirical evidence in positive coefficients on leverage (or for a debt covenant measure after controlling for leverage) for income-increasing methods in Zmijewski and Hagerman (1981) (7 strategy); Dhaliwal, Salamon, and Smith (1982) (depreciation); Dhaliwal (1988) (depreciation); Niehaus (1989) (depreciation); Lindahl (1989) (inventory); Press and Weintrop (1990) (strategy); Cushing and LeClere (1992) (inventory); Kuo (1993) (inventory); Skinner (1993) (strategy); and Christie and Zimmerman (1994) (depreciation and inventory). Some studies provide inconsistent evidence with the debt hypothesis using leverage (Hunt 1985 [inventory]; Lee and Hsieh 1985 [inventory]; Caster and Simon 1986 [inventory]; Niehaus 1989 [inventory]; Knoeber and McKee 1991 [depreciation]; Skinner 1993 [depreciation]; and Bowen, DuCharme, and Shores 1995 [depreciation, inventory, and strategy]).

Smith and Warner (1979) propose that interest coverage is a better proxy to test the debt hypothesis. A lower (higher) interest coverage ratio is thought to provide an incentive to increase (decrease) income. Hunt (1985) (inventory) finds consistent evidence for the debt hypothesis using the interest coverage ratio. Inconsistent

evidence in the form of insignificant statistical coefficients for interest coverage is found by Christie and Zimmerman (1994) (depreciation and inventory).

• Political Cost Hypothesis: The political cost hypothesis is predicated on the idea that large firms are more visible to regulators and, hence, are frequently targeted for increased taxation. In an attempt to reduce this cost, managers are more likely to choose income-decreasing methods as firm size increases (Watts and Zimmerman 1986, 1990). The Size/political cost hypothesis is supported by empirical evidence in negative coefficients for income-increasing methods in Hagerman and Zmijewski (1979) (depreciation); Zmijewski and Hagerman (1981) (7 strategy); Dhaliwal (1988) (depreciation); Ronen and Aharoni (1989) (strategy); Lindahl (1989) (inventory); Press and Weintrop (1990) (strategy); Knoeber and McKee (1991) (depreciation); Cushing and LeClere (1992) (inventory), Kuo (1993) (inventory); Skinner (1993) (depreciation, inventory, and strategy); Christie and Zimmerman (1994) (depreciation and inventory); and Bowen, DuCharme, and Shores (1995) (inventory and strategy). Some studies provide inconsistent evidence with the Size/political cost hypothesis (Hagerman and Zmijewski 1979 [inventory]; Dhaliwal, Salamon, and Smith 1982 [depreciation]; Lee and Hsieh 1985 [inventory]; and Niehaus 1989 [depreciation and inventory]). The inconsistent evidence for the Size/political cost hypothesis is in insignificant coefficients (significance greater than 10%) and not from statistically significant income-increasing coefficients.

• Accepted Set Hypothesis: Another much less tested hypothesis of positive accounting theory is the "accepted set" hypothesis (Watts and Zimmerman 1986, 1990). The accepted set hypothesis holds that managers are limited to a set of

acceptable procedures (e.g., the choices available for inventory) from which to choose defined by industry & competitor practices (Watts and Zimmerman 1986, 205). It is assumed that the contracting parties jointly determine an accepted set of accounting procedures, and the managers of the firm have discretion within the accepted set of accounting procedures (Watts and Zimmerman 1990, 136).

Except for the work by Chung, Park, and Ro (1996), little empirical work is focused on the cross-industry accepted set theory. Chung, Park, and Ro note that firms will often cite industry practice as a reason for choosing an accounting procedure. In a study of firms announcing an accounting procedure change, stock prices react positively to accounting changes away from common accounting procedures and negatively to changes towards common accounting procedures, after controlling for the change in income related to the accounting changes. Chung, Park, and Ro (1996) provide market-based evidence that the industry consensus accounting procedure choice measures the effect of industry differences on the accepted set of accounting procedures. Using the industry consensus accounting procedure choice as an explanatory variable allows a direct measure of the industry's accepted set of accounting procedure's for a firm's industry.

Knoeber and McKee (1991) also provide market-based evidence of accepted sets of accounting procedures as measured in the coefficient of determination of stock returns of firms using the same or different sets of accounting procedures. They find a statistically significant positive (negative) coefficient on the coefficient of determination between stock returns of a firm using a particular procedure and the stock returns of other firms using the same (opposite) procedure.

Some previous studies of discrete accounting procedure choice have used industry dummy variables for various stated reasons. Industry dummy variables have been used to measure the industry effect after controlling for other economic variables including inflation (Lindahl 1989, 211–2; Lee and Hsieh 1985, 475; Niehaus 1985, 275–6 [publishing industry only]); to indicate measured industry inflation (Niehaus 1985, 274–5), or used to isolate the political costs of the oil and gas industry (Bowen, DuCharme, and Shores 1995, 264).

Lee and Hsieh (1985) (inventory); Niehaus (1989) (inventory); Lindahl (1989) (inventory); and Bowen, DuCharme, and Shores (1995) (depreciation and strategy) find statistically significant coefficients for industry dummy variables. On the other hand, Bowen, DuCharme, and Shores (1995) (inventory) do not find a significant coefficient for the singular industry variable for the oil and gas industry. Christie and Zimmerman (1994) subtract the industry average from almost every independent and dependent variable in their study, reasoning that the industry average represents a measure of the efficient accounting procedure choice by industry. This suggests that using an industry average (i.e., consensus choice) of accepted accounting procedure, as an independent variable will measure average efficiency versus opportunism in this sample of subsidiary firms.

Other empirical results also provide evidence for the bonus plan, Size/political cost, and debt hypotheses. Christie (1990) reviews a selected set of the previous accounting choice literature. The studies used in Christie's analyses use either a

discrete procedure choice or a measure of continuous choice.[2] Christie uses three different aggregation techniques in meta-analyses, testing whether the firm characteristics used in previous studies have a statistically significant cross-study effect on both discrete and continuous measures of accounting choice. Christie finds statistically significant cross-study support for the bonus plan, size/political cost, and debt hypotheses in the explanatory variables of managerial compensation, leverage, size, risk, and interest coverage.

Several competing hypotheses can be found in the literature for the effect of risk on accounting method choice. Risk is hypothesized to be negatively associated with income-increasing methods due to the political costs of excessively large earnings (Hagerman and Zmijewski 1979, 143; Zmijewski and Hagerman 1981, 132; and Press and Weintrop 1990, 82, 86). Christie and Zimmerman (1994, 542, 556) reason that increased Risk is positively associated with financial distress, and a firm with a higher probability of financial distress is more likely to have made income-increasing methods. Skinner (1993, 420) uses Risk as a partial measure of the investment opportunity set and does not predict an income incentive for Risk. Both Dhaliwal (1988, 291–3) and Kuo (1993, 377) use interactive measures of Risk with both leverage and Size. In this construction Risk is hypothesized to complement the debt and Size/political cost hypotheses. Lee and Hsieh (1985, 474–5) reason that Risk

[2] Continuous measurements of accounting choices in the literature include measures of accruals, "as-if" measures of alternative accounting procedures, and measures of cash flows.

from operational volatility increases the cost of controlling inventory; therefore, Risk increases the use of FIFO to measure inventory cost flow.

Previous research has provided mixed evidence of the relationship between Risk coefficients and income-increasing accounting procedure choices. The following results are based on a predicted sign (1-tailed) for the coefficient on Risk. Previous studies that find significant negative coefficients on Risk are by Hagerman and Zmijewski (1979) (depreciation and inventory) and Lee and Hsieh (1985) (inventory). Evidence that the effect of Risk is statistically insignificant is found by Zmijewski and Hagerman (1981) (strategy) and Press and Weintrop (1990) (strategy). In addition, using either a 1-tailed or 2-tailed significance level, Skinner (1993) (depreciation, inventory and strategy) provides results that find Risk to be insignificant. Christie and Zimmerman (1994) (depreciation and inventory) find statistically significant positive coefficients for Risk. The interaction term between Risk and leverage is found to be statistically significant in complementing the effects of leverage by Dhaliwal (1988) (depreciation), but this interaction is found to be insignificant by Kuo (1993) (inventory). Both Dhaliwal (1988) (depreciation) and Kuo (1993) (inventory) find insignificant coefficients for the interaction of Risk and Size.

Performance is a variable that has been used recently in the discrete accounting procedure choice literature to measure the likelihood that a firm chooses income-increasing procedures when a firm's performance decreases (Skinner 1993, 420;

Christie and Zimmerman 1994, 548–9, 556). [3] The incentive to increase measured performance by choosing income-increasing procedures is supported by empirical evidence in Skinner (1993) (inventory). Some studies provide inconsistent evidence with the incentive to increase measured performance by choosing income-increasing procedures (in Skinner [1993] [depreciation and strategy], Christie and Zimmerman [1994] [depreciation and inventory]). The inconsistent evidence for performance is in insignificant coefficients (significance greater than 10%) and not from statistically significant income-increasing coefficients.

Skinner (1993) investigates whether including variables for a firm's investment opportunity set will affect evidence for the bonus, size/political cost, and debt hypotheses. Even after including the firm-specific investment opportunity set variables, Skinner finds statistically significant support for the bonus, Size/political cost, and debt hypotheses. Skinner finds that a firm's investment opportunity set variables are also jointly significant in determining accounting procedures for depreciation and inventory and for a strategy of procedures in the "full models" of procedure choice.[4] Skinner's study provides statistically significant evidence that a firm-specific omitted variables problem for the investment opportunity set have not

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[3] Bowen, DuCharme, and Shores (1995, 263) use a dummy variable for a firm's measure of performance that is implicitly assumed to be within a range normally used in a bonus plan calculation (Healy 1985). ROA falling within the 2-9 deciles when firm's performance is ranked by industry are coded 1 and 0 otherwise.

[4] Skinner examines multiple models of accounting choice, excluding certain variables from the "full model." For example, first the contractual variables are used, then only the noncontractual variables, and then only some of the noncontractual variables. The full model has the highest explanatory power as measured by the pseudo R-square.

led to the previous supporting evidence for the bonus plan, size/political cost, and debt hypotheses.

The Base Single-Firm Model of Accounting Choice

The base single-firm model for the subsidiary firm's accounting choice (AC) is derived from the positive accounting choice literature discussed above, by starting with Skinner's (1993) model. The single-firm model uses a discrete measure of accounting procedure choice. Pincus (1994) concludes that using a discrete model of accounting procedure choice results in a sufficient statistic compared to using a continuous measure of "as-if" income (Bowen, DuCharme, and Shores 1995). Studies using various measures of discrete accounting procedure choice have found regression results to be robust across differences in the measures of discrete accounting choice (Zmijewski and Hagerman 1981; Skinner 1993; Christie and Zimmerman 1994; and Bowen, DuCharme, and Shores 1995). The simplification of measuring accounting procedure choice as discrete introduces error in the endogenous variable, which increases the standard errors of the coefficient estimates. The effect of measuring endogenous variables with error is a reduction in the significance of the findings and biases against finding significant results (Pindyck and Rubinfeld 1991; Bowen, DuCharme, and Shores 1995). Accounting choice is coded as 1 when it is income increasing and 0 when it is income decreasing, which is consistent with Christie and Zimmerman (1994).[5] The accounting choice literature commonly characterizes

[5] Nevertheless, some studies do use a multilevel approach to measuring accounting choices.

straight-line depreciation and longer amortization periods as income-increasing methods (Skinner 1993; Christie and Zimmerman 1994), and this approach is incorporated in this study. Following Christie and Zimmerman (1994), FIFO and weighted-average methods are treated as income-increasing inventory methods. A mixture of income-increasing and income-decreasing methods is treated as income decreasing because this choice does not maximize income from accounting choice. The single-firm model of accounting procedure choice is presented below.

$$AC = f(SFV) \tag{2.0}$$

where the single-firm variables (SFV) are identified along with their expected coefficients:

$$SFV = [\text{Bonus (+), AIP (?), LEV (+), Cover (-), Size (-),}$$
$$\text{ROA (-), Risk (?), CAP (?), REG (-)}] \tag{2.1}$$

The existing literature provides the basis for the base model of accounting procedure choice. The single-firm model includes the explanatory variables of bonus plan (Bonus), assets-in-place (AIP), leverage (LEV), interest coverage (Cover), Size, performance (ROA), Risk, industry consensus accounting procedure (CAP), and regulation (REG). Except for the addition of CAP and REG, this model is similar in spirit to Skinner's (1993) full model for depreciation procedure choice. REG is included because this study includes regulated firms, and the market-based evidence of the importance of the industry consensus choice has been provided by Chung, Park, and Ro (1996) since Skinner's (1993) study. Three variables (research and development, Tobin's q, and debt covenants) that are not found by Skinner to be statistically significant in his full model of depreciation choice have been omitted for

parsimony.[6] Assets-in-place is retained from Skinner's full model of depreciation to proxy for the investment opportunity set. Assets-in-place is used to measure the investment opportunity set by Gaver and Gaver (1993), as well as Smith and Watts (1992).

• Bonus: The first variable in the base SFM is the existence of an accounting based bonus plan. Bonus is a dichotomous variable given a value of "1" when the bonus plan includes accounting income in determining management compensation and a value of "0" when that is not the case.

• Assets-in-place: Assets-in-place (AIP), which is used to proxy for the firm's investment opportunity set according to Skinner's (1993) model. Skinner (1993, 417) discusses the idea that assets-in-place helps define the constrained accepted set of accounting methods. It is not clear that assets-in-place will have a predictably income-increasing or income-decreasing effect on the accepted set.[7] Skinner posits that:

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[6] The ability to separate the effect of debt covenants from the underlying level of debt is confounded because of the lack of available information on private debt agreements, which are expected to be more important to subsidiary companies than to nonsubsidiary firms considering the potential for intercompany lending between a parent and subsidiary. Because of the lack of private debt covenant information, Skinner uses only public debt covenant information as provided by Moody's when coding an indicator variable for the existence of accounting based debt covenants. As noted by Skinner (1993, 426), the utilization of private debt by firms is an important limitation when using a debt covenant indicator variable if there is a systematic relation between a firm's investment opportunity set and a firm's mix of public versus private debt.

[7] Watts and Zimmerman (1986, 1990) posit that the contracting parties in the firm agree to an accepted set of alternative accounting policies and the accepted set constrains the accounting methods available to the manager of the firm.

> firms with relatively more assets-in-place are more likely to use earnings-based bonus plans, so that managers of these firms have larger incentives to make income-increasing accounting choices *ex post*, it may also be that these firms' accepted sets of accounting procedures are more likely to restrict managers' ability to make these choices *ex ante*. (1993, 417)

Skinner (1993, 433) reasons that more assets-in-place (the inverse of growth opportunities) results in a lower variability of inventory levels, and that *ex ante* reduces the probability of LIFO layer liquidations which increases the probable use of the LIFO (income decreasing) inventory procedure. This study should provide additional evidence on what role that assets-in-place play in a subsidiary firm's accounting choice, specifically whether the assets-in-place *ex post* income-increasing effect or the *ex ante* income-decreasing accepted set effect dominates for subsidiary firms. Assets-in-place is measured as the previous four-year average of total book value of assets less the book value of intangible assets divided by Size.

• Leverage: Leverage is defined as the previous four-year average of the book value of long-term debt divided by the book value of total assets, consistent with Skinner (1993). The coefficient on leverage is expected to be positive for choosing income-increasing accounting procedures.

• Interest Coverage: Interest coverage (Cover) a measure of the firm's performance toward satisfying the demands of debt investors to fulfill debt covenants (Christie 1990). The coefficient on interest coverage is expected to be negative for choosing income-increasing accounting procedures. Interest coverage is measured by the previous four-year average of interest expense divided by operating income before depreciation.

• Size: Firm Size (Size) is associated with the political cost hypothesis. The political cost hypothesis for a single-firm organization holds that as Size increases, the chance of regulation increases. Therefore, Size is predicted to be negatively associated with income-increasing policies in an effort to stave off regulation (Watts and Zimmerman 1986, 1990). However, as Watts and Zimmerman note:

> The evidence is consistent with the political cost hypothesis. However, the result only appears to hold for the largest firms (Zmijewski and Hagerman, 1981) and is driven by the oil and gas industry (Zimmerman, 1983). (1990, 140)

What Size proxies for is not completely understood. Size possibly proxies for multiple influences in accounting choice, as noted by Watts and Zimmerman (1986, 1990) and Ball and Foster (1982). The coefficient on Size is expected to be negative for choosing income-increasing accounting procedures. Size is measured by the previous four-year average of the sum of the market value of equity plus the book value of debt, consistent with Skinner (1993).

• Performance: Performance (ROA) is measured by the previous four-year average of a firm's return on assets. The coefficient on performance (ROA) is expected to be negative. There is potential, though, for the parent managers to acquire (at a cost) a more familiar level of information than is available to outside investors, thus mitigating the income-increasing incentive for subsidiary managers.

• Industry consensus accounting procedure: Chung, Park, and Ro (1996) document that firms routinely state that conformity with the industry consensus choice is the reason for making accounting choice decisions. Christie and Zimmerman (1994) reason that the industry consensus proxies for the efficient choice on average for an industry and is used in the calculation of the dependent variable. An industry

consensus accounting policy (CAP) may represent an efficient choice for the majority of firms within an industry and help identify the accepted set of accounting choices for a particular firm in that industry. Previous literature, as noted earlier, has provided evidence that generally supports the idea that there is an industry effect associated with accounting procedure choice after controlling for firm characteristics.

The industry consensus accounting procedure, CAP, is measured as "1" when, after deleting each firm from its industry, at least 60% of the firm's three-digit SIC group industry uses income increasing accounting choices, "-1" when 60% or more industry firms use income-decreasing methods and "0" otherwise. This specification of an industry consensus accounting policy is defined is the same as that used by Chung, Park, and Ro (1996).

Applying the reasoning of Christie and Zimmerman (1994), that the industry index represents an efficient choice, allows an interpretation of the coefficient on CAP. A positive coefficient on an efficient CAP implies that the sample firms choose their procedures based more on efficiency than opportunism. A negative coefficient on an efficient CAP implies that the sample firms choose their procedures based more on opportunism than efficiency.

• Risk: Political cost considerations lead to an expected negative coefficient for increasing risk levels when choosing income-decreasing procedures, and financial-distress pressures lead to an expected positive coefficient for increasing risk levels when choosing income-decreasing procedures. This leads to an ambiguous prediction for the sign of the coefficient for risk in the single-firm model. Risk is measured as

the previous four-year standard deviation of monthly returns divided by the maximum standard for the sample firms included in the regressions of each accounting choice.

• Regulation: Based on the political cost hypothesis, Regulation is associated with an incentive to use income-decreasing accounting procedures. This study uses a dummy variable coded as "1" for firms in regulated industries and coded "0" otherwise. A number of previous studies have omitted firms in regulated industries and this dummy variable is employed to control for the effect of being in a regulated industry. The expected coefficient on regulation is negative due to the political cost hypothesis. Regulated industries are coded "1" when the SIC group is within the groups 4000 to 4999 (e.g., railroads, trucking, communications, utilities, and air transport).

Tax Considerations for Inventory

Two additional variables will be considered for the inventory method choice. Tax-loss carryforwards (TLC) will be added to the model for choices dealing with inventory. Tax-loss carryforwards are expected to be associated with income-increasing inventory methods. TLC is measured as a "1" if there is a tax-loss carryforward and "0" otherwise. In addition, input price indices (INFL) will be included in the inventory model to control for inventory cost flows. *Ceteris paribus*, LIFO is expected to be used to delay tax payments when input prices are increasing. INFL is measured as "1" if the average inflation is 3% or more for the previous five years, "-1" if the average deflation is 3% or more for previous five years, and "0" otherwise.

Contract Provisions in the Organization

Like accounting choices, contractual provisions in the organization are endogenous (Watts and Zimmerman 1990, 137). Including contract provisions introduces endogeneity, which would be better analyzed in a model of structural equations. Unfortunately, as Skinner (1993) notes, a current lack of understanding of these complex relationships prevents this approach. The subject of endogeneity, and whether to use a structural-equations approach, is beyond the scope of this study. Therefore, like Skinner's (1993) study, a bonus contract variable (Bonus) is included in alternative models in this study. The existence of accounting-based bonus plans are coded as "1" and "0" otherwise. As noted above in the base single-firm model section, Skinner does not find statistical significance for the debt-constraint variable for depreciation; and therefore, this contractual variable is not included in this study.

CHAPTER 3

RESEARCH HYPOTHESES, DATA, AND METHODS

The Research Hypotheses: Multi-Firm Considerations

This study is designed to examine if the single-firm model of accounting choice derived from previous accounting choice literature is adequate to explain the accounting procedure choice of subsidiary firms in multi-firm organizations. The primary null hypothesis of this study is:

H1: Multi-firm characteristics do not jointly add statistically significant explanatory power to the regression of the determinants of accounting procedure choice in the subsidiary.

The base model of accounting procedure choice is expected to be inadequate because the dynamics of the parent-subsidiary relationship are not considered. The salient aspects of the parent-subsidiary relationship that are hypothesized to influence the subsidiary accounting choice are as follows: (1) the influence of the economic reasons that lead the parent manager to select the parent firm's accounting choice, (2) the effect of intercompany contracting costs and the vertical or horizontal business integration between the parent and subsidiary (including the cost of the parent manager understanding the subsidiary's business), and (3) the level of ownership that the parent holds in the subsidiary. The multi-firm variables (MFV) and the expected signs of the coefficients included in the multi-firm model of the subsidiary's accounting procedure choice are summarized below.

$$\begin{aligned} MFV = {} & [PAC\ (?),\ MAG\ (?),\ INDSPEC\ (?), \\ & INDSIM\ (?),\ \%Own\ (?)] \end{aligned} \qquad (3.1)$$

Multi-firm Organization Considerations

• PAC: One possible scenario in a multi-firm organization is that, *ceteris paribus*, the subsidiary's accounting choice will be influenced by the parent's accounting choice (PAC). The managers of the parent entity may wish to align the accounting methods of the subsidiary to the parent to ensure the uniform effect for accounting-based compensation plans and debt covenants. While a parent manager has incentive to make choices that are efficient for the entire multi-firm organization, a subsidiary manager's incentives can be more localized for a variety of reasons including job tenure and firm specific contractual incentives. Separate firms are used to create efficient contracting arrangements within the multi-firm organization, while simultaneously helping to define efficient contracting arrangements with outside parties. Watts and Zimmerman speak of organizational considerations in terms of contracts and organizational structure:

> Since the 1970s, economists have strived to develop a theory of the firm by attempting to explain the organization structure of the firm (e.g., choice of corporate form, structure of contracts, management compensation, centralization-decentralization). (1990, 133)

This reasoning is consistent with Watts and Zimmerman's (1990, 137) argument that there are accepted sets of accounting methods for each firm. For example, the accepted set for depreciation might include the accelerated methods of declining balance and sum-of-the-years digits, but not include the straight-line method. The accepted sets of accounting choices for two firms can overlap, as illustrated by Watts and Zimmerman (1990, 137). At the limit, a subsidiary's accepted set of accounting methods can be restricted to the parent's selected method.

There is no *ex ante* predictable income-effect for the parent's accounting choice's influence on the subsidiary's accepted set of accounting methods. If the parent's accounting procedure were efficient, then a positive coefficient on the parent's accounting choice would signify that on average the subsidiary uses an accounting procedure that is efficient for the parent of the multi-firm organization. A negative coefficient on the parent's accounting choice would signify that on average, the subsidiary uses an accounting procedure that is not efficient for the parent of the multi-firm organization. The above discussion leads to the following null hypothesis.

H2: The parent choice is not significant to the subsidiary accounting choice.

• MAG: Another multi-firm variable to be investigated is the measure of the magnitude (MAG) of organization-wide control costs for decisions made for the subsidiary: "The extent to which accounting choice affects the contracting parties' wealth depends on the relative magnitudes of the contracting costs" (Watts and Zimmerman 1990, 135). When the potential magnitude of the contracting costs associated the subsidiary is high, the parent managers have incentive to monitor and control the subsidiary's accounting choice. The MAG for the depreciation choice is measured as the subsidiary firm's income reduced by depreciation divided by the same income measure of the parent. The MAG for the inventory choice is measured as the subsidiary firm's income adjusted for LIFO reserves divided by the same income measure of the parent.

• INDSIM, INDSPEC: Two industry specific variables address the concern that there are alternative decision makers for the subsidiary's accounting choice in the multi-firm organization. The parent manager with a subsidiary must decide who can

efficiently make the accounting choice for the subsidiary. To make this decision, the parent manager considers the differences in knowledge possessed by the parent manager and the subsidiary manager, the cost of effectively transferring knowledge to either potential decision maker, and the expected contracting cost of delegating decisions to the subsidiary manager. The relevant costs of centralization and decentralization are expected to be affected by whether the parent and subsidiary are in the same industry (INDSIM) and whether or not the subsidiary's industry uses specialized knowledge (INDSPEC).

These two variables are expected to help measure the effect of business integration factors on the selection of the accounting policy decision maker (parent or subsidiary manager), but because no measure of centralization (identity of the decision maker) is included in the model used in this study, the expected effect of these two variables on the subsidiary's accounting choice is ambiguous. The identity of the decision maker (measure of centralization) is not included in the subsidiary's accounting choice model because the decision maker is not known. The discovery or identification of the actual decision maker for the subsidiary is beyond the scope of this study, but the possibility of alternative decision makers may be a significant issue; therefore, variables to control for this issue are included in the model of subsidiary accounting choice.

According to Jensen and Meckling (1992) and Christie, Joye, and Watts (1998), the firm's value is maximized by choosing the decision maker to minimize the sum of the knowledge-transfer costs in bringing the relevant knowledge to the decision maker and the contracting (control) costs of the decision maker. Jensen and

Meckling (1992) present a theoretical framework for allocating decision rights (allocating who has authority to make decisions within the organization). In an empirical paper, Christie, Joye, and Watts (1998) find the expected associations between the variables INDSIM and INDSPEC and the level of authority granted to the subunit manager. Christie, Joye, and Watts use a survey that produces sample sizes from 93 to 121 where the dependent variable (level of operating authority granted to the subunit manager) and the level of operating linkages between the higher level unit and the subunit are known and revealed by the firms surveyed. In one of Christie, Joye, and Watts's alternative models, the revealed operating linkages are successfully proxied by INDSIM.

Christie, Joye, and Watts constructed a classification system to identify *ex ante* which industries use specialized knowledge, which is costly to transfer to another firm's manager (the measure of INDSPEC). The results of Christie, Joye, and Watts's (1998) analyses is that the level of operating authority granted to the subunit manager is predictably associated with the variables that are hypothesized to determine the authority of the decision maker at the lower-level unit (INDSIM and INDSPEC). Therefore, including the variables INDSIM and INDSPEC in the model of accounting choice addresses the need of internal-control variables noted in the accounting choice literature and uses variables that have been shown empirically to be predictably related to the level of operating authority granted to subunit managers.

Vertical or horizontal integration between the parent and subsidiary will increase the likelihood that the parent manager has incentives to exercise control over the subsidiary. When the parent and the subsidiary firm are in the same industry and

therefore potentially integrated either horizontally or vertically or when the subsidiary has operations that are relatively costless to understand, the parent is more likely to have incentives to control the subsidiary's accounting choice than when they are not integrated firms.

The remainder of this subsection is a more detailed analysis of the relevant cost trade-offs and their affect on centralization and decentralization as described by Christie, Joye, and Watts (1998) and Jensen and Meckling (1992). The two cost behaviors that are discussed are knowledge-transfer costs and control costs. Control costs of uncoordinated decisions by the subsidiary managers include the cost of monitoring the subsidiary manager decisions. As the cost to transfer knowledge to the parent increases, the cost to monitor the subsidiary manager increases. In other words, control costs increase with knowledge-transfer costs. This means that while knowledge-transfer costs decrease centralization directly, knowledge-transfer costs increase centralization indirectly by increasing control costs related to the monitoring of the subsidiary manager. Therefore, there is no predictable effect on the centralization or decentralization of decision-making when knowledge-transfer costs are increasing. To control for the direct and indirect effects of knowledge-transfer costs in this study, the specialized knowledge variable INDSPEC is included, which corresponds with Christie, Joye, and Watts's (1998, 28) *ex ante* estimation of industries by level of knowledge specialization within each industry and is used to code the variable INDSPEC. The industry knowledge-specialization coding ranges from 0 to 1. For example, insurance industry knowledge is coded as 0. Insurance is a business of large numbers, which is knowledge that is easily transferred, but

manufacturing is coded a 1, where operations can be very complex and the knowledge is rather specialized.

When centralization occurs, the knowledge flows primarily from the subsidiary toward the parent to make decisions. Alternatively, when decentralization occurs, knowledge flows from the parent to the subsidiary. Information flows to the subsidiaries when knowledge aggregation at the parent level is useful for the subsidiary's decision making. A possible downward information flow implies that knowledge-transfer costs can be negative when the value added by aggregating knowledge at the parent level outweighs the cost of transferring the knowledge (Christie, Joye, and Watts 1998). Knowledge of trends in product demand and the optimal utilization of recourses in similar subsidiaries are examples. This value in aggregating knowledge can be especially valuable when the parent uses subsidiary firms to increase scale by replicating operating units. Certain types of knowledge (i.e., numerical or statistical) are expected to be relatively costless to transfer, while "specialized" knowledge types are more costly to transfer. For instance, multi-firm organizations that rely on networks for distribution of goods or services generate large amounts of statistical information related to their operations that can be easily aggregated at the parent level, and in these situations, there is value added by the aggregation of the unit's statistics.

On the other hand, a subsidiary with specialized operations will generate knowledge that is costly to transfer because the subsidiary managers are most familiar with the specialization of their own operations. For example, manufacturing operations that employ complicated cost allocations are characterized by specialized

operations. In accounting terms, depreciation is a cost that may be allocated in rather fine ways within a manufacturing operation but is unlikely to have complex cost allocations in the insurance industry. The existence of specialized knowledge that is costly to transfer increases decentralized decision-making; therefore, ceteris paribus, a local manager who is more familiar with the operations has a competitive advantage over the parent managers in determining efficient accounting methods (Jensen and Meckling 1992; Skinner 1993; Christie, Joye, and Watts 1998).

In this paper the term control costs, is used to identify the specific contracting costs of delegating decision making in this paper, and is consistent with Christie, Joye, and Watts (1998). Control costs occur when there are uncoordinated decisions at the subsidiary firm level. The cost of coordination increases when two firms have operations with operating linkages between them. In other words, control costs from uncoordinated decisions exist when there are operating linkages between the subsidiary and the parent. In this study, it is assumed that INDSIM reflects operating linkages. Whenever the parent and subsidiary are integrated either vertically or horizontally, there are externalities between the parent and the subsidiary. Operating linkages between the subsidiary and the parent are measured in the variable INDSIM and are coded as 1 if the parent's and subsidiary's lines of business fall within the same two-digit SIC group as the parent's and 0 otherwise, which is consistent with the public information measure of operating linkages used by Christie, Joye, and Watts (1998). Mian and Smith (1990a) also use a measure of operating linkages between the parent and the subsidiary firm in a model of the parent's choice of consolidation reporting.

• Risk: Risk is a variable already included in the single-firm model as noted above, but Risk in a multi-firm environment is discussed here following the reasoning presented by Baker, Gibbons, and Murphy (1999). As noted above, the previous literature leads to an ambiguous sign of the Risk coefficient for the use of income-increasing procedures in a single-firm model of accounting choice. They address the process of contracting delegated authority and specify the common determinant of Risk in both the informed boss's willingness to delegate and the subordinate's (firm manager) willingness to engage in opportunistic actions in repeated-game equilibrium when there is an uninformed boss. Baker, Gibbons, and Murphy (1999) conclude that the Risk (implied by the discount rate) of the future extreme outcomes affects both the boss's and subordinate's actions. Specifically, they conclude that the likelihood of the informed boss retaining authority from the subordinate increases with the Risk of extremely good or bad outcomes. On the other hand, with an uninformed boss, the subordinate is less willing to take actions that will result in the acceptance of substandard projects that hurt the boss when the discount rate (Risk) is low because the subordinate's reputation is at risk and, therefore, the subordinate risks future cash flow by taking actions that result in the acceptance of poor projects. Using an opportunistic accounting procedure over an efficient one corresponds to taking actions that lead to the acceptance of poor projects when project performance is measured in terms of accounting numbers. Opportunistic accounting procedures could be choosing income-increasing methods, while increasing income might be an efficient way to manage the financial stress of debt covenant compliance. Following Baker, Gibbons, and Murphy, and after controlling for the level of knowledge of the parent manager,

an increasing level of Risk implies that (1) *ex ante*, the accepted set of accounting policies is more likely to be restricted by the parent manager, and that (2) firm managers are more likely to choose accounting procedures that hurt the parent manager *ex post* of the contracting process. Not knowing the parent manager's preference for the accounting choice for the subsidiary leads to an ambiguous 'multi-firm' prediction for the variable Risk. The ambiguous nature of Risk in the multi-firm model only intensifies the single-firm ambiguous association of Risk and income-increasing methods.

• %Own: The level of ownership (%Own) that one firm has in another firm is used by the FASB to measure the level of apparent control. Ownership above 50% normally indicates that control exists over another firm. When the parent owns more than 50%, then control over decisions is feasible but not certain. Some decisions are delegated to the subsidiary managers; and therefore, parent firms owning more than 50% do not exercise control over certain decisions. This begs the question of whether an indicator variable identifying a 51% or greater level of ownership is significant to the subsidiary's accounting choice. The idea is that there is some level of parental ownership that, on average, signals an exercise of influence over the subsidiary's accounting policies. There is also an income incentive related to increasing concentrations of outside ownership according to Niehaus (1989). Niehaus (1989, 270) reasons that "as the concentration of outside ownership increases, these outsiders have greater incentive to monitor managers," which leads to the idea that, ceteris paribus, increased parental ownership is negatively associated with income increasing accounting methods. Proportional ownership is measured as a 1 when the parent owns

51% and 0 otherwise. Sensitivity tests will be performed to estimate the appropriate level of ownership that on average signals an exercise of control or influence over the subsidiary's accounting policies. APB 18 defines that holding 20% or more of the voting stock leads to the presumption that the investor is *able* to exercise significant influence over the investee, but this presumption does not indicate the level of ownership that on average reflects an exercise of influence over a subsidiary's accounting policy. The arguments relating to proportional ownership levels lead to the following null hypothesis.

H3: Parental ownership levels are not negatively significant to income-increasing accounting procedures at the subsidiary level.

In summary the multi-firm characteristics along with their expected coefficients regarding income-increasing accounting procedures are: PAC (?), MAG (?), INDSPEC (?), INDSIM (?), %Own (-).

Rescission Option for Decision Making Authority

One fact of organizational control is that delegated accounting policy decision rights may be rescinded unless the subsidiary managers contractually commit to the use of an accounting policy with an outside party such as a debt holder. A rescission of decision rights occurs if the actual control costs are higher than originally expected or knowledge-transfer costs from the subsidiary to the parent decrease sufficiently. The rescission of decision rights are consistent with Watts and Zimmerman's (1986, 1990) theory of accepted sets of discretionary accounting policies within firms of the organization. In other words, when subsidiary managers select accounting choices outside of the accepted set for the multi-firm organization, parent managers have the

option to veto a decision or rescind the right of subsidiary managers to make the decision. The ability to centralize previously delegated decisions implies that parent managers will rescind decision-making authority when the control costs are estimated to exceed the upper bound of knowledge-transfer costs.[8]

There are multi-period considerations to consider when contemplating the rescission of delegated authority. The contractual control costs of nonoptimal subsidiary manager decisions are period specific. The cost of transferring knowledge to the parent when rescinding decision rights is a single-period expenditure that is assumed to be constant over time. Another assumption is that decision-right rescissions are executed only when efficient. Because future contractual control costs of delegated authority are bounded by the parent manager's rescission option, ceteris paribus, the ability to rescind decision-making authority increases decentralization.

Internal Capital Markets

Internal capital markets may play a role in determining accounting choices for subsidiary firms. Internal capital markets are systems of capital allocation within an organization. Whether internal capital markets efficiently allocate investment funds within the organization is unclear. Some authors have noted that internal capital markets can serve the objective of picking the relatively best projects available in the organization (Williamson 1975, Stein 1997). On the other hand, some authors argue that internal capital markets can serve to inefficiently fund inferior projects (Jensen 1986, Stulz 1990, Billett and Mauer 1998) or serve to deny adequate funding to

[8] This assumes that the partial derivative of control costs to knowledge-transfer costs is less than unity when knowledge-transfer costs are upwardly positive.

superior projects (Wulf 1999). Regardless, any incentive to increase investment gives the subsidiary firm manager an incentive to choose income-increasing accounting policies. For accounting policies to be important for capital expenditure approvals, the approval of funding projects must depend, in part, on accounting numbers. In other words, either future cash flows must be dependent on accounting choices (e.g., inventory choice), or projected cash flows must be estimated with accounting numbers in order for the accounting numbers to be relevant to capital funding decisions (e.g., depreciation can be used to estimate maintenance costs). Ceteris paribus, a subsidiary manager may have more incentives than a parent manager to choose income-increasing accounting methods due to the effect of the internal capital markets.

Sample Design

The sample of parents and subsidiaries in this study comes from Securities Data Corporation's (SDC) databases. Subsidiary firms are identified when the level of ownership exceeds 20%. For accounting purposes, firms that are owned at least 20% by the parent are generally accounted for by using the equity method, while firms that are owned at least 50% are consolidated. The time period of the study is from 1978 to 1997, but because variable definitions are for four-year average values, the first observations start in 1982. The distribution of the final sample by year is detailed in Table 5.

The sample's industry distribution is presented in Table 6. Accounting choices, accounting numbers, and other items used in the models are taken from

Table 5
Distribution of Sample Firms by Year

Year	Number of Sample Observations
1982	2
1985	2
1986	1
1987	7
1988	8
1989	2
1990	8
1991	9
1992	8
1993	5
1994	11
1995	11
1996	14
1997	12
Total	100

Standard and Poor's 1997 Compustat PC Plus and the Center for Research in Security Prices (CRSP) databases. The distribution of accounting choices in the sample is detailed in Table 7. Contractual compensation variables are collected from proxy statements. Both acquisition and divestiture dates are used to examine choices when the parent has control over the subsidiaries.

The final sample contains one hundred observations of which ninety-six observations are used in the depreciation models and thirty-six are used in the inventory models. Summary statistics for the variables are presented in Table 8. Table 9 presents the correlation coefficients between regressors. There is no pair of regressors with a correlation coefficient higher than $|p|>0.59$, except between the Regulation and interaction term of parent choice and Regulation, which is only

Table 6
Distribution of Subsidiary Firms and Their Respective Parents by Industry

Industry Description	SIC codes	Number of Parent Firms*	Number of Subsidiary Firms	1990 Population of Firms
Agriculture Production	100	0	1	14
Gold and Silver Ores	1040	1	3	75
Crude Petroleum and Natural Gas	1311	2	4	218
Oil and Gas Field Services	1381-1389	0	2	43
Construction	1531-1731	3	1	79
Food Products	2000-2086	2	3	128
Fabric Mills	2211-2250	1	1	36
Millwork	2430	1	0	10
Paper Products	2621-2670	2	0	65
Printing	2711-2780	5	4	93
Chemicals	2800-2890	7	6	327
Plastics	3080-3089	1	1	61
Footwear	3140	1	0	17
Glass	3220	0	1	3
Cement	3241	0	1	6
Primary Metals	3310-3334	3	2	72
Fabricated Metals	3440-3490	1	1	102
Construction and Oil and Gas Equipment	3531-3533	3	1	26
Industrial Fans	3564	0	1	18
Computer Equipment	3570-3577	3	4	147
Office Equipment	3578-3579	0	1	20
Industrial Equipment	3590	1	1	13
Electrical Equipment	3600-3679	5	10	392
Aircraft Engines	3724	1	0	10
Guided Missiles	3760	1	0	4
Measuring Instruments	3822-3861	7	8	321
Misc. Manufacturing	3911-3990	4	2	62
Railroads	4011	3	0	27
Trucking	4213	0	1	32
Air Transport	4512	1	1	32
Communication	4812-4899	9	6	160
Utilities	4911-4991	4	4	272
Lumber – Whls.	5031	1	0	3
Computers – Whls.	5045	1	0	25
Hardware – Whls.	5072	1	0	7

Table 6 Continued

Industry Description	Sic codes	Number of Parent Firms*	Number of Subsidiary Firms	1990 Population of Firms
Durable Goods – Whls.	5090	0	1	11
Jewelry – Whls.	5094	1	1	2
Paper Products – Whls.	5110	0	1	7
Whls. Chem. & Pretro. – Whls.	5160-5172	2	0	75
Misc Nondurable Goods – Whls.	5190	0	1	6
Bldg Material - Retail	5200	1	1	5
Department Stores	5311	1	0	25
Variety Stores	5331	2	0	23
Apparel and Accessory Stores	5600	0	1	7
Women's Clothing Stores	5621	1	0	18
Eating Places	5812	0	2	92
Misc Shopping Goods Stores	5940	0	1	12
Jewelry Stores	5944	0	1	9
Catalog, Mail-Order Houses	5961	2	1	15
Investments and Insurance	6021-6799	7	5	893
Services and Misc.	7200-9995	8	12	799
Totals		100	100	4,927

*Includes repeats of 14 parent firms. Whls. = Wholesale.

included in an alternative model. Judge, Hill, Griffiths, Lutkepohl, and Lee (1988, 868) note than a common rule of thumb for a serious multicollinearity problem between regressors is a correlation coefficient greater than 0.80. Therefore, it appears that multicollinearity has not seriously degraded the regressions of subsidiary accounting choice.

To be included in the final sample, the data for all regressor and dependent variables had to be nonmissing. The original sample from SDC included 644

Table 7
Distribution of Accounting Choices of Subsidiary and Parent Sample Firms

Accounting Methods	Coding	Subsidiary Firms	Parent Firms
Depreciation:			
Accelerated Methods	0	1	3
Combined Accelerated and Straight-line methods	0	18	20
Straight-line Method	1	77	73
Totals		96	96
Inventory:			
LIFO	0	4	6
Standard Cost	0	2	2
Specific Identification	0	1	0
Average Cost	1	6	10
FIFO	1	23	18
Totals		36	36

acquisitions and 813 divestitures over the period 1978 to 1997. The data that proved to be limiting factors are the parent's accounting choice and the parent's return data used to measure Risk. In the end eighteen firms are eliminated when these items are missing. In addition, four observations were eliminated because the bonus plan information is missing for the parent. Observations with duplicate parents are eliminated, which affected fifteen observations. Only the most recent parent observation is used. Seven observations are eliminated because the parent does not report a depreciation method in the period of observation. Another ten observations are excluded because of missing interest coverage data. acquisitions and 813 divestitures over the period 1978 to 1997.

Table 8
Univariate Statistics of Subsidiary Firm Variables and Their Respective Parent Company Variables

Variable	N	Mean	Std Dev	Minimum	Maximum
Sub DEP Method	96	0.802	0.401	0.000	1.000
Sub INV Method	36	0.806	0.401	0.000	1.000
Par DEP Method	96	0.760	0.429	0.000	1.000
Par INV Method	36	0.778	0.422	0.000	1.000
Sub Bonus	100	0.600	0.492	0.000	1.000
Sub Assets in Place	100	1.513	2.935	0.165	18.762
Sub Leverage	100	0.214	0.158	0.005	0.986
Sub Interest Coverage	100	147.832	960.955	-549.272	9,492.619
Sub Size	100	5.858	1.604	2.637	10.139
Sub ROA	100	-0.504	15.508	-81.211	33.702
Sub Volatility	100	0.249	0.133	0.094	1.000
Sub Regulation	100	0.120	0.327	0.000	1.000
Sub Tax Loss Carry	36	0.222	0.422	0.000	1.000
Sub Inflation	36	0.111	0.398	-1.000	1.000
Sub Industry	100	0.780	0.629	-1.000	1.000
Sub Control Costs	100	1.775	7.026	0.000	61.540
Sub Industry Specialization	100	0.720	0.451	0.000	1.000
Sub/Par Industry Similarity	100	0.600	0.492	0.000	1.000
Proportional Ownership	100	0.569	0.236	0.200	0.900
Previously Owned	100	0.030	0.171	0.000	1.000
Par Choice/Reg Interaction	100	0.100	0.302	0.000	1.000
Par Bonus	100	0.500	0.503	0.000	1.000
Par Assets in Place	100	7.267	42.755	0.070	358.384
Par Leverage	100	0.237	0.139	0.000	0.625
Par Interest Coverage	100	11.576	28.003	-19.462	241.058
Par Size	100	7.559	2.144	2.661	11.352
Par ROA	100	1.065	8.429	-37.529	19.112
Par Volatility	100	0.324	0.158	0.116	1.000
Par Regulation	100	0.160	0.368	0.000	1.000
Par Tax Loss Carry	36	0.361	0.487	0.000	1.000
Par Inflation	36	0.194	0.401	0.000	1.000
Par Industry CAP	100	0.670	0.551	-1.000	1.000

N= Number of observations, Sub = Subsidiary, Par = Parent, INV = Inventory, DEP = Depreciation, CAP = Industry consensus accounting procedure
Par Choice/Reg Inter. = PAC x REG, ROA = Return on Assets.

Table 9
Correlation of Independent Variables Used in the Subsidiary Regression Models

	Variable	2	3	4	5	6	7	8	9	10	11
1	Bonus	-.07	-.25	-.08	-.00	.12	-.00	.05	-.12	-.06	-.04
2	AIP		.01	-.02	-.32	-.14	-.05	-.09	-.07	.01	.15
3	LEV			.22	.03	-.11	-.17	.32	.13	.49	-.01
4	Cover				.13	.05	-.09	.28	-.12	.05	.04
5	Size					.34	-.12	.15	-.34	-.03	-.28
6	ROA						-10	.07	.01	-.13	-.22
7	Risk							-.15	.03	-.02	.13
8	REG								.08	.43	.06
9	TLCF									.02	x
10	INFL										x

	Variable	12	13	14	15	16	17	18	19	20
1	Bonus	-.02	.10	-.01	-.05	-.13	-.02	-.10	-.13	.00
2	AIP	.10	.12	.06	.03	.01	.05	-.02	-.10	-.08
3	LEV	.09	-.03	-.03	-.26	.06	-.03	.10	.28	.33
4	Cover	-.33	.05	.01	-.19	-10	-.02	.55	.09	.28
5	Size	-.10	-.24	-.11	-.04	.08	.07	.01	-.09	.10
6	ROA	.25	-.25	.10	-.15	.06	.16	-.01	-.14	.04
7	Risk	.00	-.10	.05	.23	.04	-.06	-.09	.20	-.12
8	REG	.16	.13	.08	.59	.20	.02	.12	-.01	.90
9	TLCF	-.29	.21	.34	-.12	-.15	.01	.00	.19	.16
10	INFL	.15	-.09	-.08	-.30	-.08	-.01	.00	.16	.24
11	PDEP	pc	.12	-.11	-.09	-.23	.05	.10	-.04	.19
12	PINV		-.02	.12	-.18	-.26	.30	.00	-.09	.13
13	CAP			.08	-.22	-.22	-.20	.06	.12	.12
14	MAG				.09	-.06	.11	-.03	-.07	-.07
15	INDSPC					.08	.11	-.02	.04	-.53
16	INDSIM						-.13	.02	.10	-.27
17	%Own							-.03	-.63	.00
18	PREV								.24	.14
19	ACQUIR									.03
20	PACREG									

x = independent variables are only used in the inventory models and are not used in the depreciation models.
pc = parent choices are not used together in the same models.
PDEP = parent depreciation choice, PINV = parent inventory choice.

Model Specification

The models in this study consist of the single-firm model and the multi-firm model. The multi-firm model is the single-firm model with the addition of the multi-firm variables discussed in the hypotheses development section. The single-firm and multi-firm models are presented below. The single-firm model is repeated from above.

$$AC = f(SFV) \tag{2.0}$$

where

$$SFV = [AIP (?), LEV (+), Cover (-), Size (-), ROA (-), Risk (?), CAP (?), REG (-)] \tag{2.1}$$

$$AC = f(SFV, MFV) \tag{3.0}$$

where the multi-firm variables (MFV) are identified along with their expected coefficients:

$$MFV = [PAC (?), MAG (?), INDSPEC (?), INDSIM (?), \%Own (-)] \tag{3.1}$$

As discussed in the hypothesis development section, (H1), the primary research hypotheses is whether multi-firm characteristics jointly add statistically significant explanatory power to the regression of the determinants of the subsidiary's accounting procedure choice. Therefore, the significance of the multi-firm variables will be examined via a chi-square test where the null hypothesis is that all of the multi-firm coefficients are equal to 0. A logit model will be used to analyze the accounting procedure choice models. The evaluation of comparative models follows Skinner

(1993) who uses pseudo R-square to identify the model with the highest explanatory power. Maddala (1983) points out that the assumptions underlying ordinary least squares are violated when using a dichotomous model. Maddala (1983) also explains that if the explanatory variables are jointly normal, then the OLS t- and F-tests are exact, but in this study, like many others, the use of binary explanatory variables prevents the explanatory variables from being jointly normal.

This study follows the majority of discrete accounting choice studies that use a statistical model specifically designed to accommodate the use of discrete dependent variables. Either probit or logit models are used in the following discrete accounting procedure choice studies: Hagerman and Zmijewski (1979), Zmijewski and Hagerman (1981), Dhaliwal, Salamon, and Smith (1982), Hunt (1985), Lee and Hsieh (1985) Caster and Simon (1986), Dhaliwal (1988), Niehaus (1989), Knoeber and McKee (1991), Cushing and LeClere (1992), Kuo (1993), and Skinner (1993). Judge, Hill, Griffiths, Lutkepohl, and Lee (1988, 788) note, "The choice between the probit and logit models is usually made on the basis of convenience." Other studies use OLS (Christie and Zimmerman 1994; and Bowen, DuCharme, and Shores 1995). Lindahl (1989) uses a quadratic hill climbing statistical procedure in his model. Some studies have performed both OLS and logit (Hagerman and Zmijewski 1979 and Christie and Zimmerman 1994); however, determining the differences of using OLS versus a discrete statistical model is beyond the scope of this study.

CHAPTER 4

EMPIRICAL TEST RESULTS

Table 10 presents the base single-firm depreciation models for the parent and subsidiary firms. Models 10.1 and 10.2 are for the parents and subsidiaries respectively. Interestingly, for the subsidiary firms in Model 10.2, the pseudo R-square of 21.5% is higher than that for the parent firms at 11.7% in Model 10.1. The fact that the single-firm model for the subsidiary firms provides more predictive power than it does for the parent firms makes it, *ex ante,* more difficult to find additional explanatory power for the multi-firm variables in the expanded multi-firm models of depreciation choice.

The logit score for the subsidiary Model 10.2 is 0.2%, which rejects the null hypothesis that the regressor variables are jointly equal to 0. In the subsidiary Model 10.2, the coefficient on performance (ROA) is significantly negative (p=8.1%). The coefficient on industry consensus accounting procedure is also significantly positive (p=1.9%, 2-tailed). In the parent model, the coefficient on Size is significantly negative (p=3.4%), and the coefficient on CAP is significantly positive (p=4.5%, 2-tailed) while the coefficient on Bonus is significantly negative (p=9.2%). If this set of parent firms operates primarily through subsidiary firms, then the significantly negative Bonus coefficient may be explained by the low hurdles normally set for achieving bonus payouts in profit centers in multilayer organizations (Merchant and Manzoni 1989).

Tables 11 presents the multi-firm model results for depreciation choice in the subsidiary firms. Models 11.1 to 11.5 are identical in construction except for their

Table 10

Single-firm Logit Model of Parent and Subsidiary Firms' Depreciation Choice

Dependent variable is the depreciation choice of the firm.

Data are coefficients with p-values in parentheses. Number of observations = 96.

		Model Number	
		10.1 Parent	**10.2 Subsidiary**
Intercept	(?)	3.414	0.482
		(0.074)	(0.836)
Bonus	(+)	-0.744	-0.593
		(0.092)	(0.195)
AIP	(?)	0.038	0.095
		(0.718)	(0.617)
LEV	(+)	-0.441	-2.971
		(0.420)	(0.102)
Cover	(-)	0.035	0.000
		(0.135)	(0.360)
Size	(-)	-0.290	-0.005
		(0.034)	(0.491)
ROA	(-)	-0.034	-0.055
		(0.188)	(0.081)
Risk	(?)	-2.356	3.650
		(0.296)	(0.368)
CAP	(?)	1.178	1.403
		(0.045)	(0.019)
REG	(-)	0.914	0.499
		(0.149)	(0.306)
Logit Score		0.218	0.002
Goodness of Fit		0.200	0.740
Pseudo R2		0.133	0.221

Table 1 presents the variable definitions. The logit score is a chi-square test of the null hypothesis that all regressor variables except the intercept are jointly zero. The Goodness-of-fit statistic is a test of the null hypothesis that the model is well specified.

measures of %Own. The level of pseudo R-square is used to choose the best model for explaining the subsidiary's depreciation choice. Using various measures of %Own helps to answer the question "What is the level of ownership that on average reflects an exercise of influence over a subsidiary's accounting policy?" Just because a parent is able to exercise control over a subsidiary's decision does not mean that the parent exercises the control. APB 18 states that holding 20% or more of the voting stock leads to the presumption that the investor is *able* to exercise significant influence over the investee unless there is significant evidence to the contrary.

Ownership levels in the sample vary from 20% to 90%. The cutoff levels selected to measure %Own in Models 11.1 to 11.5 are a continuous measure, a cutoff at 50%, 40%, 30%, and 25%. In the base multi-firm model for depreciation (Model 11.2), the cutoff of 40% provides the highest pseudo R-square among the various measures of %Own in Models 11.1 to 11.5. In Models 11.1 to 11.5 %Own is significant (p=1.4%) when measured at the 40% cutoff. %Own is also significant at the 30% cutoff (p=4.5%), but the 40% cutoff in Model 11.2 gives the highest pseudo R-square.

Next is a discussion of the empirical results for the base multi-firm model with the 40% %Own found in Model 11.2. In Model 11.2 the chi-square test of the null hypothesis that the multi-firm variables are jointly equal to 0 is rejected (p=3.2%). The coefficient on leverage is significantly negative (p=9.0%). The negative coefficient for leverage may result from the effects of interfirm financing arrangements between corporations in a multi-firm organization.

Table 11

Multi-firm Logit Model of Subsidiary Firms' Depreciation Choice

Dependent variable is the depreciation choice of the subsidiary firm.

Data is t-statistic with p-values in parentheses. Number of observations = 96.

		Model Number				
		11.1	**11.2**	**11.3**	**11.4**	**11.5**
Intercept	**(?)**	-1.633	-2.294	-1.318	-0.396	-1.094
		(0.614)	(0.512)	(0.692)	(0.904)	(0.730)
Bonus	**(+)**	-0.764	-0.690	-0.74	-0.850	-0.695
		(0.174)	(0.208)	(0.185)	(0.156)	(0.197)
AIP	**(?)**	0.095	0.101	0.084	0.078	0.08
		(0.603)	(0.578)	(0.640)	(0.678)	(0.654)
LEV	**(+)**	-4.110	-3.658	-3.952	-3.716	-3.964
		(0.072)	(0.090)	(0.071)	(0.082)	(0.072)
Cover	**(-)**	0.002	0.002	0.002	0.001	0.002
		(0.241)	(0.257)	(0.270)	(0.301)	(0.262)
Size	**(-)**	0.394	0.461	0.401	0.301	0.353
		(0.107)	(0.083)	(0.105)	(0.157)	(0.128)
ROA	**(-)**	-0.0774	-0.059	-0.059	-0.055	-0.066
		(0.083)	(0.134)	(0.127)	(0.140)	(0.106)
Risk	**(?)**	7.784	10.030	8.495	6.456	6.885
		(0.167)	(0.120)	(0.152)	(0.218)	(0.206)
CAP	**(?)**	1.342	1.399	1.445	1.485	1.398
		(0.059)	(0.052)	(0.040)	(0.032)	(0.050)
REG	**(-)**	-1.476	-1.443	-1.864	-1.249	-1.465
		(0.174)	(0.179)	(0.125)	(0.214)	(0.176)

Table 11 Continued

		Model Number				
		11.1	**11.2**	**11.3**	**11.4**	**11.5**
PAC	(?)	2.360	2.939	2.612	2.265	2.352
		(0.003)	(0.001)	(0.002)	(0.004)	(0.003)
MAG	(?)	-0.018	-0.027	-0.021	-0.020	-0.017
		(0.657)	(0.501)	(0.601)	(0.609)	(0.671)
INDSPEC	(?)	-1.642	-1.258	-1.801	-1.759	-1.67
		(0.198)	(0.339)	(0.180)	(0.169)	(0.190)
INDSIM	(?)	-0.061	0.094	0.192	0.019	0.019
		(0.940)	(0.909)	(0.812)	(0.981)	(0.981)
		0.5	0.4	0.3	0.25	C
%OWN *	(-)	-1.002	-2.393	-1.778	-1.226	-1.497
		(0.115)	(0.014)	(0.045)	(0.188)	(0.195)
MFV Test		0.058	0.032	0.042	0.068	0.069
Logit Score		0.001	0.000	0.001	0.001	0.001
Fit		0.964	0.681	0.898	0.611	0.968
Pseudo R2		0.330	0.365	0.345	0.326	0.325

Table 1 presents the variable definitions. MFV Test is a chi-square test of the null hypothesis that the multi-firm coefficients are jointly equal to zero. The logit score is a chi-square test of the null hypothesis that all regressor variables except the intercept are zero. Fit =The Goodness-of-fit statistic which is a test of the null hypothesis that the model is well specified. * The subperscript text above the %OWN coeffeicents are the levels of cuttoff, and C indicates that the %Own is measured continuously.

The coefficient Size is significantly negative (p=8.3). The coefficient on the industry consensus accounting procedure is significantly positive (p=5.2%, 2-tailed). The coefficient on the parent's accounting choice is significantly positive (p=0.1%, 2-tailed). As discussed above, %Own is significantly negative (p=1.4%, 2-tailed).

Three sensitivity tests on the depreciation sample are performed. First, an indicator variable indicating if another firm previously owned (PREV) the subsidiary before being acquired by the current parent firm. Some of the acquired firms in the sample were acquired from other companies; and to control for the residual effect of previous ownership the dummy variable PREV is used. For subsidiary acquisitions, all firms that were owned by another parent at the time of acquisition are identified by SDC. Those subsidiaries that are owned less than 51% (after the acquisition by the current parent) are deleted to avoid the confounding issue of the current parent not being the true parent firm. Subsidiaries that were owned by a previous parent (before acquisition of the current parent) and are now owned at least 51% by the current parent have the variable PREV and are coded as 1, and 0 otherwise. The same set of measures for %Own used in Models 11.1 to 11.5 are used again in Models 12.1 to 12.5, along with the addition of the PREV variable. As in Models 11.1 to 11.5, %Own measured at 40% again provides the results with the highest pseudo R-square at 37.9% in Model 12.2.

In Model 12.2 (with PREV) the chi-square test of the null hypothesis that the multi-firm variables are jointly equal to 0 is rejected (p=3.6%). The coefficient on leverage is significantly negative (p=7.0%). The negative coefficient for leverage may result from the effects of interfirm financing arrangements between corporations in a

Table 12

Multi-firm Logit Model of Subsidiary Firms' Depreciation Choice

Dependent variable is the depreciation choice of the subsidiary firm.

Data is t-statistic with p-values in parentheses. Number of observations = 96.

		Model Number										
		12.1	**12.2**	**12.3**	**12.4**	**12.5**	**12.6**	**12.7**	**12.8**	**12.9**	**12.10**	**12.11**
Intercept	**(?)**	-1.084	-1.939	-0.946	-0.208	-0.665	-0.974	0.842	0.185	-0.313	-0.473	0.701
		(0.746)	(0.596)	(0.785)	(0.952)	(0.842)	(0.777)	(0.829)	(0.960)	(0.934)	(0.895)	(0.858)
Bonus	**(+)**	-0.809	-0.737	-0.77	-0.855	-0.758	-0.836	-1.229	-0.915	-0.8340	-0.778	-1.214
		(0.165)	(0.197)	(0.179)	(0.157)	(0.182)	(0.164)	(0.099)	(0.143)	(0.170)	(0.179)	(0.102)
AIP	**(?)**	0.060	0.080	0.059	0.049	0.053	0.060	0.031	0.041	0.050	0.052	0.027
		(0.766)	(0.694)	(0.766)	(0.814)	(0.789)	(0.766)	(0.871)	(0.835)	(0.811)	(0.792)	(0.886)
LEV	**(+)**	-5.010	-4.416	-4.795	-4.763	-4.962	-4.934	-4.022	-4.498	-4.818	-4.867	-4.287
		(0.055)	(0.070)	(0.056)	(0.061)	(0.054)	(0.062)	(0.120)	(0.075)	(0.065)	(0.063)	(0.113)
Cover	**(-)**	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003
		(0.285)	(0.273)	(0.297)	(0.328)	(0.298)	(0.288)	(0.355)	(0.332)	(0.328)	(0.304)	(0.291)
Size	**(-)**	0.290	0.392	0.324	0.229	0.279	0.2890	0.366	0.297	0.226	0.279	0.394
		(0.187)	(0.129)	(0.166)	(0.237)	(0.195)	(0.186)	(0.142)	(0.183)	(0.237)	(0.194)	(0.129)
ROA	**(-)**	-0.084	-0.068	-0.070	-0.068	-0.077	-0.086	-0.088	-0.072	-0.068	-0.078	-0.093
		(0.089)	(0.127)	(0.121)	(0.131)	(0.102)	(0.091)	(0.120)	(0.126)	(0.130)	(0.103)	(0.113)
Risk	**(?)**	6.259	9.113	7.440	5.273	5.966	6.392	11.640	7.879	5.266	6.086	11.866
		(0.282)	(0.176)	(0.230)	(0.332)	(0.300)	(0.278)	(0.110)	(0.198)	(0.334)	(0.294)	(0.116)
CAP	**(?)**	1.544	1.550	1.601	1.653	1.567	1.544	1.850	1.687	1.646	1.568	1.837
		(0.040)	(0.039)	(0.030)	(0.024)	(0.037)	(0.040)	(0.030)	(0.027)	(0.025)	(0.038)	(0.029)

Table 12 Continued

		Model Number										
		12.1	**12.2**	**12.3**	**12.4**	**12.5**	**12.6**	**12.7**	**12.8**	**12.9**	**12.10**	**12.11**
REG	**(-)**	-1.281	-1.434	-1.753	-1.107	-1.323	-1.301	-2.014	-2.072	-1.108	-1.360	-4.552
		(0.215)	(0.186)	(0.148)	(0.247)	(0.210)	(0.213)	(0.131)	(0.125)	(0.247)	(0.207)	(0.148)
PAC	**(?)**	2.622	3.191	2.893	2.574	2.677	2.612	3.599	2.884	2.583	2.673	3.436
		(0.003)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
MAG	**(?)**	-0.020	-0.029	-0.023	-0.021	-0.019	-0.020	-0.041	-0.024	-0.021	-0.019	-0.049
		(0.621)	(0.482)	(0.577)	(0.589)	(0.638)	(0.619)	(0.331)	(0.545)	(0.592)	(0.641)	(0.325)
INDSPEC	**(?)**	-1.494	-1.122	-1.624	-1.566	-1.525	-1.507	-1.722	-1.914	-1.557	-1.548	-1.776
		(0.253)	(0.409)	(0.238)	(0.231)	(0.246)	(0.253)	(0.268)	(0.208)	(0.236)	(0.246)	(0.249)
INDSIM	**(?)**	0.303	0.374	0.494	0.37	0.342	0.29	0.404	0.549	0.373	0.332	0.480
		(0.736)	(0.674)	(0.576)	(0.676)	(0.700)	(0.747)	(0.658)	(0.534)	(0.674)	(0.709)	(0.610)
		0.5	0.4	0.3	0.25	C	0.5	0.4	0.3	0.25	C	0.4
%OWN	**(-)**	-0.684	-2.249	-1.625	-0.86	-1.371	-0.778	-4.431	-2.249	-0.802	-1.601	-4.358
		(0.213)	(0.020)	(0.062)	(0.269)	(0.224)	(0.241)	(0.005)	(0.048)	(0.312)	(0.253)	(0.005)
PREV	**(?)**	-2.854	-2.641	-2.871	-3.064	-3.196	-2.71	-0.768	-2.199	-3.120	-3.085	-0.734
		(0.120)	(0.130)	(0.103)	(0.089)	(0.068)	(0.198)	(0.695)	(0.257)	(0.114)	(0.106)	(0.706)
AQUIR	**(?)**						-0.149	-2.719	-0.915	0.069	-0.167	-2.694
							(0.893)	(0.061)	(0.420)	(0.945)	(0.885)	(0.058)
PACREG	**(?)**											2.901
												(0.510)
MFV Test		0.061	0.036	0.044	0.065	0.064	0.101	0.075	0.079	0.105	0.106	0.128
Logit Score		0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Fit		0.968	0.775	0.946	0.923	0.962	0.966	0.590	0.688	0.922	0.996	0.191
Pseudo R2		0.347	0.379	0.362	0.345	0.346	0.347	0.404	0.366	0.345	0.346	0.407

Table 12 Continued

Table 1 presents the variable definitions. MFV Test is a chi-square test of the null hypothesis that the multi-firm coefficients are jointly equal to zero. The logit score is a chi-square test of the null hypothesis that all regressor variables except the intercept are zero. Fit =The Goodness-of-fit statistic which is a test of the null hypothesis that the model is well specified. * The subperscript text above the %OWN coeffeicents are the levels of cuttoff, and C indicates that the %Own is measured continuously.

multi-firm organization. The coefficient on the industry consensus accounting procedure is significantly positive (p=3.0%, 2-tailed). The coefficient on the parent's accounting choice is significantly positive (p=0.1%, 2-tailed). As discussed above, %Own is significantly negative (p=4.0%, 2-tailed).

The second sensitivity test involves the indicator variable AQUIR, which indicates that the subsidiary was partially acquired as opposed to being partially divested by the parent. The same set of measures for %Own used in Models 12.1 to 12.5 are used again in Models 12.6 to 12.10, along with the addition of the AQUIR variable. As in Models 12.1 to 12.5, %Own measured at 40% again provides the results with the highest pseudo R-square at 40.4% in Model 12.7. The results in Model 12.7 with the AQUIR variable are very similar to those in Model 12.2 except that the coefficient on AQUIR is significantly negative (p=6.1%, 2-tailed).

The third sensitivity test in Model 12.11 is to take Model 12.7 and include an interaction term between the parent's accounting choice and the regulation variables. The results of including this interaction term are insignificant and, therefore, this model is rejected for parsimony. The parent's accounting choice remains significant and the Regulation variable remains insignificant compared to Model 12.7.

Table 13 presents the single-firm inventory of choice models for the parent and subsidiary firms. Due to the fairly small sample of inventory firms, several variables were deleted to prevent quasi or complete separations in the sample including the Bonus variable for both the parent's and subsidiary's samples, and the parent's accounting choice for the subsidiary sample, the industry consensus accounting

Table 13

Single-Firm Logit Model of Parent and Subsidiary Firms' Inventory Choice

Dependent variable is the inventory choice of the firm.

Data is t-statistic with p-values in parentheses. Number of observations = 36.

		Model Number	
		13.1	13.2
		Parent	Subsidiary
Intercept	(?)	6.864	6.080
		(0.173)	(0.270)
AIP	(?)	-0.644	0.485
		(0.503)	(0.784)
LEV	(+)	4.362	-2.424
		(0.224)	(0.252)
Cover	(-)	0.088	-0.002
		(0.193)	(0.283)
Size	(-)	-0.724	-0.884
		(0.021)	(0.093)
ROA	(-)	-0.016	0.052
		(0.428)	(0.216)
Risk	(?)	-1.534	1.977
		(0.720)	(0.600)
CAP	(?)		-0.715
			(0.236)
REG	(-)	0.384	
		(0.346)	
TLC	(+)	0.479	-2.882
		(0.698)	(0.055)
Infl.	(+)	0.099	
		(0.465)	
Logit Score		0.699	0.524
Goodness of Fit		0.156	0.781
Pseudo R2		0.194	0.196

Variables with missing statistics result from the variable being ommitted due to quasi or complete seperation in the sample. Table 1 presents the variable definitions The logit score is a chi-square test of the null hypothesis that all regressor variables except the intercept are zero. The Goodness-of-fit statistic is a test of the null hypothesis that the model is well specified.

procedure choice for the parent firms, regulation for the subsidiary firms and inflation for the subsidiary firms.

In the single-firm inventory choice analysis for the subsidiary firms in Model 13.2, Size is significantly negative for the subsidiary firms (p=9.3%). Tax-loss carryforwards are significantly negative (p=5.5%), which may result from subsidiaries being in a consolidated return group where the tax effects in multiple firms are aggregated together. Model 13.1 provides the single-firm results for the parent firms. Size is significantly negative (p=2.1%). The pseudo R-square for the parent and subsidiary models are 19.4% and 19.6% respectively.

Table 14 contains the results of the multi-firm model for inventory choice. As is done for the depreciation sample, various levels of parental ownership levels are used in Models 14.1 to 14.5. For the multi-firm models of inventory choice, the level of proportional ownership that gives the highest pseudo R-square of 28.0% is measured at 30% in Model 14.3. In Model 14.3, the coefficient on Size is significantly negative (p=7.1%), the coefficient on industry consensus accounting procedure is significantly negative (p=9.1%), and the coefficient on tax-loss carryforwards is significantly negative (p=2.5%). The negative coefficient on Tax-loss carryforwards may result from the subsidiaries being part of consolidated tax return groups. The coefficient on proportional ownership is significantly negative (p=5.7%). The multi-firm chi-square test is calculated on the single multi-firm variable proportional ownership because other multi-firm variables are deleted when they introduce sample separation problems. The multi-firm chi-square test of the null

Table 14

Multi-firm logit model of the subsidiary firms' inventory choice

Dependent variable is the inventory choice of the subsidiary firm.

Data are coefficients with p-values in parentheses. Number of observations = 36.

		Model Number						
		14.1	**14.2**	**14.3**	**14.4**	**14.5**	**14.6**	**14.7**
Intercept	**(?)**	6.095	7.685	8.041	16.755	8.236	38.167	18.703
		(0.261)	(0.165)	(0.156)	(0.968)	(0.155)	(0.044)	(0.125)
AIP	**(?)**	0.409	0.425	0.481	0.682	0.236	0.552	0.755
		(0.817)	(0.787)	(0.774)	(0.719)	(0.886)	(0.788)	(0.715)
LEV	**(+)**	-2.431	-3.785	-4.268	-2.389	-2.688	-6.338	-2.889
		(0.249)	(0.153)	(0.138)	(0.255)	(0.223)	(0.162)	(0.265)
Cover	**(-)**	-0.002	-0.003	-0.002	-0.002	-0.002	-0.028	-0.005
		(0.272)	(0.164)	(0.250)	(0.246)	(0.228)	(0.030)	(0.090)
Size	**(-)**	-0.889	-1.037	-1.000	-0.836	-1.019	-4.447	-2.187
		(0.091)	(0.066)	(0.071)	(0.105)	(0.071)	(0.019)	(0.057)
ROA	**(-)**	0.051	0.062	0.059	0.064	0.056	-0.105	-0.028
		(0.217)	(0.167)	(0.194)	(0.161)	(0.189)	(0.205)	(0.416)
Risk	**(?)**	2.446	3.370	4.373	2.194	3.461	17.805	6.845
		(0.544)	(0.424)	(0.332)	(0.562)	(0.406)	(0.125)	(0.270)
CAP	**(?)**	-0.749	-1.044	-1.504	-0.604	-0.968	-7.598	-4.091
		(0.222)	(0.140)	(0.091)	(0.543)	(0.159)	(0.023)	(0.146)
TLC	**(+)**	-2.908	-3.026	-3.654	-2.817	-3.194	-7.453	-4.895
		(0.027)	(0.033)	(0.025)	(0.030)	(0.023)	(0.032)	(0.042)

Table 14 Continued

	Model Number						
	14.1	**14.2**	**14.3**	**14.4**	**14.5**	**14.6**	**14.7**
	$^{0.5}$	$^{0.4}$	$^{0.3}$	$^{0.25}$	^{C}	$^{0.4}$	$^{0.3}$
%OWN * (-)	-0.374	-1.798	-3.060	-11.228	-3.354	-17.013	-8.106
	(0.372)	(0. 082)	(0.057)	(0.489)	(0.112)	(0.026)	(0.059)
PREV (?)						-16.767	-6.920
						(0.050)	(0.156)
MFV Test	0.743	0.163	0.113	0.978	0.224	0.146	0.292
Logit Score	0.619	0.477	0.319	0.600	0.508	0.372	0.211
Goodness of Fit	0.406	0.412	0.762	0.853	0.374	0.598	0.501
Pseudo R2	0.199	0.245	0.280	0.210	0.232	0.441	0.374

Table 1 presents the variable definitions. MFV Test is a chi-square test of the null hypothesis that the multi-firm coefficients are jointly equal to zero. The logit score is a chi-square test of the null hypothesis that all regressor variables except the intercept are zero. The Goodness-of-fit statistic is a test of the null hypothesis that model is well specified.

* The subperscript text above the %OWN coeffeicents are the levels of cuttoff. For example, 0.5 indicates that the %OWN is measured as 1 when proportional ownership is greater than 50%. The superscript C indicates that the %OWN is measured continuously.

hypothesis that the one multi-firm variable is equal to 0 is a "two-sided" test, and therefore, it is not appropriate when the single multi-firm variable has a predicted sign.

Models 14.6 and 14.7 provide the results when the variable for previous ownership (PREV) is added to the multi-firm model when proportional ownership levels are measured at 40% and 30% respectively. Of these two models, Model 14.6 with %Own measured at 40% gives the highest pseudo R-square of 44.1%. Other results from Model 14.6 are that interest coverage is significantly negative (p=3.0%), Size is significantly negative (p=1.9%), the industry consensus accounting procedure is significantly negative (p=2.3%), tax-loss carryforward is significantly negative (p=3.2%), proportional ownership is significantly negative (p=5.3%), and previous ownership is significantly negative (p=50%). In Model 14.6, the logit test is a chi-square test that does not reject the null hypothesis that all model coefficients are jointly equal to 0 (p=37.2%). The chi-square multi-variable test that all multi-firm variables are jointly equal to 0 is not rejected at normal levels of statistical significance (p=14.6%). A sensitivity test for the interaction term between the parents accounting choice and the regulation variable is not included because use of this variable causes sample separation problems.

CHAPTER 5

SUMMARY AND CONCLUSIONS

This study examines the depreciation and inventory accounting choices made by partially owned subsidiaries in multi-firm organizations. Previous accounting choice studies focus on the parent company's choice. Examining the subsidiary's choice is important because subsidiaries can contribute significantly to the financial results of a multi-firm organization. Furthermore, understanding the accounting choices of partially owned firms should be of interest to the subsidiary's noncontrolling equity interest owners, as well as regulators and educators.

The analysis is conducted using a sample of partially owned subsidiaries (i.e., more than 20%, but less than 100% owned) between 1978 and 1997 for which separate financial statements are available. Accounting choices of both the subsidiary and parent firms are examined using a single-firm model of accounting choice derived from the previous literature. The single-firm model of accounting choice provides more explanatory power for subsidiary firms than it does for parent firms in this sample. The subsidiary firm choices are then examined with a multi-firm model of accounting choice that extends the single-firm model with variables that measure the parent-subsidiary relationship. A chi-square test of the multi-firm variables rejects the null hypothesis that the multi-firm variables are jointly equal to zero. Various levels of parental ownership are tested to identify the average level of parental ownership that influences the subsidiary's accounting choice for depreciation (40%) and inventory (30% or 40%). The findings for depreciation and inventory choice are

similar but certain regressor variables are eliminated in the inventory models to prevent sample separation problems that would result in unstable regression results.

The implications of the study are (1) A model of accounting choice that excludes the parent-subsidiary relationship is not adequate for subsidiary firms, (2) On average, parental influence over accounting choice is exercised when ownership levels reach 40% for depreciation and 30%-40% for inventory, (3) The parent's accounting choice is not sufficient by itself to explain the subsidiary's accounting choice, and (4) The industry consensus accounting procedure (Chung, Park, and Ro 1996) is important in determining the accounting choice of subsidiary and parent firms.

Limitations of the study are (1) The inferences may not be applicable to wholly owned subsidiary firms, (2) The smaller sample size for inventory choice requires the omission of some variables to prevent sample separation problems, and (3) The endogeneity of the subsidiary firm's choice in the parent firm's choice is not examined.

There are several ways to extend this work. For example, I plan on using a structural equation approach to address the endogeneity issue in the multi-firm environment. My current ongoing research includes a study of subsidiary and parent auditor choices in the multi-firm organization. Another extension of this work is a study of continuous measures of accounting choice (accruals and "what if" numbers) in the multi-firm environment. Another potential extension is to investigate subsidiary accounting method changes in the multi-firm environment.

To conclude, the accounting choice of partially owned subsidiary firms is significantly dependent upon variables that measure the multi-firm environment, and neither the parent's choice nor the single-firm model of accounting choice is adequate

to explain the subsidiary's accounting choice. This study of subsidiary accounting choice provides a preliminary basis for understanding accounting choices in multi-firm organizations.

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He has taught courses in Cost Accounting, Financial Accounting, Investments, and Personal Finance. While at Louisiana State University he received the Lloyd F. Morrison award for teaching excellence by a graduate student. Other honors that he has been fortunate to receive include attending the American Accounting Association's National Doctoral Consortium in 1998, and he was an invited participant to the American Accounting Association's Southwestern Doctoral Consortium in 1996.

His professional experience began with Arthur Young and Company (1981-1983) where he spent time in the audit and tax areas. From 1983–1992 he worked for Austin Industries Inc. in Dallas, Texas where he performed several duties including being a member of the Board of Directors of the Austin Industries Employee Credit Union. Most of his time at Austin was spent at Austin Commercial Inc., a subsidiary, where he was a member of the Managerial Board of Directors, the Leadership Council, and the Management Review Team. He was involved directly with prime

contract negotiations with customers of Austin Commercial. He also served as the project manager for the successful software and hardware implementation of a new accounting and performance reporting system, moving from a COBAL based IBM System 34 to a relational database system on a RISC processor. As the Assistant Controller he was directly responsible for financial statements, job-cost and performance reporting, federal tax packet preparation, strategic plan coordination, the annual financial review, cash flow forecasts, outside audit coordination, and contract compliance reporting.

DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Allen Kenneth Hunt

Major Field: Accounting

Title of Dissertation: Voluntary Accounting Policy Choices of Lower-Level Firms in Multi-Firm Organizations

Approved:

Donald R Deis
Major Professor and Chairman

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December 7, 2000