

**THE RELATIONSHIP BETWEEN OUTCOME  
MEASURABILITY AND PRINCIPAL'S  
PREFERENCE FOR CONTRACT  
TYPE: A LABORATORY  
EXPERIMENT**

**BY**

**MELANIE R. MIDDLEMIST**

//

Bachelor of Science  
University of Colorado  
Boulder, Colorado  
1962

Master of Science  
Oklahoma State University  
Stillwater, Oklahoma  
1980

Submitted to the Faculty of the Graduate College  
of the Oklahoma State University  
in partial fulfillment of the requirements  
for the Degree of  
**DOCTOR OF PHILOSOPHY**  
December, 1986

Thesis

1986D

M627r

cop. 2



**THE RELATIONSHIP BETWEEN OUTCOME  
MEASURABILITY AND PRINCIPAL'S  
PREFERENCE FOR CONTRACT  
TYPE: A LABORATORY  
EXPERIMENT**

Thesis Approved:

*Jan R. Bouter*  
\_\_\_\_\_  
Thesis Adviser

*James E. Huff*  
\_\_\_\_\_

*W. W. [unclear]*  
\_\_\_\_\_

*Joseph M. Jeddou*  
\_\_\_\_\_

*Norman N. Wusham*  
\_\_\_\_\_  
Dean of the Graduate College

## ACKNOWLEDGMENTS

This study is concerned with the relationship between agents and principals, and the contracts that agents offer to principals. The primary objective was to investigate the influence that the measurability of the outcome of agent's effort would have on the type of contract preferred by the principal. A factorial experiment was designed to explore the issue and to analyze the results.

The author wishes to express her appreciation to her dissertation chairman, Dr. James Boatsman, for his sound advice and assistance throughout this project and to the other members of the committee, Dr. James Groff, Dr. Joseph Jadow, and Dr. William Warde. Also, a special note of thanks is due to Dr. Janet Kimbrell for her encouragement of the study in a doctoral seminar. Also, Dr. Daniel Edwards, co-author of the research that inspired this effort was very helpful at the critical developmental stage of the study.

To my parents, I express my gratitude for their many years of support and willingness to have me return to study for the Ph.D. I am also indebted to my relentless husband, Dennis, whose patience, understanding and constant prodding contributed to this long project. Finally, to my children, George, Melinda and Melissa, I am especially grateful. Their willingness to fend for themselves, and to assist with household chores was in no small way part of the total effort.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Background of the Controversy . . . . .	3
Fund Accounting and Reporting vs. Consolidated Statements . . . . .	4
Modified Accrual vs. Full Accrual Accounting . . . . .	5
Use of Budget and Budgetary Control . . . . .	6
Accounting Procedures and Agency Theory . . . . .	7
Purpose and Limitations of the Study . . . . .	8
Summary of Content . . . . .	9
II. REVIEW OF THE LITERATURE: AGENCY THEORY . . . . .	10
Agency Theory . . . . .	11
Agency Problem . . . . .	11
Agency Costs . . . . .	12
Contracts . . . . .	13
Observability of Actions . . . . .	13
Incentive Contracts . . . . .	13
Moral Hazard and Adverse Selection . . . . .	14
Observability and Risk . . . . .	15
Monitoring and the Value of Information . . . . .	15
Forcing Contracts . . . . .	17
Summary . . . . .	19
III. METHOD AND RESEARCH DESIGN . . . . .	20
Research Question . . . . .	21
Hypotheses . . . . .	21
The Research Method . . . . .	22
The Experimental Method . . . . .	22
The Experimental Setting . . . . .	22
Procedure . . . . .	24
More Measurable . . . . .	25
Less Measurable . . . . .	25
For More Measurable Outcomes . . . . .	26
For Less Measurable Outcomes . . . . .	27
For All $S_g$ . . . . .	27
Postexperimental Questionnaire . . . . .	29
Pretest . . . . .	30
Pretest for Materials Used . . . . .	31

Chapter	Page
Manipulations . . . . .	31
Question Difficulty . . . . .	32
Classroom Activities . . . . .	32
Pretest for Experimental Procedure . . . . .	32
Modification of the Experimental Procedure . . . . .	34
IV. ANALYSES OF RESULTS . . . . .	36
Analysis and Evaluation of the Questionnaire . . . . .	36
Factor Analyses . . . . .	36
Factor Analysis of the Independent Variables . . . . .	37
Factor Analysis of the Dependent Variable . . . . .	39
Assessment of Reliability . . . . .	40
Other Questionnaire Items . . . . .	41
Manipulation Checks . . . . .	45
Measurability of Student Performance — The Independent Variable . . . . .	45
Perceived Measurability of Instructor Deviations . . . . .	46
Analysis of the Treatment Effects . . . . .	47
Measurability Treatment Effects . . . . .	48
Order Effects . . . . .	50
Summary . . . . .	50
V. SUMMARY AND CONCLUSIONS . . . . .	52
Purpose of the Study and Research Design . . . . .	52
Major Findings . . . . .	53
Implications for Research and Practice . . . . .	53
Perceptions of Measurability . . . . .	54
Order Effects and Contractual Relationships . . . . .	55
Implications for Practice . . . . .	56
Limitations and Summary . . . . .	57
SELECTED REFERENCES . . . . .	58
APPENDICES . . . . .	61
APPENDIX A — AN EXPLANATION OF GOVERNMENTAL ACCOUNTING PROCEDURES . . . . .	62
APPENDIX B — PRETEST QUESTIONNAIRE FOR EXPERIMENTAL MATERIALS . . . . .	68
APPENDIX C — PRETEST QUESTIONNAIRE FOR EXPERIMENTAL PROCEDURES . . . . .	80

Chapter	Page
APPENDIX D — TRANSPARENCIES USED IN EXPERIMENTAL PROCEDURES . . . . .	88
APPENDIX E — POSTEXPERIMENTAL QUESTIONNAIRE . . . . .	95
APPENDIX F — TABULATIONS OF ORIGINAL DATA . . . . .	102
APPENDIX G — SUBJECT APPLICATION BLANK . . . . .	107

## LIST OF TABLES

Table		Page
I.	Factor Analysis of Six Manipulation Check Questions . . . . .	38
II.	Factor Analysis of Four Dependent Variable Questions . . . . .	40
III.	Analysis of Variance of Two Treatments on Subjects' Preference for Contract Type . . . . .	49

## LIST OF FIGURES

Figure		Page
1.	Schematic Illustration of Research Design . . . . .	23
2.	Mean Preference for Contract Type by Subject Groupings . . . . .	48
3.	Mean Contract-type Preference — Measurability x Order . . . . .	51



# CHAPTER I

## INTRODUCTION

Since the mid 1970's, the reliability and utility of governmental accounting information has been questioned. Governmental accounting procedures have been widely criticized and generally have been perceived as inadequate. Many have attributed the inadequacy of the accounting procedures to the fact that governmental units use accounting methods that differ from those used by for-profit organizations. In endeavoring to rectify the controversy, two questions have been raised: 1) why do state and local governments account for themselves the way they do, and 2) wouldn't government accounting systems generate more useful information if they were more in keeping with those of for-profit organizations?

These questions have given rise to somewhat different research approaches regarding governmental accounting. Some prefer to attack the question of suspected usefulness of governmental accounting directly. Many of these researchers argue that governments should simply adopt the same procedures utilized by for-profit organizations. However, others are more interested in the fundamental forces in governmental settings that give rise to their unique accounting systems. If there are certain fundamental causes of specific governmental accounting procedures, regardless of their utility, little is likely to change. For these researchers, an understanding of why certain procedures arise must precede any attempt to force change on governmental accounting systems. If changes are necessary, one must first change the factors present in governmental settings that have caused the adoption of existing systems.

Thus, Cone and Edwards (1984) have addressed the first question using an agency

theory framework to analyze why governmental units account for themselves as they do. Agency theory deals with the relationship between a principal and an agent. It is basically a formulation of the problem of choosing the best employment contract. It is assumed that all individuals are expected to act pursuant to their own self interests. Consequently, as decision making authority is delegated by principals to agents, agents use this authority or power to promote their own well being. The matter is further complicated by the fact that contracts can be based only on elements that are observable. Contracts must be designed taking these factors into account.

Using the relationship that exists between principals (citizens) and agents (city officials) in governmental settings, Cone and Edwards (1984) analytically show that differences in accounting methods between governmental and for-profit organizations are attributable to differing contractual factors in the two environments. Central to their explanation is the proposition that while agent actions are not directly observable to the principal in either context, the outcomes of for-profit endeavors are reasonably measurable. This is due to the presence of agreed upon proxies for profit-oriented output that exist in the form of firm earnings and stock prices. Thus since the output of the for-profit organization is reasonably measurable, and therefore observable to both, it can be used as a basis for contracting by for-profit organizations. Forming the contract based on output is also motivationally sound because it provides incentive for the agent to expend effort to optimize the output. Therefore, Cone and Edwards maintain that for-profit organizations tend to offer incentive contracts.

They show, however, that no agreed upon proxies exist for the outcomes of governmental endeavors. In governmental settings, outputs related to agent efforts are not observable, and may not be the basis on which the contract is formed. In this situation, where agent action outcome is observable to the principal, he will specify the agent's action and impose a penalty if the desired level of effort is not expended. That is, the principal will offer a forcing contract. This arrangement gives a dimension of observability to agent

action as it is the agent's responsibility to demonstrate that he has taken the actions that accords to the dictates of the principal.

The purpose of this study is to test the Cone and Edwards' proposition that differences in measurability of outcomes cause preferences for differing contract types. An experimental study was designed to present different levels of outcome measurability, and subsequently to record subjects' preferences for forcing or incentive contracts. Support for their proposition would lend credence to their contention that the stewardship oriented accounting system utilized by governmental units is optimal given the nature of contractual relations that arise from less measurable outcomes.

### **Background of the Controversy**

On June 10, 1975, New York City was on the verge of default as it found itself unable to liquidate \$792 million of its maturing obligations. Critics argued that the financial problems encountered by New York and other large cities could have been anticipated if adequate accounting and reporting procedures had been used. Robertson (1975) reports that the accounting procedures utilized by the City of New York enabled city officials to conceal fiscal abuses that might otherwise have been discovered. In its report on New York City, the Securities Exchange Commission (1979) also cited poor accounting practice as a contributing factor in leading the nation's largest city to the brink of bankruptcy. Although the City of New York is given as a specific instance of inadequate accounting practice, there appears to be widespread support as to the overall inadequacy of state and local government accounting and reporting practices.

Evidence of this contention can be found in Municipal Accounting and Financial Reporting: Standard and Poor's Policy Statement (1980), wherein state and local governments generally are admonished for a lack of adequate accounting and reporting practices. The policy statement sets forth criteria for municipal bond ratings and states that the use of inappropriate accounting procedures will henceforth have an adverse effect on

future bond ratings.

Recent attempts have been made to determine the financial condition of state and local governments in the aggregate. The determinations have been viewed skeptically because they are the result of governmental accounting numbers that are generated from accounting procedures that differ across state and local governments. For example, one such assessment of state and local financial condition was made by the Treasury Department in which a state and local government surplus of \$47.2 billion was projected for 1986. Rauch (1985) maintains that the validity of this projection is questionable because it is based on numbers that emanate from governmental accounting systems that inconsistently apply accounting principles.

Much attention has been devoted to differences existing between governmental and for-profit accounting systems. The fundamental differences that exist between governmental and for-profit organizations pertain to: 1) fund accounting and reporting vs. consolidated statements, 2) modified accrual vs. full accrual basis accounting, and 3) use of budget and budgetary control.

### **Fund Accounting and Reporting vs. Consolidated Statements**

The perceived inadequacy of governmental accounting procedures have been linked by Davidson, et. al. (1977), Coopers and Lybrand (1976), Ernst and Whinney (1979), White (1975), Cleveland (1906), and Wilmot (1906) to the dissimilarities between governmental and for-profit accounting. The differences that are referred to relate to the fact that municipal accounting is largely fund accounting, a practice that generally is unknown in the for-profit setting. The use of fund accounting developed from a stewardship orientation and is the practice of accounting for various sources and uses of resources as if each fund represented a totally separate and independent entity; each must have its own set of self-balancing accounts. Thus, each fund has its own revenue, expenditure, asset, liability

and equity accounts, and each fund is essentially autonomous from the others. As such, separate reports are prepared for each fund. Unlike commercial enterprises that account and report for the entire organization as one entity and prepare consolidated statements for the overall organization whenever there is a parent/subsidiary relationship, consolidated statements for the municipality as a whole are not prepared.

Critics of governmental accounting suggest that such a procedure results in reporting that is fragmented and too detailed. In order to enhance user understanding of the overall financial condition of the municipality they recommend the use of consolidated municipal statements. The reason given is that the largest group of potential users of municipal accounting information is the general public who is interested in information as to the extent and means of financing municipal services. They believe that citizens are familiar with for-profit reporting and would therefore derive more benefit if governmental reports were presented similarly.

Government accountants, on the other hand, maintain that fund accounting is necessary in order to demonstrate that public funds are being spent in the manner that was intended. In an interview, Antonio (Liebtag,1985) stated that consolidated statements do not tend to be prepared by municipalities because there is no single success indicator in government. He observes that the reader of financial statements could not look at a consolidated set of municipal financial reports and tell whether a specific fund, such as the highway fund, was in good or bad condition.

### **Modified Accrual vs. Full Accrual Accounting**

Another fundamental difference in the accounting of the two types of organizations is the governmental use of modified, instead of full accrual accounting. Accrual accounting uses the elements of accrual, deferral and allocation including depreciation and amortization to recognize the effects of transactions in the period in which they occur, in order to determine periodic income.

Under a modified accrual system, revenues are recognized when available and measurable, expenditures when a liability has occurred. Depreciation typically is not recognized because it does not represent an appropriable resource. The emphasis, then, of an accounting system designed on the basis of modified accrual is on funds flow instead of income determination.

According to the Discussion Memorandum on “Measurement Focus and the Basis of Accounting — Governmental Funds” (February 1985), the continued use of modified accrual accounting is justified by the fact that certain governmental revenues can be accrued, whereas others such as fines, forfeits, and sales taxes, cannot. In addition, it is asserted that since most public organizations are not concerned with determining a profit, there is no reason to utilize full accrual accounting.

### **Use of Budget and Budgetary Control**

Another primary difference stems from greater governmental reliance on the budget and budgetary control. As per the exposure draft on a “Statement of Accounting Concepts — Objectives of Financial Reporting” (1980) the government’s budget is an expression of financial intent, public policy as well as control; and is the most significant document produced by a governmental entity. It is an expression of public policy because the citizenry can participate in the budgetary process. Once adopted, the budget is a formal expression of constituent preference for the objectives of the governmental entity and the resources to be used in meeting those objectives. Also, the budget represents a form of control having the force of law, as it provides authorization of and limitations on amounts that may be spent for particular purposes. Hence, the governmental accounting system is designed to show that governmental officials have operated the government in a responsible manner and within the legal constraints placed on them. To insure that spending does not exceed the amounts appropriated, control for overspending is effected by incorporating appropriation and encumbrance accounts into the system. All this is in contrast to the use

of the budget by commercial enterprise primarily as a planning device. Additional explanations of governmental accounting procedures may be found in Appendix A.

Although it is true that the above differences exist and that the emphasis of the governmental accounting system differs somewhat from that of commercial enterprise this may not, contrary to what the advocates of accounting reform believe, be inappropriate. This notion is supported by the National Committee on Government Accounting Statement 1, which refers to a governmental environment so markedly different from the business environment that a separate body of governmental accounting and financial procedures has evolved. Agency theory is one promising theoretical approach for understanding the factors in governmental settings that produce these unique accounting systems.

### **Accounting Procedures and Agency Theory**

Baiman (1982) states that accounting research has not attempted to assess the value of accounting procedures by applying a cost/benefit analysis. Rather, their value has been assumed and researchers have concentrated on: studying the attributes of techniques for implementing the procedures, generalizing the standard procedures to all settings (i.e., government), and generating variations of these standard procedures.

In the agency model, an organization's employment contracts are the optimal results of information supplied by the accounting information system. Given that accounting information is produced and used by people within organizations, the costs and benefits of any particular accounting procedure depend on how that information is used and the effects the procedure has on these users. Since the purposes of organizations vary (this has been suggested as being especially true for not-for-profit organizations), it is reasonable to expect that the value of accounting procedures will also vary. Jensen (1983, p. 323) states:

Accountants have long recognized the importance that accounting has played in the stewardship or control of organizations, and this is con-

sistent with the notion that accounting is a basic part of organizational structure and that accounting practice and organizational form are related. Accounting practices clearly differ across organizations — profit vs. non-profit for example.

In the basic agency model, the principal chooses the payment schedule and the monitoring system to reward and motivate the agent (Baiman, 1982). If certain types of information are more readily available in one organizational setting than another, contracts based on that information will be differentially feasible. Thus, accounting procedures appropriate in one setting may be less so in another.

Cone and Edwards (1984) also use agency theory to explain the use of differing accounting procedures between governmental and for-profit organizations. Central to this explanation is the proposition that when outcomes are not measurable, principals prefer to offer contracts to agents based on agent action (forcing) rather than motivationally based (incentive) contracts. Thus, forcing contracts tell the agent what steps to take while incentive contracts tell the agent what goals to achieve. This proposition formed the basis for the present study.

### **Purpose and Limitations of the Study**

The purpose of this study was to examine empirically the relationship between measurability of outcomes and the type of contract the principal preferred to offer the agent. A laboratory study was designed to test the proposition that decreased measurability of outcomes increases the principal's preference for offering a forcing contract to the agent, and that increased measurability of outcomes increases the principal's preference for offering an incentive contract. This is an essential factor, discussed by Cone and Edwards (1984), that may lead to differing accounting procedures between governmental and for-profit organizations.

This study involved an empirical test of agency theory in a laboratory setting. The use of students in a laboratory setting posed the primary limitation of the study, since the use of students in laboratory settings has been questioned. However, researchers pursuing



laboratory studies and using student subjects, need not be especially concerned about the representativeness of the sample and laboratory conditions. Although the researcher may have less confidence in the generalizability of causal relations that are uncovered in these experimental settings, the chief issue is whether the experimental situation *captures the intended essence of the theoretical variables* (Kruglanski, 1975; Berkowitz and Donnerstein, 1982; Bracht and Glass, 1968).

Thus, the true concern in this study was not so much the use of student subjects and the laboratory conditions of the research, but rather, whether the manipulated treatment conditions of the variable (measurability of outcome) captured the critical essence of agency theory variables. It should be noted that experimental designs need not be *exact* replicates of the real world, but rather, that they capture essential characteristics of real world phenomena. Considerable effort, therefore, was given to the design of the experimental manipulations (treatments) to assure compatibility with realities of agency theory variables.

### Summary of Content

The order of presentation in this dissertation follows from the researcher's development of the topic, hypothesis and design. Chapter II presents the literature related to agency theory and the agency problem. Of special concern in the theoretical literature is the nature of contracts that govern the relationship between principals and agents. The related issues of the value of information and monitoring are also discussed.

Chapter III presents the research question, hypothesis, and experimental design. The experimental method, experimental setting, discussion of the manipulations, and selection of subjects are included in this chapter. Chapter IV presents the results of the experimental study. Data are analyzed in this chapter. Chapter V discusses the conclusions that may be drawn from the analyses, and presents suggestions for further research.

## CHAPTER II

### REVIEW OF THE LITERATURE: AGENCY THEORY

It is often the case that an individual lacks specialized knowledge, has insufficient individual wealth to realize the optimal sized firm, or has a desire for risk sharing. In these cases the person may rely on another to perform the specialized tasks, provide necessary capital, or in other ways share the risk of the endeavor. When this occurs, the relationship may be viewed as one of *agency*. An agency relationship is defined as “a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent” (Jensen and Meckling, 1976; p.308).

Examples of agency abound and include such relationships as those between owners and managers of a firm, insurers and insured, governments and contractors, patients and doctors, and employers and employees. One which has received thorough coverage in the literature is the agency relationship that exists between corporate shareholders and managers of corporations. In a manager-shareholder relationship, the manager is perceived to be an agent and the shareholder to be the principal. This relationship is discussed at length in the seminal article on agency theory by Jensen and Meckling (1976).

Their work offers initial definitions of terms and proposes various causes and consequences of agency relationships. The agency relationship, as discussed by Jensen and Meckling, is an extension of the property rights literature (see Coase; 1937, 1960, and Alchian & Demsetz; 1972). As such, the firm is viewed not as an individual, but as a nexus for contracts. Therefore, the firm has no objectives per se, such as the maximization of profit. Rather it is comprised of individuals who have contracted with the firm for

certain property rights. These individuals are assumed to be rational, maximizing persons who will therefore act pursuant to their own self interests. Hence, in an agency relationship, the agent may not necessarily act in concert with the principal's welfare.

### **Agency Theory**

Agency theory, then, is concerned with the relationship between principals and agents, and the contracts that govern this relationship. Since the parties are assumed to be rational and acting in their own self interests, much discussion has occurred regarding the problem(s) such factors will cause in the relationship.

### **Agency Problem**

Although Ross (1973, 1974) views the problem as a divergence in agent's and principal's risk attitudes, generally the agency problem has been described as one that arises because of the divergence in the interests of the principal and the agent. If the agent acts in his own self interest, it is reasonable to assume that he may not always act in the best interest of the principal. Thus, the agent will often select a course of action that differs from the one that would be selected if the principal (himself) were choosing the action.

Since the principal also is a rational individual, he expects the agent to shirk (consume on-the-job leisure) and for the divergence to occur. Rational expectations mean that the costs of dysfunctional actions that arise from conflicts of interest are borne by those who take the actions. Therefore, principals and agents attempt to design contracts that minimize these costs (Watts and Zimmerman, 1986). Also the principal's expectation is reflected in a lower market wage, and in the specific terms offered in the contractual agreement. Hence, the agent will incur bonding and monitoring costs to insure that he acts in accordance with the principal's interests as reflected in the contract (the agent will act more like the principal would have acted if he had pursued the course of action himself).

## Agency Costs

Jensen and Meckling (1976, p. 309) state that, “it is generally impossible for the principal or the agent, at zero cost, to insure that the agent will make optimal decisions from the principal’s viewpoint. In most agency relationships the principal and the agent will incur positive monitoring and bonding costs, and in addition there will be some divergence between the agent’s decisions and those decisions which would maximize the welfare of the principal. The dollar equivalent of the reduction in welfare experienced by the principal due to this divergence is also a cost to the agency relationship, and we refer to this latter cost as the ‘residual loss.’ We define *agency cost* as the sum of: (1) monitoring expenditures by the principal, (2) the bonding expenditures by the agent, and (3) the residual loss.”

According to Watts and Zimmerman (1986) the major contribution of the Jensen and Meckling work is the recognition that in competitive markets it is the individual taking the dysfunctional actions who bears the costs of those actions and is the source of the demand for contracting and monitoring. Thus, according to Jensen and Meckling the agency problem is the problem of the agent.

Watts and Zimmerman point out that there is a considerable literature in economics, apart from the property rights literature, which investigates the implications of agency relationship contracts. This literature is concerned with the problem of the agent or manager shirking and is therefore somewhat complementary to the property rights literature. However, the problem in this literature is characterized as that of the principal and not the agent.

Typically, this body of agency literature centers around a risk neutral principal (owner) who supplies capital, and an agent (manager) who supplies the labor. The agent is viewed as being averse to both risk and effort. In this case, since the agent-manager within the firm is not the sole proprietor but is employed by the principal, his managerial

decisions depend on the incentives that the organization provides. These incentives are embodied in employment contracts. The principal's problem is characterized as trying to induce the agent to expend the effort that he himself would exert by offering an appropriate contract. Thus, the central focus of the agency literature has been in the area of contracts and the factors influencing them.

## Contracts

Precisely how the principal goes about offering a contract for the purpose of motivating the agent, depends on what the principal and agent jointly know or can observe (Baiman, 1982; Harris and Raviv, 1979; Shavell, 1979; and Holmstrom, 1979).

### Observability of Actions

If the principal can observe the amount of effort the agent expends, then the optimal contract is to pay the agent a fixed wage if the agent takes the right action and impose a penalty if he shirks. In this way the principal bears all the risk which is an optimal arrangement since the principal is risk neutral. A different situation arises when the principal cannot observe the agent's action. In this case the optimal contract is to have the agent share in the outcome of his actions, providing him with an incentive to expend the optimal amount of effort. This is referred to as an *incentive contract*.

### Incentive Contracts

Discussions of incentive contracts have tended to focus on particular variables thought to influence their appropriateness. From the principal's viewpoint, it is important that the agent be motivated to make optimal decisions. The principal can motivate this behavior by relating monetary payment to some characteristic of performance that can be observed by the principal (Berhold, 1971). The variables that have been proposed to influence the appropriateness of incentive contracts are: moral hazard and adverse selec-

tion, observability and risk, and monitoring and the value of information.

**Moral Hazard and Adverse Selection.** Baiman (1982) discusses the problem of divergence between self-interest and cooperative behaviors as it interacts with observability of the agent's actions to influence the contract. On the one hand it seems that agents should be motivated to engage in cooperative behaviors that benefit some of the parties, so long as this does not decrease the welfare of any. However, frequently there is divergence between self-interest and cooperative behavior, arising from either moral hazard or adverse selection. Both are the result of hiring the agent to perform some duties but not being able to motivate the agent appropriately to perform those duties.

If the agent has been hired only to provide inputs to the production process, and if the actions of the agent are observable by the principal, then the amount of inputs from the agent can be used as a basis for the contract between the agent and the principal. However, when the actions of the agent are not observable, the contract may have to be based on some surrogate variable. The use of a surrogate may result in lower motivation of the agent to supply the actions (shirking). When motivation problems come about because of basing the contract fee on imperfect surrogates of agent behavior, the problem of divergence is described as *moral hazard*.

A divergence between cooperative and self-interested behavior may occur even if the principal can verify agent action and can base the employment contract on the action. If the agent bases the action decision on private information, then the principal cannot determine whether the action choice was appropriate given the action desired by the principal and the agent's actual private information. If the agent is motivated to misrepresent his private information in order to act according to his own desires (possibly shirk) then the problem of *adverse selection* arises (Baiman, 1982; p. 163). Moral hazard and adverse selection, then, are both the result of imperfect information. In the case of moral hazard the imperfect information regards the agents actions, while adverse selection pertains to private

information the agent may possess.

Thus, the observability of the agent's actions and the verifiability of private information (that the agent may, or may not, use to the principal's benefit) influence the nature of contracts the principal is inclined to offer. Contracts will be offered that mitigate the agency cost problems posed by moral hazard and adverse selection.

**Observability and Risk.** Holmstrom (1979) and Shavell (1979) proposed somewhat similar views on the influence that observability of agent's efforts have on the principal's optimal contract. Shavell stated that the fee can depend only on variables known to both parties. Since it is natural to assume that the agent knows whatever the principal knows, the fee is assumed to be a function of the variables known by the principal. Holmstrom says that the source of this moral hazard or incentive problem is an asymmetry of information among individuals that results because agent actions cannot be observed and hence contracted upon.

In this situation it is assumed that the agent's action will affect the outcome, which is observable. Thus the extent of agent effort can be inferred from the outcome and the contract may be based on that outcome. While the effort level affects the level of output of the firm, the output also is governed by other random events that are beyond the control of the agent. An agency problem arises when the consequences of agent effort cannot be distinguished entirely from the consequences of random events by observing output alone. Hence, basing the agent's fee on the observable outcome will introduce additional non-optimal risk-sharing. Holmstrom (1979) refers to this as a second best solution given that there is a trade-off between the risk-sharing benefits and provisions for agent motivation.

**Monitoring and the Value of Information.** Rarely is the outcome completely observable and therefore it must be represented by some signal from a monitoring or information system. Holmstrom (1979), Shavell (1979), Harris and Raviv (1979), and Stiglitz (1975) show that when agent actions and outcomes are not directly observable,

gains can be derived from monitoring. For example, they show that any additional information can be used to improve the welfare of both the principal and the agent. This is attributable to the fact that information, even if imperfect, permits a more accurate evaluation of performance. The complexity of existing contracts, such as providing for various contingencies that might arise, is an example of the extensive use of imperfect information in contracting.

Harris and Raviv also demonstrate that there is a positive value to monitoring. They maintain that for any contract and action for an unsupervised agent there is another contract and action that is superior. Hence, they state that if supervision is feasible there are gains associated with such activity.

Further, they conclude that under certain conditions it will always be optimal to incorporate imperfect information in a dichotomous contract. This contract is one whereby the agent is paid according to a prespecified schedule that depends on the outcome and the monitoring result. If the action according to the monitoring result is as specified, the agent receives a fixed amount; if not, a lesser payment will be received. They also show that when monitoring becomes less exact, the agent's wage will increase. The basis on which the agent's action then is evaluated becomes more lenient, and the agent expends less effort.

In a similar vein, Stiglitz (1975) and Mirrlees (1976) analyze the contracts between employers and employees. They also find that there are benefits to be derived from monitoring. In addition, they show that the optimal contract will be affected by both the amount and quality of supervision.

Incentive contracts, then, will be offered when the agent's actions are unobservable and in order to mitigate the agent's inclination to shirk, compensation is based on outcome of performance. To control for the agent's lack of incentive to provide effort the principal will offer an incentive contract such that his welfare (utility) is maximized. The principal's problem, then, is to select an incentive contract such that the agent is enticed into supplying



the correct effort. Demski (1980) states that typical franchise arrangements, managerial incentive schemes, contingent legal fees, and cost-plus contracting provide ready examples of such phenomena.

Cone and Edwards (1984) discuss the type of contract that is optimal when the outcome is not measurable (unobservable). They maintain that the incentive contract is viable in the for-profit environment because there exists a measurable proxy for the outcome of the firm. This in turn provides a means of assessing managerial efficiency. Accounting earnings and the price of market shares of the firm's stock provide ready examples of generally accepted means of assessing managerial performance. Diamond and Verrecchia (1982) show that security prices are useful in contracting because they provide more precise, direct inference about the agent's action. Another example of the surrogate use of stock prices is provided by Fama and Jensen (1983) who state that stock prices are visible signals that summarize managerial decisions and their implications for current and future cash flows. Also, Watts and Zimmerman (1986) note that the bonus plan based on accounting earnings is a popular form of managerial compensation. These plans tie compensation to a measure of performance, i.e. accounting earnings.

The frequently used incentive contract, then, is appropriate when outcomes are observable or information surrogates related to the outcome are available. Less common, but also receiving substantial attention in the literature, is the forcing contract.

### **Forcing Contracts**

Baiman (1982) and Holmstrom (1979) state that if the agent's actions are observable or completely monitorable the optimal contract will be based on the agent's actions. Because the principal can observe the action he has knowledge as to whether the agent has performed as agreed. Therefore the principal can specify the agent's course of action and if the agent fulfills his contracted action he is paid a prearranged amount. If not, he is paid a lesser amount. That is, he is penalized for dysfunctional behavior. This contract, called

a forcing contract, is a first best solution from a risk-sharing standpoint. Both Baiman and Holmstrom suggest that the forcing contract is optimal in those situations where the agent's action is observable or completely monitorable.

Cone and Edwards(1984) argue that the governmental environment is one situation in which the forcing contract is optimal. They maintain that this is attributable to the immeasurability and hence the unobservability of the outcome of governmental endeavors. There is support for the contention that the outcome of governmental services is very difficult to measure. GAAFR, for example, states that since governments exist to provide social services to the constituency and not to earn a profit, there is no available means equivalent to the income statement of commercial enterprise with which to assess performance. James Antonio (Liebtag,1985) echoes this by saying that profit-oriented organizations obtain a success indicator by subtracting expenses from revenues. However, for governments, the success indicator is not as obvious and can only be obtained by including information on service effort and accomplishment for which no standards exist. Since the outcome is unobservable governmental accounting is structured in such a way as to make agent action virtually monitorable.

In addition, viable markets may not exist for some of the services that are provided by governmental units. This is not surprising given that one of the reasons for governmental provision of services is to provide public goods that the market alone cannot provide. Tiebout (1956) further emphasizes this when he says that there is no mechanism which the consumer constituent can use to indicate a preference, nor is there a market type solution to determine the level of expenditure for public goods.

Cone and Edwards (1984) argue, then, that when the outcome is not observable, or when no widely accepted proxy for outcome exists, the compensation contract cannot be based on outcome. When the contract is not based on outcome the agent has no incentive to use his private information (specialized knowledge and expertise). In this situation there is no advantage to the principal in delegating authority. They theorize that when these fac-

tors are prevalent, the contract will be based on agent action that is specified by the principal, and compensation will be rendered only if the agent performs as agreed. In other words, a forcing contract will be offered. From a risk sharing viewpoint, the offering of a forcing contract is a first best solution to the agency problem, since the principal has been assumed to be risk neutral and the risk averse agent doesn't bear any of the risk.

Following this logic they maintain that the legislatively approved budget constitutes the plan. Since the citizenry participates in the budget process either directly or indirectly through elected officials or advocate groups, the budget is an expression of public policy. As such the budget is the embodiment of specified actions.

Once enacted into law, an appropriation is an authorization for city administrators to incur on behalf of the governmental unit liabilities in the amounts specified for purposes set forth in the statute. Because penalties are imposed by law on administrators who incur liabilities in excess of that appropriated, this specification approximates a forcing contract. Thus, the offering of a forcing contract that imposes penalties for deviation from that specified will result in the administrators' adherence to the plan.

From an accounting viewpoint, in order to demonstrate this adherence and avoid censure, the administrators will tend to adopt accounting procedures that are compliance oriented and that provide control for overspending. Control procedures utilized include the recording of the budget, whereby the limitation on spending is actually incorporated into the accounting system. In addition, a Statement of Revenues, Expenditures and Changes in Fund Balance-Budget and Actual is required to be prepared whenever budgets have been legally adopted.

Another form of budgetary control is the governmental use of encumbrances. Once a purchase order has been issued or a contract agreement established, an expected liability exists. Prudence dictates that funds be set aside to meet this obligation. The obligation itself is an encumbrance. Encumbrance accounting provides a means of control that insures against overspending.

Governmental fund structure is another control mechanism. Since a fund is a fiscal entity and an accounting mechanism used to segregate the financing of specific activities, its use suggests that compliance demonstration is one of the goals of a governmental accounting system. Hence, evidence of compliance measures can be found in extensive governmental use of control procedures.

### **Summary**

In this chapter, the nature of the agency relationship, as well as the associated problem was discussed. It was established that the solution to the agency problem that arises as the result of divergent interests is in the employment or compensation contract that is offered to the agent by the principal. The contract itself will be based only on observable variables. This factor, it is shown, influences the type of contract that is offered in the governmental or for-profit settings. When information is not available regarding outcomes, such as is the case in governmental settings, Cone and Edwards (1984) argue that the principal will offer a contract based on the specified agent actions. This conclusion forms the basis of a research question to be explained in the following chapter.

## CHAPTER III

### METHOD AND RESEARCH DESIGN

Accounting procedures differ between government and for-profit organizations. A number of possible explanations exist for these differences. One recent explanation is provided by Cone and Edwards (1984). They attribute the differing procedures to differences in the measurability of benefits.

They suggest that net profit and stock prices serve as agreed upon proxies for the outcomes of for-profit organizations. Hence, the principal is able to assess the agent's performance in terms of the observable outcomes and is inclined to offer an outcome-based incentive contract. In this situation the agent will be motivated to optimize the outcome and will use everything at his disposal, including his experience, skill, knowledge or expertise (private information). Under these circumstances the principal tends to benefit from delegating authority since the agent is motivated to use his private information to increase the outcome. Thus, offering incentive contracts tends to work to the mutual advantage of both parties in a for-profit setting.

Correspondingly, they argue that in the context of governmental organizations there are no satisfactory agreed upon proxies for the outcomes of governmental services. They maintain that it is difficult to weigh the value of improved road maintenance as against greater police protection, etc. Hence, the principal is less able to assess the agent's performance in terms of observable benefits and is inclined to offer a forcing contract (not outcome-based). From the agent's standpoint, if compensation is not based on outcome there is no incentive for his use of private information, and the principal will not benefit from delegating authority. In these circumstances the principal will specify the action and

the agent will be rewarded on the basis of whether or not he has performed in accordance with those dictates. The agent's failure to conform to the specified actions generally results in the imposition of penalties as called for in the forcing contract. In the governmental setting this is evidenced by imposition of penalties for failure to spend within appropriated limits.

### **Research Question**

Cone and Edwards work is based on analytical explanation, as is most of the work in agency theory. An empirical test of the theoretical statements is now appropriate. The research question that arises from Cone and Edwards paper to be tested in this study is:

**Is the degree of measurability of outcomes (benefits) related to a tendency of a principal to prefer either forcing or incentive contracts?**

Such a question may be empirically tested.

### **Hypotheses**

The hypothesis derived from the research question is:

**H:** The more measurable are outcomes (benefits), the greater will be the principal's tendency to prefer an incentive contract; the less measurable are outcomes (benefits), the greater will be the principal's tendency to prefer a forcing contract.

This hypothesis is interpreted to mean that as the measurability of outcomes varies from high to low in a principal/agent relationship, the principal will tend to offer either an incentive or forcing contract, respectively.

### **The Research Method**

An experiment was designed to test the hypotheses. The experiment presented two

levels of the measurability of outcomes (the independent variable) in a certain principal — agent relationship, and assessed the effect this had on a principal's preference for offering either an incentive or forcing contract (the dependent variable).

### **The Experimental Method**

The questions previously raised in this paper define the constraints and parameters of the experimental design. The theoretical statement of the relationship between outcome measurability and principal's preference for contract type suggested that a principal/agent setting be created such that outcomes in the setting could be believably manipulated from more measurable to less measurable. Further, principals needed to be in a position to specify appropriate agent actions that would result in the desired outcomes. They also needed to be able to perceive the possibility of offering either of the two types of contracts and to express a preference for negotiating one or the other according to their interpretation of the measurability of the outcome. Factors such as perceived difficulty of achieving the outcome were controlled between the two treatment groups (high vs. low measurability) through extensive pretesting of materials. The possibility of an order effect regarding the presentation of experimental materials was allowed for in the research design. The resultant design, illustrated in Figure 1, was a 2 x 2 factorial.

### **The Experimental Setting**

Forty undergraduate students in accounting were recruited as subjects ( $S_G$ ) in the study. These subjects were all students majoring in accounting, with an average of 18.175 hours of accounting coursework completed. The mean GPA of the subjects was 3.12 in accounting and 3.10 overall. The average subject was 21.9 years old, twenty-two were females, thirty-three were single and seven were married. There appeared to be no difference between the groups in terms of distribution of these characteristics. Complete

tabulations of biographical data are contained in Appendix G. These  $S_g$  were recruited for “possible work as coordinators” of lab sections for the first principles of accounting course.

Subjects were told that this was a screening type interview, and they were, because of their advanced knowledge of accounting, being considered as possible coordinators should lab instruction in the course be undertaken. Since this interview would help in organizing the effort, they would be paid \$7.00 (the amount to be paid to the  $S_g$  had been determined by a pretest — see Appendix C) for doing the interview. Pretest subjects had been asked to indicate the amount of money they felt advanced accounting students should be paid for participating in the screening interview. The median response was \$6.50, and the next higher amount (\$7.00) was chosen since more than half (64 percent) of the pretest subjects would have felt this to be sufficient compensation for the interview.

		Measurability Treatments	
		Journalizing and Posting	Developing an Accounting Viewpoint
Order of Presentation	Activities Presented First		
	Performance Presented First		

**Figure 1. Schematic Illustration of Research Design**



## Procedure

S<sub>s</sub> reported to the experimental setting in groups of ten. Each group of ten had been randomly assigned to one of the four treatment conditions. All four treatments were run in one day, with a one-hour period between groups. The order of treatment presentations was also randomly predetermined. Subjects in the first three groups were cautioned not to discuss the procedure with any other students, in order to avoid contaminating subsequent subjects. When they reported, the following set of experimental events occurred:

1. Experimenter explained the purpose for which they were there:

“Thank you for coming. The reason you are here is because the Department of Accounting is considering the feasibility of augmenting the instruction of first principles of accounting. Outside funds have been solicited to support an innovative program for improving student performance during their initial exposure to accounting. This program generally involves supplementing typical professor-based lecture classes with student instructed work/study lab sections. These one-hour lab sessions will be limited to 10 or 15 students, and would be coordinated by advanced accounting students such as yourselves. There are seven hundred students in principles which means we would need about twelve coordinators.

The coordinator (you) would be responsible for recruiting and hiring the lab instructors who will conduct the supplementary lab sessions. You would also be responsible for generally coordinating the effort and dealing with issues as they arise. The coordinator may also identify useful teaching activities for the lab instructor. The university and faculty will not be directly involved, the proposal is for a student-based effort to upgrade accounting expertise of introductory students. Similar programs have been successful elsewhere.

Today I would like to get an application from you, explain what is proposed, and obtain other information of both a personal and organizational nature. This will help us

assess the practicality of the implementation of such a program. I would like you to complete the application and information forms even though you may later decide that you do not wish to be a lab coordinator. The proposed program is in its formative stages and work/study labs may ultimately prove to be infeasible. However, in the event the program is undertaken, the information you provide will be very useful in deciding how to organize the effort. Therefore, you will be paid \$7.00 for completing the forms. This should take a little less than an hour.”

2. The experimenter then passed out application forms that requested biographical information such as age, class, GPA, address, phone number, etc. Subjects completed the applications.

3. The outcome measurability (independent variable) treatment was then given. This manipulation established the desired outcome to be one that was either more or less measurable and was as follows:

**More Measurable.** “Concern centers around student achievement in first principles relative to two separate skills: 1) journalizing and posting skills, and 2) development of an ‘accounting viewpoint.’ Journalizing and posting skills refers to the ability to record and journalize business transactions. An accounting viewpoint refers to an internal thinking process that we might call an accounting psyche or acumen. One analysis indicates a concern about the students’ journalizing and posting skills. It is believed that professors do a good job in the classroom in terms of giving students an accounting viewpoint. However, it is felt there isn't enough time, and class size precludes individualized instruction in developing the requisite skills related to journalizing business transactions and posting the amounts to ledger accounts. When tests are given, many students demonstrate a good accounting viewpoint but do not seem able to make the appropriate journal entry. Thus, the only responsibility of the lab instructors, who you would be coordinating, is to work with the students to improve their ability to record business transactions.”

**Less Measurable.** “Concern centers around student achievement in first principles relative to two separate skills: 1) journalizing and posting skills, and 2) development of an ‘accounting viewpoint.’ Journalizing and posting skills refers to the ability to record and journalize business transactions. An accounting viewpoint refers to an internal thinking process that we might call an accounting psyche or acumen. One analysis indicates a concern about the students development of an accounting viewpoint. It is believed that professors do a good job in the classroom related to basic procedures such as journalizing business transactions and posting to ledger accounts. However, it is felt there isn't enough time, and class size precludes individualized instruction in developing an accounting viewpoint, psyche or acumen. When tests are given, many students are able to make the journal entries and post the amounts but do not demonstrate this accounting viewpoint. Thus, the only responsibility of the lab instructors, who you would be coordinating, is to work with the students to improve their development of an accounting viewpoint.”

4. The experimenter then collected the measures of the dependent variable by the following procedure:

**For More Measurable Outcomes.** “Now it is important that you understand exactly what is being sought in this work/study lab project. The objective is to improve the students’ journalizing and posting skills. This would be the only objective and it is very important that you understand this. Based on some preliminary findings dealing with this type of learning, and initial input from other sources, the instructors you would be coordinating should obtain the greatest improvement in student performance if they allocate their efforts among certain recommended activities shown on this overhead transparency.” (Experimenter showed the overhead transparency. The transparency included the objective in bold, and the list of recommended activities for lab instructors — see Appendix D.)

1. Show up before lab to get organized (5 minutes is common).
2. Journalize transactions and post to accounts (35 minutes is usual).

3. Answer questions (25 minutes is recommended with approximately 65 percent of this time spent providing individualized instruction.
4. Drill on journalizing and posting.

**For Less Measurable Outcomes.** “Now it is important that you understand exactly what is being sought in this work/study lab project. The objective is to improve the students’ development of an accounting viewpoint. This would be the only objective and it is very important that you understand this. Based on some preliminary findings dealing with this type of learning, and initial input from other sources, the instructors you would be coordinating should obtain the greatest improvement in student performance if they allocate their efforts among certain recommended activities shown on this overhead transparency.” (Experimenter showed the overhead transparency. The transparency included the objective in bold, and the list of recommended activities for lab instructors — see Appendix D.)

1. Show up before lab to get organized (5 minutes is common).
2. Explain the accounting viewpoint (35 minutes is usual).
3. Answer questions (25 minutes is recommended with approximately 65 percent of this time spent providing individualized instruction.
4. Drill on accounting thinking processes.

**For All S<sub>s</sub>.** “These work/study lab sections would not be part of the regular university instruction budget. A fund would be established from which coordinators and lab instructors would be paid. This would necessitate a somewhat unusual payment procedure. Each coordinator will be in charge of five lab instructors. The fund will provide each coordinator a lump sum of \$2,000 [see Pretest]. To this lump sum will be added an amount according to the level of improvement of students in the work/study labs you coordinate. The amount to be added according to student improvement has not yet been set, but it will be, and if improvement were to be observed, the coordinators would

benefit.

Coordinators would then pay the five lab instructors from the total fund given to them. Coordinators will be free to choose both the level and specific payment arrangements for the lab instructors. Coordinators will determine payment arrangements since they are likely to be more familiar with lab instructor needs than are faculty and because the undertaking is to be funded by outside money. Keep in mind that each lab instructor will meet his or her lab group fifteen times, for an hour, during the semester. Preparation should be minimal, since materials will be available.

I have looked at some other schools who do use a lab instructor/coordinator arrangement and have found two commonly used types of payments. However, the total payment and specific items vary some from school to school. Let me show the possibilities on the overhead, and then I would like you to fill out the final form and indicate the type of payment arrangement that you feel would be appropriate given the objective.” (The experimenter then put the contract-type information on the overhead — see Appendix D.)

“The performance-based contract pays a fixed base amount and then adds incremental amounts based on some measurement of improvement in student performance regarding the objective. In this type of contract, the coordinator would offer a specified amount and must establish performance standards of student achievement that would indicate when the lab instructor was entitled to receive the additional incremental amount. For example, you might offer a base amount of say \$112.50 and add a \$75.00 bonus (illustrated by an overhead transparency — see Appendix D) if the lab instructor achieves the performance objective you agree upon. Remember that the objective is improved journalizing and posting skills (development of an accounting viewpoint —*this statement corresponded to the treatment group* ).”

“The activity-based contract would pay a fixed amount. The coordinator would specify the desired teaching activities and then incremental amounts would be deducted in the event of deviations, by the lab instructor, from the time allocated to the specific teach-

ing activities recommended by the coordinator. In this case, the coordinator will offer a contract that specifies the base amount and the amount of time that the instructor should allocate to different teaching activities in the lab, and the penalty(ies) for deviating from these actions. For example you might offer a base rate of \$187.50 and penalize the lab instructor \$75.00 (illustrated by an overhead transparency — see Appendix D) for significant deviation from your recommended teaching activities. Remember that we did discuss some types of teaching activities that should lead to improved student performance. Also you should note that either arrangement could result in an amount you feel is fair, and both arrangements can result with the same overall earnings.” [The order in which these two contract types were presented was altered such that one-half the subjects in each treatment group were shown the performance-based contract first and activity-based contract second, while the other half were shown the activity-based contract first and the performance-based contract second. This controlled for order effects such as recency and primacy and constituted the second treatment on the experimental design as illustrated in Figure 1.]

“It is not our purpose today to formalize these arrangements, since the project is still in a formative stage. Right now I just want an idea of the type of contract, performance-based or activity-based, you think would be most suitable, given the objectives for the work-study labs. So please give it some thought, and then complete the questionnaire. A few important points that you should remember are shown on this overhead.”

The experimenter then placed the transparency (see Appendix D) on the overhead projector and read each point. The overhead was left on until the subjects were finished.

“Also please note that the final questionnaire has some additional items pertaining to your understanding of our discussion. When you complete the questionnaire you are free to leave. I will pay you the \$7.00 when you hand in the questionnaire. Thank you very much for your time.”

### **Postexperimental Questionnaire**

The postexperimental questionnaire collected two types of information, 1) data on the dependent variable, e.g. preference for type of contract to negotiate with the agent-instructor, and 2) data that could be used to test the efficacy of the manipulations. Five point Likert-type scales were used to collect the information. The manipulation check items attended to the issues of clarity of the instruction (presentation), and perceived measurability of journalizing and posting skills and accounting viewpoint. The postexperimental questionnaire is shown in Appendix E.

### **Pretest**

The pretest consisted of three distinct efforts. First the materials used in the experiment were tested for consistency. Initially, it had been felt that subjects should be shown examples of the types of test questions that might be used as surrogate measures of the lab instruction outcomes. Also, at this point it was felt that the “less measurable” performance would involve the development of the “underlying philosophy, logic and concepts” of accounting. Of concern was whether the conceptual and journalizing/posting questions used as “sample problems” were of equivalent difficulty. If they were not perceived as equivalently difficult, any preferences for either the incentive-based or forcing contract could be attributed to differences in perceived difficulty of the questions associated with tests that corresponded to the treatments. As explained in the next chapter, the final experiment did not use these sample questions since analysis of the pretest results suggested a change in the procedure. Perceived difficulty of measuring conceptual or journalizing-posting skills was assessed in this pretest. The experimental manipulation was intended to vary the level of the difficulty of measuring outcomes, and this pretest permitted evaluation of the manipulations along this line.

Second, the experimental procedure was pretested to evaluate several issues. It was important to assess the degree to which the instructions used to create the manipulations

were understandable. Also, this pretest permitted a determination of the amount of money that should be paid to subjects for the experiment (and this amount is reflected in the previous discussion of the experimental procedure). Further, the amount of money to be offered for “acting as a coordinator” (e.g. the initial contract pool as described in the previous discussion) was determined from the pretest procedure.

Third, when analysis of the first pretest revealed some weaknesses in the “underlying philosophy, logic and concepts” manipulation, an additional pretest was conducted in order to determine if there was a superior procedure for the “less measurable” treatment.

These pretest procedures are described in more detail below.

### **Pretest for Materials Used**

Thirty-three accounting undergraduate students served as subjects for pretesting the materials to be used during the experiment. A questionnaire was designed for this pretest (see Appendix B), and administered during one session attended by all pretest subjects. The questionnaire consisted of three parts: 1) assessment of difficulty of measuring the presence of journalizing and posting skills vs. conceptual skills, 2) exam question difficulty, and 3) feelings toward certain classroom activities. The questionnaire included some items not intended for analysis in order that the pretest subjects not guess the purpose of the questionnaire.

**Manipulations.** A paired t-test was used to analyze differences in perceived difficulty of measuring the presence of four types of skills: computational skills, journalizing and posting skills, knowledge of tax laws and regulations, and conceptual skills. On a 1-5 scale (5 is very hard to measure), the mean perceived measurability of these four skills was 2.68, 2.26, 3.24 and 3.24 respectively. The mean perceived difficulty of measuring journalizing and posting skills was significantly different from the mean difficulty of measuring conceptual skills ( $n = 33$ ;  $t = 3.848$ ,  $p \leq 0.001$ ) and also from the mean perceived difficulty of measuring knowledge of tax laws and regulations. No other differences were



significant. Because of the better potential for explaining conceptual skills as a “principles” topic, conceptual skills and journalizing and posting skills were chosen as the treatments for less measurable and more measurable respectively, and were used in the pretest for the experimental procedure.

**Question Difficulty.** Three sample problems, each having one or more journalizing questions and one or more conceptual questions, were presented in the questionnaire. Perceived difficulty of answering each question was measured. The specific problem and question set to be included in the experimental procedure was chosen such that the question difficulty was neither very hard nor very easy, and such that the difficulty level of both types of questions would be equivalent. An analysis of the results revealed that Questions 1 and 5 of Sample Problem 1 were rated as 2.59 and 2.74 in difficulty. These ratings were not significantly different and were close to the mid-point. Therefore, these were used as the sample problems in the pretest for the experimental procedure.

**Classroom Activities.** There were eight items in this part of the questionnaire. These included items that assess preferences for objective or subjective questions (three items), preference for theory or problem-solving instructor presentations (two items), and three other questions. Information on the objective or subjective question preference were assessed for correspondence with question difficulty. Information on preference for theory or problem-solving instructor presentations also were tested for correspondence with question difficulty. There appeared to be no problems with regard to correspondence.

### **Pretest for Experimental Procedure**

Twenty accounting undergraduates served as subjects for pretesting the experimental procedure. These pretest subjects reported at the same time, and the following events occurred. The experimenter informed the subjects as to the purpose of the procedure as follows:

“The Department of Accounting is considering some possible modifications in instructional procedures for first principles. These modifications would require that several graduate students in accounting be hired as ‘work/study lab coordinators.’ Before we interview them to explain what we have in mind, we would like to get your opinions on three issues, 1) whether the information we will present to them is clear and understandable, 2) since we are unsure the recommended modifications will actually occur, how much we should pay them for the interview, and 3) how much money they should be given for coordinating the work/study labs in the event the project is carried out.

To get your opinions, I would like to present the information as we will give it to the coordinators, and then have you answer a questionnaire regarding the issues. Do you have any questions?”

The experimenter then presented the experimental procedure described above. The subjects then completed the questionnaire (see Appendix C) regarding the experimental procedure. Three analyses were performed. First, the level of clarity and understanding of the experimental instructions was assessed. Second, the level of pay for doing the interview was determined as \$7.00 (and is reflected in the previous description of the experimental procedure). Third, the level of money that establishes the initial contract pool in the experimental procedure was determined as \$2,000. This amount captured eighty-nine (89) percent of the pretest responses, and assured that the allocated amount would be perceived as adequate by most subjects.

A subjective evaluation of the pretest results, and discussion with some of the pretest subjects indicated two areas of concern. These were :

1. Subjects rated the conceptual skills as being more measurable than was desired for maximum difference between the two treatment levels.
2. Some subjects were interviewed regarding their overall impression of the procedure. Several indicated that they felt the use of penalties in a “forcing contract” would be somewhat harsh. On further reflection, it was determined that these subjects thought that

such penalties would necessarily result in lower compensation than would the incentive contract. Such a belief might be a confounding factor, since the perception of greater or lesser compensation would likely lead to a preference for one or the other contract types.

### **Modification of the Experimental Procedure**

Eight graduate teaching assistants (masters degree candidates) were solicited for their opinions regarding various types of student achievements in an accounting classroom that would be “very difficult to assess or measure.” The eight students engaged in a brainstorming session, led by the experimenter for this purpose. The experimenter did not preview the experimental procedure nor even inform them of the nature of the study.

Two ideas were first presented by the experimenter which were: 1) understanding of accounting concepts and underlying philosophies of accounting, and 2) development of a positive attitude toward accounting. Using these as possible examples of objectives that probably exist in undergraduate accounting instruction, but that are sometimes very difficult to measure or assess, the students then listed as many possibilities as they could. Following this listing, they discussed the various methods that might be used to measure the achievement of each objective. At the end of the session, the students were required to reach consensus regarding the one objective that would be the most difficult to measure. The consensus was that the “development of an accounting viewpoint” would be the most difficult to measure.

Their rationale was that most beginning students seem to feel such an objective is present, but that it is a very vague notion. Given its vagueness, it would be perceived as difficult to measure.

The experimental procedure was then rewritten to replace “develop an understanding of the underlying logics, philosophies and concepts of accounting” with the instructional objective “to develop an accounting viewpoint.” The modified procedures were subse-

quently presented to the same eight graduate teaching assistants. They were asked their opinion regarding the difference in measurability of the two treatments. Further, they were asked to indicate whether such a procedure would be credible to undergraduate students.

The graduate students were again seated in a circle for the discussion, which lasted approximately an hour. They generally concluded that the procedure was credible and that the measurability of the two treatments should be quite different. Thus, the procedure described earlier was adopted, along with the new less measurable treatment of developing an accounting viewpoint.

## CHAPTER IV

### ANALYSES OF RESULTS

This chapter discusses the results of the experiment under the a priori data groupings and hypotheses as developed in the preceding chapter. All original data are tabulated in Appendix F.

The results of this experiment are presented in terms of analyses of the data and consideration of alternative explanations of the results.. The analyses of the data are presented in three (major) categories: 1) analysis and evaluation of the questionnaire, 2) manipulation checks, and 2) analysis of the treatment effects.

#### **Analysis and Evaluation of the Questionnaire**

A questionnaire had been designed to measure the dependent variable and to serve as a manipulation check for the independent treatments. The questionnaire is shown in its entirety in Appendix E. Three questions were asked of each subject relative to their perceptions of the measurability of student performance, and three questions were similarly asked to assess perceived measurability of instructor deviation from recommended teaching activities. These six questions served as manipulation checks. Further, the dependent variable, preference for type of contract was measured by four items. Before subjecting the results to analyses for hypotheses testing, these questions were examined for common factors and reliability.

#### **Factor Analyses**

Factor analysis is used to explain the covariance relationships among many variables

that have a few underlying, but unobservable, quantifiable factors. The purpose of factor analysis is to explain the covariance structure of the independent variables. Essentially it consists of methods for finding clusters of related variables. Each such cluster, or factor, is denoted by a group of variables whose members correlate more highly among themselves than they do with variables not included in the cluster. Each factor is thought of as a unitary attribute which is measured to greater and lesser degrees by particular instruments, depending on the extent to which they correlate with the factors (Johnson and Wichern, 1982).

**Factor Analysis of Independent Variable.** A priori reasoning had led to the development of six questions which were designed to measure perceptions of measurability; of student performance, and instructor deviation from recommended teaching activities. Each item was measured on a five-point scale from Strongly Agree to Strongly Disagree. Three questions designed to assess perceived measurability of student performance were:

2. I feel the bases of measurement as suggested above would capture an accurate measurement of student performance related to journalizing and posting skills (developing an accounting viewpoint). (A preceding question had asked the subject to propose a method for measuring student performance.)
5. I believe it would be possible to establish accurate measures of student performance related to journalizing and posting skills (developing an accounting viewpoint).
7. The measurement of student performance related to journalizing and posting skills (developing an accounting viewpoint) is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

The three questions designed to assess perceptions of the measurability of instructor deviation from recommended teaching activities were:

4. I feel the bases of measurement as suggested above would capture an accurate measurement of instructor deviation from recommended teaching activities. (A preceding question had asked the subject to propose a method for measuring student performance.)
6. I believe it would be possible to determine accurate measures of instructor deviation from specified teaching activities.

8. The measurement of instructor deviation from recommended teaching activities is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

A priori reasoning suggested that these would be two separate factors. Factor analysis was performed on these six questions to determine if they did indeed separate into two factors. If they did, then the independent variable could be represented as an average of subjects' responses to items 2, 5, and 7. Responses to items 4, 6, and 8 would assess subjects' perceptions of observability of agent actions, and hence viability of a forcing, in lieu of an incentive, contract. The varimax procedure was used to orthogonally rotate the factor matrix. The results of the rotated factor analysis are shown in Table I.

**TABLE I**  
**FACTOR ANALYSIS OF SIX MANIPULATION CHECK QUESTIONS**

Question Number	Factor Loadings	
	Factor I	Factor II
2	-0.33828	0.69958
4	0.81311	-0.28482
5	-0.19070	0.85698
6	0.84866	-0.28850
7	-0.14282	0.76246
8	0.81406	-0.11462

As is illustrated by the data in the table there was a definite correlation between ques-

tions 4, 6 and 8, as related to Factor I in the rotated factor matrix. Each of these questions loaded heavily on Factor I but not on Factor II. This was consistent with the a priori belief that Factor I represents the extent to which subjects perceive instructor deviation from recommended teaching activities to be measurable, irrespective of treatment. Accordingly, the manipulation check measure for perceived measurability of instructor deviation from recommended teaching activities was represented by the subject's average response to these three questions.

Similarly, there was a strong correlation between questions 2, 5, and 7, as related to Factor II in the rotated factor matrix. Each of these questions loaded heavily on Factor II but not on Factor I. This was consistent with the apriori belief that Factor II represents the extent to which subjects perceive student performance to be measurable irrespective of treatment. Therefore, the manipulation check measure for perceived measurability of student performance was represented by the subject's average response to these three questions.

**Factor Analysis of the Dependent Variable.** Four questions had been designed to measure subjects' preference for either a forcing contract or an incentive contract. These questions were (from Part II of the questionnaire):

1. I would prefer to negotiate some form of performance-based contract.
2. I would prefer to negotiate some form of activities-based contract.
3. I believe the type of contract that would be most suitable for the work-study labs, given the teaching objective, is a performance-based contract.
4. I believe the type of contract that would be most suitable for the work-study labs, given the teaching objective, is an activities-based contract.

Each question was measured on a five-point scale from Strongly Agree to Strongly Disagree. Since strong preference for a performance-based contract should yield a weak preference for an activities-based contract (and vice-versa), a priori reasoning suggested that these four questions would measure only a single attribute, subjects' contract prefer-



ence. If this proved true, then the dependent variable could be measured by averaging the subjects' responses to the four questions, and the single attribute scale would be a five-point scale from Strongly Prefer Performance-based Contract to Strongly Prefer Activities-based Contract. Inverse scoring of questions 2 and 4 would be necessary to correspond to the single attribute scale. The results of the factor analysis for the dependent variable are shown in Table II.

**TABLE II**  
**FACTOR ANALYSIS OF FOUR DEPENDENT**  
**VARIABLE QUESTIONS**

	Factor Loadings
Question Number	Factor I
1	-0.84831
2	0.88345
3	-0.88926
4	0.87604

As seen in Table II, the factor analysis yielded only one factor, with each question loading highly on this factor. Correlations ranged from 0.88345 to -0.88926, and since the factor analysis yielded only one factor, the matrix was not rotated. The analysis supported the a priori reasoning and permitted the averaging procedure suggested in the previous paragraph.

### Assessment of Reliability

Reliability concerns the *precision* of measurement regardless of *what* is measured. Nunnally (1970, p. 108) states that “In order for a test to be highly valid, it must be highly reliable also. High reliability is a *necessary* but not *sufficient* condition for high validity.” In one sense, then, the reliability of the questionnaire regarding the independent and dependent variables is the minimum assessment necessary to permit evaluation of the relationship between perceived measurability and subjects’ preference for contract type. Without a reliable instrument, the results would be suspect.

Cronbach’s coefficient alpha was applied to the data. Cronbach’s coefficient alpha is a measure of the internal consistency of the items within a set designed to measure a factor. The reliability of a measure can be estimated from the internal consistency of the items within it (Nunnally, 1970). Coefficient alpha is obtained by the equation (Cronbach, 1951, p.299):

$$\alpha = \frac{n}{n-1} \left( 1 - \frac{\sum_i V_i}{V_t} \right)$$

Where:

$n$  = number of items on existing factor

$V_t$  = variance of total scores on the factor

$\sum_i V_i$  = the summation of variance for the scores on each item for the factor

Cronbach’s alpha for Factor I (perceived measurability of instructor deviation) was computed to be 0.819. Coefficient alpha for Factor II (perceived measurability of student performance) was computed to be 0.708. Coefficient alpha for the dependent measure (contract preference) was 0.893. Nunnally stated that if the average correlation between items within a measure is high, the internal consistency (reliability) is high. The correlations obtained regarding the measures within the questionnaire for this study suggest that

they are satisfactorily reliable.

### **Other Questionnaire Items**

In addition to the six items measuring the independent variable and the four items measuring the dependent variable, the questionnaire contained six other items (see Appendix E). Items 1 and 3 (Part I) were the following:

1. How would you propose to measure student performance related to developing an accounting viewpoint (journalizing and posting skills) if you were to use a performance-based contract?
  
3. How would you propose to measure deviations by the lab instructor from recommended teaching activities if you were to use an activity-based contract?

These questions were included in order to cause the students to think about the difficulty of assessing student performance (or instructor deviation) before responding to the items intended to assess perceived measurability. In the pilot studies, it had been observed that subjects tended to perceive all things as relatively measurable, regardless of the subjective nature of the attribute. It was felt that inserting these items before the measurement scales would cause the subjects to give more careful consideration to their responses.

Although this was their primary purpose, subjects' responses are, in themselves, interesting. Some of the responses to item 1 were:

#### **Journalizing and Posting**

"An informal test could be administered based on the material covered in the lab session. It would need to be the same for each lab section under a specific coordinator."

"I would use their progress in the student's first principles class as an indicator to measure the student's performance related to journalizing and posting skills (i.e. watch their scores in class throughout the semester)."

"Short weekly quizzes."

"Set a lower limit on the amount of skills that should be achieved, and suggest extra ones that could be attained and measure the extra skills attained."

### **Developing an Accounting Viewpoint**

“Since an accounting viewpoint is subjective, performance must be measured subjectively. Some type of essay topic based on accounting viewpoints would subjectively measure performance in a fair manner.”

“Student performance would be evaluated through essay tests on what they feel the purposes of accounting are and why certain accounting techniques and principles are used to accomplish these goals. Performance is thus evaluated by evaluating how accurate and thoughtful the answers were.”

“I think an oral discussion with a written evaluation would provide the viewpoint better, and give it a stronger base.”

“I don’t know if it would be possible to measure someone’s mental processes accurately enough to base an instructor’s pay on it. An interview could be conducted with each student to determine the degree to which they apply an accounting viewpoint.”

These samples of subject responses to the question are reflective of the total group. Subjects tended to feel that student performance could be assessed on the basis of short quizzes given on a weekly basis in the case of journalizing and posting. By and large they expressed no misgivings or reservations in regards to the accuracy of these measures of student performance. Similarly, some felt that subjective short quizzes and/or oral discussions would provide a sufficient basis to assess student performance in the case of developing an accounting viewpoint. However, as reflected in the final response above, at least some students in the less measurable treatment conditions expressed misgivings and recognized that such subjective measures were not likely to be accurate. This was, of course, the intention of the manipulation — that students perceive developing an accounting viewpoint to be less measurable.

Some of the responses to item 3 were:

#### **Journalizing and Posting**

“I would give a teacher evaluation to the students and have the recommended teaching activities listed and have them answer to what degree their instructor followed these actions.”

“Have the instructor turn in a short report saying what he did that day. It would cover the materials he went over and the problems he was presented.”

“Have a set routine for each instructor and if an instructor did not follow the procedure, then he/she would be penalized.”

“Coordinator sit in on some of the sessions, survey students to see what type of instruction used, take into consideration improvement on test.”

### **Developing an Accounting Viewpoint**

“I would develop a strict outline of activities to be given to teachers and students and poll students at the end to see if the instructor had reached the specified goals for him or her.”

“The job could periodically be monitored by someone, i.e. the lab coordinator, to curb deviation. A test could be given to see that the proper activities are being covered.”

“By observations.”

“By having each instructor keep a journal of his activities during each lab session, and by attending 2 sessions (unannounced) of each lab instructor to verify this information.”

These responses are interesting in that they are consistent with the idea that less measurable outcomes will lead to a tendency by principles to monitor agent actions. While in the journalizing and posting condition few students suggested measures that would require monitoring, many such suggestions were made by subjects in the accounting viewpoint treatment. The terms “monitoring” and “observing” were used frequently in the latter condition.

Items 9, 10, 11, and 12 (Part I) were included to assess the extent to which subjects had: 1) clearly understood the meaning of a performance-based (incentive) contract, 2) clearly understood the meaning of an activities-based (forcing) contract, 3) understood the distinction between the two types of contracts, and 4) felt that both types of contracts could result in the same rate of pay to lab instructors.

Items 9 and 10 asked for a short definition from the students. Examination of the responses indicated that there was no problem with regard to the definition of the two contract types. Item 11 asked students to respond to the question, “To me the distinction between the two types of contracts is clear,” on a five-point scale from Strongly Agree to Strongly Disagree. The mean response was 4.65 (5 = strongly agree). There was no

difference between the four treatment cells indicating a high degree of distinction between the two types of contracts as described by the experimenter, which was unaffected by the specific treatment.

Item 12 asked students to respond to the question, “A lab instructor could earn the same amount of pay whether paid by performance- or activities-based contract,” on a five-point scale from Strongly Agree to Strongly Disagree. The mean response was 3.85 (5 = strongly agree). The cell means ranged from 3.3 to 4.6, 3.3 being recorded in the journalizing and posting/performance-based activities first cell and 4.6 being recorded in the viewpoint/performance-based activities first cell. While the mean responses indicate that subjects generally perceived the two types of contracts to result in equal pay, there was considerably more skepticism in the more measurable treatment condition, and less skepticism in the less measurable condition. Also, there was more skepticism in the order “activities-first, performance-second” than in the inverse order of presentation.

It had been hoped that subjects would perceive the possibility that both contract types would result in equal pay, and care had been taken to show examples of arrangements that would lead to equal pay. Such perceptions were generally achieved, but not equivalently between the treatment conditions. However, since the level of agreement was generally high, this finding is less likely to have affected the experimental results.

### **Manipulation Checks**

#### **Measurability of Student Performance:**

#### **The Independent Variable**

The manipulation check was designed to assess that part of the experimental procedure that had been intended to create the perception of measurability of student performance along the two objectives. The less measurable treatment involved the hypothetical lab instruction objective of developing an accounting viewpoint. The more measurable treat-

ment involved the alternative objective of journalizing and posting skills. These objectives were intended to create a differential perception between the treatment groups of the measurability of the instructional objective assigned to them. Six items on the questionnaire, as previously discussed, had been designed to check the efficacy of this manipulation procedure.

The *minimum* criteria of efficacy of the treatment was whether or not those subjects receiving the “developing an accounting viewpoint” treatment perceived it as significantly less measurable than did those subjects receiving the “journalizing and posting skills” treatment. This minimum criteria simply required that the two treatments yield significantly different perceptions, since if this did not occur, it would be unlikely that there would be any effects on the dependent variable. The *ideal* criteria was whether the perception of the “developing an accounting viewpoint” treatment would be perceived as on the less measurable side of the scale, and the “journalizing and posting skills” treatment would be perceived as on the more measurable side of the scale. The ideal criteria was not a necessary condition to create the desired effect, however it was desirable.

The three items (2, 5, 7 — Part I) were combined in the procedure suggested by the factor analysis. These items were intended to measure the degree to which subjects perceived student performance to be measurable (relative to the teaching objective given them). The response to the three items was averaged for each subject and the difference between the two treatment groups was examined using this single factor scale.

The mean response for subjects receiving the viewpoint treatment was 3.3667 (5 = very measurable; 1 = not at all measurable) while the mean response for the journalizing and posting groups was 4.3333. While the results do not support the ideal criteria, the viewpoint treatment is not very far from the midpoint of the perceived measurability scale, and the journalizing and posting treatment is very close to the measurable end point. A two-group t-test (one-tailed) was used to examine the difference between the means. It was felt that there should not only be a significant difference, but that the measurability of

the journalizing and posting skills should be higher than for the viewpoint treatment. The t-value was 5.85, significant at the level 0.0005 (38 degrees of freedom). Thus it was concluded that the procedure to induce the required differences in the perceived measurability of student performance was successful.

### **Perceived Measurability of Instructor Deviations**

In leading the subjects to the point of indicating a preference for either the performance-based (incentive) contract or the activity-based (forcing) contract, it was necessary to determine whether they also perceived that instructor activities could be measured. If subjects felt that instructor deviations from recommended activities could not be measured, then they might not feel free to opt for the activity-based contract, even if they perceived that student performance could not be measured. Therefore items 4, 6, and 8 had been designed to assess this perception.

The rationale of the manipulation check was that there would be some correspondence between the measurability of student performance and the measurability of instructor deviation. Specifically, if subjects perceived student performance to be more measurable, they might see less need to search for an alternative measure to base compensation on, and this might affect the perceived measurability downward. Alternatively, subjects perceiving student performance as less measurable would look favorably on the opportunity to measure instructor deviation and ultimately base compensation on it.

The mean perceived measurability of instructor deviation from recommended teaching activities in the viewpoint treatment groupings was 3.700 (5 = very measurable). The mean perceived measurability in the journalizing and posting groupings was 2.833. These means were significantly different ( $t = 3.322$ ;  $p \leq 0.01$ ). Indeed, the subjects perceived the measurability of instructor deviation as suggested by the a priori reasoning. Subjects who saw this as an alternative to a difficult measurement problem regarding student performance (viewpoint) saw it as more measurable than did the other groupings. In this



case, the activities-based contract was likely to be viewed as a viable alternative to a performance-based contract.

### Analysis of the Treatment Effects

For the analysis of the main treatment effects there were four subject groupings. There were the crossing treatments of measurability of student performance (journalizing and posting skills vs. developing an accounting viewpoint) and the order treatments (presenting the activities-based contract first vs. presenting the performance-based contract first during the experimental procedure). These treatments were analyzed for their effect on the dependent variable, preference for contract type.

Following the procedure suggested by the factor analysis, the four items to measure the preference for contract type were collapsed to a single factor scale. This scale would be interpreted as a 5-point scale ranging from 5 = strongly prefer performance-based contract to 1 = strongly prefer activities based contract. The mean preference scores for the subjects in each treatment grouping is shown in Figure 2.

		Measurability Treatments	
		Journalizing and Posting	Developing an Accounting Viewpoint
Order of Presentation	Activities Presented First	4.58	2.95
	Performance Presented First	4.45	4.03

**Figure 2. Mean Preference for Contract Type by Subject Groupings**

Using the contract preference scores as the dependent criterion, the SPSS Analysis of Variance procedure (completely randomized-fixed effects model) was used to test for differences in contract preference among the four treatment groupings. Table III presents the results of this analysis in summary form.

**TABLE III**  
**ANALYSIS OF VARIANCE OF TWO TREAT-**  
**MENTS ON SUBJECTS' PREFERENCE**  
**FOR CONTRACT TYPE (ONE-TAIL)**

Source of Variation	df	SS	MS	T	Significance
Measurability	1	10.506	10.506	4.076	0.0003
Order	1	2.256	2.256	1.889	0.035
Measurability X Order	1	3.600	3.600	2.386	0.011
Explained	3	16.363	5.454	2.937	0.0003
Residual	36	22.763	0.632		
Total	39	39.125	1.003		

### Measurability Treatment Effects

The contention of the study was that in a principal/agent relationship the measurability of the outcome influences the principal's preference for contract type. Two levels of measurability were presented to subject groupings, and the manipulation checks ascertained that the treatments did invoke a difference between the groupings in their perception of

the measurability of the outcome. Hence, differences in contract preference should be observed in the analysis of the dependent variable.

The two part hypothesis proposed that “the more measurable are outcomes (benefits), the greater will be the principal’s tendency to prefer an incentive contract; the less measurable are the outcomes (benefits), the greater will be the principal’s tendency to prefer a forcing contract.” An incentive contract was represented in this study as a performance-based contract. A forcing contract was represented in this study as an activities-based contract.

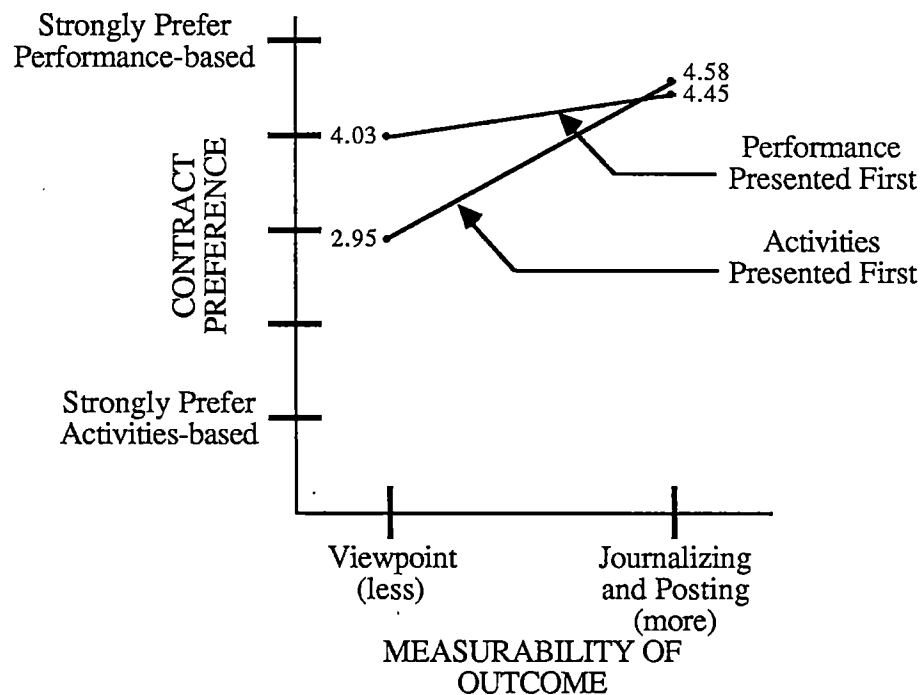
The significant ( $p \leq 0.0003$ ) differences between the more and less measurable treatment groups (journalizing and posting skills and developing an accounting viewpoint) supported this hypothesis. In this experimental study, subjects who were told that the objective of classroom instruction would be the improvement of students’ journalizing and posting skills in fact indicated a stronger preference for the performance-based contract than did subjects who were told that the objective of the classroom instruction would be the development of an accounting viewpoint.

The second aspect of the hypothesis was not as strongly supported, since the mean preference of those subjects who had been told that the objective was to develop an accounting viewpoint still indicated a slight preference for the performance-based (incentive) contract. However, this was only a slight preference, and in one cell (develop an accounting view- point x activities first) the preference was indeed slightly toward the activities-based (forcing) contract. In total, the analysis of variance results support the general notion that the degree to which outcomes are perceived as measurable does influence the principal’s preference for the type of contract to be offered to the agent.

### **Order Effects**

The order in which the contract-type examples had been presented to the subjects had been arranged to control for the possibility that the order of presentation could influ-

ence subjects' contract preference responses. Although the main effect of order was not significant at 0.05, there was an interaction effect between order and measurability on subject preference. The effect of order appears to be that seeing the activities-based contract first, in the less measurable treatment group, reinforces the possible efficacy of the activities-based contract. This is the condition under which the preference is toward the activities-based contract side of the preference scale. This effect is illustrated in Figure 3.



**Figure 3. Mean Contract-type Preference:  
Measurability x Order**

Although this result was not predicted by a priori reasoning and therefore does not involve a hypothesis, it does warrant additional discussion. It may be that the effects postulated by Cone and Edwards will be most prevalent only when forcing contracts are *first* in

a principal's awareness. If the principal is unacquainted with them until his or her mind-set has already concluded that employment contracts must be incentive-based, then forcing contracts may not later be deemed as a viable alternative, even if the outcome of the agent's performance is perceived as less measurable. Another possible explanation of this finding is that it may be more an experimental anomaly than anything that has external ramifications. Specifically, the limitations of a five-point scale may account for the order and interaction effects.

### Summary

In this chapter, the analyses of the data collected during the agency experiment were presented. The subjects' preference for contract type, as measured by a four-item scale, was used as the dependent variable in an analysis of variance procedure. Subjects' preference for a performance-based (incentive) contract was greater when they had been told that the outcome desired was the improvement of students' journalizing and posting skills, a more measurable outcome. Subjects were less likely to prefer the performance-based contract when they had been told that the objective of the classroom instruction was the development of an accounting viewpoint by the students.

In the following chapter, the complete implications of these findings will be discussed.

## **CHAPTER V**

### **SUMMARY AND CONCLUSIONS**

In this chapter the results of the analyses are discussed and summarized. A brief summary of the purpose of the study and research design are presented. The results of the study are interpreted in light of the major theoretical developments that gave rise to the research. Finally, interesting questions and implications for future research are examined.

#### **Purpose of the Study and Research Design**

The study was undertaken to investigate one aspect of agency theory that has been analytically developed to explain why governmental and for-profit accounting procedures differ. Such an explanation was undertaken by Cone and Edwards (1984) in order to produce a better understanding of why governmental organizations have adopted certain accounting procedures. They postulate that an understanding of why certain methods are used must precede any attempt to change them. For if the understanding of why things are done the way they are is absent, then any subsequent changes to accounting procedures will run the risk of being ineffectual.

With this purpose in mind, a theory was developed around the proposition that differences in contractual relationships that are formed in the governmental and for-profit environments may explain differing accounting practices. Further, differences in contracting may be the result of the degree to which the outcomes of managerial efforts are measurable. The purpose of this study, then, was to provide empirical evidence as to the relationship between outcome measurability and principal's preference for contract type.

The research question was:

Is the degree of measurability of outcomes (benefits) related to a tendency of a principal to prefer either forcing or incentive contracts?

A simple 2 x 2 factorial experiment was designed to test whether the degree of outcome observability impacts on the principal's contract preference.

### **Major Findings**

The major finding of this study relates to the research question and indicates that perceptions of measurability do influence a preference for contract type. Further, the level of contract preference corresponds closely to perceived measurability. This contention is related to the fact that mean perceived measurability for the more measurable treatment (journalizing and posting skills) was 4.33 (5-point scale) which is relatively close to the mean contract preference for that group of 4.51 (near the incentive contract end point). Similarly, the perceived measurability of the less measurable treatment group (accounting viewpoint) averaged 3.36, while the average preference level for the same group was 3.49. This association may indicate a stronger relationship than was revealed by the analysis of variance. If anything, the results of the statistical procedure are on the conservative side of estimating the relationship. While this is a very tentative suspicion, based on the close correspondence of the means, the interpretation of the analysis of variance was not.

The contention of Cone and Edwards that the measurability of outcomes may influence the nature of contracts offered by principals to agents, is now empirically supported. In this study, those subjects perceiving a less measurable outcome were less likely to prefer a performance-based (incentive) contract.

### **Implications for Research and Practice**

The study itself represents a laboratory test of agency theory. To date the empirical testing of agency theory has been relatively limited as the vast amount of agency research

has been largely analytical. Indeed, one of the criticisms of the theory is that it has not as yet been extensively tested. Since the value of any theory lies in its ability to explain real world phenomena, such testing is necessary. This study investigated one facet of the theory as it pertains to contractual relationships in governmental and for-profit organizations. It finds some support for the proposition that contract preference is the result of perceived measurability of outcome.

**Perceptions of Measurability.** One of the reasons that there are relatively few empirical studies of agency theory is the difficulty posed by specifying the variables. This was no less true in this study as the experimenter had great difficulty in abstracting the independent variable, perceived measurability. While researchers may readily acknowledge the difficulty of measuring certain types of outcomes, such as various mental developments (intelligence, and other personality traits are ready examples), the student-subject population apparently has few reservations about measurement problems.

Several different performance tasks and objectives were tested for outcomes that should have been seen as less measurable. Even such vague objectives as developing concepts, logics, and underlying philosophies of accounting posed little worry to student-subjects when they considered how they would measure (or not measure) the achievement level on these objectives. Although the experimenter did manage to create a less measurable treatment in the relative sense, achievement of the absolute level of “immeasurable” appeared impossible.

This suggests that one problem which may contribute to the controversy between those who criticize governmental accounting procedures and those who support these methods, may be the differing perceptions they have of the extent to which the outcomes of governmental purposes are measurable. It may have been in this study that the naivete of the “accounting undergraduate” student-subjects led to an overly optimistic view— all things can be measured. That would have been relatively consistent with their field of



study. Their responses to Part I, Question 1, generally seemed to indicate they believe that essay questions and/or oral discussions could be used to measure the acquisition of an accounting viewpoint. They apparently felt that essay questions are easily measurable, or at least more measurable than they really are.

Perhaps experience with an attribute that is hardly measurable is a necessary condition to perceive measurability with a more critical eye. This may also extend to the practical world of accounting. Unless one has experience with the elusive nature of governmental goals and objectives, one may view measurability of outcomes too optimistically. While this is purely speculation, based on the difficulty of establishing a stronger manipulation of the less measurable treatment, it does pose an interesting question that may be worthy of research attention.

**Order Effects in Contractual Relationships.** In this study, a significant interaction occurred between measurability and the order in which contract examples were presented to subjects. No hypotheses had been created to deal with this finding since the interaction effect is not postulated in the theoretical literature. However, it was an interesting finding that warrants additional study. On first glance, the effect makes little sense. On further examination, however, it may be that “normal“ employment contracts involve incentives for performance outcomes. Other types of arrangements, such as the forcing contract, may be rarely experienced prior to governmental service. Even in this case, agents working under a forcing contract arrangement may not think of it as a “forcing” contract.

For one to consider such an arrangement, it must be seen as a distinct possibility, one that is not unusual. In this study, first presenting the performance-based contract to the less measurable group seemed to lessen the effect on opting for the activities-based contract. Could it have been that seeing the performance-based (incentive) contract first evoked a response similar to “yes, that’s what I’ll do,” which caused them to not seriously

consider an alternative? This is speculation, of course, but does raise an important issue that might have implications for research in agency theory.

**Implications for Practice.** Procedural difference in accounting methods that exist between for-profit and governmental organizations are the real world phenomena that Cone and Edwards' theory is trying to explain. These differences, according to the theory are the result of relations that are unique to the particular environments. If indeed different agency relationships result in contractual arrangements of dissimilar nature, then it is reasonable to expect that the method of accounting may be dissimilar. In fact, the theory hypothesizes that accounting standards have been adopted optimally, given the governmental and for-profit environments and the agency relationships.

When benefits are unobservable they won't be contracted upon. Hence, the agent will not be motivated to use his expertise to increase the outcome. The principal, therefore, derives no benefits from delegating authority and will simply specify the action he expects the agent to take. The agent will be compensated if action is as agreed and penalized if it isn't. In order to avoid being penalized unduly, the agent will select a method of score keeping that demonstrates that the actions taken are in keeping with those prescribed. That is, a system of accountability will be established that demonstrates compliance.

This phenomena regarding monitoring was observed in student comments to the open-ended questions. Student observation that assurance of agent action could be obtained by "requiring the agent to maintain a journal" and have students verify this on course evaluations, provides evidence that this inclination exists. Once determining that agent action is the crucial compensation criterion, monitoring becomes necessary.

Cone and Edwards discuss governmental use of various procedures in conjunction with the forcing contract. They state that the specified action is exemplified by the budget. The budget has legal status given that it must be approved by the legislative body. Once approved, the budget becomes law. Most jurisdictions subject administrators, who spend

in excess of stipulated amounts, to penalties such as fines or imprisonment. This situation closely approximates the definition of the forcing contract, and affords a rationale for why governmental accounting systems incorporate procedures such as the use of budgetary control. Budgetary control is implemented to prevent accidental overspending. Principals, in turn, expect reassurance that spending restrictions have not been violated.

All this suggests that accounting reformers should be somewhat hesitant about calling for a total change of the fund accounting system. In an attempt to make it more profit-like, the constraints of the environment within which it operates may be overlooked. Governmental fund accounting may be optimal, given the nature of less measurable outcomes. This study has provided empirical support that agency theorists may be correct in their assessment of the critical differences.

Other interesting questions that some may wish to note are: 1) given the forcing contract, what type of score-keeping will the agent devise? and 2) will he use his private information to influence the outcome? Questions such as these may be investigated in experimental settings such as the one used in this study.

### **Limitations and Summary**

Many of the speculations made in this chapter are merely that, speculations. The study raised interesting possibilities beyond the simple support for the notion that the level of measurability of outcomes affects the principal's preference of contract type. One must consider that this study was done in an experimental setting, using student-subjects. Both facts raise the spectre of generalizability. Still, the phenomena were at least observed with real people.

Perhaps the most important limitation of the study has to do with the issue of risk neutrality. It should be noted that the theory implies that a forcing contract is "first best" when the principals are risk neutral. There was no attempt made to measure the risk preferences of the subjects in this study. However, this was not deemed critical as the

subjects had nothing at risk, since they received \$7.00, irrespective of their response. Further, since subjects were assigned on a random basis to the four treatment cells, it can be assumed that there were no systematic differences between the treatment groups relative to their risk preference. Therefore, the results can not be attributed to such differences.

## SELECTED REFERENCES

- Alchian, A. and H. Demsetz, "Production, Information Costs, and Economic Organization," *American Economic Review*, (December, 1972).
- Baiman, Stanley, "Agency Research in Managerial Accounting: A Survey," *Journal of Accounting Literature*, (v.1, 1982).
- Berhold, M., "A Theory of Linear Profit Sharing Incentives," *Quarterly Journal of Economics*, (August 1971).
- Berkowitz, L. and E. Donnerstein, "External Validity Is More Than Skin Deep," *American Psychologist*, (March, 1982).
- Bracht, G. and G. Glass, "The External Validity of Experiments," *American Education Research Journal*, (November, 1968).
- Cleveland, F. A., "Municipal Credit and Accounting Reform," *Journal of Accountancy*, (June, 1906).
- Coase, R., "The Nature of the Firm," *Economica*, (Vol. 4, 1937).
- Coase, R., "The Problem of Social Cost," *Journal of Law and Economics*, (October, 1960).
- Cone, K. and D. Edwards, "Agency Theory and Accounting Practices: Why is Government Accounting So Strange," *Working Paper*, (University of Chicago, 1984).
- Coopers and Lybrand and the University of Michigan, *Financial Disclosure Policies of the American Cities*, (University of Michigan, 1976).
- Cronbach, L. J., "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, September, 1951.
- Davidson, S. et. al., *Financial Reporting by State and Local Government Units*, (Center for Management of Public and Nonprofit Enterprise, University of Chicago, 1977).
- Demski, J. S., *Information Analysis*, 2nd Ed., (Addison Wesley: Reading, Mass., 1980).
- Diamond, D. W. and R. E. Verrecchia, "Optimal Managerial Contracts and Equilibrium Security Prices," *Journal of Finance*, (May, 1982).
- "Discussion Memorandum: An Analysis of Issues Related to Measurement Focus and Basis of Accounting — Governmental Funds," *Governmental Accounting Standards Series*, February, 1985.

- Ernst and Whinney, *How Cities Can Improve Their Financial Reporting*, (1979).
- "Exposure Draft: Proposed Statement of Governmental Accounting Concepts," *Governmental Accounting Standards Series*, January 17, 1986.
- Fama, E. and M. Jensen, "Separation of Ownership and Control," *Journal of Law and Economics*, (June, 1983).
- Harris, M. and R. Raviv, "Optimal Incentive Contracts with Imperfect Information," *Journal of Economic Theory*, (Vol. 20, 1979).
- Holmes, W., "Governmental Accounting in Colonial Massachusetts," *Accounting Review*, (January, 1979).
- Holmstrom, B., "Moral Hazard and Observability," *The Bell Journal of Economics*, (Spring, 1979).
- Jensen, M., "Organization Theory and Methodology," *Accounting Review*, (April, 1983).
- Jensen, M. and W. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, (Vol 3, 1976).
- Johnson, R. A., and D. W. Wichern, *Applied Multivariate Statistical Analysis*, (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1982).
- Kruglanski, A., "The Human Subject in the Psychological Experiment: Fact and Artifact," in L. Berkowitz (ed.), *Advances in Experimental Psychology*, Vol. 8, (Academic Press, 1975).
- Liebtag, B., "Interview with James F. Antonio," *Journal of Accountancy*, October, 1985.
- Mirrlees, J. A., "The Optimal Structure of Incentives and Authority Within an Organization," *Bell Journal of Economics*, (Spring, 1976).
- Municipal Accounting and Financial Reporting: Standard and Poor's Policy Statement*, (Standard and Poor's Corporation, 1980).
- National Committee on Governmental Accounting, *Governmental Accounting, Auditing, and Financial Reporting*, (MFOA, 1980).
- Nunnally, J. C., Jr., *Introduction to Psychological Measurement*, (New York: McGraw-Hill Book Company, 1970), pp. 107-131.
- Rauch, J., "Treasury's Rosy State Financial Forecast Set Off New Numbers Battle," *Federalism Report, National Journal*, (February 2, 1985).
- Robertson, W., "Going Broke the New York Way," *Fortune*, (August, 1975).
- Ross, S. A., "The Economic Theory of Agency: The Principal's Problem," *American Economic Review*, (May, 1973).

- Ross, S., "On the Economic Theory of Agency and the Principle of Similarity," in M. S. Balch, D. L. McFadden, and S. V. Wu, (Eds.), *Essays on Economic Behavior Under Uncertainty*, (North-Holland: Amsterdam, 1974).
- Securities and Exchange Commission Report on the City of New York*, (February 5, 1979).
- Shavell, S., "Risk Sharing and Incentives in the Principal and Agent Relationship," *Bell Journal of Economics*, (Spring, 1979).
- Stiglitz, J. E., "Incentives, Risk and Information: Notes Toward a Theory of Hierarchy," *Bell Journal of Economics*, (Autumn, 1975).
- Tiebout, C. M., "A Pure Theory of Local Expenditures," *Journal of Political Economy*, (October, 1956).
- Watts, R. and J. Zimmerman, *Positive Accounting Theory*, (Englewood Cliffs, N. J.: Prentice-Hall, 1986).
- White, R. H., "Government Accounting: Past, Present and Future," *Journal of Accountancy*, (March 1975).
- Wilmot, H. W., "Municipal Accounting Reform as Illustrated in the City of Minneapolis," *Journal of Accountancy*, (June, 1906).

## **APPENDICES**



## **APPENDIX A**

### **AN EXPLANATION OF GOVERNMENTAL ACCOUNTING PROCEDURES**

This appendix contains additional discussion of specific accounting procedures utilized by governmental organizations. More detailed discussion is available elsewhere.

## GOVERNMENTAL ACCOUNTING PROCEDURES

Governments exist to provide a wide variety of services to constituents. The funding for these activities is obtained from various sources. For many of the revenues received the use may be restricted to specified purposes. In order to provide assurance that expenditures are made in accordance with the dictates of the restriction, governments have adopted the use of fund accounting.

Fund accounting is a process whereby separate funds are established to ensure that the resource requirements are being fulfilled. Originally, "fund" meant "cash fund" and each was maintained in its own cash drawer. Thus, a physical separation as well as separability of accounts was effected. Today "fund" refers to a distinct fiscal and accounting entity which has its own self-balancing set of accounts.

The funds that are recommended for use are delineated in Governmental Accounting, Auditing and Financial Reporting (1980)<sup>1</sup>. The funds are broadly classified into three categories with subdivisions for specific funds within each category. They include the following:

1. Governmental funds - those funds that account for the financing of most of the government's functions. Governmental funds include:
  - a. General fund - the fund that is used to account for all financial resources except those required to be accounted for in a different fund.
  - b. Special revenue funds - the funds that are used to account for the proceeds of specific revenue sources that are legally restricted for specified purposes.
  - c. Capital projects funds - funds used to account for financial resources to be used for the acquisition or construction of major capital facilities.

---

<sup>1</sup> Governmental Accounting, Auditing, and Financial Reporting (GAAFR) is a published accumulation of recommended governmental accounting procedures. It is recognized as the leading source of governmental accounting standards.

- d. Debt service funds - funds used to account for the accumulation of resources for and the payment of general long-term debt principal and interest.
- e. Special assessments funds - funds used to account for the financing of public improvements against which special assessments are levied.
2. Proprietary funds - commercial type funds that are used to account for a government's ongoing operations that are similar to those found in the private sector. Specific types of proprietary funds include:
  - a. Enterprise funds - funds that are used to account for activities that are financed and operated in a manner similar to that found in the private sector.
  - b. Internal service funds - funds that are used to account for the financing of goods or services provided by one department or agency to another on a cost reimbursement basis.
3. Fiduciary funds - funds that are used to account for funds held by the governmental unit in a trustee capacity.
  - a. Trust funds - there are two types of trust funds: expendable and unexpendable.

The former requires accounting procedures akin to those of governmental funds, because the corpus of the trust is expended. The corpus, for the latter, is to be held intact, and as such is accounted for as a proprietary type fund.
  - b. Agency funds - funds that are established to account for custodial activities.

Accountability for and control of the government's general fixed assets and general long-term debt are accomplished through the use of account groups. These include the general fixed asset group of accounts which reflects all fixed assets of the community ex-

cept those accounted for in proprietary type funds. The other account group is the general long-term debt account group which reflects the long-term debt of the community except for that related to proprietary type activities.

The governmental unit will adopt the use of as many funds as is consistent with its own legal requirements. Because funds are formed to serve different purposes, the basis of accounting used for any individual fund will depend on the nature of the fund.

In addition to a fund accounting approach, other measures have been instituted to facilitate governmental accountability. One such procedure is the use of appropriations.

Appropriation is recorded in the appropriate fund, and is a budgetary account that reflects the legally established amount to be expended during the fiscal period. The appropriations account is incorporated in the fund accounting system for budgetary control purposes and to insure that overspending does not occur. The association between accountability and state-of-the-art accounting can be traced as far back as the late 1700's in Colonial America. The minutes of a 1798 Boston town meeting, included in an article by Holmes (1979, p. 54) provides early evidence of such practice:

Your Committee recommend that the Town desire the Selectmen to procure a Book and order the Town Clerk to keep Accounts agreeable to the Appropriations as above and in their Drafts on the Treasurer it will be proper to designate the Appropriation; they also Recommend that the Treasurer be ordered to Open as many Accounts in his Books as will conform to said Appropriations & charge each agreeable to the Selectmen's Drafts - so that in future the Town may know which & how much they fall short of the Sums granted.

### **Encumbrances**

Given that there is a need to demonstrate conformity and compliance with the budgetary statute, a primary objective of governmental accounting is to provide a method of controlling expenditures so that overspending does not occur. Toward this end, *encumbrances* are used. This involves recording in an encumbrance account whenever the governmental unit contracts for goods or services. Thus, the accounting system is designed to provide assurance that total actual expenditures plus amounts that are committed

do not exceed the appropriation. An encumbrance system, therefore, is a logical means of augmenting formal budgetary control.

### **Accounting Basis**

The fund system is used to facilitate compliance and the funds are classified by type. The nature of the fund determines the accounting basis that is utilized within the fund. The most common basis across funds is *modified accrual*. Accordingly, revenues are recognized when available and measurable. Typically, this results in property taxes being accrued with other sources of revenue being recognized on a cash basis. Expenditures are recognized when a fund liability is incurred. They relate to the cost of goods or services and capital outlays. The emphasis on funds flow and appropriable resources is why fixed assets are accounted for the way they are.

Since fixed assets do not represent appropriable resources, they typically are not accounted for in the fund from which the expenditure is made. Further, even though depreciation is widely held to be an expense, it is not recognized as such by most government funds because it does not require the use of appropriable resources. The major aspects of governmental accounting procedures are summarized in Figure A-1.

FIGURE A-1

## Summary of Fund Accounting (Funds and Groups of Accounts)

Fund or Account Group	Purpose of Fund	Budget Accounts Integrated Into General Ledger	Uses Encumbrance System	Carries Fixed Assets	Carries Bonded Debt
General	Accounts for all revenues and expenditures which are not accounted for in other funds.	Yes	Yes	No	No
Special Revenues	Similar to the general, except the fund accounts for revenue from specific taxes for special purposes.				
Capital Projects	Receives the proceeds of capital project bond issues and other matching funds. If applicable, lets contracts and constructs capital project.	Yes	Yes	No	No, bonded debt recorded in the General Long-Term Debt Group
Debt-Service	Accounts for funds to be used for payment of principal and interest on long-term and general obligation debt, except Special Assessment and Enterprise debt.	Not Usually	No	No	No
Internal Service Funds (Formerly ISF)	Performs services to other government departments on a user-charge basis.	Not Usually	If budget system is used	Yes, except as constructed by capital projects	No
Special Assessment	Finance, construct improvements benefiting certain property owners. Levy assessments against such property owners and retire debt related thereto.	Yes	Yes	No	Yes, debt carried and finally retired by assessing property owners
Trust & Agency	Accounts for money and property received from Non-enterprise fund sources to be held in the capacity of a trustee, custodian or agent.	No	No	Yes	Only debt related to investments.
Enterprise Uses GAAP	Accounts for self-supporting activities which render service on a user-charge basis to general public.	No	If budget system is used	Yes	Yes
General Fixed Asset Account Group	Accounts for all fixed assets except those accounted for internal, enterprise and trust funds.	No	No	Yes, as its only function	No
General Long-Term Debt Accounting Group	Accounts for all long-term (maturity one year or more) except enterprise and special assessment fund debt.	No	No	No	Yes, accounting for debt is group's sole function

Source: Cone, K. and D. Edwards, "Agency Theory and Accounting Practices: Why is Governmental Accounting So Strange?" *Working Paper*, (University of Chicago, 1984).

## **APPENDIX B**

### **PRETEST QUESTIONNAIRE FOR EXPERIMENTAL MATERIALS**

This appendix contains the pretest questionnaire that was used to examine the materials that were to be included in the experiment. As discussed in the body of this dissertation, some of the materials were not included in the final experimental design.

## QUESTIONNAIRE

The School of Accounting is evaluating several possible teaching procedures for the purpose of improving various aspects of undergraduate education. The purpose of this questionnaire is to obtain your opinion regarding: 1) the ability to accurately measure the presence of certain types of accounting skills in students, 2) the difficulty of specific questions that might be asked on accounting exams and 3) your feelings toward certain classroom activities. Your opinion on these issues is very important to us as we evaluate possible changes, so please work carefully through the questionnaire.



## PART 1 - Measuring Accounting Skills

In this portion of the questionnaire we are interested in your opinion regarding the ability to accurately detect or measure the presence of certain accounting skills in students. You are given the type of skill, and then asked to indicate by placing an X at the point on the scale corresponding to your opinion of the measurability of the skill.

Example:

### 1. Computational skills

<u>  X  </u>				
very easy to accu- rately measure	somewhat easy to accurately measure	neither easy nor hard to accurately measure	somewhat hard to accurately measure	very hard to accu- rately measure

If you feel that computational skills are very easy to accurately measure, you would place an X as above.

			<u>  X  </u>	
very easy to accu- rately measure	somewhat easy to accurately measure	neither easy nor hard to accurately measure	somewhat hard to accurately measure	very hard to accu- rately measure

If you feel that computational skills are somewhat hard to accurately measure, you would place an X as above.

Rate the difficulty of measuring the following accounting skills:

1. Computational skills

<u>          </u> very easy to accu- rately measure	<u>          </u> somewhat easy to accurately measure	<u>          </u> neither easy nor hard to accurately measure	<u>          </u> somewhat hard to accurately measure	<u>          </u> very hard to accu- rately measure
---	---	--	---	---

2. Knowledge of tax laws and regulations

<u>          </u> very easy to accu- rately measure	<u>          </u> somewhat easy to accurately measure	<u>          </u> neither easy nor hard to accurately measure	<u>          </u> somewhat hard to accurately measure	<u>          </u> very hard to accu- rately measure
---	---	--	---	---

3. Understanding of underlying concepts, logics and philosophies of accounting

<u>          </u> very easy to accu- rately measure	<u>          </u> somewhat easy to accurately measure	<u>          </u> neither easy nor hard to accurately measure	<u>          </u> somewhat hard to accurately measure	<u>          </u> very hard to accu- rately measure
---	---	--	---	---

4. Journalizing and posting skills

<u>          </u> very easy to accu- rately measure	<u>          </u> somewhat easy to accurately measure	<u>          </u> neither easy nor hard to accurately measure	<u>          </u> somewhat hard to accurately measure	<u>          </u> very hard to accu- rately measure
---	---	--	---	---

## PART 2 - Question Difficulty

In this portion of the questionnaire you are given three sample problems that might be used in certain coursework. You are not expected to solve the problems or answer the problem questions. Rather you should read the problem and then give your opinion as to the difficulty of answering the questions, by placing an X at the point on the scale corresponding to your opinion.

### Example

1. Calculate the depreciation expense for the year.

<u>          </u> X	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
very easy to answer	somewhat easy to answer	neither easy nor hard to answer	somewhat hard to answer	very hard to answer

If you feel the question would be very easy to answer, you would place an X as above.

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u> X	<u>          </u>
very easy to answer	somewhat easy to answer	neither easy nor hard to answer	somewhat hard to answer	very hard to answer

If you feel the question would be somewhat hard but not exceptionally so, you would place an X as above.

### Sample Problem 1

The following are selected account balances from a 12/31/1984 unadjusted trial balance. All balances are normal.

Cash	\$48,900	Accumulated Depreciation:	
Cleaning supplies	500	Machine	15,200
Office supplies	870	Building	75,000
Prepaid insurance	1,600	Accumulated Depreciation:	
Prepaid advertising	900	Building	12,100
Prepaid rent	2,400	Service revenue	97,950
Land	56,000	Wage expense	9,200
Machine	84,000	Cleaning supplies expense	70

#### Additional Information:

- The machine was purchased for \$84,000. It has an estimated useful life of twelve years and no salvage value. Straight line depreciation is used.
- Two years rent of \$2,400 was paid in advance on July 1, 1984.
- Cleaning supplies on hand at year end amounted to \$140.

#### Questions and Ratings:

- Make the adjusting entry necessary on December 31, 1984 to adjust the cleaning supplies account.

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
very easy	somewhat	neither	somewhat	very hard
to answer	easy to	easy nor	hard to	to answer
	answer	hard to	answer	
		answer		

---

- Explain the philosophy behind the recognition of depreciation expense.

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
very easy	somewhat	neither	somewhat	very hard
to answer	easy to	easy nor	hard to	to answer
	answer	hard to	answer	
		answer		

---

3. An adjusting entry is required on 12/31/1984 to adjust the cleaning supplies account balance. Explain the accounting concept that pertains to such adjusting entries.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

4. Calculate depreciation expense for the year.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

5. The balance in the prepaid rent account is \$1,200 and rent expense is recognized in the amount of \$1,200 after adjustment on 12/31/84. This is done in order for rent expense to be properly matched with revenues generated during the period. Explain the matching principle.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

6. Calculate the balance in the prepaid rent account after adjustment.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

## Sample Problem 2

A transaction involved the purchase of an ore crushing machine. The following expenditures were made.

Purchase price of the machine	\$100,000
Cost of a test run	300
Cost of repair due to damage of the machine incurred during unloading	150
Interest paid on loan to finance the purchase	5,000
Transportation cost	1,500
Sales tax	2,000

### Questions and Ratings:

1. Calculate the amount at which the ore crushing machine would be recorded.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

2. Under the historical cost principal the acquisition of an asset is recorded in terms of its cost. Explain what is meant by the term "cost of an asset."

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

**Sample Problem 3**

	Units	Unit cost
Beginning inventory	100	\$2.00
Purchases 2/24/84	200	2.50
4/14/84	300	3.00
7/13/84	100	3.25
11/19/84	150	3.50
Units sold during the year	600	

**Questions and Ratings:**

1. Determine the cost of inventory using a LIFO cost flow assumption.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

2. Both LIFO and FIFO inventory cost flow assumptions are widely used. Discuss some of the advantages and disadvantages of both.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

3. Determine the cost of inventory using a FIFO cost flow assumption.

<u>          </u> very easy to answer	<u>          </u> somewhat easy to answer	<u>          </u> neither easy nor hard to answer	<u>          </u> somewhat hard to answer	<u>          </u> very hard to answer
---	--	---	--	---

---

### PART 3 - Classroom Activities

In this portion of the questionnaire we are interested in your feelings regarding certain classroom activities. Your feelings are to be recorded as "preferences" by appropriately marking the scales with an X.

Example:

1. Regarding objective or subjective accounting examination types, I prefer:

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>  X  </u>
Strongly	Somewhat	Indifferent	Somewhat	Strongly
prefer	prefer		prefer	prefer
objective	objective		subjective	subjective

If you strongly prefer subjective examinations, you would place an X as above.

<u>          </u>	<u>  X  </u>	<u>          </u>	<u>          </u>	<u>          </u>
Strongly	Somewhat	Indifferent	Somewhat	Strongly
prefer	prefer		prefer	prefer
objective	objective		subjective	subjective

If you somewhat prefer objective examinations, but not strongly, you would place an X as above.



1. Regarding objective or subjective accounting examination types, I prefer:

<u>Strongly</u> prefer objective	<u>Somewhat</u> prefer objective	<u>Indifferent</u>	<u>Somewhat</u> prefer subjective	<u>Strongly</u> prefer subjective
--	--	--------------------	---	---

---

2. Regarding multiple choice or essay accounting questions, I prefer:

<u>Strongly</u> prefer multiple choice	<u>Somewhat</u> prefer multiple choice	<u>Indifferent</u>	<u>Somewhat</u> prefer essay questions	<u>Strongly</u> prefer essay questions
---	---	--------------------	---	---

---

3. Regarding computational problems or conceptual questions, I prefer:

<u>Strongly</u> prefer computa- tional problems	<u>Somewhat</u> prefer computa- tional problems	<u>Indifferent</u>	<u>Somewhat</u> prefer conceptual questions	<u>Strongly</u> prefer conceptual questions
---	---	--------------------	--	--

---

4. Regarding lecture or discussion-based accounting instruction, I prefer:

<u>Strongly</u> prefer lecture	<u>Somewhat</u> prefer lecture	<u>Indifferent</u>	<u>Somewhat</u> prefer discussion	<u>Strongly</u> prefer discussion
--------------------------------------	--------------------------------------	--------------------	---	---

---

5. Regarding the instructor's classroom presentation, between presenting theory or solving problems, I prefer:

<u>Strongly</u> prefer theory	<u>Somewhat</u> prefer theory	<u>Indifferent</u>	<u>Somewhat</u> prefer problems	<u>Strongly</u> prefer problems
-------------------------------------	-------------------------------------	--------------------	---------------------------------------	---------------------------------------

---

6. Regarding whether homework should be included in computing the final course grade, I prefer:

<u>Strongly</u> prefer it's inclusion	<u>Somewhat</u> prefer it's inclusion	<u>Indifferent</u>	<u>Somewhat</u> prefer it's exclusion	<u>Strongly</u> prefer it's exclusion
---	---	--------------------	---	---

---

7. Regarding whether class attendance should count toward the final course grade, I prefer:

<u>Strongly</u> prefer it not count	<u>Somewhat</u> prefer it not count	<u>Indifferent</u>	<u>Somewhat</u> prefer it does count	<u>Strongly</u> prefer it does count
---	---	--------------------	--	--

---

8. Regarding comprehensive or non-comprehensive final exams, I prefer:

<u>Strongly</u> prefer compre- hensive	<u>Somewhat</u> prefer compre- hensive	<u>Indifferent</u>	<u>Somewhat</u> prefer non-comp- hensive	<u>Strongly</u> prefer non-comp- hensive
---	---	--------------------	---	---

---

## **APPENDIX C**

### **PRETEST QUESTIONNAIRE FOR EXPERIMENTAL PROCEDURES**

This appendix contains the pretest questionnaire that was used to examine the experimental procedure used in the experiment. This included items to assess clarity and understanding, to determine the rate of pay for subjects, to assess the amount that would be included as to be paid during the work/study lab sessions, and to gain a feeling for whether students could understand the nature of forcing and incentive contracts.

## QUESTIONNAIRE

The purpose of this questionnaire is to obtain your opinion regarding three issues. First, you will be asked to indicate whether you easily understood the information that will be presented to graduate students who will be considered for the position of work/study lab coordinators. Second, you will be asked to recommend the amount of money that should be paid to the students for the interview. Third, you will be asked to recommend the amount of money that would be paid to the coordinators for distribution among themselves and the work/study lab instructors. Your opinions are very valuable to us as we consider this innovative instructional project, so please work carefully.

## PART 1 - Clarity of presentation

1. The purpose of the proposed new instructional project is: \_\_\_\_\_  
 \_\_\_\_\_.

2. The type of skill the project is designed to improve is: \_\_\_\_\_  
 \_\_\_\_\_.

3. Work/study lab coordinators will: (circle all correct answers)

- a. provide lab instruction for students in first principles
- b. be able to determine the payment that lab instructors will receive.
- c. be responsible for hiring lab instructors.
- d. need to prepare materials to be used in the labs.

4. Overall, I felt the information was: (Place an X over the scale that corresponds to your opinion)

very clear	somewhat clear	somewhat unclear	very unclear
---------------	-------------------	---------------------	-----------------

5. The transparencies used in the presentation were: (Place an X over the scale that corresponds to your opinion)

very clear	somewhat clear	somewhat unclear	very unclear
---------------	-------------------	---------------------	-----------------

**PART 2 - Payment**

1. In my opinion, the amount to be paid graduate students for participating in the interview and presentation should be: (indicate some amount between \$5.00 and \$10.00)

\$\_\_\_\_\_

2. In my opinion, the amount to be provided as an initial pool from which to pay the work/study lab coordinator and the lab instructors should be: [Remember that each coordinator will supervise 5 lab instructors and that each lab instructor will conduct 15 one-hour lab sessions during the semester. Graduate students who assist professors typically receive \$1125 per semester].

\$\_\_\_\_\_

## QUESTIONNAIRE

The purpose of this questionnaire is to determine the type of contract you would prefer to negotiate with the five lab instructors you would coordinate, and to collect other information that will allow us to assess whether you understand the nature of the new instructional project as has been explained during the presentation. Your answers are very important to us in evaluating the project and determining the procedures we should use during the instructional phase. Please work carefully and give us your "true" opinion, as opposed to what you think we might "want to hear." There are no right or wrong answers, only your true opinions.

## PART 1 - Contract preference

1. Two types of contracts that can be negotiated by work/study lab coordinators are: 1) **Type one**- a base amount and then adding incentive amounts for the instructor based on the level of student improvement in conceptual skills, and 2) **Type two** - a base amount and then deducting incremental amounts based on deviations by the lab instructor from the recommended time to be allocated to specific teaching activities. I would prefer: (indicate by placing an X above the scale corresponding to your preference.)

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
strongly prefer type one	somewhat prefer type one	indifferent	somewhat prefer type two	strongly prefer type two

2. I believe the type of contract that would be most suitable for the work study labs, given the teaching objective, is:

<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
strongly prefer type one	somewhat prefer type one	indifferent	somewhat prefer type two	strongly prefer type two



**PART 2- Other information** (Place an X above the scale point that corresponds to your belief in each case)

1. I feel that students perform best on accounting examinations that are:

_____	_____	_____	_____	_____
predomi- nately based on making journal entries	somewhat based on making journal entries	based both on making journal entries and conceptual/ logic skills	somewhat based on conceptual/ logic skills	predomi- nately based conceptual/ logic skills

2. I believe that such an instructional project as has been described is needed:

_____	_____	_____	_____	_____
strongly agree	somewhat agree	indifferent	somewhat disagree	strongly disagree

3. I believe that student conceptual, logical, philosophical skills in accounting can be accurately measured:

_____	_____	_____	_____	_____
strongly agree	somewhat agree	indifferent	somewhat disagree	strongly disagree

4. I believe that students' journalizing and posting skills in accounting can be accurately measured:

_____	_____	_____	_____	_____
strongly agree	somewhat agree	indifferent	somewhat disagree	strongly disagree



## **APPENDIX D**

### **TRANSPARENCIES USED IN EXPERIMENTAL PROCEDURES**

This appendix contains the transparencies that were used during the final experiment. They are shown in the order they were used.

## WORK/STUDY LAB PROJECT

**THE PERFORMANCE OBJECTIVE: Improve the students' journalizing and posting skills.**

### Recommended TEACHING ACTIVITIES:

1. Show up before lab to get organized (5 minutes is common).
2. Work problems and explain the journalizing and posting entries. (35 minutes is usual).
3. Answer questions (25 minutes is recommended with approximately 65 percent of this time spent providing individualized instruction).
4. Drill on journalizing and posting.

## WORK/STUDY LAB PROJECT

**THE PERFORMANCE OBJECTIVE:** Improve the students' development of an "accounting viewpoint" (the internal thinking process that we might call an accounting psyche or acumen).

### Recommended TEACHING ACTIVITIES:

1. Show up before lab to get organized (5 minutes is common).
2. Explain supporting accounting viewpoints and thinking processes in student language (35 minutes is usual).
3. Answer questions (25 minutes is recommended with approximately 65 percent of this time spent providing individualized instruction).
4. Drill on accounting viewpoints and internal thinking processes.

**CONTRACT EXAMPLES**

**Performance-based contract:**  
**Students' journalizing and posting performance.**

<b>Base salary</b>	<b>\$112.50</b>
<b>Bonus for exceeding standard</b>	<b><u>75.00</u></b>
<b>Total</b>	<b>\$187.50</b>

**Activity-based contract**  
**Instructor deviation from recommended teaching activities.**

<b>Base salary</b>	<b>\$187.50</b>
<b>Penalty for excess deviation</b>	<b><u>75.00</u></b>
<b>Total</b>	<b>\$112.50</b>

**CONTRACT EXAMPLES**

**Performance-based contract:  
Students' development of accounting "viewpoint".**

<b>Base salary</b>	<b>\$112.50</b>
<b>Bonus for exceeding standard</b>	<b><u>75.00</u></b>
<b>Total</b>	<b>\$187.50</b>

**Activity-based contract  
Instructor deviation from recommended teaching  
activities.**

<b>Base salary</b>	<b>\$187.50</b>
<b>Penalty for excess deviation</b>	<b><u>75.00</u></b>
<b>Total</b>	<b>\$112.50</b>

## **Important Points to Remember!**

- 1. Either type of contract can be arranged such that the lab instructor will earn the amount you feel is appropriate.**
- 2. If you use a performance-based contract, you must be able to measure student performance toward the performance objective of improved journalizing and posting.**
- 3. If you use an activity-based contract, you must be able to measure lab instructor deviation from teaching activities you recommend.**
- 4. You would choose the type of contract and the amount of compensation you feel is most suitable.**
- 5. Your initial lump sum of \$2,000 will be increased according to the success of your coordination across all five lab sections.**



## **Important Points to Remember!**

- 1. Either type of contract can be arranged such that the lab instructor will earn the amount you feel is appropriate.**
- 2. If you use a performance-based contract, you must be able to measure student performance toward the performance objective of developing an "accounting viewpoint" (internal thinking process or accounting psyche).**
- 3. If you use an activity-based contract, you must be able to measure lab instructor deviation from teaching activities you recommend.**
- 4. You would choose the type of contract and the amount of compensation you feel is most suitable.**
- 5. Your initial lump sum of \$2,000 will be increased according to the success of your coordination across all five lab sections.**

## **APPENDIX E**

### **POSTEXPERIMENTAL QUESTIONNAIRE**

This appendix contains the postexperimental questionnaire that was used to collect data regarding the independent and dependent variables.

## QUESTIONNAIRE

The answers to this questionnaire will be used by the accounting department in planning for the work/study lab project. Please take your time and answer all questions thoughtfully. Your assistance may help us improve our methods for educating accounting students in the future. We thank you very much for your assistance on this project.

## PART I

1. How would you propose to measure student performance related to journalizing and posting skills if you were to use a performance-based contract?

2. I feel the bases of measurement as suggested above would capture an accurate measurement of student performance related to journalizing and posting skills. (Place an X at the point corresponding to the degree that you agree or disagree with this statement.)

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

3. How would you propose to measure deviations by the lab instructor from recommended teaching activities if you were to use an activity-based contract?

4. I feel the bases of measurement as suggested above would capture an accurate measurement of instructor deviation from recommended teaching activities. (Place an X at the point corresponding to the degree that you agree or disagree with this statement.)

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

5. I believe it would be possible to establish accurate measures of student performance related to journalizing and posting skills.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

6. I believe it would be possible to determine accurate measures of instructor deviation from specified teaching activities.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

7. The measurement of student performance related to journalizing and posting skills is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

8. The measurement of instructor deviation from recommended teaching activities is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

9. In my own words, a performance-based contract is:

10. In my own words, an activities-based contract is:

11. To me the distinction between the two types of contracts is clear.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

12. A lab instructor could earn the same amount of pay whether paid by performance- or activities-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

## PART I

1. How would you propose to measure student performance related to developing an accounting viewpoint if you were to use a performance-based contract?

2. I feel the bases of measurement as suggested above would capture an accurate measurement of student performance related to developing an accounting viewpoint. (Place an X at the point corresponding to the degree that you agree or disagree with this statement.)

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

3. How would you propose to measure deviations by the lab instructor from recommended teaching activities if you were to use an activity-based contract?

4. I feel the bases of measurement as suggested above would capture an accurate measurement of instructor deviation from recommended teaching activities. (Place an X at the point corresponding to the degree that you agree or disagree with this statement.)

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

5. I believe it would be possible to establish accurate measures of student performance related to developing an accounting viewpoint.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

6. I believe it would be possible to determine accurate measures of instructor deviation from specified teaching activities.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

7. The measurement of student performance related to developing and accounting viewpoint is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

8. The measurement of instructor deviation from recommended teaching activities is objectively determinable to the extent that it would be reasonable to base someone's pay on it.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

9. In my own words, a performance-based contract is:

10. In my own words, an activities-based contract is:

11. To me the distinction between the two types of contracts is clear.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

12. A lab instructor could earn the same amount of pay whether paid by performance- or activities-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

## PART II

Two types of contracts that can be negotiated by work/study lab coordinators are performance-based and activities-based.

1. I would prefer to negotiate some form of performance-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

2. I would prefer to negotiate some form of activities-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

3. I believe the type of contract that would be most suitable for the work/study labs, given the teaching objective, is a performance-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree

4. I believe the type of contract that would be most suitable for the work/study labs, given the teaching objective, is an activities-based contract.

Strongly \_\_\_\_\_ Strongly  
Agree \_\_\_\_\_ Disagree



## **APPENDIX F**

### **TABULATIONS OF ORIGINAL DATA**

This appendix contains the tabulations of the data gathered from subjects following the completion of the experimental procedure. The tabulations are arranged in terms of the four treatment cells of the factorial design.

Subject	Part I — Scores on Items 2,4,5,6,7,8,11,12								Part II — All Items			
	2	4	5	6	7	8	11	12	1	2	3	4
1	5	1	5	1	5	1	5	5	5	1	5	1
2	5	3	5	1	5	3	5	1	5	1	5	1
3	5	4	5	4	3	4	5	5	5	3	5	3
4	4	4	5	3	4	4	5	5	5	3	5	2
5	4	3	4	2	4	2	5	3	5	1	5	2
6	4	5	4	5	4	4	5	2	5	3	5	3
7	4	4	5	3	2	2	3	3	5	2	5	1
8	4	3	5	3	4	2	4	2	5	1	4	3
9	4	4	5	4	5	3	5	2	5	1	5	3
10	4	4	4	5	4	5	5	5	4	2	4	2

**ORIGINAL DATA FOR SUBJECTS IN THE MORE MEASURABLE (Journalizing and Posting) TREATMENT, WITH PERFORMANCE-BASED CONTRACT PRESENTED FIRST**

Subject	Part I — Scores on Items 2,4,5,6,7,8,11,12								Part II — All Items			
	2	4	5	6	7	8	11	12	1	2	3	4
1	4	3	4	3	4	2	5	4	5	1	5	1
2	4	4	4	3	4	4	4	4	5	2	5	2
3	4	3	5	3	4	3	5	5	5	1	5	1
4	4	2	4	2	4	2	4	2	4	2	4	1
5	5	3	5	3	5	2	5	4	5	3	5	2
6	4	3	4	2	4	2	5	5	5	1	5	2
7	5	2	4	2	4	1	4	2	5	2	5	2
8	4	3	4	3	4	4	5	5	5	3	5	3
9	5	3	5	2	4	2	5	2	5	2	5	2
10	5	1	5	1	5	1	5	1	5	1	5	1

**ORIGINAL DATA FOR SUBJECTS IN THE MORE MEASURABLE (Journalizing and Posting) TREATMENT, WITH ACTIVITIES-BASED CONTRACT PRESENTED FIRST**

Subject	Part I — Scores on Items 2,4,5,6,7,8,11,12								Part II — All Items			
	2	4	5	6	7	8	11	12	1	2	3	4
1	4	5	4	5	5	5	5	2	4	2	5	2
2	4	3	4	2	4	2	5	4	4	1	5	1
3	4	4	3	5	1	2	5	5	5	2	4	2
4	4	4	3	4	3	4	5	5	2	4	2	4
5	3	5	4	4	2	2	5	5	5	1	5	1
6	3	4	2	4	3	3	5	5	4	2	2	4
7	5	3	5	3	2	4	4	5	2	4	2	4
8	3	4	3	5	4	4	5	5	5	1	5	1
9	4	4	5	4	4	3	5	5	5	1	5	1
10	4	4	4	4	4	2	5	5	5	1	5	1

**ORIGINAL DATA FOR SUBJECTS IN THE LESS MEASURABLE (Developing an Accounting Viewpoint) TREATMENT, WITH PERFORMANCE-BASED CONTRACT PRESENTED FIRST**

Subject	Part I — Scores on Items 2,4,5,6,7,8,11,12								Part II — All Items			
	2	4	5	6	7	8	11	12	1	2	3	4
1	2	2	4	4	4	5	5	5	2	4	4	3
2	4	4	4	4	3	3	4	4	4	3	4	3
3	4	3	4	3	4	3	4	5	4	2	4	2
4	3	4	4	2	2	4	5	3	4	3	4	2
5	4	4	3	4	2	4	4	2	2	5	2	4
6	4	4	4	4	2	3	3	2	4	4	3	4
7	3	4	2	3	2	4	5	4	2	5	5	2
8	4	5	3	5	3	3	4	5	4	5	2	5
9	4	4	4	4	2	3	4	3	5	3	5	3
10	3	4	2	4	2	4	5	4	2	4	2	4

**ORIGINAL DATA FOR SUBJECTS IN THE LESS MEASURABLE (Developing an Accounting Viewpoint) TREATMENT, WITH ACTIVITIES-BASED CONTRACT PRESENTED FIRST**

## **APPENDIX G**

### **SUBJECT APPLICATION BLANK**

This appendix contains the application blank completed by all subjects during the experiment. This permitted the evaluation of biographical data to assure that random assignment to treatment conditions was successful. Tabulations of biographical data are presented in two tables, according to the treatment groupings.

**WORK/STUDY LAB COORDINATOR  
APPLICATION**

Name: \_\_\_\_\_ Social Security Number: \_\_\_\_\_

Local Address: \_\_\_\_\_ Phone: \_\_\_\_\_

**Education**

Number of hours in accounting: \_\_\_\_\_

GPA in accounting: Graduate \_\_\_\_\_ Undergraduate \_\_\_\_\_

Number of hours in related coursework:

Math: \_\_\_\_\_ Computer Science: \_\_\_\_\_ Finance: \_\_\_\_\_

Overall cumulative GPA: \_\_\_\_\_

**Experience**

Have you previously served as a graduate or teaching assistance? \_\_\_\_\_

If yes, for whom? \_\_\_\_\_

Have you previously served as a classroom instructor? \_\_\_\_\_

If yes, what class? \_\_\_\_\_ What semester(s)? \_\_\_\_\_

Are you presently working as either a graduate assistant or classroom instructor? \_\_\_\_\_

**Personal**

Birthdate: \_\_\_\_\_ Colorado resident? \_\_\_\_\_

Sex: M \_\_\_\_\_ F \_\_\_\_\_

Marital Status: Married \_\_\_\_\_ Single \_\_\_\_\_ Other \_\_\_\_\_

Expected date of graduation: \_\_\_\_\_

Career objective: (Briefly and in your own words)

**BIOGRAPHICAL DATA: DISTRIBUTIONS  
MORE MEASURABLE GROUPINGS  
(Journalizing and Posting Skills)**

	Hours in Acctg.	GPA in Acctg.	Cumm. GPA	Age	Sex	Marital Status
<b>Performance-Based Contract Presented First</b>	17	2.6	3.0	21	M	S
	19	3.0	3.1	21	M	S
	21	2.8	3.2	23	M	S
	17	2.9	2.8	21	M	S
	17	3.0	3.0	21	M	S
	14	3.5	3.5	21	F	S
	18	2.7	2.5	22	F	S
	21	3.0	2.9	22	F	S
	17	4.0	3.8	32	F	M
	17	2.8	2.8	21	F	S
	<b>Average</b>	17.8	3.03	3.06	22.5	
<b>Activities-Based Contract Presented First</b>	17	2.9	2.7	22	F	S
	17	3.2	2.9	21	F	S
	17	3.1	2.8	21	F	S
	17	2.3	2.9	21	F	S
	30	3.0	3.2	30	M	M
	18	3.5	3.4	21	F	S
	20	2.8	2.7	21	M	S
	20	3.8	3.6	21	F	S
	13	3.0	3.3	22	F	S
	22	3.7	3.5	21	F	S
	<b>Average</b>	19.1	3.13	3.10	22.1	



**BIOGRAPHICAL DATA: DISTRIBUTIONS  
LESS MEASURABLE GROUPINGS  
(Developing an Accounting Viewpoint)**

	Hours in Acctg.	GPA in Acctg.	Cumm. GPA	Age	Sex	Marital Status
Performance-Based Contract Presented First	15	3.2	3.3	21	M	S
	15	2.0	2.1	22	M	S
	15	3.5	3.2	21	M	S
	20	3.7	3.8	23	M	S
	17	2.7	2.5	22	M	S
	17	2.1	2.6	21	F	S
	17	3.4	3.3	21	M	S
	19	1.8	2.3	22	F	M
	21	3.8	3.9	21	F	M
	21	3.4	2.6	21	F	M
Average	17.7	2.96	2.96	21.5		
Activities-Based Contract Presented First	15	2.1	2.6	21	F	S
	17	3.5	3.5	21	M	S
	22	4.0	3.8	24	F	M
	22	3.5	3.2	24	M	M
	17	3.7	3.2	21	M	S
	17	2.6	2.3	21	M	S
	17	3.4	3.2	21	F	S
	20	3.0	3.4	21	M	S
	17	3.8	3.8	21	F	S
	17	4.0	3.9	21	F	S
Average	18.1	3.36	3.29	21.6		

VITA

Melanie R. Middlemist

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE RELATIONSHIP BETWEEN OUTCOME MEASURABILITY AND  
PRINCIPAL'S PREFERENCE FOR CONTRACT TYPE: A LABORATORY  
EXPERIMENT

Major Field: Accounting

Biographical:

Personal Data: Born in Denver, Colorado, May 12, 1940, the daughter of George and Floreine Wilson. Married to R. Dennis Middlemist on June 9, 1962. Mother of George, Melinda, and Melissa Middlemist.

Education: Graduated from Jefferson High School, Edgewater, Colorado, in May, 1958; received Bachelor of Science degree in Arts and Sciences from the University of Colorado in June, 1962; received Master of Science degree from Oklahoma State University in December, 1980; completed requirements for Doctor of Philosophy degree at Oklahoma State University in December, 1986.

Professional Experience: Instructor, Department of Accounting, Colorado State University, 1981-1982; Instructor, School of Accounting, Oklahoma State University, 1982-1985; Assistant Professor, Department of Accounting, Colorado State University, 1986-present.

Professional Activities: Certified Public Accountant, Oklahoma, 1982; member American Accounting Association; member Governmental Accounting Standards Board.