

INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.
2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.
3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of "sectioning" the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.
4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.
5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.

**University
Microfilms
International**

300 N. Zeeb Road
Ann Arbor, MI 48106

8324885

Elikai, Faramarz

**AN INVESTIGATION OF THE IMPACT OF CURRENT-VALUE VERSUS
HISTORICAL-COST DATA ON USERS' SIMPLE ECONOMIC DECISIONS**

The University of Oklahoma

Ph.D. 1983

**University
Microfilms
International** 300 N. Zeeb Road, Ann Arbor, MI 48106

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy.
Problems encountered with this document have been identified here with a check mark ☒.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy _____
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages ☒
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Other _____

University
Microfilms
International

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN INVESTIGATION OF THE IMPACT OF
CURRENT-VALUE VERSUS HISTORICAL-COST
DATA ON USERS' SIMPLE ECONOMIC DECISIONS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF PHILOSOPHY

BY

FARAMARZ ELIKAI

Norman, Oklahoma

1983

AN INVESTIGATION OF THE IMPACT OF
CURRENT-VALUE VERSUS HISTORICAL-COST
DATA ON USERS' SIMPLE ECONOMIC DECISIONS

APPROVED BY:

Stanley Monant
William F. Benth
Homer A. Braun
Jayaraj V
Eddchiemo

DISSERTATION COMMITTEE

ACKNOWLEDGEMENT

I gratefully acknowledge the cooperation of the participants who generously and enthusiastically gave their support and time to help me with the experiment in this study. Their participation was essential to the completion of this project. I also wish to express my appreciation to those personal and professional friends who have contributed to the production of this work. I regret that individual acknowledgement is impossible. Moreover, I am indebted to the members of my dissertation committee, Professors Shane Moriarity, William Bentz, Homer Brown, Edward Shrems, and Jeyaraj Vadiveloo for their valuable contributions to this research. I greatly appreciate their helpful and constructive advice, comments, suggestions and criticisms of this work. I am especially indebted to Professor Shane Moriarity, who in addition to assisting me in the conception of the idea, also reviewed and edited several drafts of the dissertation. He provided continual encouragement throughout the endeavor that resulted in this dissertation. His numerous comments and suggestions have significantly improved the methodology and presentation of this dissertation. Without his assistance, guidance and patience, this work could not have been completed. Special appreciation also goes to

Professor William Bentz for his continued encouragement and unwavering support during my graduate training. Without his friendship, advice and guidance, I could not have completed my graduate degrees. My greatest debt, however, is to my family for their patience and support; particularly to my sister, Mariam Elikai, who in addition to assisting with the writing and editing of the computer programs, also shared the strain of the research process and the writing of this work.

TABLE OF CONTENTS

		<u>PAGE</u>
	LIST OF TABLES.....	vii
	LIST OF FIGURES.....	ix
CHAPTER		
1.	OBJECTIVES AND VALUATION METHODS	
1.1	Introduction.....	1
1.2	Objectives.....	2
1.3	Historical-Cost Accounting.....	3
1.4	Current-Value Accounting.....	5
1.5	Price-Level-Adjusted Accounting.....	8
1.6	Choosing Between Competing Models.....	8
2.	PRIOR EMPIRICAL STUDIES	
2.1	Predictability and Capital Markets.....	11
2.2	Questionnaire and Laboratory Experiments.....	14
2.3	Inferences From and Remarks On Prior Studies.....	19
3.	THE STUDY: OBJECTIVES AND THE RESEARCH INSTRUMENT	
3.1	Introductory Overview.....	22
3.2	Development of the Model.....	25
3.3	The Characteristics of the Model.....	27
3.4	Development of the Firm.....	28
3.5	Procedure for Generating Decisions and Financial Statements.....	33
3.6	Summary.....	47
4.	FINANCIAL STATEMENTS AND PARTICIPANTS	
4.1	Financial Statements.....	48
4.2	Participants.....	49
4.3	Administration of Experiment.....	51

5.	STATISTICAL TESTS	
5.1	Binomial Test.....	74
5.2	Analyses of the Subjects' Ranks (The Binomial Test).....	76
5.3	The Wilcoxon Rank-Sum Test.....	90
5.4	Analyses of the subjects' Ranks (The Wilcoxon Rank-Sum Test).....	94
5.5	The Chi-Square Test.....	110
5.6	Analyses of the Subjects' Ranks (The Chi-Square Test).....	112
5.7	Summary of the Statistical Analyses.....	121
6.	SUMMARY.....	123
	BIBLIOGRAPHY.....	127

LIST OF TABLES

TABLE	<u>PAGE</u>
1. Analysis of Percentage of Correct Decisions.....	30
2. Combination of Correct Ranking (Ranking Scheme).....	32
3. Decision Model.....	34
4. Decision Scheme (Firm A).....	37
5. Decision Scheme (Firm B).....	38
6. Decision Scheme (Firm C).....	39
7. Comparative Net Income (Loss).....	46
8. The Comparison of Correct Rankings, Auditors (Set 1).....	78
9. The Comparison of Correct Rankings, Bankers (Set 1).....	80
10. The Comparison of Correct Rankings, Financial Analysts (Set 1).....	81
11. The Comparison of Correct Rankings, Auditors (Set 2).....	83
12. The Comparison of Correct Rankings, Bankers (Set 2).....	84
13. The Comparison of Correct Rankings, Financial Analysts (Set 2).....	85
14. The Comparison of Correct Rankings, Auditors, Bankers and Financial Analysts (Set 1).....	87
15. The Comparison of Correct Rankings, Auditors, Bankers and Financial Analysts (Set 2).....	88
16. The Comparison of Correct Rankings, Auditors, Bankers and Financial Analysts (Set 1 and Set 2).....	89
17. The Comparison of HC and CV (Auditors), The Wilcoxon Rank-Sum Test (Set 1).....	95
18. The Comparison of HC and CV (Bankers), The Wilcoxon Rank-Sum Test (Set 1).....	96
19. The Comparison of HC and CV (Financial Analysts) The Wilcoxon Rank-Sum Test (Set 1).....	97
20. The Comparison of HC and CV (Auditors), The Wilcoxon Rank-Sum Test (Set 2).....	98
21. The Comparison of HC and CV (Bankers), The Wilcoxon Rank-Sum Test (Set 2).....	99

TABLE		<u>PAGE</u>
22.	The Comparison of HC and CV (Financial Analysts), The Wilcoxon Rank-Sum Test (Set 2).....	100
23.	Percentages of Correct Rankings for Each Group (Auditors).....	102
24.	Percentages of Correct Rankings for Each Group (Bankers).....	103
25.	Percentages of Correct Rankings for Each Group (Financial Analysts).....	104
26.	Results of the Statistical Analysis, The Wilcoxon Rank-Sum Test, Comparison of HC and CV For Each Group.....	106
27.	Results of the Statistical Analysis, The Wilcoxon Rank-Sum Test, Comparison of HC and CV All Groups Combined.....	108
28.	Results of the Statistical Analysis, The Wilcoxon Rank-Sum Test, Comparison of Auditors and Bankers Ranking.....	109
29.	Contingency Tables.....	111
30.	Results of the Statistical Analysis, The Chi-Square Test, Comparison of HC and CV.....	114
31.	Contingency Tables, Auditors, (Set 1).....	115
32.	Contingency Tables, Bankers (Set 1).....	116
33.	Contingency Tables, Financial Analysts (Set 1).....	117
34.	Contingency Tables, Auditors (Set 2).....	118
35.	Contingency Tables, Bankers (Set 2).....	119
36.	Contingency Tables, Financial Analysts (Set 2).....	120

LIST OF FIGURES

<u>FIGURE</u>	<u>PAGE</u>
1. Financial Data for The Three Hypothetical Firms.....	40
2. Cover Letters for the Research Instrument.....	55
3. Participant's Response Form.....	57
4. The Research Instrument (Set 1).....	58

CHAPTER ONE
OBJECTIVES AND VALUATION METHODS

1.1 Introduction

Many alternative income measurement and asset valuation methods have been advocated in accounting through the years. Typically these discussions concern the pros and cons of the use of current-values (Net Realizable Value, Adjusted Cost, Market Value, Capitalization, etc.) rather than traditional historical-costs as the basis for the preparation of financial statements. Although historical-cost continues to be the generally accepted measurement method, there seems to be growing support for the thesis that current-values, although less objective, would be more relevant to the needs of investors and other users of accounting information.

However, relatively little is known about the effect of accounting information on decision making. Without such knowledge it is difficult to predict the diverse effects that different accounting and reporting systems would have on decisions. The decision makers usually apply or select a decision rule which relates inputs to decisions in a manner consistent with their objectives, perceptions, and

experiences. But changes in accounting methods may affect the perceived relevance of accounting information and may alter the effect of accounting information on decisions.

This dissertation considers the above issue, by examining the effect of current-value, and historical-cost information on users' decisions. The dissertation is divided into six chapters. Chapter One deals with the objectives of financial statements, and the theoretical concepts of asset valuation and income determination. Chapter Two presents the related prior empirical studies. Chapter Three discusses the objective of the study with related hypotheses and model. Chapter Four presents the nature of the research instrument and the participants in the study. Chapter Five deals with the statistical tests and Chapter Six presents a summary and inferences from the study.

1.2 Objectives

In response to criticisms of corporate financial reporting and the lack of a framework for the development of accounting principles, the Trueblood Committee in 1973 issued a report on objectives of financial statements. The Trueblood Report contained twelve objectives which were stated within a context of assumptions and arguments purporting to support the objectives and provide for their logical derivation. The report stresses the desirability of using accounting data to predict future cash flows. The principal objective is stated in these terms:

"An objective of financial statements is to provide information useful to investors and creditors for predicting, comparing, and evaluating potential cash flows to them in terms of amount, timing, and related uncertainty."

"An objective of financial statements is to provide users with information for predicting, comparing, and evaluating enterprise earning power."

"An objective of financial statements is to supply information useful in judging management's ability to utilize enterprise resources effectively in achieving the primary enterprise goal." (p. 63).

It is generally agreed by current-value proponents that historical-cost is not a satisfactory accounting method to fulfill the above objectives. Since it is not the intention of this paper to examine the theoretical justification of each valuation method I will cite only some of the arguments concerning the pros and cons of the use of each method in order to clarify the problems of the different asset valuation and income determination methods.

1.3 Historical-Cost

In favor of historical-cost (HC) Ijiri (1972) set forth five propositions and argued that: (1) Based on HC valuation, every actual change in the resources of an entity would be recorded by relating inputs and outputs. As a result, the actual change in the resources can be traced and identified whenever it is necessary. (2) Data based on HC valuation are less disputable than data provided under other valuation methods. (3) If the income figures are used in solving conflicts of interest in income distribution (in the

form of dividends, bonuses to officers and employers, income taxes, refunds to customers of a firm in a regulated industry, etc.) then the process of income determination must be carried out in the least disputable manner. Income figures under HC are less disputable than other methods, since the accountant operates under this system, in the most objective, consistent, and unambiguous manner. (4) Since history is a primary basis for predicting the future, HC valuation is useful because it provides data useful for predictions. (5) Among all valuation methods, HC valuation is the least costly to society considering the costs of recording, reporting, auditing, settling disputes, etc. Furthermore, Most (1977) also argued that, in addition to the fact that HC valuation is objective, verifiable and free from subjective interpretation, it can also represent the value of the asset to the acquirer at the time of acquisition.

In contrast, Revsine (1973) questions the interpretation and usefulness of historical-cost balance sheet figures. Revsine pointed out that, amounts recorded for various assets do not represent the replacement cost of service potential, nor do they represent the current cash equivalent of the assets (net realizable values); nor, do these amounts represent the discounted service potential of the assets. Furthermore, Revsine criticized the traditional income figure and its components as being misleading, since during periods of fluctuating prices, the difference between realized revenues and expired historical-costs will not necessarily represent the change in real net assets over the preceding period. Therefore, the income figures may not be an adequate basis for dividend policy. Moreover,

the historical income figure may be a poor estimator of the firm's expected future profit generating capabilities, since the income computation does not incorporate specific price changes for certain assets. Finally, historical income figures neither segregate nor reflect the success of management's operating activities and its assets holding activities.

1.4 Current-Value

Several other valuation methods have been proposed to alleviate some of these deficiencies. For example, Chambers (1966) suggested an asset valuation method that emphasizes the current cash equivalent of financial items. Under this method, all balance sheet account items would be valued at net realizable value, or some approximation thereof. Net income or loss under this method would be equal to the difference between the value of the net assets (assets minus liabilities) at the end of the fiscal period and the value of the net assets at the beginning of the fiscal period.

Sterling (1970) argued that the current selling prices of a firm's assets define the firm's market alternatives, and are relevant to rational decision models of management, creditors, and investors. This method was also believed to avoid the arbitrary cost allocations that reduce the significance of financial information presented in conventional historical-cost financial statements.

The use of current selling price valuation has been criticized in regard to the lack of quoted selling prices for all the assets of a firm. Furthermore, current selling price valuation results in an

income statement that provides little information for financial decision-making purposes, especially with respect to predicting future net income of the firm. This is because such valuation is essentially a stock of wealth measurement approach. In order to avoid the arbitrary allocations that would be necessary to report such flows, the resulting income statement normally does not show the revenue inflows and the expense outflows, which are thought to be useful information for financial decision-making purposes.

Edwards and Bell (1961) proposed a valuation method in which the assets would be shown based on their current replacement cost. Cost expirations would be measured by employing the prevailing market price at the time of asset disposition. As a result, balance sheets would reflect the current replacement costs of all assets. The income statement operating margin would reflect the excess of realized revenues over the expired current cost of asset services. There is also a separate component, realizable cost savings, which would contain the impact of specific price changes on assets held by the enterprise.

Drake and Dopuch (1965) evaluated the arguments advanced by Edwards and Bell on the usefulness of disaggregating net income (NI) into a holding gain (HG) and replacement cost income (RCI). This dichotomy was said to provide approximations of returns to holding and operating decisions, respectively. Drake and Dopuch concluded that: (1) the HG and RCI amounts cannot be used to evaluate the holding and operating activities, (2) the predictive powers of RCI is an empirical question and its validity cannot be evaluated on an a priori

basis, (3) the usefulness of the dichotomy lies in the area of improving inter-period and inter-firm comparability.

Prakash and Sunder (1979) also examined the usefulness of dichotomizing income into current operating profit (COP) and HG. They set forth a criteria and argued that the COP-HG dichotomy is useful only when the operating and asset-holding decisions are independent of each other and the holding risks of the firm's assets are "separable". In other words, the operating and holding decisions would be independent only when a firm can hold assets without having to bear the economic risk of specific price changes, or "holding risk". The components of holding gains (losses) consists of: gains (losses) on (1) speculative assets, (2) operating assets carrying separable risk and (3) the cost of carrying speculative assets. The authors also suggested that the savings in the imputed risk premium, arising from the separable risk that management chose to carry, be charged against the current operating profit and be realized as part of the holding gain.

In summary, the most frequent arguments in favor of current replacement-costs are that current costs are matched with current revenue to derive operating income, holding gains and losses are reported separately in the income statement and not mixed with operating income, and the assets are reported in the balance sheet at current costs. As a result, current replacement cost valuation supposedly provides more useful information for financial decision-making purposes than do those based on the conventional historical-cost method. On the other hand, it is argued that, the replacement-cost valuation method is based on hypothetical purchase prices which

may not be relevant to reporting the present financial condition of a firm.

1.5 Price Level Adjustments

Another problem related to financial statements is the unstable monetary unit. Changing values of the monetary measurement unit produce incompatible financial statements for different time periods. This is strictly a measurement problem and it has been argued that financial statements should reflect the effects of general price level changes and recognize explicitly the inflation effect. That is, replacement cost accounting discloses the results of specific price changes while general purchasing power accounting discloses the inflation effect.

1.6 Choosing Between Competing Models

Revsine (1973) argued that a plausible explanation for these controversies might be related to the linkage between user information needs and the data provided to them through accounting reports; which means, the information generated by a given accounting measurement model ought to correspond to the information required by users' decision models. Some measurement models might be more effective than others in satisfying the information needs of users' decision models. If the information generated by a given measurement model is deemed the most relevant to the actual information needs of the group of users toward whom the model is directed, then other measurement

models will likely be rejected. As a result, the output of an accounting measurement model must be viewed as relevant for the information needs of its intended audience.

In recent years, the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board (FASB) began experimenting with the effect of alternative accounting measurements on users' decision. In 1976, the SEC required a subset of large corporations to disclose certain elements of replacement cost information in their 10-K reports filed with the SEC for fiscal periods beginning after December 25, 1976. Similarly, the FASB issued Statement of Financial Accounting Standards No. 33, "Financial Reporting and Changing Prices". This statement required certain large, publicly held companies to disclose the effect of changing prices as supplementary information to the basic financial statements. The Board emphasized that the rule adopted is flexible and is intended to encourage experimentation. In addition to this recent experimentation in accounting practice, a number of research studies have also addressed the problem of selecting among competing accounting valuation models.

The studies have mostly been concerned with the superiority of price-level adjusted data, rather than current-value data, over historical-cost information, and have yielded contradictory results. Moreover, in general, the studies have not examined the effect of using alternative financial information, especially current-value data, on users' economic decisions. Basically, price-level adjusted data are concerned with the changing values of the monetary measurement unit, and reflect the effects of general-price-level changes on

financial data. In other words, price-level adjusted data are derived from the other asset valuation and income determination methods, and reflect the general inflation effects. Once the financial data are generated based on historical costs or current values, they can be easily adjusted for general price level changes.

Therefore, general-price-level accounting is not per se competing or conflicting with historical-cost or current-value accounting; the effects of general-price-level changes can be incorporated with the alternative accounting methods in the same set of statements. As a result, one can question what basis of valuation (historical-cost or current-value) should be adopted. The answer to this question depends largely on the objectives of financial statements. As an initial step, one must examine the extent of the usefulness and the degree of the reliability of current-value data, and its related costs and benefits, in comparison with historical-cost data. In the next chapter, a number of prior empirical studies related to the usefulness of current-value versus historical-cost statements will be examined.

CHAPTER TWO

PRIOR EMPIRICAL STUDIES

A number of studies have been conducted to examine the superiority of current-value versus historical-cost data. The studies mostly employed capital market, interview, questionnaire, predictive ability and simulation approaches as the research methodology. In general, the results of the studies are contradictory and leave unresolved the issue of whether current-value data, in any sense, is superior to historical-cost data. The studies also have not been concerned with the effect of different valuation methods on users' decision making ability. In this chapter some of the research concerning the pros and cons of current-value versus historical-cost data are reviewed. This summary will clarify the extent of the prior research done related to each accounting method.

2.1 Predictability and Capital Markets

Greenball (1968) developed a simulation model and examined the behavior of 230 hypothetical firms. In this experiment he tested six different accounting methods, including historical-cost, business profit and current operating profit. Each of these methods was also

divided into two different categories, absorption costing and direct costing. The major focus of his study was comparing the performance of different methods rather than evaluating the absolute performance of each of the six methods. From his study, Greenball concluded that the two best methods for estimating earnings and rates of return were historical absorption cost and current operating absorption profit. Based on error criteria (estimation of earnings and rates of return) the latter method was somewhat superior; however, this method tends to understate earnings substantially when net holding gains are positive.

Frank (1969) compared the relative accuracy of forecasts of accounting income based on past values of accounting income with forecasts of those same values based on past values of replacement-cost income. The financial data of 76 firms in six industries, primarily manufacturing firms, were obtained from Standard and Poor's COMPUSTAT tape for the periods 1947-65. He applied specific price indices to adjust historical-cost income, in order to obtain replacement-cost income. He found no superiority between replacement-cost income and accounting income series.

Revsine (1970, 1973) provided a plausible argument for the predictability of replacement-cost income related to the different types of price changes. He argued that if the changes in future flows generated by the firm's use of resources does not correspond to future changes in prices, then reported income might not increase or decrease in the same direction as the cash flow potential of the firm increases or decreases. As a result, the income reported might not

vary in the same direction and by the same magnitude that discounted cash expectations vary. This result could generate serious misleading inferences for investors regarding the firm's prospects.

To test such an argument, Revsine and Thies (1976) employed simulation to examine the impact of productivity changes on the relative differences between alternative income determination methods. They concluded that, productivity changes could have a systematic impact on the differences between (1) historical-cost income and current operating profit and (2) historical-cost income and total replacement cost income; in the sense that when productivity increases, the relative magnitude of differences between income alternatives decreases, and when the productivity decreases, the relative differences between income alternatives increase.

Abdel-khalik and McKeown (1978) evaluated the effect of the disclosure of the estimated replacement cost information, required by Accounting Series Release 190 (ASR 190), on the stock market's revisions of its assessment of systematic risk measures of firms affected by the ruling (prior to and after the date of issuance of ASR 190, 1976). In order to examine whether the stock market had impounded replacement-cost information prior to its quantification and disclosure, they derived five hypotheses based on Rubinstein's breakdown of systematic risk into financial and operating risk measures. The tests were performed on a sample of 211 stocks; stock prices and financial statements of the firms were selected from CRSP and COMPUSTAT tapes respectively. They concluded that: (1) The stock market's evaluations of financial and operating risk measures

appeared inconsistent with the tenor of their broad hypothesis that replacement-cost-based income and information about holding gains were impounded in security prices prior to the disclosure of their forecasted numbers. (2) The lack of a statistically significant shift in the imputed market assessment of systematic risk after the disclosure of estimates of replacement-cost-based income is inconsistent with the authors' second broad hypothesis that such information has information content and will induce market revisions of common stock prices. (3) It was possible that forecasted replacement cost information was not the relevant type of information and that investors were waiting for the actual disclosure of replacement cost information before revising their expectations.

Gheyara and Boatsman (1980) examined the magnitude of holding gains. They did not find any abnormal return or any information content relating to the ASR 190 data. They concluded that replacement cost data (which are suggested by ASR 190) are not useful in the context of decision making by capital market agents.

2.2 Questionnaire and Laboratory Experiments

Estes (1968) surveyed the desirability of reporting current-value information for various classes of assets, both current and long term. Three organizations were sampled: The Institute of Chartered Financial Analysts, the National Association of Bank Loan Officers and Credit Men (Robert Morris Association), and the Financial Executives Institute. In questionnaires, subjects were asked to assume that: (a) historical cost is the primary form of measurement

and the new data would be supplementary only, and (b) valuation could be objectively determinable. The accounting methods were ranked by the subjects based on "very useful," "somewhat useful," or "not useful," where "very" and "somewhat" responses were combined in assessing utility. The results of his study showed that, current-value is rated useful, as supplementary information to historical-costs in the financial statements, by 90 percent of the Bank Loan Officers and Credit Men, 82 percent of the financial analysts, and 67 percent of the financial executives.

Brenner (1970) examined whether changes in values should be included in earnings per share. A questionnaire was also used in his study. His sample was selected from three main groups: stockholders, bankers, and financial analysts. As opposed to the Estes study, subjects were asked to assume that the current value earnings per share is the primary form of measurement and will replace, rather than supplement, currently reported earnings per share. This assumption required subjects to impute the opportunity costs of not having access to historical-cost figures. However, subjects relied on their own judgments concerning the degree of objective measurability of current values, which may bias the results of his study. Subjects were asked to respond to the items in each statement as: "strongly agree," "agree," "undecided," "disagree," or "strongly disagree." The results of his study suggest that, the majority of the subjects were uncertain as to which type of earnings per share figures should be reported; they prefer inclusion of only some specific kinds of

current value information and in a supplementary form. Brenner concluded that ". . . only a small proportion of statement users are willing to forego historical-cost information in favor of current values in the determination of earnings per share. On the basis of these results and those of the Estes study, current values are desirable only if they are presented as supplementary information to historical cost figures." (p. 166). However, he felt that an appropriate conclusion was not determinable from the data collected in his study.

Bentson and Krasney (1978) surveyed the practices and opinions of the Direct Placement Officers, and Common Stock Investment Officers employed by sixty-two life insurance companies about the demand for alternative accounting methods. The major conclusion of their survey indicated that 89 percent of the direct placement officers and 66 percent of the common stock investment officers preferred Generally Accepted Accounting Principles (GAAP) in comparison with the other valuation methods as a uniform valuation basis for financial statements.

Garsombke (1978) reported a survey of chief financial officers of 717 companies concerning the usefulness of the experimental guidelines which ASR 190 had required. Subjects were selected from COMPUSTAT files and 244 of them responded. The majority of the subjects indicated that the ASR 190 guidelines were insufficient.

Stanga (1979) evaluated the reliability of historical-cost data as opposed to replacement-cost. He conducted an experiment where the subjects were commercial lending officers at 500 of the nation's

largest banks. Subjects were asked to extend a term loan to a moderate size, publicly held industrial firm, by considering five accounts. The accounts were inventory, plant and equipment, accumulated depreciation, cost of sales, and depreciation expenses (which were recommended by ASR 190). It was assumed that the data were from the customer's published report. Stanga concluded that "in each case, the historical cost measure is perceived as considerably more reliable than the associated replacement-cost measure" (p. 53).

McIntyre (1975) conducted an experiment where the subjects were students. The subjects were given financial statements of actual companies and were asked to select the firm which they felt would produce the highest rate of return to the investor. The financial statements were based on historical-cost data, specific-price adjusted data, or both. The results of his study indicated no significant differences between decisions of subject's using specific-price adjusted data and decisions of subject's using only historical-cost data.

To facilitate better understanding of the essence and extent of prior research, a summary of the above prior empirical studies is presented in Illustration 1. The illustration lists: (1) Authors and publication dates (full details are in the bibliography), (2) the research methodologies, and (3) brief comments.

ILLUSTRATION 1
THE DESCRIPTION OF PRIOR EMPIRICAL STUDIES
(CURRENT-VALUE)

<u>AUTHOR(S) AND PUBLICATION DATE</u>	<u>RESEARCH METHODOLOGY</u>	<u>USEFULNESS OF CURRENT-VALUE INDICATED</u>	<u>ADDITIONAL DESCRIPTION AND OTHER COMMENTS</u>
Abdel-khalik & McKeown (1978)	Capital Markets	No	Deals with impounded current-value information prior to its disclosure in stock market.
Benston & Krasney (1978)	Questionnaire	Slightly	Survey, desirability of current-value data to investment of prices of insurance companies.
Brenner (1970)	Questionnaire	Mixed	Survey, inclusion of changes in values in earning per share.
Estes (1968)	Questionnaire	Yes	Survey, desirability of current-value data for various assets.
Frank (1969)	Predictability	No	Forecasting alternative incomes based on their own past values.
Garsombke (1978)	Questionnaire	No	Survey, usefulness ASR 190 guidelines.
Gheyara & Boatsman (1980)	Capital Markets	No	Any abnormal return based on ASR 190 data.
Greenball (1968)	Simulation	Mixed	Evaluating the performance of different methods.
McIntyre (1973)	Lab Study	No	Students, evaluate the firms based on rate of return.
Revsine (1970, 73)	Simulation	Mixed	Predictability of replacement-cost income related to price changes.
Revsine (1976)	Simulation	Mixed	Impact of productivity changes on different net incomes.
Stanga (1979)	Questionnaire	No	Reliability of historical-cost and current-value data.

2.3 Inferences From and Remarks On Prior Studies

Many alternative income measurement and asset valuation methods have been suggested in the accounting literature through the years. Each method has different strengths and deficiencies. Many accountants argue for a change in accounting valuation, in order to disclose and reflect the effects of inflation, technological changes, changes in social philosophies, and changes in consumer desires. In addition, some accountants argue that alternative valuation models will improve the communication process in a business environment leading to better economic decision making. However, there is a fundamental question as to the extent of the users' comprehensibility and cognition of new information systems, and their competency to utilize the systems coherently. This process (cognition and utilization) can be influenced by the users' prior perception of the new information, where the perception was created by indiscriminantly applying the concepts and features of an old information system to the new one.

In this regard Ijiri (1967) argued that an accounting system would affect the users' decision process and would provide a means by which a decision maker would organize his experiences and thoughts. As a result, once an accounting system is accepted by a decision maker as a means of organizing this decision process, then his behavior could be influenced by that system. Therefore, decision makers may intuitively associate a meaning with a title or surrogate based upon their past experiences, and may not recognize that, what a surrogate represents in the present or future may be significantly different

from what it was in the past. Consequently, changes in the accounting system might create a fallacious perception of the accounting information, and incapacitate the users for making rational economic decisions. Ijiri called this endogenous functional fixation.

Moreover, Revsine (1970) also argued that given functional fixation and the importance of cash flow potential in investors' decision models, the tendency might exist to identify income with changes in cash flow potential. The fixation mechanism might create a fallacious perception of the reported replacement-cost income when the cash flow potential of the firm does not vary in the same direction and by the same magnitude that discounted cash expectations vary. As a result, investors might consider positive reported replacement cost income to be a reflection of increased profit potential when, in fact, the profit generating potential of the firm may have actually diminished. This could generate seriously misleading inferences for investors regarding the firm's prospects.

In brief, the prior studies indicate that the subject matter is still controversial. The issue of whether current-value data are, in any sense, superior to historical-cost data is still unresolved. Moreover, empirically, little is known about the effect of different valuation methods on users' decision making. There is still a lack of competent compelling empirical evidence to indicate which alternative accounting method has superiority over the others, what financial information users need for their economic decision making, the users' demand for alternative accounting methods, and the impact of alternative accounting data on the users' decision making scheme.

Furthermore, no conclusive empirical study has been made on the actual use of the various methods in decision contexts. Basically, the studies surveyed the opinions of respondents about the desirability of reporting current-value information, by furnishing them "shopping list" questionnaires of a fairly long list of items, in the context of some subjective criterion of usefulness as specified by researchers. Regarding these types of questionnaire research, Frishkoff remarks that "no matter how long the list, very few items are typically rated below the arithmetical mid point . . . , which is usually labeled something like 'of some usefulness.' That is, respondents are reluctant to throw any kind of information totally away, because few 'costs' are incurred in this setting" (p. 7). Therefore, respondents were never examined objectively as to the extent of their comprehensibility, rather than subjective desirability, of alternative accounting data, and the impact of this information on their decisions. This dissertation examines the effect of alternative financial information structures on users' decisions in a simple investment context. The usefulness of current-value data, as opposed to historical-cost data, is examined in the potential users' decision making scheme in a situation in which the respondents are required to render their judgments based solely on historical-cost or current-value data. The next chapter describes the objective and framework of the research study.

CHAPTER THREE

THE STUDY: OBJECTIVES AND THE RESEARCH INSTRUMENT

3.1 Introductory Overview

In order to examine the relative usefulness of historical-cost and current-value financial statements in a decision context, it is necessary to have an objective criteria of usefulness. One such criteria might be whether one set of statements leads to better investment decisions. But even then, there is still the question of what constitutes a good investment decision? If one set of financial statements leads investors to undertake an investment, while another leads to rejection of the investment, how do we determine which decision is better?

One possibility for evaluating decisions is to examine the future performance of the investment. Using such an approach, we might prepare current-value and historical-cost financial statements for a sample of real firms, ask a sample of investors to select the "good" firms by using only historical-cost data, ask another sample to do the same, using current-value financial data, and then compare future performance. Unfortunately, such an approach has several significant weaknesses. The time period selected to be the measure of "goodness of performance" would be arbitrary. With the passage of

time, many of the factors which influenced the decision will change. What was a "good" investment may become a poor investment due to changes in management, market conditions, and so forth. But it would be necessary that the time period was long enough to allow the soundness of an investment to show itself. Another weakness is that the measures of performance would be influenced by the actual accounting procedures currently used. If, for example, future stock prices were used to evaluate the goodness of an investment, then the measure of usefulness may be biased if stock prices are affected by currently used accounting practice. For these reasons, it was felt that real firms could not be the basis for examining the decision affects of alternative accounting systems.

Many of the problems relating to using real firms disappear if hypothetical firms are constructed. However, it is still necessary to be able to objectively determine which firm is a better investment. Therefore, a type of firm for which a single criteria unambiguously measures relative performance must be selected. Investment advisory services seems to meet this requirement.

In most investment situations, the quality of management performance can be gauged by the relative frequency with which future price movements are predicted. Establishing hypothetical investment firms and altering the relative percentages of correct predictions on future price movements between the firms, provides a situation with an objective measure of the performance of each firm. Thus, the use of hypothetical investment firms was chosen as the vehicle for evaluating the usefulness of current-value and historical-cost accounting information.

Once the type of firm was selected it then became necessary to choose whether the operating performance of the firms would be based on real data or hypothetical data. That is, should investment performance be measured using the results which would be obtained from actual investment opportunities available in the marketplace, or can performance be measured by looking at hypothetical investment opportunities (in which the researcher determines prices and returns)? If the latter approach is taken the study becomes a simulation and is subject to the well known limitations of simulation. The most critical being that the results may not be generalizable to any real world market. To avoid this criticism, I chose to base the operating results of the firms on available actual market data.

The next question then became "which set of market data"? The first set considered was the stock market. The stock market was rejected for several reasons: (1) to keep the study manageable only a small set of potential investments could be allowed, if the stock market were selected, there would be a question of how to choose the stocks to be included. (2) There would also be a question of whether to consider common stocks or all the outstanding securities of a firm such as bonds and preferred stocks. Because maximizing the value of a firm may not be equivalent to maximizing the value of the firm's shares. In effect, some decisions might increase the value of bonds at the expense of the shareholders, leading to higher total value but lower share values. For example, existing bondholders may have restricted management's decisions by covenants in the bond contract in order to eliminate the possibility of a decision that would adversely

affect them while benefiting the shareholders. Furthermore, other decisions might reduce the total value of the firm while increasing the value of shares if lower bond values resulted. (3) There is no clear cut-off point for deciding when to sell investments. That is, stocks could be held indefinitely. (4) Usually the prices of stocks are not highly volatile, therefore the use of stocks might not produce material holding gains and losses over a short period of time.

Based on the reasons given in the foregoing discussion, I chose to use firms investing in commodity futures contracts. The current values of the contracts are unbiased and determinable in the market place, and the prices are highly volatile. As a result, commodity prices generate holding gains and losses over a short period of time which yield substantially different income figures in current-value versus historical-cost financial statements. Furthermore, the financial statements for such firms are quite straightforward; they do not require a great deal of analysis thus, I was able to minimize the required amount of respondents' valuable time.

3.2 Development of the Model

The basic approach of this study is a controlled experiment, this methodology allows the study of the usefulness of alternative accounting methods in the context of users' actual decisions. The measure of usefulness is based on a pre-specified and an objective criterion of performance measurement. In order to produce such an objective ranking scheme, four hypothetical investment clubs which trade commodity futures contracts were created.

Futures contracts can be bought and later sold (buying long), or sold and later bought (selling short) at a profit if the speculators are correct in their forecast of price movements. The clubs do not actually take or make delivery of commodities. Instead contracts are cancelled by offsetting transactions on or before the settlement date. Speculators are required by exchange regulations to maintain a specified minimum margin on deposit to assure that they will stand by their obligations. Margins are a guarantee, required of both sellers and buyers, that they will respectively make and take delivery of the commodity represented by the contract unless the obligation to do so is offset through an offsetting transaction. Moreover, when a price movement impairs the margin to a specified extent, additional deposits are required to bring the margin deposit back to the minimum required level (for more detail see Commodity Trading Manual, 1980). These margin requirements were included in the transactions used for the clubs in this study.

It is assumed that each of the firms is organized by a group of investors, who meet every two months (for example March 1st, May 1st, July 1st, and so forth) to predict the future price changes of commodity contracts. Based on their predictions, the investors then make investment decisions about which commodity contracts to buy, sell or hold for the next two months. The policy of trading every two months was chosen so that I could prepare financial statements between decision dates resulting in statements which include holding gains and losses.

Each firm created began business with \$55,000 of capital on January 1, 1975. The firms traded an identical commodity portfolio consisting of cattle, hogs, wheat and soybeans. These commodities were chosen because they were actively traded and data were readily available. There were 72 trading decisions for each commodity over the four-year interval. The firms always held three contracts of a commodity (either long or short), with different maturity dates. The prices of the contracts were obtained from the Chicago Merchantile Exchange and The Wall Street Journal. The daily opening prices of the contracts were used in the study. The first four year's quarterly financial data of the firms based on historical-cost and current-value are presented in the next chapter. The first financial statements were prepared after several months of operation. They reflect the effect of the transactions and dissimilarity of the management performances of the firms and disguise the fact that all firms initially began with the same capital.

3.3 The Characteristics of the Model

As mentioned earlier, futures contracts can be bought long or sold short at a profit, if the speculators are correct in their forecast of price movement. Therefore, the prediction of the direction of future price changes is the most important judgment in this environment. As a result, the proportion of correct predictions can be used as a criterion for evaluating the performance of speculators (investment firms) in this environment. More specifically, if investors have an opportunity to invest in one of the four investment

firms, logically they should choose the firm with the highest proportion of correct decisions as the best alternative.

The firms (investment clubs) were distinguished by the proportion of correct decisions they make. The proportions of correct decisions made by each firm were prespecified in the model. Thus, the effectiveness of each firm is known, providing an objective best ranking of the firms. In brief, the percentage of correct decisions made was chosen as the variable to be manipulated across the firms, because it is an important factor in the performance of the types of firms studied, it is tractable, and it is independent of the choice of the accounting methods used for statement preparation.

3.4 Development of the Firm

Different percentages of correct decisions were simulated in order to find appropriate ones for the firms in the model. It was found that firms with less than a fifty percent rate of correct decisions generally incurred significant losses and had financial statements that were easily distinguished from firms with a greater than fifty percent rate of correct decisions (under either current-value or historical-cost reporting). Furthermore, percentage rates of correct decisions between fifty to sixty percent correct generated low net income; hence the related financial statements were also easily distinguished from the firms with rates above sixty percent correct. As a result, including financial statements for firms with a low percentage of correct predictions with statements for firms who

make above sixty percent correct predictions would make the ranking of firms obvious, regardless of the accounting method. Moreover, through simulation, I found that including more than a fifteen percent difference in the proportion of correct decisions between firms also generated easily distinguishable financial statements under each accounting method. Consequently, in order to assign meaningful percentages which reflect reasonable average returns on investment, I generated two sets of four hypothetical firms which made correct decisions seventy-five percent, seventy-two percent, seventy percent and sixty-five percent of the time. As the results in Chapter 5 will show, this choice resulted in a nontrivial ranking task.

The choice of percentages of correct decisions for the firms is illustrated in Table One. These percentages produce small differences in the proportion of correct decisions, as well as large ones among the firms. From Table One, the differences in percentage of correct decisions between A and B, B and C, and C and D are 3 percent, 2 percent and 5 percent respectively, whereas, the differences between A and C, B and D, and A and D are 5 percent, 7 percent and 10 percent respectively. Logically, the smaller the differences in the percentage of correct decisions among the firms, the harder it is to properly rank the firms based on their financial data. But the question is, what resulting financial data, HC or CV, will better assist the potential users in properly ranking the firms? These percentages allowed me to examine that question, since they produced both small differences in performance as well as large ones.

TABLE I
ANALYSIS OF PERCENTAGE OF CORRECT DECISIONS

<u>Firms</u>	<u>Percentage of Correct Decision</u>	<u>Difference in Percentage Correct Decision</u>
A	75%	
B	72%	
C	70%	
D	65%	

The differences in the percentages of correct decisions based on pairwise, triple and quadruple combinations of the correct ranking decisions are illustrated in Table Two. This table lists the correct ranking decisions based on their degree of difficulty. In general, the smaller the differences are in the percentage of correct decisions among the firms the harder it is to properly rank the firms using financial statement data. Therefore, the easiest rankings among the firms should be A versus D. The next easiest is B versus D, and the hardest ranking should be B versus C. This ranking scheme (Table 2) will be used to examine the degree of the users' ability to rank the firms properly, when the differences in the proportion of correct decisions vary (from large ones to small ones) under each alternative accounting method.

TABLE 2
COMBINATION OF CORRECT RANKING
(Ranking Scheme)

<u>Ranks*</u>	<u>Difference In % of Correct Decisions</u>
Pairwise Comparison:	
A > D	10
B > D	7
A > C	5
C > D	5
A > B	3
B > C	2
Triple Comparison:	
A > C > D	5, 5
A > B > D	3, 7
B > C > D	2, 5
A > B > C	3, 2
Quadruple Comparison:	
A > B > C > D	3, 2, 5

* > = is preferred to

3.5 Procedure for Generating Decisions and Financial Statements

This section illustrates the procedures that were employed to generate the data and financial statements for the firms. While the cases in the study are more comprehensive, this demonstration should clarify the applied methodology.

Assume that there are three hypothetical firms A, B, and C. Each firm starts the business at the same time with \$30,000 of capital. The firms trade commodities futures contracts in cattle, hogs and frozen pork bellies, based on the daily opening prices of the contracts which are registered in Chicago Merchantile Exchange. Moreover, the proportion of correct decisions that the firms (A, B, and C) make are 60 percent, 50 percent and 40 percent respectively.

Table 3 illustrates the decision rules for each firm. The first column indicates the correct decision. The positive signs indicate that the correct decision is to buy long or hold long and negative signs represent sell short or hold short. For example, the first sign is positive which is related to the October 76 contract for Live Beef Cattle future contracts. the price for a contract was \$43.20 per 100 pound on March first 1976 and increased to \$46.35 by May first. Therefore at March first, the correct decision would be to buy one October 76 contract of Live Beef Cattle. On May first, again the price of the contract (\$46.35) is compared with the price of the contract on July first (\$43.45). Thus at May first the correct decision is to close the contract and receive the gain (the difference between \$46.35 and \$43.20) and sell short one future contract. Therefore, in this case, the negative sign indicates the best action is to

TABLE 3
DECISION MODEL

		Correct Decision	FIRM A			FIRM B			FIRM C		
			60%	Long	Short	50%	Long	Short	40%	Long	Short
<u>CATTLE:</u>											
Oct. Contract: 76	March 76	+	+	43.2		+	43.2		-		43.2
	May	-	+			+			-		
	July	-	-		43.45 43.45	+			+	43.45 43.45	
	Sept 76		+	40.5		-		40.5	-		40.5
	Oct. 77	Sept	-	+	45.5		+	45.5		+	45.5
Dec. Contract: 76	Nov	+	+			+			-		43.3 43.3
	March 76	+	-		43.6	-		43.6	-		43.6
	May	-	+	46 46		-			-		
	July	-	+			-			+	44.15 44.15	
	Sept	-	-		42.5 42.5	-			-		42.5 42.5
Dec. 77	Nov		+	38.9		+	38.9		+	38.9	
	Nov	+	+	43.6		+	43.6		-		43.6
	Feb. Contract: 77	March 76	+	-		43.8	-		43.8	+	43.8
	May	-	+	45.5 45.5		-			-		45.5 45.5
	July	-	-		44.25 44.25	+	44.25 44.25		+	44.25 44.25	
	Sept	-	-			+			-		42.75 42.75
	Nov	+	+	39.6 39.6		-		39.6 39.6	-		
	<u>HOG:</u>										
	Feb. Contract: 77	March 76	+	+	41		+	41		-	41
	May	+	-		42.2 42.2	-		42.2 42.2	-		
	July	-	-			-			+	42.25 42.25	
	Sept	-	-	30 30		-	30 30		+		30 30
	Nov	+	+	30 30		+	30 30		-		30 30

TABLE 3
DECISION MODEL
(Continued)

	Correct Decision	FIRM A			FIRM B			FIRM C		
		60%	Long	Short	50%	Long	Short	40%	Long	Short
<u>FROZEN PORK:</u>										
Feb. Contract: 77 March 76	-	-		65.7	-		65.7	-		65.7
May	-	-			+	64.35 64.35		-		
July	-	-			+			-		
Sept	-	-			-		56.75 56.75	+	56.75 56.75	
Nov	+	-			-			+		

close the long contract and to sell short one future contract. Two positive or negative signs after one another indicates that the firms should hold the related contracts. For example the price of the contract on July first was \$43.45 and decreased to \$40.50 on September first; therefore the correct decision on July first is to hold the short contract.

Based on the above process the correct decision is generated for every contract and is the same for every firm. Table 3 also indicates the proportion of correct decisions each firm will make. The number of decisions for the period examined is 25 and 60% of the 25 decisions (15 decisions) are randomly chosen to be correct for Firm A, 50% for Firm B and 40% for Firm C. The decision rules and the prices for each futures contract on the trading dates are also shown in Table 3. Tables 4 through 6 indicate the decision scheme of each firm showing the number of trades made on each trading date. Note that each firm is allowed to hold only one contract of a particular future contract of a commodity in order to decrease the riskiness of the portfolio. Therefore, when a firm closes a long contract, it can only sell short, one contract of that future contract.

The financial statements for the second quarter are also generated for each firm based on each firm's decision scheme and are presented in Figure 1 at the end of this section. These financial statements indicate the results of the operations for each firm based on the historical-cost and current-value method. Furthermore, Table 7 presents the comparative quarterly net income figures of the firms based on the historical-cost and current-value.

TABLE 4
DECISION SCHEME
(FIRM A)

MONTH OF TRADING	LIVE BEEF CATTLE										HOG				FROZEN PORK	
	Oct 76 Contract		Oct 77 Contract		Dec 76 Contract		Dec 77 Contract		Feb 77 Contract		Feb 77 Contract		Dec 77 Contract		Feb 77 Contract	
	L	S	L	S	L	S	L	S	L	S	L	S	L	S	L	S
March 76	43.2					43.6				43.8	41					65.7
May					46 46				45.5 45.5			42.2 42.2				
July		43.45 43.45								44.25 44.25						
Sept	40.5		45.5			42.5 42.5										
Nov					38.9		43.6		39.6 39.6		30 30					

TABLE 5
DECISION SCHEME
(FIRM B)

MONTH OF TRADING	LIVE BEEF CATTLE										HOG		FROZEN PORK	
	Oct 76 Contract		Oct 77 Contract		Dec 76 Contract		Dec 77 Contract		Feb 77 Contract		Feb 77 Contract		Feb 77 Contract	
	L	S	L	S	L	S	L	S	L	S	L	S	L	S
March 76	43.2					43.6				43.8	41			65.7
May												42.2 42.2	64.35 64.35	
July									44.25 44.25					
Sept		40.5	45.5											56.75 56.75
Nov					38.9		43.6			39.6 39.6	30 30			

TABLE 6
DECISION SCHEME
(FIRM C)

MONTH OF TRADING	LIVE BEEF CATTLE										HOG	FROZEN
	40,000LB Per Contract										30,000LB Per Contract	36,000LB Per Contract
	Oct 76		Oct 77		Dec 76		Dec 77		Feb 77		Feb 77	Feb 77
	L	S	L	S	L	S	L	S	L	S	L	S
March 76		43.2				43.6			43.8		41	65.7
May										45.5 45.5		
July	43.45 43.45				44.15 44.15				44.25 44.25		42.25 42.25	
Sept		40.5	45.5			42.5 42.5				42.75 42.75		56.75 56.75
Nov				43.3 43.3	38.9			43.6			30 30	

FIGURE 1
FINANCIAL DATA FOR THE THREE HYPOTHETICAL FIRMS

FIRM A
Income Statement (Historical-Cost)
For the Second Quarter, Ended June 30, 1976

Gain from closing one contract	\$ 360
Losses from closing two contracts	<u>(1,640)</u>
Net Loss	<u><u>(\$1,280)</u></u>

FIRM A
Balance Sheet (Historical-Cost)
Second Quarter, June 30, 1976

Assets:		
Cash		\$ 14,885
Marketable Securities (commodity future contracts)		53,880
Due from Broker (short sales)		36,312
Total Assets		<u><u>\$105,077</u></u>
Liabilities:		
Net Short-term Liabilities		\$ 76,357
Partnership Equity:		
Capital	\$30,000	
Net Deficit	<u>(1,280)</u>	<u>28,720</u>
Total Equities		<u><u>\$105,077</u></u>

FIGURE 1 (Continued)

FIRM A
Income Statement (Current-Value)
For the Second Quarter, Ended June 30, 1976

Gain from closing one contract	\$ 495	
Loss from closing two contracts	(700)	
Net loss from closing the contracts		(\$ 205)
Holding Gain and Losses:		
Gains from one contract	\$ 18	
Losses from four contracts	(2,468)	
Net Holding Losses		(2,450)
Total Net Loss		(\$ 2,655)

FIRM A
Balance Sheet (Current-Value)
Second Quarter, June 30, 1976

Assets:		
Cash		\$ 14,885
Marketable Securities (commodities future contracts)		53,820
Due from Broker (short sales)		36,312
Total Assets		<u>\$105,017</u>
Liabilities:		
Net Short-Term Liabilities		\$ 75,607
Partnership Equity:		
Capital	\$30,000	
Net Deficit	(590)	29,410
Total Equities		<u>\$105,017</u>

FIGURE 1 (Continued)
 FIRM B
 Income Statement (Historical-Cost)
 For the Second Quarter, Ended June 20, 1976

Gain from closing two contracts	\$ <u><u>846</u></u>
---------------------------------	----------------------

FIRM B
 Balance Sheet (Historical-Cost)
 Second Quarter, June 30, 1976

Assets:

Cash	\$ 16,771
Marketable Securities (commodity future contracts)	40,446
Due from Broker (short sales)	47,620
Total Assets	<u><u>\$104,837</u></u>

Liabilities:

Net Short-Term Liabilities	\$ 73,991
----------------------------	-----------

Partnership Equity:

Capital	\$30,000	
Net Earnings	<u>846</u>	<u>30,846</u>
Total Equities		<u><u>\$104,837</u></u>

FIGURE 1 (Continued)

FIRM B
Income Statement (Current-Value)
For the Second Quarter, Ended June 30, 1976

Gain from closing one contract	\$ 495	
Loss from closing one contract	<u>(2,034)</u>	
Net Loss from closing the contracts		(\$ 1,539)
Holding Gain and Losses:		
Gain from one contract	\$ 15	
Loss from three contracts	<u>(546)</u>	(531)
Total Net Loss		<u><u>(\$ 2,070)</u></u>

FIRM B
Balance Sheet (Current-Value)
Second Quarter, June 30, 1976

Assets:		
Cash		\$ 16,771
Marketable Securities (commodity future contracts)		40,680
Due from Broker (short sales)		47,620
Total Assets		<u><u>\$105,071</u></u>
Liabilities:		
Net Short-Term Liabilities		\$ 75,016
Partnership Equity:		
Capital	\$30,000	
Net Earnings	<u>55</u>	30,055
Total Equities		<u><u>\$105,071</u></u>

FIGURE 1 (Continued)
 FIRM C
 Income Statement (Historical-Cost)
 For the Second Quarter, Ended June 30, 1976

Gain from closing one contract:	\$ <u>680</u>
---------------------------------	---------------

FIRM C
 Balance Sheet (Historical-Cost)
 Second Quarter, June 30, 1976

Assets:

Cash	\$ 16,771
Due from Broker (short sales)	<u>88,372</u>
Total Assets	<u>\$105,643</u>

Liabilities:

Net Short-term Liabilities	\$ 74,963
----------------------------	-----------

Partnership Equity:

Capital	\$30,000	
Net Earnings	<u>680</u>	<u>30,680</u>
Total Equities		<u>\$105,643</u>

FIGURE 1 (Continued)

FIRM C
Income Statement (Current-Value)
For the Second Quarter, Ended June 30, 1976

Gain from closing contract		\$ 260
Holding Gains and Losses:		
Gains from two contracts	\$ 300	
Losses from two contracts	<u>(2,208)</u>	<u>(1,908)</u>
Total Net Loss		<u><u>(\$ 1,648)</u></u>

FIRM C
Balance Sheet (Current-Value)
Second Quarter, June 30, 1976

Assets:		
Cash		\$ 16,771
Due from Broker (short sales)		88,872
Total Assets		<u><u>\$105,643</u></u>
Liabilities:		
Net Short-term Liabilities		\$ 75,416
Partnership Equity:		
Capital	\$30,000	
Net Earnings	<u>227</u>	<u>30,227</u>
Total Equities		<u><u>\$105,643</u></u>

TABLE 7

Comparative Net Income (Loss)
Historical-Cost

Period	FIRM A	FIRM B	FIRM C
Second Quarter	(\$1,280)	\$ 846	\$ 680
Third Quarter	(620)	(3,996)	(587)
Fourth Quarter	6,960	3,680	(3,115)

Comparative Net Income (Loss)
Current -value

Period	FIRM A	FIRM B	FIRM C
Second Quarter	\$ 2,655	(\$2,070)	(\$1,648)
Third Quarter	10,162	982	(2,362)
Fourth Quarter	(402)	1,098	(1,538)

3.6 Summary

In brief, quarterly financial statements, under HC and CV, for four hypothetical firms were developed for this project. The firms trade futures contracts of commodities every two months and are distinguished by their proportion of correct decisions; their proportion of correct decisions are predetermined and are based on fixed assigned probabilities for each firm. The financial statements prepared for each firm were analyzed by a sample of potential users to determine whether the different accounting methods affect the users' ability to correctly rank the hypothetical firms as investments. Auditors, bankers and financial analysts groups were selected as the subjects of my study. A description of the subjects and the procedures for administering the instrument will be discussed in Chapter 4.

CHAPTER FOUR

FINANCIAL STATEMENTS AND PARTICIPANTS

4.1 Financial Statements

Two sets of operating data were generated for each of four firms. The firms differed in the proportion of correct predictions made concerning future contract price changes. The two sets of data were generated, in order to ensure that the results obtained were not artifacts of the particular random assignment of correct and incorrect decisions to specific trades.

From the operating data, quarterly financial statements were prepared under both historical-cost and current-value accounting. The financial statements for the firms which constituted set one, along with the cover letters and questionnaire form are presented at the end of this chapter. In the research instrument, the financial data for each firm were reduced and combined together on one page. As a result, the respondents received one page of financial data for each of the four firms based either on HC or CC. Three types of financial data were provided for each firm: annual financial statements, a graph of quarterly earnings and a tabular summary of quarterly earnings.

Under the historical-cost method, assets and liabilities were valued at their original costs. The balance sheets of the historical-cost financial statements report the monetary cost of the contracts on hand and the related liabilities at the date of the acquisition. In the income statement, the investment gain (loss) represents the net income or loss from only the transactions completed during the period. Thus, holding gains or losses for contracts still on hand were not recognized under the historical-cost method.

The current-value balance sheet reports the current values of contracts on hand and the related liabilities at the balance sheet date. The current-value gain or loss in the income statement is the historical-value gain or loss plus any realizable gain (or minus any realizable loss) from the contracts on hand at the balance sheet date.

The method used to calculate net income and loss was included in the financial statements as a footnote. Thus, persons receiving the current-value statements were alerted to the fact that the statements were not based on historical-cost accounting. In addition, the footnote to the historical-cost statements gave the current market value of the instruments so both groups had approximately the same amount of total information.

4.2 Participants

The subjects of the study consisted of three groups. The first group is made up of 113 auditors from four large, national public accounting firms located in Oklahoma and Texas. The second group consists of eighty-seven commercial bank loan and investment officers

from Oklahoma and Texas. The last group includes sixty-six management counselors and financial analysts from across the nation. The participation of the auditors and bankers were arranged through personal contacts with the managers and partners of the auditing firms and with the vice-presidents of the banks. In contrast, the financial analysts and management counselors were contacted by mail. Questionnaires were sent to 500 portfolio analysts and 1900 management counselors who are members of the Financial Analysts Federation. The mailing lists were obtained from the Federation.

The response rates for the auditors and bankers were close to 100 percent, whereas for the financial analysts group the response rate was less than 3 percent. Because of the low response rate from the financial analysts, the results from their judgments cannot be construed as representative of the population of all financial analysts. The results from this group are reported for completeness, but any conclusions based on these results are tenuous at best.

Each group of subjects had four or more years of college education. On the average, they had six years of experience and spent over 40 percent of their time reading, preparing, or evaluating financial statements. Based on a demographic analysis of the educational and professional background of the subjects there is no reason to believe that the auditors, bankers and financial analysts of this project are not typical of the other experienced people, in their field of business. In one sense, the results of this research may only be generalizable to the subjects who participated in the project; however, it is

entirely possible that the results attained by this study are representative of those that would be obtained by using other samples.

Financial analysts and loan and investment officers were chosen as surrogates for sophisticated users of financial reports; whereas, auditors were surrogates for the users who are more familiar with the foundations of accounting thought. Our selected subjects represent potential users of financial reporting who have a reasonable understanding of business and economic activities and financial reporting, as described by FASB Concept No. 1 "Objectives of Financial Reporting by Business Enterprises" (p. 3023). In addition to the above participants, students at the University of Oklahoma who were majoring in Accounting or Finance in 1982 also participated in the project. The student groups served to pretest the content and format of the questionnaires. The use of the students also made it possible to estimate the amount of time required for participants to complete the project.

4.3 Administration of Experiment

The financial statements of the four firms under HC were combined together in one packet and under CV in another packet for each set. In effect, four different packets of financial data, two for each set, were generated which were based on historical-cost or current-value accounting methods. Each participant was randomly assigned to one of the four packets of financial data. No subject received more than one packet of financial data and they were asked - by their supervisor - to work alone. The subjects were asked to compare the firms by analyzing the financial data of the firms, and to

rank the firms in descending order from the firm which is the best alternative for investment to that which is the least attractive firm for investment.

There were two cover letters and a questionnaire enclosed in each packet. For financial analysts, a postage-paid envelope was also enclosed for the return of the questionnaire. For the auditors and bankers, the packets were distributed by their supervisors; the review of the packet and completion of the questionnaire, on the average, took twenty minutes.

The cover letters explained the objective and purpose of my project, and the basic features of the firms and financial statements. There were eight questions in my questionnaire. The first question was the main question which asked the respondents to rank the firms in order of their attractiveness as an investment. In the second question, respondents were asked to describe the factors or methods they employed for analysis of the financial data. The third question dealt with the alternative modes of presentation of the financial data. In this question respondents were asked to rank the data in the order of their usefulness for evaluating the firms. Questions four and five asked the respondents whether they would like to consider other information besides the financial data for their decision making, and if so, what type of information they would desire and how they would employ it. Set 1 of the packets of the firms' financial data, cover letters and questionnaire are presented at the end of this chapter.

In general, the analyses of the responses of questions two through five indicate that, the subjects applied ratio analyses for ranking the firms. The factors considered in the subjects' analyses consisted of: (1) the ratio of average income to average assets, (2) the consistency of income, (3) the return on equity for each year and for the four years' average, (4) the relative growth of equity and income levels, (5) the current ratio, (6) the existence of erratic losses, and (7) the market values of the futures contracts as an indicator of future earnings. Besides the above factors the subjects given CV statements also considered: (1) the realized gains and losses on a cumulative basis, (2) the average absolute difference between realized and unrealized gains and losses, (3) the average realized return, (4) the conversion rate of unrealized gains to realized gains, (5) the percentages of difference in realized gains between the periods as an indicator of cash position, (6) the percentages of difference between realized gains or losses and unrealized gains or losses as an indicator of the volatility of earnings and the riskness of the firms, and (7) the consistency of realized gains and losses.

In response to questions four and five, the subjects expressed a desire to know more about: (1) management history, (2) the type of commodities, (3) the investors' portfolio, (4) the tax bracket of the investors, (5) cash policy, (6) the forecasted budget, (7) forecasted information about expectations concerning the economy and industry, political developments, management and changes in management, and capitalization plans, and (8) industry trends. Questions two through

five were intended to lead subjects to believe that this study was concerned with the usefulness of modes of presentation of financial data and required supplementary information as opposed to the usefulness of HC versus CV. Specifically, question three was included in order to give the impression that I was researching alternative formats of data presentation. This was done to try to prevent response bias such as intentionally rendering a poor decision in order to show one valuation method as poor.

From the administration of this instrument I gathered data to test the following hypotheses.

H_0 : There is no difference among the investment decisions of users provided current-value as opposed to historical-cost data.

H_1 : If H_0 is not correct, then which accounting method has more relevant information content, as indicated by the ability of the users of financial statements to make more accurate investment decisions.

FIGURE 2
COVER LETTERS FOR THE RESEARCH INSTRUMENT



M. J. Neeley School of Business

Dear Financial Professional:

As an investment professional you probably already know that the SEC and the Financial Accounting Standards Board are concerned about the form and content of current financial disclosures. Both of these groups have questioned whether users of financial information, such as you, are finding existing published reports helpful in making investment decisions. We seek the benefit of your knowledge and experience in analyzing financial information, in the belief that your professional expertise will prove important to such policy-making groups.

Enclosed is a brief questionnaire designed to record your decisions about a very limited number of hypothetical investment opportunities. In this short experiment our intention is to examine the relative usefulness of different types of financial information to professional investors. Review of the facts and completion of the questionnaire should take, at most, 15 minutes of your time. The results of this experiment will be of considerable value to those groups concerned with making policy about financial disclosures.

The investment alternatives in this experiment are four investment clubs, each speculating in commodity futures. We recognize that trading in commodities is a very high-risk undertaking and that you may or may not deal with such investments on a regular basis. However, the peculiarities of the commodities market are not particularly important to the experimental situations proposed here, so your interest or previous involvement in such investments is not relevant. What we are seeking is simply an application of your basic investment expertise to the evaluation of the relative attractiveness of the four available investment alternatives.

We have enclosed a postage-paid envelope for the return of the questionnaire and we appreciate your taking the time to participate in this experiment. Needless to say, responses will be reported only in the aggregate, and individual respondents will not be identified in any way. Thanks again for your help, which we believe will contribute significantly to the improvement of financial reporting.

Sincerely,

F. Elikai
Assistant Professor of Accounting

Encls.

FIGURE 2 (Continued)

THE INVESTMENT PROJECT

For this experiment, ASSUME that you have decided to make a small investment in an investment club specializing in the trading of commodity futures contracts. (That is, none of the clubs is involved in the growing, processing, or other handling of any of the commodities in which they speculate.) Through friends, you have identified four clubs that you might join, and you have obtained the attached financial information about these four clubs for the last few years.

The following facts may help you to interpret and evaluate the information provided for the investment alternatives.

1. When buying a futures contract, a club pays a small percentage of the purchase price to a broker. Those sums, shown as "Margin Deposits," guarantee fulfillment of the contract and provide protection to the broker to cover any losses that may result from adverse price movements. The total purchase price of the contract is shown as an asset, "Investment in Futures Contracts," and is also shown as a liability.
2. When short-selling a futures contract, the proceeds from the sale are reflected in the asset "Due from Brokers." The corresponding obligation to deliver on the contract is included as a liability.

Based on your analysis of the financial information provided for the four investment clubs, please complete and return the enclosed questionnaire. There is no need to return any of the financial information about the investment alternatives.

FIGURE 3
PARTICIPANT'S RESPONSE FORM

RETURN QUESTIONNAIRE

1. Based on the financial information supplied, please rank the four clubs in order of their attractiveness to you as an investment. (Use the club names.)

1. Most attractive _____	3. Third most attractive _____
2. Second most attractive _____	4. Least attractive _____
2. Please describe briefly what factors you considered to be most important in arriving at your rankings for Question 1. _____

3. Three types of financial information were provided for each club: (a) comparative annual data; (b) graphic presentation of quarterly earnings data; and (c) comparative quarterly earnings. Please rank these data sets in order of their usefulness to you in evaluating the relative attractiveness of each investment club. (Use "1" for the most useful information and "3" for the least useful data set.)

a. Comparative Annual Data _____	
b. Graphic Display of Quarterly Data _____	
c. Comparative Quarterly Earnings Data _____	
4. If you were actually going to make this type of investment you would probably seek additional types of information. Please state briefly what other types of information you would like to have available before making a decision. _____

5. Assume you had the information specified in Question 4, as well as the information that has already been provided. Briefly describe how you would make the decision about which club is the most attractive of those available. _____

6. A. Approximately what percentage of your time on your present job is spent reading, preparing, or evaluating financial statements? _____ %
 B. How many years have you been at your present job? _____ yrs.
7. A. For the job that you held previous to your current position, approximately what percentage of your time was spent in reading, preparing, or evaluating financial statements? _____ %
 B. How many years did you spend at that previous jobs? _____ yrs.
8. What is the highest academic degree that you earned? _____

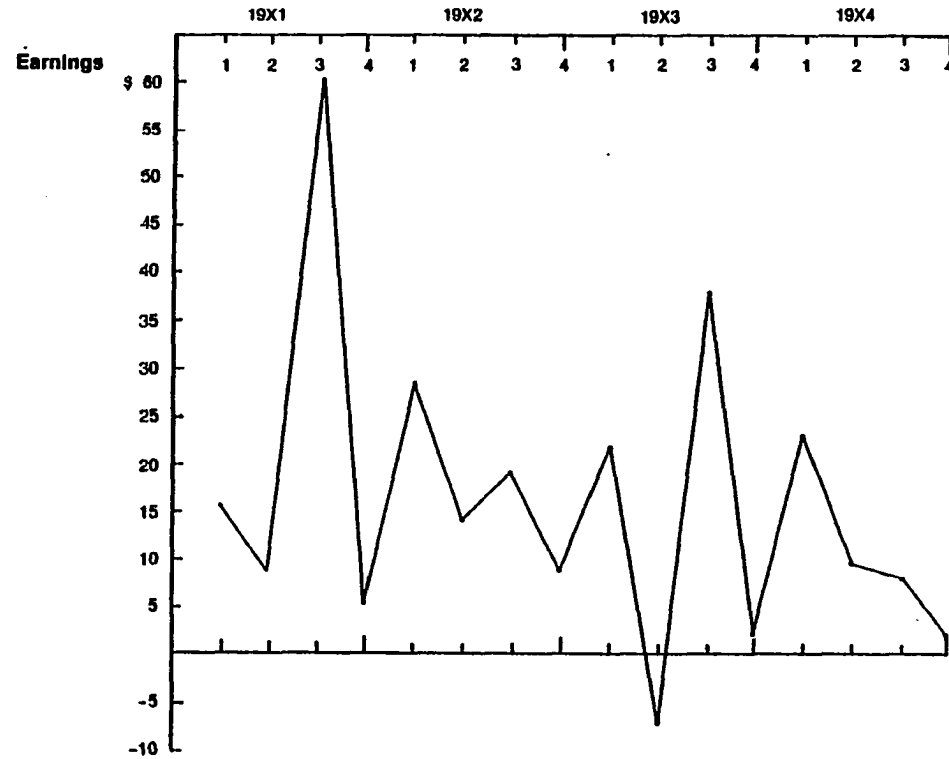
FIGURE 4
THE RESEARCH INSTRUMENT (SET 1)
VOOR Investment Club

Condensed Comparative Financial Data (Historical Cost Basis*)

	19x1	19x2	19x3	19x4
Investment Income (Loss)	<u>\$ 89,440</u>	<u>\$ 70,411</u>	<u>\$ 54,726</u>	<u>\$ 43,335</u>
ASSETS				
Cash	\$ 99,130	\$169,673	\$229,095	\$261,471
Investment in futures contracts (at cost) ⁽¹⁾	85,860	151,434	131,067	136,854
Due from Broker (short sales)	140,690	74,454	71,338	120,348
Margin Deposits	45,310	45,178	40,482	51,441
Total	<u>\$370,990</u>	<u>\$440,739</u>	<u>\$471,982</u>	<u>\$570,114</u>
LIABILITIES (short-term)	\$226,550	\$225,888	\$202,405	\$257,202
PARTNERSHIP EQUITY	144,440	214,851	269,577	312,912
Total	<u>\$370,990</u>	<u>\$440,739</u>	<u>\$471,982</u>	<u>\$570,114</u>
⁽¹⁾ Market value of futures contracts	\$ 88,042	\$156,503	\$147,925	\$145,326

*Assets and Liabilities are valued at original cost. Investment Gains (Losses) represents the net income or loss from all completed transactions during the period.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

<u>Period</u>	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total</u>
Year 19x1	\$15,825	\$ 8,775	\$59,360	\$ 5,480	\$89,440
Year 19x2	28,700	14,110	19,156	8,445	70,411
Year 19x3	21,988	(7,159)	37,755	2,142	54,726
Year 19x4	23,320	9,685	8,335	1,995	43,335

FIGURE 4 (Continued)

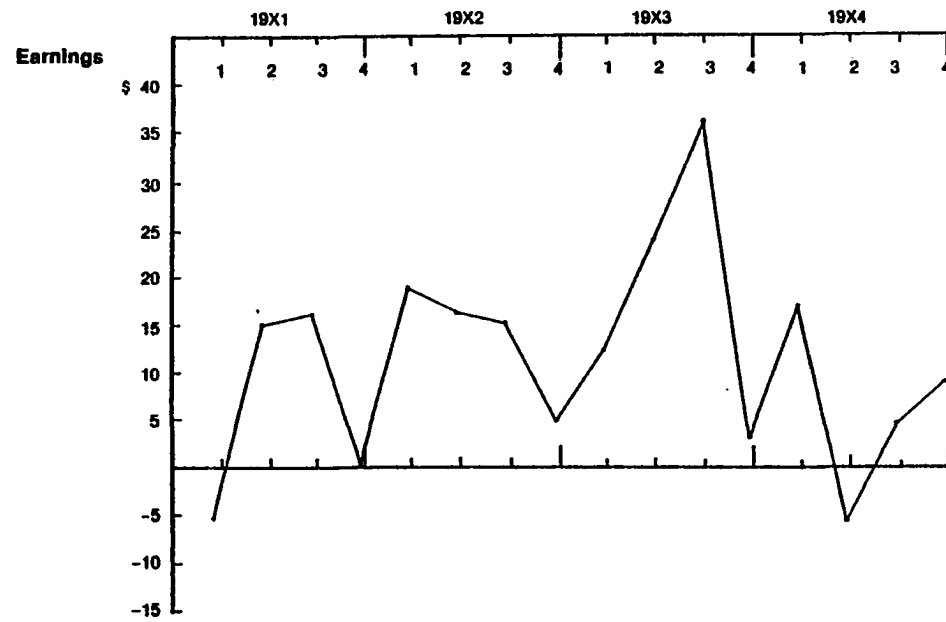
JUSH Investment Club

Condensed Comparative Financial Data (Historical Cost Basis*)

	19x1	19x2	19x3	19x4
Investment Income (Loss)	<u>\$ 26,422</u>	<u>\$ 54,768</u>	<u>\$ 76,033</u>	<u>\$ 25,677</u>
ASSETS				
Cash	\$ 34,702	\$ 89,576	\$171,249	\$185,759
Investment in futures contracts (at cost) ⁽¹⁾	96,340	186,310	166,490	90,748
Due from Broker (short sales)	137,260	46,760	38,380	169,953
Margin Deposits	46,720	46,614	40,974	52,141
Total	<u>\$315,022</u>	<u>\$369,260</u>	<u>\$417,093</u>	<u>\$498,601</u>
LIABILITIES (short-term)	\$233,600	\$233,070	\$204,870	\$260,701
PARTNERSHIP EQUITY	81,422	136,190	212,223	237,900
Total	<u>\$315,022</u>	<u>\$369,260</u>	<u>\$417,093</u>	<u>\$498,601</u>
⁽¹⁾ Market value of futures contracts	\$ 96,363	\$188,490	\$178,963	\$ 97,301

*Assets and Liabilities are valued at original cost. Investment Gains (Losses) represents the net income or loss from all completed transactions during the period.

FIGURE 4 (Continued)
Quarterly Earnings
 (000 omitted)



Condensed Comparative Quarterly Earnings

<u>Period</u>	<u>First Quarter</u>	<u>Second Quarter</u>	<u>Third Quarter</u>	<u>Fourth Quarter</u>	<u>Total</u>
Year 19x1	(\$ 5,375)	\$14,775	\$16,222	\$ 800	\$26,422
Year 19x2	18,663	16,370	15,055	4,680	54,768
Year 19x3	12,425	23,766	36,605	3,237	76,033
Year 19x4	17,462	(5,785)	4,890	9,110	25,677

FIGURE 4 (Continued)

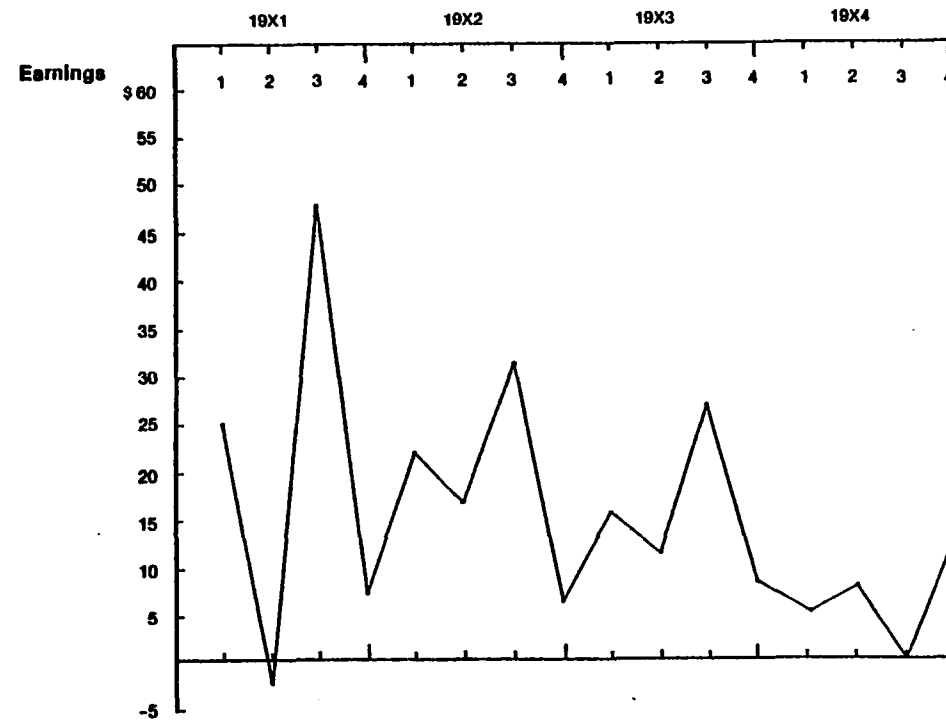
BIRE Investment Club

Condensed Comparative Financial Data (Historical Cost Basis*)

	19x1	19x2	19x3	19x4
Investment Income (Loss)	<u>\$ 73,830</u>	<u>\$ 74,834</u>	<u>\$ 61,174</u>	<u>\$ 23,916</u>
ASSETS				
Cash	\$ 80,972	\$158,050	\$224,674	\$237,096
Investment in futures contracts (at cost) ⁽¹⁾	51,290	111,700	115,810	188,962
Due from Broker (short sales)	188,000	116,370	85,010	69,320
Margin Deposits	47,858	45,614	40,164	51,658
Total	<u>\$368,120</u>	<u>\$431,734</u>	<u>\$465,658</u>	<u>\$547,036</u>
LIABILITIES (short-term)	\$239,290	\$228,070	\$200,820	\$258,282
PARTNERSHIP EQUITY	128,830	203,664	264,838	288,754
Total	<u>\$368,120</u>	<u>\$431,734</u>	<u>\$465,658</u>	<u>\$547,036</u>
⁽¹⁾ Market value of futures contracts	\$ 46,400	\$121,265	\$128,736	\$203,983

* Assets and Liabilities are valued at original cost. Investment Gains (Losses) represents the net income or loss from all completed transactions during the period.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
19x1	\$24,075	(\$ 2,100)	\$46,640	\$ 5,215	\$73,830
19x2	21,494	16,280	30,835	6,225	74,834
19x3	15,447	11,092	26,585	8,050	61,174
19x4	5,306	7,800	(1,870)	12,680	23,916

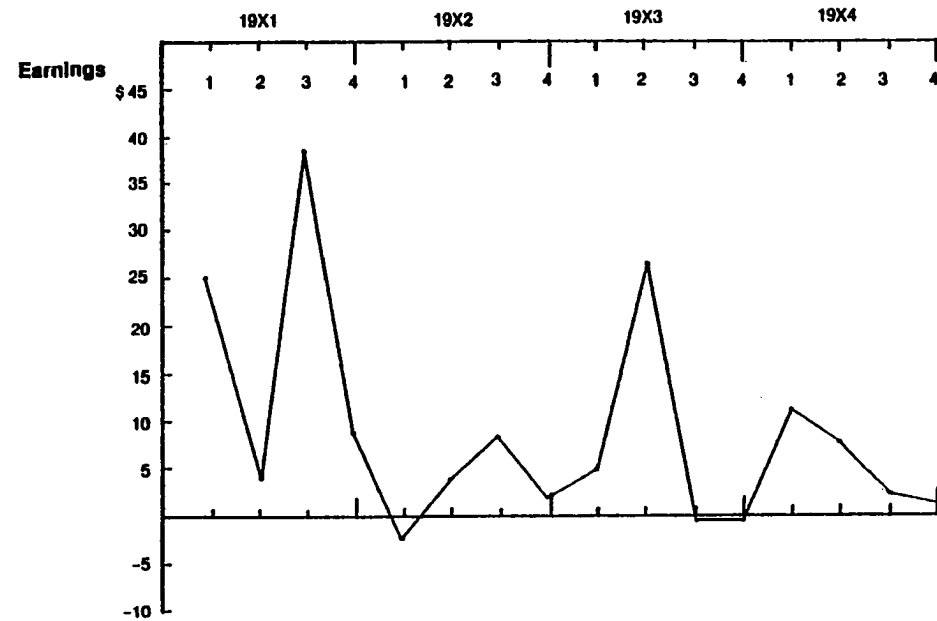
FIGURE 4 (Continued)
MONN Investment Club

Condensed Comparative Financial Data (Historical Cost Basis*)

	19x1	19x2	19x3	19x4
Investment Income (Loss)	<u>\$ 75,010</u>	<u>\$ 11,293</u>	<u>\$ 29,417</u>	<u>\$ 22,030</u>
ASSETS				
Cash	\$ 84,876	\$ 96,723	\$129,716	\$141,530
Investment in futures contracts (at cost) ⁽¹⁾	96,840	129,573	135,047	147,608
Due from Broker (short sales)	128,830	93,330	69,973	108,493
Margin Deposits	45,134	44,580	41,004	51,221
Total	<u>\$355,680</u>	<u>\$364,206</u>	<u>\$375,740</u>	<u>\$448,852</u>
LIABILITIES (short-term)	\$225,670	\$222,903	\$205,020	\$256,102
PARTNERSHIP EQUITY	130,010	141,303	170,720	192,750
Total	<u>\$355,680</u>	<u>\$364,206</u>	<u>\$375,740</u>	<u>\$448,852</u>
 ⁽¹⁾ Market value of futures contracts	 \$ 90,290	 \$132,374	 \$147,118	 \$160,829

* Assets and liabilities are valued at original cost. Investment Gains (Losses) represents the net income or loss from all completed transactions during the period.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
Year 19x1	\$24,200	\$ 3,900	\$38,025	\$ 8,885	\$75,010
Year 19x2	(2,576)	3,843	8,447	1,579	11,293
Year 19x3	4,927	25,938	(840)	(608)	29,417
Year 19x4	11,125	7,555	2,170	1,180	22,030

FIGURE 4 (Continued)

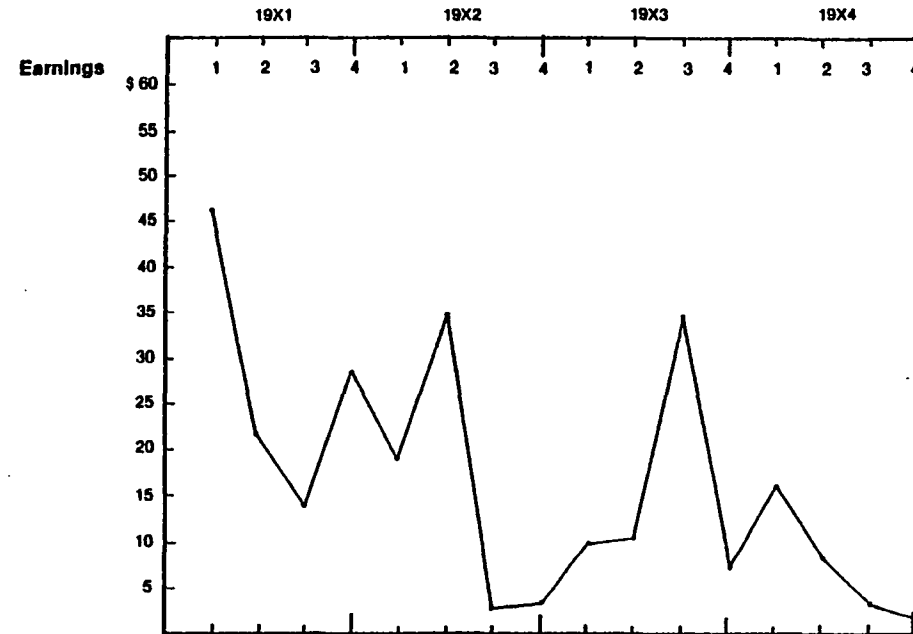
QOSH Investment Club

Condensed Comparative Financial Data (Current Cost Basis*)

	19x1	19x2	19x3	19x4
GAINS AND LOSSES				
Realized Gains (Losses)	\$ 33,898	\$ 9,883	\$ 36,193	\$ 13,409
Unrealized Gains (Losses)	75,174	49,720	25,519	15,885
Investment Income (Loss)	<u>\$109,072</u>	<u>\$ 59,603</u>	<u>\$ 61,712</u>	<u>\$ 29,294</u>
ASSETS				
Cash	\$ 99,130	\$169,673	\$229,095	\$261,471
Investment in futures contracts (market value)	88,042	156,503	147,925	145,326
Due from Broker (short sales)	140,690	74,454	71,338	120,348
Margin Deposits	45,310	45,178	40,482	51,441
Total	<u>\$373,172</u>	<u>\$445,808</u>	<u>\$488,840</u>	<u>\$578,586</u>
LIABILITIES (short-term)	\$209,100	\$222,133	\$203,453	\$263,905
PARTNERSHIP EQUITY	164,072	223,675	285,387	314,681
Total	<u>\$373,172</u>	<u>\$445,808</u>	<u>\$488,840</u>	<u>\$578,586</u>

* Assets and Liabilities are valued at current market prices. Unrealized holding gains and losses represent the change in market prices of contracts still on hand at the end of each period. Realized holding gains and losses are recognized for contracts closed during the period. The gains and losses are measured with respect to the previous carrying value of the contract.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter			Second Quarter			Third Quarter			Fourth Quarter			Total		
	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total
Year 19x1	\$15,825	\$29,595	\$45,420	(\$1,315)	\$22,835	\$21,520	\$17,245	(\$3,548)	\$13,697	\$ 2,143	\$26,292	\$28,435	\$33,898	\$ 75,174	\$109,072
Year 19x2	9, 592	9, 210	18,802	5,225	29,466	34,691	(2,160)	5,004	2,844	(2,774)	6,040	3,266	9,883	49,720	59,603
Year 19x3	13,163	(3,298)	9,865	(3,790)	14,070	10,280	27,115	7,260	34,375	(295)	7,487	7,192	36,193	25,519	61,712
Year 19x4	6,558	9,520	16,078	3,426	4,910	8,336	2,435	795	3,230	990	660	1,650	13,409	15,885	29,294

FIGURE 4 (Continued)

RAAT Investment Club

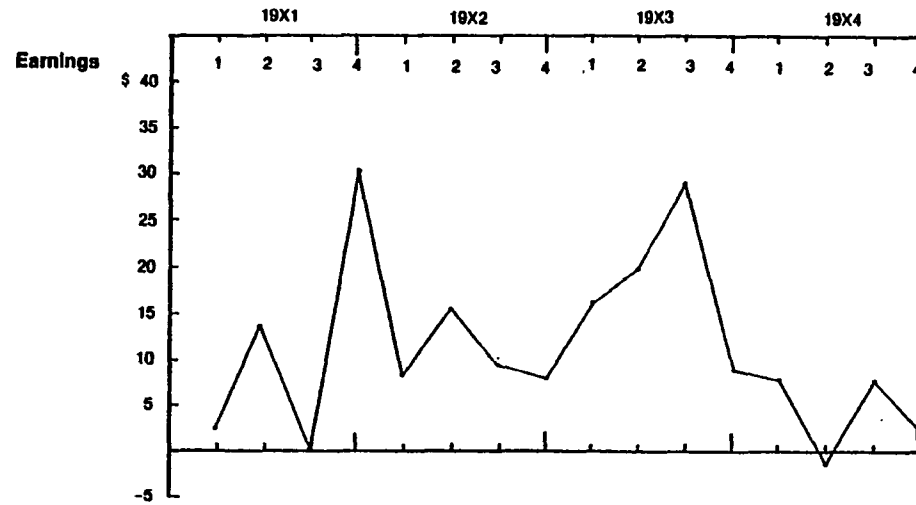
Condensed Comparative Financial Data (Current Cost Basis*)

	19x1	19x2	19x3	19x4
GAINS AND LOSSES				
Realized Gains (Losses)	\$ 15,970	\$ 10,258	\$ 39,430	\$ 11,174
Unrealized Gains (Losses)	32,815	32,373	35,880	6,429
Investment Income (Loss)	<u>\$ 48,785</u>	<u>\$ 42,631</u>	<u>\$ 75,310</u>	<u>\$ 17,603</u>
ASSETS				
Cash	\$ 34,702	\$ 89,576	\$171,249	\$185,759
Investment in futures contracts (market value)	96,363	188,490	178,963	97,301
Due from Broker (short sales)	137,260	46,760	38,380	169,953
Margin Deposits	46,720	46,614	40,974	52,141
Total	<u>\$315,045</u>	<u>\$371,440</u>	<u>\$429,566</u>	<u>\$505,154</u>
LIABILITIES (short-term)	\$211,260	\$225,024	\$207,840	\$265,825
PARTNERSHIP EQUITY	103,785	146,416	221,726	239,329
Total	<u>\$315,045</u>	<u>\$371,440</u>	<u>\$429,566</u>	<u>\$505,154</u>

* Assets and Liabilities are valued at current market prices. Unrealized holding gains and losses represent the change in market prices of contracts still on hand at the end of each period. Realized holding gains and losses are recognized for contracts closed during the period. The gains and losses are measured with respect to the previous carrying value of the contract.

FIGURE 4 (Continued)

Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter			Second Quarter			Third Quarter			Fourth Quarter			Total		
	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total
Year 19x1	(\$ 5,375)	\$ 8,265	\$ 2,890	\$ 5,205	\$ 8,995	\$14,200	\$ 8,327	(\$ 7,688)	\$ 639	\$ 7,813	\$23,243	\$31,056	\$15,970	\$32,815	\$48,785
Year 19x2	2,687	5,727	8,414	4,145	11,692	15,837	3,636	6,290	9,926	(210)	8,664	8,454	10,258	32,373	42,631
Year 19x3	3,237	13,222	16,459	10,640	9,710	20,350	25,823	3,240	29,063	(270)	9,708	9,438	39,430	35,880	75,310
Year 19x4	6,789	1,291	8,080	(1,915)	528	(1,387)	3,530	4,540	8,070	2,770	70	2,840	11,174	6,429	17,603

FIGURE 4 (Continued)

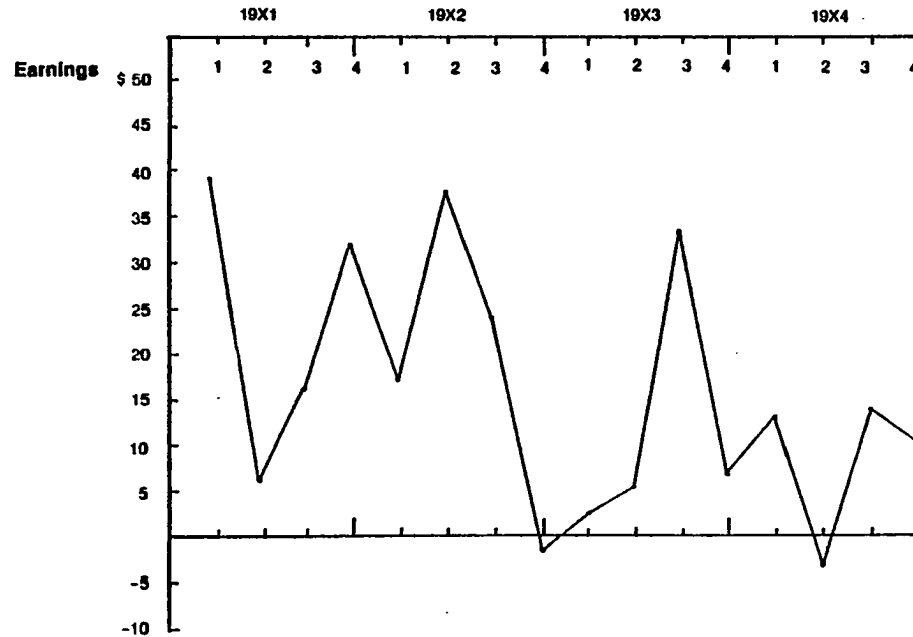
CECT Investment Club

Condensed Comparative Financial Data (Current Cost Basis*)

	19x1	19x2	19x3	19x4
GAINS AND LOSSES				
Realized Gains (Losses)	\$ 49,095	\$ 7,897	\$ 28,178	\$ 6,220
Unrealized Gains (Losses)	42,962	68,706	19,358	27,280
Investment Income (Loss)	<u>\$ 92,057</u>	<u>\$ 76,603</u>	<u>\$ 47,536</u>	<u>\$ 33,500</u>
ASSETS				
Cash	\$ 80,972	\$158,050	\$224,674	\$237,096
Investment in futures contracts (market value)	46,400	121,265	128,736	203,983
Due from Broker (short sales)	188,000	116,370	85,010	69,320
Margin Deposits	47,858	45,614	40,164	51,658
Total	<u>\$363,230</u>	<u>\$441,299</u>	<u>\$478,584</u>	<u>\$562,057</u>
LIABILITIES (short-term)	\$216,173	\$217,639	\$207,388	\$257,361
PARTNERSHIP EQUITY	147,057	223,660	271,196	304,696
Total	<u>\$363,230</u>	<u>\$441,299</u>	<u>\$478,584</u>	<u>\$562,057</u>

* Assets and Liabilities are valued at current market prices. Unrealized holding gains and losses represent the change in market prices of contracts still on hand at the end of each period. Realized holding gains and losses are recognized for contracts closed during the period. The gains and losses are measured with respect to the previous carrying value of the contract.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter			Second Quarter			Third Quarter			Fourth Quarter			Total		
	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total
Year 19x1	\$24,075	\$14,835	\$38,910	(\$10,495)	\$15,775	\$ 5,280	\$25,575	(\$ 9,768)	\$15,807	\$ 9,940	\$22,120	\$32,060	\$49,095	\$42,962	\$92,057
Year 19x2	3,627	13,509	17,136	5,275	32,222	37,497	4,310	19,504	23,814	(5,315)	3,471	(1,844)	7,897	68,706	76,603
Year 19x3	(4,407)	6,852	2,445	5,400	30	5,430	26,140	6,873	33,013	1,045	5,603	6,648	28,178	19,358	47,536
Year 19x4	3,590	9,417	13,007	(3,500)	(47)	(3,547)	3,010	10,910	13,920	3,120	7,000	10,120	6,220	27,280	33,500

FIGURE 4 (Continued)

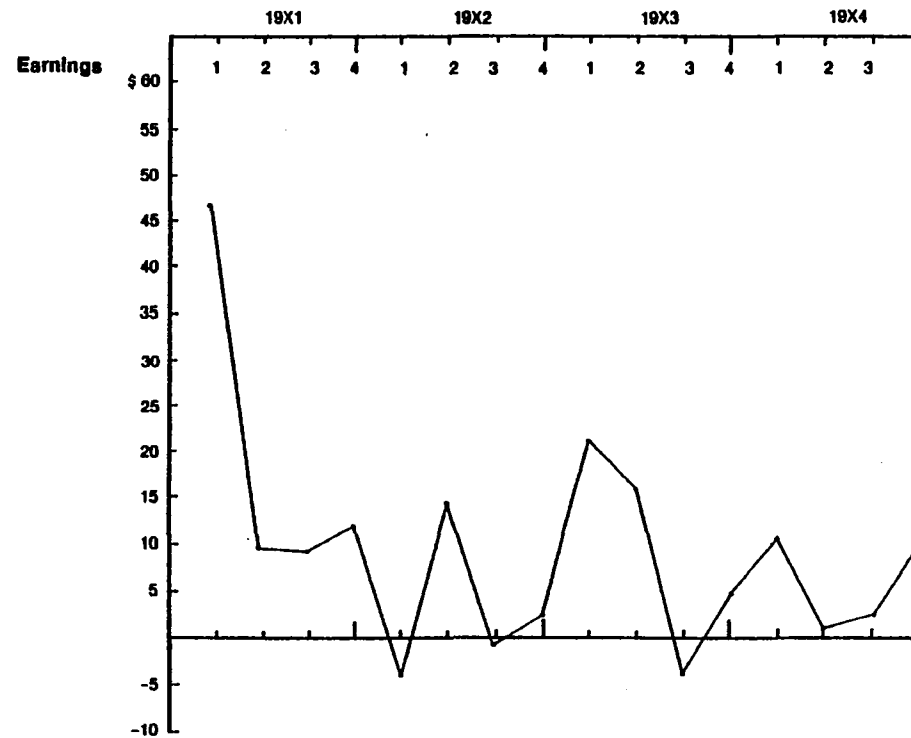
LEMZ Investment Club

Condensed Comparative Financial Data (Current Cost Basis*)

	19x1	19x2	19x3	19x4
GAINS AND LOSSES				
Realized Gains (Losses)	\$ 35,245	(\$ 13,043)	\$ 10,267	\$ 5,322
Unrealized Gains (Losses)	41,052	24,350	26,697	18,022
Investment Income (Loss)	<u>\$ 76,297</u>	<u>\$ 11,307</u>	<u>\$ 36,964</u>	<u>\$ 23,344</u>
ASSETS				
Cash	\$ 84,876	\$ 96,723	\$129,716	\$141,530
Investment in futures contracts (market value)	90,290	132,374	147,118	160,829
Due from Broker (short sales)	128,830	93,330	69,973	108,493
Margin Deposits	45,134	44,580	41,004	51,221
Total	<u>\$349,130</u>	<u>\$367,007</u>	<u>\$387,811</u>	<u>\$462,073</u>
LIABILITIES (short-term)	\$217,833	\$224,403	\$208,243	\$259,161
PARTNERSHIP EQUITY	131,297	142,604	179,568	202,912
Total	<u>\$349,130</u>	<u>\$367,007</u>	<u>\$387,811</u>	<u>\$462,073</u>

* Assets and Liabilities are valued at current market prices. Unrealized holding gains and losses represent the change in market prices of contracts still on hand at the end of each period. Realized holding gains and losses are recognized for contracts closed during the period. The gains and losses are measured with respect to the previous carrying value of the contract.

FIGURE 4 (Continued)
Quarterly Earnings
(000 omitted)



Condensed Comparative Quarterly Earnings

Period	First Quarter			Second Quarter			Third Quarter			Fourth Quarter			Total		
	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total	Realized Profit (Loss)	Unrealized Profit (Loss)	Total
Year 19x1	\$24,200	\$22,030	\$46,230	(\$ 6,350)	\$15,660	\$ 9,310	\$13,535	(\$ 4,518)	\$ 9,017	\$ 3,860	\$ 7,880	\$11,740	\$35,245	\$41,052	\$76,297
Year 19x2	(5,873)	1,709	(4,164)	2,985	11,248	14,233	(10,641)	9,733	(908)	486	1,660	2,146	(13,043)	24,350	11,307
Year 19x3	5,827	14,868	20,695	9,380	6,530	15,910	(5,125)	902	(4,223)	185	4,397	4,582	10,267	26,697	36,964
Year 19x4	2,599	7,852	10,451	(287)	1,160	873	1,500	880	2,380	1,510	8,130	9,640	5,322	18,022	23,344

CHAPTER FIVE

STATISTICAL TESTS

5.1 Binomial Test

The initial step in assessing the degree of the usefulness of the alternative sets of financial data for users' decisions, was the calculation of the percentage of correct rankings by the subjects. These percentages and the related z values for the Binomial Test were computed for pairwise, triple and quadruple comparisons (based on the ranking scheme from Table 2). The Binomial distribution was approximated by the normal curve, in order to find the z values of the ranks for HC and CV. The expectation and variance of the number of correct ranks (R) were calculated as follows:

$$E(R) = NP$$

$$\text{Var}(R) = NPQ$$

where

N = Total number of participants for each group ;

P = Probability of ranking the firms correctly for pairwise, triple and quadruple combinations, and

Q = 1-P

Then the Central Limit Theorem was applied which allowed the normal approximation and the transformation of the number of correct ranks (R) into the standard normal variables by the following:

$$z = \frac{R - E(R)}{\sqrt{\text{Var}(R)}}$$

This is a one-sided test. Positive z values indicate that subjects were able to rank the firms correctly at better than chance levels. Because larger z values result from a greater percentage of correct rankings, the z values can be used as a measure of the degree of usefulness of the financial data under each of the alternative accounting methods.

A test for significant differences in the percent of correct rankings under the two accounting methods was also performed. This test utilized the z values for a two-sided test calculated from the following formula.

$$z = \frac{\pi_1 - \pi_2}{\sqrt{pq(1/n + 1/m)}}$$

where

- π_1 = Percentage of correct rankings by the subjects
under HC (P_H);
- π_2 = Percentage of correct rankings by the subjects
under CV (P_C);

P = Percentages of the subjects who ranked the firms correctly under both HC and CV, for pairwise, triple and quadruple comparisons;

Q = $1-P$,

n = Number of participants under HC, and

m = Number of participants under CV.

Positive values for z in this case, indicate that a greater percentage of subjects correctly ranked the firms under HC than CV. Values for z were calculated for all pairwise, triple and quadruple comparisons.

5.2 Analysis of the Subjects' Ranks (The Binomial Test)

The statistical analyses of the subjects' rankings by auditors, by bankers and by financial analysts under each of the two sets of cases are illustrated in tables eight through thirteen. Each table indicates: (a) the ranking scheme from Table 2, (b) the number of participants under each alternative accounting method, (c) the mean and the standard deviation of subjects' ranking for each pairwise, triple, and quadruple comparisons under each alternative accounting method, (d) the number of correct ranks made by the participants in each category, the related percentage of correct ranks and the z values measuring the percentage of correct ranks for each alternative accounting method, and (e) the z value for the significance of difference between the percentage of correct ranks achieved under the two accounting methods.

The results of the statistical analyses of the percentage of correct rankings indicate that the subjects' rankings under HC are very similar to CV. This was examined by ranking the magnitude of the percentages of correct ranks for pairwise and triple comparisons under each accounting method, then comparing the ranks for both accounting methods for each group of subjects under each set. Furthermore, as the difference in the percentage of correct decisions made by the firms decreases fewer subjects are able to rank the firms correctly. The trends are true for both accounting methods and are especially pronounced in the triple comparisons. This is to be expected, of course, because the data under both accounting methods become less effective in distinguishing the superior firms, for potential users in their decision context, as the firms' performances become more similar.

The last column indicates the z values of the two-sided test for auditors, bankers and financial analysts. Again, the positive z values, in this case, indicates that, relatively, greater proportions of the subjects had the ability to rank the firms correctly under HC than CV for each ranking category. For example Table 8 indicates that the auditors using set 1 of the experiment were slightly more able to correctly rank the superior firms under HC than CV since there are more positive z values, with a greater magnitude, than negative ones. Furthermore, the quadruple comparison - which is the correct overall ranking - indicates that a greater percentage of auditors ranked the firms correctly under HC than CV, because the related z value is positive and relatively large.

TABLE 8
THE COMPARISON OF CORRECT RANKINGS
AUDITORS
(SET 1)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R _H	Percentage of Correct Ranks P _H	Z Value	# of Correct Ranks R _C	Percentage of Correct Ranks P _C	Z Value		
Pairwise Comparison:								
A > D	29	78.37	3.287	26	86.66	3.834	-0.879	37.88
B > D	28	75.67	2.959	22	73.33	2.373	0.218	82.58
A > C	25	67.56	1.972	13	43.33	-0.912	1.990	4.66
C > D	32	86.48	4.274	28	93.33	4.564	-0.911	36.28
A > B	28	75.67	2.959	24	80.00	3.103	-0.422	67.44
B > C	14	37.83	-1.643	2	6.66	-4.929	2.975	0.30
Triple Comparison:								
A > C > D	21	56.75	6.322	13	43.33	3.674	1.092	27.58
A > B > D	20	54.05	5.881	17	56.66	5.633	-0.213	83.36
B > C > D	10	27.02	1.470	2	6.66	-1.714	2.161	3.08
A > B > C	8	21.62	0.588	1	3.33	-2.204	2.183	2.92
Quadruple Comparison:								
A > B > C > D	6	16.21	3.257	1	3.33	-0.685	1.713	8.72

* > = is preferred to

	HC	CV
# of Participants	37	30
Pairwise Comparison	$\mu = 18.5$ $\sigma = 3.0413813$	$\mu = 15$ $\sigma = 2.7386128$
Triple Comparison	$\mu = 6.1666667$ $\sigma = 2.2669118$	$\mu = 5$ $\sigma = 2.0412415$
Quadruple Comparison	$\mu = 1.54$ $\sigma = 1.215496$	$\mu = 1.25$ $\sigma = 1.0944938$

In the case of the bankers using set 1 (Table 9), the results are somewhat mixed but tend to suggest that CV data was slightly more useful for ranking the firms. The comparisons which yield large differences tend to be negative especially in the case of the triple comparison ($B > C > D$ and $A > B > C$). The negative z scores for the comparison indicate that the CV rankings were better. Again, the positive one-sided z values (columns 4 and 7) indicate that the percentage of persons giving a correct ranking was greater than the chance level, while negative one-sided z values indicate that the percentages were less than the chance level (the chance levels for the pairwise, triple, and quadruple comparisons are $1/2$, $1/6$, and $1/24$ respectively).

Table 10 presents the statistical analyses for the financial analysts using set 1. Again, the z values of the two-sided test are somewhat mixed but with a much lower level of significance. This suggests that for the financial analysts, both accounting methods were equally effective but with a very slight tendency in favor of CV.

TABLE 9
THE COMPARISON OF CORRECT RANKINGS
BANKERS
(SET I)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	21	91.30	3.753	19	86.36	3.198	0.527	59.62
B > D	21	91.30	3.753	18	81.81	2.771	0.936	34.72
A > C	17	73.91	2.085	13	59.09	0.639	1.054	29.38
C > D	20	86.95	3.336	22	100.00	4.477	-1.754	3.02
A > B	17	73.91	2.085	14	63.63	1.066	0.744	45.92
B > C	5	21.73	-2.919	6	27.27	-2.345	-0.432	66.72
Triple Comparison:								
A > C > D	15	65.21	5.968	13	59.09	5.053	0.423	67.44
A > B > D	15	65.21	5.968	12	54.54	4.481	0.730	46.54
B > C > D	2	8.69	-1.305	6	27.27	1.048	-1.629	10.32
A > B > C	—	—	-2.424	1	4.54	-1.811	-1.032	30.30
Quadruple Comparison:								
A > B > C > D	—	—	-1.521	1	4.54	-0.444	-1.032	30.30

* > = is preferred to

	HC	CV
# of Participants	23	22
Pairwise Comparison	$\mu = 11.5$ $\sigma = 2.3979158$	$\mu = 11$ $\sigma = 2.3452079$
Triple Comparison	$\mu = 3.8333333$ $\sigma = 1.7873009$	$\mu = 3.6666667$ $\sigma = 1.7480147$
Quadruple Comparison	$\mu = 0.9583333$ $\sigma = 0.9583333$	$\mu = 0.9166667$ $\sigma = 0.9372685$

TABLE 10
THE COMPARISON OF CORRECT RANKINGS
FINANCIAL ANALYSTS
(SET 1)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	15	93.75	3.250	19	95.00	3.801	-0.162	87.28
B > D	15	93.75	3.250	17	85.00	2.906	0.830	40.66
A > C	8	50.00	-0.250	10	50.00	-0.223	0.000	100.00
C > D	15	93.75	3.250	19	95.00	3.801	-0.162	87.28
A > B	9	56.25	0.250	10	50.00	-0.223	0.373	71.14
B > C	7	43.75	-0.750	13	65.00	1.118	-1.275	20.40
Triple Comparison:								
A > C > D	7	43.75	2.571	10	50.00	3.699	-0.373	71.14
A > B > D	8	50.00	3.242	7	35.00	1.900	0.907	36.28
B > C > D	6	37.50	1.900	13	65.00	5.499	-1.642	10.10
A > B > C	1	6.25	-1.453	3	15.00	-0.500	-0.830	40.66
Quadruple Comparison:								
A > B > C > D	1	6.25	-0.208	3	15.00	1.365	-0.830	40.66

* > = is preferred to

	HC	CV
# of Participants	16	20
Pairwise Comparison	$\mu = 8$ $\sigma = 2$	$\mu = 10$ $\sigma = 2.236068$
Triple Comparison	$\mu = 2.6666667$ $\sigma = 1.490712$	$\mu = 3.3333333$ $\sigma = 1.6666667$
Quadruple Comparison	$\mu = 0.6666667$ $\sigma = 0.7993053$	$\mu = 0.8333333$ $\sigma = 0.8936504$

The analyses of the rankings by auditors, bankers and financial analysts using set 2 (Tables 11, 12 and 13) also support the results of the analyses of the subjects' rankings under set 1, except for some minor differences. In general the comparison of the two sets indicates that greater proportions of the subjects were able to rank the firms correctly - for each category - under set 1 than under set 2. This held true for both HC and CV. Moreover, the magnitude of the z values (of the two-sided test) was not as significant under set 2 as they were under the set 1 experiment, especially in the case of auditors and financial analysts. Furthermore, the results of the bankers' ranking under set 2 of the experiment, were slightly different than set 1. In set 2 there was a tendency toward supporting HC data as being more useful, as opposed to CV in set 1.

TABLE 11
THE COMPARISON OF CORRECT RANKINGS
AUDITORS
(SET 2)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparisons:								
A > D	15	53.57	0.188	9	50.00	-0.235	0.236	81.04
B > D	19	67.85	1.700	12	66.66	1.178	0.084	93.62
A > C	18	64.28	1.322	7	38.88	-1.178	1.687	9.10
C > D	16	57.14	0.566	10	55.55	0.235	0.106	91.24
A > B	8	28.57	-2.456	4	22.22	-2.592	0.478	63.12
B > C	21	75.00	2.456	15	83.33	2.592	-0.668	50.28
Triple Comparison:								
A > C > D	9	32.14	1.943	4	22.22	0.316	0.729	46.54
A > B > D	2	7.14	-1.605	2	11.11	-0.948	-0.466	63.84
B > C > D	11	39.28	2.958	8	44.44	2.846	-0.346	72.64
A > B > C	6	21.42	0.422	2	11.11	-0.948	0.900	36.82
Quadruple Comparison:								
A > B > C > D	2	7.14	0.315	1	5.55	-0.294	0.213	83.36

* > = is preferred to

	HC	CV
# of Participants	28	18
Pairwise Comparison	$\mu = 14$ $\sigma = 2.6457513$	$\mu = 9$ $\sigma = 2.1213203$
Triple Comparison	$\mu = 4.6666667$ $\sigma = 1.9720266$	$\mu = 3$ $\sigma = 1.5811388$
Quadruple Comparison	$\mu = 1.1666667$ $\sigma = 1.0573815$	$\mu = 0.75$ $\sigma = 0.8477912$

TABLE 12
THE COMPARISON OF CORRECT RANKINGS
BANKERS
(SET 2)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	14	70.00	1.565	10	45.45	-0.639	1.605	10.96
B > D	16	80.00	2.459	13	59.09	0.639	1.463	14.44
A > C	14	70.00	1.565	11	50.00	-0.213	1.318	18.68
C > D	11	55.00	0.223	12	54.54	0.213	0.029	97.60
A > B	7	35.00	-1.565	2	9.09	-4.050	2.043	4.14
B > C	15	75.00	2.012	18	81.81	2.771	-0.537	58.92
Triple Comparison:								
A > C > D	6	30.00	1.300	9	40.90	2.765	-0.736	45.92
A > B > D	5	25.00	0.700	2	9.09	-1.239	1.381	16.76
B > C > D	6	30.00	1.300	10	45.45	3.337	-1.029	30.30
A > B > C	5	25.00	0.700	2	9.09	-1.239	1.381	16.76
Quadruple Comparison:								
A > B > C > D	1	5.00	-0.373	2	9.09	0.622	-0.514	61.00

* > = is preferred to

	HC	CV
# of Participants	20	22
Pairwise Comparison	$\mu = 10$ $\sigma = 2.236068$	$\mu = 11$ $\sigma = 2.3452079$
Triple Comparison	$\mu = 3.333333$ $\sigma = 1.6666667$	$\mu = 3.6666667$ $\sigma = 1.7480147$
Quadruple Comparison	$\mu = 0.8333333$ $\sigma = 0.8936504$	$\mu = 0.9166667$ $\sigma = 0.9372685$

TABLE 13
THE COMPARISON OF CORRECT RANKINGS
FINANCIAL ANALYSTS
(SET 2)

Ranking+ Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	5	33.33	-1.549	3	20.00	-2.581	0.583	56.20
B > D	7	46.66	-0.516	11	73.33	1.549	-1.054	29.38
A > C	7	46.66	-0.516	3	20.00	-2.581	1.095	27.58
C > D	9	60.00	0.516	10	66.66	1.032	-0.267	78.72
A > B	3	20.00	-2.581	—	0.00	-4.131	1.290	19.70
B > C	8	53.33	0.000	9	60.00	0.516	-0.260	79.48
Triple Comparison:								
A > C > D	4	26.66	0.692	3	20.00	0.000	0.304	76.42
A > B > D	1	6.66	-1.385	—	0.00	-2.078	0.718	47.16
B > C > D	5	33.33	1.385	5	33.33	1.385	0.000	100.00
A > B > C	2	13.33	-0.692	—	0.00	-2.078	1.034	30.30
Quadruple Comparison:								
A > B > C > D	—	0.00	-1.453	—	0.00	-1.453	0.000	100.00

* > = is preferred to

	HC	CV
# of Participants	15	15
Pairwise Comparison	$\mu = 7.5$ $\sigma = 1.9364917$	$\mu = 7.5$ $\sigma = 1.9364917$
Triple Comparison	$\mu = 2.5$ $\sigma = 1.4433757$	$\mu = 2.5$ $\sigma = 1.4433757$
Quadruple Comparison	$\mu = 0.625$ $\sigma = 0.773924$	$\mu = 0.625$ $\sigma = 0.773924$

The combined results of the rankings for the auditors, bankers and financial analysts for each set as well as both sets together were also examined. These analyses are shown in Tables 14, 15, and 16. Table 14, illustrates the analyses of the combined rankings of the subjects under the set 1 experiment. The magnitude of the z values for the test of differences between HC and CV are not significant although there is a very slight tendency toward a positive sign. The analyses of the combined rankings of the subjects for set 2 and for the two sets together (Table 15 and 16) reveal a somewhat greater tendency toward supporting HC data as the more useful financial data in this experiment.

In summary, for the binomial tests, I compared the subjects actual rankings of the firms to the rankings which I knew to be correct. The results of the analyses of the rankings indicate that, both accounting methods were effective in leading subjects to correctly rank the firms at better than chance levels, but in general there are no statistically significant differences among the subjects' rankings based on HC and CV data, and there is a slight tendency in favor of HC data as the more useful financial information for the subjects in this experiment.

TABLE 14
THE COMPARISON OF CORRECT RANKINGS
AUDITORS, BANKERS AND FINANCIAL ANALYSTS
(SET 1)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	65	85.52	6.079	64	88.88	6.481	-0.610	54.18
B > D	64	84.21	5.850	57	79.16	4.831	0.790	42.96
A > C	50	65.78	2.638	36	50.00	-0.117	1.944	5.24
C > D	67	88.15	6.538	69	95.83	7.660	-1.710	8.72
A > B	54	71.05	3.555	48	66.66	2.710	0.576	56.20
B > C	26	34.21	-2.867	21	29.16	-3.653	0.659	50.92
Triple Comparison:								
A > C > D	43	56.57	9.182	36	50.00	7.431	0.800	42.38
A > B > D	43	56.57	9.182	36	50.00	7.431	0.800	42.38
B > C > D	18	23.68	1.487	21	29.16	2.687	-0.756	44.72
A > B > C	9	11.84	-1.282	5	6.94	-2.371	0.943	34.72
Quadruple Comparison:								
A > B > C > D	7	9.21	1.913	5	6.94	0.884	0.505	61.70

* > = is preferred to

	HC	CV
# of Participants	76	72
Pairwise Comparison	$\mu = 38$ $\sigma = 4.3588989$	$\mu = 36$ $\sigma = 4.2426407$
Triple Comparison	$\mu = 12.6666667$ $\sigma = 3.2489314$	$\mu = 12$ $\sigma = 3.1622777$
Quadruple Comparison	$\mu = 3.1666667$ $\sigma = 1.7420454$	$\mu = 3$ $\sigma = 1.6955825$

TABLE 15
THE COMPARISON OF CORRECT RANKINGS
AUDITORS, BANKERS AND FINANCIAL ANALYSTS
(SET 2)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	34	53.96	0.503	22	40.00	-1.618	1.514	13.10
B > D	42	66.66	2.519	36	65.45	2.157	0.138	88.86
A > C	39	61.90	1.763	21	38.18	-1.887	2.571	1.02
C > D	36	57.14	1.007	32	58.18	1.078	-0.114	91.24
A > B	18	28.57	-3.527	6	10.90	-5.932	2.378	1.74
B > C	44	69.84	3.023	42	76.36	3.775	-0.794	42.96
Triple Comparison:								
A > C > D	19	30.15	2.704	16	29.09	2.291	0.125	90.44
A > B > D	8	12.69	-1.014	4	7.27	-2.050	0.971	33.20
B > C > D	22	34.92	3.718	23	41.81	4.824	-0.768	44.12
A > B > C	13	20.63	0.676	4	7.27	-2.050	2.061	3.94
Quadruple Comparison:								
A > B > C > D	3	4.76	-0.078	3	5.45	0.140	-0.170	86.50

* > = is preferred to

	HC	CV
# of Participants	63	55
Pairwise Comparison	$\mu = 31.5$ $\sigma = 3.968627$	$\mu = 27.5$ $\sigma = 3.7080992$
Triple Comparison	$\mu = 10.5$ $\sigma = 2.9580399$	$\mu = 9.1666667$ $\sigma = 2.763854$
Quadruple Comparison	$\mu = 2.625$ $\sigma = 1.5860722$	$\mu = 2.2916667$ $\sigma = 1.4819516$

TABLE 16
THE COMPARISON OF CORRECT RANKINGS
AUDITORS, BANKERS AND FINANCIAL ANALYSTS
(SET 1 AND SET 2)

Ranking* Scheme	HC			CV			Normal Deviate of HC & CV (z)	Approximated Percentage of α (HC & CV)
	# of Correct Ranks R_H	Percentage of Correct Ranks P_H	Z Value	# of Correct Ranks R_C	Percentage of Correct Ranks P_C	Z Value		
Pairwise Comparison:								
A > D	99	71.22	4.919	86	67.71	3.904	0.621	53.52
B > D	106	76.25	6.106	93	73.22	5.146	2.445	1.46
A > C	89	64.02	3.223	57	44.88	-1.242	3.133	0.18
C > D	103	74.10	5.598	101	79.52	6.566	-1.044	29.84
A > B	72	51.79	0.339	54	42.51	-1.774	1.514	13.10
B > C	70	50.35	0.000	63	49.60	-0.177	0.122	90.44
Triple Comparison:								
A > C > D	62	44.60	8.724	52	40.94	7.222	0.602	54.86
A > B > D	51	36.69	6.220	40	31.49	4.365	0.892	37.34
B > C > D	40	28.77	3.717	44	34.64	5.317	-1.028	30.30
A > B > C	22	15.82	-0.379	9	7.08	-3.015	2.218	2.64
Quadruple Comparison:								
A > B > C > D	10	7.19	1.574	8	6.29	0.980	0.291	77.18

* >= is preferred to

	HC	CV
# of Participants	139	127
Pairwise Comparison	$\mu = 69.5$ $\sigma = 5.8949131$	$\mu = 63.5$ $\sigma = 5.6347138$
Triple Comparison	$\mu = 23.1666667$ $\sigma = 4.3938088$	$\mu = 21.1666667$ $\sigma = 4.1998677$
Quadruple Comparison	$\mu = 5.7916667$ $\sigma = 2.3559175$	$\mu = 5.2916667$ $\sigma = 2.2519282$

5.3 The Wilcoxon Rank-Sum Test

The Wilcoxon Rank-Sum test was also employed to examine whether there are significant differences among the subjects' rankings under the alternative accounting presentations. The test is based on the principle that the two samples of ranks are treated as though they came from a common population. The observed values in the pooled sample are then ranked. After the rankings are obtained, the samples are separated by accounting treatment and the sum of the ranks are calculated for each. The rank sums obtained are used as test statistics for the analyses discussed in Section (5.4) and illustrated in Table 17 through 22.

Since the sample size was large for both the historical-cost and current-value treatments, the normal approximation was applied to the Wilcoxon distribution.

That is,

$$P\left[W_{HC} \leq W\right] = \Phi \left[\frac{W - E(W_{HC})}{\sqrt{\text{Var}(W_{HC})}} \right]$$

where

- $E(W_{HC})$ = Expectation of W_{HC} ,
- $\text{Var}(W_{HC})$ = Variance of W_{HC} ,
- $\Phi(X)$ = Distribution function of the standard normal random variable, and

W_{HC} = Sum of the ranks for the HC data.

The Central Limit Theorem allows treating the sum W_{HC} of a large number of independent random variables as approximately normally distributed, (for further discussion see Lehmann and D'Abrera, 1975).

Then the expectation and variance of W_{HC} are calculated based on the following formulas respectively:

$$E(W_{HC}) = 1/2 n(N+1)$$

where

n = Sample size of historical-cost subjects, and
 N = Total sample size of historical-cost and current-value subjects.

$$\text{Var}(W_{HC}) = \frac{mn(N+1)}{12} - \frac{\sum_{i=1}^e (d_i^3 - d_i)}{12 N(N-1)}$$

where

n = Sample size of historical-cost subjects,
 m = Sample size of current-value subjects,
 N = Total sample size of n and m ,
 d_i = The number of ties in each class of ranking, and
 e = The number of distinct ranks.

The first term in the expression for the variance is just the variance of W_{HC} ; the second term gives the correction for ties. The effect of the corrections tend to be quite small. When no ties are present, all the d_i are equal to 1, and the correction term is zero.

The hypothesis tested using the Wilcoxon Rank-Sum test was stated as:

H_0 : The financial statements based on HC and CV are equally effective in helping subjects correctly rank the firms.

H_1 : The financial statements based on HC and CV differ in effectiveness.

using a significance level of $\alpha = .05$ the decision rule was established as:

Accept H_0 if $-1.96 \leq z < 1.96$

Reject H_0 either if $z < -1.96$ (conclude HC the most effective)

or if $z > 1.96$ (conclude CV the most effective)

where

$$z = \frac{W_{HC} - E(W_{HC})}{\sqrt{\text{Var}(W_{HC})}}$$

The Wilcoxon Rank-Sum test indicates which group of subjects were able to provide ranks significantly closer to the correct ranking of the firms. Since each group of subjects ranked the firms based on a different set of financial data, then the degree of closeness of each group's ranking to the predetermined ranking of the firms will indicate which of the alternative sets of financial data the subjects found more useful.

Each individual ranking was placed into one of seven different categories starting from zero to six. These seven categories reflect the number of errors in a subject's ranking. An error is defined as the number of reversals between pairs of firms needed to adjust the order in which firms were actually ranked by a respondent to the optimal ordering. For example the ranking $B > A > C > D$ contains one error because only the pair AB needs to be reversed to yield the optimal ordering. The ranking of $A > D > B > C$ contains two errors because two reversals are necessary. The pair DB must be reversed to yield the ranking $A > B > D > C$, and then the pair DC must be reversed to yield the optimal ordering $A > B > C > D$. Since there were four firms, then the number of possible errors would range from zero through six. Small values of the rank sum (W_{HC}), and hence negatives z 's, would reflect that fewer errors were made with the HC data. Thus, values of $z < -1.96$ would strongly indicate that the subjects were better able to analyze the financial data for this simple economic decision by using historical-cost data than current-value accounting. On the other hand values of $z > 1.96$ would lead to the conclusion that subjects were better able to make the decision using the CV data. The

actual level of α was also calculated in order to determine the degree of closeness of the rankings based on HC and CV.

5.4 Analyses of the Subjects' Ranks (the Wilcoxon Rank-Sum Test)

While differences between the subjects' rankings were observed, some evidence of a degree of consensus was apparent. Tables 17 through 22 provide summaries of the statistical analyses based on the Wilcoxon Rank-Sum test. These tables reflect the results of the rankings of the auditors, bankers and financial analysts based on the HC and CV data in each error category. Column one indicates the number of errors in each person's ranking, where 0 represents a ranking with no errors and six represents a ranking with the maximum of six errors. Column two indicates the combined number of subjects using both HC and CV data for each set of the firms who fell into each error category. Column three shows the midrank of each class of ranking. The midranks were calculated based on the Wilcoxon Rank-Sum test and the distribution of the subjects' ranks (column two). Columns four and six show the number of subjects in each error class under HC and CV respectively. The total of these two columns is equal to column two. Columns five and seven indicate the assigned value of each group of the subjects' ranks. These sums were used as the test statistics, (W_{HC}, W_{CV}) .

Tables 23, 24 and 25 provide the proportion of the subjects' rankings in each error class under sets 1 and 2 for the auditors, bankers and financial analysts respectively. The total number of

TABLE 17
THE COMPARISON OF HC AND CV (AUDITORS)
THE WILCOXON RANK-SUM TEST
(SET 1)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	7	4	6	24	1	4
1	24	19.5	13	253.5	11	214.5
2	15	39	8	312	7	273
3	11	52	4	208	7	364
4	6	60.5	5	302.8	1	60.5
5	4	65.5	1	65.5	3	196.5
6	—	—	—	—	—	—
Total	67	—	37	1165.5	30	1112.5
				(W _{HC})	(W _{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2}.$$

TABLE 18
THE COMPARISON OF HC AND CV (BANKERS)
THE WILCOXON RANK-SUM TEST
(SET 1)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	1	1	—	—	1	1
1	24	13.5	14	189	10	135
2	12	31.5	5	157.5	7	220.5
3	5	40	3	120	2	80
4	1	43	1	43	—	—
5	2	44.5	—	—	2	89
6	—	—	—	—	—	—
Total	45	—	23	509.5	22	525.5
				(W_{HC})	(W_{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2} .$$

TABLE 19
THE COMPARISON OF HC AND CV (FINANCIAL ANALYSTS)
THE WILCOXON RANK-SUM TEST
(SET 1)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	4	2.5	1	2.5	3	7.5
1	12	10.5	6	63	6	63
2	16	24.5	7	171.5	9	220.5
3	2	33.5	1	33.5	1	33.5
4	1	35	1	35	—	—
5	1	36	—	—	1	36
6	—	—	—	—	—	—
Total	36	—	16	305.5	20	360.5
				(W _{HC})	(W _{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2}.$$

TABLE 20
THE COMPARISON OF HC AND CV (AUDITORS)
THE WILCOXON RANK-SUM TEST
(SET 2)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	3	2	2	4	1	2
1	9	8	7	56	2	16
2	9	17	3	51	6	102
3	12	27.5	9	247.5	3	82.5
4	8	37.5	5	187.5	3	112.5
5	3	43	1	43	2	86
6	2	45.5	1	45.5	1	45.5
Total	46	—	28	634.5	18	446.5
				(W _{HC})	(W _{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2}.$$

TABLE 21
THE COMPARISON OF HC AND CV (BANKERS)
THE WILCOXON RANK-SUM TEST
(SET 2)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	3	2	1	2	2	4
1	14	10.5	7	73.5	7	73.5
2	6	20.5	5	102.5	1	20.5
3	5	26	4	104	1	26
4	4	30.5	1	30.5	3	91.5
5	8	36.5	2	73	6	219
6	2	41.5	—	—	2	83
Total	42	—	20	385.5	22	517.5
				(ΣW_{HC})	(ΣW_{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2} .$$

TABLE 22
THE COMPARISON OF HC AND CV (FINANCIAL ANALYSTS)
THE WILCOXON RANK-SUM TEST
(SET 2)

(1) Category	(2) Combined # of Subjects In Categories (HC & CV)	(3) Midrank*	HC		CV	
			(4) # of Subjects In Each Category	(5) Assigned Value (3 x 4)	(6) # of Subjects In Each Category	(7) Assigned Value (3 x 6)
0	—	—	—	—	—	—
1	8	4.5	5	22.5	3	13.5
2	—	—	—	—	—	—
3	5	11	3	33	2	22
4	6	16.5	—	—	6	99
5	8	23.5	5	117.5	3	70.5
6	3	29	2	58	1	29
Total	30	—	15	231	15	234
				(W_{HC})	(W _{CV})	

*If d_i = # of Combined Subjects in i^{th} category, $i = 0, 1, 2, \dots, 6$, then midrank for the i^{th} category would be:

$$\sum_{i=0}^{i-1} d_i + \frac{d_i + 1}{2} .$$

participants in each group and under each set is also given. Tables 23 through 25 are derived from the data in Tables 17 through 22 and indicate the relative percentages of correct rankings for the different groups of subjects under HC and CV. Although some minor differences exist, the comparisons indicate that both methods of accounting led to equally effective rankings of the firms. However, the tables indicate that, a slightly greater percentages of auditors were better able to rank the firms based on the HC data than under the CV data for both sets. In the case of bankers and financial analysts, the results are somewhat mixed.

TABLE 23
PERCENTAGES OF CORRECT RANKINGS FOR EACH GROUP
(AUDITORS)

Ranks	Set 1		Set 2	
	HC Total = 37	CV Total = 30	HC Total = 28	CV Total = 18
0	16.22	3.33	7.14	5.56
1	35.14	36.67	25.00	11.11
2	21.62	23.34	10.72	33.34
3	10.81	23.33	32.14	16.66
4	13.51	3.33	17.86	16.66
5	2.70	10.00	3.57	11.11
6	—	—	3.57	5.56
Total	100.00	100.00	100.00	100.00

TABLE 24
 PERCENTAGES OF CORRECT RANKINGS FOR EACH GROUP
 (BANKERS)

Ranks	Set 1		Set 2	
	HC Total = 23	CV Total = 22	HC Total = 20	CV Total = 22
0	---	4.54	5.00	9.09
1	60.87	45.46	35.00	31.82
2	21.74	31.82	25.00	4.54
3	13.04	9.09	20.00	4.54
4	4.35	---	5.00	13.64
5	---	9.09	10.00	27.28
6	---	---	---	9.09
Total	100.00	100.00	100.00	100.00

TABLE 25
PERCENTAGES OF CORRECT RANKINGS FOR EACH GROUP
(FINANCIAL ANALYSTS)

Ranks	Set 1		Set 2	
	HC Total = 16	CV Total = 20	HC Total = 15	CV Total = 15
0	6.25	15.00	---	---
1	37.50	30.00	33.33	20.00
2	43.75	45.00	---	---
3	6.25	5.00	20.00	13.34
4	6.25	---	---	40.00
5	---	5.00	33.33	20.00
6	---	---	13.34	6.66
Total	100.00	100.00	100.00	100.00

In general, the results of the analyses of the percentages of correct rankings support the results of the binomial test. Table 26 provides a summary of the results from the statistical analyses related to the Wilcoxon Rank-Sum test. Table 26 shows the expectation, variance and other statistical data for the different groups of subjects under both the set 1 and set 2 models. The z values from the statistical analysis for the different groups of subjects are highly consistent with the null hypothesis under the Wilcoxon Rank-Sum test. The probability values (α) of the results are also given and they are much greater than .05 which also indicates that there are no statistically significant differences among the subjects' rankings based on HC and CV data. However, with one exception, the z values are negative, this indicates that small values for the rank sums were assigned to the rankings of the subjects who used HC data. This suggests that the subjects have a slightly better ability to analyze the historical-cost financial data for this simple economic decision than the current-value data.

TABLE 26
RESULTS OF THE STATISTICAL ANALYSIS
THE WILCOXON RANK-SUM TEST
COMPARISON OF HC AND CV
FOR EACH GROUP

Groups	$E(W_{HC})$	$Var(W_{HC})$	Z	Approximated Percentage of (α)
Auditors (Set 1)	1258	5890.7564	-1.2051	23.02
Auditors (Set 2)	658	1898.6435	-0.5393	59.62
Bankers (Set 1)	529	1606.5500	-0.4865	63.12
Bankers (Set 2)	430	1498.8618	-1.1494	25.02
Financial Analysts (Set 1)	296	862.60317	0.3234	74.90
Financial Analysts (Set 2)	232.5	551.89655	-0.0600	95.22

Auditors and bankers were pooled together for one test, and in another test, the auditors, bankers, and financial analysts were all pooled together as if they were from the same population. These tests were to examine whether there were any overall differences in the results of the rankings between the groups. Table 27 illustrates the results of the statistical analysis of the pooled samples. The results of the tests performed were highly consistent with the results of the previous tests and supported the null hypotheses of no significant differences. A statistical test was also conducted to examine whether there was any difference between the rankings of the auditors and bankers based on HC and CV. Table 28 indicates the results of the statistical analysis. Again except for some minor differences, on the average, the probability values for these two measures are also similar.

TABLE 27

RESULTS OF THE STATISTICAL ANALYSIS
 THE WILCOXON RANK-SUM TEST
 COMPARISON OF HC AND CV
 ALL GROUPS COMBINED

Groups	$E(W_{HC})$	$Var(W_{HC})$	Z	Approximate Percentage of (α)
Auditors and Bankers				
Set (1)	3390	26549.74	-1.2734	20.4
Set (2)	2136	12558.723	-1.4277	15.56
Auditors, Bankers & Financial Analysts				
Set (1)	5662	61576.977	-0.9288	35.24
Set (2)	3748.5	33170.235	-1.5483	12.12

TABLE 28
RESULTS OF THE STATISTICAL ANALYSIS
THE WILCOXON RANK-SUM TEST
COMPARISON OF AUDITORS AND BANKERS RANKING

Groups	$E(W_{HC})$	$Var(W_{HC})$	Z	Approximate Percentage of (α)
HC:				
Set (1)	1128.5	3873.2520	0.2410	81.04
Set (2)	686	2169.2553	0.9769	33.20
CV:				
Set (1)	795	2649.2081	1.0491	29.84
Set (2)	369	1313.2731	-0.1379	88.86

5.5 The Chi-Square Test

In order to increase the validity of the previous statistical results, the Chi-Square test was also employed to examine the independence of the rankings of the groups under HC and CV. The Chi-Square test is based on the assumption that the samples C_1, C_2, \dots, C_c are drawn from C populations where $C_1 + C_2 + \dots + C_c = N$. Furthermore, each group can be classified into exactly one of " r " different categories according to one criterion, and into exactly one of " c " different categories according to a second criterion, then contingency tables can be generated as shown in Table 29 on the next page:

where

O_{ij} = The # of observations associated with row i and column j simultaneously, and

E_{ij} = $R_i C_j / N$

then the test statistic can be expressed as:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Moreover the hypotheses can also be stated as:

H_0 : $P(\text{of an observation falling in column } j) \text{ is the same for each row, for all } j$

H_1 : Otherwise

TABLE 29
CONTINGENCY TABLES

CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES					
Column Row	1	2	---	C	Totals
1	O_{11}	O_{12}	---	O_{1c}	R_1
2	O_{21}	O_{22}	---	O_{2c}	R_2
---	---	---	---	---	---
r	O_{r1}	O_{r2}	---	O_{rc}	R_r
Totals	C_1	C_2	---	C_c	N

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES					
Column Row	1	2	---	C	Totals
1	E_{11}	E_{12}	---	E_{1c}	R_1
2	E_{21}	E_{22}	---	E_{2c}	R_2
---	---	---	---	---	---
r	E_{r1}	E_{r2}	---	E_{rc}	R_r
Totals	C_1	C_2	---	C_c	N

All Chi-Square tests that compare frequencies are upper-tailed with an approximate level of significance of α . Thus, H_0 is rejected if χ^2 exceeds the $1 - \alpha$ quantile of a Chi-Square random variable with $(r-1)(C-1)$ degrees of freedom, (for further discussion see Conover 1971).

In this study, each observation for auditors, bankers and financial analysts were classified into one of "r=7" categories according to the error criteria (namely 0,1,...,6), and into one of "c=2" categories according to the HC and CV criteria.

Then at a significance level of $\alpha = .05$, the decision rule was stated as:

Accept H_0 (conclude that the distribution of the scores are the same for HC and CV if $\chi^2 \leq 12.592$).

Reject H_0 (conclude that there is a significant difference in the distribution of scores between HC and CV if $\chi^2 > 12.592$).

Therefore large χ^2 values tend to refute H_0 , while small values support the null hypothesis. The actual significance level of α was also calculated in order to determine the degree of homogeneity of the scores. This latter aspect is discussed in the next section.

5.6 Analyses of the Subjects' Ranks (The Chi-Square Test)

Table 30, provides a summary of the results of the statistical analyses related to the Chi-Square tests performed on the different groups of rankings. Again the Chi-Square statistics (χ^2) are highly consistent with the null hypothesis because the probability values

are much greater than .05. The contingency tables for the actually observed and expected frequencies using the Chi-Square test are given in Tables 31 through 36.

The statistical results from the Wilcoxon Rank-Sum test are very similar to the results from the Chi-Square test, as shown on Tables 26 and 30 respectively. However, there is a large discrepancy in the results from the two tests for the financial analysts who used set 2. The alpha significance level was approximately 95 percent for the Wilcoxon Rank-Sum test whereas it was approximately 10 percent based on the Chi-Square test. The reason for this difference may be due to the fact that the Wilcoxon Rank-Sum test determines the degree of closeness of the average of subjects' scores; whereas the Chi-Square test examines the entire distribution of the scores and the degree of homogeneity between them. Hence, these results suggest that the average of the individual scores for the set-two-financial analysts were the same, but the distribution of the individual scores differed.

TABLE 30
RESULTS OF THE STATISTICAL ANALYSIS
THE CHI-SQUARE TEST
COMPARISON OF HC AND CV

Subject Groups	χ^2	Degree Of Freedom	Approximated Percentage Of (α)
Auditors (Set 1)	7.6416	5	< 20
Auditors (Set 2)	6.0567	6	> 30
Bankers (Set 1)	5.1803	5	> 30
Bankers (Set 2)	9.7268	6	< 20
Financial Analysts (Set 1)	2.8406	5	> 70
Financial Analysts (Set 2)	7.5333	4	> 10

TABLE 31
AUDITORS (SET 1)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	6	1	7
1	13	11	24
2	8	7	15
3	4	7	11
4	5	1	6
5	1	3	4
6	--	--	--
Totals	37	30	67

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	3.8656716	3.1343284	7
1	13.253731	10.746269	24
2	8.2835821	6.7164179	15
3	6.0746269	4.9253731	11
4	3.3134328	2.6865672	6
5	2.2089552	1.7910448	4
6	--	--	--
Totals	37	30	67

$$\chi^2 = 7.6416805 \text{ With 5 Degrees of Freedom}$$

TABLE 32
BANKERS (SET 1)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	0	1	1
1	14	10	24
2	5	7	12
3	3	2	5
4	1	—	1
5	0	2	2
6	—	—	—
Totals	23	22	45

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	0.5111111	0.4888889	1
1	12.2666667	11.7333333	24
2	6.1333333	5.8666667	12
3	2.5555556	2.4444444	5
4	0.5111111	0.4888889	1
5	1.0222222	0.9777778	2
6	—	—	—
Totals	23	22	45

$\chi^2 = 5.1803357$ With 5 Degrees of Freedom

TABLE 33
FINANCIAL ANALYSTS (SET 1)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	1	3	4
1	6	6	12
2	7	9	16
3	1	1	2
4	1	0	1
5	0	1	1
6	--	--	--
Totals	16	20	36

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	1.7777778	2.2222222	4
1	5.3333333	6.6666667	12
2	7.1111111	8.8888889	16
3	0.8888889	1.1111111	2
4	0.4444444	0.5555556	1
5	0.4444444	0.5555556	1
6	--	--	--
Totals	16	20	36

$$\chi^2 = 2.8406252 \text{ With 5 Degrees of Freedom}$$

TABLE 34
AUDITORS (SET 2)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	2	1	3
1	7	2	9
2	3	6	9
3	9	3	12
4	5	3	8
5	1	2	3
6	1	1	2
Totals	28	18	46

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	1.826087	1.173913	3
1	5.4782609	3.5217391	9
2	5.4782609	3.5217391	9
3	7.3043478	4.6956522	12
4	4.8695652	3.1304348	8
5	1.826087	1.173913	3
6	1.2173913	0.7826087	2
Totals	28	18	46

$$\chi^2 = 6.0567682 \text{ With 6 Degrees of Freedom}$$

TABLE 35
BANKERS (SET 2)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	1	2	3
1	7	7	14
2	5	1	6
3	4	1	5
4	1	3	4
5	2	6	8
6	0	2	2
Totals	20	22	42

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	1.4285714	1.5714286	3
1	6.6666667	7.3333333	14
2	2.8571429	3.1428571	6
3	2.3809524	2.6190476	5
4	1.9047619	2.0952381	4
5	3.8095238	4.1904762	8
6	0.952381	1.047619	2
Totals	20	22	42

$$\chi^2 = 9.7268181 \text{ With 6 Degrees of Freedom}$$

TABLE 36
FINANCIAL ANALYSTS (SET 2)
CONTINGENCY TABLE FOR ACTUAL OBSERVED FREQUENCIES

Ranks	HC	CV	Totals
0	—	—	—
1	5	3	8
2	—	—	—
3	3	2	5
4	—	6	6
5	5	3	8
6	2	1	3
Totals	15	15	30

CONTINGENCY TABLE FOR EXPECTED FREQUENCIES

Ranks	HC	CV	Totals
0	—	—	—
1	4	4	8
2	—	—	—
3	2.5	2.5	5
4	3	3	6
5	4	4	8
6	1.5	1.5	3
Totals	15	15	30

$\chi^2 = 7.5333$ With 4 Degrees of Freedom

5.7 Summary of the Statistical Analyses

The degree of usefulness of HC versus CV financial data on users' decisions was examined first by (a) developing a ranking scheme (Table 2), (b) computing the percentages of correct rankings made by the subjects, and (c) calculating the related z values of the subjects' rankings by employing the binomial test. The results of the binomial test indicate that, when all of the rankings are compared, there are no significant differences among the subjects' rankings based on HC and CV data. However, there is a slight tendency which indicates that auditors were better able to make the rankings with HC data, while the financial analysts made slightly better rankings with the CV data.

The Wilcoxon Rank-Sum test was also employed for pairwise comparisons of the HC and CV rankings. When all rankings are considered, the results of the Wilcoxon Rank-Sum test support the results of the overall binomial test. The test suggests that subjects were equally effective in ranking the firms using either of the alternative accounting methods. Once again, however, a slightly greater percentage of the subjects were better able to rank the firms using HC data.

The Chi-Square test was also employed to examine the independence of the rankings of the groups under HC and CV. Except for some minor differences, the statistical results from this test were very similar to the previous two.

In summary, the results of the Binomial tests and the Wilcoxon Rank-Sum tests were highly consistent with the results of the Chi-Square tests. The results suggest that, there are no statistically

significant differences among the investment decisions made by the subjects using historical-cost as opposed to current-value data, in this simple investment decision.

CHAPTER SIX

SUMMARY

Many accountants criticize historical-cost accounting and argue for a change of accounting method, to better disclose and reflect the effects of inflation and technological change. It has been argued that current-value accounting will better facilitate the communication process in a business environment, and hence lead to better economic decision-making. However, there is a lack of conclusive and compelling empirical evidence to indicate the extent to which users are able to utilize new current-value information.

The prior empirical studies which have been made typically have surveyed the opinions of respondents about the desirability of reporting current-value information. But these studies have usually been in the context of some subjective criterion of usefulness specified by the researchers. There have not been studies which objectively examine (1) the extent of users' comprehension of alternative accounting data, (2) whether a "learning effect" has indeed taken place as time has passed and inflation has intensified, (3) whether such information, which is costly to produce, results in sufficiently better economic decisions to justify the cost, (4) how alternative information should be presented and interpreted, and (5) how

current-value data is to be measured and applied for different industries.

This study attempted to address the first three questions in the context of a specific industry. It involved the usefulness of current-value as opposed to historical-cost data, in the context of a potential users' actual decision. The respondents in the experiment were required to render their judgments on a potential investment based solely on historical-cost or current-value data. A sample of three groups of potential users of financial statements (auditors, bankers and financial analysts) were selected. The subjects were asked to evaluate the financial statements of four investment firms and rank them based on each firm's attractiveness. The results of the study indicate that there are no significant differences among the subjects' investment decisions based on HC data as opposed to CV data and that both methods were equally effective in making this simple investment decision.

The general finding of this study may be explained by a plausible theoretical argument (set forth by Ijiri, 1967 and Revsine, 1970) which states that decision makers usually employ or select a decision rule which relates inputs to decisions in a manner consistent with their prior experience, perceptions, and objectives. Therefore, changes in accounting methods may affect the perceived relevance of accounting information and may lead to an erroneous judgment about the firms' performance. Based on this argument, decision makers may intuitively associate a meaning with a title or surrogate that they have been applying through their past experience. Hence, the results

of decision makers' judgments based upon a new accounting measurement approach may be systematically biased from the start. Judgments arising from a misinterpreted surrogate may not reflect the usefulness of the new information system. This argument may apply to this study, where the results indicate that there are no significant differences among the investment decisions made by users given historical-cost versus current-value information. The current-value information may be potentially more relevant and useful, but the subjects may not yet know how to properly incorporate the information into their analysis.

It has been argued that, although current-value accounting has more useful financial information content than historical-cost data, users may not yet be familiar with how to use this information. If this is the case, then in order to prevent misuse of the accounting information, and to assist users in making rational economic decisions, the potential users may need to be more informed about the applicability, and the proper procedures for analysis of current-value data. In this regard, one can suggest that the accounting profession (theorists, policymakers and professionals) (1) should more closely examine the effects of current-value as opposed to historical-cost data in each industry, (2) should place more emphasis on the practical aspects of application and interpretation of current-value data for each industry, and (3) recognize that there is a need for programs to educate users about current-value data and its interpretation. With regard to the last point, there is some evidence in this study that familiarity with the current-value data improves its

usefulness. The findings suggest that financial analysts were slightly better able to rank the firms based on the current-value than historical-cost data. This may be due to financial analysts being relatively more involved with the utilization of current-value data.

Future work should provide more extensive investigation of the impact of current-value and general-price-level adjusted accounting data versus historical-cost data on users' economic decisions. Since the results of this study are, at most, generalized only to industries without long-term assets, additional work will be necessary to identify the impact of alternative financial data on users' decisions for different industries. Moreover, since the subjects of this project indicated a desire to have forecasted operational and financial statements by management (in order to examine the deviation planned from actual performance) it might be beneficial to examine the degree of usefulness of alternative accounting methods where the subjects have access to such supplementary information.

BIBLIOGRAPHY

- Abdel-khalik, A. R. and J. C. McKeown, "Disclosure of Estimates of Holding Gains and the Assessment of Systematic Risk," Journal of Accounting Research (Supp 1978), pp. 46-77.
- Arbel, A. and B. Jaggi, "Impact of Replacement Cost Disclosures on Investors' Decisions in the United States." The International Journal of Accounting Education and Research (Fall 1978), pp. 71-82.
- Arnold, D. F. and R. J. Huefner, "Measuring and Evaluating Replacement Costs: An application," Journal of Accounting Research (Autumn 1977), pp. 245-252.
- Ashton, R. H. and S. S. Kramer, "Students as Surrogates in Behavioral Accounting Research: Some Evidence," Journal of Accounting Research (Spring 1980).
- Baesel, J., "On the Assessment of Risk: Some Further Considerations," Journal of Finance (December 1974), pp. 1491-94.
- Backer, M., Financial Reporting for Security Investment and Credit Decisions. National Association of Accountants Research Studies in Management Reporting, No. 3. (New York: NAA, 1970).
- Baran, A., J. Lakonishok and A. R. Ofer, "The Information Content of General Price Level Adjusted Earnings: Some Empirical Evidence," The Accounting Review (January 1980).
- Beaver, W. H., "Alternative Accounting Measures as Prediction of Failure," The Accounting Review (January 1968), pp. 113-122.
- _____, A. A. Christie and P.A. Griffin, "The Information Content of SEC Accounting Series Release No. 190." Journal of Accounting and Economics (August 1980), pp. 127-57.
- _____, J. W. Kennelly and W. M. Voss, "Predictive Ability as a Criterion for the Evaluation of Accounting Data," The Accounting Review (October 1968), pp. 675-83.

- _____, T. P. Kettler and M. Scholes, "The Association Between Market Determined and Accounting Determined Risk Measures," The Accounting Review (October 1970), pp. 654-82.
- Bedford, N. M., Income Determination Theory: An Accounting Framework (Addison-Wesley, 1965).
- Benston, G. J. and M. A. Krasney, "DAAM: The Demand for Alternative Accounting Measurements," Journal of Accounting Research (Supp 1978), pp. 1-37.
- Benjamin, J. J. and K. G. Stanga, "Differences in Disclosure Needs of Major Users of Financial Statements". Accounting and Business Research (Summer 1977), pp. 187-92.
- Birnberg, J. G. and R. Nath, "Laboratory Experimentation in Accounting Research," The Accounting Review (January 1968), pp. 38-45.
- Boatsman, J. R. and L. Revsine, "Discussion of Disclosure of Estimates of Holding Gains and the Assessment of Systematic Risk." Journal of Accounting Research (Supp 1978), pp. 96-105.
- Brenner, V. C., "Financial Statement Users' Views of the Desirability of Reporting Current Cost Information," Journal of Accounting Research (Autumn 1970), pp. 159-166.
- Bruns, Jr., W. J., "Accounting Information and Decision Making: Some Behavioral Hypotheses," The Accounting Review (July 1968), pp. 469-80.
- _____, and D. T. DeCoster, Accounting and Its Behavioral Implications (McGraw-Hill).
- Chambers, R. J., Accounting Evaluation and Economic Behavior (Prentice-Hall, 1966).
- Chandra, G., "A Study of the consensus on Disclosure Among Public Accountants and Security Analysts". The Accounting Review (October 1974), pp. 733-42.
- _____, "Information Needs of Security Analysts." Journal of Accountancy (December 1975), pp. 65-70.
- Chicago Board of Trade: Commodity Trading Manual, 1980.
- Chicago Mercantile Exchange: Chicago Mercantile Exchange Year Book, 1976-77, 1977-78.
- Conover, W. J., Practical Nonparametric Statistics (Wiley & Sons, Inc., 1971).

- Cooper, T., "Replacement Cost and Beta: A Financial Model." Journal of Accounting, Auditing and Finance (Winter 1980), pp. 138-46.
- Davidson, S. and R. L. Weil, "Inflation Accounting: What will General Price-Level Adjusted Income Statements Show?" Financial Analysts Journal (January-February 1975), pp. 27-31, 70-81.
- Dopuch, N. and S. Sunder, "FASB's Statements on Objectives and Elements of Financial Accounting: A Review," The Accounting Review (January 1980).
- Drake, D. F. and N. Dopuch, "On the Case for Dichotomizing Income," Journal of Accounting Research (Autumn 1965), pp. 192-205.
- Dyckman, T. R., Investment Analysis and General Price-Level Adjustments Studies in Accounting Research, No. 1, (American Accounting Association, 1969).
- Edwards, E. D. and P. Bell, The Theory and Measurement of Business Income (University of California Press, 1961).
- Estes, R. W., "An Assessment of the Usefulness of Current Cost and Price-Level Information by Financial Statement Users," Journal of Accounting Research (Fall 1968), pp. 200-207.
- Fama, E. F. and G. W. Schwert, "Asset Returns and Inflation." Journal of Financial Economics
- Financial Accounting Standards Board: Statement of Financial Accounting Standards No. 33.
- Frank, W., "A Study of the Predictive Significance of Two Income Measures," Journal of Accounting Research (Spring 1969).
- Freeman, R. N., "The Disclosure of Replacement Cost Accounting Data and Its Effect on Transaction Volumes: A Comment." The Accounting Review (January 1981), pp. 177-80.
- Friedman, L. A.; T. A. Buchman and R. W. Melicher, "The Informational Content of Replacement Cost Valuation Data." Review of Business and Economic Research (Spring 1980), pp. 27-38.
- Frishkoff, P., Financial Reporting and Changing Prices: A Review of Empirical Research (Research Report, FASB, 1982).
- Garsombke, H. P., "A.S.R. 190: Implementation, Costs and Benefits." The CPA Journal (February 1978), pp. 23-26.
- Gheyara, K. and J. Boatsman, "Market Reaction to the 1976 Replacement Cost Disclosures." Journal of Accounting v Economics (August 1980), pp. 107-25.

- Greenball, M. N., "The Accuracy of Different Methods of Accounting For Earnings - A Simulation Approach." Journal of Accounting Research, (Spring 1968), pp. 114-29.
- Grossman, S. D.; S. H. Kratchman and R. B. Welker, "Comment: The Effect of Replacement Cost Disclosures on Security Prices." Journal of Accounting, Auditing and Finance, (Winter 1981), pp. 136-43.
- Ijiri, Y., The Foundations of Accounting Measurement (Scholar Book Company, 1972).
- _____, "A Defense for Historical Cost Accounting," Asset Valuation (Scholars Book Company, 1972).
- Jaedicke, R. K., Y. Ijiri and O. Nielsen, Research in Accounting Measurement (AAA Collected Papers).
- Ketz, J. E., "The Effect of General Price-Level Adjustments on the Predictive Ability of Financial Ratios," Journal of Accounting Research (Supp 1978), pp. 273-84.
- Lapin, L. L., Statistics Meaning and Method, (Harcourt Bruce Jovanovick, Inc., 1975).
- Largay, J. A. and J. L. Livingstone, Accounting for Changing Prices: Replacement Cost and General Price-Level Adjustments (Wiley/Hamilton, 1976).
- Lehmann, E. L. and H. J. M. D'Abrera, Nonparametrics, Statistical Methods Based on Ranks (Holdenday, Inc., 1975).
- McIntyre, E., "Current cost Financial Statements and common Stock Investment Decisions," The Accounting Review (July 1973), pp. 575-85.
- Modigliani, F. and R. A. Cohn, "Inflation, Rational Valuation and the Market." Financial Analysts Journal (March/April 1979), pp. 24-44.
- Morris, R. C., "Evidence of the Impact of Inflation Accounting on Share Prices." Accounting and Business Research (Spring 1975), pp. 82-90.
- Most, K.S., Accounting Theory (Grid, Inc., 1977).
- Noreen, E. and J. Sepe, "Market Reactions to Accounting Policy Deliberations: The Inflation Accounting Case." The Accounting Review (April 1981); pp. 253-69.

- Norton, C. L. and R. E. Smith, "A Comparison of General Price-Level and Historical Cost Financial Statements in the Prediction of Bankruptcy," "The Accounting Review" (January 1979), pp. 72-87.
- O'Connor, M. C. and G. Chandra, "Replacement Cost Disclosure." Management Accounting (September 1978), pp. 58-59.
- Parker, J. E., "Impact of Price-Level Accounting," The Accounting Review (January 1977), pp. 69-98.
- Petersen, R. J., "Interindustry Estimation of General Price-Level Impact on Financial Information," The Accounting Review (January 1973), pp. 34-43.
- Prakash, P. and S. Sunder, "A Case Against Separation of Current Operating Profit and Holding Gains," The Accounting Review (January 1979), pp. 1-23.
- Rappaport, A., Information for Decision Making: Quantitative and Behavioral Dimensions (Prentice-Hall, 1970).
- Revsine, L., "Accounting Data, Inflation, and Resource Allocations." The Accounting Forum (December 1978), pp. 24-30.
- Revsine, L., "On the Correspondence Between Replacement Cost Income and Economic Income," The Accounting Review (July 1970), pp. 512-23.
- _____, Replacement Cost Accounting (Prentice-Hall, 1973).
- _____, and I. B. Thies, "Productivity Changes and Alternative Income Series: A Simulation," The Accounting Review (April 1976), pp. 255-68.
- Ro, B. T. "The Adjustment of Security Returns to the Disclosure of Replacement Cost Accounting Information." Journal of Accounting and Economics (Vol. 2, 1980), pp. 159-89.
- Securities and Exchange Commission: Accounting Series Release No. 190.
- Short, D. G., "The Impact of Price-Level Adjustment in the Context of Risk Assessment," Journal of Accounting Research (Supp 1978), pp. 259-72.
- _____, "The Disclosure of Replacement Cost Accounting Data and Its Effect on Transaction Volumes." The Accounting Review (January 1981), pp. 70-84.
- _____, "The Disclosure of Replacement Cost Accounting Data and Its Effect on Transaction Volumes: A Reply." The Accounting Review (January 1981), pp. 181-87.

- Siegel, S., Nonparametric Statistic for the Behavioral Sciences (McGraw-Hill, 1956).
- Simmons, J. K. and J. Gray, "An Investigation of the Effect of Differing Accounting Frameworks on the Prediction of Net Income," The Accounting Review (October 1969), pp. 757-76.
- Solomon, I. and P. J. Beck, "A comparison of General Price Level and Historical Cost Financial Statements in the Prediction of Bankruptcy: A Comment." The Accounting Review (July 1980), pp. 511-15.
- Stanga, K. G. "SEC Replacement Cost Information: How Reliable?" The Journal of Commercial Bank Lending (May 1979), pp. 49-54.
- Sterling, R. R., "Measuring Income and Wealth: An Application of the Relevance Criterion," Journal of Business Administration (Spring 1972), pp. 3-23.
- _____, Ed., Theory of the Measurement of Enterprise Income (The University Press of Kansas, 1970).
- _____, Ed., Research Methodology (Scholar Book Company, 1972).
- _____, and W. F. Bentz, Eds., Accounting in Perspective (Southwestern Publishing Company, 1971).
- Temeles, R. J., C. V. Harlow and H. L. Stone, The Commodity Future Games (McGraw-Hill, 1974).
- Trueblood Committee: Objectives of Financial Statements: Report of the Study Group on the Objectives of Financial Statements (American Institute of CPAs, 1973).
- Vancil, R. F. and R. L. Weil, Replacement Cost Accounting: Reading on Concepts, Uses and Methods.
- Watts, R. L. and J. L. Zimmerman, "On the Irrelevance of Replacement Cost Disclosures for Security Prices." Journal of Accounting and Economics (August 1980), pp. 95-106.