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Research study on current-value accounting measurements and utility;

George M. Scott

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by Dr. George M. Scott
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PREFACE

This research study emerged from the conviction of the Touche Ross Foundation that historical-cost accounting provides inadequate information when substantial or persistent inflation is present in the economy. The Foundation solicited competitive research proposals in the belief that experimentation with current-value accounting and analysis of current-value benefits and measurement techniques is desirable. The proposal submitted by the research team at the University of Texas at Austin was accepted, and the research was undertaken with the financial sponsorship of the Touche Ross Foundation.

The project was ably guided by a Steering Committee composed of the following members:

Glenn A. Welsch Chairman	John Arch White Professor of Accounting, The University of Texas at Austin
Clarence D. Hein	Partner in Charge, Houston Office of Touche Ross & Co.
George Kozmetsky	Dean, Graduate School of Business, The University of Texas at Austin
James K. Loebbecke	National Director of Auditing Standards, Touche Ross & Co.
Edward L. Summers	Chairman, Department of Accounting, The University of Texas at Austin

Three faculty members at the University of Texas at Austin participated in the research and writing. Assistant Professor of Finance William E. Avera (now Manager of Financial Education at International Paper Company) deserves the credit for Chapter 4, Usefulness of Current Values to Investors and Creditors. Professor Avera also contributed many constructive comments pertinent to Chapter 7, Choice of Discount Rates for Present Value Analysis. Associate Professor of Accounting Barry E. Cushing (now Professor of Accounting at the University of Utah) designed and implemented the computer simulation model and analyzed the model output. Professor Cushing wrote Appendix B, INFLAN: The Computer Simulation Model, and Appendix C, INFLAN Output Analysis. Jim Loebbecke and Ray Perry of Touche Ross & Co. jointly contributed several ideas to Appendix E, Items for Further Consideration. Associate Professor of Accounting George M. Scott (now Professor of Accounting, The University of Oklahoma) wrote the remainder of the study and, as Project Director, supervised all research activities and edited the final report.

Two external and two internal consultants participated. Angela Falkenstein, an independent consultant engaged in continuing

research and analysis in the area of adjusting financial information for inflation, provided valuable assistance with the computer simulation model. Lawrence Revsine, Professor of Accounting at Northwestern University, provided guidance on several aspects of the research during the early phases of the project, and reviewed most of the draft of the final report. Jack Robertson, Associate Professor of Accounting, The University of Texas at Austin, critiqued some of the early chapters at their first draft stage. Associate Professor of Accounting Edward B. Deakin contributed at several stages to the general research design of the project.

The research team is indebted to the Steering Committee for their perspective, guidance, encouragement, and extensive efforts. Jim Loebbecke, Glenn Welsch, and Ed Summers participated deeply in the project in many ways, and each was available for consultation at all times during the study. The resources made available from Touche Ross & Co. by Jim Loebbecke provided an invaluable assist to the project. The research team is grateful that Dean George Kozmetsky devoted so much time to the project despite his deep commitment to so many other urgent activities; his contributions and support, as well as the administrative support of Assistant Dean Seymour Schwartz, are fully appreciated by the research team and by the other members of the Steering Committee.

Several research assistants made substantial contributions to the project. Two deserve special commendation. Steve Jarrett, an accounting Ph.D. student, drafted several numerical examples for Chapter 5, Usefulness of Current Values to Managers. Loretta Kirby, an MBA student, was in charge of running the computer model; to her goes special credit for perseverance in the face of seemingly infinite numbers of computer system behavioral problems.

Ada Scott assisted ably as an "in-house" systems consultant and assistant at a critical juncture in the development of the computer simulation model. She also smoothed the path of the entire study by her abiding patience with the demands of the project on her husband.

The research team is indebted to William S. Easman, Jr. of Faulkner, Dawkins & Sullivan, Eugene Minihan and James Williams of ARCO, and Don Brinkman of Valuation Systems for materials provided and for particularly useful discussions. Many other persons also provided various kinds of assistance.

George M. Scott
Project Director

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SECTION I

INTRODUCTION

CHAPTER 1

A SUMMARY OF THE STUDY

This study examines current-value accounting within a framework based on the premises that: (a) moderate to high levels of inflation will continue in the United States; (b) under inflationary conditions a variety of users who rely on historical cost financial statements will be provided misleading or inadequately informative information by these statements; and (c) therefore, attention to the usefulness of current-value accounting during inflation and to the measurement problems of current values is warranted. The study is intended to present the case in favor of using current-value accounting and does not attempt to provide equal consideration to the possible advantages of historical cost accounting.

Financial Statements and Users

Chapter 3 discusses the objectives of financial statements to establish a context for much of the rest of the study. It is argued that a primary objective of financial statements should be that of providing information to assist users in their prediction of future cash flows. It follows from this objective that information about earnings and earning power is not important per se, but rather is important because these measures provide information about probable future cash flows. Much of the discussion throughout the study deals with the virtues of current-value accounting for aiding users in the prediction of future cash flows.

A major tentative finding of the study is that while current-value measures calculated in conformance with the Touche Ross current-value accounting model (described in the booklet Economic Reality in Financial Reporting and in less detail in Appendix A) are apparently better predictors of future operating cash flows than is historical cost net income in most inflationary circumstances, for some sets of conditions historical cost net income predicts future operating cash flows as well as do current-value accounting measures (see Appendix C). However, for the most part the discussion in the study is in the context of the majority of situations where current values appear to be superior for cash flow predictions.

In Chapters 4 and 5, the accounting information needs of investors, creditors and managers are examined in detail. Chapter 6 considers a variety of ways in which current values may serve the needs of society better than do historical costs. These information uses are discussed primarily with reference to inflationary and post-inflationary periods.

Investors and creditors are shown to require accounting values about individual resources and obligations to help their prediction of: (a) company cash flows and liquidity and (b) how securities

prices will change in the market; both of these influence cash flows to investors and creditors from dividends and interest, the proceeds of sales, or from repayment of obligations. Deductive reasoning is used to show that historical costs provide incomplete information to investors and creditors in a dynamic price environment and that in general current-value measures provide a more useful basis for investors' and creditors' estimates of a company's future cash flows than do historical cost measures. Liquidity measurement ratios based on current-value financial statements are shown to be useful to fixed-income security investors.

While professional investors and lenders may attempt to compensate for inflation in their investment analyses they are likely to do so in a macro and inefficient manner. Nonprofessional investors are less well equipped to deal with the effect of inflation on financial statements; these investors may be more inclined to accept financial statements at face value, or to completely reject financial statements because the statements are not adjusted for inflation. Considerations of resource utilization efficiency, source and availability of current-value information, consistency and accuracy of current-value measurements, equity to nonprofessional investors, and the need for independent verifications of current values suggest that current-value calculations should be prepared and promulgated by companies rather than by analysts within the investment community.

In many of the treatises about price level accounting that have been published, no attention has been devoted to the use of inflation-adjusted information for managerial purposes, and in most of the remainder the subject has received but scant attention. This study considers at length the possible ramifications of current values for managerial purposes and puts forward several managerial uses of current values that appear to merit additional attention and exploration. The managerial utility of current values may be so great that current-value accounting could be justified in many companies on this basis alone.

Attention is devoted to the assistance that current values may provide to managers in four general areas: strategic planning, managerial control, operations control, and the external relations of companies. For several reasons, it appears that greater benefits can be realized if current values are routinely provided by a comprehensive current-value accounting system that systematically, continuously, and routinely provides current values in a consistent manner and that includes the normal checks and balances of an accounting system.

Because of the unstructured nature of the strategic planning processes it is difficult to specify precisely how current values can aid senior managers with these processes. Nevertheless, it seems reasonable that information about cost trends provided by current values would contribute significantly to the general background knowledge that is so important for senior managers in

their strategic deliberations. Current values seem particularly important to the development of growth, divestment, and R & D strategies.

Current values can serve well for several aspects of management control. As an example, the outcome of several aspects of investment analysis can be influenced by current values. These include the choice of a rate of return acceptance threshold and whether a project will be financed internally or through borrowings.

An important aspect of management control is product pricing. Costs are considered in several ways for establishing prices and managing product lines. Whether costs are taken into consideration when setting prices or in the after-the-fact analysis of profit margins, the relationship of prices to current-value costs is generally of greater significance to the manager than is the relationship of prices to historical costs. When costs are on a current basis, gross margin and rate of return maintenance may be more likely to be effective.

Current values may also serve usefully for margin maintenance in price regulated companies, can be used to help control product costs, and can assist in decisions about dropping unprofitable products. Current values could also serve as a basis for government contract renegotiations and for cost-plus contracts.

The complexities of international operations suggest that current-value accounting may be especially useful for management control in international companies. Current-value accounting holds promise for assistance with the particularly difficult problem of simultaneously compensating for the many different rates and patterns of inflation encountered as a consequence of operations in many different countries.

At the level of operations control, current-value accounting may be usefully employed in cost accounting systems for cost control purposes. Because of their closer relationship to market values, current values also appear to be more useful for liquidity assessments and for cash and working capital management than are historical costs.

Two areas of contact of the company with its environment may be well served by current-value information. First, current values seem likely to provide a more realistic company financial picture as a prelude to wage contract negotiations with employee unions. Second, because current values are more closely related to economic values of resources than are historical costs, earnings and rate of return measures based on current values may assist many companies' efforts to convince the public that company earnings are not in excess of those needed to satisfy stockholders, maintain productivity, and expand operations to provide the products and services expected by society.

Current-value accounting may be particularly important to society in two areas. The first is that of providing warning signals about capital erosion at the levels of both the company and the economy. Primarily because of a lack of information about the real values of companies' resources, the public and policy-making officials are inadequately informed about the real profits available for reinvestment. Current-value accounting can serve this need for information by informing society and policy makers about the need for additional capital as a consequence of capital erosion during inflation. The consequences of a lack of knowledge about current values may include excessive dividend distributions, a threat to the viability of our private enterprise system, and a deterioration of the ability of companies to raise new capital in the capital markets.

The other promising major service to society of current-value accounting is that of serving as an equitable basis for federal income taxation. Taxation based on historical costs has resulted in effective tax rates that are much higher during inflationary periods than are the rates based on historical costs; this contributes substantially to liquidity crises and cripples the economy's capital accumulation processes and economic growth.

It seems reasonable that to be most effective in establishing the credibility of current-value accounting for taxation purposes, industry should: (a) implement on a widespread basis one type of comprehensive current-value accounting; (b) use current-value accounting extensively for managerial purposes; and (c) place the priority for acceptance of current-value accounting as a basis for taxation above less desirable forms of taxation reform. Acceptance of taxation based on current-value accounting seems likely to require a long-term effort by industry.

Current values also appear to be usefully employed for several other social purposes. Arguments are made in the study to the effect that current values are preferable to historical costs because they tend to: (a) promote greater efficiency in the stock markets; (b) improve the efficiency of use of resources within the economy; (c) encourage equity investment; and (d) have greater potential value for government statistical and economy regulation purposes. Additionally, current-value accounting, although long criticized by its opponents as perhaps contributing to inflation, also tends to dampen inflationary trends in several ways.

The Cash Flow Prediction Model

A unique aspect of this study was the INFLAN computer simulation model. INFLAN was primarily devoted to examining the relationship of operating cash flows to historical cost net income and to various measures produced in conformance with the Touche Ross current-value accounting model. INFLAN was necessarily restricted in scope and did not fully define the financial conditions of the four companies (each in a different industry) or their environmental constraints. Nevertheless, the INFLAN results provided strong evidence that at

least one of the current-value measurements examined outperforms historical cost net income as a predictor of the next year's operating cash flows in most of the wide variety of inflationary conditions simulated.

The INFLAN model results suggest three general statements about the relative abilities of various measures as predictors of operating cash flows in different circumstances. These are: (a) there does not appear to be any one measure that is preferable to all others in all types of inflationary conditions for the prediction of future operating cash flows; (b) current-value accounting measures perform at least as well as historical cost net income as a predictor of the next year's operating cash flows in almost all conditions examined and significantly better than historical cost net income in most situations; and (c) analysis of the relative predictive ability of various measures is complex and involved; in a particular set of circumstances one measure appears to be the best predictor, and in other circumstances another does.

The INFLAN findings also permit several more specific statements to be made, which should be interpreted not as conclusions but rather as demonstrations within the limited context and capabilities of the INFLAN model. These are detailed in the Appendices.

The INFLAN model represents only a beginning in the quest for insight into the situations in which financial statement users should utilize one measure as opposed to another to attempt to understand and predict future cash flows. Further research efforts in this direction could eventually provide guidelines, based on combinations of company characteristics and patterns of inflation, for selection of a preferred measure for use as a cash flow predictor.

Current-Value Measurement and Implementation

Chapters 7 and 8 examine the measurement of present value and current costs, respectively. These chapters also establish guidelines for choosing a discount rate and for selecting from among several current cost measurement methods.

Based on the nature of discounting and the purposes of accounting valuation the conclusion is reached that discount rates used for present value calculations should compensate for the time value of money, inflation expectations, and risk, and should also encompass the term structure of interest rates that is appropriate for the particular resource. The several types of risk are classified as: price-of-money risk, financial risk, business risk, and management risk. The analysis indicates that not all of these risks are germaine to accounting valuation for each resource; which risks are relevant varies according to the nature of the item valued and whether it has a value separate from the company.

Potential discount rates which merit consideration and are examined in the study fall into four categories: interest rates,

cost of capital rates, capitalization rates, and return on investment rates. The advantages and disadvantages of each when considered for use as a discount rate are noted.

Based on consideration of: (a) the components of discount rates, including the nature of the various risk components and which risks should be included in a discount rate for different discounting purposes; (b) the nature of the term structure of interest rates and the need to incorporate this structure into discount rates; and (c) the availability and suitability of various types of financial rates for use as discount rates, recommendations are made for selection of discount rates for particular types of resources and obligations. The overall recommendation is that a three-tier system be established for choosing discount rates.

The three tiers are: (a) market interest rates for debt instruments for which an active market exists; (b) quasi-market rates for debt instruments without markets, with the discount rates established by relating the debt instruments to bond rating tables to find a bond yield that captures the risks and term structure required of the discount rate; and (c) "treasury bond calculated rates" for other resources and obligations that can be discounted. The treasury bond calculated rates would be determined by correlating interest rate term structure and duration of the resource valued to a treasury bond issue of similar term structure and duration in order to establish a base discount rate, and then adjusting this base discount rate for the additional risks associated with the resource. An approach similar in some respects to bond risk analysis is suggested for establishing suitable add-on rates to compensate for the additional risks. It is reasonable to believe that, if this approach to discount rate determination is adopted, a specialized body of knowledge similar to that associated with bond rating analysis and a professional group of valuation experts can be expected to emerge to implement the second and third tiers of this approach.

Where cash flows cannot be reasonably estimated or a supportable discount rate cannot be established, a measurement approach should be used to establish a current-cost surrogate for present value. Approaches to current-cost measurement that were considered, in order of their perceived overall suitability for determining a current-cost surrogate for present value, are: (a) current costs in the nature of market prices for the resource; (b) expert assessments which eclectically choose and utilize the best measurement methods for the circumstances to construct a market price equivalent; (c) pricing systems within the company and associated with its control systems that are adapted to provide current costs; (d) internally prepared specific price indexes; and (e) external specific price indexes. The choice among these methods is presented as a tradeoff among theoretical preference, and cost, measurement difficulty, and other considerations. It is noted that collaborative effort on the part of accounting associations might serve to provide specific price indexes that are designed exclusively for accounting valuation

and which minimize the disadvantages of the external specific price indexes available at the present time.

Contributions of the Study

This study pioneers in current-value accounting research and thought in several ways that the reader should be alert to while examining the study results. These ways include theoretical explorations which apparently have not previously been accomplished or synthesized, the use of innovative research methodology, and the identification of previously latent valuation issues. Several recommendations are made which are thought to warrant a great deal of further consideration.

The most significant contributions of this study are seen as: (a) establishment of cash flow prediction as a major purpose to which financial statements should be put, and incorporation of this cash flow prediction orientation into much of the discussion in the study; (b) creation of a computer simulation model to explore the abilities of accounting measures to predict operating cash flows, and findings based on output from this model which have implications for accounting valuation and for further cash flow prediction research; (c) detailed analysis of the current-value accounting information needed for financial statement users and for several social purposes; (d) analysis of the nature of discount rates and of the risks and term structure they should capture for accounting valuation purposes; (e) recommendations for an approach to selection of discount rates; and (f) establishment of selection criteria for current costs when discounting to establish accounting value is not practical.

The researchers do not intend for the findings of this study to be definitive or that they be represented as an immutable position on any topic. Rather, the findings are put forward in the vein of providing new insights about current-value accounting and accounting valuation which merit the attention of the community of accountants and others concerned with financial reporting and accounting information use. It is hoped that the report will be accepted in this spirit of continuing inquiry and experimentation.

CHAPTER 2

THE NATURE OF THE STUDY

Introduction

The effect of inflation on enterprises' economic activity and financial well-being may not be adequately reported to those who use financial information about enterprises for making decisions. In part, this inadequacy of reporting is because conventional financial statements do not disclose the impact of inflation on resource values, liquidity positions, cash flows, earning power, and current earnings of the enterprise.

If the effects of inflation are not indicated or are improperly measured in the financial statements, these financial statements can be a contributory cause of erroneous resource allocation decisions of financial statement users. Lack of adequate information about inflation also complicates the internal investment analysis process and the management process, and causes tax and other inequities between companies as well as between the sectors of the economy.

Enterprises' financial information and reporting systems should measure, record, and report the economic reality of the effects of inflation on financial position, earning power, and cash flows. Although current-value accounting measures and communicates effects of inflation on enterprises, it is an untried approach for most American companies. As such, it is fraught with a multitude of challenging problems which require innovative solutions, not the least problem of which is determining which current-value accounting system would provide satisfactory measurements.

Even those accountants who are sensitive to the critical need for accounting approaches that recognize inflation are presently unable to agree that one of the several proposed current-value approaches is preferable to all others. In part, as Revsine noted, this dilemma of choice may exist because different types of users may need different kinds of information.[1]

One way to resolve this dilemma is to design, implement, and experiment with those current-value accounting approaches that appear to have the potential for satisfying the financial information needs of most user groups. These approaches then can be evaluated on the basis of experimental results, first-hand observations, and experience. The Touche Ross current-value accounting model (described in Appendix A) is one such approach that currently is being implemented in several companies.

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[1]Lawrence Revsine, Chapter 1 of Replacement Cost Accounting (New York: Prentice-Hall, Inc., 1973).

Concurrent with experimentation and evaluation, the accounting profession should institute a program to educate accountants, managers, investors who use financial information in their analyses, creditors, special interest groups such as union leaders, government agency officials and other public policymakers, and the general public about how current-value accounting can improve financial reporting in the face of inflation.

Objectives of This Study

The overall objective of this research study is to provide recommendations concerning measurement and choice decisions for current-value accounting which take into consideration both theoretical and implementation problems.

Specifically, the purposes of the research study are to:

1. Investigate how current values impact on the decision models of managers, investors, creditors, and the numerous persons and groups both in and outside of government who base their decisions affecting society on information from private enterprises.

2. Investigate how performance analysis of companies based on traditional financial statements produces misleading or inadequate information as a consequence of inflation and focus on how current values may improve the information provided by accounting for performance measurement.

3. Develop a set of current-value measurement techniques, giving attention to the reliability of these techniques and to how they are applied in practice.

4. Present criteria for selection of appropriate discount rates for valuation of monetary resources and obligations using the present-value method.

Scope

To accomplish the purposes of this study, primary attention is given to the following areas:

1. Objectives of accounting

2. Theory of current-value accounting

3. Prediction of future cash flows based on financial information

4. The extent to which current-value accounting provides the needed financial information to decision makers

5. Current-value measurement techniques and their effectiveness.

Measurement problems in current-value accounting common to most companies are analyzed in this study. Specific industry problems (for example, the valuation of mineral resource assets) are excluded.

The primary focus of this study is on current-value accounting measurements and utility; the study is secondarily concerned with disclosure, reporting format, conventions, and the cost of current-value accounting information as compared to the benefits.

Approach

The approach was to use several methodologies. An examination of the literature on current-value theory was made, and a number of published empirical studies relating to current-value measurement were examined. Deductive reasoning was applied, and computer simulation was used. Extensive discussions were held with managers (particularly in the petroleum industry), institutional investors, bankers, valuation experts, representatives of the SEC, FASB, and AICPA, executives of companies experimenting with current-value accounting, other researchers in the area of current-value accounting, and numerous other persons. As the study progressed, it evolved in response to the tentative conclusions that emerged, the research findings of others as they were made known, the SEC's pronouncements and deliberations related to financial disclosure and to ASR 190 dealing with replacement costs, and the changing thinking and priorities within the accounting community about current-value accounting.

Three faculty members at the University of Texas were directly involved in the research and writing and a fourth participated as a consultant. Three other faculty members served on the project's Steering Committee, and two partners of Touche Ross & Co. also served on that Committee. The Committee held one-day meetings on four occasions to review progress, establish policies, and provide direction. Two outside current-value consultants were utilized.

Extensive experiments were conducted utilizing INFLAN, a computer simulation created as a part of the study and based on the Touche Ross current-value accounting model. INFLAN simulated the financial statements of four companies for 15 years under a variety of inflationary conditions -- eighteen different combinations of general inflation, specific inflation, and sales growth conditions for each company. The companies included a chemical company, a steel company, an appliance company, and an integrated oil company. INFLAN takes into account each company's different capital structure, level of sales, financing policies, and various attributes of operations. The findings from the INFLAN simulations are discussed at various points in the study, and are provided in full detail in Appendix C; the INFLAN model is described fully in Appendix B.

For the purposes of the study, the Report of the Trueblood Committee, Objectives of Financial Statements (New York: American Institute of CPAs, 1973), is considered to be authoritative with respect to the objectives of enterprise financial statements. Chapter 3, Objectives of Financial Statements, is based in large measure on the Trueblood Committee's Report.

SECTION II

FINANCIAL STATEMENTS AND USERS

CHAPTER 3

THE OBJECTIVES OF FINANCIAL STATEMENTS

This chapter presents those aspects of the Report of the Study Group on the Objectives of Financial Statements (Trueblood Report) that are particularly relevant to current-value accounting to establish a background for subsequent discussions about the information needs of various users. In particular, the Trueblood Report will be shown to place emphasis on financial information that assists financial statement users in their prediction of future cash flows, and this emphasis on future cash flows will be reflected throughout this study.

A Hierarchy of Objectives

A hierarchical arrangement of several of the objectives of financial statements that are stated in the Trueblood Report helps to demonstrate the interrelationships among them. The objectives are arranged in Exhibit 1-1 in the following sequence:

1. What is the basic objective of financial statements?
2. Information for what purpose and for use by whom?
3. What information should be provided?

The Trueblood Report states that:

> THE BASIC OBJECTIVE OF FINANCIAL STATEMENTS IS TO PROVIDE INFORMATION USEFUL FOR MAKING ECONOMIC DECISIONS.[1]

This objective focuses clearly on the generation of accounting information for decision making rather than on the traditional notion of stewardship. While this objective may appear to be an articulation of an obvious conclusion, for many it represents a fundamental reorientation of accounting objectives.

The remaining objectives shown in Exhibit 1-1 comprise the basis for the following summary statement of the objectives of financial statements:[2]

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[1] Objectives of Financial Statements: Report of the Study Group on the Objectives of Financial Statements (Trueblood Committee), p. 13 (New York: American Institute of CPAs, 1973).

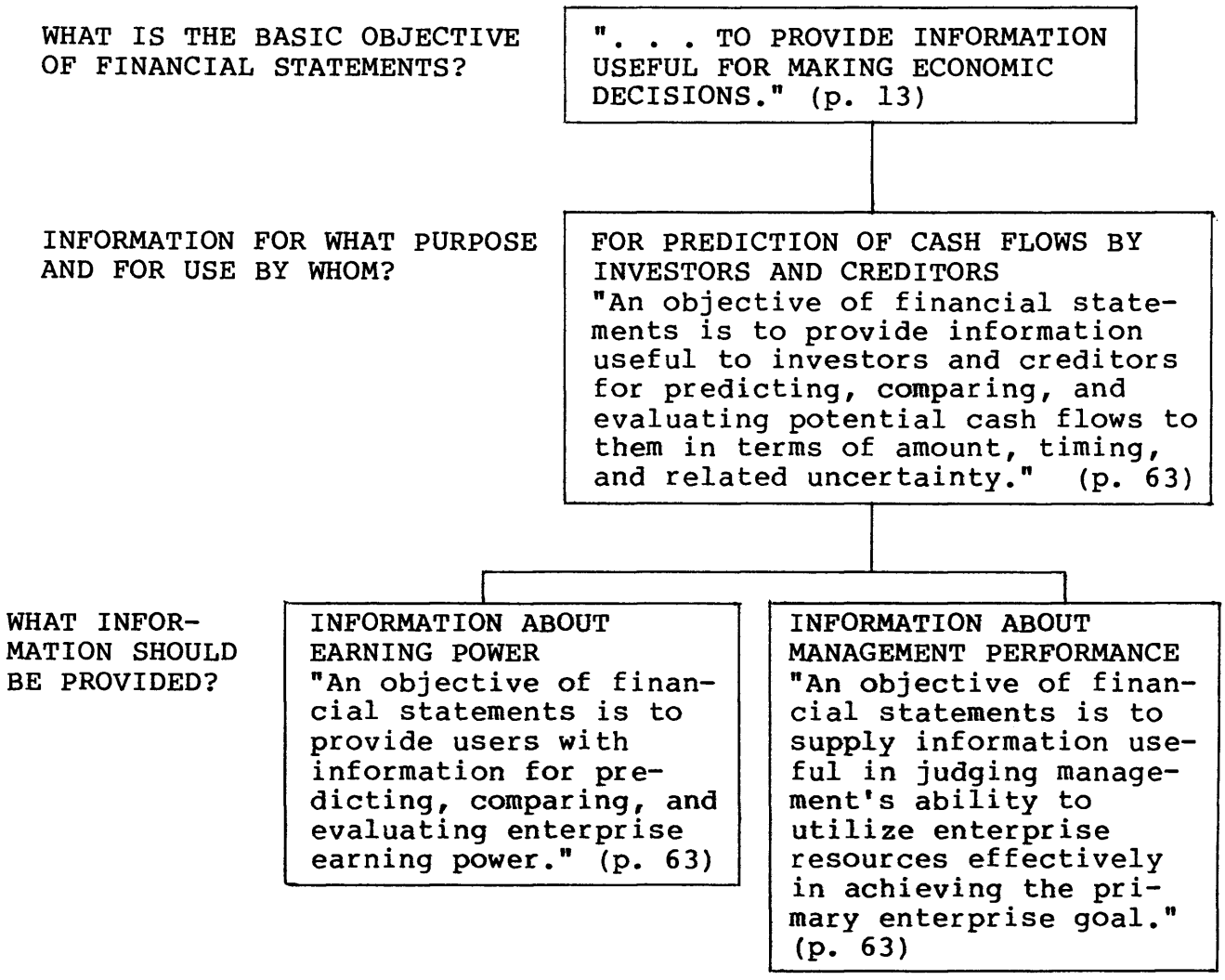
[2] Only those objectives considered to have the more significant implications for current-value accounting are presented.

FINANCIAL STATEMENTS SHOULD PROVIDE INFORMATION ABOUT EARNING POWER AND MANAGEMENT PERFORMANCE TO ASSIST INVESTORS AND CREDITORS IN PREDICTING CASH FLOWS FOR USE IN MAKING ECONOMIC DECISIONS.

This objective indicates that cash flows and their prediction are paramount. Earning power is important because it provides an indication of the ability of a company to generate cash and of the prospects of cash flows in the future.

EXHIBIT 1-1

A HIERARCHY OF OBJECTIVES BASED ON THE TRUEBLOOD REPORT



Users of Financial Information

Who are the users of financial statements? First and foremost, they are economic decision makers. While the objective cited in Exhibit 1-1 identifies only investors and creditors as users of financial statements, the Trueblood Report (p. 18) further identifies economic decision makers as follows:

> Economic decisions about commercial enterprises are made principally by present or potential investors in equity securities, by creditors, and by managers and employees who invest time and effort . . .

This study focuses on the three primary groups of financial statement users: investors, creditors, and managers, although some consideration is given to a variety of other users in Chapter 6.

The Information to be Provided

The Trueblood Report states that financial statements should not be viewed as the sole source of information for economic decisions. Exhibit 1-2 further explicates this statement by showing the general types of information which have a major impact on economic decisions. Exhibit 1-2 suggests that information about a particular entity relates to the past and future, to the performance of the entity, and to characteristics of the environment in which it functions. Thus, there are two sets of required information (1.1, 1.2, 1.3) and (2.1, 2.2, 2.3). Financial information about the entity is restricted to the subsets designated 1.1 and 2.1; information reported in conventional published financial statements is further restricted to subset 1.1.

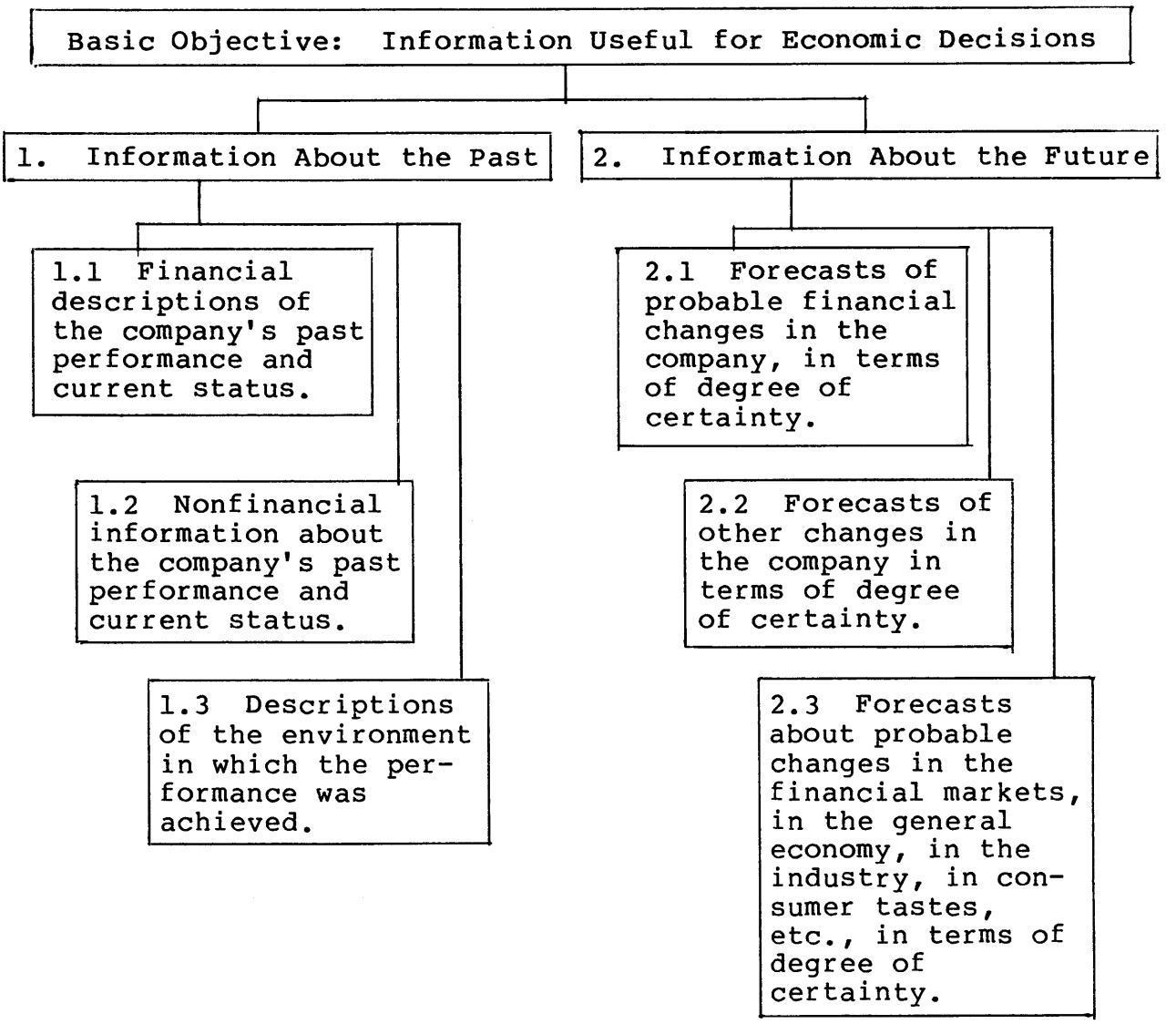
This classification scheme indicates the various forms of information that are needed by decision makers which are not provided by financial statements. Foremost among the missing types of information is the entire category of information about the future.

The Trueblood Report states that "all economic decisions look to the future" (p. 45), which serves to dramatize the importance of information that assists users in evaluating a company's future prospects. Financial statements portraying the results of past operations and present status derive their utility because "decision makers cannot know the future, they must approach it by looking at the past" (p. 45). For this fundamental reason, investors, creditors, and managers are interested in financial information for predictive purposes.

Projections of earnings and cash flows based on the past are useful to the extent that the future will be similar to the past. Although the future is never identical to the past, financial statements help identify trends which may be reasonably expected to continue into the future. The accuracy of prognostications is

thereby greater than what would generally prevail without attention to these statements, assuming that the statements realistically represent current status and past operating results. In general, the more realistic the representations in the financial statements, the more realistic will be the predictions on which economic decisions are based.

EXHIBIT 1-2



Financial statements should provide information useful for the prediction of cash flows. An important subtlety, however, is that "the role of financial statements is not to predict, evaluate and compare cash flows to users, but to provide information that assists the user in this role."[3]

The three following statements in the Trueblood Report appear to support the provisions of information useful for prediction of future cash flows as the paramount objective of financial reports:

> . . . transactions that establish highly probable receipts and disbursements of cash should be emphasized in the financial activities statement. (p. 38)
>
> . . . the measurements made by accounting should relate to the enterprise's goal of producing the most cash for its owners. These measurements, therefore, should emphasize the actual or prospective disbursement or receipt of cash. (p. 22)
>
> . . . accounting measurements of earnings should recognize the notion of economic better-offness, but should be directed specifically to the enterprise's success in using cash to generate cash. (p. 22)

Users are primarily concerned about the ability of an enterprise to generate net cash inflows. If users could realistically predict a company's cash inflows and outflows in terms of amount, timing, and uncertainty, their use for information about periodic earnings would be reduced to legal and other considerations which necessarily rely heavily on the accrual earnings concepts. Indeed, earnings and cash flows that are properly accounted for as to timing and that involve no uncertainties would be equivalents. The Trueblood Report notes, "With perfect knowledge . . . earnings for the period would be the change in the present value of future cash flows, discounted at an appropriate rate for the cost of money." (p. 22) If users could determine these future cash flows, they would utilize them directly for performance evaluation purposes as well as for making economic predictions about the company. Unfortunately, the direct evaluation of future cash flows associated either with specific resources and obligations or with the total entity involves monumental measurement and judgmental difficulties. These problems preclude the direct prediction of cash flows and force users to concentrate on the prediction of earnings and the evaluation of management.

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[3]Martin S. Gans, Robert S. Kay, and George H. Sorter, The Objectives of Financial Statements, p. 9 (New York: Touche Ross & Co., 1974).

Information About Earning Power

The importance of earning power information stems from the fact that "Enterprise earning power has as its essence the notion of ability to generate cash in the future." (p. 23) In commenting on the strong association between earning power and cash flows identified in the Trueblood Report, Anton notes that "the definition of earning power as the ability to bring in cash rather than the ability to produce earnings continues the emphasis . . . on cash flows and is a shift in emphasis from traditional accounting ideas."[4] The clarification of objectives made by the Trueblood Report tends to promote substance over form in the information provided by financial statements.

Information about earnings is important for future cash flow prediction because relationships exist between present earnings and earning power as determined on an accrual basis, and the ability to generate future cash flows. Accrual accounting is designed to indicate "economic reality" more accurately than cash basis accounting because earnings measured on an accrual basis generally is a better indicator than are cash basis reports of a company's ability to generate cash, and it is cash generation which represents economic reality. However, measurement of earnings on an accrual accounting has tended to become an end in itself; that is, earnings figures appear to be viewed as if they are intrinsically important as opposed to being important because of their role in the estimation of future cash flows.

While the most important purpose of accrual earnings calculations is the facilitation of cash flow prediction, this may be an indirect process involving prediction of earnings rather than of cash flows. For example, pro forma financial statements on an accrual basis, rather than cash flow statements, are often the primary result of the planning and forecasting processes.

The Trueblood Report implies that earnings should be measured using rules that will provide a close, natural relationship between cash flows and earning power. The Report suggests a direction of change that would result in a direct linkage of these, as follows: "The determination of periodic earnings may develop in stages toward a methodology based on changes in discounted cash flows." (p. 32)

Information About Management Performance

The objective of providing information useful in judging management performance is closely linked with the objective of prediction of earning power. Investors and creditors are primarily interested in evaluating the performance of the company and its managers to assist in their predictions of earnings and cash flows.

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[4]Hector R. Anton, "Objectives of Financial Accounting: Review and Analysis," The Journal of Accountancy, January 1976, p. 45.

Earning power represents the potential of the company to generate earnings and cash flow. Without capable management, earning power potential may not be realized. Investors and creditors evaluate the past performance of management as an indication of a company's probable future performance level. This process in turn helps to indicate whether potential earnings and cash flows are likely to be realized.

The relationships between cash, earning power, and management evaluation have been described as follows: "Users want to predict, evaluate and compare cash flows. To do so they must have information about enterprise earning power and information about management's utilization of enterprise resources to effectively achieve enterprise goals."[5]

Managers also need information for evaluating how effectively the resources at their disposal were utilized. As a part of their planning responsibilities, managers must make predictions about a company's future, and analysis of past performance is an essential ingredient in these predictions.

Required Qualitative Characteristics of Information Provided

The Trueblood Report identifies seven qualitative considerations which are summarized below:

> Relevance and Materiality -- Information should be disclosed in financial statements when it is likely to influence the economic decisions of the users of financial statements.
>
> Form and Substance -- The guidelines for reporting information should be expressed so that substance, not form, governs. The substantive economic characteristics, not the legal or technical form, should establish the accounting for transactions and other events.
>
> Reliability -- Reliability varies with the nature of the information. The objectives of separating fact from interpretation and of disclosing uncertainties and assumptions should increase the value of financial statements by indicating the inherent differences in reliability attached to various pieces of information . . . The reliability of financial statement information is affected not only by uncertainties inherent in the subject matter, but also by the degree of precision of the measurement process . . . Financial statements should not be presented to imply a misleading degree of precision or reliability.
>
> Freedom from Bias -- Preparers and users, borrowers and lenders, buyers and sellers, special interest groups, and others have primary interests in financial statements.

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[5]Gans, Kay, and Sorter; op cit p. 9.

While any information affected by judgments necessarily has some bias, there should be no purposeful bias favoring any group.

Comparability -- The essence of economic decisions is choice among possible courses of action. Choice requires awareness of the opportunities offered by alternatives. Financial information should facilitate the comparisons needed to make investment and other decisions.

Consistency -- Consistency of method over time is a valuable adjunct to comparability. The needs of users of financial statements may be expected to change, which will produce a need for changed objectives and for changed accounting standards . . . The desire for consistency should not become an obsession that impedes progress. When information indicates that the current presentation is inappropriate, a new presentation should be adopted. But until that happens, consistency should be observed meticulously.

Understandability -- Accounting information should be presented so that it can be understood by reasonably well-informed, as well as by sophisticated, users . . . Increasing understandability of financial information is not a matter of mere simplifying. Not all complexities can be made simple by describing them simply. Understandability requires that information be expressed as simply as permitted by the nature and circumstances of what is being communicated.

Reporting Objectives and Economic Reality: A Summary

The Trueblood Report makes a cogent argument that it is an enterprise's future cash flows which are of primary interest to managers, investors and creditors. From that premise it follows that financial statements should be developed in ways which provide information useful for predicting the potential for the future generation of cash flows by the enterprise. Information about financial position and earning power can be useful for predicting future cash flows for the entity. However, particularly during inflationary times, a way to measure and report the financial position and earning power of an enterprise is needed that is more effective than the conventional historical cost-based model.

Financial position represents: (a) the resources available to a company for generation of future cash inflows; and (b) obligations that require future cash outflows. Earning power indicates the potential of an enterprise to generate cash flows. In the long run earnings are synonymous with a company's net cash flows.

In order to measure financial position and earnings to reflect the long-run cash consequences of a company's activities for the statement users, the following question must have an appropriate response:

> Which approach to the measurement of financial position and earnings provides valuations that most accurately reflect the cash flow potential in particular circumstances?

Alternative responses that should be considered are:

a. Historical cost

b. General price-level adjusted historical cost

c. Current cost

d. Net realizable value

e. Present value of future cash flows

f. Combinations of the preceding approaches.

The following chapters initiate the research task of developing useful responses to this question.

CHAPTER 4

USEFULNESS OF CURRENT VALUES TO INVESTORS AND CREDITORS

Introduction

Dynamic and dramatic changes in the relative prices of goods are a fact of modern economic life. The concern of equity investors is to determine the impact of unstable prices on risk and return of securities. Lenders must evaluate the impact of price changes on the repayment probabilities of loans to business enterprises.

This chapter examines changes in financial reporting which might aid communication to investors and creditors of the impact of changing prices on the past performance and future operations of companies. Accounting based on historical costs, while perhaps adequate in times of relatively stable prices, provides inadequate information in a dynamic price environment.

The hypothesis which will be validated in this chapter is that financial reports reflecting temporary price information are more useful for investor and creditor purposes than is historical cost information. The analysis proceeds from general principles of security evaluation to how information contributed by current-value accounting assists investors and creditors. The chapter also addresses the question of which of the available procedures for determining current values for various accounts is the more consistent with investor information requirements.

Classification of Investors

The way an investor uses financial information depends upon the investor's institutional setting, portfolio strategy, and view of security markets. This section establishes a distinction among investors -- professional and nonprofessional investors, fixed-income investors, equity investors and creditors, and market-oriented investors and fundamental investors.

First considered is the distinction between professional and nonprofessional investors. Professional investors encompass the growing ranks of institutions and those individuals who devote substantially all of their efforts to portfolio management. These investors use a broad range of data inputs in addition to published financial statements. They possess substantial expertise and are inclined to undertake detailed analyses and extensive manipulations of accounting numbers; some professional investors have even been making adjustments to historical cost accounting data that produce approximations of current-value amounts.

Nonprofessional investors typically use a more limited set of information sources and are more inclined to accept financial statements at face value. Current-value statements will make available to this class of investors information that most of them have not previously used in their decision making.

Fixed income and equity investors use different types of analyses. The valuation of fixed-income securities is concerned with the probability that all contractual payments will be made on time and in full. Creditors make similar assessments when evaluating the quality of a loan and tend to use about the same analysis techniques and information as do fixed-income investors.

Equity investors do not receive contractual payments, but instead participate in the growth and prosperity of the firm. Equity investors are primarily concerned with information about earnings potential and other considerations that indicate the future dividend distributions and market values of a company's equity securities.

Market-oriented and fundamental investors concentrate on different types of information in predicting future stock returns. Market-oriented investors believe that the most useful information source is the market itself. These analysts believe that careful study of past behavior of price and volume data will reveal underlying forces of supply, demand, and psychology. Fundamental analysts, on the other hand, argue that the future price of a security is related to the intrinsic economic value of the business enterprise underlying the security. Thus, fundamental analysts rely heavily on accounting information and other indicators of resource and entity values.

Most investors use some mix of each of these two approaches. Typically investors speculating on short-run price swings give greater credence to technical indicators in the marketplace while long-run investors are more inclined to emphasize fundamental analysis. The discussion of this chapter about current-value accounting is from the perspective of the long-run investor with the fundamental orientation because of the interest of this type of investor in value information.

Current Values and Fixed-Income Investment

Fixed-income investment includes bonds, mortgages, preferred stock, and other securities with a maximum promised cash flow to the investor. Fixed-income analysis is sometimes called a "negative art" because the focus is on the possibility of harmful events which could cause the firm to miss scheduled interest and principal payments. Accounting and other information is used to attempt to answer two questions:

1. What is the probability of default on each future payment date?

2. What is the likely settlement value should the company default?

This section will examine how current-value accounting is useful in answering the above two questions. For convenience of exposition the discussion will use bond terminology. The phenomena discussed are applicable to other forms of fixed-income obligations including the important category of loans made by commercial banks and other financial institutions.

The ability of an entity to avoid default on interest or principal at the payment date of fixed obligations is related to the cash generated by operations. If the cash generated is less than the maturity of fixed obligations the company must either convert assets to cash, or borrow (usually by pledging assets), or issue securities, or default. If the entity defaults, the eventual proceeds paid to the investor are determined by how much cash the trustee can raise through the sale of assets and the extent to which the cash is dedicated to more senior creditors.

Analysts utilize a number of accounting ratios, together with other information, for estimating default probability and settlement value. In an environment of changing prices, ratios based on historical costs are unlikely to be as relevant to fixed-income investor needs as are current-value based ratios, as is indicated by examination of the information content of the various ratios used. These ratios fall into three broad categories:

1. Coverage ratios -- these ratios measure the relationship between income and fixed obligations.

2. Working capital ratios -- these ratios portray the ability of an enterprise to generate cash in the short-run.

3. Capitalization ratios -- these ratios indicate the degree to which a company is financed with borrowed funds.

How current-value accounting enhances these ratios to investors for assessing the probability of default and of payment of the principal is discussed in the next several paragraphs.

Coverage ratios measure the margin of safety by which earnings exceeds the fixed obligations due in the near future; they portray the extent to which income generated through operations must decline before a fixed obligation (interest, rent, lease payments, etc.) cannot be paid by the company. Implicit in the use of coverage ratios is that a close association exists between earnings streams and cash flows. While the specific definition of earnings and fixed obligation depends upon the type of security or loan being evaluated, a common definition used for income is earnings before interest and taxes (EBIT).

The coverage ratio is used to assist in making judgments about the stability of an enterprise's earnings to determine how vulnerable the investor is to default. Consider a ratio of 2.0: an investor could reason that it would require a 50% decline in EBIT to force the enterprise to extremis (straightened settlement) that would require the company to turn producing assets into liquid assets to the detriment of future earnings potential. If the investor believes that a decline of this magnitude is unlikely over the life of the investment, the possibility of default will be judged remote.

In an inflationary environment when the replacement of inventory and fixed assets at higher prices absorbs more of the cash generated by operations, historical cost EBIT would not reflect the higher replacement costs. Suppose that 25% of EBIT must be devoted to the additional expenditures necessary for replacement of inventory, plant, and equipment because of inflating prices. If EBIT is measured on a historical cost basis the additional expenditures necessary for replacement of inventory, plant and equipment would not be reflected in EBIT for the period and the ratio would remain at 2:1. Yet, from a cash flow perspective, if EBIT fell 25% (a historical cost coverage of 1.5), the enterprise would be able to meet only fixed obligations and make the expenditures needed to replace inventories and capital equipment. Any further drop in coverage would cause the enterprise to be unable to maintain its current level of operations, so that interest would be paid out of capital, hence triggering a decline in future EBIT. This future decline may affect the probability and magnitude of future payments to investors and creditors. To evaluate coverage in an inflationary environment, the analyst must be able to reasonably estimate maintainable income. The information needed to do this must be provided by current-value accounting.

A coverage ratio based on current values adjusts for inflationary impacts. Analysts then can judge better the point at which the enterprise ceases to be able to meet fixed obligations and to maintain level operations and earnings.

Working capital ratios are important because fixed payments must be made in cash. Even if an enterprise has earnings, creditors can force reorganization if cash is not present to meet current obligations. Working capital ratios normally compare the size of some or all current asset accounts to some or all of the current liabilities. The rationale behind these ratios is that such current assets as marketable securities, accounts receivable, and inventory can be readily converted to cash in the event of an emergency.

In an inflationary environment, the historical cost conventions for valuing noncash current assets may not reflect the ability of the firm to raise cash by selling or pledging its current assets. For example, the LIFO method of inventory valuation leaves older, less inflated costs on the balance sheet, and so the book value of LIFO inventory may be much lower than the amount of cash the firm could raise through sale or hypothecation. Fixed obligation investors are thereby deprived of realistic and relevant information about the liquidity of the company.

Current-value accounting provides that current asset and liability accounts be adjusted to reflect contemporary values so that they bear a closer relationship to cash-out values. Thus current-value working capital ratios communicate more information about the short-run solvency of the firm.

The purpose of capitalization ratios is to communicate the size of the claim that various classes of creditors have against the resources of the enterprise. Much of the interpretation of capitalization ratios centers around settlement value in the likelihood of reorganization. If total assets are large relative to the claims of more senior creditors, a bond is more likely to receive settlement near par if a distress settlement must be made. Since settlement is made in today's dollars, current values rather than historical costs are most relevant.

In historical cost accounting the balance sheet amounts are based on transactions at past dates. Asset values may bear little relationship to liquidation values if price changes of the resources held by the company have occurred in the interim. Hence, conventional accounting numbers do not provide useful information about liquidation values. The difficulties that may be caused by this tenuous relationship between historical costs and current values were reported by one author in his discussion of capitalization ratios:

> Although it would be nice to send out teams of industrialists, engineers, and real estate appraisers to evaluate corporate assets, this usually is not feasible. Accordingly, the practice has developed among security analysts of using two measures of common stock equity: (1) the book value as shown on the balance sheet, and (2) the market value, derived by multiplying the number of shares outstanding by current market price, or by an average of recent high and low market prices. Where the two measures produce quite different results, the analyst must use his judgment as to which is more representative of realistic asset value.[1]

Current-value asset values also provide valuable information about the liquidity value of long-term assets. Although the degree of liquidity of these assets typically is less than that of working capital assets, an enterprise with a cushion of fixed assets is better able to arrange quickly sales, loans, or even leaseback arrangements to meet immediate cash needs. To all investors concerned about liquidity, current values are usually better indicators than are historical costs of the probable indirect liquidity aspect of long-term assets.

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[1]Jerome B. Cohen, Edward D. Zinbarg, and Arthur Zeikel, Investment Analysis and Portfolio Management (Homewood, Illinois: Richard D. Irwin, 1973), p. 389.

Current Values and the Fundamental Analysis of Equity Investment

Equity holders are not granted a contractual return but are induced to contribute capital because of the potential for increase in the value of the company which, if realized, provides a return to equity investors that may exceed that payable to fixed obligation investors. In this sense equity analysis is a positive art -- the analyst attempts to anticipate the good news that may occur in the future. Since an equity security has no maturity, the length of the returns extends to the indefinite future.

Income Approach

If an investor purchases a common stock with the intention of holding it indefinitely, the economic worth of the share would be the discounted value of all future dividends. In mathematical terms:

(1) $$V_o = \sum_{t=1}^{T} \frac{D_t}{(1 + R_t)}$$

where V_o = value at time zero (now)
D_t = dividend anticipated in period t
R_t = appropriate discount rate (which accounts for risk and the expected erosion of the purchasing power of the monetary unit)

While the discounting of all future dividends theoretically is valid, it is not an operational way of analyzing common stocks. The Gordon Model is one attempt to operationalize this analysis by assessing the effect of price changes in the input and product markets.[2] This model assumes the enterprise is able to reinvest its retained earnings in a way that maintains a constant dividend growth rate.

(2) $$V = \frac{D_o}{k - g}$$

where g = the maintainable dividend growth rate

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[2]M. J. Gordon, The Investment, Financing, and Valuation of the Corporation (Homewood, Illinois: Richard D. Irwin, 1962). A further discussion of the applications and usefulness of the model is available in E. M. Lerner and W. T. Carleton, "The Integration of Capital Budgeting and Stock Valuation," American Economic Review, Vol. LIV, No. 4 (September 1964), pp. 683-704.

Consider a firm with a $1.00 dividend, a dividend growth rate of 5%, and a required return of 10%. According to the Gordon Model the intrinsic value of the stock is $20, i.e.:

$$\frac{\$1.00}{.10 - .05} = \$20.$$

In the Gordon Model an environment of volatile prices affects both the dividend growth rate (g) and the discount rate that is appropriate (k). These changes are best understood by first analyzing a pure case and then considering deviations.

Suppose investors expect inflation to increase to a rate 4% higher than the current inflation level. If all input costs and revenues to the firm increase at 4%, the firm can increase the growth of dividends by 4%. Through the Fisher effect the required return to investors from the dividends must increase 4% to account for the decreased purchasing power of the monetary unit.[3] The result is that the increase in expected growth rate exactly offsets the increase in the required rate of return. In this pure case stock value would not change immediately when the inflationary expectation comes into existence, although over time the price would increase an extra 4% per period, just enough to offset the effect of inflation on the investor's wealth.

As the example moves from the pure case, the differential changes in price expectations on various costs and revenues, if known and understood by the investor, are likely to have a decided effect on the stock value. For example, suppose that taxes do not change in proportion to changes in other costs and revenues. This would be the case with a graduated tax or a tax that recognizes certain deductions (such as depreciation) on a historical basis. The change in inflation rate can be expected to have a lagged effect on the deductions and hence increase the tax bill proportionately more than the proportional increase in inflation. The reduction in reinvestment triggered by the increase in the tax burden during the transitory period would reduce the growth path of the company in all future periods, and the stock price would fall. Thus, a tax structure built upon historical costs has a nonneutral effect on stock prices.

Another path to nonneutrality is for the costs of inputs and prices of outputs to rise disproportionately. If the cost of some inputs, such as labor, rises faster than output prices, then the increase in the dividend growth rate would fall short of the rise in

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[3]The Fisher effect is the tendency for nominal interest rates to contain a premium equal to the expected rate of inflation to compensate lenders for the anticipated loss in purchasing power. This thesis, based on the original analysis of Irving Fisher, is further explained by Stephen F. Leroy, "Interest Rates and the Inflation Premium," Federal Reserve Bank of Kansas City, Monthly Review (May 1973), pp. 11-18.

discount rate, thereby tending to precipitate a drop in stock price. Conversely, the case of output prices rising more rapidly than input costs would imply an increase in stock prices.

Risk also enters the picture. Suppose the investing public is partially aware of relative price movements in past inputs and outputs, but is not fully knowledgeable about them. This introduces an element of perceived risk. As the structure of future price movements becomes more uncertain, another element of risk is added. The price uncertainties cause the required discount rate to increase as a function of the degree of incremental risk and of the extent of risk-aversion of the market. The increase in uncertainty surrounding inflation leads to a drop in the economic value of common stocks.

The foregoing examples illustrate that the impact of inflation on stock prices depends upon the structure of price movements, tax conventions, and uncertainty surrounding inflationary expectations. What information does an investor need to estimate the effect of inflation on a particular common stock? Much of the information is macroeconomic in nature, such as the likely inflation expectations and risk premiums in market interest rates. Other information is unique to a company, such as the rate of change in input costs and output revenues. The investor needs this company-specific information on a timely basis to project future dividend-paying capacity. In addition, the investor needs to estimate the relative volatility of these respective price movements in order to appropriately assess risk.

Conventional accounting statements create difficulty in developing relevant company information by lumping together contemporaneous price data and data based on historical transactions. As an example, this occurs when dollars associated with old inventory are aggregated with those of new, higher priced inventory. The result is financial statements which do not provide a clear view of the current trend or volatility of input and output prices.

Examination of the behavior of earnings per share is one of the traditional approaches to evaluating dividend growth potential. The association between dividend valuation and earnings valuation has been addressed by a number of studies. The Modigliani and Miller (M & M) model is perhaps the best known study.[4] In the M & M view of the world, the enterprise may invest in activities having the same expected return period after period. If the company pays all of its earnings in dividends and there is no debt, the dividend yield to the common stock equals the company's return on assets. If the company chooses to retain part of the earnings as reinvestment, the

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[4]Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," The American Economic Review (June 1958), pp. 261-297.

earnings would be higher in every future period. Since earnings would increase, dividends could increase. In the absence of taxes, transactions costs, imperfect information, and other matters such as personal utility functions, investors would be indifferent between retained earnings and current dividends.

Now assume that inflation enters the picture and that earnings are calculated as EBIT based on historical cost. As prices rise, the enterprise must increase its investment in assets to maintain the current level of activity. But EBIT includes an allocation for capital consumption and inventory expenditures predicated on earlier (and lower) prices. Thus the firm is no longer free to pay out all of EBIT and maintain the same level of activity. In terms of the investors' tradeoff between current dividends and future dividend growth, the question becomes: What part of retained earnings can be dedicated to financing growth and therefore to increasing the potential for future dividend increases?

The M & M model has a concept of earnings that is akin to earnings as determined by current-value accounting. In the M & M model the earnings, if distributed wholly through dividends, would maintain the steady state earnings stream. These "maintainable" earnings are the benchmark for common stock evaluation.[5] The rationale is that management either uses earnings to pay dividends or reinvests the funds in the company to provide future growth in earnings and hence growth in dividend capacity.

Net Asset Approach to Equity Valuation

For approximately 30 years investors increasingly have focused on income statement measures rather than balance sheet figures for common stock analysis. In part, this shift probably was caused by the "growth mentality" which has characterized the stock market and in part by a recognition that conventionally reported book value per share has little relationship to contemporary economic values. This recognition tends to be exhibited by the rise in the average market-to-book ratio over the postwar years.

In concept and by law each equity holder owns a proportional share of the net assets of the company. An investor can recover invested funds only by: (a) selling the shares owned; (b) receiving cash from liquidation of the company; or (c) direct distribution of assets (dividends in kind).

Analysts sometimes attempt to estimate the difference between the current value of assets and liabilities on the justification

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[5]"Sustainable income" is similar; for a discussion of sustainable income see Sidney Davidson and Roman Weil, "Inflation Accounting: The SEC Proposal for Replacement Cost Disclosures," Financial Analysis Journal, March-April 1976.

that this value (sometimes called "tangible value") represents a lower limit to the economic value of the stock. A company stock which drops in price below its tangible value is considered ripe for merger, restructuring, or voluntary liquidation; all of these have occurred frequently in recent years. Indeed, a number of respected investment advisors -- including Benjamin Graham -- have advocated viewing companies with an excess of asset value over market price as prime take-over targets.[6]

Financial statements that report the current value of assets would facilitate the determination of tangible value. For this purpose information would be useful to both equity investors and companies seeking acquisitions.

Information about current value might benefit the company as well as improve the allocation of society's scarce capital resources. An enterprise with a high asset value relative to its earning power would have this fact clearly shown in its financial statements, thereby inviting the interest of acquisition-minded companies as well as alerting the directors of the company and investors in the company about the potential for redeployment of assets. In the other direction, the reporting of current values might discourage merger interest in those cases where the underlying asset value, as shown by current-value financial statements, is not attractive.

Current-Value Adjustments at the Company Level

The foregoing discussion of fixed-income and equity investment analyses identified the importance of current-value information for investor decision making. Ample evidence exists that the securities markets reward those investors who quickly respond to relevant information. Hence there is an incentive for investors to make current-value adjustments to conventional accounting statements and to use the adjusted results in their analyses. Discussions with analysts verify that adjustments to accounting numbers are made both explicitly and implicitly to reflect the impact of general inflation and relative price changes on particular securities. Additionally, recent articles in investor-oriented publications indicate a widespread recognition of the need to adjust for the effects of price changes in security analysis.[7]

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[6]Benjamin Graham, "The Future of Common Stocks," Financial Analysis Journal (September-October 1974), pp. 20-30.

[7]See, as examples, "Current Replacement Cost Accounting, Depreciable Assets, and Distributable Income," Financial Analysts Journal (July-August 1976), pp. 38-45 and "The Numbers Game," Forbes (March 15, 1976), pp. 92-93.

Investors require information about the impact of relative price changes on the value of particular securities. Because the economy continues in the direction of more advanced technology, and resource shortages will remain critical, volatile relative prices are likely to continue regardless of whether the overall drift is toward inflation or deflation.

For the most part the enterprise is in the best position to measure current values. This is because managers know the details of contractual agreements (bond indentures, etc.) and of the company's intentions, and because they participate in the specialized markets for the classes of assets used in their business. Further, the planning, engineering, purchasing, property management, and similar staff functions are likely to develop much of the underlying data for current-value estimates during the course of operations.

From the perspective of society in general, multiplication of the resources devoted to current-value information production is wasteful. The company is the logical locus for this activity because production of current-value information probably requires a great deal less incremental effort at the company level than elsewhere. After current-value information is made available by the enterprise, external users, such as investors, will be able to make whatever fine-tuning adjustments they believe prudent.

There is a tradeoff between the economy and consistency of centralized estimates and the danger of systematic tendencies to under or overestimate price change impacts. With respect to this matter, the investing public should be protected by independent audits of current-value accounting information. Additionally, it can be expected that a few professional analysts will monitor the current-value estimation practices of particular firms.

An underlying philosophy of the U.S. securities laws is that all investors should have equal and simultaneous access to information affecting a security's value. While professional investors may be able to introduce current-value information into their analyses (although with less accuracy than can be done by the companies), nonprofessional investors are more limited in their ability to analyze the impact of price changes. By incorporating current-value data into accounting statements all investors will be assured of equal access to managements' judgments as well as to auditors' exceptions to and comments about the current-value financial statements.

Current Values and Market Efficiency

A substantial body of empirical evidence supports the "efficient markets hypothesis."[8] The efficient markets hypothesis has important implications for the potential usefulness of current-value accounting. The hypothesis specifies the linkage between information and security price returns in the short-run. It states that any available information perceived by investors will more or less instantaneously affect share prices. The linkage between the entry of information and security price adjustments is due to the competitive action of buyers and sellers in adjusting supply and demand schedules to reflect the anticipated impact of the information. Although all market participants may not have access to the information, the economic motivations of those who receive and interpret the information assure that market prices move to reflect the information. The investors with the information will buy (if the information is favorable) or sell (if unfavorable) until the pressure of their transactions drives the price to a level consistent with the perceived economic impact of the information.

Because the market participants who first carry relevant information to the market may realize gains (or avoid losses) from this information, there is a competitive incentive to ferret out and interpret such information. Hence information which can be anticipated is impounded into market prices by market supply and demand functions responding to speculators who buy or sell based on the new information they bring to the market. This is not to say that being an aggressive and information-seeking speculator in the security markets offers returns in excess of the level commensurate with the risk borne. Quite the contrary, the competitive interaction and free entry into the anticipation and trading of information tends to drive excess profits to zero. In this competitive activity, participants on average earn the minimum return necessary to attract capital, given the level of risk associated with a security.

Indeed, the competitive nature of the model tends to lead toward a strategy of passive investment. If all available information is impounded into the price of every available security, then intensive security analysis is unlikely to reveal systematically underpriced or overpriced situations. Further, selling of one security to purchase another may be folly, since there are transaction costs involved but both securities are likely to provide only a return commensurate with their risk.

Thus, in this efficient markets setting, the optimal strategy is for the investor to incur no information search or transactions

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[8]For a discussion of the "efficient markets" behavior of securities with respect to financial statement data, see William H. Beaver, "What Should Be FASB's Objectives?", The Journal of Accountancy, August 1973.

costs by purchasing a portfolio having the competitive risk and return characteristics appropriate. The investor then holds this portfolio over time. Only those portfolio adjustments would be made which are necessary because of a change in the risk characteristics of one of the constituent securities.

Current Values and Beta

The singular concern of an investor who embraces the efficient markets hypothesis and who pursues a passive portfolio strategy is that of what will be the incremental effect on the risk of his total portfolio resulting from the inclusion or exclusion of a particular security. The accepted measure of the marginal contribution of a security to the risk of a portfolio is the beta of the security.

Beta measures the responsiveness of the return of an individual security to changes in the weighted average return of a group of securities (e.g., to the Standard and Poors 500). Thus, a beta of .5 indicates that the security's return tends to respond at half the magnitude of market movements. With a beta of .5 an increase in market return by 10% probably would cause a 5% increase in the return of the security. Similarly a beta of 2 indicates the security tends to follow market movements with an amplitude that is twice as great as the underlying market stimulus.

Betas are of primary interest to passive investors, and the relevance of current-value accounting to these investors rests with its ability to improve beta estimates. There appears to be a logical connection between current-value accounting and beta; however, given the current state of incomplete knowledge underlying the fundamental beta process, this point bears empirical investigation.

The unique beta of a security must be generated by the difference in responsiveness of a particular security to stimuli which impact all securities in that market. One of the global stimuli which affects all securities is inflation, and the magnitude of the inflationary effect on a company and on its financial reporting depends upon the nature and age structure of its assets, liabilities, inputs, outputs, production process, and so on. Current-value accounting provides reasonable and timely measures of the impact of inflation on a company's operations, cash flow, and shareholders' equity, and hence the basic data on the processes shaping the company's beta.

A passive investor is likely to find current-value statements useful in predicting changes in beta. This ability is significant, since statistical studies have revealed that other approaches (such as analysis of past data) produce large errors in beta estimation.[9]

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[9]Barr Rosenberg and James Guy, "Prediction of Beta from Investment Fundamentals," Financial Analyst Journal (May-June 1976), pp. 60-72.

Current-Value Accounting and Investor Needs

The preceding discussion in this chapter has argued that investors need timely information concerning the effect of changes in the level and structure of input costs and product prices of a company, and that this information is best provided by the company in the form of audited current-value financial statements. This section discusses specific types of current values from the perspective of their usefulness to investors.

Valuation of Individual Resources vs. Valuation of the Entire Company

A major question is that of whether investors seek an accounting value for the entire company or prefer that the resources and obligations be individually and separately valued. While potential and actual claimants on the general resources of a company (such as residual equity shareholders) are interested in establishing a value for the entire enterprise, they do not look to accounting to establish this value. The role of accounting is to value individual resources rather than the entire company for two primary reasons:

1. Some users are concerned only with the cash flow potential of individual resources.

2. Even those users primarily concerned with the value of the total entity require values of individual resources for their estimation of entity value.

Users interested in the value of individual resources *per se* include: creditors with liens on particular resources; creditors without rights to particular resources but whose primary concern is default and the subsequent cash flows from disposition of individual resources; and managers who utilize values of individual resources in a variety of ways for their analyses and decision making.

Total entity value is determined in the marketplace at specific points in time by a consensus of buyers and sellers. Investors who need to value the entire company do so by examining the individual components, activities and other characteristics of a company (including its organizational and managerial characteristics), then evaluating the company's potential cash flows and the risk of that potential in consideration of their assessment of the individual components. Those investors then buy, sell, or hold the stock, thereby establishing value for the entire company. To these investors, values of individual resources of the company is one type of information useful in forming their opinion about the value of the company's securities, and it is this information that the financial statements should provide.

Replacement Value, Net Realizable Value, and Consistency

Within the fundamental approach to analysis of both equity and fixed-income securities a distinction can be made between income and asset orientations. The income orientation focuses on the ability of a company to generate enough cash through operations to meet fixed obligations, to grow, and to pay dividends. As a general rule the income-oriented investor is interested in separating the cash flows necessary to maintain the enterprise as a going concern from the cash available to make payments to creditors or to shareholders, or to reinvest to provide higher cash flows in the future. This "sustainable income" approach requires that resources used in the business be valued at their replacement cost (current cost) on the date of the measurement.

Fundamentalists with an asset orientation concentrate on the amount of cash which could be raised by selling the assets directly or through merger. For this purpose this type of investor needs to know the net realizable value of the resources and the exit value of obligations. These measurements allow the investor to judge the liquidity contributions of various resources and obligations and to estimate the payout to his position should the firm be liquidated or merged. In practice the movements of realizable values and replacement costs are likely to be highly correlated. Hence the measurement of one typically provides information about the probable changes in the other.

Consistency of measurement is of prime importance for security analysis. Often it is the rate of change in earnings, book value, ratios, and other quantities rather than absolute magnitudes that provide important signals to the analyst. Hence the method of measurement adopted should be consistently applied through sequential reporting periods. To most analysts consistency across time of each company appears to be more important than comparability across companies.[10]

This premium on consistency implies that measurement techniques can be chosen for one company that are different from those chosen for another company if in each case consistency through time is facilitated by the measurements used. For example, if the company's assets have well-developed secondary markets (e.g., aircraft) then realizable value might be measurable with greater consistency. Another firm might have complex assets which are unique and custom built to the job which suggests that replacement cost measurement is appropriate.

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[10]See H. A. Latane, D. L. Tuttle, and C. R. Jones, Security Analysis and Portfolio Management (New York: The Ronald Press, 1975), Chapter 17.

Summary

This chapter uses deductive argumentation to reach the conclusion that current-value accounting has great potential usefulness to investors and creditors. These arguments demonstrate that fundamental equity investors whether professional or not, can usefully employ current-value information to assist in: (a) assessing the likely impact on a company of differential price changes among its different costs and prices; (b) security risk evaluation; (c) evaluating dividend growth potential; and (d) estimating tangible value (the difference between the current value of resources and obligations). Nonprofessional investors are seen to require current-value information to maintain equity with those professional investors who can use the extensive resources at their command to estimate current values, however approximately. Fixed-income investors are shown to need contemporary price information for the calculation of the coverage, working capital and capitalization ratios used in their default analyses.

Several cogent arguments are presented which suggest strongly that the information about contemporary prices required by investors and creditors should be prepared within each company rather than within the investment community. The efficient markets hypothesis is examined, and the usefulness of current values to investors for estimating beta risk is postulated. A brief explication is provided of why investors seek values of individual resources and obligations in their quest to estimate the value of a company's stock. Also considered are the need by investors for both replacement cost and net realizable value information in those circumstances where these measures diverge significantly, and the need for consistency through time of current-value measurement methods for each company.

CHAPTER 5

CURRENT-VALUE ACCOUNTING FOR MANAGERS

Most accountants and managers are inclined to think first in terms of the utility of current values for external reporting. Those who go beyond that to consider the question of current-value accounting for managerial purposes may think that if current values are available anyway for external reporting, they may be put to managerial usages to achieve a secondary benefit as well. In fact, current values probably provide as much or more benefit from use by managers as from external reporting, and it seems probable that a current-value system can be justified on the basis of management need alone.

This is not a new idea. Bakker tells us that the giant Netherlands-based international company of Philips Lamp has a comprehensive, worldwide current-value accounting system that:

> . . . is set up and maintained first and foremost for managerial purposes, to provide management at all levels with current and relevant information for their day-to-day decisions . . . The Philips financial statements for shareholders, in a condensed form, are based on current values as well.[1]

This chapter explores the ways in which current values are potentially useful for managing a company. Some of these uses are in the nature of intuitively appealing possibilities that appear to have not been explored by industry. Other uses refer to areas where some companies already utilize current values and find them beneficial.

For all of the potential uses, it is not just the utilization of current values which is important, it is also that a current-value accounting system, once established, can provide current values routinely, quickly, and at a low marginal cost. This consideration is important even in those circumstances where current values are already in use but are developed on an ad hoc basis. An ongoing current-value accounting system permits current values to be generated on a consistent basis for all uses, and often will provide current values in a more timely manner because the system may already contain the current values needed.

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[1]Pieter Bakker, "Accounting for Inflation in an International Company," in Accounting for Inflation: A Challenge for Business, Michael O. Alexander, ed. (Toronto: Maclean-Hunter Limited, 1975), Chapter 11, p. 63.

Managers analyze costs, determine trends, develop business goals and strategies, and undertake other actions intended to ensure the continuity and profitability of a company. These activities fit within the general headings of strategic planning, managerial control, operations control, and external relations. Several examples of the ways in which current values relate to these managerial activities are put forward in this chapter. The discussion proceeds according to the following format:

Strategic Planning
- Investment and divestment strategies
- R & D strategies

Managerial Control
- Investment analysis
- Product pricing
- Dividend distribution determinations
- Performance evaluation
- International financial control

Operations Control
- Cash and working capital control
- Cost accounting

External Relations
- Wage negotiations
- Public relations

Strategic Planning

Senior managers often spend most of their time planning, and a significant portion of their planning time is devoted to strategic planning. Strategic planning is the process of establishing the objectives of the company and deciding in a broad fashion on the resources and strategies that will be dedicated to achieving those objectives. The plans and strategies which result from strategic planning are intended to maneuver the company into the position at the end of the planning horizon that is indicated by the objectives established.

Strategic planning is an unstructured and irregular process. Perhaps more than any other management process, strategic planning relies heavily on the general experience, breadth and background knowledge and judgment of the managers undertaking the planning, rather than on specific techniques and specific kinds of information. Because the thought processes of the managers who do strategic planning are unfettered by the need to conform to established procedures, these thought processes are ill-understood and can be presumed to vary widely from manager to manager.

In this amorphous milieu it is difficult to state with exactitude how current values -- or any other kind of information -- is or should be used to improve the planning processes or the plans

which emerge from these processes. Some general statements can be made however. Strategic planning requires a realistic assessment and synthesis of the relevant considerations, and a balancing of tradeoffs. It is reasonable to presume that a realistic assessment is more likely to be obtained if it is based on realistic information. Therefore, to the extent that accounting information is used in strategic planning and that current values more realistically describe economic reality during and after inflatioary periods than do historical costs, the strategic planning processes and the resulting plans will reflect a better balancing of the tradeoffs involved.

Senior managers require three general types of information for strategic planning:

1. Information about their competitors

2. Information about the environment, including information about price changes in other parts of the economy

3. Information about the operations of their own company -- its efficiency, its status, its prospects, and its strengths and weaknesses.

It is the third type of information that encompasses current values. The senior managers who plan strategy, work in the realm of forecasts, projections, and trend extrapolations of both the environment and their own company's operations. These managers are concerned about the present and past status of the company to the extent that information about these is useful for formulating a description of what the company might be like three, five, or more years from the present. Information about present and past production, operating and fixed asset costs is relevant to formulating this description, and senior managers should "know their costs" and be aware of cost trends when considering strategic alternatives. This awareness enables good managers to quickly discard without full analysis many alternatives that are superficially appealing in the light of today's conditions but might bring disaster five years ahead. At the same time managers who are alert to cost trends can pull forward for further consideration alternatives that show real promise, given the expected future conditions, but which might be overlooked if attention were not given to cost trends.

Forecasts of future costs may be based in part on projections of the past trends that are indicated by the accounting records. If these records are based on current values, more realistic trends are likely to result, and so more realistic estimates of future costs may be possible. Without current values, senior managers who are not familiar with cost change patterns are more likely to be misled in their assessments of the probable future cost environment within which the company will operate.

Because senior managers often are not in close contact with operations, they may not be intimately familiar with current costs and cost trends. Therefore, lacking adequate background knowledge about the company's costs, the managers generally must interpret cost reports primarily within the context of the information contained in the reports. Accordingly, during periods of inflation, managers are unlikely to be able to accurately impute to historical cost reports information about changed prices, and tend to either accept the historical cost information as correct or adjust it mentally for inflation in some arbitrary manner. For this reason, all information about prices that is necessary for the proper interpretation of accounting reports and the establishment of cost trends should be provided as a part of the reports so that it can be factored into strategic deliberations. A full understanding of costs requires information about current costs as well as about the current costs of preceding periods; together, these permit a more informed analysis of cost trends and promote an awareness of the entire cost picture on the part of senior managers.

Current-value information appears to be particularly relevant to growth and divestment strategies and to R & D strategies. General discussions of these areas follow.

Growth and Divestment Strategies

Strategic planning is concerned with allocating resources among competing alternatives. Growth alternatives include acquisition, merger, and direct investment, each of which may entail further growth in the company's present markets or diversification into different markets. The probable future costs of both current and fixed assets are considerations in choosing among these alternatives, and estimates of these future costs may be based in part on cost trends developed from current cost information. A projection of rapidly increasing construction costs, for example, could persuade management not to initiate an investment involving long-term construction, and instead could lead it to prefer another investment strategy.

Timely divestment is as important a strategic decision as is the choice of growth paths. If costs and earnings of a division are misstated by historical cost accounting because of inflation, senior managers are less likely to discover and analyze the poor performance of a division and more likely to overlook the strategy alternative of disposing of the division and allocating the proceeds to areas with higher future profit potential.

R & D Strategy

Production and operating cost patterns can play an important role in establishing R & D strategy. Current costs and current-cost trends may indicate that production costs of a product line are rising rapidly, for example. A projection of these costs combined

with estimates of consumer resistance to price increases may indicate that the profit margins of the product line will diminish to the point of unprofitability in the future. This might suggest the strategy of allocating large amounts to R & D for development of replacement product lines. Alternatively, it may seem preferable to allocate extensive R & D funds to the development of new technology intended to reduce the production costs of the present product line. Current costs seem more likely than do historical costs to provide the information that will assist management in deciding on one or another or some combination of these strategies.

Managerial Control

Managerial control is the managerial activity of obtaining and efficiently utilizing resources for the accomplishment of the organization's objectives, and it is exercised within the broad framework and guidelines established by strategic planning. While strategic planning is done primarily by senior managers and their staff, managerial control is more likely to be an activity undertaken by both senior and middle-level managers.

Managerial control usually is a systematic and repetitive activity and generally follows prescribed procedures. Because managerial control in most companies tends to utilize similar control systems and procedures and the information available is used in similar ways, it is possible to delineate how current values may be useful for managerial control activities. Five of these activities will be considered here: investment analysis, product pricing, dividend distributions, performance evaluation, and international operations.

Investment Analysis

Investment activities are directly related to management's concerns about maintaining productivity and productive capacity. Assessment of productivity and productive capacity in absolute terms, as well as in relation to past periods and to competitors, is dependent upon information from the accounting system which is not distorted by inflation. Profits and rates of return on investment influence managers' investment and reinvestment decisions and can also be macroestimators of the company's well-being.

Investment activities may relate directly to maintaining or enhancing market position and product-line profitability. A deterioration of market position is a danger signal, while an improved market position suggests that the company is outperforming its competitors. Market share alone is an insufficient indicator of market position -- a company's overall market position is deteriorating if the market share for a given product is maintained only by devoting a greater proportion of company resources to that product than do its competitors. Evaluation of market position requires analyses by managers of the current value of the resources committed to their company's own products, as well as by competitors to their product lines.

Product-line management entails the allocation and reallocation of resources to activities directed toward nurturing existing product lines, establishing new lines, and phasing out products that have run their cycle. Critical to product-line management is knowledge of earnings and earnings trends, the values of resources committed to product lines, and product-line rates of return, all of which should be adjusted for inflation.

Investment allocations take many forms, the most common of which are allocations for new investments in plant capacity, expansion or renovation of existing facilities, acquisitions of other companies in whole or in part, and investments required to comply with regulatory requirements. The purposes of investment activities range from creation of new productive capacity to establishing new fringe benefits for employees (e.g., cafeterias). Although the specific approaches to investment activities vary, depending on the nature and purpose of the activity, a general approach is applicable to most investment activities. This approach involves the following steps:

1. The amount of capital investment and other cash outflows required over the life of the project is estimated.

2. Cash inflows are estimated for the life of the project.

3. The risk or uncertainty of the project is assessed.

4. Internal and external means of financing are considered.

5. Cash flows of alternative financing configurations are discounted using a discount factor such as the accounting rate of return required by the company on its investments.

6. The project is accepted or rejected.

7. If the project is accepted and completed, a post-completion audit is (should be) made after a period of time.

The analysis as outlined requires extensive information about the future cash flows of the proposed project over its expected life. These cash flows must accurately reflect the expected costs and revenues at their current values at given points in the future.

Steps three and five relate to using a rate of return discount factor as the threshold criterion. The factor chosen is based partly on the company's past experience. As an example, a company that has traditionally achieved an 11 percent rate of return for a given risk level is more likely to accept an expected 12 percent rate of return on a new project than is a company that traditionally has achieved 20 percent.

Inflation seriously affects both the cost and the investment components of the rate of return calculation. The effect is that both the numerator and denominator of return on investment

calculations on past investments may be distorted by inflation -- the former typically being overstated by inflation of earnings and the latter understated by undervaluation of resources. Together they compound the error of overstatement of return on investment. An artificially high rate of return on existing investments may prompt the rejection of a proposed project which would be accepted if the rate of return based on current values had been used in the discounting. Current-value accounting adjusts for inflation in both the numerator and denominator so that the financial statements portray an inflation-adjusted rate of return.

In deciding whether to finance the project internally or externally (step 4 above), managers should examine the company's debt/equity ratio both before and after a proposed debt financing to determine whether or not debt financing would introduce excessive risk as viewed by the company's actual and prospective stockholders and debtors. Historical cost accounting, by understating resource values and equity during and after inflationary periods, causes the debt/equity ratio to be overstated. As a consequence, potential debtors are not apprised by the financial statements of the underlying values of the company's resources relative to outstanding debt. This may cause debtors to assign greater risk to the investment and insist on a higher interest rate or decline to finance the investment project.

Current-value accounting adjusts equity position for inflation and hence provides a valid basis for comparisons of debt/equity ratios among companies. This comparison is useful to both managers and debtors when attempting to evaluate the tradeoffs between financing with more debt or more equity. Because the necessary inflation-related adjustments to equity are the consequence of cumulative inflation adjustments to all types of resources and equities, restatement of equity to compensate for inflation is not possible without comprehensive current-value adjustments.

Current values also may influence the posture of management toward contractual agreements such as restrictive loan covenants which may attach to investment financing and which might jeopardize a company's future operations. To retain flexibility of operations in an inflationary environment, managers should assess these agreements on the basis of realistic relationships and values produced by current-value accounting rather than on the basis of conventional accounting which ignores inflation.

The availability of internal financing for investment projects may also be influenced by current-value accounting. Price increases of plant and equipment that must be replaced mean that massive additional capital requirements for this replacement may be required. However, historical cost accounting does not provide indications that additional funds will be required, and does not provide a realistic estimate of the amount of funds which should be retained in the company for replacement of its capital assets. If the period between the acquisition of capital assets and the replacement time is long, even small annual inflation rates may

dramatically increase the quantity of funds required for replacement of the capital assets. This capital accumulation problem is severe in capital intensive industries, and particularly for those companies with highly leveraged financial structures which will have difficulty financing capital replacements with borrowings. Although the higher cost of replacing physical plant and equipment often can be overlooked in the short term, in the longer term greater amounts of earnings often must be retained to provide for replacement of physical assets. The alternative may be decreased efficiency and a deteriorated competitive position due to using rundown or obsolete plant. To help forestall this condition stockholders, regulatory authorities, and other interested parties should be apprised systematically on a period-by-period basis of the probable future capital needs.

The need for additional funds to replace plant and equipment is systematically measured and reported by current-value accounting. By recognizing the replacement cost (current value) of plant and equipment in the financing statements and by charging depreciation on a current-value basis against current operations, current-value accounting alerts managers as well as stockholders and others at interest about the approximate amount of funds the company must retain each period to ensure that productive resources can be replaced in the face of inflationary conditions.

The post-completion audit (step 7) typically involves the analysis of financial results to provide feedback for decisions yet to be made about future projects. Current-value financial statements may be useful at the postaudit stage for portraying the value and income relationships that are needed to ascertain whether expected results were in fact attained, as well as for explaining the differences between actual and anticipated cash flows.

Product Pricing

It is generally acknowledged that if, during inflationary periods, prices are not adjusted for inflation, real gross margins will erode. The INFLAN computer simulation results (see Appendix D) confirm this general result across a wide variety of inflation patterns and for all four companies simulated. The INFLAN model also indicates that a distinct difference between historical cost and current-value gross margins arises even after the first year of inflation.

Many companies are already using current values for pricing on at least a partial basis. For very few companies, however, are these current values provided by a comprehensive current-value accounting system. The complex ways in which costs interact in an accounting system may reduce the effectiveness of *ad hoc* adjustments for pricing purposes. When using costs as guidelines for pricing decisions, all types of cost should be considered, including labor, manufacturing, administrative, marketing, and overhead costs. A comprehensive current-value accounting system should provide for restatement of all of these costs to a current-value basis.

Current costs are relevant for pricing purposes because they represent the sacrifices made in generating the associated revenue. During inflationary periods both survival and profitability depend on the ability of the company to change product prices as rapidly as the new economic realities of changing costs can be determined and analyzed. Without current-value accounting, this critical task is likely to be more difficult and is less likely to be successful. Widespread failure to adjust prices as rapidly as costs increased was revealed in a study in Canada which indicated that during the period from 1971 to 1974, "only a few of the companies examined were able to maintain or improve their profit margins during the inflation."[2]

The Canadian study also notes that margin maintenance is not as straightforward as simply increasing sales price by the amount of the cost increase:

> "A selling price increase which is purely passing along the additional cost maintains the absolute amount of profit but not the percentage margin. Since a larger amount of capital is required to finance inventory levels because of the higher costs, the percentage margins should be maintained if this capital is to be adequately financed. Otherwise, what happens is that although absolute profits are maintained at the same level, real earnings as a return on capital will decline."[3]

Thus, margin maintenance involves setting prices to maintain the absolute amount of profit and also to maintain the rate of return on capital since this is a primary ratio indicating the efficiency of the enterprise. Accordingly, there are two tests of margin maintenance. First, are margins maintained in real terms? All of the cost factors comprising the cost of sales on which the profit-margin rate is based should be stated in current-value terms in order to maintain the real margin.

Second, and equally important, are prices set to maintain a real rate of return? This return may be based on the current value of total assets employed (for the product line or the entire company), or of total equity. Therefore, current-value adjustments are required to all accounts for determination of whether or not the real rate of return has been maintained. These adjustments should result from a current-value accounting system. Because of the critical need to adjust prices on a timely basis, this analysis of real rate of return may be required more often than annually.

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[2]Inflation: Its Impact on Business (Touche Ross & Co., 1976), p. 34.

[3]Inflation: Its Impact on Business (Touche Ross & Co., 1976), p. 39.

In some instances failure to keep sales prices in line with rising costs may be due to competitive factors; however, the reason often is at least partly because of a lack of timely information about cost changes coupled with an inability to trace these changes through to their ultimate impact on profit margins in the absence of a current-value accounting system.

Price-regulated companies have different margin maintenance problems because they require permission to adjust their price structures in response to cost increases. Approval for price changes must be secured from regulators who are frequently difficult to convince of the need for increases; price increases in regulated industries tend to lag far behind cost increases. Current-value financial statements can present persuasive evidence to regulators showing that delays in increasing prices can cause deterioration of the company's liquidity and of its ability to replace the resources necessary to maintain at least a stable level of operations over the long-term future.

Current values, particularly if generated routinely and on an ongoing basis in a current-value accounting system, may also help regulated companies combat rising costs. Regulated companies may have discretion about what products and services are offered even if they cannot control prices. Accordingly, current values can indicate which product margins are suffering most from a price and cost squeeze and so can provide a basis for decisions about how to allocate resources in the face of this squeeze. For example, current-value information may indicate that some services associated with products should be abandoned, that relatively larger amounts of higher margin products should be provided, or that a low margin product should be dropped.

A similar situation is present for unregulated companies with long-term fixed-price sales contracts. Current values may provide a basis for contract renegotiations. In extreme situations where rapid increases occur that could not be reasonably anticipated, current values also may assist if legal release from a contract is sought. In both situations, current values that are routinely provided by a current-value accounting system may provide a high level of credibility.

Current values also may serve as the price escalation basis in a contract that permits cost increases to be systematically passed through to sales prices. Here, a current-value accounting system could provide current values on a timely basis and the parties to the contract would be more likely to understand and agree to the accounting basis for the price increases if they were based on the output of a current-value accounting system.

Companies can use analyses of inflation to assist in forestalling price increases. If the components of increased costs are disaggregated by a current-value accounting system so that their causes are identified, companies may be able to change their products in ways that reduce costs, thereby decreasing the need for price increases.

The use of costs to help establish prices merits attention. Although cost is commonly viewed as the starting point in pricing products, it is also necessary to consider customer demand and competitor behavior when establishing prices. These additional factors tend to obscure the relationship between cost and sales price, but cost is usually considered either directly or indirectly.

Cost plays various roles in pricing, the most direct of which is when price is cost plus a percentage markup. This markup approach is used frequently in retailing. It is also used where a competitive market price does not exist, such as when the product is new or highly differentiated. When prices are a function of cost, the markup percentage should be based on current costs in order to maintain productive capacity.

In some situations, cost may set a lower limit on price. Current costs may be used to help define the point at which a customer's offer will be declined. Depending upon the situation, this point may be represented by incremental costs or by full costs. If the market will not bear a price in excess of current costs, this may indicate that the product should be discontinued.

For products with prices established in the marketplace, current-cost information may direct sales efforts toward the most profitable products by revealing the current-value gross margin for each product. The margin between the market price and current cost also influences whether or not product quality or after-sale service should be decreased to preserve profitability.

Current costs may be usefully employed with cost-plus contracts. If historical costs are used in cost-plus pricing during inflation, the producing company will systematically decrease its profit by the amount of inflation that occurs from the time of purchase of the resources embodied in the product to the receipt of revenue for the product, assuming that the resources must be replaced or that similarly inflated resources must be acquired so that the producer can continue operations. As a simple example, assume that a company produces nuclear power plants on cost-plus 20 percent, five-year contracts, with all revenue received upon completion and acceptance. If, during the period, inflation of the materials and labor was 60 percent (an average of 10 percent per year) the revenues received on the basis of historical cost plus 20 percent would not enable the company to purchase enough materials and labor to make its next nuclear power plant and so the company incurs a loss on the project. For companies having several contracts underway each year, current-value cost-plus contracting may be practical only if a current-value accounting system exists so that tested, standardized, and well documented techniques for restating to current values are available for cost determinations under the contract.

One approach to bidding cost-plus jobs is that of tying bids to a formula based on current costs at mutually acceptable dates in the future. At the time of bidding only the formula is known -- the

product costs determine the revenues according to the formula and the product costs are a function of future prices. A pre-existing current-value accounting system may encourage a company to begin submitting bids on this basis even for jobs that are normally competitively bid on other than a cost-plus basis.

A study by the National Association of Accountants of over fifty companies concludes that, "Where the company knows the costs of its products, costs generally receive more weight in pricing than is the case where the company has little knowledge of product costs."[4] The study also notes that, "Such companies generally have adequate facilities for determining the costs of their products and management has reliable information to guide it in making pricing decisions." (p. 13) However, when inflation causes costs to change rapidly both in amount and relative to other costs, management systems that keep track of only historical costs may provide misleading information. If managers are misled, their pricing may err. However, if managers are aware of this cost system shortcoming, they may feel compelled to adopt a new and unfamiliar approach to pricing at the very time they are bedevilled by other inflation-caused management problems, and this could cause chaos in product pricing.

Dividend Distribution Determinations

Companies attempt to provide regular dividends to stockholders, generally as a set or increasing proportion of earnings over time. Dividend policies typically are established in ways which minimize fluctuations in share market values and respond to shareholder expectations. Managers often feel compelled to acquiesce to shareholder expectations even if it may not be in the best interest of the company. As noted in the previously cited Canadian study, "If higher revenues and earnings are achieved, then a business will pay more income tax and it will probably pay higher dividends to its shareholders in keeping with the higher reported profits."[5]

Using realistic assumptions about managerial behavior in making dividend decisions, the INFLAN simulation study (see Appendix D) demonstrates that dividends paid by companies exceed their current-value income across a surprisingly broad spectrum of inflationary conditions. While exceeding current-value results of operations was used as the critical overpayment threshold in the INFLAN simulations, the much more numerous instances where dividend payments exceeded 80% of current value earnings would also be termed "excessive" payouts by most observers, particularly when a severe capital shortage is imminent.

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[4] Product Costs for Pricing Purposes, Research Report 24 (New York: National Association of Accountants, 1953), p. 13.

[5] Op cit, p. 30.

The INFLAN study also identified what is not widely known to be a critical dividend payout situation. This is that companies with increasing costs combined with declining sales volume (a condition commonly encountered during stagflation) are particularly prone to pay dividends out of capital rather than earnings.

The INFLAN findings suggest that the general problem of excessive dividend payments is an extremely serious one in many kinds of inflationary conditions. This conclusion is reinforced by studies of economy-wide dividend distributions (see Chapter 6).

Inflation makes payment of a dividend as a proportion of historical cost earnings doubly onerous. First, earnings are overstated with historical cost accounting and so a set proportion for dividends means greater dividends. Second, inflation erodes a company's liquidity, making it more difficult to distribute even the same dollar amount of dividends as previously. Although financial reports which account for inflation cannot alleviate the inflation-induced liquidity crisis, they can provide managers with the information needed to inform stockholders about the real impact on the company of the continued distribution of a given proportion of historical cost earnings.

Current-value accounting facilitates a rational dividend policy in three ways:

1. Earnings on a current-value basis indicate the amount that may be distributed to shareholders without jeopardizing future productive capacity and therefore the viability of the firm. Without this calculation, managers may be unable to determine whether productive capacity is being maintained and do not have the information needed for establishing the amount of earnings which should be retained.

2. Current-value accounting provides a systematic approach to quantitatively measuring the liquidity and other effects of inflation on the company, thereby facilitating more rational dividend distribution decisions by managers.

3. Current-value accounting statements may provide the shareholders with a persuasive explanation of how inflation is affecting the company; this reduces the pressure on management to pursue irrational dividend policies.

Performance Evaluation

Managers should continuously evaluate how effectively the resources at their disposal were utilized. Performance evaluations generally are conducted on an operating unit or product-line basis, and they influence the future allocations of resources (including managerial resources) as well as the pay, promotion, and other perquisites accorded to managers and other employees.

Performance evaluation focuses on the relationship between a measure of the resources used to achieve a given result and a measure of the result itself. The "resources used" can be employees, physical plant, dollars of working or other capital employed, or (most frequently) some combination of these. Results can be in terms of output quantities, output costs, revenues received, cash flows, or profit and profit-related measures.

Although substantial differences exist between performance evaluations conducted by managers and those undertaken by external users of financial statements, the evaluation processes overlap for these groups. The purpose of evaluations by managers is to assess both the present efficiency and the future opportunities at all levels and in every sector of the company to provide a basis for internal resource allocations and to improve the efficiency of the subunits. External users are primarily concerned with the performance of the entire company to facilitate making an investment choice among companies; they are only tangentially concerned with internal resource allocations and operating unit efficiency. One consequence of this difference in orientation is that managers need more detailed information for their performance evaluations than do external users of financial statements.

The profit center approach is used in one form or another by most U.S. companies for management and performance evaluation purposes. Profit centers permit individual divisions of a company to be managed and evaluated as if each were an independent company. Evaluation of profit center performance generally revolves around calculations of profits and ROI.

Whenever historical costs are a component of the profit and ROI calculations, the results will fail to incorporate the effects of inflation during inflationary and post-inflationary periods. Because different profit centers usually have different asset age mixes, and may even have different asset structures if their products are different, the impact of inflation on each is different. The consequence is that comparability between profit centers is not possible with a historical cost system if the inflation effect is significant.

Formal performance evaluation often begins with an analysis of income and return on total investment or return on equity. The INFLAN computer simulation (see Appendix D) was used to analyze extreme cases of distortion of those performance measurements. Extreme cases were defined as cases where the historical cost income, return on investment, or return on equity of a company indicated a trend when compared to the preceding year that was the opposite of the trend of the corresponding current-value measurements. As an example of an extreme case, if ROI on a historical cost basis increased from the preceding year, on a current-value basis it decreased from the preceding year so that the current-value and historical cost trends were in opposite directions.

For 72 cases (4 companies, each for 18 different inflationary situations) examined for 15 years each, in 13% of the total cases income growth trends were in opposite directions, in 20% of the total cases ROI trends were in opposite directions, and in 21% of the cases return on equity trends were in opposite directions. In each of the 72 cases at least one trend reversal occurred during the 15-year period. These results indicate that across a broad range of inflationary conditions, the failure of historical cost accounting to adjust for inflation causes dramatic differences between historical cost and current-value performance trends.

Not only were the trends the opposite for many of the cases, but in every case for each of the 15 years the absolute difference between historical cost and current-value performance evaluation measurements was significant. Current-value and historical cost performance evaluation measures were found to be particularly divergent where current-value results of operations were low, sales volume was declining, and the rate of inflation of fixed assets was high.

A simple cash flow investment example will demonstrate how inflation affects income and ROI. Assume that a businessman purchases a small business for $100,000 with a guarantee that the seller will repurchase the business at the end of one year for $100,000. During that year, the business earns $12,000 cash. Three cases are presented for analysis: (1) no inflation; (2) 10% inflation with the same cash flows; and (3) 10% inflation with calculations that portray the additional cash flow income which would be required to maintain the same ROI percentage in real terms that is present in the no-inflation case.

CASE 1: No inflation

$$\text{ROI} = \frac{\text{Income}}{\text{Investment}} = \frac{\$12,000}{\$100,000} = 12\%$$

CASE 2: Inflation of 10% with no cash flow income adjustment for inflation

$100,000	cash investment
+ 12,000	cash income
$112,000	cash at the end of the year

The purchasing power of this $112,000 is 10% ($11,200) less because of inflation. (This example makes the simplifying assumption that general and specific price levels are identical.) Accordingly, the inflation adjusted return is $12,000 - $11,200, or $800.

$$\text{Inflation adjusted ROI} = \frac{\$800}{\$100,000} = .8\%$$

As can be seen in Case 2, the ROI is negligible after considering the effects of inflation. This suggests that companies which base their ROI calculations on accounting that is not adjusted for inflation are in danger of improperly evaluating their expected ROI when making investment decisions. For example, if a company borrowed heavily at 10% during an inflationary period with the erroneous belief that its investment return was increasing its purchasing power by 12% per year and that its leverage position was favorable, it might find itself seriously overextended in terms of ability to service the debt.

CASE 3: Inflation of 10% with cash flow income adjusted to provide a real ROI of 12%. This answers the question, "How much cash must be received at the end of the period to earn a 12% real rate of return in the face of 10% inflation?"

Alternative No. 1: $112,000 cash flow adjusted by the inflation index

$$\frac{110}{100} \times \$112,000 = \$123,200$$

Original investment	$100,000
Required income	23,200
Total cash flow required to earn 12%	$123,200

Alternative No. 2: The original investment adjusted for inflation with a 12% return calculated for the adjusted investment amount.

Original investment, adjusted for inflation	$\frac{110}{100} \times \$100,000 =$	$110,000
12% return on $110,000 cash flow required to earn 12%	$.12 \times \$110,000 =$	13,200
		$123,200

Case 3 demonstrates that for the investor to be as well off at the end of the period in terms of purchasing power as in Case 1, the investment must earn $23,200 rather than $12,000. The three cases are summarized in Exhibit 5-1.

EXHIBIT 5-1

SUMMARY OF CASES

	Case 1	Case 2	Case 3
	No inflation	10% inflation, no adjustment	10% inflation, income adjustment
Cash investment	$100,000	$100,000	$100,000
Cash income	$ 12,000	$ 12,000	$ 12,000
Required increment to cash income	-	-	11,200
Total income	12,000	12,000	23,200
Income adjusted for inflation loss	-	11,200	13,200
Real income (in beginning of year $)	$ 12,000	$ 800	$ 12,000
Real ROI	12%	.8%	12%

Exhibit 5-2 presents a performance evaluation approach which establishes a point of departure for further and more detailed evaluations of the factors contributing to profit and ROI. The costs and ratios for which adjustment for inflation in the financial statements is most critical are marked with stars. As suggested by Exhibit 5-2, not only are these critical costs and ratios numerous, but their interactions are also complex. When inflation exceeds a nominal level, the evaluation of the company's performance cannot be adequately accomplished without extensive inflation adjustments.

Two factors compound the evaluation difficulties. One is that each company has several rates of inflation, and so the inflation rate for each starred element is likely to be different. The other is that components of the ROI formula vary with respect to the extent to which they are affected by the duration of inflation. Prolonged inflation, even if moderate, will cause extreme distortion in the plant and equipment category with conventional accounting; because of the cumulative effect of inflation, the values of long-lived assets will be seriously understated after a long period of time. On the other hand, moderate but persistent inflation will not cause a great divergence between recorded inventory cost and the

value of inventory, except when inventory turnover is unusually slow or the LIFO inventory method is used and significant amounts of very old costs remain on the books. (With LIFO an unusually severe divergence of historical cost of sales from current-value cost of sales can occur when significant amounts of a LIFO base stock inventory are included in cost of sales.)

Transfer pricing is another aspect of performance evaluation that is affected by inflation. The overriding purpose of tranfer pricing in domestic operations is to establish and maintain an equitable basis for performance evaluation, particularly for profit centers. Since one division's revenue from interdivision transfers is another's cost, the profit of each division is directly affected by transfer prices.

Transfer pricing may be divided into two general approaches -- market-based and cost-based pricing, both of which are widely used. Because the former utilizes primarily noncost factors, however, it is outside the purview of this study. Cost-based prices may be based on full costs, full costs plus a markup, marginal costs, standard costs or some combination of these. Further, transfer prices may either include or exclude such types of costs as administrative and selling costs.

Inflation that is not adjusted for by the accounting system affects the profit and ROI of the division receiving the transferred goods in much the same way as it affects nontransferred goods; that is, if historical costs are used, both the profit and ROI of the receiving organization will be greater than they would be on a current-value accounting basis. The selling organization, however, suffers the opposite effect -- its profit and ROI are reduced if no inflation adjustments are made.

Managers are sensitive to the equity or inequity of transfer prices because these prices are important to the reported performance of their division. Inflation adds a confounding factor which causes the selling organization in particular to believe that transfer prices based on historical costs are inequitable.

If transfer prices are based on current values the sacrifice of the selling division will be more in accord with the value of the goods transferred and all parties concerned will be more likely to agree that the transfer prices are equitable. The argument in favor of current-value transfer prices is identical to that in favor of current-value accounting for profit and ROI calculations for the company as a whole.

An example will illustrate the transfer pricing problem during inflation. Consider the case of a parent with two Divisions -- A and B. Division A sells its output of components to Division B at historical cost plus 10%. Division B has a contract to sell all of the finished product at its historical cost (which includes the cost of goods transferred in from Division A) plus 30% to the government. The costs and selling prices per unit of finished products of Divisions A and B are as shown in Exhibit 5-3.

EXHIBIT 5-2

COMPONENT PARTS OF RETURN ON INVESTMENT

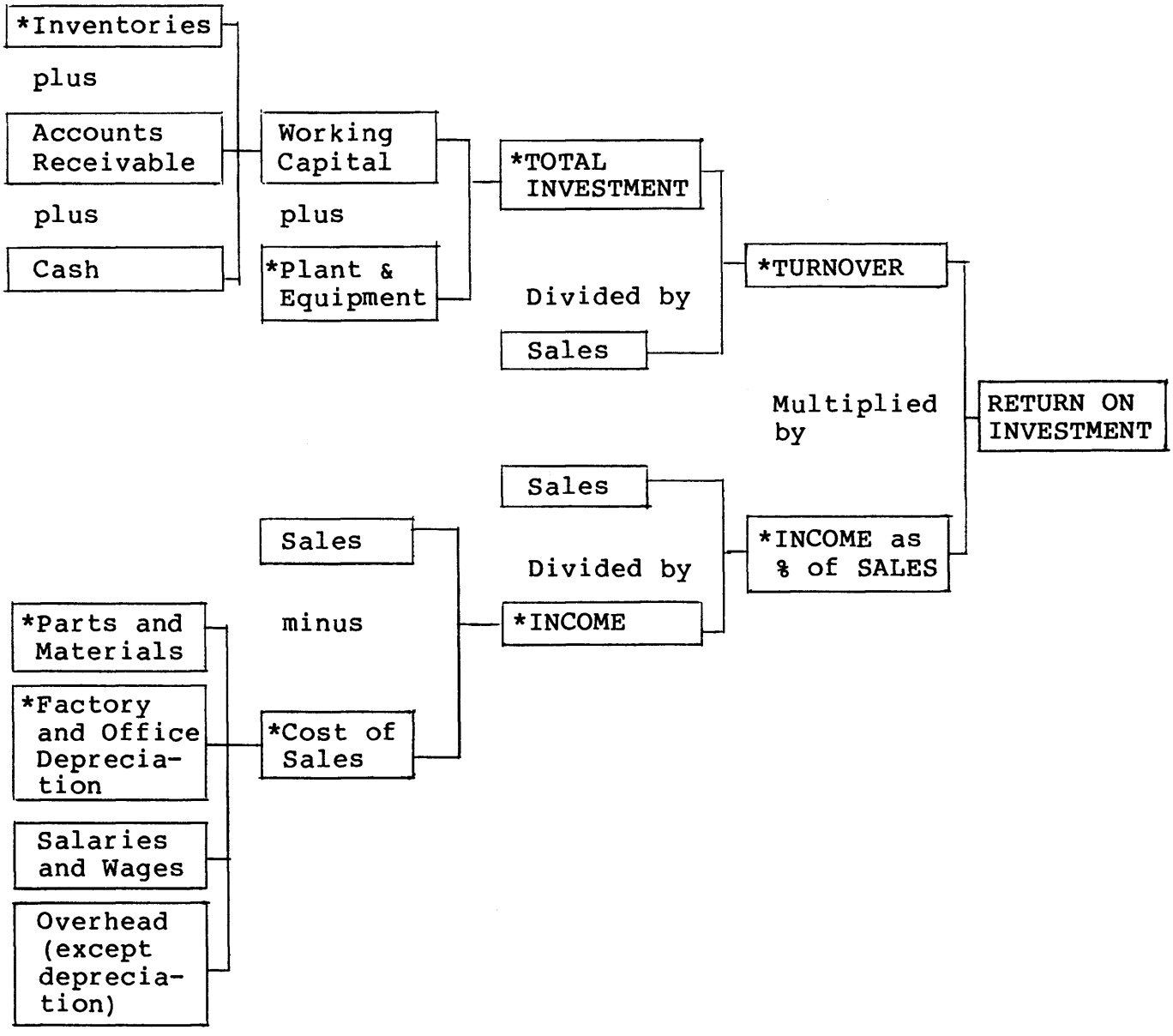

EXHIBIT 5-3

HISTORICAL COSTS AND PRICES OF DIVISIONS A AND B

	Division A	Division B
Transfer price from Division A	$ -	$ 5.50
Variable costs	3.00	5.00
Fixed costs (depreciation of plant and equipment)	2.00	4.50
Total (historical) cost	5.00	15.00
Markup (A = 10%; B = 30%)	.50	4.50
Prices	$ 5.50	$19.50

Production is 10,000 units per year for both divisions. The historical cost of the plant and equipment for Divisions A & B were, respectively, $200,000 and $450,000, and the useful lives are all 10 years.

The current value of Division A's plant and equipment is $400,000 and of Division B's plant and equipment is $600,000. Accordingly, current cost depreciation per unit is $4.00 for Division A and $6.00 for Division B. Based on this information, component transfer and finished product sales prices on a current-value basis are as shown in Exhibit 5-4.

EXHIBIT 5-4

CURRENT-VALUE COSTS AND PRICES OF DIVISIONS A AND B

	Division A	Division B
Transfer price from Division A	$ -	$ 7.70
Variable costs	3.00	5.50
Fixed costs (depreciation of plant and equipment)	4.00	6.00
Total costs	7.00	19.20
Markup (A = 10%; B = 30%)	.70	5.76
Prices	$ 7.70	$24.96

As can be seen, on a current-value basis A is losing $1.50 per unit on its sales to B ($7.00 current-value cost - $5.50 selling price), and thus is not maintaining its productive capability. Company B is making a profit on a current-value basis of only $.30 per unit ($19.50 - $19.20) when it should be earning $5.76, or $24.96 - $19.20.

International Financial Control

For an international company, most management problems are complicated in numerous ways by the multiplicity of cultures, value systems, and legal and tax structures, as well as by differences in the regulatory, economic and business climates of the countries. Inflation interacts with some of these considerations to compound the complexity. However, even without considering this compounding effect, each of the inflation-related management problems discussed in this chapter is more difficult to deal with for an international company due to the fact that each foreign subsidiary experiences a different rate of inflation. Different rates of inflation mean that even if for no other reason, current-value accounting is more important for operations in several countries rather than in just one, it may be the only means available to managers to establish at least a modicum of comparability between operations in different countries. Where very high rates of inflation are present, as in some countries, profits reported in conventional accounting statements may be entirely divorced from economic values.

Achieving comparability among operations located in different countries is one of the most difficult accounting problems of international operations. Each country has a unique cost/price structure and pattern of inflation in its economy which in combination means that the impact of inflation on financial information is unique for each country. As a consequence, conventional financial statements for subsidiaries in different economies typically provide a much wider pattern of variation of reported amounts from market values than occurs within domestic divisions of a company. Further, because headquarters managers of an international company are best acquainted with their own country, they are usually not as familiar with the nature and extent of inflation in each country and so are unable to mentally adjust at all effectively the financial information. The consequence is that in most instances any semblance of comparability among foreign operations is destroyed.

Consider the extent and kinds of knowledge that a manager in a company using historical cost accounting must possess to comprehend and compare financial operations in several countries. The manager must simultaneously understand and mentally juggle: (1) the vintages of assets held in each country, (2) the past and present inflation of each kind of resource held in each country, (3) when the inflation rates in each country changed for each type of resource, and (4) based on these, the relationship of the historical costs in each

country to current market values in that country. Of course, the manager must then synthesize this information into his own decision model of the company. This is an impossible task!

Current-value accounting is capable of providing intercountry comparability by expressing locally-held resources in terms of values in the local economy where they will be utilized to generate future earnings and cash flows. Identical pieces of equipment, for example, might have somewhat different values in different economies; these values would represent the local market's assessment of the value of the income and cash flow streams associated with each piece of equipment in its own country.

A serious problem related to inflation which also complicates financial comparisons among subsidiaries in different countries is that of exchange rate changes. The exchange rate problem is viewed by many observers as solely a currency translation problem that is unrelated to current-value accounting. However, it appears that proper currency translation cannot be achieved without a combination of current values and appropriate translation techniques -- good translation procedures by themselves will be for naught without current values. An association between current values and exchange rate changes was recognized some time ago by Philips Lamp, as noted by Bakker in reference to a 1936 devaluation of the Dutch Guilder:

> Since Philips imports a very substantial part of its requirements for manufacturing materials and machines, and exports the major part of its production, the devaluation created an immediate need for current cost information to enable management to review its policies with respect to sales pricing for the domestic and export markets, as well as for make-or-buy decisions, the allocation of production to and from other countries and for long-term investments. It became obvious that the continued use of financial information derived from historical costs would result in wrong management decisions."[6]

Investment analyses are significantly complicated by different rates and patterns of inflation in different countries. Two similar investment alternatives within one country may tend to be misrepresented in similar ways and to a similar degree (within a range) even if inflation adjustments are not made, because for both the inflation rates and pattern of inflation may be similar. Investment alternatives in different countries, however, generally will not share similarities of inflation rates and patterns, and so the impact of inflation on the financial information included in the analysis will often mean that alternative proposals are much less comparable than are alternative domestic investment proposals. Additionally, in an entirely domestic setting managers are more likely to be able to subjectively compensate, at least to a degree,

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[6]Pieter Bakker, "Accounting for . . .", op cit, p. 63.

for inflation because of their general awareness of domestic inflation. Managers are likely to be completely unable to make this kind of informal adjustment for inflation for investment proposals outside of their own country.

Operations Control

Operations control is the process of assuring that specific tasks are efficiently completed and accord with the company's goals. The tasks are usually repetitive and programmable in that an objective decision rule can be formulated which specifies the most efficient way to complete the task. Most such tasks are performed by lower level managers and clerical personnel and the information required for their completion is generally provided in disaggregated form by an operations level accounting or other information system. A task example is the reconciliation of a bank account, which is based on information provided by the accounting system.

Cash and working capital management and managerial analyses based on cost accounting information are described in this section. Operations level accounting systems provide the information for tasks related to these areas, and many of these tasks are undertaken by lower level managers. However, during inflationary periods, the information provided by these operations control systems may be misleading. Especially when this information is aggregated for higher level managerial use, it may lead to impairment of the operations of the company by failing to alert managers to the impact of inflation on some aspects of operations.

Cash and Working Capital Management

Cash management focuses on planning and controlling cash flows and working capital management consists of managing, planning and controlling those noncash resources and obligations which will soon be converted to cash or require cash outlays. This joint activity is directly related to managers' concerns about maintaining liquidity.

The primacy of cash flows for a company was described in Chapter 3. Managerial concern for liquidity centers on ensuring that cash is available as needed so that operations will be unhampered by a lack of cash. Financial information which fails to consider the effects of inflation may lead to an unrealistically optimistic expectation of future liquidity. According to Hackett:

> The current corporate liquidity dilemma developed rapidly and it appears that many managements failed to identify the problem until it reached serious proportions. Failure to recognize the liquidity problem much earlier is due, in large part, to a combination of the distorting effect a prolonged period of inflation has on financial information and the hesitancy of management to adopt new accounting and financial

reporting techniques that more accurately reflect current financial performance.[7]

Understanding cash inflows and outflows seems straightforward. Why then is it possible for a company to be unaware that it is about to experience a liquidity crisis as apparently happened with many companies during the high inflation of 1974? The activities which influence cash flows often are intricate. Cash flows are often the indirect or deferred result of complex interactions among transactions so that it may be difficult for managers to intuitively estimate the timing and amount of future cash flows.

This complexity and the related difficulty of readily perceiving the timing and extent of future cash flows encouraged managers to believe (perhaps wishfully or unconsciously) that even during inflation cash flows will tend to average out close to historical cost earnings much as they do when there is no inflation. Managers may often retain this feeling even in the face of near-term cash forecasts which are not encouraging.

However, if prices continue to rise, net cash flows will generally continue to remain substantially less than historical cost earnings. There are two reasons for this. The first deals with the nature of the cash flows. Greater cash outflows are necessary during inflation for replacement of inventory and fixed assets; the correspondingly increased cash revenues often lag considerably behind this increase in cash outflows, and they may never fully offset the greater cash outflows. The second reason concerns the nature of historical cost net income, which often increases dramatically during inflation even with a stable level of company activity. This increase is a consequence of the failure of historical cost accounting to account for inflation.

Thus, not only are cash outflows greater relative to cash inflows during inflation than during periods of stable prices, but also the net cash flow during inflation is less relative to historical cost earnings because earnings are not adjusted for inflation. The company with policies that implicitly assume a continuing correspondence between cash outflow and cash inflow when inflation commences is courting trouble; the company with policies that also are based on a continuing correspondence between net cash flows and historical cost earnings when inflation begins may soon be surprised by a liquidity crisis.

Current-value accounting is a managerial tool that is relevant to both of these problems. By stating inventory and fixed assets at their current value, managers are alerted to the greater cash outflows that will be required in the future. By adjusting for inflation in the calculation of earnings, current-value accounting

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[7]John T. Hackett, "The Multinational Corporation and Worldwide Inflation," Financial Executive, February 1975, p. 68.

tends to maintain a closer correspondence between earnings and future cash flows. The INFLAN model results (see Appendix D) corroborates the assertion that in most situations, current-value results of operations correlates more closely with the next period's cash flows than does historical cost net income.

Cost Accounting

Cost accounting systems are specialized and detailed operations level control systems which produce product cost calculations that play a vital role in the control of production costs. Costs generated by the cost accounting system also play a role -- either directly or indirectly -- in the establishment of product prices. Indeed, Hackett maintains that during inflationary periods profit margin erosion is "due in large part to the use of cost accounting systems that are insensitive to inflation."[8] Current-value accounting may assist costing systems to maintain their utility for both cost control and establishment of product prices.

By incorporating current values into the standards of standard costing systems, for example, these standards may serve simultaneously for both cost control and product pricing purposes. When current costs are significantly different for only a few input items, it is then possible and probably most convenient to directly revise each product's standard cost to reflect the new current cost. However, when a large number of standard costed goods and services have significant price changes, it may be preferable to not adjust each standard on an individual basis but instead apply price indices to groups of standards. The price index preparation involves classification of the standard costed items into homogenous groups for which the prices have changed to a similar extent. Of course the standards must be periodically revamped on an individual basis using current cost, but the use of price data indices on an interim basis provides a rapid means of adjusting standards within a period, and permits the difficult and time consuming chore of changing the standards to be undertaken less frequently. If the standard cost system is computerized, the standards can be even more quickly revised with price indices.

Direct costing systems which incorporate current values may be useful for spotlighting capital maintenance problems which often accompany inflation. If direct costing employs current values for fixed costs as well as for variable costs, the contribution to fixed costs derived from these current values provides a direct and highly visible indication of the extent to which the current-cost contribution margin covers the value of period fixed costs. This also portrays the extent to which capital has been maintained in dollar terms.

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[8]John T. Hackett, Ibid., p. 66.

Direct costing on a current-value basis is demonstrated by the example shown in Exhibits 5-5 and 5-6. Exhibit 5-5 portrays a company's direct cost statement, based on historical cost accounting information (ignoring income tax effects and assuming variable costs are at current prices):

EXHIBIT 5-5

DIRECT COST INCOME STATEMENT ON A HISTORICAL COST BASIS

		Total
Sales (10,000 units)		$100,000
Variable costs:		
Production	$ 40,000	
Selling and administrative	15,000	55,000
Contribution margin		45,000
Fixed costs:		
Production	25,000	
Selling and administrative	10,000	35,000
Net margin		$ 10,000

In Exhibit 5-5, fixed costs of production are due solely to the depreciation of the company's equipment which was purchased for $250,000. The equipment had an estimated life of 10 years and was expected to have no salvage value. Due to inflation the value of equivalent new machinery is $400,000. With current-value accounting this would result in increased depreciation charges, which would now be $40,000 per year, i.e., 1/10 x $400,000. As Exhibit 5-6 indicates, the net margin line in the revised direct cost statement would be negative on a current-value basis, dramatizing the fact that $5,000 of capital has eroded:

EXHIBIT 5-6

PARTIAL DIRECT COSTING STATEMENT ON A CURRENT-VALUE BASIS

		Total
Contribution margin		$45,000
Fixed costs:		
Production	$40,000	
Selling and administrative	10,000	50,000
Net margin		$(5,000)

With absorption costing, certain of the fixed costs become associated with inventory cost, which causes a delay in their appearance on the income statement. When direct costing is used, however, price changes for all fixed costs allocated to a period appear on the income statement for that period, providing an accurate indication of the contribution of income toward period fixed costs.

Current values may also be useful in cost-volume-profit (CVP) analysis. Marginal and average variable costs of quantities produced and distributed follow a particular cost pattern within an identified "relevant quantity range." During inflationary periods when costs increase and also change in relation to each other, the relevant quantity range must be supplemented with a relevant time range -- a period of time over which cost relationships remain stable enough to yield useful results from CVP analyses. Inflation can seriously impede CVP analyses by altering previously stable cost and volume relationships so rapidly that it is difficult to establish a valid past relationship which will remain stable over the relevant future time period.

A current-value accounting system may provide information that improves CVP analyses during inflationary periods. In CVP analysis how costs interact with volume is studied to find the pattern of product volumes and sales prices which yields the greatest overall profit. Product costs and product demands are the unknowns in this calculation, and statistical time series analyses of costs from past years may be used to determine product costs at different levels of volume. If past costs are recorded as historical costs and either lag with respect to current costs or indicate stable cost relationships that did not or no longer exist, improper cost-volume relationships may be found and used in making decisions about quantities to produce and sell. In most situations, the incorporation of current costs into CVP analyses will improve the information on which product volume and sales price decisions are made.

In the direct costing example previously explained it was shown that the company incurs a net loss of $5,000 on a direct cost basis if current value information is utilized. Assume that the maximum plant capacity in that example is 10,000 units. If the selling price and cost behavior patterns remain the same (and the effects of income tax are ignored) the breakeven point on a historical cost basis is:

$$\frac{\text{Fixed Cost}}{\text{Contribution Margin Per Unit}} = \frac{\$35{,}000}{\$4.50 \text{ per unit}} = 7{,}778 \text{ units}$$

However, if current value accounting information is used, the breakeven point becomes:

$$\frac{\text{Fixed Cost}}{\text{Contribution Margin Per Unit}} = \frac{\$50{,}000}{\$4.50 \text{ per unit}} = 11{,}111 \text{ units}$$

This breakeven point on a current-value basis exceeds the company's plant capacity and indicates what was perceived as a profitable long-run operation will never be able to be profitable. As this example demonstrates, without the use of current-value information, a company risks the possibility that its breakeven point will be incorrectly determined with the consequence of decisions being based on erroneous information.

External Relations

Current-value accounting may provide information useful to a company in dealing with its external environment in two key areas, those of wage negotiations with labor unions and public relations. Each area is briefly examined here.

Wage Negotiations

Workers and their unions are vocal in seeking their "fair share" of earnings. As a practical matter, "fair share" frequently translates into increased union demands when a company's or an industry's profits are high, and less stringent demands when profits are normal or depressed. Also, a relationship exists between profitability and a company's ability and willingness to increase wages. Reported earnings influence the initial demands of the opposing groups. Earnings also affect the strength of each side's bargaining position and their willingness to negotiate about such crucial issues as wage rates, job security, and the tradeoffs between increased present versus increased future wages that might be provided by escalator clauses and increased pension contributions.

Managers cannot be fully prepared for wage negotiations without knowing how inflation affects their company. This requires a thorough and systematic analysis of financial operations. While

this can be an ad hoc analysis, most of the information about inflation needed can be provided as a by-product of a current-value accounting system. Moreover, managers who have failed to pinpoint the effects of inflation suffer a lack of credibility when they state to union representatives that the published and certified historical cost financial statements incorrectly represent the financial status results of operations. Current-value statements that are derived from a comprehensive accounting system and that are also used for public reporting and internal management purposes will be more persuasive evidence than will reports prepared specifically for the wage negotiations.

Public Relations

Managers are concerned about the public image of their company. At the level of the company, this image affects the public's willingness to purchase the products and services as well as the extent to which the public is in general sympathy with wage demands. In a broader sphere, the perception of business held by the public influences public policy decisions, such as those pertaining to price controls and other forms of government regulation of business.

In the face of steadily increasing sales prices and historical cost profits abundantly buoyed by inflation, it understandably is difficult for managers to convince the public that their company is in the midst of hard times rather than making "obscene profits." The public even appears to be inclined toward outrage at the temerity of managers who allege a great discrepancy between reported and actual profits. Current-value accounting would portray a less rosy picture to the general public about a company's well-being.

Comments in the Canadian study are pertinent to this point:

> The record profits of Canadian industry in 1974 were greeted with cries of corporate gouging and demands for higher wages. Why should profits increase so dramatically when the customer had to pay more and more? Management claimed that these profits were illusory and overstated -- why? The answer is simply that the increase in profits of 22% was not accompanied by similar increases in cash.[8]

Conclusions

If current values are prepared for external reporting, costs must necessarily be incurred, and it is natural that managers will welcome ways to benefit internally from the additional outlays. Current values have been shown to be important to managers of companies in several ways and at all levels within a company.

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[8] Op cit, p. 28.

It seems reasonable that some companies will soon begin earnest efforts to formulate the grand design for a comprehensive program package that is developed, designed, and implemented to "manage inflation." Current-value accounting should become an integral part of such a package. Other elements seem likely to include training of managers who specialize in inflation management, as well as additional and more refined tools and techniques for managing inflation. Examples of these tools and techniques are pricing policies, product mix decision techniques which continuously adjust product mix as inflation advances, and a systematic approach to finding substitute inputs into the production processes as costs of present inputs inflate. All of these tools and techniques can utilize current-value accounting information.

If used extensively for internal purposes, and particularly if used as a part of a comprehensive management approach to inflation management, current values should be integrated into the accounts rather than used only to adjust end-of-period accounting numbers. This integration may increase the total of the current-value accounting costs, but it may also tend to make the machinery for the generation of current values for external reporting purposes more systematic and reliable because current values would be the end product of a continuous accounting system with the normal controls of such a system. Current values from a comprehensive current-value system can also be provided a degree of additional credibility for managerial use if the external auditors review, test, and evaluate the current-value accounting system.

How great are the additional benefits of an integrated and ongoing current-value system? Goudeket provides the following response with respect to his firm, Philips Lamp, which has used a comprehensive current-value accounting system for decades in its global operations:

> In accordance with the principles of "accounting for management," the responsible managers of all levels must know periodically the income and the capital employed, both in total and in detail . . . In other words, the application of the replacement value theory is not merely a calculation technique used in preparing the annual statements of the concern. It is integrated in the accounting system of all sections of the concern at every stage. In this way it is ensured that all information for management is compiled in accordance with this principle, and thus the replacement value automatically enters into all management considerations and decisions . . . Without the application of the replacement value theory we would feel a great uncertainty in our management. The segregation between operating results related to transactions or periods on the one hand, and other changes in capital, such as differences resulting from changes in price levels, on the other hand, is essential for management. The information in respect of capital invested is indispensable for financial purposes and for the appraisal of earning capacity. Intercompany

comparisons and comparisons of subsequent periods would be unreliable without replacement value.[9]

How great are the additional costs of an integrated current-value accounting system? The system would be required to routinely provide current values for the many purposes outlined in this chapter. However, the relevant costs are not the total costs of the system; they are those which exceed the costs which would be incurred anyway to secure current values in an ad hoc fashion for some uses, as some companies now do.

Goudeket addresses the question of the total cost of a current-value accounting system as follows:

> It is not possible to make a calculation which shows the cost connected with the application of the replacement value. Modern accounting methods and equipment reduce the extra cost to a minimum. Of far greater importance is the conviction that a more appropriate basis for policy decisions is created, and that is of tremendous value. The extra cost is certainly negligible as compared with this benefit.[10]

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[9]A. Goudeket, "An Application of Replacement Value Theory," The Journal of Accountancy, July 1960, p. 37.

[10]Goudeket, Ibid.

CHAPTER 6

USEFULNESS OF CURRENT VALUES TO SOCIETY

The burden of inflation falls unevenly on different companies and industries. In particular, companies with substantial investment in plant, machinery and equipment have been hard hit by capital erosion due to the large amounts of additional capital required in the future to replace existing assets at much higher prices.

These differing inflation effects between companies and industries tend to be obscured: (a) if no inflation adjustments are made in the accounts and (b) if price level adjustments only are made. Unfortunately, the real differences in inflation impact on companies can vitally affect the economic well-being of the nation. Knowledge communicated to the general public and other groups about differences in inflationary effects is essential to aid our society and economy to adjust rationally to the ravages of inflation.

Current values can portray the different inflation effects on specific companies and industries. This is because current values measure separately the price change effect on each resource in the market basket of goods that each company utilizes for its operations. Current values are not concerned with general inflation but instead relate to the price changes of each specific resource.

This chapter discusses several aspects of how inflation can deleteriously affect society and how these effects can be better managed or ameliorated if they are appropriately measured and reported on a company-by-company basis. The major topics examined are:

1. Capital formation
2. Capital erosion as a threat to the private sector
3. Inflation taxation
4. The stock market and inflation
5. Economic efficiency
6. Government use of current values
7. Current values for social and wage programs
8. Current values -- contributors to inflation?

Capital Formation

Several inquiries have been conducted in recent years into the future capital needs of the United States. Typically the time horizons for these studies were one to two decades into the future. While the analysis methods of the studies differ, the conclusions were nearly unanimous that the amounts of capital required to provide continued economic growth will be enormous and that the capital accumulation process and mechanisms as now constituted may be unable to provide the capital needed. Virtually all of the studies predicted a capital shortage in the future, and many suggest that the short fall will be of an alarming amount.

Our capital supply plight is summed up by Business Week:

> The amount of capital that the U.S. needs if it is to move back to its historic real growth rate of 4% a year and stay there is enormous by any measure.
>
> . . . By the best estimates available, the U.S. will need the incredible sum of $4.5 trillion in new capital funds in the next 10 years; capital that, for the most part, will have to come from the savings of the American people and the profits of American Business.
>
> Looked at in a slightly different way, the nation's total supply of capital will have to rise at a compoundannual rate of 8.7% during the next decade, compared with a compound annual rate of 6.7% in the past decade . . .
>
> And that is the nature of the crisis; the need to invest more to keep the economy growing, but also the strong likelihood that given the tax laws and corporate balance sheets as they are, and the economy as it is likely to be, there will not be enough capital to meet those investment goals. Some factors in this question must change or the U.S. economy of the late 1970s and the 1980s will be unlike anything the American people have seen in nearly four decades: an economy marked by slower growth, higher unemployment, and fewer fulfilled promises for nearly everyone.[1]

The way inflation bears on the capital crisis is highlighted by Angela Falkenstein in a study conducted for Legg Mason, a research arm of First Regional Securities. Falkenstein analyzed data from the Department of Commerce, the Federal Trade Commission, and the

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[1]"The Capital Crisis," Business Week, September 22, 1975. This article examines two detailed studies of the long-term capital outlook. See also William C. Freund, "Are We Headed for a Capital Shortage?", TEMPO (Touche Ross & Co.), Vol. 23, No. 1, 1977, p. 6.

Federal Reserve to factor out inflation-caused "inventory profits" and to adjust depreciation to a replacement cost basis. The conclusions reported in Business Week were:

> Although reported after-tax profits shot up to $73.3 billion in 1974 for nonfinancial U.S. companies, real profits sank to $23.8 billion, down 58% since 1965.
>
> In 1974 the apparent return on invested capital climbed to 11.6%, but the real return plummeted to 3.5%.

According to Business Week, "So far, most investors, government policy makers -- even corporate managers -- fail even to recognize the problem."[2]

Many factors influence the accumulation of savings by individuals that become a part of capital investment, the accumulation of funds for investment or reinvestment by companies, and the decisions of capital intermediaries and companies to invest or not invest. Current-value accounting impinges several of these factors at the company level; these factors are enumerated below:

1. Dividend distributions and capital erosion
2. Financial structure
3. Lack of appreciation of the impact of inflation on replacement costs and earnings
4. Taxation of profits and capital gains.

All but the last of these topics are discussed in the following few pages. The topic of taxation of profits and capital gains is reserved for separate discussion at a later point in the chapter.

Dividend Distributions and Capital Erosion

Dividend distributions can contribute to capital erosion and trigger a liquidity crisis of a company. Dividend payouts directly reduce the amounts available for reinvestment by a company. While a proportion of dividend payouts becomes savings of the recipients and thereby becomes available within the economy as a whole for direct reinvestment, a high proportion of divdends is used to purchase consumer items.

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[2]"The Great Industrial Vanishing Act," Business Week, August 11, 1975. Falkenstein is an independent consultant conducting continuing research in the area of inflation's impact on companies.

The prospect of dividends is a major reason why equity investors purchase securities. Nevertheless, most investors as well as companies prefer that dividend payouts represent a limited portion of current earnings, so that a substantial part of the earnings remain available for reinvestment and company growth. However, with earnings reported on a historical cost basis, it is unlikely that management or shareholders are able to determine the extent to which these earnings are influenced by inflation. Accordingly, it cannot be known when dividend payouts represent a distribution of an unintended high proportion of real earnings, or when distributions dip into retained earnings or represent a distribution of contributed capital.

In the absence of financial statements adjusted for inflation, stockholders are likely to expect about the same proportion of reported earnings to be paid in dividends as in recent periods. Rising reported earnings with the historical cost model during inflationary periods mean that even greater absolute amounts of dividends than in previous years must be paid to maintain a given percentage-of-earnings payout rate. Management feels pressure to maintain the payout percentage, and vague assertions about higher future replacement costs may not placate investors or the marketplace enough to permit a lower payout percentage when profits are skyrocketing. The result is that management generally meets investors' expectations at least part way, often to the detriment of the capital accumulation process.

This unfortunate sequence of high reported earnings, high investor expectations, and management acquiescence appears to have plagued the Canadian economy. Consider the figures in Exhibit 6-1 that were compiled by a recent study:[3]

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[3]Touche Ross & Co., Inflation: Its Impact on Business, 1976, p. 41.

EXHIBIT 6-1

A COMPARISON OF INFLATION-ADJUSTED EARNINGS AND DIVIDENDS PAID IN CANADA

	1974	1975
	(in billions)	
Reported earnings of business (on a historical cost basis)	$9.2	$8.3
Less:		
Additional cost of inventory replacement because of inflation	4.0	2.2
Additional depreciation to reflect current cost of plant and equipment	2.7	3.0
Earnings adjusted for inflation	$2.5	$3.1
Dividends paid	$3.1	$3.4
Excess of dividends paid over inflation-adjusted earnings	$ .6	$ .3

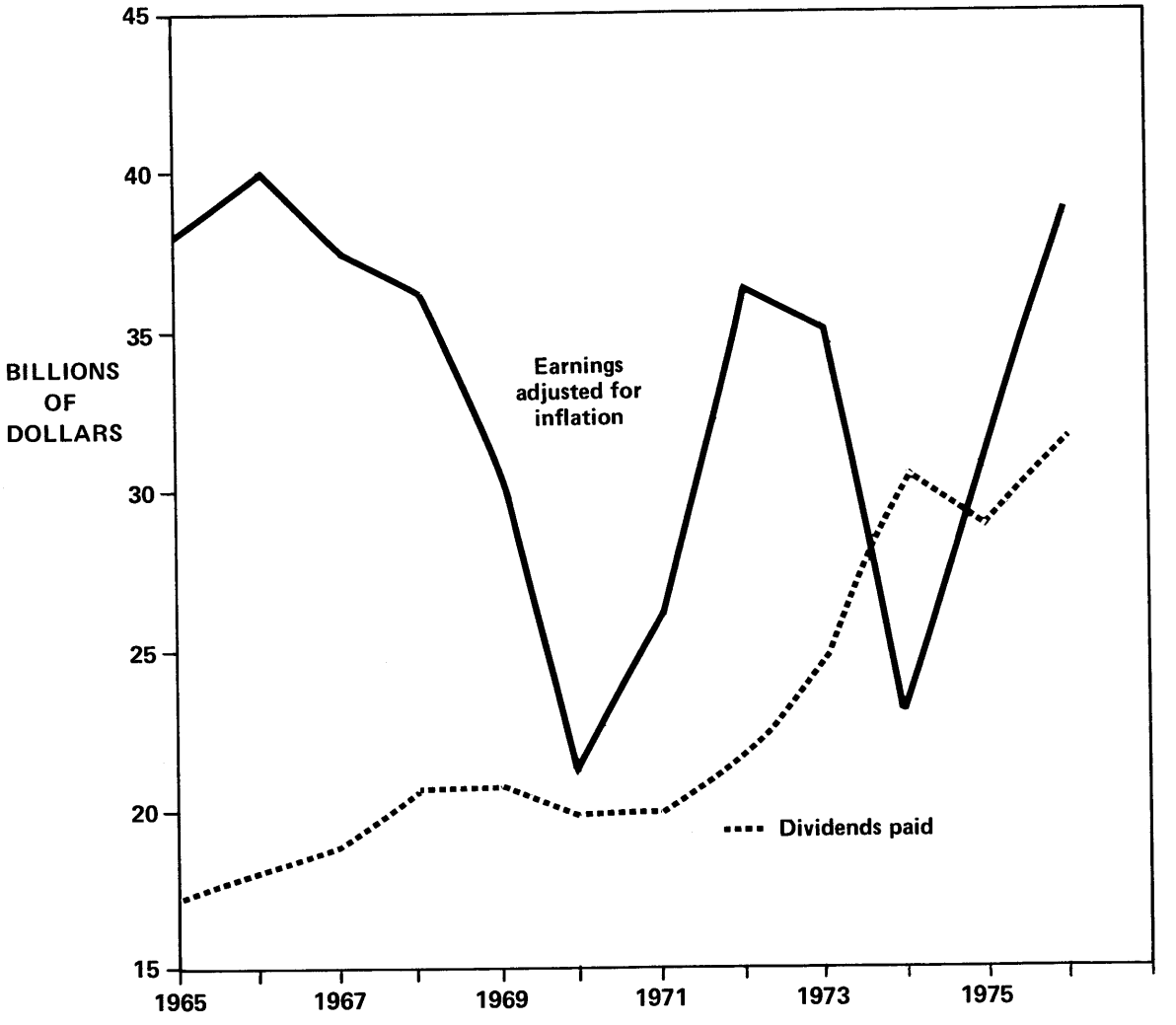
As indicated, Canadian industry paid dividends of $3.1 billion in 1974 and $3.4 billion in 1975. On the basis of inflation-adjusted earnings, there was an excess of $.6 billion and $.3 billion of dividend distributions in 1974 and 1975 respectively over earnings for those years. This indicates that no earnings were retained for capital expansion and that existing capital was exceeded by dividend payments in both years for the entire Canadian economy.

This striking situation is not restricted to Canada. As indicated by Exhibit 6-2, dividends for U.S. corporations (excluding financial institutions) exceeded earnings after adjustment for inflation for the year of 1974. Additionally, adjusted earnings barely exceeded dividends in 1970 ($21.1 billion vs. $19.9 billion) and in 1975 ($30.2 billion vs. $29.0 billion). Further, although 1974 earnings were lower than 1973 earnings, dividend payments increased in 1974. This demonstrates the effect of the very high historical cost income in 1974 of $71.9 billion.

Nor are long-term trends encouraging. As indicated on Exhibit 6-2, for the five-year period 1965-69 (a period of low inflation), an average of about $17 billion of inflation adjusted earnings per

EXHIBIT 6-2

NONFINANCIAL CORPORATIONS REAL PROFITS & DIVIDENDS PAID



SOURCE: Data provided by Angela Falkenstein

year was reinvested by industry. The comparable figure for the seven-year period 1970-1976 is less than $4 billion per year. The magnitude of this difference is alarming.

A helpful step in countering a possible capital crisis is provision of company financial information that includes adjustments for inflation and portrays the extent to which dividends can be paid while still providing for desirable capital expansions. With the financial facts at hand for each company, the aggregate dividend payout decisions for the entire economy may reflect dividend strategies which would result in a greater investment of earnings.

Financial Structure

Two of the more critical ingredients in the capital investment process are the willingness on the part of lending institutions and the equity marketplace to provide capital, and the interest rate at which capital is provided. Lending institutions base their decisions on their funds availability and on an analysis of the financial strength of a company, and the capital markets decide the prices of securities. A critical aspect of resource allocation decisions in both situations is the debt-to-equity ratio of the company seeking capital. As the ratio rises the price of capital to the company rises, inhibiting investment plans, and at some ratio restrictive covenants take effect or the financial risk is considered so great that the company cannot secure capital at any price. During inflationary periods a vicious cycle operates: the higher the inflation rate the greater is the capital need and the higher the debt-to-equity ratio as conventionally determined; but the higher the debt-to-equity ratio, the more difficult it is for companies to secure additional financing.

By comprehensively restating resources to economic values during inflation and providing an offsetting adjustment to equity, current-value accounting portrays equity position realistically. This provides an appropriate basis for debt covenants based on equity position. Further, capital providers who may have been unaware of the inflation effect on equity become alerted to it and those who were aware of the effect, but not its magnitude, are apprised of this magnitude; both groups have additional information on which to base more informed investment decisions. The effect of this restatement to current values typically will be a reduced debt-to-equity ratio, which may have a salutory effect on a company's ability to raise capital. The likely aggregate of this effect for the entire economy might significantly increase the capital flows to industry.

Lack of Appreciation of the Impact of Inflation on Replacement Costs and Earnings

It is critical for capital accumulation purposes that business adequately communicates the need for capital and the justification for realistic earnings to the voting and wage seeking public as well

as to the regulatory price setting and policy-making authorities. However, to the general public as well as to some of the most involved citizens and government agencies, the alarm that is spread by executives and other concerned persons about a capital shortage may seem rather remote, unimpressive, and easily dismissed. Further, the general public appears to doubt the credibility of companies that report record earnings and at the same time plead a liquidity crisis and capital shortage. The alarm about high replacement costs and about the insufficiency of real earnings in the face of these costs may be viewed by many persons as based on macro estimates replete with statistical errors and herculean assumptions, and propounded by doomsayers or groups with an axe to grind.

Skepticism on the part of the public and policy makers in both government and industry is likely to be minimized if earnings and replacement costs are routinely determined in a decentralized basis by comprehensive systems which utilize approaches that are consistent for all companies. Even though the time for replacing plant, machinery, and equipment may not be near at hand, companies should recognize and report these expected future costs as they become known, and the most explicit and credible recognition efforts are likely to be those afforded by current-value accounting.

Current values will provide credibility to individual companies when they claim that their historical cost earnings are not a valid indication of their ability to pay dividends and replace assets. Equally important, the aggregate amount of current values for the entire economy may constitute a major means for social and political persuasion that helps to convince the public and the government of the need for higher economic earnings, reasonable dividend payouts, and equitable taxes for the purpose of encouraging continued economic growth. A fringe benefit of current values may be that the aggregate of these costs may provide a relevant basis for national planning purposes because they will be based less on assumptions and more on management intentions, and less on imputed, assigned or macro-indexed costs and more on actual current costs.

Value Line has stated the general arguments of the preceding paragraphs with this reference to the required SEC disclosure of replacement costs:

> We are pleased with the arrival of SEC's bold new approach to accounting methodology. Over the short pull, replacement accounting may frighten some investors. But more astute investors will see the silver lining: the new bookkeeping methods will highlight the need for companies to earn more in order to build for the future; it will strengthen their case with tax-hungry legislators, slow-moving regulators, consumers and unions.[4]

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[4]"Investment Survey," Value Line, October 15, 1976. Published by Arnold Bernhard & Company, Inc.

Capital Erosion as a Threat to the Private Sector

Inflation could tend to influence government policy makers toward the view that companies and industries which have traditionally been largely unregulated should now be overseen more closely by agency regulators. Here, inflation could strike a blow against the continued existence of a relatively unfettered private sector.

Inflation contributes to liquidity crises; if inflation is high or is coupled with stagnation, a liquidity crisis can extend beyond individual companies to entire industries or the entire economy. Inflation also invokes political response, which may exacerbate a liquidity crisis by bringing forth additional governmental regulations or intervention, such as pressure to hold down prices despite runaway costs, or politically motivated investigations of price increases. During a liquidity crisis productive facilities cannot be maintained adequately and funds are not appropriately earmarked for plant replacement or expansion.

These general conditions are likely to result in an erosion of capital for the companies or industries in question, and the low levels of investible earnings bring government policy makers to question the ability of companies to finance the productive capacity required to provide the future goods and services expected by society. This scenario is particularly crucial to social well-being if the industries are pacesetting industries, such as energy and electronics. One possible outcome is that the industries which can no longer provide for themselves may feel forced to turn to the government for assistance which, if provided, will be accompanied by the government monitoring and regulation that is almost inevitable in such circumstances.

Worse even than regulation is that the public concern about the product shortages or deteriorated consumer services, especially if the reported earnings of industry are high, may encourage the extreme act of nationalization, or the sanctioning of public enterprises in the industries in question. A vicious cycle then emerges. Public enterprises are unlikely to suffer the consequences of capital erosion because the government can increase deficit financing or increase the taxation burden of the private sector. If deficit spending occurs, private enterprises suffer from further inflation, and if greater taxation is imposed, increased amounts of cash flow out of the private sector and into the government. In either case, the effects reduce further the ability of private enterprise to meet the expectations of society, and both transfer additional economic power from private industry to government. Caught in this circle, the general belief that private enterprise cannot get the job done continues to increase, and government is tempted to further increase its nefarious inroads into the areas of the private sector.

Current-value accounting information cannot alter the economic facts but it may assist in alleviating some of the unfortunate consequences of those facts. First, current-value information can marshall the facts about cost increases. This enables management to

take necessary actions in the nature of raising prices in a systematic manner or, if price controls exist or "moral suasion" is exercised by government officials, management can then present a stronger case in favor of being able to pass costs through. Second, current-value accounting can signal to companies and to the public the extent to which their capital is being eroded and trade associations and other lobby groups can more readily marshall the economic facts as evidence and sound a convincing warning to government and the public. Industry's condition would then not be a surprise, and government officials as well as the public would more likely be sympathetic to the plight of industry. Finally, the reporting of realistic earnings that take into account replacement costs also should serve to ameliorate concern about price changes, and shareholders' concerns if dividends are not based on historical cost earnings.

The report on Canadian inflation states that, "The first step is to stop further erosion of individual and business capital. Ultimately, this effect of inflation will destroy institutions, social structures, and the Canadian economy."[5] The most significant means at the disposal of accountants to combat capital erosion is that of providing information that demonstrates effectively the devastating effect of inflation on each company as well as on entire industries with respect to their ability to continue providing the products and services demanded by society. Current-value accounting can demonstrate these effects in a realistic and convincing way.

Taxation and Inflation

In the U.S., most federal, state and local taxes are based on historical cost calculations.[6] When prices increase or decrease dramatically in the short run significant variations occur between taxes paid on the basis of historical cost accounting and taxes which would be paid if they were based on accounting adjusted to current values. The result is that companies and individuals pay more or less tax than they would if economic values served as the tax base. All else being equal, if inputs are inflating, the company will pay more taxes on a historical cost accounting basis, and if these costs are deflating, it will pay less tax on a historical cost accounting basis.

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[5]Touche Ross & Co., op cit., p. 14.

[6]In some taxing jurisdictions, property taxes are based on market values. While this chapter gives little attention to property taxation, it is worth noting that historical cost based property taxation provides a comparative advantage to firms with older asset compositions. This advantage tends to counter efficiency advantages of companies having more advanced technology (newer equipment). Taxation based on current-value accounting will tend to neutralize this tax inequity.

The INFLAN computer simulation results (see Appendix D) demonstrate that taxes based on current-value earnings exceed nominal historical cost taxes by an especially large margin for companies with declining sales volumes and for the least profitable companies. Thus, an effective rate of taxation far in excess of the rate envisioned by the writers of the tax laws seems most likely to be exacted from companies which can least afford to pay the taxes.

Simple examples will serve to illustrate the effect of inflation on income and capital gains taxes. Assume that the current cost of a product is 10% higher at the end of the year than the average cost of the product sold during the year, that the cost to replace a plant purchased at the beginning of the current year had increased by 15% by the end of the year, and that the general price level, assumed to affect other expenses, increased by 5% at the end of the year over the average costs of other expenses during the year. Consider the earnings statements shown in Exhibit 6-3:

EXHIBIT 6-3

INCOME TAXATION DURING INFLATION

		Historical Cost		Current Value
Sales		$150		$150
Cost of sales:				
Depreciation	$ 20		$ 23[1]	
Product cost	80	100	88[2]	111
Gross margin		50		39
Other expenses		20		21[3]
Pretax earnings		30		18
Tax at 50% (based on historical costs)		15		15
After-tax earnings		$ 15		$ 3

Adjustments

[1] 15% x $20 = $3
[2] 10% x $80 = $8
[3] 5% x $20 = $1

It can be seen from examination of Exhibit 6-3 that:

1. The tax rate was 83% on a current-value basis ($15 ÷ $18).

2. The company is able to pay only $3 of dividends and still maintain its productive capacity. Additional dividends would be paid out of capital (assuming no cost-reducing technological advances).

3. The after-tax return on sales for the company was 2% on a current-value basis ($3 ÷ $150) as opposed to a nominal 10% after-tax return on a historical cost basis ($15 ÷ $150).

Inflation does not affect all companies in the same way. This can be demonstrated by assuming that depreciation expense on a historical cost basis and the product cost were reversed in the preceding example to represent a capital intensive company. Thus, depreciation expense would be $80 and product cost of sales $20. Therefore, the first two adjustments would change to $12 and $2, respectively, which would not alter historical cost income or income taxes, but would reduce current-value after-tax income to zero.

If, in this capital intensive company, the plant is assumed to be several years old, the cumulative impact of inflation could be devastating. To illustrate, assume that the plant cost $800, has a useful life of 10 years, and is five years old. Further assume that the replacement cost of the plant is $1,280 (this is approximately equivalent to an annual plant inflation rate of 10%). Depreciation for the current year then becomes $128 (i.e., $1,280 x 10%), and the financial statements are as shown in Exhibit 6-4.

EXHIBIT 6-4

CUMULATIVE EFFECT OF INFLATION ON EARNINGS

		Historical Cost		Current Value
Sales		$150		$150
Cost of sales:				
Depreciation	$ 80		$128	
Production cost	20	100	22	150
Gross margin		50		-
Other expenses		20		21
Pretax earnings (loss)		30		(21)
Income tax (based on historical costs)		15		15
After-tax earnings (loss)		$ 15		$(36)

As can be seen in Exhibit 6-4, the cumulative effect of inflation on earnings is substantial, causing large losses on a current-value basis. Nevertheless, the taxes paid remained unchanged.

The hypothetical example in Exhibit 6-4 is particularly relevant to capital intensive companies in industries where new technology does not offset cost increases. The example also demonstrates how taxation exacerbates capital problems -- in the example the company must pay substantial taxes even though it is in a pretax loss position on a current-value earnings basis. Additionally, taxes based on current-value accounting income tend to be closely related to a company's ability to pay because of correspondence between current values and cash flows.

Capital gains tax has a similar effect. Assume that a company purchased land in 1947 for $20,000 and sold it in 1973 for $40,000. Currently a $20,000 gain is taxed. Given that the price level doubled during the period, the company received back only as much purchasing power as it gave up in 1947. Consequently there was no economic gain. The tax in this example is, in effect, on $20,000 of capital so that it is a capital tax rather than a capital gains tax.

The preceding examples demonstrate that taxation problems are caused by accounting on a historical cost basis for: (a) depreciable assets and inventories for income taxes, and (b) both depreciable and nondepreciable fixed assets for the capital gains tax. When Congress enacted the first Revenue Act in 1913, apparently no consideration was given to the possibility that inflation would cause taxation of inflation-caused profits and no attention was given to the possibility of basing taxation on anything other than historical cost. At that time Senator Cummins stated that the depreciation deduction was "to maintain the capital intact" but it can be seen that during inflationary periods this original intent of Congress is thwarted.[7]

Inflation, Taxation, and Tax Equity

Equity in taxation requires: (a) that taxpayers on the average pay the statutory tax rate, and (b) that taxpayers in similar circumstances be treated similarly. Inflation destroys both of these dimensions of tax equity.

Falkenstein calculated the inflation-adjusted tax rate for all nonfinancial companies in the economy.[8] Her conclusion (as demonstrated in Exhibit 6-5) is that the gap between tax rates based on historical costs (hereafter called the nominal tax rate) and tax

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[7]50 Congressional Record 3847, 1913.

[8]Business Week, August 11, 1975.

rates based on earnings adjusted for inflation (hereafter called the effective tax rate) has expanded rapidly since 1965, reaching a peak in 1974 of 77.6% as compared to a nominal tax rate of 41.1% in that year. The effective rate has since declined somewhat to a rate of 61.5% in 1976.

In another study Terbough estimated that because of the understating of depreciation and inventory values, the average effective tax rate on nonfinancial companies in the 5 years 1969-1973 was 60%. The effective tax rate in 1973 was 66.5%, while the nominal tax rate was 48.3%.[9] Although the Falkenstein and Terbough studies are based on different approximation methodologies, both indicate that companies have been paying taxes at effective tax rates which are much higher than the nominal rates.

This phenomenon is not restricted to the U.S. In Canada, the effective tax rate in both 1974 and 1975 approached 70%.[10]

Effective tax rates that greatly exceed statutory tax rates is not the only inflation-related tax inequity. For 1,050 companies, 1974 earnings were adjusted to conform to FASB's price level accounting exposure draft. The study concludes that:

> Thus, with respect to the study's primary objective of measuring inflation's impact on the consistency in 1974 effective tax rates, the evidence is clear. Inflation, measured by the FASB's proposal for general price level accounting, did substantial damage to the consistency notion of equity among 1974 tax rates for nonfinancial corporations . . . while 47 firms' adjusted or real tax rates were less than half their stated or nominal rates, another 76 firms paid tax at more than double their nominal rates. Of the 76, 27 of these firms even paid taxes when inflation adjustment revealed that 1974 was a loss year. Clearly, inflation's impact did not fall evenly on individual firms.[11]

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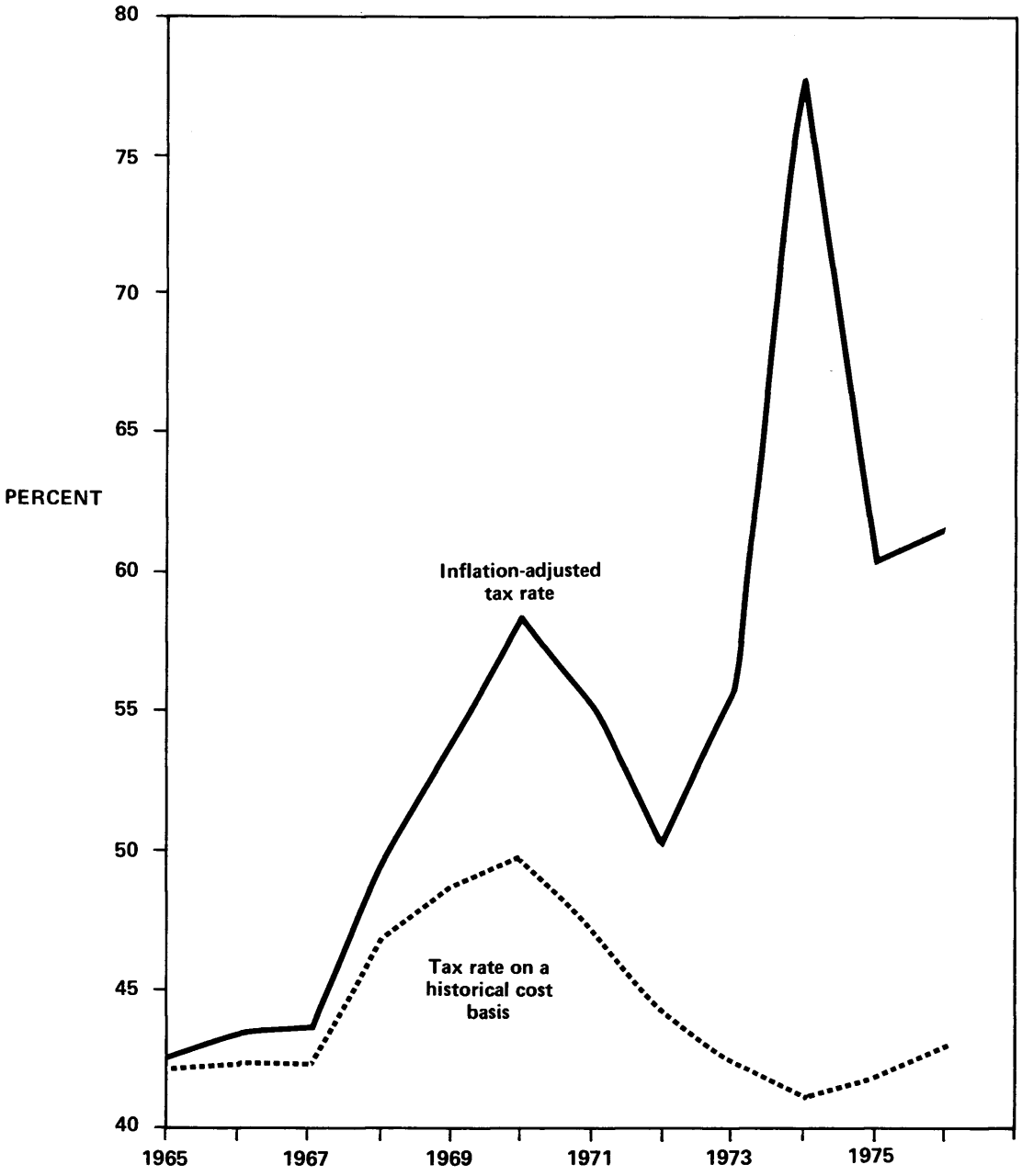
[9]George Terbough, "Inflation and Profits," Financial Analysts Journal, May-June 1974, pp. 21-22.

[10]Inflation: Its Impact on Business, op cit., p. 2.

[11]James E. Parker, "Inflation's Impact on Corporate Tax Rates," Taxes, September 1976. Contrary to the previously cited studies, however, Parker concluded that based on general price level adjustments applied as specified in the FASB exposure draft (as opposed to current values for depreciation and inventories as used in the previous two cited studies) inflation had little effect on the average effective tax rate.

EXHIBIT 6-5

INFLATION-ADJUSTED TAX RATE



SOURCE: Business Week, August 11, 1975, updated for 1975 and 1976 by date provided by Angela Falkenstein

A broad conclusion, which seems reasonable on the basis of the arguments developed in preceding paragraphs, was embodied in a statement by William E. Simon, then the Secretary of the Treasury. He observed, ". . . it is readily apparent that the Federal tax system (as applied) is poorly structured for a period of rampant inflation."[12]

Social Implications of a High Effective Tax Rate

Excessive tax rates contribute to at least two principal deleterious social effects. First they erode the capital base of industry and thereby inhibit growth in productive capacity. A preceding section of this chapter has suggested that the capital shortage problem in coming decades will be increasingly critical, and for this reason this effect of excessive effective tax rates should be accorded great importance.

What is the magnitude of the capital transfers to government caused by excessive effective income tax rates? In Canada, of the $5 billion of income taxes paid by Canadian industry in 1974, almost $1.5 billion or about 30% of the income taxes paid by Canadian industry was the consequence of the difference between the effective and nominal tax rates. In the U.S., income taxes if paid on a current-value basis would have been lower by about $20 billion in 1974.[13] If this $20 billion were reinvested each year for 10 years by industry it would represent more than 4% of the $4.5 trillion mentioned in the Business Week quotation previously given as the amount that may be required in the decade 1975-1985.

After-tax earnings retained in companies is a major source of new capital for business enterprises and for this reason alone excessive taxation has serious repercussions for capital formation. Additionally there is a crucial indirect effect as well; by reducing the level of reinvestment, stock prices tend to fall as this decreased growth is perceived by investors. Investors tend to become less willing to provide either equity or debt capital to industry and become more inclined to consume their capital or to invest it in nonproductive fixed assets (such as real estate) that serves as a hedge against inflation. A consequence is a lower growth path for industry for all future periods.

The other negative social effect of excessive tax rates is the damage to corporate liquidity. As already noted, one aspect of this is the direct transfer of excessive cash for taxes. Another aspect is that higher effective tax rates tend to push companies to debt capital markets because of the disinclination of investors to

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[12]William E. Simon, "These Three Tax Reforms Can Restore Equity and Confidence in Our System," Tax Review, December 1975, p. 49.

[13]Data provided by Angela Falkenstein.

provide funds in the face of lower distributable earnings. The consequence is that companies are likely to borrow more heavily and if so will suffer cash drains from heavy debt service costs, which reduces their flexibility by transforming optional dividend payments into obligatory interest payments.

Many avenues other than basing taxation on current-value accounting must be considered as possible routes toward tax equity and encouraging capital accumulation. One study used the 1975 Data Resources, Inc. quarterly econometric model of the U.S. to analyze the probable effects of three proposed alternatives: (1) a 2% permanent increase in the investment tax credit; (2) a two-stage reduction in the tax rate on corporate profits from 48% to 42%; and (3) an inflation allowance for depreciation, roughly comparable to inflation on a current-value basis.[14] The results suggested that replacement value depreciation was in most ways the preferred tax reform of the three analyzed. For example, for each dollar of tax revenue lost because of one of the reforms the additional real capital expenditures resulting from the depreciation proposal would be far larger than from the other two policies -- $.63 compared to only $.33 from the higher investment tax credit and only $.14 from a reduction in the tax rate.

Quite apart from its probable capital formation impact, replacement value depreciation tax reform seems desirable in that it would be a permanent reform, and not simply an on-again off-again stimulus to more production. It would permit companies to retain funds that many would agree should not be paid in the first place. Moreover, there is a positive psychological impact -- it seems likely to reduce the uncertainty in companies about undertaking the very large capital expansions required in the future because companies will have reason to believe that tax policy will consider the need to replace the productive capacity in the future at higher prices if inflation has ensued.

It seems likely that the U.S. Congress, recognizing the variety of possible accounting methods which would be employed by companies in implementation if taxation were to be based on current-value accounting, would be more inclined to act favorably on this proposal when the machinery for current-value accounting is already in place and a body of the current-value accounting principles and procedures relating to depreciation is already developed and in use. A powerful incentive to implement current-value accounting is present in this argument.

Exhibit 6-6 provides a summary of the benefits of current-value accounting for tax purposes.

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[14]Andrew F. Brimmer and Allen Sinai, "The Effects of Tax Policy on Capital Formation, Corporate Liquidity and the Availability of Investible Funds: A Simulation Study," Journal of Finance, May 1976.

EXHIBIT 6-6

ADVANTAGES OF CURRENT-VALUE ACCOUNTING AS A BASIS FOR INCOME TAXATION: A SUMMARY

1. Current-value accounting is a total accounting system -- it adjusts inventories and all other assets for inflation to values that appear to be equitable for tax purposes; most other tax relief approaches are only partial and therefore inequitable (for example, a company with large inventories and little plant or equipment gains less tax relief from an investment tax credit than does a capital intensive company).

2. Current-value results would be consistent through time, assuming that they are produced by an ongoing accounting system.

3. Tax equity would be across the board rather than only an arbitrary redistribution of the tax burden which may favor some companies over others. Tax computations would be prepared on the basis of values determined according to consistent accounting principles.

4. Current-value based taxation represents a comprehensive and permanent reform, not a stopgap method or temporary incentive.

5. Current-value accounting is equally valid for taxation during periods of inflation, stable prices, and deflation, thereby providing consistency in all price conditions.

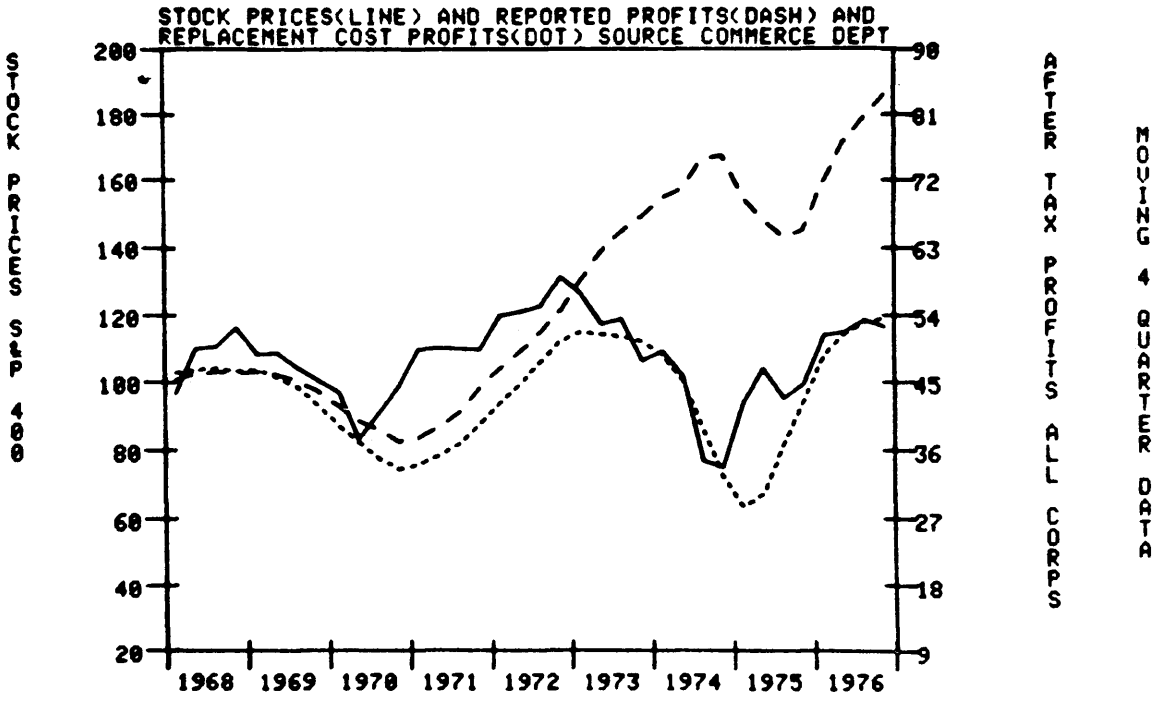
6. Because current-value accounting has a closer relationship between earnings and cash flows in many cases than does historical cost accounting, current values will in most cases be more closely related to ability to pay taxes than will tax relief provisions that permit taxation to be based on historical cost accounting.

7. Current-value accounting is neutral with respect to tax incentives; while it may eliminate the need for tax incentives in many circumstances, tax incentives can nevertheless be implemented better with current-value accounting than without current-value accounting. This is because current-value accounting provides a tax-equity base as a point of departure for whatever tax incentives are thought to be needed for social or fiscal purposes.

The Stock Market and Inflation

The stock market as a whole appears to be aware that business profits during recent inflationary periods have been specious. This awareness is clearly shown in Exhibit 6-7, which shows a much stronger correlation of stock prices with replacement cost profits than with reported historical cost profits. Exhibit 6-7 portrays the Standard and Poors 400 Industrial Companies on a moving four-quarter basis. The year 1974, when inflation rates were at their peak, is particularly interesting.

EXHIBIT 6-7[15]



[15]Reproduced from William S. Easeman, Jr., Inflation Accounting/Indexing & Stock Behavior, March 31, 1977, a monthly bulletin published by Faulkner, Dawkins & Sullivan.

The first inclination after examining Exhibit 6-7 may be to question that if the market is already discounting profits for inflation, why would current-value accounting be needed to adjust for inflation? The primary reasons are: (a) to increase stock market efficiency and (b) to help perpetuate a broad base of small investors in the marketplace.

Stock Market Efficiency

A prerequisite for any criteria -- be they social, political, or economic -- applied to the allocation of capital resources is that of comparability of accounting information about past status and performance to information about current status and performance so that a basis is provided for inference about future prospects. Because of the lack of this comparable information during and after inflation, the stock market appears to be inefficient in adjusting for inflation in at least three ways.

First, it is likely that the market adjusts on an economy-wide basis for all stocks as if each were affected in about the same way by inflation, although the market may compensate to an unknown degree for general differences between industries. Inflation has dramatically different impacts on different companies even within the same industry, and the differences in these impacts should be measured and reported to the marketplace.

Second, even if the market or analysts in the market attempted to adjust each company's financial results for inflation, it is probable that many analysts would make independent adjustments for each company using a variety of different adjustment approaches. Immense resources would be consumed by the efforts, and the results would likely be of inconsistent quality and questionable accuracy. Further, the results could be objectively verified only with great difficulty because only the company analyzed would possess the required information about input proportions and cost, asset replacement intentions, and so on. It has been argued that the complexity of current-value accounting retards its acceptance; however, a variety of current-value approaches practiced by outside analysts would be more difficult for market participants to deal with than would a current-value accounting system implemented by each company.

Third, uncertainties about current-value calculations made outside the company would tend to introduce greater uncertainty into the marketplace. The added uncertainty would tend to depress market prices and introduce an unwanted element of price volatility when diverging evaluations are announced for particular companies.

Small Investors

Considerable attention has been given recently to the concern that perhaps business opportunities and the financial statements that bear on these opportunities necessarily are complex beyond the ability of small investors to comprehend and analyze, and that therefore financial statements should be directed to the sophisticated professional analysts. Yet in the view of most observers, small investors are important beyond the amount of their investments in equity stock. Their continued participation in the capital markets is thought important to encourage individual savings and the investment of those in the productive sector, and it is believed to be even more critical to garnering widespread support for the present system of economic capitalism. Few observers doubt but that the disenfranchisement of the small equity investor would have unpleasant repercussions for society.

Current-value accounting is complex, and it is difficult for small investors to understand. However, without current-value accounting disenfranchisement of small investors during inflation seems even more likely because these investors are then faced with the task of analyzing not only the published historical cost financial statements but they must separately analyze the effects of inflation on the company and the ways in which the published financial information should but fails to reflect this effect. This is a difficult assignment for the small investor with limited time and resources for analysis purposes. When seen in this light, current-value financial statements seem preferable to conventional historical cost basis financial statements for small investors.

The case for current values for small investors can also be made in terms of equity. Without current-value accounting these investors become primarily pricetakers only, rather than participants in price setting in the stock markets. The argument is that if professional investors, because of their superior resources and tools for analysis, have monopolistic access to current-value information, security prices will be bid up or down by them to the point that prices reflect the current-value information. Nonprofessional investors then face prices which impound current-value information without having been privy to the information on which the prices were based.

The concept of equity embodied in the securities laws implies that all investors should have equal access to information. This in turn means that current-value information should be made available to all investors. Publishing current-value financial statements meets this need, whereas conventional historical cost basis financial statements fail in this respect.

Economic Efficiency

Many of the ways that current values assist investors and managers, as noted in preceding chapters, also promote efficiency in economy-wide resource allocations. For example, current-value determined rates of return (ROR) can help managers make investment decisions that in the aggregate promote economy-wide efficiency in resource allocations. A related example is that of the expected ROR of new investments; if the minimum expected ROR is based on historical cost accounting, misallocations may occur. If the minimum acceptable rates are generally too high because past rates have not been based on current-value accounting, the economy may not grow as rapidly as it might because total investment in new plant and equipment will be lower than is economically justified.

As a third example, if current-value estimates at the company level provide superior information to the stock market participants -- such as providing a better indication of the overall liquidity present in the corporate world -- the beneficial impact on the decisions of these individual participants also promotes the overall efficiency of the market as an allocation mechanism.

Thus, the most compelling economic efficiency argument about the importance to society of current values is a simple one. It is that, in the many ways enumerated in the preceding chapters, current values tend to promote efficiency in the capital markets and productivity in individual companies, and the aggregate of these efficiency and productivity increases represents a net gain to society in its utilization of scarce resources. These benefits tend to translate into an improved standard of living.

An argument similar to the preceding one is related to industry efficiency rather than to economy-wide aggregation of the incremental efficiency improvements of individual companies. Earnings and ROI calculations based on current values should provide interindustry comparability even during inflation; with historical costs this comparability is lacking because each industry's financial statements are influenced in different ways by the different pattern of inflation in each industry. If a company believes that it can earn an acceptable return in a new industry, the effect of its entry into the industry is generally to increase efficiency in that industry because the other companies in the industry are required to increase their own efficiency to remain competitive. Society is likely to receive the benefits of the increased competition and efficiency.

Benefits to society from current values can also be surmised at a third level, that of worldwide allocations of resources. The lack of comparability of financial information across national borders is a critical problem for international companies. By providing greater financial comparability among operations abroad, current-value accounting may permit a better assessment of foreign risk and foreign investment opportunities.

Government Use of Current Values

Various arms of the government -- federal, state and local -- use accounting information for policy setting, industry regulation, economic planning, statistical analysis, and a variety of other purposes. Some of the ways in which current-value accounting can assist in these activities are discussed in this section.

Almost everyone would agree that if government officials are to formulate economic policies based on information provided by companies, they should use realistic information -- information that portrays the actual status and results of private enterprises. Virtually all information from companies' financial statements is utilized in one way or another by the government agencies for control of the economy; current-value accounting information can provide the reality that is so urgently needed by government in its policy formulations.

Control of economic cycles is one much discussed form of government intervention that will serve here as an example. Cycle control includes policing the liquidity of the economy through monetary policy formulation which requires an assessment of the liquidity in the business sector. As suggested in Chapter 4, current values provide a better measure of company liquidity. The aggregation of current values could improve the liquidity estimates on which monetary policies are based in part.

Tempering of economic cycles also involves predicting future economic trends and taking fiscal and monetary action to eliminate or reduce cyclical extremes. Although economic forecasting involves many nonquantitative factors, accounting information from companies is utilized. Information about the value of inventories on hand, budgeted estimates of sales and cash flows, and the extent of future commitments by firms for capital investments help to indicate the private sector's financial expectations and commitment as well as how entrepreneurs are likely to react to an economic upturn or downturn. As was shown in the preceding chapter, each of these measurements is improved by current-value accounting.

High levels of inventory in an industry during an economic downturn, for example, probably presage a long period of inventory usage before companies return to normal inventory purchasing patterns. Information about inventory levels helps to determine the when, where, and how of governmental fiscal and monetary policy. If current values are used in the measurement of inventories realistic information about aggregate inventory values would be provided to policy makers. This information would probably be more likely than would historical cost information to provide insight to economic policy makers about the probable intentions of companies with respect to replenishing their inventory. Government policies which are influenced by how heavily companies are expected to invest in inventory replenishment would then be based on more realistic information from the private sector.

As another example, government policy makers must receive information about the impact that inflation has on private sector liquidity. Some policies that seem appropriate for macroeconomic purposes may spell disaster for companies if inflation has placed the companies in a poor liquidity position. For example, a restrictive money supply policy intended to slow down an inflating economy could precipitate a severe liquidity crisis. To the extent that current-value accounting provides a better basis for forecasting future cash flows, as discussed in Appendix D, it also provides better aggregated information to government for establishing monetary and interest rate policies.

Tariffs, import quotas, currency restrictions, and other barriers intended to control imports and exports and to protect domestic industry also can be influenced by current values. These barriers are established, altered and eliminated frequently as the perception of government officials of domestic and foreign costs and other considerations change. Policies intended to protect domestic industry or encourage export activities must be continuously reassessed in the light of the most current conditions. Current costs of domestic companies are one of the most important current conditions that must be evaluated, and current-value accounting can provide these current costs.

Regulation of Monopolies

In many areas of public service monopolies are conferred by governments. Regardless of whether the monopolist is a private or public enterprise, government must use accounting information to adequately evaluate efficiency and regulate prices. For example, information about production costs and amounts of invested capital is necessary for evaluation of what constitutes a "satisfactory" return on investment. Wilcox succinctly summarized the need for accounting information by regulatory agencies in the United States:

> A commission must be equipped with accurate and informative accounts if it is to succeed in assuring reasonable rates, satisfactory service, and financial stability. To control the general level of rates, it needs to know operating expenses and the value of investments. To control the rate structure, it needs to know the cost of different types of service. To pass judgment on proposals for extension and abandonment, it needs information on the revenue and costs of particular operations. And to prevent overcapitalization, it requires information on all corporate assets and liabilities.[16]

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[16]Claire Wilcox, Public Policies Toward Business (Homewood, Illinois: Richard D. Irwin, Inc., 1966), p. 302.

The implications of current values for the matters expresed in this quote are enormous. To provide enlightened regulation, an agency must know costs, expenses, revenues, and values of resources, obligations, and investments. Recalling the context of the discussion of the preceding chapter, and in particular that dealing with ROI, it seems probable that government agencies charged with the regulation of monopolies would find current-value accounting information to be of great assistance. Apparently British regulatory authorities find current values useful, for in Great Britain the Monopolies Commission which has traditionally examined profits based on historical costs in its investigations has also been preparing ad hoc figures for some time on a current-value basis.[17]

Government Statistics

Governments compile extensive statistics about private enterprises for direct governmental policy making use as well as for regulation of the marketplace. Most of these statistics are also made available to industry trade associations, individual companies, academic and other researchers, and the general public.

A significant portion of the federal government's raw data input is from individual companies and is received by the agencies in the form of accounting reports. Morgenstern states that, "Business accounts constitute the single most important source of information about the economic activity of a nation."[18]

One use of this information is in preparation of the national accounts which serve many purposes, one of which is providing the basis for Gross National Product (GNP) calculations. Yanovsky puts forward some major uses of the national accounts systems:

> The national accounts were drawn up with the view of helping the public authorities in formulating their economic and financial policies. The accounts constitute a framework which makes possible a continuous systematically interrelated and constant record of data on the basic economic functions in an economy -- production, consumption, and accumulation of capital . . . The use of the national accounts for the study of the economy and appropriate decision making has also spread to the business world and to the labour organizations.[19]

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[17]Inflation Accounting: Report of the Inflation Accounting Committee (London: Her Majesty's Stationery Office, 1975), p. 214.

[18]Oscar Morgenstern, On the Accuracy of Economic Observations (Princeton, Princeton University Press, 1963), p. 70.

[19]M. Yanovsky, Social Accounting Systems (Chicago: Aldine Publishing Company, 1965), pp. 11-12.

The system of national accounts provides the information used for GNP calculation for the entire economy which is as follows (in simplified form):

Wages
+ Rents
+ Interest
+ Profits
+ Indirect business taxes
+ Depreciation on capital consumption

= GNP

The items of profits and depreciation are of greatest concern in this context since both are derived from company financial statements and both are greatly affected by inflation. The statisticians who prepare these accounts do not find the historical cost based figures from company financial statements to be satisfactory for their purposes. As noted by May et al with respect to the adjustments required to the GNP data:

> The most general of the adjustments is the elimination of the effects of general price-level changes. GNP estimates are often stated in terms of current dollars as well as in terms of some base period dollars. Restatements are also needed when inventory figures conventionally prepared on the transaction cost basis by the business sector are to be included on a current market-value basis in GNP statements.[20]

It seems reasonable that current values from corporate financial statements, if resulting from company current-value accounting systems that measure on a consistent basis, could be incorporated directly into the national accounts and so into the GNP calculations. The advantage of doing so might include greater reliability and precision in the national accounts and GNP calculations, and so better information for the many purposes to which these natonal statistics are put.

Governmental Purchasing

Each year, federal, state and local governments purchase enormous amounts of goods and services on a contract basis from companies. For many of these purchases (e.g., many defense contracts) the price paid is based at least in part on costs incurred, profits, target rates of return on capital employed by the

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[20]R. May, G. Mueller, and T. Williams, A Brief Introduction to Managerial and Social Uses of Accounting (Englewood Cliffs: Prentice-Hall, Inc., 1975), p. 103.

company, or some combination of these or other considerations on a formula basis. Additionally, in many cases, after-the-fact price renegotiations occur to determine additional payments to the company or rebates to the government which are a function of particular conditions of performance or contractor cost overruns.

Inflation wreaks havoc with these traditional bases for government purchase contracts if they are not adjusted for inflation because it causes accounting reports to misrepresent costs, profits, ROI, equity position, and other accounting measures. By basing government purchase contracts on current-value measures, greater equity may be possible and definite standards can be provided that will enable a given contract to be valid no matter the level of inflation. Measurements of performance under the contract can also incorporate appropriate adjustments for inflation.

Current Values for Social and Wage Programs

A variety of corporate and public programs at all levels of government are influenced by inflation. Many of these programs can properly be a function of the ability of a company, association of companies, or an industry to pay, which in turn is determined by performance in real terms. Examples are automatic wage rate escalation programs, pension fund contribution programs, profit-sharing plans, and support to the arts and other community programs. Contributions to these and similar programs might be indexed to current-value earnings or other current-value performance criteria.

Once begun, many of these company or industry programs may become moral or even legal commitments. Accordingly, the accounting systems that produce the performance criteria on which contributions are based should routinely provide economic value measurements with high credibility. This suggests that current-value accounting systems are appropriate.

Current Values: Contributors to Inflation?

This chapter on current values and society would be incomplete without addressing the argument that current values, by informing managers of their economic costs, serve to feed inflation because managers are then encouraged to increase sales prices. The most important responses to the "current-values-cause-inflation" argument have been examined or implied in this report in other contexts. These responses may be summarized as follows:

1. Managers raise prices in response to inflation even without current-value accounting, although they do not appear to do this in a timely fashion. Unfortunately when price increases are based on ignorance of current costs, the increases are quite often inconsistent with the need and in some cases are higher than warranted by the cost increases.

Current-value accounting provides information on which realistic pricing policies can be based because this information prompts neither over nor under reaction on the part of managers. While current-value accounting, as seen from only this perspective, on balance may tend to promote inflation, it also has a beneficial influence consisting of tending to make pricing policies more rational.

2. Current-value accounting also may have a built-in dampening effect on inflation. If earnings are calculated on a current-value basis, one effect may be reduced wage and salary demands in recognition of the demonstrated lower real earnings. Thus, a company's costs may tend to rise less rapidly and therefore its price increases may be less. The size of this effect, however, may be modest.

3. While price rises are painful to consumers and in many cases might be the natural consequence of the measurement of economic realities by current-value accounting, failure to raise prices may be even more painful in that this may impair the ability of American industry to continue to provide the services demanded by the populace. While arguments in extremis are always dangerous, it seems likely that for industry to not raise prices systematically while costs escalate could result in an economic catastrophe for the nation. The question then becomes: How much and how systematically should prices rise? Current-value accounting provides rational answers on a product-by-product basis.

4. While current values as an inflation-causing agent have received ample attention, the role of current values in reducing the rate of inflation has received scant attention. Current-value accounting informs the manager exactly why and how much product costs have increased. By utilizing this information, managers can determine the cost effectiveness point at which alternative and less expensive inputs become economic or at which product quality decreases become preferable to cost increases, thereby enhancing the company's price competitiveness in the marketplace.[21] By projecting current-value cost trends, managers are alerted on a timely basis of the need to begin the search for and evaluation of cost reducing alternatives.

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[21]During inflationary periods consumer preferences change and are reflected in consumer demand for a different mix of products as consumers continuously adjust their own purchase mix to gain the maximum satisfaction from their purchases. Accordingly, even many of the product quality decreases contribute to sustaining or increasing the overall well-being of consumers. Stated more directly, consumers often prefer decreased quality to increased price.

5. Finally, the effect of current-value accounting tends to be counter-cyclical in nature so that at the macro level it contributes to a dampening of inflation. As cost inflation progresses because economic expansion is adding scarcity value to factors of production, the cost increases are reflected quickly by current-value accounting as reduced earnings and ROIs. Managers as well as capital contributors who observe the new economic reality of low returns are less likely to make decisions that lead to further expansion and therefore more competition for scarce resources which brings a further spiraling of prices.

Summary and Conclusions

A high priority for industry should be communication to the government, public, and special interest groups of the extent of damage attributable to inflation. Current-value accounting is one of the most effective ways to communicate this. Yet, managers exhibit a degree of reluctance to report to shareholders and the public the extent of the damage that inflation has done to their company; apparently they fear that such reporting will cause their company to be unfairly compared to competitors who have not disclosed this information. This fear was evidenced by the plea that the replacement cost data required by the SEC be kept secret until the data for all or a substantial number of the companies subject to this requirement could be released at one time.[22]

Nevertheless, the importance of current value information to investors, managers, and society is compelling in favor of the routine production and reporting of current-value information for all major companies. The social role of current values in capital market efficiency, equity, and economic development and stability, and the persuasive power of current values in arguing for tax reform are sufficient reasons for the systematic generation and disclosure of current values. When the considerations of economic efficiency in industry, capital erosion and government statistical needs for policy, planning, and regulation purposes are added, the implementation of current-value accounting becomes an urgent matter. If, as was suggested in this chapter, the viability of the private sector is jeopardized because of inflation and this jeopardy can be reduced significantly by current-value accounting, then implementation becomes not only urgent, it becomes important to the survival of our economic system.

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[22] Wall Street Journal, November 23, 1976.

SECTION III

CURRENT VALUE MEASUREMENT

AND

IMPLEMENTATION

CHAPTER 7

CHOICE OF DISCOUNT RATES FOR PRESENT-VALUE ANALYSIS

The primary purpose of this chapter is to develop and present guidelines for selecting discount rates. These guidelines are presented in the Recommendations section at the end of the chapter. Three general categories of situations are recognized, each of which requires a different discount rate determination methodology.

Consideration of several topics is useful prior to discussion of the recommendations. These topics, examined in sequence in this chapter, are:

Present value and economic value

Risk and interest rates

Types of risk

Possible bases for discount rates

Analysis of discount rate types and needs

In those circumstances for which discounted cash flow analysis is not appropriate for valuation of resources and obligations, current costs should be used. Some general guidelines for the selection of current costs are presented in Chapter 8.

Present Value and Economic Value

There is general agreement that the total economic value of a company's resources and obligations at any point in time is the present value of the future cash flows, plus the net liquid assets on hand.[1] However, accounting measurement is oriented to measuring the value of specific resources rather than total company value. Accordingly, economic value for a specific resource is the present value of the future cash flows of that resource. Sorter states that, "Almost unanimous agreement exists among economists that the value of an asset is quantified by the discounted value of the future cash flows attributable to it."[2]

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[1]See Lawrence Revsine, Replacement Cost Accounting (Englewood Cliffs: Prentice-Hall, Inc., 1973), p. 96; and John S. Cook and Oscar J. Holzman, "Current Cost and Present Value in Income Theory," The Accounting Review, October 1976, p. 778.

[2]George H. Sorter, "Accounting Income and Economic Income," Objectives of Financial Statements, Volume 2: Selected Papers (New York: American Institute of CPAs, 1974), p. 105.

Many resources have alternative cash flow potentials from disposition or from continued productive use in the company. Economic value is the greater of the present values of the alternatives, if (as is the usual case) it can be expected that the resource will be utilized to realize the highest present value.

Exhibit 7-1 summarizes how present value concepts apply to the major categories of resources and obligations.

EXHIBIT 7-1

Resource or Obligation	Economic Value
Cash now held	Present value = cash now held
Noncash monetary items, e.g., receivables and payables	Present value = discounted future net cash flows
Nonmonetary items held for sale, e.g., inventory	Present value = discounted future net cash sales proceeds
Nonmonetary items held for services, e.g., factory	Present value = discounted future net cash flow from services

Exhibit 7-1 indicates that for cash stocks held now, no discount factor is applied; this is because cash stocks are already at their present value. However, the determination of economic value of noncash monetary resources and both types of nonmonetary resources requires their adjustment to present value by using a discount rate, or another valuation approach where present value determination is not feasible.

Risk and Interest Rates

Crucial questions in the selection of a discount rate are those of what is risk and how is risk related to interest rates. Risk may be defined as the probability that future cash flows will be different from the expectations held now. This variance can be one of timing (earlier or later cash flows) or amount (greater or lesser cash flows). The risk may also be favorable (greater or earlier cash inflows, lesser or later cash outflows). Both favorable and unfavorable risk can be present simultaneously. For example, for a given instance, cash flows may be either greater or less than expected.

Traditionally risk has been incorporated into financial analysis by increasing the interest rate to compensate for perceived risk. Yet, while capital asset pricing models provide a theoretical basis

for converting a given perceived risk level to a given increment of interest, in practice the measurement processes are difficult and are insufficiently refined to provide consistently useful results.[3] An additional problem for accounting valuation purposes is that capital asset valuation models are concerned with the entire company rather than each resource separately.

For certain accounting valuation purposes market interest rates capture the appropriate risks. To appreciate this, it is first necessary to consider the relationship of risk and interest rates by examination of two concepts. The first is that of the "term structure of interest rates," and the second is that of "duration."

Term structure refers to the phenomenon that differences in the market interest rates (yields) of some debt instruments can be ascribed directly to differences in the time until maturity, or the remaining term, of a debt instrument. While "term structure" is a phrase generally associated with the bond market, other resources that can be valued by the application of a discount rate to cash flows may have term structure influences on their value.

The term structure of interest rates can be readily observed in U.S. treasury bonds. All issues are at a near-zero level of risk of default yet long-term and short-term treasury bonds have different yield rates in the marketplace, and the yields for both short- and long-term bonds change from day to day but not necessarily in the same magnitude or direction.

Two factors account for term structure differences between apparently equally risky securities of different term lengths. One factor is investor expectations about interest rates over the entire term; the market yield rates are averages of the interest rates expected to prevail during intervening periods until the end of the term for that level of risk. Thus, if the market expects interest rates to rise over the long term, the market would assign a higher interest rate to the long-term securities, and vice versa. Because of inflation expectations for different periods in the future, the market interest rates vary for issues of different maturities.

The other factor determining the term structure of interest rates is the "liquidity premium," or "term risk," a type of risk associated with the length of time until maturity. While this risk is near zero for treasury bonds, it does affect other debt securities. A short maturity bond is less risky than a longer maturity bond because the short-term future is easier to predict than is the distant future. Ability to repay is more certain for an obligation due one year from now than for an obligation due thirty years from now, and this affects the term structure of interest

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[3]For a discussion of the difficulties see Jack Clark Francis, Investment: Analysis and Management (New York: McGraw Hill, Inc., 1972), p. 453.

rates even for the same class of different maturity securities issued by the same company. Liquidity premium encourages investors to require higher long-term than short-term interest rates, if all else is equal.

Interest rate expectations and liquidity premium interact so that securities that are identical except with respect to maturity dates generally have different yield rates in the market. Inflation expectations and liquidity premium may influence yields in either the same or in opposite directions and the net impact can mean either higher or lower interest rates for long-term than for short-term maturities.

As noted, term structure is related to the maturity date of a debt instrument or other resource with known cash flows. The maturity date, however, inadequately describes the pattern of cash flows because many debt instruments and other cash generating resources do not have just one point in time at which all cash flows materialize. Indeed, the cash flow patterns of resources vary widely, and many mature partially (i.e., provide some cash flows) at several different dates or more-or-less continuously through time.

Duration is a concept which adds a dimension to interest rate term structure by accounting for these different cash flow sequences within a term.[4] The determination of the duration of a debt instrument or other resource is technical but is quite feasible and practical. For convenience, the discussion of duration here is restricted to debt instruments.

Duration is the average time until maturity of a debt instrument. If two debt instruments have the same term with zero coupon payments and all payments are made at the end of the term, their durations are equal. If, however, one debt instrument provides for interim coupon payments and another does not, the holders of the instruments receive cash flows in a different sequence, with the one providing some cash flows in advance of the other. The instrument which returns money sooner, on average, has a shorter duration, which is the length of time from the present at which it generates average present value dollars. All else being equal the debt instrument with a shorter duration is less risky, which is consistent with the previous discussion of term structure.

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[4]For further discussion of duration, see: Frederick R. Macaulay, Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields, and Stock Prices in the United States Since 1856 (New York: Columbia University Press, 1938); William Avera and David Cordell, "New Capital Budgeting Measure: The Integration of Time, Liquidity, and Uncertainty," Proceedings, Southwestern Finance Association, 1976; and Michael Hopewell and George Kaufman, "Bond Price Volatility and Term to Maturity: A General Respecification," The American Economic Review, September 1973.

For the instruments having one lump sum payment at maturity, duration is equal to maturity; for all other instruments duration is less than maturity. The debt instrument analogy has a perfect correspondence with other types of resources generating or providing cash payments. Mathematically, duration is an average of the cash flows weighted according to the time periods in which they take place so that the differences in the present values of the cash flows at different times is accounted for.

Duration affects both the inflation expectations and liquidity premium aspects of term structure. It is duration rather than the final maturity date that affects the extent to which the market yields of long-term securities are greater than those of short-term securities as both respond to market stimuli. Hopewell and Kaufman have provided the following general theorem:

> "For a given basis point change in market yield, percentage changes in bond prices vary proportionately with duration and are greater, the greater the duration."[5]

Components of Discount Rates

Essential to the establishment of guidelines for the selection of discount rates is knowledge about the components of discount rates. Central to this knowledge is the notion of an interest rate.

An interest rate serves to establish an equality of value between a lesser amount of money now and a greater amount in the future. If the future cash flows associated with a resource or obligation are known with certainty and there is no expectation of inflation, then the interest rate is the "pure rate of interest." The pure rate of interest compensates only for the "time value of money" or the fact that individuals must be rewarded for the deferral of consumption from the present to the future, which is necessary if they use the money to invest rather than purchase consumer goods. The pure rate of interest is believed to be about 3%.

Uncertainties associated with future cash flows as well as expectations about future price changes influence perceptions of the value of future cash flows, i.e., these factors reduce the value of these future cash flows. The application of an interest rate to establish this reduced value is known as "discounting." The interest rate chosen for discounting, referred to as the discount rate, is increased to compensate for these uncertainties (risks) of the cash flows and for expectations about future inflation. Thus,

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[5]Ibid, p. 749.

present value calculations simultaneously compensate for time value, expected inflation, and risk, as shown in the equation below.[6]

+ Time Value Factor
+ Inflation Expectations Factor
+ Risk Factor

= Discount Rate

The inflation expectations factor represents the expected annual rate of inflation for the entire period for which the discount rate is to be applied. If the inflation rate for the period in question is expected to be about 5%, then the marketplace adds approximately 5% to the discount rate as compensation for inflation.

A hypothetical example will illustrate the components of the discount rate. If a lending institution wanted to determine a loan rate by aggregating the components, it would start with the pure time value factor of about 3%, add the estimated rate of inflation during the period of the loan, say 2%, to compensate for the inflation-caused decreased purchasing power of the loan principal when returned at the end of the period, and then add an investment risk factor, say 1-1/2%, to compensate for the possibility that the loan will never be fully repaid or that payment will be delayed. The loan rate would thus be 6-1/2%. In practice, usually the investment risk factor only is evaluated by the loan officer; the other factors are determined in the marketplace.

When discount rates are used for resource valuation purposes, care must be taken that the discount rate chosen incorporates the appropriate adjustments for inflation and risk. The amounts of these components and the resulting discount rate may vary widely and depend upon the particular resources. There are several types of risk, and these are discussed in the next section.

Types of Risk

Central to the question of choosing a discount rate is the issue of risk. The major types of risk discussed here are:

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[6]When the discount factor (interest rate) is market determined, certain types of risk are captured in the discount factor. However, when managers are determining an appropriate discount factor for a specific purpose or project they may prefer to take explicit and separate cognizance of risk on a "certainty equivalent" or "expected value" basis. In this case risk should not be included as a part of the discount factor because it is accounted for separately. For a discussion of this expected value approach, see, for example, David B. Hertz, "Risk Analysis in Capital Investment," Harvard Business Review, January-Feburary 1964.

1. Price-of-money risk
2. Financial risk
3. Business risk
4. Management risk.

These risks are not entirely mutually exclusive. The effects of the various risks on valuation are discussed and then a summary is given in Exhibit 7-2.

Price-of-Money Risk

Price-of-money risk, often called the interest rate risk, is the variability in returns caused by changes in market interest rates. Interest rates, like all market prices, establish a supply and demand equilibrium by rationing scarce resources; in the case of interest rate "prices," this scarce resource is money. A change in the price of money is in direct response to either the time value component of interest rates or the inflation expectations component; of these, the time value component is by far the most stable. Note, however, that price-of-money risk is quite different from both the time value and inflation expectations factors in that price-of-money risk is the chance that these factors will change, i.e., that the interest rates influenced by these factors will change.

Due to the nature of discounting, the longer the maturity of a resource, the greater the price-of-money risk. This is because economic value changes as a partial function of the probability of future (but now expected) interest rate changes, and increased maturity increases the probability of a future interest rate change.

The level of price-of-money risk is related to the time dimension of cash flows in two ways. The first results from the mathematics of the discounting process. A change in the discount rate changes the present value of payments discounted for a large number of periods more than those discounted for a small number of periods. Hence, the value of longer-term cash flows are more sensitive to changes in the price of money than short-term streams.

Second, the band of uncertainty around an interest rate prediction tends to be greater as the prediction extends farther into the future. Thus, the variance around the expected price of money increases with the maturity of the cash flow.

Financial Risk

Financial risk is the probability that a company's cash flows in either the short run or long run will be insufficient to meet its financial obligations to investors and creditors. To a great extent this risk is a reflection of a company's capital structure in that, with all else equal, the risk of inability to cover financial obligations is greater for highly leveraged companies. The presence of significant financial risk is an important warning signal about

the extent, timing, and variability of future cash flows, and in this capacity it is one measure of the perceived uncertainty of cash flows.

Bond rating analysts as well as other analysts evaluate financial risk. Their concern is with whether the expected cash inflows exceed the required cash outflows by an adequate margin of safety. Financial risk influences the interest rate at which lenders will provide capital, thus the market interest rate for a specific issue of corporate bonds incorporates the opinions of analysts and other market participants about the financial risk of the securities.

For fixed obligation securities financial risk is reflected in the effective rate of interest (or yield to maturity). The market value of a bond issue which has fallen relative to other similar issues of the same maturity generally reflects a consensus market belief that the financial risk of that bond issue has increased relative to the others.

If the effective rate of interest for an issue of bonds changes because of financial risk, the new rate should be used for the valuation of the issue. The new rate is not relevant for valuation of other resources which do not possess the same financial risk. Changes in financial risk measures may be useful for providing an indication of the probable cash generating ability of the entire company.

Business Risk

Business risk (sometimes called business and industry risk) is the risk which inheres to a particular company or industry. For example, operations conducted in the aerospace industry carry different business risks than do agribusiness operations. Business risk is associated with the probability of shortages of raw materials (e.g., an oil export embargo imposed by the Arab countries), decreased demand for the industry's products, price controls imposed on the industry, and so on.

Business risk has two components:

1. Company-wide risk
2. Individual asset risk.

The existence of company-wide risk decreases the value of the company because it indicates concern that business and industry constraints will jeopardize the company's cash flows. Individual asset risk may either decrease or increase the value of particular resources within the company, depending on the market's perception of whether the future cash flows to that asset are injured or enhanced. For example, while the risk of output price controls for an industry would tend to decrease company value, if the market for an individual resource held by the company were broader than just

that industry, the value of the resource might be unaffected by price controls. However, if the resource had value only to companies in that industry, its value might be reduced by the price controls. As another example, while the risk of a disruption of raw materials supply would depress a company's value and perhaps also the value of the equipment that fabricates the products from raw materials, this risk would generally add scarcity value to the raw materials in question and would increase the value of the raw materials inventory held by the company.

Business risk that is associated with individual assets should be taken into consideration in the valuation of resources. Company-wide business risk is not relevant to the valuation of individual resources except to the extent the risk also affects the separate value of the resources.

In general, the impact of business risk on the value of individual resources is captured by the market value of the resource in question. For example, business risk is reflected in the borrowing interest rates of a company. In this case the risk is company-wide, but it affects the value of the loan instruments because they have no value apart from the company. Accordingly, the risk is a proper element in the valuation of these obligations.

Management Risk

Management risk is the uncertainty about the level of competence of management. Regardless of a company's present products, industry, or capital structure, managerial actions can be the cause of significant variations in future cash flows. Managerial competence can diminish or enhance the value of the company in the marketplace; indeed, management ultimately will determine the destinies of most companies. However, management ability should not be allowed to affect the valuation of resources that clearly have value apart from the business. It is this separate value which represents the future cash flow potential of these resources and that provides incremental information to investors; therefore it is this separate value which is of concern for accounting valuation.

Certainly investors are interested in evaluating the combined cash flows from all resources. However, information about the separate cash flow potential of individual resources, as indicated by their market values, is useful. Individual resource values are used in conjunction with independent evaluation of management effectiveness and other considerations to formulate a considered opinion about the extent to which total-company cash flow is likely to be realized or exceeded due to the synergistic confluence of all factors.

Exhibit 7-2 summarizes the discussion of risk of the last several pages.

Possible Bases for Discount Rates

Several types of rates that relate to value in one way or another are used in financial analysis. In the absence of any prior explicit analysis of the potential of these rates as discount rates for accounting valuation, each -- no matter how unlikely a candidate it may seem -- should be specifically evaluated for its potential for this use. The preceding discussion of this chapter will be helpful in making this evaluation, and the evaluation will provide additional insight into the problems of selecting discount rates.

Prospective rates divide into four general categories. They are:

Interest rates

Cost of capital rates

Capitalization rates

Return on investment rates

EXHIBIT 7-2

SUMMARY OF RISKS

Risk Type	Relationship to Resource and Obligation Valuation	How Taken Into Account for Accounting Valuation
Price-of-Money Risk	A function of economy-wide loanable funds supply and demand, this risk directly affects valuation of all resources and obligations that are valued by discounting.	The current interest rate must be utilized to establish the current value of future cash flows for all monetary resources and obligations. The longer the maturity of these obligations, the greater will be the value change as a consequence of the interest rate change.
Business and Industry Risk	The individual asset risk portion should be included in valuation of the related individual assets. The company-wide risk portion of a discount rate should be excluded for valuation purposes except for those resources and obligations which have no value separate from the company.	Business and industry risk is captured by market values. For nonmonetary resources this risk is reflected in the market value of the item and therefore is correctly associated with the individual resource rather than with the company. For debt instruments with no value separate from the company, company-wide risk is reflected in the market interest rate which establishes a market value for the instrument.
Financial Risk	A function of the financing arrangements of the particular company, this risk should affect valuation of only financial obligations and receivables. In some cases the financial risk portion of a discount rate pertains only to individual obligations and receivables, and in other situations, it may be applied for valuation of all cash flows.	Financial risk is included in market interest rates and represents a part of the increment to the prime rate that is charged a company. The time-specific interest rate increment caused by this risk should be used for valuation of the cash flows associated with specific resources or obligations, e.g., a mortgage payable or bonds payable. However, it should not be utilized in the valuation of other resources; e.g., a mortgage interest rate which reflects the financial risk of the mortgage should not be used to discount the expected cash flows from the resource that is mortgaged.
Management Risk	Management risk should not affect the value of resources which have separable value, but should impact value when there is no separate value.	For those resources with no separable value, management risk is captured by the market discount rate or by market value. For resources with separable value, it is excluded from the market discount rate and market price.

Interest Rates

Several general types of interest rates exist. These include the pure rate of interest, the prime rate, the U.S. treasury bond rate, the market rate for pledged resources, and the market rate based on the general credit of the company.

Pure rate of interest. The pure rate of interest represents the price of money in an environment with zero inflation and zero risk. Some theoreticians believe the pure rate is basically a function of the marginal productivity of physical capital goods. Others believe it to be the result of the interplay of marginal productivity and the willingness of consumers to save (or their propensity to spend). Some believe that the pure rate is entirely stable over time, perhaps varying only from one country to another; others think that it varies significantly within countries over reasonably short periods of time.[7]

These differences of opinion persist because the pure rate of interest is an abstraction that has never been calculated directly and may never be amenable to calculation. This fact is obviously a decisive shortcoming when considering the pure rate by itself as a discount rate for valuation purposes. Additionally, the pure rate of interest captures none of the risks which should be included in a discount rate used for accounting valuation. For these reasons the pure rate of interest is excluded from further consideration.

Prime rate. This is the market rate for the highest quality loans of the least risky companies. The prime rate includes an inflation expectations factor, the price-of-money risk, and a modest amount of both financial and business risk. The current prime rate also is reasonably objective and determinable and could be applied consistently. However, there are several prime rates which vary slightly from region to region.

The prime rate is applicable only to a few companies, is company-wide in nature, and is useful only for short-term obligations. Thus, the prime rate cannot be generalized to all companies, nor does it have relevance to the cash flows of resources and obligations other than those short-term loans to which it applies. The prime rate used as a discount factor would overvalue the vast majority of resources that embody more than the minimum level of risk and so its use for accounting valuation should be restricted to only the debt instruments of the highest quality.

U.S. treasury bond rate. U.S. treasury bonds have an active market similar to corporate bonds. Short-maturity treasury bonds typically receive the market's lowest rate. There are many series

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[7]For further discussion of these points, see Jack Clark Francis, op cit., p. 233, and Paul Samuelson, Economics (Eighth Edition) (New York: McGraw Hill Book Company, 1970), p. 587.

of treasury bonds with different maturity dates, and treasury bond market yield rates are quoted daily in the financial press for a large number of maturity dates.

Market yield rates of treasury bonds incorporate time inflation expectations and price-of-money risk. They incorporate little or no business risk because their level of business risk is near zero. Accordingly, use of treasury bond yield rates for accounting valuation discount rates would always result in overvaluation of long-term obligations.

Market rate for pledged resources. When specific resources are pledged as security for a debt the interest rate is lower as a reflection of the lesser risk. The pledged market rate incorporates the price-of-money risk, financial risk, and business risk, with all of these being specific to the particular debt instrument. The total risk associated with the resource is a combination of the weighted average of these company-wide risks and the uncertainty in the estimated cash flows of the pledged resources. The particular weighting is partly a function of the marketability of the pledged asset. For example, if the pledged asset has a known and satisfactory sales value in an active market, the interest rate would be reduced to reflect a heavier dependency on the liquidity of the asset.

The current interest rate for debt instruments backed by pledged resources is useful for the valuation of those debt instruments because it indicates their market value. However, the determination of this current rate may not be possible because the rate is a combination of changes in the lender's perceived riskiness of a company's cash flows as well as the potential cash flows from the pledged resources and it is difficult to separate the elements of the rate attributable to the resource from the general credit of the company. This difficulty is compounded because of the lack of active markets that establish current rates for debt instruments backed by pledged assets.

Market rate -- general credit of the company. This rate properly captures those interest rate risks and the specific resource, financial, and business risks pertaining to the debt instruments which reflect the general credit of the company. The current rate for debt instruments for which an active market exists is determined directly in the marketplace. It is the yield to maturity calculated from the coupon rate combined with amortization of discount or premium.

Cost of Capital

Cost of capital is the total cost to the company of its payments to both lenders and equity holders. Stated otherwise, the cost of capital is the minimum return that a company can earn and distribute while maintaining a constant level of capitalization over the long run. This minimum return is imposed on the company by the rate of

return that capital providers in each category could earn on alternative and equally risky investments.[8] A cost of capital calculation may be the average cost of capital, the marginal cost of capital, or the cost of capital in a particular country.

Cost of capital is composed of two major elements -- the cost of debt and the cost of equity. The relevant cost of debt is the marginal cost of new debt, which is the current interest rate for debt to the company. However, this interest rate is affected by the company's capital structure -- for a highly leveraged company the interest rate will be higher, all else being equal. Additionally, this rate is a function of the amount of the funds sought. Thus, there is a supply schedule with a different marginal cost of debt rate for each combination of capital structure and amount of funds sought.

The cost of equity is more difficult to measure. It is the rate of return expected by investors to induce them to continue to hold their stock or to purchase additional shares. As stated by Van Horne, it is ". . . the minimum rate of return that the company must earn on the equity-financed portion of an investment project in order to leave unchanged the market price of the stock."[9]

The total cost of capital is the weighted average of debt and equity costs. The debt component of cost of capital includes price-of-money risk, financial risk, and business risk related to the specific debt instruments. The equity component excludes price-of-money risk but includes both financial and business risk as well as management risk. These included risks are for the entire company and are not related directly to any specific resource or obligation. Management risk weighs heavily in the market's perception of whether or not the company will be able to pay enough to equity holders to make the stock an attractive purchase.

This orientation of the cost of capital toward company rather than individual resource valuation is further demonstrated by the correlation between the cost of capital and the market's perception of the company's future profitability and cash flows. The higher the company's expected profitability and cash flows the lower will be the perceived risk and cost of capital (assuming no change in the expected rate of inflation). The lower cost of capital, if used for valuation as a discount factor, would result in higher valuation of the resources. This correlation of cost of capital with profitability and cash flows demonstrates that cost of capital captures the market's estimate of future profits and cash flows for the company.

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[8]For a more extensive discussion of cost of capital, see Ezra Solomon and Burton Malkiel, The Debt-Equity Combination of the Firm and the Cost of Capital: An Introductory Analysis (New York: General Learning Press, 1971).

[9]James C. Van Horne, Financial Management and Policy, Third Edition (Englewood Cliffs: Prentice-Hall, Inc., 1974), p. 105.

Cost of capital is not an observable value in the sense that it is not represented by a quantitative measure of known precision. Rather, cost of capital is an abstraction because the expected returns to equity holders are not observable. Accordingly, calculations of it are fraught with theoretical and practical measurement difficulties. Another problem is that many different types of securities exist that are neither pure debt nor pure equity, but instead have some attributes of each type of security. Further, companies calculate cost of capital in different ways -- they include or exclude various factors from the calculations to suit their own perceived purposes, and they base their calculations on a variety of different assumptions.

Cost of capital should be rejected as a discount factor for accounting valuation purposes for the following reasons:

1. Cost of capital is company-wide and incorporates total-company profit and cash flow expectations as well as total-company financial and management risk. Cost of capital cannot usefully be associated with specific resources and obligations.

2. Cost of capital is not an observable phenomenon that can be directly measured; it must be calculated by formula. A wide variation of methods of calculation and assumptions exists in practice, and therefore cost of capital lacks objectivity and consistency.

Equity Capitalization Rates

Capitalization rates often are used by securities analysts to estimate the intrinsic value, or "true economic worth" of a security. In theory, the intrinsic value is the present value of all future cash flows.

Analysts often use short-cut computations involving the capitalization rate to develop present value. Many analysts believe that the capitalization rate is the appropriate discount rate for determining a company's present value and therefore its economic value.

The procedure used (presented in simplified form) multiples the expected normalized (average) earnings per share times the appropriate price earnings ratio (PER) to find a per share value. The PER is calculated as follows:

$$\text{PER} = \frac{1}{\text{Capitalization Rate}} = \frac{\text{Normalized Earnings}}{\text{Current Stock Price}}$$

Empirical studies have shown that historical average earnings capitalization rates vary directly with a company's systematic risk,

which is the company's variability in earnings that is attributable to factors affecting the price of all marketable securities.[10]

For use as a discount factor for account valuation, the capitalization rate suffers from many of the faults of the cost of capital rate. The capitalization rate is related to the entire company's future cash flows rather than to specific resources and obligations, and the capitalization rate captures the profit expectations of the entire company. Also like the cost of capital, the capitalization rate is not observable -- it is an abstraction, and its calculation is complex and subjective.

Equity capitalization rates also suffer from another fault. Since analysts use the capitalization rate to extrapolate from a company's earnings to the value of the entire company, its use to value the company's resources (which in turn influences the company's income determination) would result in circularity. For this and the preceding reasons, the capitalization rate would not serve adequately as a discount rate for accounting valuation.

Rates Based on Return on Investment

A rate of return or return on investment (ROI) rate possesses the valuable characteristic that it is a performance measure. ROI relates performance (generally earnings or net cash flows) to the resources utilized in the generation of that performance.

Resource values are a function of their performance, that is, of their ability to generate future cash flows. ROI provides a direct linkage between performance and the resources that underlie that performance. Therefore, the ROI is an indicator of the value of the resources in that the higher the ROI, all else being equal, the more valuable are the resources that underlie the performance.

Another positive characteristic of ROI is that it captures the risks of a specific entity -- be it the entire company, a company segment, or a particular machine (unfortunately, these risks include management risk). ROI measures actual, after-the-fact return; the risk is no longer just perceived but is already reflected in performance results. Thus, a high risk resource would normally have a high ROI since investors generally insist on high actual returns for high risk investments.

However, for valuation purposes the market perception of future risk should be used to determine the discount rate rather than past actual risk projected to the future. Also, in the real world of imperfect competition, companies gain temporary market advantages, operating efficiencies, or other advantages that increase their ROI

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[10]For further explication of capitalization rates, see Francis, op cit., Chapter 11.

but have little or nothing to do with the value of their individual resources. Further, these factors cause wide variations in ROIs from year to year so that the most recent ROI or even an average of recent ROIs may not be representative. Finally, ROI does not account for the time value of money, by itself a fatal flaw when considered for use as a discount rate.

The above discussion of potential discount rates is summarized in Exhibit 7-3. Reference to Exhibit 7-2, Summary of Risks, may be useful in the interpretation of Exhibit 7-3.

Recommendations

Based on the preceding analysis of this chapter, a three-tier system of discount rate selection approaches is recommended for accounting valuation. Each of the three approaches utilizes a different valuation methodology. These discount rate determination methods are:

Market rates
Quasi-market rates
Calculated rates based on treasury bonds

Market Interest Rates

Market interest rates have been shown to capture the appropriate risks for those obligations for which an active market exists. Therefore market rates should be used for discounting these obligations. Many corporate bond issues and government bonds issued by the various levels of government can be valued with this approach. The current market interest rate is appropriately used for valuation by both the holders and debtors of obligations.

EXHIBIT 7-3

DISCOUNT RATES FOR ACCOUNTING VALUATION

Discount Rate	Advantages	Shortcomings	Appropriate For
Pure rate of interest	1. Accounts for time value	1. Does not compensate for risks or inflation	Situations with zero expected inflation and zero risk; no such situations exist
Prime rate of interest	1. Objective, easily determinable 2. Accounts for time value and expected inflation.	1. Is nearly risk-free 2. Does not account for term structure	Nearly risk-free future cash flows, e.g., very high grade short-term bonds
U.S. treasury bond yield rate	1. Objective, easily determinable 2. Accounts for time value, expected inflation, and the investors' expectations about interest rates portion of term structure	1. Does not include business risk 2. Does not include the term risk portion of term structure	Only the highest grade short-term obligations where prime rate and market rate are likely to be equal to the yield rate
Market rate - pledged resources	1. Accounts for time value, expected inflation, and term structure 2. Accounts for risks associated with the debt instrument 3. Accounts for term structure	1. Changes in this rate are not easily measurable for particular resources	The specific debt instrument, but only if the current rate is determinable
General market rate	1. Accounts for time value, expected inflation and term structure 2. Accounts for risks associated with the debt instruments valued by the marketplace	1. An active market does not exist for many debt instruments	The specific debt instruments having an active market

Discount Rate	Advantages	Shortcomings	Appropriate For
Cost of capital	1. Accounts for time value and expected inflation 2. Accounts for risk	1. Relates only to the entire company 2. Arbitrary assumptions and conventions are used in its calculations 3. Does not account for term structure 4. Accounts for risks of the entire company rather than for individual resources	Not suitable for accounting valuation
Equity capitalization rate	1. Accounts for time value and expected inflation 2. Adjusts for risks	1. As presently used it relates only to the entire company 2. Computation is subjective and arbitrary 3. A circularity problem 4. Accounts for risks of the entire company rather than for individual resources	Not suitable for accounting valuation
Return on investment	1. Represents past performance, an ingredient in valuation	1. Does not incorporate time value 2. Encompasses past actual risk rather than future perceived risk 3. Level of performance is not always relevant to the value of a resource 4. Is calculated in a variety of ways	Not suitable for accounting valuation

Quasi-Market Rates

For many debt instruments no market interest rate exists. These include relatively small issues of bonds, much of the commercial paper, ordinary loans and notes, and some pledged-resource instruments such as mortgages. For most of these instruments, a quasi-market rate can be calculated with a reasonable degree of confidence that it will be within a narrow band around what the market rate would be if one existed. Because the general risk structure of most debt instruments is similar, a discount rate can be determined by relating these instruments to bond rating tables. The procedure recommended for determining quasi-market rates is:

Step 1: Evaluate the debt instrument risks using standard bond rating techniques or similar but less comprehensive techniques.[11] Specialists may emerge to fulfill this function.

Step 2: Assign the instrument to a standard risk classification. These classifications for Moody's and Standard & Poors are shown in Exhibit 7-4. These independent rating services usually do not diverge in their rating by even as much as one category for a bond issue.

Step 3: Determine the average market yield for bonds with this selected risk rating and with the same duration, and use this average yield figure as the discount rate.

Average yield can be calculated from the financial press at each month-end (to correspond with all fiscal quarter and year-ends) for a variety of durations. Average yields could be published monthly in an accounting medium such as The Journal of Accountancy.

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[11]For a discussion of bond rating procedures, see Francis, op cit., Chapter 1.

EXHIBIT 7-4

BOND RATINGS

Moody's Ratings	Standard & Poors Bond Ratings	Descriptive Category
AAA	AAA	High quality bonds
AA	AA	
A	A	Medium quality bonds
BAA	BBB	
BA	BB	
B	B	Speculative bonds
CAA	CCC	
CA	CC	
C	C	
	D	Bonds in default
	E	Bonds of bankrupt firms

The materiality of the amounts involved for a particular case will dictate the effort that should be expended in determining what rating a debt instrument should have. The amount of disagreement among experts about what rating is appropriate in a given case would seldom exceed one category and would be most unlikely to exceed two categories, say from AAA to A; in many cases a two-category variation would not cause materially different values for financial reporting purposes. The approach should provide adequately objective and consistent results. The rating and the basis for its choice should be disclosed in the financial statements so that a user may establish his own discount rate if he so desires.

Calculated Rates Based on Treasury Bond Rates

This approach to discount rate selection, hereinafter referred to as the treasury bond calculated rate approach, involves selection of the rate of a treasury bond issue of the same duration as that of the cash flows to be discounted, and the addition of points to this rate to compensate for the extent to which the risks associated with the cash flows of the resource being valued exceed those of the treasury bond. The sum of the addition is the discount rate to be used.

This approach to discount rate determination is appropriate for those resources and obligations that are not debt instruments and for which: (a) cash flows can be determined reasonably and (b) no active market exists. Typical of these are resources with cash flows partly or completely guaranteed by contracts; that is, either contractual revenues with costs of contract fulfillment reasonably

certain, or contractual costs with revenues reasonably certain, or with both revenues and costs defined by contracts. Examples are: (a) defense contracts (e.g., for munitions production) whereby the equipment is acquired to produce under the contract and has no alternative use; (b) real estate developments (e.g., shopping centers) with contractual revenues and reasonably predictable property maintenance costs; and (c) oil and gas transmission companies with contracts for both gas sales and purchases.

Another example of where the treasury bond calculated rate approach may be appropriate is for valuation of mineral resource assets. The report of a University of Texas research team recommends that replacement cost of proved oil and gas reserves be measured in most situations by "equivalent purchase cost" which entails present value determination. In a section titled "Critical Application Problems" the report states:

> "The discount rate must be chosen on the basis of an estimate of what a typical purchaser would be willing to pay for a quantity of reserves similar to those held by the company. No exact number is available, but discussions with industry representatives and others indicate an 8 percent rate would be 'approximately correct' at this time."[12]

Certainly the trillions of dollars of petroleum reserves merit a considerable effort to analyze the specific risks and develop a discount rate determination program if discount rates are to be used for valuation of mineral resource assets.

In these and similar cases, known cash flows may be estimated reasonably; however, there are no established markets for the resources and the risk structures can vary dramatically from those of the debt instruments. The calculations recommended here entail greater judgment and possibly less measurement precision than do the approaches of the preceding two tiers.

Treasury bond market yield rates are used as base rates in this approach for three reasons. First, treasury bonds have almost zero risk, thereby permitting analysis in each valuation situation to begin from a "zero base." To use another security yield rate which includes risk as a base would pose the possibility of double counting risks and would preclude a disaggregated risk analysis approach as presented below.

Second, treasury bonds provide a readily determinable and almost risk free term structure of interest rates which captures time value

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[12]Glenn A. Welsch and Edward B. Deakin, Measuring and Reporting the "Replacement Cost" of Oil and Gas Reserves (Washington, D.C.: The American Petroleum Institute, 1977), pp. 75-76.

and the market's perception of the expected pattern of future general inflation.

The third reason is that the market for treasury bonds is active and well developed, and information about the yield of these bonds is readily available in the public press. Treasury bonds are issued to mature at many different dates through the long-term future, and there generally should be little difficulty finding a treasury bond issue that is close to the duration of a particular cash flow.

The procedures suggested to construct the appropriate discount rate are as follows:

Step 1: Assess whether the resource value is inextricably related to the value of the company so that the risks of the company and the risks of the resource's cash flows cannot be separated, or whether the resource has value independent from the company and therefore a risk structure that is different from the company's. If the former is the case and if the company has debt instruments with the appropriate term structure and duration and has a current interest rate which reflects this, this interest rate is appropriate for discounting the cash flows from the resource and should be used. If the resource has a separate value, continue to the next step.

Step 2: Determine the average maturity, or duration, of the expected cash flows from the resources.

Step 3: Analyze each risk component not properly represented in the treasury bond rate. The following provides a guide for this analysis:

Inflation expectations -- Inflation expectations is already captured by the treasury bond rate. Nevertheless the analysis required here is of critical importance. While the treasury bond rate captures the expected general level of inflation, for a specific resource the analysis must determine: (a) whether the price changes affecting cash flows of the resources will be about the same as for the economy as a whole, and (b) whether both cash inflows and outflows can be expected to inflate at the same rate (inflating costs coupled to contractually stable revenues, for example, could result in a very different assessment of inflation expectations). The results of the analysis should be used to adjust the treasury bond rate; judgment and experience is required in the determination of how much adjustment is necessary. The presumption should be that the chosen treasury bond rate properly reflects inflation expectations unless there is evidence to the contrary.

Price-of-money risk -- This risk is captured by the treasury bond yield rate.

Business risk -- The business risk of treasury bonds is near zero. In general the value of the resources of concern here are affected by business risk and therefore this risk must be evaluated.

Financial risk -- The financial risk of treasury bonds is near zero. If the value of the resource in question is a function of financing arrangements for it or for the entire company, this risk is relevant and must be evaluated.

Management risk -- Treasury bonds have no management risk. This risk must be analyzed if the value of the resource is dependent upon management's ability.

Step 4: With the presence or absence and general nature of each risk component of the resource being valued now known, each risk must be classified with respect to the extent of its effect on the discount rate. Although a more sophisticated classification system can be devised, it seems advisable for at least a period of experimentation to simply categorize each risk as very high, high, medium, or low. It is probably preferable to make these category assignments on a disaggregated basis for each risk rather than to attempt to evaluate total risk in one step.

Step 5: Establish the discount rate premium for each risk and add it to the treasury bond rate. The total is the discount rate. A matrix of discount rate "add-on" premiums should be developed on the basis of a consensus of opinion on experts throughout the business community as to the appropriate add-on amount for each risk type and level. This system is illustrated in Exhibit 7-5. Each cell of the matrix would contain the add-on factor for each risk type and level combination. To the extent that inflation expectations (see Step 3) is not properly compensated for in the treasury bond rate, it would be separately adjusted for. This scheme appears to be relatively easy to use and the add-on points should not prove difficult to agree upon.[13]

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[13]The Delphi questionnaire technique may be a suitable vehicle for gaining the required consensus about add-on values. For a description of Delphi, see Norman C. Dalkey, "Delphi," The Rand Corporation (Santa Monica, CA), Document No. p-3704, October 1976. Related Rand publications are Document Nos. RM-65115-PR (1969), p-2973 (1964), and p-3499 (1966).

EXHIBIT 7-5

Risk Level	Type of Risk: Business Risk	Financial Risk	Management Risk
Very High			
High			
Medium			
Low			

It may be argued that the treasury bond calculated rate approach provides arbitrary results or is subject to management manipulation. Certainly, judgment is exercised, but the alternative to judgment in selecting the discount rate in these circumstances may be that of arbitrarily selecting a rate without judgment. Between these alternatives, the approach proposed seems more reasonable. Disclosure of the risk level selected for each category of risk will enable financial statement users to substitute their own judgment if they so desire.

Information about the uncertainty of the risk estimates also should be disclosed. Many of the cash flows of the resources valued with the treasury bond calculated rate method are likely to have a high degree of risk, and the error in risk measurement also can be high because of the nature of the resources (which may sometimes even require estimates of cash flows) as well as because of the unknown accuracy of the risk assessments.

Because of these considerations, financial statement users should be provided estimates of probable measurement error. Ideally the user should receive information about the central tendency and dispersion of probable returns. In most instances, provision of these statistics will not be possible, but disclosure of a range of discount rates around the expected value rate would provide useful information. For example, if two resources have business risk estimated at 2%, but the range is given as 1.75% to 2.25% for the first, and 1.5% to 2.5% for the second, the reader is aware that the estimate of business risk of the second is considered to be less certain. This recommendation is in the spirit of the discussion of the Trueblood Report about communicating information with ranges rather than single numbers.[14]

It is probable that a group of specialists in the nature of discount rate analysts will emerge after a period of time to make the analyses and judgments involved with this calculated rate approach. A related body of detailed knowledge also can be expected to be developed. This body of knowledge will be comparable in many ways

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[14]Objectives of Financial Statements, Report of the Study Group (New York: American Institute of CPAs, 1973), pp. 39-40.

to that utilized by bond rating agencies today, and can be expected to provide similarly reliable results.

Summary and Conclusions

Discount rates are shown to be composed of a time value factor, an inflation expectations factor, and a risk factor. Several types of risk are analyzed with respect to their relationship to value and their impact on accounting valuation. The conclusion is that only certain types of risk should be considered for accounting valuation purposes and that in general these are the risks incorporated in the market-determined discount rate. Several possible types of pre-existing rates are considered for possible use as discount rates. All except market interest rates are shown to have no utility for accounting valuation, or to be useful only for a very limited category of resources.

Recommendations are made to use: (a) market interest rates as discount rates for debt instruments for which market rates exist, (b) a quasi-market approach for establishing discount rates for debt obligations without markets, and (c) treasury bonds yield rates plus risk increments established by analysis of individual risks for discounting resources that are not debt instruments but nevertheless have reasonably predictable cash flows.

CHAPTER 8

DETERMINATION OF CURRENT COSTS

Current Costs as Surrogates for Present Value

The purpose of this chapter is to examine the current-cost selection processes and develop current-cost selection criteria for those resource measurement situations where present value cannot be utilized. "Current cost" is intended to be synonymous with the phrases "current cost of replacement," "current replacement cost," "replacement cost," "replacement value," "input price," "entry price," "replacement market price" and "current entry value"; while nuances of meaning have been imputed to these phrases by different authors, all are intended here to have reference to the cost of replacing equivalent productive capacity or service capability.

For some resources present value cannot be determined with adequate accuracy because: (a) cash flows associated with those resources are highly uncertain, (b) cash flows are commingled with those of other resources in complex ways which would necessitate arbitrary allocations of cash flows among the resources, or (c) a supportable discount rate cannot be established. In these cases another value measurement must be used as a surrogate for present value.

The future cash outflows of concern in this chapter are those which are necessary on a more or less repetitive basis to maintain the company's revenue stream; principally these are the expenditures for acquisition of resources, such as for inventory and replacement of productive capacity. These and other resources acquired generally should be valued to facilitate users' predictions of the present value of future cash outflows that will be required for replacement of the resources, and in most circumstances no consideration should be given to their relationships to cash inflows. Cash inflows derived in the normal course of business from the resources that are to be replaced are generally a function of the marketplace and pricing policies, and in general are better predicted by reference to the exit markets and to past sales prices and policies independently of the replacement costs of production inputs.

The relevant measure for a resource held is the cash sacrifice expected to be required in the future to replace the resource now held with a resource of similar service potential.[1] This future

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[1]If the resources are not to be replaced in kind or in function because they are unique or no longer in use by the company, then no future cash sacrifices will be made and the resources should not be valued at current cost. For these resources net realizable value seems appropriate. If the resources will be disposed of this should be disclosed because it will affect future cash flows.

cash sacrifice generally is best represented by the current cost of the resource, since present costs usually provide a closer association with future costs than past costs. Current cost as used here is the lowest amount that must be paid to obtain an asset of equal productive capacity or service potential, i.e., the current market value of the equal productive capacity or service potential.

Present value represents an estimate of economic value. Current market value is related to present value in that current market value is established in the marketplace at the present time for resources and obligations by an implicit rather than an explicit discounting of cash flows.[2] Accordingly, current values from the marketplace in which the resource is normally acquired are preferred as surrogates for present value where present value cannot be determined by discounting. The relevant market normally is the input market, and it is the entry prices that are relevant for accounting valuation. Entry prices can come from a variety of sources, such as purchase order, price quotations, etc.

Current Cost Measurement Approaches[3]

There are several approaches to current-cost measurement. These approaches vary with respect to how closely associated the resulting current costs are likely to be to future cash flows as well as with respect to other characteristics which establish their degree of acceptability as accounting measurements. The current-cost approaches considered here are discussed in the general order of their perceived overall usefulness for the prediction of future cash flows, with the "most useful" listed first. Of course, this ordering embodies a sizable element of judgment.

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[2]The correspondence between market values of fixed assets and expected present values of their future cash flows has been analyzed by John S. Cook and Oscar J. Holzman, "Current Cost and Present Value in Income Theory," The Accounting Review, October 1976, who conclude that the relationship can be expected to hold, and that the correspondence may be perfect given the assumption of perfectly competitive markets. They state that: "In the absence of pure competition, and given the emergence of separate entry and exit markets, a determination of the nature and state of the relevant markets, and the intentions of the asset's owner concerning its future employment is required in order to select the value that is potentially the closest, but does not necessarily equal the present value of its future cash flows (p. 787).

[3]Several measurement approaches that are similar to those of this chapter are discussed in the Touche Ross publication SEC Replacement Cost Accounting: A Guide to Implementation, 1977, Chapter IV. Readers are referred to that publication for discussion of appropriate application circumstances, advantages and disadvantages, and other additional information about these approaches.

Practical considerations such as measurement difficulties and organizational or other limitations of the accounting system will dictate the choice of an approach in many situations that is lower in the preference ordering than the preferred method. The first step in the selection process should be to consider whether or not it is practical to establish current cost using the preferred approach. If it is practical and the results are reliable this approach should be used. If not, the next method similarly should be considered and if not found practical the next should be evaluated and so on.

The approaches are listed below:

1. Direct market prices
2. Expert assessments
3. Internal pricing systems
4. Internally prepared specific price indexes
5. External specific price indexes.

Direct Market Prices

For the great majority of nonmonetary resources adjustments of value in consideration of risk are subjectively made by the collective opinions of the marketplace participants who: (a) determine the expected cash flow pattern; (b) assess the risk; and (c) decide how much less they are willing to pay for assets with the particular cash flow and risk characteristics. Thus, market values reflect both time value and risk; they represent an equilibrium point established by market participants who tend to bid the prices up to a consensus estimate of the present value of the expected cash flows from the resources. The consensus market price is achieved by finding the equilibrium price among the buyers who seek the lowest price and the sellers who seek the highest price. In perfect markets, the same effective price (making allowances for transportation and other such differences) will prevail and establish an equilibrium for the entire market. Reasonable equilibrium in the market is a necessary condition for the use of market prices as a measure of the value of an asset. In general, this equilibrium is assumed to hold where there is an active exchange market.

Chapter 7 explained that for the most part market determined discount (interest) rates compensate for the risks that should influence the value of resources and obligations. When market discount rates are not available for a resource, current market values (assuming a reasonably free and efficient marketplace) effectively capture the same risks. Accordingly, an attempt to fabricate a discount factor for discounting those resources for which market discount factors do not exist but for which active markets do exist seems unnecessary and could be counter-productive because elements of the incorrect risks might be included in the discount rate.

Market prices exist for many kinds of general purpose and standardized machinery and equipment (e.g., lathes and trucks), most types of inventories, and numerous other items of tangible property. The trend toward the use of modular construction for larger pieces of equipment and for buildings is helpful in the determination of market prices since the prices for the modules often are available even though the price for a completed unit with identical specifications to one held by the company may not be available.

Direct pricing may not be economically justified in situations involving a great many low cost products. Even if this method is feasible under these circumstances the cost of gathering and processing information may make it impractical and an alternative approach may be preferred.

Expert Assessments -- A Constructed-Price Approach

For those resources not having active markets, a pseudo market price may be constructed by expert assessment to approximate what the replacement market prices would be if a market did exist. This approach could be used for buildings, plant, and some types of equipment. It is especially appropriate for special purpose and complex capital items for which no price index is adequately specific, or for capital items which possess an element of technological obsolescence. Expert assessments may entail considerable cost.

Expert assessments generally involve a particular valuation technology and body of knowledge as practiced by an expert trained in valuation disciplines. Examples of assessments already done, but generally for different purposes than accounting valuation, are insurance and real estate appraisals, and engineering valuation studies, each of which utilizes specialized expertise developed for the particular assessment purpose.[4] The assessments can be made by outside consultants or by resident experts in the company.

Constructed-price assessments should take into consideration technological obsolescence and economic depreciation and should be based on replacement of equivalent productive capacity for those resources for which the productive capacity is expected to be replaced. Actual measurement methods could include, for example, current market prices for some components of an asset, price indexes for others, and engineering estimates for still others, as necessary to approximate current cost. It is because this approach encompasses a variety of methods, picking and choosing the best for the circumstances, that it is the preferred method where market prices are not used exclusively.

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[4]For a discussion of engineering valuation techniques for both individual resources and entire enterprises, see: Henry Babcock, Appraisal Principles and Procedures (Homewood, Illinois: Richard D. Irwin, Inc., 1968).

The constructed-price approach derives its quality of proximity to cash flows from its objective, which is that it attempts to construct a market price equivalent. In doing so, painstaking attention should be devoted to indications that the resulting value may not be representative of the equivalent market price, if one existed. An unsatisfactory outcome as a consequence of this security should indicate that another valuation approach or a combination of methods be used. However, careful expert assessments should provide measures that are at least as close to market value as would be price indexes, as an example, because the assessment methodology encompasses evaluation of price indexes (and other measurement methods) as to their suitability for valuation of individual components of the capital item.

A caution is in order about this approach -- it is only as good as the experts making the assessment. Where the experts possess dubious expertise, another approach may be preferable. Another caution is that much of the existing body of knowledge relating to assessments is oriented to selling markets rather than replacement markets. For some capital items, e.g., buildings, prices in these two markets would ordinarily be nearly identical so that in effect the markets are merged. For others, such as equipment for which the resale market is quite separate from the entry price market, additional valuation methods may need to be developed.

An important variation of the assessment approach is called unit pricing. With unit pricing the assessment calculations are oriented toward determination of the current price of a unit of capacity, and the current price of one unit is then applied to the total number of units embodied in the resource. For example, units of capacity may be passenger seats for an airplane, square feet for a retail store, or barrels of processing capacity for a refinery.

Market values for capacity units will not exist in most cases, although a generally accepted industry rule of thumb guideline may be in existence. As examples, there is no active market for passenger seats of airplanes or square feet of retail space. Accordingly, the current cost per unit must be calculated by appraisal, an engineering study, or other methods. Consistent with the expert assessment approach, the objective should be oriented toward establishing the price which would prevail in the replacement market if a market were in existence.

Expert assessments also encompass what is sometimes known as functional pricing, the determination of the current cost of an integrated production process. Current costs are based on replacement of the function rather than of a specific asset or asset grouping. Functional pricing is especially appropriate for situations where the function will continue but the assets that will be acquired will not be similar to those currently held.

Internal Pricing Systems

Internal pricing systems also provide constructed prices, but are different in that they generally are focused on output of a production or service rather than a capacity unit. The replacement prices produced are the result of ongoing internal accounting systems rather than special analyses by appraisers, engineers or other valuation experts. These systems exist primarily in manufacturing companies and consist of job order costing or process costing systems, or either of these combined with a standard costing system.

Internal systems also differ from the assessment approach in that internal systems are created primarily for control and cost accumulation purposes rather than for generation of current costs. For this reason these systems may be based on objectives and aggregation procedures that provide current values which are not as reflective of entry market prices as would be constructed prices. However, these internal systems possess quality control advantages conferred by an ongoing system with normal accounting checks and balances. Also, where the values are or can be adjusted to be reasonably close approximations of current entry value the additional cost of providing these internally generated measurements for financial statement purposes is usually minimal.

Standard costing systems may be particularly useful for current costing of resources embodied in inventories and cost of sales. Typically standards are revised annually, and new standards are based on current materials and labor costs. The new standards incorporate new production efficiencies, and are developed toward the end of the fiscal year to become effective coincident with the start of the new year. During the development of standards, decisions must be made about what prices will be incorporated into the standards -- a past period average, the current price when the standard is developed, or an expected future price, such as for the year-end. If the process of developing standards is coordinated with financial statement reporting, prices for standards can be selected that will permit the system to provide reasonably close approximations of year-end current costs for financial reporting purposes. If year-end adjustments are required or if current costs are needed for interim reporting purposes, standard costs can be updated easily with price indexes.[5] Up-to-date standard costs are also useful for various management purposes, such as product pricing sales and margin setting, or for analyzing the impact of past pricing and margin maintenance policies on performance.

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[5]For discussion of current-value standard costs for financial statement use, see P. Bakker, Inflation and Profit Control (Toronto: Metheun Publications, 1974), pp. 42, 53.

Internally Prepared Specific Price Indexes

The ability of indexes to establish surrogate values for current costs is cited here as the least preferred current-cost determination approach from a theoretical point of view primarily because indexes are based on past costs. While indexes attempt to maintain a correspondence with current market values, this correspondence need not necessarily be a close one. Indexes nevertheless are advocated widely and may be especially appropriate in situations where current market prices are not available and the extra cost of developing current costs by other means is an important consideration, or where an index can be applied easily to groups of homogenous resources.

Price indexes can be prepared internally or provided externally by government, trade associations, or private valuation or economic statistics companies. Internally prepared price indexes generally are preferable to externally provided indexes, however they entail costs for their development and maintenance. Philips Lamp, the Dutch electronics firm, maintains a statistical department separate from accounting that is charged with the responsibility for price index preparation.

The major advantage of internally generated price indexes over externally provided indexes is that the former can be tailored to specific resources or resource categories to better approximate their current cost. It is this characteristic which tends to make internal indexes better surrogates for current costs than are external indexes.

Accuracy verification can be a problem with index use. Index preparation begins with the weighted average current cost of a group of items for a base year. Then the index is prepared for subsequent years by making assumptions about, or by sampling, the mix of items and new costs in each subsequent year. Accuracy must be estimated by reference to the current market or by sampling current costs or by comparing the index to the results of another current-cost calculation approach. Errors in price indexes tend to compound as a function of the amount of time beyond the base year.

External Specific Price Indexes

Existing external indexes have the same shortcomings as internally prepared indexes, and additionally have the following drawbacks:

1. They are not prepared with accounting valuation in mind and thus may not be attempting to measure accounting current cost. For example, they may not deal with technological obsolescence in a manner that is appropriate for accounting valuation.

2. They frequently have a base year in the distant past and have not been recently revised. Cumulative errors may be significant.

3. The simplifying and other assumptions as well as preparation procedures and weights given to various components may be known only by the preparing organization and therefore are an unknown quantity to the company user.

4. Most indexes are national in their coverage and mask local cost differences.

5. Indexes often are not adequately specific, or they cover resource groupings that do not coincide with those of the company's or are not logical from an accounting point of view.

However, externally provided indexes have three advantages over internally prepared indexes. First, external indexes are available, convenient and inexpensive. Second, they may be more objective and more credible than internally prepared indexes in that, being independently prepared, there is no implication that they might have been constructed to reflect management's valuation biases or preferences. Partially offsetting this latter advantage is the fact that internal indexes can be carefully documented with objectivity and verification in mind as to the assumptions and procedures employed in their preparation.

Finally, giving attention to long-term future possibilities, externally prepared indexes may one day be able to provide the basis for a combined current-value and index system to serve as the basis of an international purchasing-power-parity-index system for accounting currency translation. This system would permit companies to achieve greater after-translation comparability of current-value financial position and results. Such a system, however, appears to be many years into the future.[6]

One promising possibility is that a series of specific price indexes could be designed specifically for accounting valuation purposes. This would eliminate the necessity of relying on existing indexes for accounting valuation. These accounting indexes would tend to minimize the five problems discussed with reference to externally prepared indexes and might also ameliorate many of the problems associated with internally prepared indexes.

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[6]For an outline of such a system and a discussion of related shortcomings of present translation, see George M. Scott, "Currency Exchange Rates and Accounting Translation: A Mismarriage?", ABACUS, June 1975, especially pp. 69-70.

Summary and Conclusions

Current cost is shown to be the best surrogate for present value in most resource valuation circumstances. For those resources for which current cost is not practical as a valuation method, another valuation approach must be used. Each has its advantages and disadvantages as discussed in the chapter.

Expert assessments involve construction of market price equivalents by valuation experts, who may utilize a combination of methods and technology where necessary. Internal pricing systems, which are generally cost accounting systems, can be adapted to provide approximations of current costs efficiently and cheaply.

Either internally prepared or externally provided specific price indexes can be used to approximate current costs. The accounting community should consider a united effort to develop special-purpose specific price indexes for accounting valuation which potentially would offset many of the disadvantages of specific price indexes.

APPENDICES

APPENDIX A

THE TOUCHE ROSS CURRENT-VALUE ACCOUNTING MODEL

This Appendix is based on and summarizes concepts and measurements presented in the booklet Economic Reality in Financial Reporting (New York: Touche Ross & Co., 1976). The current value approach presented in the booklet is used in this study for experimental purposes because it is representative of several current-value approaches that have been suggested, has received a great deal of publicity, and has been implemented by several companies. The INFLAN computer simulation model (Appendix B) is based on the Touche Ross current-value accounting model as described in this Appendix.

The major characteristics of the Touche Ross current-value accounting model are that it:

1. Flexibly encompasses a variety of inflationary conditions and industry structures.

2. Emphasizes information useful for predicting earning power and cash flows.

3. Applies a current-value measurement approach which posits that the present value of future of cash flows is the ideal form of measurement; it recommends current costs or net realizable value where present value measurement is either infeasible or impractical.

4. Portrays separately the impacts on the enterprise of general price level changes and of specific price changes.

5. Includes a capital maintenance concept.

6. Provides a set of four financial statements, prepared on a current-value basis:

   a. Financial Position
   b. Cash Flows
   c. Net Results of Operations and Changes in Value
   d. Stockholders' Equity.

7. Includes in the financial statements all resources and obligations that can be measured in monetary terms.

8. Provides a strong orientation toward economic substance rather than traditional form and conventional stewardship.

Valuation Approach

The Touche Ross model is oriented toward valuation methods that are especially designed to aid users in predicting earning power and cash flows. The model recommends that, where practical, resources and obligations should be valued at the present value of their associated future cash flows. This is considered to be consistent with managers', investors' and creditors' objective of predicting future cash flows. The discount factor used need not necessarily correspond with the contractual interest rate associated with the resource or obligation.

The future cash flow streams that will be generated by certain types of resources and obligations, however, cannot be determined with reasonable certainty in advance of actual events. The Touche Ross model recommends that the valuation approach be used which most clearly reflects the probable future cash flow consequences of these resources and obligations.

In the Touche Ross model, it is the individual resources and obligations that are adjusted to current values; no attempt is made to value the entire entity. The rationale is that values of resources and obligations are used by the marketplace to help predict a firm's prospects and these prospects, in turn, are analyzed by the market and reflected in the value of the entity's stock.

All resources and obligations that can be measured in monetary terms are included in the financial statements. Some items that are excluded from conventional statements may be included in statements prepared in accordance with the Touche Ross model.

Valuation Methods

Current cost (in terms of the cost to replace equivalent capacity using current technology) and net realizable value are considered to provide the next best information about future cash flows where net present value cannot be satisfactorily determined. Exhibit A-1 indicates which valuation method is recommended for each of the various categories of resources and obligations.

General and Specific Price Changes

In addition to using current values for valuation purposes the Touche Ross model provides that separate general price level adjustments are made to portray the impact of inflation on both monetary items and nonmonetary items. These general price level adjustments are made on the Statement of Net Results of Operations and Changes in Value, and offsetting adjustments are made in aggregate form to the beginning balance of Stockholders' Equity. The financial statements of prior years are not adjusted for general price level changes.

Capital Maintenance

Stockholders' equity is adjusted to reflect the additional increment (or decrement) of capital caused by general price changes during the period. The impact of specific price changes on stockholders' equity is recorded by transferring the net effect of the changes in value which occurred during the period to the stockholders' equity account.

EXHIBIT A-1

RECOMMENDED VALUATION METHODS IN THE TOUCHE ROSS CURRENT-VALUE ACCOUNTING MODEL

Resource or Obligation	Valuation Method
Short-term monetary resources	NPV
Long-term monetary resources	NPV
Short-term monetary obligations	NPV
Long-term monetary obligations	NPV
Inventory	To be replaced - CC Not to be replaced - NRV
Equity investments (not held for sale)	Equity method on a current-value basis
Equity investments	NRV
Depreciable resources (in use)	CC less depreciation on a CC basis
Land	NRV
Intangibles (except goodwill)	NRV
Goodwill	Excluded from financial statements
Revenues	Actual historical cost
Cost of sales (except depreciation)	CC at date of sale
Depreciation expense	CC at the end of the year
Interest expense	Based on current interest rate

NPV = Net Present Value of future cash flows

CC = Current Replacement Cost

NRV = Net Realizable Value

The Four Statements

Statement of Financial Position

This statement includes all resources and obligations measurable in dollars. All resources and obligations are adjusted to current values using the measurement techniques listed in Exhibit A-1, and the offsetting adjustments are included (along with the general inflation adjustments) in the Changes of Value section of the Statement of Net Results of Operations and Changes in Value.

Statement of Cash Flows

While both the conventional statement and the Touche Ross current-value cash flow statement report cash flows which are identical in amount, the latter reports cash flows on a broad basis in a manner considered more relevant to cash planning. The Touche Ross model cash flow statement is only concerned with cash and not with other measurements of funds such as working capital.

Net Results of Operations and Changes in Values

This statement reports the following in separate sections:

1. Net results of operations
2. Value changes for nonmonetary items
3. Value changes for monetary items.

The captions for this statement are shown in Exhibit A-2, which is excerpted from the Economic Reality booklet.

The first section, Net Results of Operations, differs from the conventional income statement primarily in that cost of sales and all expenses are reported on a current-value basis. The current value of resources consumed is therefore matched with revenues in order to determine the Net Results of Operations. Typically the bottom line figure of the section on Net Results of Operations will be lower than the amount of conventional net income because the latter reflects an element of specious income during inflationary periods.

The second section, Changes in the Value of Nonmonetary Resources, and the third section, Changes in the Value of Monetary Resources, respectively contain nonmonetary and monetary value changes and price level information. The second and third sections are intended to symmetrically reflect both realized and unrealized specific-resource value changes as well as the general purchasing power effect. However, in Exhibit A-2 no realized monetary changes are shown. The unrealized monetary changes in the third section are attributable to changes in the value of debt caused by interest rate fluctuations.

EXHIBIT A-2

STATEMENT OF NET RESULTS OF OPERATIONS

AND CHANGES IN VALUE

	Current-Value Basis December 31,		Conventional (Historical Cost) Basis December 31,	
	19X1	19X2	19X1	19X2
Results of operations:				
Sales	$ 90	$ 90	$ 90	$ 90
Cost of sales	50	65	50	50
Current expenses	10	14	10	15
Depreciation	15	20	10	10
	75	99	70	75
Net results of operations	15	(9)	20*	15*
Changes in value of nonmonetary resources:				
Realized changes from inventory sold after increase in value	-	5		
Unrealized changes:				
Inventory held at year-end	10	5		
Long-term investment	50	(10)		
Equipment	50	45		
	110	40		
Impact of decline in general purchasing power on value changes	(26)	(37)		
	84	8		
Changes in value of monetary resources and obligations:				
Unrealized changes in long-term debt due to change in interest rates	(10)	19		
Economic advantage from decline in general purchasing power on net monetary items held	6	9		
	(4)	28		
Total of net results of operations and changes in value for year	$ 95	$ 27	$ 20*	$15*

*In conventional financial reporting these amounts are designated as net income.

In both sections two and three the total of the specific value changes are adjusted for the total change in general purchasing power affecting (for section two) nonmonetary items and (for section three) monetary items. In section two of Exhibit A-2, general purchasing power effect is a decrement and in section three it is an increment to the total of specific value changes. The offsetting general purchasing power adjustments are not shown in Exhibit A-2 -- they are adjustments to equity in the Statement of Stockholder Equity.

An alternative format for the Statement of Net Results of Operations and Value Changes that is considered appropriate by Touche Ross is for it to consist of the following three sections:

1. Results of Operations
2. Value Changes
3. Impact of Change in the General Price Level.

With this format details about realized and unrealized value changes would be provided within section two and details about general purchasing power changes would be provided within section three. For any given set of financial facts, both formats would provide the same final results.

The INFLAN computer simulation output is programmed to reflect the first discussed statement format. The first format is also that put forward in the widely distributed Touche Ross booklet Economic Reality in Financial Reporting.

Statement of Stockholder Equity

This current-value statement differs from its conventional counterpart primarily because of the adjustments made in the former to reflect the impact of general and specific price changes.

Summary

The Touche Ross current-value accounting model is a comprehensive current-value accounting system that eclectically combines the three measurement methods of present value, current cost, and net realizable value. The model includes a set of financial statements which attempts to represent the economic reality of the impact of inflation on the enterprise. The INFLAN computer simulation model described in the Appendix B accurately reflects the Touche Ross current-value model.

APPENDIX B

INFLAN: THE COMPUTER SIMULATION MODEL

The INFLAN computer model simulates the operation of four hypothetical one-product manufacturing companies over a seventeen-year period. Model output includes financial statements and ratios prepared under both historical cost accounting and current-value accounting, the latter defined according to the Touche Ross booklet Economic Reality in Financial Reporting. Selected model outputs become inputs to a separate computerized data analysis program designed to provide insight into several of the research questions addressed in this study.

INFLAN operates in a manner similar to an accounting system. One group of variables represents a set of general ledger accounts and another group represents a set of transactions. For each simulated period the model computes all transaction amounts, posts the transactions to the accounts, and generates financial statements.

INFLAN is based on a software package called IFPS (Interactive Financial Planning System) which incorporates an interactive programming language.[1] Using IFPS the user constructs mathematical formulas defining financial accounts and transactions; IFPS then uses its own computation routines to perform the computations required for all of the periods specified by the user. The major advantages of IFPS are: (1) its interactive language and commands are easy to use to construct formulas and instruct the computer to perform the required calculations, and (2) the IFPS package contains all of the logic necessary to control transactions from one period to the next and to output financial statements.

To initialize INFLAN, beginning balances must be established for each of the company's general ledger accounts. Four different sets of beginning account balances were prepared, each representing a company having a different cost and resource structure. For each run of the model, the user specifies which one of these four are to be used to provide initial values of the account balances. The balances were extracted from recent Compustat reports on four actual companies, including a chemical producer (hereafter Chemco), an integrated oil company (hereafter Oilco), a steel producer (hereafter Steelco), and an appliance manufacturer (hereafter Appco). Note that the Compustat data were used to establish balances for the initial period only -- amounts generated for subsequent periods are a function of the model logic alone. However, many of the relationships inherent in the initial data values are carried forward through the entire seventeen-year simulation period, and therefore the simulated companies should bear some resemblance to their real-world counterparts.

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[1]Marketed by Execucom Systems Corporation, Austin, Texas.

After each run of the model was completed, several key items of data were extracted from the results and assembled for input to a data analysis program. This program, written in BASIC, was designed to examine data relating to several key issues in the study, including cash flow prediction, performance evaluation, taxes, dividends, and pricing. For each issue the differences between results on a historical cost basis and results on a current-value basis were highlighted. This program prepared a number of schedules summarizing the results. Data from these schedules were then aggregated manually by the researchers to draw conclusions about the major research questions.

The overview of the model as discussed above is illustrated in Exhibit B-1.

The basic objective which the research team hoped to accomplish with the computer simulation model was to assemble a data base which would provide a systematic body of evidence on the differences between current-value accounting and historical cost accounting. The specific objectives of the modeling project relate to the key issues of the overall project, and include the following:

1. To assess whether current-value accounting provides greater predictability of future cash flows than historical cost accounting.

2. To assess whether current-value accounting provides significantly better information for decision making in the areas of:

   a. Pricing
   b. Dividend distribution
   c. Firm performance evaluation.

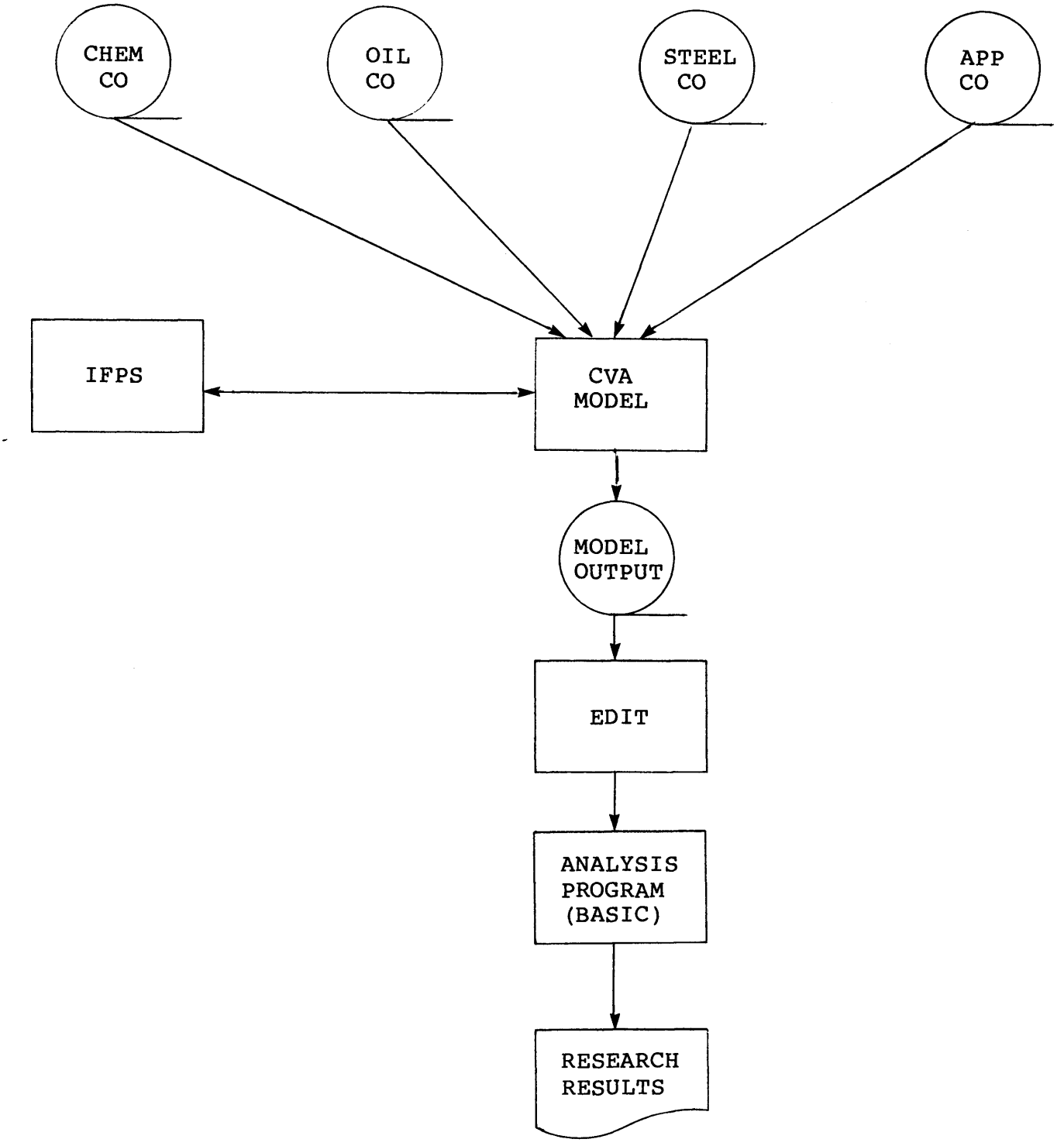
3. To assess the extent to which income taxes determined from historical cost net income are likely to exceed real income as measured by results of operations under current-value accounting.

In addition, the numerous outputs of financial statements under current-value accounting and historical cost accounting provide a source of illustrations for inclusion in the final report.

Computer simulation was chosen as a research methodology because there was no other method available to systematically assemble such a large body of evidence bearing directly on the research questions. The only alternative methodologies would have been: (1) collection and analysis of data from real companies, (2) construction and manipulation of an analytical model, and (3) manual preparation and analysis of a few representative cases. All of these methods have been used in other research. In our judgment, method (1) would have been too time consuming and would not have provided a broad and comprehensive set of data; method (2) would have been too difficult and too dependent upon questionable assumptions, and method (3) would

EXHIBIT B-1

OVERVIEW OF THE MODELING PROJECT



not have provided nearly enough data to form meaningful conclusions. With the simulation approach, the research objectives were accomplished with a minimum of effort.

The modeling project spanned a total of eleven months from its conception through the completion of the analysis of results. All told this project consumed approximately 100 man-days. The most significant components of this total effort were consumed by the tasks of (1) programming and debugging of the simulation model itself, (2) preparation of the data analysis program, and (3) generation of the output and its analysis with respect to the research questions.

The three sections in the remainder of this Appendix describe the underlying logic and assumptions of the computer simulation model. Appendix E contains a description of the research design, a closer examination of the data analysis program, and a summary of the results of the modeling project.

Model Structure and Assumptions

The computer simulation model maintains variables representing thirty-two balance sheet and income statement accounts under current-value accounting, and twenty-four such accounts under historical cost accounting. During each simulated period of operation of the hypothetical firm, amounts for twenty-two transactions under current-value accounting are computed, as are amounts for a comparable number of historical cost accounting transactions. End-of-period account balances are then determined from beginning balances and transactions amounts. Financial statements and other relevant data are obtained from the end-of-period account balances, which then become beginning balances for the next period. This cycle is repeated for a total of sixteen periods, of which the first is a transition period from initial (historical cost) account balances to current-value accounting. The data analysis is performed on the remaining fifteen years.

Several items of data for the initial period were obtained from the Compustat file for each of the four companies. For each company a representative recent year was chosen. These items of data included twenty-four historical cost account balances,[2] unit sales volume, unit inventory amounts, current replacement cost of plant and equipment, net realizable value of land, interest rate on outstanding long-term debt, average tax rate on income, average dividend payout rate, and accounts receivable turnover rate.

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[2]Some minor adjustments were made in order to reconcile the Compustat account format with that used in the model.

Four other parameters whose values were established at the beginning of each run of the model are the rate of growth in unit sales volume, the general price level index, the raw materials price index, and the fixed asset price index. The actual values of these four parameters were systematically varied in order to provide a variety of cases for analysis by the researchers. A complete description of the values chosen and the results obtained is contained in Appendix C.

Several of the most important specific assumptions underlying the operations of the model are detailed in the sections below. All of these assumptions apply to all four of the simulated companies.

Equipment

The company starts operations with 15 "units" of equipment. The capacity of each unit increases each year in proportion to a productivity index, which in turn increases at a constant 1% rate per year. One unit of equipment is assumed to be retired each year. The number of additional units needed each year is determined based upon projected sales volume for the next year.

Plant

The company starts operations with 2 "units" of plant, with each unit assumed to be operating at 75% of capacity. Need for additional plant is determined by comparing projected sales volume to existing capacity. If projected volume exceeds 90% of existing capacity, a new unit of plant is built with capacity sufficient to reduce the firm's operating level back to 75% of capacity.

Depreciation

Depreciation is computed on a straight-line basis. A 15-year life is assumed for equipment, and a 40-year life for plant.

Capital Structure Policies

The company finances its plant acquisitions through long-term debt, unless long-term debt exceeds total equity. In the latter case, additional equity is used to finance the new plant. Equipment acquisitions are financed through current operating funds. If the company's short-term debt obligations grow to exceed its current assets, then all short-term debt is converted to long-term debt.

Long-term debt is assumed to have a 20-year life when issued. It is repaid in 20 equal annual instalments (in a manner similar to mortgage debt). The rate of interest for new debt is set at the current market rate at the time of issue.

Interest Rates

The current interest rate on short-term debt is set at 3% plus the current rate of inflation. The current interest rate on long-term debt is assumed to be the short-term rate plus 1.5%.

Short-Term Cash Management

Accounts payable are paid on the average in 30 days. Accounts receivable are collected in an average number of days based on an accounts receivable turnover rate specifically determined for each of the four companies.

A target ending cash balance is determined based on a desired ratio of cash to accounts payable. This target ratio is achieved by short-term borrowing or sale of marketable securities (if cash short) or by extinguishing short-term debt and buying marketable securities (if cash long).

Marketable securities are assumed to return a yield of 8%, all of which is assumed to be reinvested at no transactions cost.

Inventories

The company produces and markets a single product. One unit of raw material inventory is required for each unit of finished product sold. Production and raw material purchases are geared to produce inventory units equal to a fixed percentage of next year's expected sales.

Raw materials, labor, and overhead costs flow into work in process, which in turn flows into finished goods inventory. For historical cost accounting, a FIFO cost flow assumption is made. This assumption enables a distinction to be made between realized and unrealized changes in inventory value under current-value accounting.

Price Indices

Separate price indices are maintained for fixed assets and raw materials in addition to a general price level index. Values for these indices are established at the beginning of each run of the model. The fixed asset price index determines the current replacement cost of plant and equipment, and the net realizable value of land. The raw materials price index affects only the purchase price of raw materials. Direct labor costs, overhead costs other than depreciation, selling expenses, and general and administrative expenses increase in proportion to increases in unit sales and the general price level index, but are adjusted for the 1% increase in productivity.

Market Price of Product

Price is determined by a markup over historical cost of goods sold. The markup rate is determined for each company based upon sales and cost of goods sold for the initial period. The price determined in this manner is subject to a market acceptance constraint which may cause it to be lowered. The market acceptance factor is proportional to the general price level index and the rate of sales growth. However, a second constraint limits the amount of any decrease in price to no more than 10% of the amount determined by the markup approach; this is intended to reflect the "downward stickiness" which exists in prices. These assumptions were intended to represent the manner in which prices are established in the majority of large American corporations, and are considered appropriate for the four test companies.

Dividends

Dividends paid are computed as a constant percentage of historical cost net income, subject to the constraint that total dividends in any year are never less than in the prior year. The payout rate is determined for each company based on actual historical rates.

Model Output

Output from each run of the model included six statements and schedules. These were a cash flow statement, a historical cost balance sheet and income statement, a current-value accounting position statement and results of operations summary, and a ratio analysis schedule comparing historical cost and current-value ratios. The accounting rules used for current-value accounting, and the financial statement formats, are based directly on the Touche Ross model, as summarized in Economic Reality in Financial Reporting and several subsequently issued position papers. Some examples of the statements generated by the model are included in Appendix D.

Several procedures were used to check the output from each run of the model for numerical accuracy. These included: (1) a comparison of total assets to total liabilities on both the historical cost balance sheet and the current-value accounting position statement, (2) reconciliation of income minus dividends to beginning and ending retained earnings for both historical cost and current-value accounting, and (3) reconciliation of net cash flow to the beginning and ending cash balance. In addition, the ratios for each run of the model were checked for reasonableness.

APPENDIX C

THE SIMULATION MODEL RESULTS

A total of 72 runs of the computer simulation model were generated and analyzed. These were composed of 18 runs for each of the 4 companies. These 18 different cases were constructed by varying the values of four basic parameters: (1) the rate of growth in unit sales volume, (2) the raw materials price index, (3) the fixed asset price index, and (4) the general price level index. On each individual run, three of these parameters were set at a base level, while the fourth was varied from its base value. The base value of the unit sales growth rate was set at 10%, while the base value for each of the three inflation rates was set at 5%. Table C-1 details the specific values used for each of these four parameters in each of the 18 cases.

The objective in selecting these combinations of parameter values was to be able to analyze the effects of varying each of the four individual parameter values while keeping all other factors constant: As can be seen from the table, Case 2 is the "base case" in which all four of the parameters are kept at their base levels. The results from this case serve as a standard for comparison of results from all of the other cases.

The four companies were selected with the intention of obtaining a cross section of manufacturing companies with a variety of operating characteristics. The nature of these 4 companies is highlighted by a comparative analysis of their base year ratios in Table C-2. The most significant differences among these companies are that: (1) the steel company (designated "Steelco") is much less profitable than the others and more capital intensive, (2) the chemical company (designated "Chemco") has a considerably higher proportion of working capital than the others, and (3) the appliance company (designated "Appco") is much less capital intensive than the others.

As a by-product of each run of the model, output values of 24 parameters over the 15-year period were extracted to a separate file and used as input to a data analysis program. This program performed five different categories of analysis, which were concerned with the topics of: (1) pricing, (2) dividends, (3) taxes, (4) performance evaluation, and (5) prediction of cash flows. In the remaining sections of this Appendix, the analyses performed and results obtained in each of these five areas are described.

Before proceeding to review the findings of the INFLAN simulation study, two important points should be noted. First, the modeling approach necessarily requires simplifying; assumptions abstracted from the real world, and therefore the conclusions of the study should be interpreted in the light of this limitation. To the extent that the conclusions of the simulation study are consistent

EXHIBIT C-1

Case	Unit Sales Growth Rate	Fixed Asset Inflation Rate	Raw Materials Inflation Rate	General Inflation Rate
1	0%	5%	5%	5%
2	10%	5%	5%	5%
3	20%	5%	5%	5%
4	-10%	5%	5%	5%
5	Volatile, no growth[a]	5%	5%	5%
6	Volatile, moderate growth[b]	5%	5%	5%
7	10%	10%	5%	5%
8	10%	20%	5%	5%
9	10%	Steadily increasing[c]	5%	5%
10	10%	Steadily decreasing[d]	5%	5%
11	10%	5%	10%	5%
12	10%	5%	20%	5%
13	10%	5%	Steadily increasing[c]	5%
14	10%	5%	Steadily decreasing[d]	5%
15	10%	5%	5%	10%
16	10%	5%	5%	20%
17	10%	5%	5%	Steadily increasing[c]
18	10%	5%	5%	Steadily decreasing[d]

[a]"Volatile, no growth" means that the rate of growth in sales fluctuated from -15% to +15% per year, but averaged zero growth.

[b]"Volatile, moderate growth" means that the rate of growth in sales fluctuated from -5% to +25% per year, and averaged 10%.

[c]"Steadily increasing" means that the inflation rate was set at 0% for the first 4 years, 5% for the next 4 years, 10% for the next 4 years, and 20% for the final 4-year period.

[d]"Steadily decreasing" means that the inflation rate was set at 20% for the first 4 years, 10% for the next 4 years, 5% for the next 4 years, and 0% for the final 4-year period.

EXHIBIT C-2

	Base Year Ratios			
	Chemco	Oilco	Steelco	Appco
Profitability:				
Gross margin %	25.9	30.3	14.9	19.1
Operating profits as % of sales	13.4	20.0	7.7	9.9
Net income as % of sales	6.5	5.3	4.3	5.0
Return on total assets	7.4	6.1	3.7	11.4
Return on total equity	11.1	10.3	6.4	21.1
Credit capacity ratios:				
Current ratio	3.5	1.4	1.9	2.1
Working capital to sales	.24	.11	.18	.15
Times interest earned	4.6	22.4	3.5	5.9
Long-term debt to equity	.32	.18	.42	.29
Other:				
Asset turnover	1.15	1.16	0.86	2.29
Inventory turnover	4.3	7.5	3.8	3.8
Dividend payout rate	.60	.50	.40	.30
Net fixed assets to total assets	.53	.50	.60	.27
Materials cost as % of sales	40.5	57.5	31.0	41.6
Depreciation as % of sales	3.1	3.4	8.3	1.0

with prior expectations, or can be logically explained, the validity of both the model and the conclusions is enhanced. However, because the model is an abstraction from reality, it cannot provide conclusive answers to relevant questions.

Second, it should be noted that the analyses performed in this simulation study represent only a first step in exploring the multitude of issues relating to cash flow prediction by various accounting models. Any single study must necessarily limit its scope in order to reach conclusions within the time available. An attempt was made to focus upon what were viewed as critical issues, but many other worthy issues remain to be explored. In the concluding section of this Appendix, several of these remaining issues are identified and possible extensions to this study are discussed.

Pricing

The primary objective of this portion of the analysis was to assess whether current-value accounting provides better information for pricing decisions under inflationary conditions than does historical cost accounting. Pricing decisions may be viewed as having two facets: (1) establishment of selling prices, and

(2) evaluation of previously established prices. One of the items of financial information most commonly used in both of these aspects of pricing is gross margin. Therefore, the analysis of model results in the pricing area focuses upon gross margins. The research program printed the historical cost and current-value gross margin for each of the 15 years, as well as the total difference between them and the difference expressed as a percentage.

The patterns of fluctuation of gross margin over time tended to be quite similar among the four companies. The magnitude of the percentage difference between historical cost and current-value gross margin also tended to be similar for three of the four companies. In the fourth company -- Steelco -- this percentage difference tended to be much higher, probably because this company's lower profitability provided it with less of a "cushion" against inflation. In a few cases, Steelco's current-value gross margin became negative.

Because all of the study cases involved positive rates of inflation, the current-value gross margin was always less than the historical cost gross margin. The pattern of this difference varies significantly across the 18 study cases. However, in all cases there was a distinct, although often modest, difference which arose in the first year of use of current-value accounting, and in many cases this difference tended to level off in subsequent years. In some cases the largest percentage difference occurred in the first year.

Among the cases in which sales volume was varied while the inflation rates stayed constant (Cases 1, 3-6), the case of declining sales volume (Case 4 in Table C-1) produced the most interesting and unusual results. In this case the historical cost gross margin tended to stay constant while the current-value gross margin declined substantially over time. By the 15th year the current-value gross margin was 41% less than the historical cost gross margin for Appco, 51% less for Oilco, 65% less for Chemco, and was negative for Steelco.

In the cases where the fixed asset price index was varied while the other parameters remained constant (Cases 7-10), the historical cost gross margins were very stable, but the current-value gross margins tended to decine substantially over time in proportion to the severity of the index fluctuation. The most severe declines occurred when the fixed asset price index was set at a constant 1.20 (Case 8); these results paralleled those in Case 4. Case 10, in which the fixed asset price index started at 20% but declined over time to 0% during the last four years, was the lone exception to this pattern; here the current-value gross margin tended to decline during the early years but then rose slightly during the later years.

The substantial decline in gross margins under current-value accounting when fixed asset inflation rates are high reflects the cumulative effect of current-value accounting depreciation. A 20% increase in prices of plant and equipment not only increases the amount required to buy new plant and equipment, but also increases the amount of current-value depreciation on all old equipment.

The cases in which the raw materials price index was varied from its base rate (Cases 11-14) produced little in the way of interesting results. In Case 12 (Index = 1.20) and Case 13 (Index steadily increasing from 1.00 to 1.20), the difference between the two gross margins did tend to increase over time. The amount of this difference was relatively small in Oilco and Chemco, but reached as high as 48% in Steelco and Appco. Except for Appco, the effects of varying the raw materials price index were much smaller in magnitude than the effects of comparable variations in the fixed asset price index. Appco is an exception because of the lesser relative importance of fixed assets in its asset and cost structure.

In the cases for which the general price level index was varied from its base rate (Cases 15-18), no results of any consequence were produced. This was because under current-value accounting the general price level by itself has no impact upon cost of goods sold; only the specific price of raw materials and fixed assets have such an impact.

The general conclusion from this portion of the study is that historical cost accounting information may be adequate for pricing decisions when inflation rates are moderate and stable, and sales volume is not declining. However, if the specific rate of inflation of fixed assets or raw materials becomes substantial -- 10% or higher -- for a period of five or more years, or if sales volume declines for a sustained period of time, then gross margins under current-value accounting may decline substantially and continuously relative to historical cost gross margins. In such cases it may be inferred that historical cost gross margins could be misleading as a basis for establishing prices and evaluating previous pricing decisions. For those companies which rely heavily on gross margins for their pricing decisions, historical cost accounting information could lead to poor decisions and failure to recognize on a timely basis that pricing problems exist. Perhaps the main virtue of current-value accounting information is that it signals the existence of pricing problems on a more timely basis, thereby enabling management to react more quickly in response to changing market conditions.

The results of this analysis, and these conclusions, are not particularly surprising and are consistent with what might have been logically expected. However, these results do provide the first systematic and objective supporting evidence for such expectations, and thus lend substantial credibility to the claim that current-value accounting generally provides better information for pricing decisions than does historical cost accounting.

Dividends

The original objective of this portion of the study was to assess whether current-value accounting provides better information for dividend decision making than does historical cost accounting. The dividend policy adopted for the simulation model assumed a

constant dividend payout rate as a percentage of historical cost net income, subject to the constraint that each year's dividends never be less than those of the prior year. This policy was intended to conform to the policy most commonly used by corporate managers. The approach used on the research question was based on the assumption that payment of dividends in excess of "real" income is a bad decision, one which management would wish to avoid. In effect, such dividends could be interpreted as representing a partial return of capital to shareholders. Current-value results of operations was used as a surrogate for "real" income. The method of data analysis was simply to compare the historical cost and current-value dividend payout rates over time, and count the number of instances in which dividends paid exceeded current-value results of operations.

Each of the 72 model cases was run for a 15-year period, providing a total of 1,080 instances of dividend decisions. In 395 of these cases, or 36.6%, dividends were paid in excess of "real" income. Of this number, 231 were accounted for by Steelco which showed negative current-value results of operations in most of the simulated years. Therefore, in the 810 cases involving the three companies other than Steelco, there were 164 instances of dividends paid in excess of real income, which represents a percentage of 20.2%.

Among the 18 different cases, there were 7 which accounted for the vast majority of bad dividend decisions. Without exception these were cases in which sales volume or price indexes were of such an unfavorable nature that current-value results of operations fell substantially below historical cost net income. These were Cases 4 and 5, in which sales volume was declining, and was volatile around a zero growth trendline, respectively; Cases 7, 8 and 10, in which the fixed asset price index was set at 1.10, 1.20, and steadily decreasing from 1.20 to 1.00, respectively; Case 12, in which the raw materials price index was set at 1.20; and Case 16, in which the general price level index was set at 1.20.

Though not tabulated, there were also a sizable number of instances in which the dividend payout rate as a percentage of current-value results of operations was less than 100% but yet much higher than most managements would consider normal (in the 80% to 90% range). Conceivably, these could also be considered bad dividend decisions.

The general conclusion from this portion of the study is that historical cost accounting is a poor basis for dividend decision making under inflationary conditions. The evidence indicates that a dividend policy based on historical cost net income leads to questionable dividend decisions in a sizable percentage of cases. Once again this is no particular surprise, but does lend credibility and urgency to the claims of those who argued this point based on anecdotal evidence from a few companies. Indeed, the relatively large number of model cases in which this problem existed is a signal that this problem could be more serious than previously supposed, especially for companies experiencing relatively low

profitability. Together with the serious capital shortage facing our country today, these results suggest that a deeper inquiry into the issue of dividend policy is in order.

Taxes

The objective of this portion of the analysis was to provide some evidence on the seriousness of the potential problem of tax payments in excess of "real" income under conditions of inflation. Once again current-value results of operations was used as a surrogate for "real" income. In the model, taxes are computed as a constant percentage of historical cost net income. The research program printed a schedule showing the "real" tax rates (taxes as a percentage of pretax current-value results of operations) over the 15-year period for each run. The researchers then observed the pattern of fluctuation of the "real" tax rate over time, and tabulated the number of instances in which this "real" tax rate was greater than 100%.

Since dividends are paid on after-tax historical cost income, it follows that dividend distributions, if made at all (and they are always made in the model) are more likely to exceed real income than are tax payments. Based on this, one might incline toward the view that therefore excessive tax payments are not as serious as excessive dividend payments, since the latter exceed real income more frequently. However, what is relevant to this argument is that dividend payments can be curtailed or eliminated by the individual company in recognition of the impact of inflation on real income, and companies can be expected to take this action as they begin to calculate their real income. Unfortunately, companies have no such nonpayment option with respect to tax payments; current-value income can show that taxes are excessive but cannot directly help managers control their tax payments. Accordingly, excessive tax payments are a more serious problem than is indicated only by the relatively limited number of times the model results show that tax payments exceed real income. Indeed, it can be argued that in equity, every time that taxes paid exceed the statutory rate as applied to real income (which is true for every case in the simulation model), tax payments are excessive and the problem is serious.

The typical pattern of movement of the effective tax rate on a current-value basis over time in the model results is to move to a point 15 to 50% higher than the historical cost tax rate during the first year or so after transition to current-value accounting, and then to gradually decline to a point 5 to 20% higher than the historical cost rate at the end of 15 years. Perturbations in the form of sales volume or price index fluctuations generate temporary and slight reversals of this trend, but the basic trend is resumed in most of the cases. The primary exceptions are the cases in which environmental conditions are sufficiently adverse that the company sustained consistently negative current-value results; in these cases the real tax rate tended to increase over time. Specific information about these cases is revealed by the tabulations of instances of real tax rates in excess of 100%.

Of the total of 1,080 simulated years, there were 179, or 16.6% in which taxes paid were not only excessive, but exceeded the total of real income. However, 126 of these were accounted for by Steelco, and only 53 by the other 3 companies. Once again this difference among the companies may be accounted for by the relatively lower profitability of Steelco. Among the 18 cases, the ones which accounted for the majority of instances here were again those in which sales volume and price indices were of an unfavorable nature.

In all of the simulated cases the "real" tax rate exceeded the historical cost accounting tax rate. As in the dividend analysis, there were a sizable number of instances in which the "real" tax rate was less than 100% but was still quite high (around 80% to 90%). Such cases would probably also be interpreted as representing excessive taxation.

The general conclusion of this portion of the analysis is that under conditions of inflation, income taxation based on historical cost measures of net income results in effective tax rates which are consistently higher than the stated tax rates, and which in some cases require a company to pay taxes which exceed its "real" income, or to pay taxes even though experiencing a "real" loss. Such a condition is more likely to occur in a company which has a declining sales volume or which is relatively less profitable, and becomes increasingly likely as inflation becomes more severe. Based upon these results it is not possible to generalize regarding the extent of this problem; such conclusions are more readily derived from empirical analysis. However, these results do demonstrate the likely existence and severity of the problem under certain conditions.

Performance Evaluation

The objective here was to assess whether current-value accounting provides significantly better information for evaluation of company performance under inflationary conditions than does historical cost accounting. Three measures of company performance were selected as a focal point for the analysis. These are income growth, return on total assets, and return on equity. These are appropriate yardsticks for use by internal management as well as by external investors. For each of these measures, current-value results of operations was used as the income measure under current-value accounting.

In approaching this issue an assumption was made that performance measures under current-value accounting are correct, and the analysis was then concentrated on the difference between current-value accounting performance measurements and those under historical cost accounting. The data analysis program compared the values of each of these performance measures over the simulated period of each run, and tabulated the number of "trend errors." These are defined as instances where the year-to-year trend of the

historical cost accounting performance measure is in the opposite direction of the year-to-year trend of the current-value performance measure. The underlying assumption was that such occurrences represent the least tolerable condition for performance evaluation -- not only are the absolute historical cost measurements misleadingly different from true measures but also they portray an opposite trend from the true trend.

During a 15-year period, only 14 instances of a trend error are possible for any given performance measure; therefore the total number of possible trend errors for any single company over the 18 model cases is 252, and over all four companies is 1008. Table C-3 summarizes the number and percentage of occurrences of trend errors for each of the four companies and each of the three performance measures.

EXHIBIT C-3

	Income Growth		Return on Assets		Return on Equity	
	Number	Percent	Number	Percent	Number	Percent
Chemco	22	8.7%	48	19.0%	32	12.7%
Oilco	22	8.7%	42	16.7%	42	16.7%
Steelco	72	28.6%	77	30.6%	93	36.9%
Appco	16	6.3%	36	14.3%	52	20.6%
Total	132	13.1%	203	20.1%	219	21.7%

The results indicate that the incidence of trend errors represent a significant performance evaluation problem. This problem is most severe in Steelco's results, in which historical cost performance measures often tended to show a favorable trend while current-value performance measures indicated a declining trend. However, even in the other three companies the incidence of this problem ranged from a low of 6% to over 20%.

The performance measures themselves differed with respect to the incidence of trend errors. Return on equity accounted for more than the others, followed closely by return on assets. All companies had a significantly smaller number of trend errors in the income growth indicator.

Over one-half of the trend errors occurred in 5 of the 18 cases. These were Case 4 (declining sales) and Cases 7-10 (all cases in which the fixed asset price index was varied from its base

rate). However, there were at least some trend errors in every one of the 72 runs of the model. The higher incidence of trend errors under conditions of high fixed asset inflation is due primarily to the impact of current-value accounting for fixed assets on the denominators of the return on assets and return on equity equations.

In summary, the results indicate that under conditions of inflation historical cost accounting measures of performance can be misleading for a variety of types of manufacturing companies under a wide variety of conditions. However, the conditions under which they are most likely to be misleading include: (1) low profitability, (2) declining sales volume, and (3) high rates of fixed asset inflation (10% or higher). Return on assets and return on equity are misleading more often than income growth, primarily due to their greater sensitivity to fixed asset inflation. If nothing else were done, the accuracy of these performance measures might be substantially improved by adjusting the denominator of the return on assets and return on equity calculations to reflect the current value of fixed assets. However, even with such an adjustment, the results here indicate a significant potential for error in performance measures under historical cost accounting in conditions of inflation. These results suggest that a closer study of potential inaccuracies in historical cost performance measures would be worthwhile.

Cash Flow Prediction

According to the Trueblood Committee Report, the main concern of an investor or creditor of a company is to predict his own cash flow from the company, and the information most useful in this regard is an accurate prediction of the company's future cash flows. Therefore, the main objective of this portion of the study was to determine whether current-value accounting or historical cost accounting provides a better basis for prediction of the future cash flows of a company during periods of inflation. This objective is achieved by testing the following hypothesis, stated in null form:

> Ho: Current-value accounting and historical cost accounting are equally useful in the prediction of future cash flows in a manufacturing company under conditions of inflation.

Because of the distortions which historical cost accounting is known to introduce into financial statements during inflation, and because it is frequently argued that current-value accounting reduces or eliminates these distortions, the alternative hypothesis for this test is:

> Ha: Current-value accounting provides a better basis for the prediction of future cash flows in a manufacturing company under inflationary conditions than does historical cost accounting.

The 72 model cases summarized in Table C-1 were used as the bases for testing this hypothesis. In order to operationalize the test, it was necessary to specify what future cash flow was to be predicted, and then to develop a simple prediction model similar to that which a typical investor might use. It was decided to focus on the prediction of operating cash flow, which is defined as cash collections on account minus cash payments for materials, labor, overhead, selling expenses, general and administrative expenses, purchase of equipment, interest and taxes.[1] This cash flow figure could be interpreted as an amount available to management for distribution as dividends, and is therefore quite consistent with the investor's ultimate goal of predicting his own cash flows from the company.

With respect to the prediction model, it was decided that investors are likely to use the primary income number as a main element in the predictive equation; i.e., net income under historical cost accounting and net results of operations under current-value accounting. However, it would also be necessary to adjust for the company's expected level of activity during the period being predicted, in order to properly reflect conditions in the economy and the industry. It was decided to use estimated unit sales volume as an adjustment factor. It was further decided to use multiple regression as a prediction technique. Accordingly, the form of the prediction model is as follows:

$$y^t = a + b_1 x_1^{t-1} + b_2 x_2^t$$

Where y^t is operating cash flow for period t, x_1^{t-1} is an income number for period t-1, and x_2^t is an estimate of unit sales volume for period t.

Five years of past data are used to solve for the parameters a, b_1, and b_2. Once these are obtained, values of x_1^{t-1} and x_2^t for the next year are substituted into the equation to obtain a predicted value of y^t for that year. This predicted value is then compared with the actual value of operating cash flow for that year to determine the amount of prediction error.

For each simulated year that the prediction model is applied, two predictions are made. One is made using historical cost net income for x_1^{t-1}, while the other uses current-value results of operations. In both cases projected unit sales volume, which is assumed to be estimated with 100% accuracy, is used for x_2^t. For both predictions, the research program computes the absolute difference between the predicted and actual operating cash flow. For each of the 72 simulated cases, a prediction is made for years

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[1]There are a number of alternative cash flow numbers which might have been selected. To avoid excessive broadening of the scope of the study it was decided to use only a single representative number. Research on the prediction of other cash flow numbers is a potentially fruitful extension of this study.

7 through 15. The total prediction error over this nine-year period is then accumulated for both predictors. Either historical cost net income or current-value results of operations is then deemed to be the better predictor for that case, depending upon which produced the smallest total prediction error.

If the null hypothesis were true, then it would be expected that historical cost net income would be a better predictor in roughly half of the 72 simulated model cases, and current-value results of operations a better predictor in the remainder. However, under the alternate hypothesis, current-value results of operations would be expected to be a better predictor in a significantly larger percentage of these cases. This hypothesis is tested using a one-tailed test based upon the binomial theorem.

A secondary objective of the research on cash flow predictions was to assess whether the information on value changes in the current-value accounting statement of net results of operations and changes in value might enhance the predictive power of current-value results of operations. Accordingly, seven additional predictors were constructed by adding various combinations of value change amounts to current-value results of operations; each of these predictors was used in the regression equation as a value of x_{t-1}, making a total of nine predictors which were actually tested. In essence, these represent nine different accounting models. These nine predictors are listed in Table C-4. With the exception of predictor numbers 6, 8 and 9, which are based on adjusting net results of operations for the general price level, these predictors consist of combinations of line-items in the Statement of Net Results of Operations and Changes in Value as shown on page 24 of the Touche Ross & Co. booklet Economic Reality in Financial Reporting. Exhibit C-5 shows how each of the eight current-value predictors are constructed from adding together various line items from the Touche Ross statement; in the column for each predictor a "+" identifies the items which are added together to form that predictor.

EXHIBIT C-4

DESCRIPTION OF THE INFLAN CASH FLOW PREDICTORS

Number	Description of Predictors
1	Historical Cost Net Income
2	Current-Value Net Results of Operations
3	Current-Value Net Results of Operations plus Unrealized Changes in Long-term Debt
4	Current-Value Results of Operations plus Changes in Value of Nonmonetary Resources before Adjustment for General Purchasing Power
5	Current-Value Results of Operations plus the Value Changes in 3 and 4 above
6	Current-Value Results of Operations Adjusted for General Price Level Effect
7	Current-Value Total of Net Results of Operations and Changes in Value (Bottom Line)
8	Current-Value Results of Operations Adjusted for General Price Level Effect, plus Changes in Value of Nonmonetary Resources after Adjustment for General Purchasing Power
9	Current-Value Results of Operations Adjusted for General Price Level Effect, plus Unrealized Changes in Long-term Debt Adjusted for General Purchasing Power

For each of the seven additional current-value accounting predictors, the total absolute prediction error was computed over the nine predicted periods, and the size of this prediction error was compared to that obtained using historical cost net income as a predictor, as well as to that obtained with current-value results of operations as a predictor. In addition to simply counting the number of instances where one predictor did better than another, an analysis of the dollar amount of prediction errors was also performed. Furthermore, all analyses were broken down on a company-by-company and case-by-case basis in order to detect any significant patterns relative to type of company or environmental conditions.

With respect to the main hypothesis, on the number-of-instances basis current-value results of operations was deemed to be a better predictor of future operating cash flows from historical cost net

EXHIBIT C-5

RECONCILIATION OF INFLAN CASH FLOW PREDICTORS

TO TOUCHE ROSS MODEL

Line Items from the Touche Ross Statement of Net Results of Operations and Changes in Value (See Exhibit A-2)	2	3	4	5	6	7	8	9
Net results of operations[a]	+	+	+	+	+		+	+
Changes in value of nonmonetary resources								
Realized changes from inventory sold after increase in value								
Unrealized changes								
Inventory held at year-end								
Long-term investment								
Equipment								
[b]Subtotal: Gross nonmonetary value			+	+				
Impact of decline in general purchasing power on value changes								
Subtotal: Net nonmonetary value changes							+	
Changes in value of monetary resources and obligations								
Unrealized changes in long-term debt due to change in interest rates		+		+				
Economic advantages from decline in general purchasing power on net monetary items held								
[b]Subtotal: Net monetary value changes								+
Total of net results of operations and changes in value for year						+		

[a]In Cases 6, 8 and 9, net results of operations is adjusted for the effect of increases in the general price level during the year.

[b]These subtotal lines are added to this Exhibit to permit a full description of the relationship of the Predictors to the Touche Ross model.

income in 50 of the 72 cases. This result enables rejection of the null hypothesis at a level of significance of .001, and thus provides very strong support for the alternative hypothesis. Analysis of the total dollar amount of prediction error reinforces this conclusion.[2] The total prediction error for all 72 cases was $6,334 with current-value results of operations as the predictor, and $7,321 (or 15.6% higher) with historical cost net income as the predictor. Furthermore, this result holds consistently across all 4 of the test companies, and 14 of the 18 test cases. All of these results point strongly toward rejection of the null hypothesis in favor of the alternate hypothesis.

The four cases in which current-value results of operations did not clearly outperform historical cost net income as a predictor were Cases 1, 4, 5 and 9. In each of these cases historical cost net income provided a better prediction for three out of four companies. However, only in Cases 5 and 9 was the total dollar prediction error across all four companies smaller with historical cost net income as the predictor; in the other two cases, the current values of one company were so much better a predictor that the superiority of historical costs for the other three companies was more than offset. Whether any meaning may be ascribed to these results is an open question. Cases 1, 4 and 5 are those in which growth in unit sales volume is zero or negative, which suggests that current-value results of operations may not be a significantly better predictor than historical cost net income under such conditions. Case 9 is one in which the fixed asset price index starts at 1.00 and steadily increases to 1.20. No reasonable explanation was found about why historical cost net income should do better in this case, and indeed it was only slightly better.

When the other seven predictors are compared to historical cost net income, it is found that three of them do significantly better according to the binomial test. These results are summarized in Exhibit C-6. Predictors 3, 6 and 9 outperform historical cost net income in a significantly larger percentage of the 72 cases. However, analysis of total dollar prediction error confirms this

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[2]In this and subsequent references, dollar prediction error refers to "normalized" dollar prediction error. In each of the 72 cases the amount of prediction error was normalized for each of the nine predictors by summing the prediction error for all nine predictors, dividing the result into 900, and multiplying the amount of prediction error for each predictor by the resulting constant. The result is that the average expected prediction error for each predictor in each case is equal to $100, and the expected total prediction error for each predictor over all 72 cases is equal to $7,200. The purpose of this adjustment was to equalize the impact of all cases and companies on the aggregate prediction error. In the absence of such an adjustment, the aggregate prediction error results would have been dominated by those companies and cases for which the prediction error tended to be larger.

EXHIBIT C-6

Predictor Number	Number of cases better than historical cost	Total dollar prediction error
1	--	$7,321
2	50*	6,334
3	46*	7,807
4	34	7,107
5	36	7,603
6	49*	6,329
7	34	7,644
8	30	7,790
9	48*	6,803

*Higher than expected under the null hypothesis at a level of statistical significance of .05.

result for only two of these three; the total dollar prediction error for predictor number 3 is much higher than the total dollar prediction error for historical cost net income, indicating that predictor number 3 is quite unreliable in some cases. The dollar prediction error for predictor number 6 (current-value results of operations adjusted for the general price level effect) and predictor number 9 (current-value results of operations adjusted for general price level effect plus unrealized changes in long-term debt adjusted for general purchasing power) is substantially less than the total dollar prediction error for historical cost accounting, which further confirms their superiority.

Current-value results of operations was also compared to the other 7 current-value predictors using the binomial test. It was found that current-value results of operations was a significantly better predictor than predictors 4, 5, 7 and 8, at a .05 level of significance, but was only slightly better than predictors 3, 6 and 9. These results are consistent with the dollar predictor error results in Exhibit C-6 (except for the large dollar prediction error for predictor number 3 mentioned earlier). This evidence seems to indicate that if one were forced to rely upon a single income measure in predicting operating cash flows, current-value results of operations would be a worthy choice because on the average it is at least as informative as all alternatives, and clearly superior to most alternatives. However, there were numerous individual cases in which other predictors did better than current-value results of operations.

A third way to compare the performance of the nine predictors is to examine the number of times each ranked 1st, 2nd, etc., and compute the average rank of each predictor among the group. Exhibit C-7 summarizes this information.

EXHIBIT C-7

Predictor Number	Rank		Number of times ranked as		
	Average	Absolute	1st-2nd-3rd	4th-5th-6th	7th-8th-9th
1	5.51	7	17	26	29
2	4.24	1	34	19	19
3	4.81	4	26	23	23
4	5.39	6	20	22	30
5	4.99	5	21	33	18
6	4.28	2	35	20	17
7	5.68	8	15	26	31
8	5.86	9	18	18	36
9	4.28	2	30	29	13

These results confirm the prior conclusions. Current-value results of operations ranks as the best predictor, followed closely by current-value results adjusted for the general price level and adjusted current-value results plus net monetary value changes. Historical cost net income ranked among the worst predictors, with the majority of its high rankings occurring in Cases 1, 4, 5 and 9.

For the most part, these results were found consistently among each of the four companies. The three best predictors ranked 1st, 2nd, and 3rd among all 4 companies, with one exception -- predictor 4 (current-value results + gross nonmonetary value changes) did very well in predicting the operating cash flows of Steelco. Recall that Steelco is the most capital intensive and least profitable of the four companies. Perhaps nonmonetary value changes have some predictive information content in such circumstances, though this is certainly not a conclusive finding.

Historical cost net income performed at its best as a predictor of operating cash flows for Appco, ranking 4th. This is probably due to the fact that Appco was the least capital intensive of the four companies. However, even for Appco, historical cost net income was outperformed as a predictor by each of the three leading current-value accounting predictors. This result does suggest that historical cost net income becomes progressively worse as a predictor of cash flows as capital intensity increases.

There were no obvious patterns among the 18 model cases. In an effort to discover such a pattern, these 18 cases were separated into two groups: (1) the 9 cases in which the total actual dollar prediction error (aggregated over the four companies) was highest -- Cases 3, 5, 6, 8, 12, 13, 14, 16 and 17, and (2) the 9 cases in which the total actual dollar prediction error was lowest -- Cases 1, 2, 4, 7, 9, 10, 11, 15 and 18. For convenience, the former are referred to as the "unpredictable" cases and the latter as the "predictable" cases. In both groups of cases, the same three current-value predictors ranked as the best among the nine

predictors. However, historical cost net income did substantially better as a predictor in the predictable cases, ranking 4th as opposed to 8th in the unpredictable cases. This suggests that the predictive advantage provided by current-value data relative to historical cost data declines as the effects of inflation and volume variations become less pronounced. The converse of this is that current-value data provides more and more of a predictive advantage as the effects of inflation and sales volume variations become more pronounced.

Another finding here is that predictor 3, current-value results of operations plus monetary value changes, did very poorly in the predictable cases, ranking 9th, but improved substantially to 4th among the unpredictable cases. The specific reason for this is not clear, other than that it is one manifestation of the converse finding mentioned above.

The current-value accounting bottom line amount (predictor 7) was a consistently poor predictor relative to the others. This was true across all companies, among both predictable and unpredictable cases, and in virtually all of the 18 individual cases. It had the lowest dollar predictor error in only two cases -- numbers 8 and 17 -- but by a very narrow margin both times. Generally, the current-value bottom line figure did worse in predicting operating cash flows than historical cost net income; the main exception to this was in the unpredictable cases.

One important consideration in interpreting these results is that every one of the nine predictors did well in at least some of the 72 cases. Therefore it can be stated that no single predictor completely dominates the others, in the sense of being superior under all circumstances.

At least two implications may be drawn from this conclusion. First, it suggests that it is inappropriate to select any single measure of income to be reported to the exclusion of other measures; the reader of financial statements may need a variety of income measures, such as, for example, those included in the Statement of Net Results of Operations and Changes in Value proposed by Touche Ross & Co. The second implication is that further research is necessary to examine the types of companies and environmental conditions for which one income measure might be expected to have greater predictive information content than another.

In summary, the strongest and most significant conclusions from the cash flow prediction analysis are listed below:

1. Current-value results of operations is a better predictor of future operating cash flows among all four test companies, and across a wide variety of conditions of sales volume trends and rates of inflation.

2. No other current-value income measures improve the predictability of future cash flows above that provided by current-value results of operations. Of particular interest is the current-value bottom line figure, which predicted even slightly worse than did historical cost net income.

3. The situations in which historical cost net income is not substantially worse than current-value results of operations as a predictor include when: (a) the company is not capital intensive, (b) sales volume is not increasing, and (c) the impact of sales volume variations and inflation is less pronounced. However these results are not surprising, since under these conditions inflation generally has the least impact upon financial results.

The reader should note that these results are obtained from computer simulation of hypothetical companies, and thus are not totally conclusive. However, they are consistent with what was logically expected and hypothesized, and are also internally consistent (across the 72 cases) to a remarkable degree. As such they do possess a certain amount of credibility, and provide additional support to the conclusions expressed throughout the entire body of this report.

Possible Extensions of the INFLAN Modeling Project

The modeling project as conducted for this study represents only a first step in addressing the important issues of accounting for inflation generally and of cash flow prediction by accounting models. However, the model provides a point of departure for exploring a number of issues which, due to time and cost limitations, were not addressed in this project. In this section a number of possible extensions to the modeling project are identified.

One set of extensions involves variations in the model parameters. The project considered only a limited set of values of sales volume growth rate, inflation rates, and company characteristics. Furthermore, only one of the four model parameters was varied at a time. One extension would be to consider a wider range of values for the basic parameters, and also to incorporate greater variability into them. Another possibility is to consider cases in which two or more parameters are varied from their base values. A third possibility is to vary the characteristics of the subject companies systematically in order to study the way in which differences among companies are reflected in current-value accounting results. Still another possible extension is to study the impact of varying other parameters which were held constant in this project but which might prove to be important, such as the rate of increase in productivity.

The cash flow prediction model might also be refined. For example, only a single prediction technique, multiple regression, was used.

Other techniques, such as smoothing models and auto-correlation models, could also be utilized. As another example, predictions were made only one year into the future; a study of the effectiveness of predictions made two or more years into the future holds promise. As a third refinement, interesting results might be obtained from a study of the incremental impact of specific items on predictive effectiveness. This might be accomplished by comparing predictions made with those items included in the predictive model to predictions made without those items. Fourth, it would also be interesting to examine the effectiveness of the predictors in predicting measures of cash flow other than operating cash flow as defined in this study.

APPENDIX D

ILLUSTRATIVE FINANCIAL STATEMENTS

Introduction

This Appendix presents three illustrative sets of financial statements from the 72 INFLAN cases analyzed in Appendix C. These are Chemco Case No. 2, Chemco Case No. 4, and Steelco Case No. 7. Also included with each case are the computer provided analyses and a narrative discussion of several of the highlights that deserve the reader's attention. The INFLAN model was not programmed to provide a separate and detailed Statement of Stockholders' Equity.

The sequencing of the line items in the current-value Statement of Net Results of Operations and Changes in Value in the cases presented here conforms to that provided in Exhibit A-2 of Appendix A and to Exhibit C-3 of Appendix C; however the line titles are abbreviated to conserve computer storage printout space.

Also due to space limitations, the financial statements and Comparative Indexes Analysis provide output only for the years 1979-1989. However, the Performance Evaluation Data Analysis provides analyses for the 15-year period 1979-1993.

The Detailed Comparison Among Cash Flow Predictors (Exhibit D-9) is provided here only for Chemco Case No. 2. This appendix compares the operating cash flow prediction ability of the nine predictors for the nine-year period 1985-1993 (as explained in Appendix C, the first six years are necessary to provide a basis for the prediction and so 1985 is the first year that cash flow is predicted by the model). The Summary Comparison Among Cash Flow Predictors for each case summarizes the cash flow predictor comparisons; it also covers the period 1985-1993.

CHEMCO CASE NO. 2

Parameter values

Unit Sales Growth Rate	1.10
Fixed Asset Inflation Rate	1.05
Raw Materials Inflation Rate	1.05
General Inflation Rate	1.05

This case is one of four "base cases" -- one for each of the four companies. It represents the "normal" condition of 10% unit sales growth rate with all inflation rates set at 5%. For other INFLAN cases either the unit sales growth rate or one of the three inflation rates are varied from this base, but no two of these four are varied simultaneously.

On the Statements of Financial Position (Exhibits D-1 and D-4) the most notable differences between current value and historical cost at the end of 1989 are found in plant and equipment (Net Fixed Assets of $16,891 vs. $12,345) and Capital ($14,990 vs. $9,252). On the Statement of Operating Results and Value Changes (Exhibit D-2), results of operations is seen to increase progressively from $423 in 1979 to $2,230 in 1989 while historical cost net income (Exhibit B-5) increases from $557 to $2,672. It can be seen that net value changes and purchasing power changes on the current-value statement are relatively minor although both unrealized changes in fixed asset value ($843 in 1989) and purchasing power gain on nonmonetary items ($1,106, deducted) are substantial. Thus, with a uniform inflation rate of 5%, differences in the base case financial statements of Chemco are not startling.

However, certain of the historical cost and current-value indexes (as per the Comparative Indexes Analysis, Exhibit D-6) can be seen to be significantly different with relatively modest inflation even during the early years of inflation. For example, current-value and historical cost return on total assets for 1979 are respectively, 5.4% and 8.4% so that the actual return is considerably less than that indicated by the historical cost financial statements; in 1989 these calculations are 8.3% and 12.0% and significant distortion remains.

The Performance Evaluation Data Analysis (Exhibit D-7) provides several types of information. First, the growth indexes compare each year's current-value results of operations to the same statistics calculated from the balances entered to initiate the model. For 1993, current-value results of operations was about 10 times as large as in 1979 (13.164 vs. 1.297); while the absolute increase in historical cost net income growth was greater, the percentage increase was less than the growth of current value results of operations.

The figures in the Return on Assets section correspond to the Return on Assets measures in Exhibit D-6. Here, however, we can see that in 1984 the current-value return (5.8%) increased over 1983 (5.7%) but the historical cost return decreased (8.4% from 8.6%). This shows that not only are the magnitudes different, but of even greater importance is that the one set of indicators is improving while the other is deteriorating. Thus the indicated trends are in opposite directions. This phenomenon occurred again in 1986. The Return on Equity section is similarly interpreted, although no trend errors occurred here for this case.

The Gross Margin Analysis, as explained in Appendix C, is intended to demonstrate differences between historical cost and current-value margins, which can affect pricing decisions. In this case, these differences are negligible; for 1993, for example, the absolute difference is 1.7%, and the absolute difference as a % of historical cost gross margin (25.9%) is 6.6%.

Greater differences are found in the Dividend Data Analysis. Historical cost dividends are intentionally kept constant at 60% of Historical cost net income (minor rounding errors can be observed), but during the initial year the current-value dividend payout rate is 79%. This can be interpreted to mean that the company is actually distributing a considerably higher portion of its income than the 60% it intends to distribute. The real dividend distribution rate gradually declines to about 70% in 1993.

The Tax Data Analysis shows that the historical cost tax rate is 40% for Chemco, but the rate based on current-value accounting, even during such mild inflation, is in excess of 46% in 1979.[1] This effective rate gradually declines with a constant inflation rate to 44% in 1993.

The Detailed Comparisons Among Cash Flow Predictors (Exhibit D-8) shows the prediction error for each of the nine predicted years by each of the nine predictors. The summary statistic "Total Absolute Difference" is also presented in the Summary Comparison of Cash Flow Predictors (Exhibit D-9). This latter schedule also shows the aggregated difference between the actual and predicted cash flows for each following year as a % of the actual cash flows for each predictor (2% for historical cost net income), the percentage of annual predictions within 5% and 10% (88% and 100% for historical cost net income), and predictor's rank among the nine predictors as measured by total absolute dollar prediction error. (In this case historical cost net income and current-value results of operations were the 3rd and 1st best predictors, respectively, of cash flow from operations).

Exhibit D-9 summarizes the cash flow prediction results of Exhibit D-8.

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[1]Historical cost net income and current-value results of operations are both shown after-tax but the historical cost and real tax rates must be applied to the before-tax figure. For example, for 1979 the effective tax rate is determined as follows: $422.83 + $371.15 = $793.98 = current-value results of operations before taxes. $793.98 ÷ $371.15 = .467, the effective (real) tax rate.

EXHIBIT D-1

CHEMCO CASE NO. 2

COMPARATIVE CURRENT-VALUE STATEMENTS OF FINANCIAL POSITION

TEN YEAR COMPARATIVE BALANCE SHEET (CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 272	$ 305	$ 343	$ 385	$ 427	$ 488	$ 542	$ 612	$ 684	$ 783	$ 878
MARKETABLE SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ACCOUNTS RECEIVABLE	$ 1,241	$ 1,404	$ 1,588	$ 1,793	$ 2,032	$ 2,295	$ 2,604	$ 2,946	$ 3,345	$ 3,787	$ 4,308
INVENTORIES	$ 1,300	$ 1,473	$ 1,676	$ 1,902	$ 2,167	$ 2,460	$ 2,806	$ 3,190	$ 3,641	$ 4,143	$ 4,735
TOTAL CURRENT ASSETS	$ 2,813	$ 3,182	$ 3,607	$ 4,080	$ 4,625	$ 5,243	$ 5,952	$ 6,748	$ 7,671	$ 8,713	$ 9,920
LAND	$ 551	$ 579	$ 608	$ 638	$ 670	$ 704	$ 739	$ 776	$ 814	$ 855	$ 898
PLANT	$ 4,802	$ 6,102	$ 6,407	$ 8,140	$ 8,547	$10,858	$11,401	$14,485	$15,210	$19,324	$20,290
LESS ACCUM DEPR	$-1,689	$-1,900	$-2,155	$-2,431	$-2,766	$-3,129	$-3,570	$-4,048	$-4,631	$-5,261	$-6,032)
EQUIPMENT	$ 2,409	$ 2,663	$ 2,935	$ 3,229	$ 3,390	$ 3,722	$ 3,908	$ 4,103	$ 4,121	$ 4,327	$ 4,337
LESS ACCUM DEPREC	$-1,031	$-1,118	$-1,221	$-1,340	$-1,479	$-1,629	$-1,801	$-1,986	$-2,185	$-2,386	$-2,602)
NET FIXED ASSETS	$ 5,042	$ 6,325	$ 6,574	$ 8,236	$ 8,362	$10,526	$10,677	$13,330	$13,329	$16,859	$16,891
TOTAL ASSETS	$ 7,856	$ 9,507	$10,181	$12,316	$12,987	$15,769	$16,629	$20,079	$21,000	$25,572	$26,812
ACCOUNTS PAYABLE	$ 544	$ 610	$ 685	$ 770	$ 853	$ 975	$ 1,085	$ 1,225	$ 1,369	$ 1,566	$ 1,755
SHORT TERM DEBT	$ 1,223	$ 1,449	$ 1,655	$ 1,914	$ 2,003	$ 2,231	$ 2,272	$ 2,289	$ 2,078	$ 1,883	$ 1,423
TOTAL CURRENT LIAB	$ 1,767	$ 2,059	$ 2,340	$ 2,684	$ 2,856	$ 3,206	$ 3,357	$ 3,514	$ 3,447	$ 3,449	$ 3,178
LONG TERM DEBT	$ 1,382	$ 2,333	$ 2,196	$ 3,453	$ 3,258	$ 3,043	$ 2,808	$ 2,551	$ 2,393	$ 2,232	$ 2,052
CAPITAL	$ 1,922	$ 2,177	$ 2,456	$ 2,764	$ 3,104	$ 5,368	$ 5,888	$ 8,975	$ 9,733	$13,913	$14,990
RETAINED EARNINGS	$ 2,785	$ 2,939	$ 3,189	$ 3,415	$ 3,769	$ 4,152	$ 4,576	$ 5,039	$ 5,427	$ 5,977	$ 6,591
TOTAL EQUITY	$ 4,707	$ 5,115	$ 5,646	$ 6,179	$ 6,873	$ 9,520	$10,464	$14,014	$15,160	$19,891	$21,582
TOTAL LIAB + EQUITY	$ 7,856	$ 9,507	$10,181	$12,316	$12,987	$15,769	$16,629	$20,079	$21,000	$25,572	$26,812

EXHIBIT D-2

CHEMCO CASE NO. 2

COMPARATIVE CURRENT-VALUE STATEMENTS OF OPERATING RESULTS AND VALUE CHANGES

TEN YEAR COMPARATIVE INCOME STATEMENT(CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 7,449	$ 8,423	$ 9,530	$10,759	$12,190	$13,769	$15,622	$17,673	$20,070	$22,724	$25,849
COST OF GOODS SOLD	$ 5,642	$ 6,360	$ 7,202	$ 8,129	$ 9,220	$10,411	$11,826	$13,374	$15,203	$17,206	$19,592
GROSS MARGIN	$ 1,807	$ 2,063	$ 2,328	$ 2,630	$ 2,970	$ 3,358	$ 3,796	$ 4,299	$ 4,867	$ 5,519	$ 6,257
SELLING EXPENSES	$ 164	$ 179	$ 195	$ 212	$ 231	$ 252	$ 274	$ 299	$ 325	$ 354	$ 386
GENERAL-ADM EXPENSES	$ 623	$ 678	$ 739	$ 804	$ 876	$ 954	$ 1,039	$ 1,132	$ 1,233	$ 1,343	$ 1,462
OPERATING RESULTS	$ 1,020	$ 1,206	$ 1,394	$ 1,613	$ 1,862	$ 2,152	$ 2,482	$ 2,869	$ 3,309	$ 3,822	$ 4,409
INTEREST EXPENSE	$ 226	$ 341	$ 350	$ 492	$ 499	$ 492	$ 494	$ 479	$ 472	$ 423	$ 397
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 371	$ 398	$ 479	$ 516	$ 625	$ 752	$ 900	$ 1,070	$ 1,274	$ 1,508	$ 1,782
CVA RESULTS OF OPNS	$ 423	$ 467	$ 566	$ 604	$ 738	$ 908	$ 1,089	$ 1,319	$ 1,563	$ 1,891	$ 2,230
REALIZED CHANGES IN INVENTORY VALUE	$ 43	$ 37	$ 47	$ 50	$ 64	$ 65	$ 85	$ 88	$ 113	$ 117	$ 152
UNREALIZED CHANGES IN INVENTORY VALUE	$ 3	$ 2	$ 3	$ 3	$ 4	$ 4	$ 5	$ 6	$ 7	$ 8	$ 10
UNREALIZED CHANGES IN SECURITIES VALUE	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
UNREALIZED CHANGES IN FIXED ASSET VALUE	$ 241	$ 252	$ 316	$ 329	$ 412	$ 418	$ 526	$ 534	$ 667	$ 666	$ 843
DEDUCT PURPOWER GAIN ON NON-MONEY ITEMS	$ -316	$ -362	$ -412	$ -471	$ -531	$ -558	$ -682	$ -711	$ -866	$ -899	$-1,106
NET VALUE CHANGES	$ -29	$ -71	$ -45	$ -89	$ -51	$ -70	$ -65	$ -83	$ -79	$ -108	$ -101
UNREALIZED CHANGES IN L-T DEBT VALUE	$ 20	$ 8	$ 29	$ 12	$ 39	$ 43	$ 48	$ 52	$ -56	$ 51	$ 60
PUPPOWER GAIN ON NET-MONEY ITEMS	$ 82	$ 108	$ 132	$ 164	$ 190	$ 178	$ 162	$ 138	$ 108	$ 73	$ 29
TOTAL CVA RESULTS +VALUE CHANGES	$ 496	$ 512	$ 681	$ 691	$ 916	$ 1,060	$ 1,234	$ 1,426	$ 1,535	$ 1,907	$ 2,218

EXHIBIT D-3

CHEMCO CASE NO. 2

COMPARATIVE CASH FLOW STATEMENTS

CASH FLOW STATEMENT

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH INFLOWS										
SALES	$ 8,423	$ 9,530	$10,759	$12,190	$13,769	$15,622	$17,673	$20,070	$22,724	$25,849
INCREASE IN CURRENT DEBT	$ 292	$ 281	$ 343	$ 173	$ 349	$ 151	$ 157	$ -67	$ 2	$ -271
SALE OF INVESTMENTS	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
LONG TERM BORROWING	$ 1,059	$ 0	$ 1,413	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ISSUE OF NEW CAPITAL	$ 0	$ 0	$ 0	$ 0	$ 1,885	$ 0	$ 2,514	$ 0	$ 3,354	$ 0
TOTAL INFLOWS	$ 9,774	$ 9,811	$12,515	$12,363	$16,003	$15,773	$20,344	$20,003	$26,080	$25,578
CASH OUTFLOWS:										
PURCHASE OF INVENTORY	$ 3,893	$ 4,497	$ 5,193	$ 5,998	$ 6,928	$ 8,002	$ 9,242	$10,675	$12,330	$14,241
CURRENT EXPENSES	$ 3,888	$ 4,259	$ 4,744	$ 5,195	$ 5,679	$ 6,226	$ 6,815	$ 7,473	$ 8,182	$ 8,987
INVESTMENTS IN SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
INCREASE IN RECEIVABLES	$ 162	$ 184	$ 205	$ 238	$ 263	$ 309	$ 342	$ 399	$ 442	$ 521
PURCHASE OF NEW EQUIPMENT	$ 266	$ 280	$ 294	$ 154	$ 324	$ 170	$ 178	$ 0	$ 197	$ 0
PURCHASE OF NEW PLANT	$ 1,059	$ 0	$ 1,413	$ 0	$ 1,885	$ 0	$ 2,514	$ 0	$ 3,354	$ 0
REPAY LONG TERM DEBT	$ 114	$ 123	$ 159	$ 172	$ 187	$ 202	$ 219	$ 237	$ 120	$ 131
CASH DIVIDEND	$ 359	$ 431	$ 465	$ 563	$ 677	$ 810	$ 963	$ 1,147	$ 1,357	$ 1,603
TOTAL OUTFLOWS	$ 9,741	$ 9,774	$12,473	$12,321	$15,942	$15,718	$20,274	$19,931	$25,982	$25,483
NET INFLOW (OUTFLOW)	$ 33	$ 37	$ 42	$ 42	$ 61	$ 55	$ 70	$ 72	$ 98	$ 95

EXHIBIT D-4

CHEMCO CASE NO. 2

COMPARATIVE HISTORICAL COST STATEMENTS OF FINANCIAL POSITION

TEN YEAR COMPARATIVE BALANCE SHEET(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 272	$ 305	$ 343	$ 385	$ 427	$ 488	$ 542	$ 612	$ 684	$ 783	$ 878
MARKETABLE SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ACCOUNTS RECEIVABLE	$ 1,241	$ 1,404	$ 1,588	$ 1,793	$ 2,032	$ 2,295	$ 2,604	$ 2,946	$ 3,345	$ 3,787	$ 4,308
INVENTORIES	$ 1,284	$ 1,456	$ 1,656	$ 1,879	$ 2,140	$ 2,430	$ 2,770	$ 3,149	$ 3,594	$ 4,089	$ 4,672
TOTAL CURRENT ASSETS	$ 2,798	$ 3,165	$ 3,587	$ 4,057	$ 4,598	$ 5,212	$ 5,916	$ 6,707	$ 7,623	$ 8,659	$ 9,858
LAND	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360
PLANT	$ 3,494	$ 4,553	$ 4,553	$ 5,965	$ 5,965	$ 7,850	$ 7,850	$10,364	$10,364	$13,718	$13,718
LESS ACCUM DEPREC	$-1,155	$-1,242	$-1,356	$-1,470	$-1,619	$-1,768	$-1,964	$-2,161	$-2,420	$-2,679	$-3,022)
EQUIPMENT	$ 1,941	$ 2,140	$ 2,344	$ 2,555	$ 2,617	$ 2,837	$ 2,892	$ 2,943	$ 2,801	$ 2,841	$ 2,666
LESS ACCUM DEPREC	$ -786	$ -849	$ -917	$ -990	$-1,068	$-1,139	$-1,214	$-1,279	$-1,333	$-1,363	$-1,378)
NET FIXED ASSETS	$ 3,853	$ 4,962	$ 4,985	$ 6,421	$ 6,255	$ 8,140	$ 7,924	$10,228	$ 9,772	$12,877	$12,345
TOTAL ASSETS	$ 6,651	$ 8,127	$ 8,571	$10,478	$10,854	$13,352	$13,841	$16,935	$17,395	$21,536	$22,202
ACCOUNTS PAYABLE	$ 544	$ 610	$ 685	$ 770	$ 853	$ 975	$ 1,085	$ 1,225	$ 1,369	$ 1,566	$ 1,755
SHORT TERM DEBT	$ 1,223	$ 1,449	$ 1,655	$ 1,914	$ 2,003	$ 2,231	$ 2,272	$ 2,289	$ 2,078	$ 1,883	$ 1,423
TOTAL CURRENT LIAB	$ 1,767	$ 2,059	$ 2,340	$ 2,684	$ 2,856	$ 3,206	$ 3,357	$ 3,514	$ 3,447	$ 3,449	$ 3,178
LONG TERM DEBT	$ 1,534	$ 2,479	$ 2,355	$ 3,609	$ 3,436	$ 3,249	$ 3,047	$ 2,828	$ 2,592	$ 2,471	$ 2,340
CAPITAL	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 3,385	$ 3,385	$ 5,899	$ 5,899	$ 9,252	$ 9,252
RETAINED EARNINGS	$ 1,850	$ 2,089	$ 2,376	$ 2,686	$ 3,061	$ 3,512	$ 4,052	$ 4,694	$ 5,459	$ 6,363	$ 7,432
TOTAL EQUITY	$ 3,350	$ 3,589	$ 3,876	$ 4,186	$ 4,561	$ 6,897	$ 7,436	$10,593	$11,357	$15,616	$16,685
TOTAL LIAB + EQUITY	$ 6,651	$ 8,127	$ 8,571	$10,478	$10,854	$13,352	$13,841	$16,935	$17,395	$21,536	$22,202

EXHIBIT D-5

CHEMCO CASE NO. 2

COMPARATIVE HISTORICAL COST INCOME STATEMENTS

TEN YEAR COMPARATIVE INCOME STATEMENT(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 7,449	$ 8,423	$ 9,530	$10,759	$12,190	$13,769	$15,622	$17,673	$20,070	$22,724	$25,849
COST OF GOODS SOLD	$ 5,522	$ 6,244	$ 7,065	$ 7,976	$ 9,036	$10,207	$11,580	$13,101	$14,877	$16,845	$19,161
GROSS MARGIN	$ 1,927	$ 2,179	$ 2,466	$ 2,784	$ 3,154	$ 3,562	$ 4,042	$ 4,572	$ 5,192	$ 5,879	$ 6,688
SELLING EXPENSES	$ 164	$ 179	$ 195	$ 212	$ 231	$ 252	$ 274	$ 299	$ 325	$ 354	$ 386
GENERAL-ADM EXPENSES	$ 623	$ 678	$ 739	$ 804	$ 876	$ 954	$ 1,039	$ 1,132	$ 1,233	$ 1,343	$ 1,462
OPERATING RESULTS	$ 1,140	$ 1,322	$ 1,532	$ 1,767	$ 2,046	$ 2,356	$ 2,728	$ 3,142	$ 3,634	$ 4,182	$ 4,839
INTEREST EXPENSE	$ 212	$ 326	$ 335	$ 476	$ 483	$ 476	$ 479	$ 466	$ 449	$ 412	$ 385
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 371	$ 398	$ 479	$ 516	$ 625	$ 752	$ 900	$ 1,070	$ 1,274	$ 1,508	$ 1,782
NET INCOME	$ 557	$ 598	$ 718	$ 775	$ 938	$ 1,128	$ 1,349	$ 1,606	$ 1,911	$ 2,262	$ 2,672

EXHIBIT D-6

CHEMCO CASE NO. 2

COMPARATIVE INDEXES ANALYSIS

TEN YEAR COMPARATIVE RATIO ANALYSIS

GROWTH INDICES (BASE YEAR=1977	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	1.476	1.669	1.888	2.131	2.415	2.728	3.095	3.501	3.976	4.502	5.121
HISTORICAL COST NET INCOME	1.708	1.833	2.203	2.376	2.876	3.460	4.139	4.925	5.862	6.938	8.197
CVA RESULTS OF OPERATIONS	1.297	1.431	1.736	1.853	2.263	2.786	3.341	4.046	4.794	5.801	6.841
HISTORICAL CAST TOTAL ASSETS	1.519	1.857	1.958	2.394	2.480	3.050	3.162	3.869	3.974	4.920	5.072
CVA TOTAL ASSETS	1.795	2.172	2.326	2.814	2.967	3.603	3.799	4.587	4.798	5.842	6.126
PROFITABILITY RATIOS:											
GROSS MARGIN % - HIST. COST	.259	.259	.259	.259	.259	.259	.259	.259	.259	.259	.259
GROSS MARGIN % - CVA	.243	.245	.244	.244	.244	.244	.243	.243	.243	.243	.242
OPERATING PROFIT % - HC	.153	.157	.161	.164	.168	.171	.175	.178	.181	.184	.187
OPERATING PROFIT % - CVA	.137	.143	.146	.150	.153	.156	.159	.162	.165	.168	.171
NET INCOME % - HIST. COST	.075	.071	.075	.072	.077	.082	.086	.091	.095	.100	.103
NET INC RESULTS OF OPNS % - CVA	.057	.055	.059	.056	.061	.066	.070	.075	.078	.083	.086
RETURN ON TOTAL ASSETS-HC	.084	.074	.084	.074	.086	.084	.097	.095	.110	.105	.120
RETURN ON TOTAL ASSETS-CVA	.054	.049	.056	.049	.057	.058	.065	.066	.074	.074	.083
RETURN ON EQUITY-HC	.166	.167	.185	.185	.206	.164	.181	.152	.168	.145	.160
RETURN ON EQUITY-CVA	.090	.091	.100	.098	.107	.095	.104	.094	.103	.095	.103
CREDIT CAPACITY RATIOS:											
CURRENT RATIO - HIST. COST	1.583	1.537	1.533	1.512	1.610	1.626	1.762	1.909	2.212	2.511	3.102
CURRENT RATIO - CVA	1.592	1.546	1.541	1.521	1.619	1.635	1.773	1.920	2.226	2.526	3.122
WORKING CAPITAL TO SALES-HC	.138	.131	.131	.128	.143	.146	.164	.181	.208	.229	.258
WORKING CAPITAL TO SALES-CVA	.140	.133	.133	.130	.145	.148	.166	.183	.210	.232	.261
TIMES INTEREST EARNED-HC	4.742	3.653	4.119	3.355	3.819	4.485	5.151	6.131	7.319	9.241	11.408
TIMES INTEREST EARNED-CVA	4.515	3.536	3.987	3.276	3.728	4.376	5.028	5.986	7.012	9.038	11.109
LONG-TERM DEBT TO EQUITY-HC	.458	.691	.608	.862	.753	.471	.410	.267	.228	.158	.140
LONG-TERM DEBT TO EQUITY-CVA	.294	.456	.389	.559	.474	.320	.268	.182	.158	.112	.095
OTHER RATIOS:											
ASSET TURNOVER-HC	1.120	1.036	1.112	1.027	1.123	1.031	1.129	1.044	1.154	1.055	1.164
ASSET TURNOVER-CVA	.948	.886	.936	.874	.939	.873	.939	.880	.956	.889	.964
INVENTORY TURNOVER-HC	4.300	4.288	4.266	4.244	4.223	4.201	4.180	4.160	4.140	4.120	4.101
INVENTORY TURNOVER-CVA	4.340	4.316	4.297	4.273	4.255	4.231	4.214	4.192	4.175	4.153	4.138
DIVIDEND PAYOUT RATE-HC	.600	.600	.600	.600	.600	.600	.600	.600	.600	.600	.600
DIVIDEND PAYOUT RATE-CVA	.790	.768	.762	.769	.763	.745	.743	.730	.734	.718	.719

EXHIBIT D-7

CHEMCO CASE NO. 2

PERFORMANCE EVALUATION DATA ANALYSIS

GROWTH INDICES		TREND ERRORS	
CV RESULTS	HC NET INC	YEAR	CUM
1.297	1.708	0	0
1.431	1.833	0	0
1.736	2.203	0	0
1.853	2.376	0	0
2.263	2.876	0	0
2.786	3.460	0	0
3.341	4.139	0	0
4.046	4.925	0	0
4.794	5.862	0	0
5.801	6.938	0	0
6.841	8.197	0	0
8.138	9.636	0	0
9.573	11.346	0	0
11.305	13.268	0	0
13.164	15.496	0	0

RETURN ON ASSETS		TREND ERRORS	
CV ACCTG	HC ACCTG	YEAR	CUM
0.054	0.084	0	0
0.049	0.074	0	0
0.056	0.084	0	0
0.049	0.074	0	0
0.057	0.086	0	0
0.058	0.084	1	1
0.065	0.097	0	1
0.066	0.095	1	2
0.074	0.110	0	2
0.074	0.105	0	2
0.083	0.120	0	2
0.081	0.114	0	2
0.091	0.130	0	2
0.087	0.120	0	2
0.094	0.132	0	2

RETURN ON EQUITY		TREND ERRORS	
CV ACCTG	HC ACCTG	YEAR	CUM
0.090	0.166	0	0
0.091	0.167	0	0
0.100	0.185	0	0
0.098	0.185	0	0
0.107	0.206	0	0
0.095	0.164	0	0
0.104	0.181	0	0
0.094	0.152	0	0
0.103	0.168	0	0
0.095	0.145	0	0
0.103	0.160	0	0
0.095	0.140	0	0
0.103	0.155	0	0
0.095	0.137	0	0

EXHIBIT D-7 (continued)

CHEMCO CASE NO. 2

PERFORMANCE EVALUATION DATA ANALYSIS

PRICING DATA ANALYSIS

YEAR	HIST. COST % GROSS MARGIN	CVA % GROSS MARGIN	DIFFERENCE	DIFF AS % OF HCGM
1	0.259	0.243	0.016	0.062
2	0.259	0.245	0.014	0.053
3	0.259	0.244	0.014	0.056
4	0.259	0.244	0.014	0.055
5	0.259	0.244	0.015	0.058
6	0.259	0.244	0.015	0.057
7	0.259	0.243	0.016	0.061
8	0.259	0.243	0.015	0.060
9	0.259	0.243	0.016	0.063
10	0.259	0.243	0.016	0.061
11	0.259	0.242	0.017	0.064
12	0.259	0.242	0.016	0.063
13	0.259	0.242	0.017	0.065
14	0.259	0.242	0.016	0.064
15	0.259	0.242	0.017	0.066

DIVIDEND DATA ANALYSIS

YEAR	HIST. COST NET INCOME	DIVIDENDS	PAYOUT RATE	CV RESULTS OPERATIONS	PAYOUT RATE
1	556.727	334.036	.6	422.826	.790008
2	597.56	358.536	.6	466.595	.768409
3	718.181	430.908	.599999	565.809	.761579
4	774.526	464.716	.600001	604.104	.769264
5	937.722	562.633	.6	737.695	.762691
6	1127.83	676.699	.600001	908.292	.745024
7	1349.35	809.613	.600002	1089.03	.743423
8	1605.53	963.318	.6	1319.14	.730265
9	1911.15	1146.69	.6	1562.88	.733702
10	2261.82	1357.09	.599999	1891.06	.717635
11	2672.3	1603.38	.6	2230.27	.718918
12	3141.48	1884.89	.600001	2652.92	.710494
13	3698.9	2219.34	.6	3120.79	.711146
14	4325.41	2595.25	.600001	3685.42	.704192
15	5051.6	3030.96	.6	4291.62	.70625

TAX DATA ANALYSIS

YEAR	HIST. COST NET INCOME	INCOME TAX	H/C TAXRATE	CV RESULTS OPERATIONS	REAL TAXRATE
1	$ 556.73	$ 371.15	0.400	$ 422.83	0.467
2	$ 597.56	$ 398.37	0.400	$ 466.59	0.461
3	$ 718.18	$ 478.79	0.400	$ 565.81	0.458
4	$ 774.53	$ 516.35	0.400	$ 604.10	0.461
5	$ 937.72	$ 625.15	0.400	$ 737.69	0.459
6	$ 1127.83	$ 751.89	0.400	$ 908.29	0.453
7	$ 1349.35	$ 899.57	0.400	$ 1089.03	0.452
8	$ 1605.53	$ 1070.35	0.400	$ 1319.14	0.448
9	$ 1911.15	$ 1274.10	0.400	$ 1562.88	0.449
10	$ 2261.82	$ 1507.88	0.400	$ 1891.06	0.444
11	$ 2672.30	$ 1781.54	0.400	$ 2230.27	0.444
12	$ 3141.48	$ 2094.32	0.400	$ 2652.92	0.441
13	$ 3698.90	$ 2465.93	0.400	$ 3120.79	0.441
14	$ 4325.41	$ 2883.61	0.400	$ 3685.42	0.439
15	$ 5051.60	$ 3367.73	0.400	$ 4291.62	0.440

EXHIBIT D-8

CHEMCO CASE NO. 2

DETAILED COMPARISON AMONG CASH FLOW PREDICTORS

CASH FLOW PREDICTION ANALYSIS

PREDICTOR: HISTORICAL COST NET INCOME

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1118.73	1207.76	89.0288	.073714
8	1394.8	1412.98	18.1828	1.28684E-2
9	1642.27	1681.39	39.1245	2.32691E-2
10	1993.02	1950.76	42.26	2.16634E-2
11	2267.3	2306.4	39.1027	.016954
12	2698.76	2667.81	30.9538	1.16027E-2
13	3088.6	3143.13	54.5292	1.73487E-2
14	3693.32	3623.21	70.1087	1.93499E-2
15	4181.74	4252.29	70.5471	1.65904E-2

TOTAL ABSOLUTE DIFFERENCE = 453.838

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1107.04	1207.76	100.715	8.33902E-2
8	1393.2	1412.98	19.7823	1.40004E-2
9	1643.97	1681.39	37.4201	2.22555E-2
10	1964.32	1950.76	13.5571	6.94964E-3
11	2316.29	2306.4	9.88665	4.28661E-3
12	2679.3	2667.81	11.4921	4.30770E-3
13	3110.11	3143.13	33.0181	1.05048E-2
14	3655.86	3623.21	32.6474	9.01063E-3
15	4227.05	4252.29	25.2449	5.93678E-3

TOTAL ABSOLUTE DIFFERENCE = 283.764

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1111.55	1207.76	96.2127	7.96621E-2
8	1375.91	1412.98	37.0663	2.62327E-2
9	1640.14	1681.39	41.2479	.024532
10	1782.18	1950.76	168.582	8.64188E-2
11	2243.84	2306.4	62.5639	2.71262E-2
12	2661.36	2667.81	6.449	2.41734E-3
13	3077.57	3143.13	65.557	2.08572E-2
14	3592.24	3623.21	30.9747	8.54897E-3
15	4142.28	4252.29	110.005	2.58697E-2

TOTAL ABSOLUTE DIFFERENCE = 618.659

EXHIBIT D-8 (continued)

CHEMCO CASE NO. 2

DETAILED COMPARISON AMONG CASH FLOW PREDICTORS

PREDICTOR: CVA RESULTS + GROSS NONMONEY VALUE CHANGES

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1122.46	1207.76	85.2974	7.06245E-2
8	1351.2	1412.98	61.7775	4.37215E-2
9	1635.74	1681.39	45.6497	.02715
10	1900.03	1950.76	50.7289	2.60047E-2
11	2245.87	2306.4	60.5261	2.62427E-2
12	2585.53	2667.81	82.2791	3.08415E-2
13	3058.15	3143.13	84.983	2.70377E-2
14	3519.05	3623.21	104.159	2.87477E-2
15	4144.6	4252.29	107.686	2.53242E-2

TOTAL ABSOLUTE DIFFERENCE = 683.087

PREDICTOR: CVA RESULTS + ALL GROSS VALUE CHANGES

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1122.72	1207.76	85.0413	7.04124E-2
8	1348.85	1412.98	64.132	4.53878E-2
9	1635.26	1681.39	46.1341	2.74381E-2
10	1940.69	1950.76	10.0726	5.16341E-3
11	2221.39	2306.4	85.0097	3.68582E-2
12	2677.04	2667.81	9.23293	3.46087E-3
13	3061.6	3143.13	81.5259	2.59378E-2
14	3579.47	3623.21	43.7441	1.20733E-2
15	4150.82	4252.29	101.465	2.38613E-2

TOTAL ABSOLUTE DIFFERENCE = 526.358

PREDICTOR: CVA RESULTS ADJUSTED FOR GEN. PRICE LEVEL

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1107.04	1207.76	100.716	8.33903E-2
8	1393.2	1412.98	19.7824	1.40005E-2
9	1643.97	1681.39	37.4201	2.22554E-2
10	1964.32	1950.76	13.5567	6.94946E-3
11	2316.29	2306.4	9.88685	4.28670E-3
12	2679.3	2667.81	11.4922	4.30774E-3
13	3110.11	3143.13	33.0181	1.05048E-2
14	3655.86	3623.21	32.6473	9.01060E-3
15	4227.05	4252.29	25.245	5.93680E-3

TOTAL ABSOLUTE DIFFERENCE = 283.764

EXHIBIT D-8 (continued)

CHEMCO CASE NO. 2

DETAILED COMPARISON AMONG CASH FLOW PREDICTORS

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1122.62	1207.76	85.1448	7.04981E-2
8	1346.32	1412.98	66.6585	4.71758E-2
9	1635.85	1681.39	45.5372	.027083
10	1920.43	1950.76	30.3284	1.55469E-2
11	2239.73	2306.4	66.6714	2.89071E-2
12	2604.	2667.81	63.8143	2.39201E-2
13	3057.31	3143.13	85.8188	2.73036E-2
14	3537.51	3623.21	85.7019	2.36536E-2
15	4149.92	4252.29	102.373	2.40747E-2

TOTAL ABSOLUTE DIFFERENCE = 632.048

PREDICTOR: ADJ CVA RESULTS + NET NONMONEY VAL CHANGES

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1127.47	1207.76	80.2917	6.64798E-2
8	1305.94	1412.98	107.042	7.57563E-2
9	1634.88	1681.39	46.5072	.02766
10	1903.13	1950.76	47.6268	2.44145E-2
11	2247.69	2306.4	58.708	2.54544E-2
12	2585.01	2667.81	82.7987	3.10362E-2
13	3058.83	3143.13	84.3028	2.68213E-2
14	3517.35	3623.21	105.855	2.92159E-2
15	4146.35	4252.29	105.938	2.49132E-2

TOTAL ABSOLUTE DIFFERENCE = 719.071

PREDICTOR: ADJ. CVA RESULTS + NET MONEY VALUE CHANGES

YEAR	OPERATING CASH FLOW PREDICTED	ACTUAL	DIFFERENCE ABSOLUTE	≠OF ACTUAL
7	1106.28	1207.76	101.481	8.40244E-2
8	1394.42	1412.98	18.5621	1.31368E-2
9	1643.59	1681.39	37.7997	2.24812E-2
10	1877.88	1950.76	72.8847	3.73622E-2
11	2248.75	2306.4	57.6492	2.49953E-2
12	2664.79	2667.81	3.01924	1.13173E-3
13	3080.16	3143.13	62.9746	2.00356E-2
14	3597.53	3623.21	25.6764	7.08664E-3
15	4145.63	4252.29	106.665	2.50841E-2

TOTAL ABSOLUTE DIFFERENCE = 486.712

EXHIBIT D-9

CHEMCO CASE NO. 2

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

COMPARISON AMONG PREDICTION ERRORS

	CASH FLOW OPERATING
HISTORICAL COST NET INCOME	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 453.84
DIFFERENCE AS + OF ACTUAL TOTAL	0.02040
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	3

	CASH FLOW OPERATING
CVA RESULTS OF OPERATIONS	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 283.76
DIFFERENCE AS + OF ACTUAL TOTAL	0.01276
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	1

	CASH FLOW OPERATING
CVA RESULTS + GROSS MONETARY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 618.66
DIFFERENCE AS + OF ACTUAL TOTAL	0.02781
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.77778
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	6

	CASH FLOW OPERATING
CVA RESULTS + GROSS NONMONEY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 683.09
DIFFERENCE AS + OF ACTUAL TOTAL	0.03071
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	8

	CASH FLOW OPERATING
CVA RESULTS + ALL GROSS VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 526.36
DIFFERENCE AS + OF ACTUAL TOTAL	0.02366
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	5

	CASH FLOW OPERATING
CVA RESULTS ADJUSTED FOR GEN. PRICE LEVEL	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 283.76
DIFFERENCE AS + OF ACTUAL TOTAL	0.01276
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	2

	CASH FLOW OPERATING
CVA BOTTOM LINE AMOUNT	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 632.05
DIFFERENCE AS + OF ACTUAL TOTAL	0.02841
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	7

EXHIBIT D-9 (continued)

CHEMCO CASE NO. 2

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

ADJ CVA RESULTS + NET NONMONEY VAL CHANGES	CASH FLOW OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 719.07
DIFFERENCE AS ↓ OF ACTUAL TOTAL	0.03232
PERCENTAGE OF CASES PREDICTION WITHIN 5↓	0.77778
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	9

ADJ. CVA RESULTS + NET MONEY VALUE CHANGES	CASH FLOW OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 486.71
DIFFERENCE AS ↓ OF ACTUAL TOTAL	0.02188
PERCENTAGE OF CASES PREDICTION WITHIN 5↓	0.88889
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	4

CHEMCO CASE NO. 4

Parameter values

Unit Sales Growth Rate	.90
Fixed Asset Inflation Rate	1.05
Raw Materials Inflation Rate	1.05
General Inflation	1.05

This case demonstrates the impact on the financial statements of a declining company of a moderate and steady inflation of 5% for all three inflation rates. In this case the current-value financial position (Exhibit D-10) improves only moderately in absolute amounts over the period 1979-1989, but if the earlier years were indexed for general price level changes to 1989 dollars a decline in real values would be observed in the total assets and equities. Historical Cost Financial Position (Exhibit D-13) also portrays a decline in these values. In this case historical cost accounting values total assets at only about 58% of their current value after 11 years of this moderate rate of inflation; after just 5 years (1979-1983) this percentage is 69%.

Current-Value Results of Operations (Exhibit D-11) gradually deteriorates from $19 in 1979 to a $20 loss in 1989, which portrays a mediocre performance at best (a mere .4% return on assets in 1979 as recorded in the Ratio Analyses, Exhibit D-15). Historical Cost Net Income (Exhibit D-14), on the other hand, while not robust (3.2% return on assets in 1979), nevertheless portrays a decidedly less bleak picture, and net income actually increases from $128 in 1979 to $134, then falls to $129 in 1989. Even if all value changes on the current-value statement were to be construed as income (which they should not be) the current-value bottom line statistic remains much gloomier than historical cost net income for every year.

This case demonstrates that historical cost financial statements do not portray the gradual deterioration of the company. This deterioration is evidenced by current-value results and verified by the fact that Net Cash Flow (Exhibit D-12) was negative by a substantial amount for every period from 1979-1989 (net cash flows were not output by the model for the years after 1989).

The Gross Margin section of the Performance Evaluation Data Analysis (Exhibit D-16) indicates that if the historical cost margin is held steady at about 18%, the current-value margin declines from about 16% in 1979 to about 6% in 1993. Certainly, current values would provide a better test for pricing policies in this circumstance.

The Dividend Data Analysis shows that dividends were paid throughout the 15-year period at an effective rate of not less than three times current-value results of operations. The Tax Data

Analysis indicates that during the simulation period the real tax rate was at least double the nominal rate (40%) for every year except 1980 (at 79.2% for 1980 it was nearly double that year). Further, the effective tax rate exceeded 100% of real income for 8 of the 15 years.

The Growth Indexes section shows that for 7 of the 15 years, current-value results of operations are declining while historical cost net income is increasing. 1989 is the first year that historical cost net income decreases.

Multiple trend errors are also observed in the Return on Assets section whereby historical cost accounting indicates that the return is increasing but current-value accounting indicates that the return is decreasing. It is not until the 11th year (1988) that historical cost accounting begins to show a decreasing return on assets.

As noted in Appendix C, the simulation has not demonstrated that current-value results of operations is notably good at predicting operating cash flows in no-growth and negative-growth conditions. In this case it ranks fourth (Exhibit D-17); however, historical cost accounting does even worse, ranking 8th. The best predictor in this case is current-value results of operations combined with gross nonmonetary value changes.

Overall, Chemco Case No. 4 demonstrates that in certain circumstances conventional financial statements provide information that is the opposite of economic reality. With negative growth and steady inflation, the historical cost accounting results of Chemco indicate slightly improving financial results for a substantial number of years after inflation commences, but in reality Chemco is deteriorating at a rapid rate.

EXHIBIT D-10

CHEMCO CASE NO. 4

COMPARATIVE CURRENT-VALUE STATEMENTS OF FINANCIAL POSITIONS

TEN YEAR COMPARATIVE BALANCE SHEET (CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 171	$ 157	$ 144	$ 133	$ 122	$ 113	$ 104	$ 96	$ 89	$ 83	$ 73
MARKETABLE SECURITIES	$ 163	$ 391	$ 620	$ 851	$ 1,082	$ 1,313	$ 1,543	$ 1,772	$ 1,997	$ 2,355	$ 2,726
ACCOUNTS RECEIVABLE	$ 763	$ 707	$ 654	$ 607	$ 562	$ 522	$ 484	$ 450	$ 417	$ 388	$ 360
INVENTORIES	$ 725	$ 676	$ 630	$ 589	$ 550	$ 515	$ 482	$ 451	$ 423	$ 397	$ 372
TOTAL CURRENT ASSETS	$ 1,821	$ 1,930	$ 2,050	$ 2,179	$ 2,317	$ 2,463	$ 2,614	$ 2,769	$ 2,927	$ 3,222	$ 3,531
LAND	$ 551	$ 579	$ 608	$ 638	$ 670	$ 704	$ 739	$ 776	$ 814	$ 855	$ 898
PLANT	$ 3,969	$ 4,167	$ 4,376	$ 4,595	$ 4,824	$ 5,066	$ 5,319	$ 5,585	$ 5,864	$ 6,157	$ 6,465
LESS ACCUM DEPR	$-1,668	$-1,856	$-2,058	$-2,276	$-2,510	$-2,763	$-3,034	$-3,325	$-3,638	$-3,974	$-4,334)
EQUIPMENT	$ 1,648	$ 1,598	$ 1,538	$ 1,468	$ 1,387	$ 1,295	$ 1,189	$ 1,070	$ 937	$ 787	$ 620
LESS ACCUM DEPREC	$ -997	$-1,029	$-1,053	$-1,066	$-1,068	$-1,057	$-1,031	$ -987	$ -924	$ -839	$ -729)
NET FIXED ASSETS	$ 3,503	$ 3,458	$ 3,410	$ 3,358	$ 3,303	$ 3,244	$ 3,183	$ 3,119	$ 3,053	$ 2,987	$ 2,919
TOTAL ASSETS	$ 5,324	$ 5,388	$ 5,460	$ 5,537	$ 5,620	$ 5,707	$ 5,796	$ 5,888	$ 5,981	$ 6,209	$ 6,451
ACCOUNTS PAYABLE	$ 341	$ 314	$ 289	$ 266	$ 245	$ 226	$ 209	$ 193	$ 178	$ 165	$ 153
SHORT TERM DEBT	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TOTAL CURRENT LIAB	$ 341	$ 314	$ 289	$ 266	$ 245	$ 226	$ 209	$ 193	$ 178	$ 165	$ 153
LONG TERM DEBT	$ 669	$ 598	$ 520	$ 435	$ 341	$ 239	$ 128	$ 6	$ -3	$ 0	$ 0
CAPITAL	$ 1,893	$ 2,115	$ 2,345	$ 2,584	$ 2,833	$ 3,092	$ 3,362	$ 3,642	$ 3,932	$ 4,230	$ 4,540
RETAINED EARNINGS	$ 2,420	$ 2,362	$ 2,306	$ 2,252	$ 2,200	$ 2,149	$ 2,098	$ 2,047	$ 1,873	$ 1,814	$ 1,757
TOTAL EQUITY	$ 4,313	$ 4,477	$ 4,651	$ 4,837	$ 5,034	$ 5,241	$ 5,460	$ 5,689	$ 5,805	$ 6,044	$ 6,298
TOTAL LIAB + EQUITY	$ 5,324	$ 5,388	$ 5,460	$ 5,537	$ 5,620	$ 5,707	$ 5,796	$ 5,888	$ 5,981	$ 6,209	$ 6,451

EXHIBIT D-11

CHEMCO CASE NO. 4

COMPARATIVE CURRENT-VALUE STATEMENTS OF OPERATING RESULTS AND VALUE CHANGES

INPUT:GENREPORT INCOMESTMT

TEN YEAR COMPARATIVE INCOME STATEMENT(CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 4,576	$ 4,240	$ 3,927	$ 3,639	$ 3,375	$ 3,131	$ 2,906	$ 2,698	$ 2,505	$ 2,325	$ 2,158
COST OF GOODS SOLD	$ 3,865	$ 3,589	$ 3,336	$ 3,105	$ 2,892	$ 2,697	$ 2,517	$ 2,352	$ 2,199	$ 2,057	$ 1,926
GROSS MARGIN	$ 711	$ 651	$ 590	$ 535	$ 483	$ 434	$ 389	$ 346	$ 306	$ 268	$ 232
SELLING EXPENSES	$ 110	$ 98	$ 87	$ 78	$ 69	$ 62	$ 55	$ 49	$ 44	$ 39	$ 35
GENERAL-ADM EXPENSES	$ 417	$ 371	$ 331	$ 295	$ 263	$ 234	$ 209	$ 186	$ 166	$ 148	$ 132
OPERATING RESULTS	$ 184	$ 181	$ 172	$ 162	$ 151	$ 138	$ 125	$ 111	$ 97	$ 81	$ 65
INTEREST EXPENSE	$ 79	$ 70	$ 64	$ 57	$ 50	$ 42	$ 33	$ 23	$ 23	$ 0	$ 0
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 85	$ 88	$ 88	$ 89	$ 89	$ 89	$ 89	$ 89	$ 89	$ 89	$ 86
CVA RESULTS OF OPNS	$ 19	$ 23	$ 19	$ 16	$ 12	$ 8	$ 3	$ -1	$ -15	$ -8	$ -20)
REALIZED CHANGES IN INVENTORY VALUE	$ 21	$ 25	$ 24	$ 23	$ 22	$ 21	$ 20	$ 19	$ 18	$ 17	$ 16
UNREALIZED CHANGES IN INVENTORY VALUE	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1	$ 1
UNREALIZED CHANGES IN SECURITIES VALUE	$ 0	$ 13	$ 31	$ 50	$ 68	$ 87	$ 105	$ 123	$ 142	$ 160	$ 188
UNREALIZED CHANGES IN FIXED ASSET VALUE	$ 177	$ 175	$ 173	$ 171	$ 168	$ 165	$ 162	$ 159	$ 156	$ 153	$ 149
DEDUCT PURPOWER GAIN ON NON-MONEY ITEMS	$ -216	$ -211	$ -206	$ -202	$ -197	$ -192	$ -188	$ -183	$ -178	$ -174	$ -169)
NET VALUE CHANGES	$ -16	$ 3	$ 23	$ 42	$ 62	$ 81	$ 100	$ 119	$ 138	$ 157	$ 186
UNREALIZED CHANGES IN L-T DEBT VALUE	$ 5	$ 5	$ 6	$ 6	$ 7	$ 7	$ 7	$ 8	$ -105	$ -3	$ 0
PURPOWER GAIN ON NET-MONEY ITEMS	$ 2	$ -11	$ -24	$ -38	$ -52	$ -67	$ -82	$ -98	$ -111	$ -125	$ -142)
TOTAL CVA RESULTS +VALUE CHANGES	$ 10	$ 21	$ 24	$ 26	$ 28	$ 29	$ 29	$ 29	$ -94	$ 21	$ 24

EXHIBIT D-12

CHEMCO CASE NO. 4

COMPARATIVE CASH FLOW STATEMENTS

INPUT:GENREPORT CASHFLOW

CASH FLOW STATEMENT

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH INFLOWS										
SALES	$ 4,240	$ 3,927	$ 3,639	$ 3,375	$ 3,131	$ 2,906	$ 2,698	$ 2,505	$ 2,325	$ 2,158
INCREASE IN CURRENT DEBT	$ -27	$ -25	$ -23	$ -21	$ -19	$ -17	$ -16	$ -15	$ -13	$ -12)
SALE OF INVESTMENTS	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
LONG TERM BORROWING	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ISSUE OF NEW CAPITAL	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TOTAL INFLOWS	$ 4,212	$ 3,901	$ 3,616	$ 3,354	$ 3,112	$ 2,889	$ 2,682	$ 2,490	$ 2,312	$ 2,146
CASH OUTFLOWS:										
PURCHASE OF INVENTORY	$ 2,031	$ 1,919	$ 1,814	$ 1,714	$ 1,620	$ 1,531	$ 1,446	$ 1,367	$ 1,292	$ 1,221
CURRENT EXPENSES	$ 1,879	$ 1,685	$ 1,511	$ 1,355	$ 1,215	$ 1,088	$ 974	$ 871	$ 778	$ 699
INVESTMENTS IN SECURITIES	$ 215	$ 198	$ 181	$ 163	$ 144	$ 125	$ 105	$ 84	$ 198	$ 182
INCREASE IN RECEIVABLES	$ -56	$ -52	$ -48	$ -44	$ -41	$ -37	$ -35	$ -32	$ -30	$ -28)
PURCHASE OF NEW EQUIPMENT	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
PURCHASE OF NEW PLANT	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
REPAY LONG TERM DEBT	$ 78	$ 84	$ 90	$ 96	$ 103	$ 111	$ 119	$ 127	$ 0	$ 0
CASH DIVIDEND	$ 79	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80
TOTAL OUTFLOWS	$ 4,226	$ 3,914	$ 3,628	$ 3,364	$ 3,122	$ 2,898	$ 2,690	$ 2,498	$ 2,319	$ 2,155
NET INFLOW (OUTFLOW)	$ -14	$ -13	$ -11	$ -10	$ -9	$ -9	$ -8	$ -7	$ -7	$ -9)

EXHIBIT D-13

CHEMCO CASE NO. 4

COMPARATIVE HISTORICAL COST STATEMENTS OF FINANCIAL POSITION

INPUT:GENREPORT HCBALANCE

TEN YEAR COMPARATIVE BALANCE SHEET(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 171	$ 157	$ 144	$ 133	$ 122	$ 113	$ 104	$ 96	$ 89	$ 83	$ 73
MARKETABLE SECURITIES	$ 163	$ 378	$ 576	$ 757	$ 920	$ 1,064	$ 1,190	$ 1,295	$ 1,379	$ 1,577	$ 1,759
ACCOUNTS RECEIVABLE	$ 763	$ 707	$ 654	$ 607	$ 562	$ 522	$ 484	$ 450	$ 417	$ 388	$ 360
INVENTORIES	$ 713	$ 663	$ 617	$ 575	$ 535	$ 499	$ 465	$ 434	$ 404	$ 377	$ 352
TOTAL CURRENT ASSETS	$ 1,809	$ 1,904	$ 1,992	$ 2,071	$ 2,140	$ 2,198	$ 2,243	$ 2,274	$ 2,290	$ 2,424	$ 2,544
LAND	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360	$ 360
PLANT	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700	$ 2,700
LESS ACCUM DEPREC	$-1,135	$-1,203	$-1,270	$-1,338	$-1,405	$-1,473	$-1,540	$-1,608	$-1,675	$-1,743	$-1,810
EQUIPMENT	$ 1,204	$ 1,137	$ 1,062	$ 979	$ 887	$ 784	$ 669	$ 541	$ 399	$ 242	$ 68
LESS ACCUM DEPREC	$ -754	$ -767	$ -768	$ -756	$ -729	$ -685	$ -623	$ -540	$ -434	$ -303	$ -145
NET FIXED ASSETS	$ 2,375	$ 2,227	$ 2,084	$ 1,945	$ 1,813	$ 1,686	$ 1,566	$ 1,454	$ 1,351	$ 1,256	$ 1,173
TOTAL ASSETS	$ 4,184	$ 4,131	$ 4,076	$ 4,016	$ 3,953	$ 3,884	$ 3,810	$ 3,729	$ 3,640	$ 3,681	$ 3,717
ACCOUNTS PAYABLE	$ 341	$ 314	$ 289	$ 266	$ 245	$ 226	$ 209	$ 193	$ 178	$ 165	$ 153
SHORT TERM DEBT	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TOTAL CURRENT LIAB	$ 341	$ 314	$ 289	$ 266	$ 245	$ 226	$ 209	$ 193	$ 178	$ 165	$ 153
LONG TERM DEBT	$ 807	$ 729	$ 646	$ 556	$ 460	$ 357	$ 246	$ 127	$ 0	$ 0	$ 0
CAPITAL	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
RETAINED EARNINGS	$ 1,535	$ 1,588	$ 1,641	$ 1,695	$ 1,748	$ 1,801	$ 1,855	$ 1,908	$ 1,962	$ 2,016	$ 2,064
TOTAL EQUITY	$ 3,035	$ 3,088	$ 3,141	$ 3,195	$ 3,248	$ 3,301	$ 3,355	$ 3,408	$ 3,462	$ 3,516	$ 3,564
TOTAL LIAB + EQUITY	$ 4,184	$ 4,131	$ 4,076	$ 4,016	$ 3,953	$ 3,884	$ 3,810	$ 3,729	$ 3,640	$ 3,681	$ 3,717

EXHIBIT D-14

CHEMCO CASE NO. 4

COMPARATIVE HISTORICAL COST INCOME STATEMENTS

INPUT:GENREPORT HCINCOME

TEN YEAR COMPARATIVE INCOME STATEMENT(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 4,576	$ 4,240	$ 3,927	$ 3,639	$ 3,375	$ 3,131	$ 2,906	$ 2,698	$ 2,505	$ 2,325	$ 2,158
COST OF GOODS SOLD	$ 3,769	$ 3,492	$ 3,234	$ 2,997	$ 2,780	$ 2,579	$ 2,394	$ 2,222	$ 2,063	$ 1,915	$ 1,777
GROSS MARGIN	$ 807	$ 748	$ 692	$ 642	$ 595	$ 552	$ 513	$ 476	$ 442	$ 410	$ 381
SELLING EXPENSES	$ 110	$ 98	$ 87	$ 78	$ 69	$ 62	$ 55	$ 49	$ 44	$ 39	$ 35
GENERAL-ADM EXPENSES	$ 417	$ 371	$ 331	$ 295	$ 263	$ 234	$ 209	$ 186	$ 166	$ 148	$ 132
OPERATING RESULTS	$ 280	$ 278	$ 274	$ 269	$ 263	$ 256	$ 249	$ 241	$ 232	$ 223	$ 214
INTEREST EXPENSE	$ 67	$ 59	$ 53	$ 47	$ 40	$ 33	$ 26	$ 18	$ 9	$ 0	$ 0
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 85	$ 88	$ 88	$ 89	$ 89	$ 89	$ 89	$ 89	$ 89	$ 89	$ 86
NET INCOME	$ 128	$ 132	$ 133	$ 133	$ 134	$ 134	$ 134	$ 134	$ 134	$ 134	$ 129

EXHIBIT D-15

CHEMCO CASE NO. 4

COMPARATIVE INDICES ANALYSIS

TEN YEAR COMPARATIVE RATIO ANALYSIS

GROWTH INDICES (BASE YEAR=1977	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	.906	.840	.778	.721	.669	.620	.576	.534	.496	.461	.427
HISTORICAL COST NET INCOME	.392	.404	.407	.409	.410	.410	.410	.410	.411	.411	.394
CVA RESULTS OF OPERATIONS	.060	.071	.060	.048	.036	.023	.011	-.002	-.047	-.025	-.063
HISTORICAL CAST TOTAL ASSETS	.956	.944	.931	.918	.903	.887	.870	.852	.832	.841	.849
CVA TOTAL ASSETS	1.216	1.231	1.247	1.265	1.284	1.304	1.324	1.345	1.366	1.419	1.474
PROFITABILITY RATIOS:											
GROSS MARGIN ↓ - HIST. COST	.176	.176	.176	.176	.176	.176	.176	.176	.176	.176	.176
GROSS MARGIN ↓ - CVA	.155	.154	.150	.147	.143	.139	.134	.128	.122	.115	.107
OPERATING PROFIT ↓ - HC	.061	.066	.070	.074	.078	.082	.086	.089	.093	.096	.099
OPERATING PROFIT ↓ - CVA	.040	.043	.044	.044	.045	.044	.043	.041	.039	.035	.030
NET INCOME ↓ - HIST. COST	.028	.031	.034	.037	.040	.043	.046	.050	.053	.058	.060
NET INC RESULTS OF OPNS ↓ - CVA	.004	.005	.005	.004	.003	.002	.001	.000	-.006	-.003	-.009
RETURN ON TOTAL ASSETS-HC	.031	.032	.033	.033	.034	.034	.035	.036	.037	.036	.035
RETURN ON TOTAL ASSETS-CVA	.004	.004	.004	.003	.002	.001	.001	.000	-.003	-.001	-.003
RETURN ON EQUITY-HC	.042	.043	.042	.042	.041	.040	.040	.039	.039	.038	.036
RETURN ON EQUITY-CVA	.005	.005	.004	.003	.002	.001	.001	.000	-.003	-.001	-.003
CREDIT CAPACITY RATIOS:											
CURRENT RATIO - HIST. COST	5.304	6.072	6.902	7.792	8.736	9.726	10.751	11.796	12.841	14.689	16.640
CURRENT RATIO - CVA	5.338	6.153	7.102	8.199	9.458	10.896	12.526	14.361	16.415	19.525	23.102
WORKING CAPITAL TO SALES-HC	.321	.375	.434	.496	.562	.630	.700	.772	.843	.972	1.108
WORKING CAPITAL TO SALES-CVA	.323	.381	.448	.526	.614	.714	.828	.955	1.097	1.315	1.566
TIMES INTEREST EARNED-HC	2.566	2.894	3.040	3.232	3.498	3.900	4.580	5.964	9.00781.248E465.292E4		
TIMES INTEREST EARNED-CVA	2.321	2.573	2.681	2.823	3.023	3.326	3.845	4.907	4.26181.248E465.292E4		
LONG-TERM DEBT TO EQUITY-HC	.266	.236	.206	.174	.142	.108	.073	.037	.000	.000	.000
LONG-TERM DEBT TO EQUITY-CVA	.155	.134	.112	.090	.068	.046	.023	.001	.000	.000	.000
OTHER RATIOS:											
ASSET TURNOVER-HC	1.094	1.026	.963	.906	.854	.806	.763	.724	.688	.632	.581
ASSET TURNOVER-CVA	.859	.787	.719	.657	.601	.549	.501	.458	.419	.375	.335
INVENTORY TURNOVER-HC	5.283	5.265	5.248	5.216	5.192	5.169	5.146	5.124	5.101	5.078	5.054
INVENTORY TURNOVER-CVA	5.332	5.311	5.292	5.273	5.256	5.239	5.224	5.210	5.196	5.184	5.172
DIVIDEND PAYOUT RATE-HC	.600	.600	.600	.600	.600	.600	.600	.600	.600	.600	.626
DIVIDEND PAYOUT RATE-CVA	3.939	3.432	4.097	5.101	6.859	10.597	23.351	-129.611	-5.242	-9.909	-3.945

EXHIBIT D-16

CHEMCO CASE NO. 4

PERFORMANCE EVALUATION DATA ANALYSIS

PRICING DATA ANALYSIS

YEAR	HIST. COST % GROSS MARGIN	CVA % GROSS MARGIN	DIFFERENCE	DIFF AS % OF HCGM
1	0.176	0.155	0.021	0.119
2	0.176	0.154	0.023	0.129
3	0.176	0.150	0.026	0.147
4	0.176	0.147	0.029	0.167
5	0.176	0.143	0.033	0.189
6	0.176	0.139	0.038	0.214
7	0.176	0.134	0.043	0.241
8	0.176	0.128	0.048	0.272
9	0.176	0.122	0.054	0.307
10	0.176	0.115	0.061	0.347
11	0.176	0.107	0.069	0.391
12	0.176	0.098	0.078	0.442
13	0.176	0.088	0.088	0.500
14	0.176	0.077	0.100	0.565
15	0.176	0.062	0.114	0.647

DIVIDEND DATA ANALYSIS

YEAR	HIST. COST NET INCOME	DIVIDENDS	PAYOUT RATE	CV RESULTS OPERATIONS	PAYOUT RATE
1	127.865 76.7188	.599998	19.4753	3.93929	
2	131.739 79.0433	.599999	23.0284	3.43242	
3	132.696 79.6176	.6	19.4334	4.09695	
4	133.276 79.9658	.600002	15.6761	5.10114	
5	133.574 80.1442	.599999	11.6844	6.8591	
6	133.691 80.2146	.6	7.56969	10.5968	
7	133.719 80.2317	.600002	3.43583	23.3515	
8	133.741 80.2445	.599999	-.619119	-129.611	
9	133.828 80.2969	.600001	-15.3189	-5.2417	
10	134.047 80.4285	.600002	-8.11701	-9.90864	
11	128.519 80.4285	.62581	-20.3871	-3.94507	
12	122.806 80.4285	.654923	-33.1514	-2.4261	
13	116.929 80.4285	.68784	-46.4095	-1.73302	
14	110.9 80.4285	.725234	-60.1663	-1.33677	
15	106.45 80.4285	.755552	-76.3277	-1.05373	

TAX DATA ANALYSIS

YEAR	HIST. COST NET INCOME	INCOME TAX	H/C TAXRATE	CV RESULTS OPERATIONS	REAL TAXRATE
1	$ 127.86	$ 85.24	0.400	$ 19.48	0.814
2	$ 131.74	$ 87.83	0.400	$ 23.03	0.792
3	$ 132.70	$ 88.46	0.400	$ 19.43	0.820
4	$ 133.28	$ 88.85	0.400	$ 15.68	0.850
5	$ 133.57	$ 89.05	0.400	$ 11.68	0.884
6	$ 133.69	$ 89.13	0.400	$ 7.57	0.922
7	$ 133.72	$ 89.15	0.400	$ 3.44	0.963
8	$ 133.74	$ 89.16	0.400	$- 0.62	1.007
9	$ 133.83	$ 89.22	0.400	$- 15.32	1.207
10	$ 134.05	$ 89.36	0.400	$- 8.12	1.100
11	$ 128.52	$ 85.68	0.400	$- 20.39	1.312
12	$ 122.81	$ 81.87	0.400	$- 33.15	1.680
13	$ 116.93	$ 77.95	0.400	$- 46.41	2.471
14	$ 110.90	$ 73.93	0.400	$- 60.17	5.370
15	$ 106.45	$ 70.97	0.400	$- 76.33	- 13.237

EXHIBIT D-16 (continued)

CHEMCO CASE NO. 4

PERFORMANCE EVALUATION DATA ANALYSIS

CV	GROWTH RESULTS	INDICES HC NET INC	TREND ERRORS YEAR	CUM
	0.060	0.392	0	0
	0.071	0.404	0	0
	0.060	0.407	1	1
	0.048	0.409	1	2
	0.036	0.410	1	3
	0.023	0.410	1	4
	0.011	0.410	1	5
-	0.002	0.410	1	6
-	0.047	0.411	1	7
-	0.025	0.411	0	7
-	0.063	0.394	0	7
-	0.102	0.377	0	7
-	0.142	0.359	0	7
-	0.185	0.340	0	7
-	0.234	0.327	0	7

CV	RETURN ON ASSETS ACCTG	HC ACCTG	TREND ERRORS YEAR	CUM
	0.004	0.031	0	0
	0.004	0.032	0	0
	0.004	0.033	1	1
	0.003	0.033	1	2
	0.002	0.034	1	3
	0.001	0.034	1	4
	0.001	0.035	1	5
-	0.000	0.036	1	6
-	0.003	0.037	1	7
-	0.001	0.036	1	8
-	0.003	0.035	0	8
-	0.005	0.033	0	8
-	0.007	0.031	0	8
-	0.008	0.029	0	8
-	0.010	0.028	0	8

CV	RETURN ON EQUITY ACCTG	HC ACCTG	TREND ERRORS YEAR	CUM
	0.005	0.042	0	0
	0.005	0.043	0	0
	0.004	0.042	0	0
	0.003	0.042	0	0
	0.002	0.041	0	0
	0.001	0.040	0	0
	0.001	0.040	0	0
-	0.000	0.039	0	0
-	0.003	0.039	0	0
-	0.001	0.038	1	1
-	0.003	0.036	0	1
-	0.005	0.034	0	1
-	0.007	0.032	0	1
-	0.008	0.030	0	1
-	0.010	0.029	0	1

EXHIBIT D-17

CHEMCO CASE NO. 4

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

COMPARISON AMONG PREDICTION ERRORS

	CASH FLOW OPERATING
HISTORICAL COST NET INCOME	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 314.75
DIFFERENCE AS % OF ACTUAL TOTAL	0.14111
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.77778
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	8

	CASH FLOW OPERATING
CVA RESULTS OF OPERATIONS	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 101.59
DIFFERENCE AS % OF ACTUAL TOTAL	0.04554
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	4

	CASH FLOW OPERATING
CVA RESULTS + GROSS MONETARY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 585.32
DIFFERENCE AS % OF ACTUAL TOTAL	0.26241
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	9

	CASH FLOW OPERATING
CVA RESULTS + GROSS NONMONEY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 66.25
DIFFERENCE AS % OF ACTUAL TOTAL	0.02970
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.77778
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	1

	CASH FLOW OPERATING
CVA RESULTS + ALL GROSS VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 247.61
DIFFERENCE AS % OF ACTUAL TOTAL	0.11101
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	7

	CASH FLOW OPERATING
CVA RESULTS ADJUSTED FOR GEN. PRICE LEVEL	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 101.59
DIFFERENCE AS % OF ACTUAL TOTAL	0.04554
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	3

	CASH FLOW OPERATING
CVA BOTTOM LINE AMOUNT	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 129.28
DIFFERENCE AS % OF ACTUAL TOTAL	0.05796
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	5

EXHIBIT D-17 (continued)

CHEMCO CASE NO. 4

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

ADJ CVA RESULTS + NET NONMONEY VAL CHANGES	CASH FLOW OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 86.31
DIFFERENCE AS % OF ACTUAL TOTAL	0.03870
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.66667
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	2

ADJ. CVA RESULTS + NET MONEY VALUE CHANGES	CASH FLOW OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 173.15
DIFFERENCE AS % OF ACTUAL TOTAL	0.07763
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	6

STEELCO CASE NO. 7

Parameter values

Unit Sales Growth Rate	1.10
Fixed Asset Inflation Rate	1.10
Raw Materials Inflation Rate	1.05
General Inflation Rate	1.05

This case portrays the reporting differences between historical cost accounting and current-value accounting for a capital intensive company with a moderate growth rate during medium-high inflation of plant and equipment and with other inflation rates remaining moderate. This is not an extreme condition -- the companies of many industries are operating in a similar inflationary condition today, except that the "other" inflation rates generally are not as moderate as the 5% used here.

It can be seen from Exhibit D-18 that current-value total assets increased substantially in the period 1979-1989. However, we see that Current-Value Results of Operations (Exhibit D-19) became increasingly negative during that period, and the asset value increase is attributable to the unrealized changes in fixed assets plus the acquisition of additional fixed assets at higher prices. In marked contrast however, Historical Cost Net Income (Exhibit D-22) improves over the same period by almost 800%. The Cash Flow Statement (Exhibit D-20) shows that the company is kept afloat only by massive issues of new capital to finance plant; without this additional financing the cash flows would present a very sorry picture indeed.

Exhibit D-24 indicates that the constant historical cost gross margin of about 15% is less than 11% on a current-value basis during 1979, the first year. The current-value margin progressively erodes to 4.6% in 1993.

The company pays both dividends and taxes every year (Exhibit D-24). The rate of each exceeds 100% of current-value results of operations each year.

For most of the period 1979-1993 the historical cost financial statements indicate trends that are the opposite of the actual trends for income growth, return on assets, and return on equity. In all of these opposite-trend instances, historical costs indicate a more favorable picture than does current-value accounting.

In this case, both historical cost net income and current-value results of operations were among the worst cash flow predictors (Exhibit D-25), with the current-value results of operations plus gross monetary value changes combination being the best predictor. The reasons for these rankings with these conditions are not apparent, and no general conclusions seem warranted. Further experimentations and analytic research is required.

EXHIBIT D-18

STEELCO CASE NO. 7

COMPARATIVE CURRENT-VALUE STATEMENTS OF FINANCIAL POSITIONS

TEN YEAR COMPARATIVE BALANCE SHEET (CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 135	$ 158	$ 175	$ 167	$ 180	$ 241	$ 249	$ 278	$ 287	$ 346	$ 359
MARKETABLE SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ACCOUNTS RECEIVABLE	$ 466	$ 521	$ 582	$ 649	$ 726	$ 805	$ 902	$ 1,003	$ 1,122	$ 1,243	$ 1,394
INVENTORIES	$ 860	$ 965	$ 1,089	$ 1,225	$ 1,385	$ 1,551	$ 1,758	$ 1,972	$ 2,230	$ 2,496	$ 2,830
TOTAL CURRENT ASSETS	$ 1,461	$ 1,644	$ 1,847	$ 2,040	$ 2,291	$ 2,597	$ 2,909	$ 3,253	$ 3,638	$ 4,085	$ 4,583
LAND	$ 484	$ 532	$ 586	$ 644	$ 709	$ 779	$ 857	$ 943	$ 1,037	$ 1,141	$ 1,255
PLANT	$ 4,099	$ 5,456	$ 6,002	$ 7,989	$ 8,788	$11,696	$12,866	$17,125	$18,837	$25,072	$27,579
LESS ACCUM DEPR	$-2,303	$-2,646	$-3,060	$-3,531	$-4,104	$-4,756	$-5,554	$-6,463	$-7,580	$-8,856	-10,431)
EQUIPMENT	$ 4,207	$ 7,187	$ 8,301	$ 9,566	$10,523	$12,102	$13,312	$14,643	$15,407	$16,948	$17,795
LESS ACCUM DEPREC	$-2,757	$-3,129	$-3,574	$-4,105	$-4,739	$-5,458	$-6,312	$-7,283	$-8,385	$-9,583	-10,937)
NET FIXED ASSETS	$ 5,731	$ 7,402	$ 8,255	$10,563	$11,177	$14,363	$15,169	$18,965	$19,316	$24,722	$25,262
TOTAL ASSETS	$ 7,192	$ 9,046	$10,102	$12,603	$13,467	$16,961	$18,078	$22,217	$22,955	$28,807	$29,845
ACCOUNTS PAYABLE	$ 356	$ 395	$ 438	$ 487	$ 501	$ 602	$ 622	$ 694	$ 717	$ 866	$ 898
SHORT TERM DEBT	$ 531	$ 1,051	$ 1,594	$ 2,264	$ 282	$ 991	$ 1,202	$ 1,415	$ 962	$ 1,065	$ 387
TOTAL CURRENT LIAB	$ 887	$ 1,446	$ 2,032	$ 2,751	$ 784	$ 1,593	$ 1,824	$ 2,109	$ 1,678	$ 1,931	$ 1,285
LONG TERM DEBT	$ 1,191	$ 2,038	$ 1,911	$ 3,153	$ 2,968	$ 2,764	$ 2,537	$ 2,287	$ 2,132	$ 1,971	$ 1,790
CAPITAL	$ 3,174	$ 3,442	$ 3,736	$ 4,059	$ 6,678	$ 9,217	$ 9,877	$13,567	$14,495	$19,843	$21,141
RETAINED EARNINGS	$ 1,940	$ 2,120	$ 2,423	$ 2,641	$ 3,038	$ 3,387	$ 3,839	$ 4,255	$ 4,650	$ 5,062	$ 5,628
TOTAL EQUITY	$ 5,114	$ 5,562	$ 6,159	$ 6,700	$ 9,716	$12,604	$13,717	$17,821	$19,145	$24,905	$26,770
TOTAL LIAB + EQUITY	$ 7,192	$ 9,046	$10,102	$12,603	$13,467	$16,961	$18,078	$22,217	$22,955	$28,807	$29,845

EXHIBIT D-19

STEELCO CASE NO. 7

COMPARATIVE CURRENT-VALUE STATEMENTS OF OPERATING RESULTS AND VALUE CHANGES

INPUT:GENPEPORT INCOMESTMT

TEN YEAR COMPARATIVE INCOME STATEMENT(CVA)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 4,191	$ 4,692	$ 5,242	$ 5,837	$ 6,531	$ 7,247	$ 8,120	$ 9,025	$10,095	$11,189	$12,550
COST OF GOODS SOLD	$ 3,749	$ 4,190	$ 4,711	$ 5,271	$ 5,938	$ 6,616	$ 7,470	$ 8,334	$ 9,385	$10,435	$11,786
GROSS MARGIN	$ 442	$ 502	$ 531	$ 566	$ 593	$ 631	$ 650	$ 691	$ 710	$ 754	$ 765
SELLING EXPENSES	$ 120	$ 130	$ 142	$ 154	$ 168	$ 183	$ 200	$ 217	$ 237	$ 258	$ 281
GENERAL-ADM EXPENSES	$ 162	$ 176	$ 192	$ 209	$ 228	$ 248	$ 270	$ 294	$ 321	$ 349	$ 380
OPERATING RESULTS	$ 161	$ 195	$ 197	$ 202	$ 197	$ 200	$ 180	$ 180	$ 153	$ 147	$ 104
INTEREST EXPENSE	$ 237	$ 256	$ 289	$ 456	$ 497	$ 325	$ 366	$ 366	$ 376	$ 309	$ 308
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 41	$ 52	$ 59	$ 22	$ 32	$ 117	$ 135	$ 167	$ 207	$ 266	$ 318
CVA RESULTS OF OPNS	$ -117	$ -112	$ -151	$ -276	$ -333	$ -242	$ -321	$ -354	$ -430	$ -427	$ -523)
REALIZED CHANGES IN INVENTORY VALUE	$ 31	$ 17	$ 24	$ 22	$ 32	$ 24	$ 44	$ 33	$ 52	$ 36	$ 72
UNREALIZED CHANGES IN INVENTORY VALUE	$ 2	$ 1	$ 2	$ 2	$ 2	$ 2	$ 3	$ 2	$ 4	$ 3	$ 5
UNREALIZED CHANGES IN SECURITIES VALUE	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
UNREALIZED CHANGES IN FIXED ASSET VALUE	$ 507	$ 573	$ 740	$ 826	$ 1,056	$ 1,118	$ 1,436	$ 1,517	$ 1,896	$ 1,932	$ 2,472
DEDUCT PURPOWER GAIN ON NON-MONEY ITEMS	$ -277	$ -375	$ -444	$ -529	$ -553	$ -663	$ -824	$ -875	$-1,066	$-1,115	$-1,389)
NET VALUE CHANGES	$ 263	$ 216	$ 321	$ 320	$ 537	$ 480	$ 659	$ 677	$ 886	$ 855	$ 1,160
UNREALIZED CHANGES IN L-T DEBT VALUE	$ 16	$ 8	$ 26	$ 11	$ 38	$ 44	$ 51	$ 58	$ -45	$ 64	$ 74
PURPOWER GAIN ON NET-MONEY ITEMS	$ 98	$ 107	$ 150	$ 207	$ 198	$ 154	$ 163	$ 158	$ 138	$ 118	$ 91
TOTAL CVA RESULTS +VALUE CHANGES	$ 261	$ 219	$ 347	$ 262	$ 441	$ 436	$ 553	$ 539	$ 549	$ 609	$ 803

EXHIBIT D-20

STEELCO CASE NO. 7

COMPARATIVE CASH FLOW STATEMENTS

INPUT:GENREPORT CASHFLOW

CASH FLOW STATEMENT

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH INFLOWS										
SALES	$ 4,692	$ 5,242	$ 5,837	$ 6,531	$ 7,247	$ 8,120	$ 9,025	$10,095	$11,189	$12,550
INCREASE IN CURRENT DEBT	$ 559	$ 586	$ 718	$-1,967	$ 810	$ 231	$ 285	$ -431	$ 252	$ -646)
SALE OF INVESTMENTS	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
LONG TERM BORROWING	$ 947	$ 0	$ 1,386	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ISSUE OF NEW CAPITAL	$ 0	$ 0	$ 0	$ 2,264	$ 2,030	$ 0	$ 2,972	$ 0	$ 4,351	$ 0
TOTAL INFLOWS	$ 6,198	$ 5,829	$ 7,942	$ 6,828	$10,087	$ 8,351	$12,282	$ 9,664	$15,793	$11,905
CASH OUTFLOWS:										
PURCHASE OF INVENTORY	$ 1,407	$ 1,625	$ 1,876	$ 2,167	$ 2,503	$ 2,891	$ 3,339	$ 3,857	$ 4,455	$ 5,145
CURRENT EXPENSES	$ 2,906	$ 3,179	$ 3,561	$ 3,888	$ 4,102	$ 4,488	$ 4,877	$ 5,305	$ 5,732	$ 6,243
INVESTMENTS IN SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
INCREASE IN RECEIVABLES	$ 56	$ 61	$ 66	$ 77	$ 80	$ 97	$ 101	$ 119	$ 122	$ 151
PURCHASE OF NEW EQUIPMENT	$ 719	$ 791	$ 870	$ 478	$ 1,052	$ 579	$ 637	$ 0	$ 770	$ 0
PURCHASE OF NEW PLANT	$ 947	$ 0	$ 1,386	$ 0	$ 2,030	$ 0	$ 2,972	$ 0	$ 4,351	$ 0
REPAY LONG TERM DEBT	$ 103	$ 112	$ 147	$ 159	$ 173	$ 188	$ 203	$ 221	$ 106	$ 116
CASH DIVIDEND	$ 38	$ 44	$ 44	$ 44	$ 87	$ 100	$ 124	$ 154	$ 197	$ 236
TOTAL OUTFLOWS	$ 6,175	$ 5,811	$ 7,950	$ 6,814	$10,027	$ 8,343	$12,254	$ 9,655	$15,733	$11,892
NET INFLOW (OUTFLOW)	$ 22	$ 17	$ -8	$ 14	$ 60	$ 8	$ 29	$ 9	$ 60	$ 13

EXHIBIT D-21

STEELCO CASE NO. 7

COMPARATIVE HISTORICAL COST STATEMENTS OF FINANCIAL POSITION

TEN YEAR COMPARATIVE BALANCE SHEET(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
CASH	$ 135	$ 158	$ 175	$ 167	$ 180	$ 241	$ 249	$ 278	$ 287	$ 346	$ 359
MARKETABLE SECURITIES	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
ACCOUNTS RECEIVABLE	$ 466	$ 521	$ 582	$ 649	$ 726	$ 805	$ 902	$ 1,003	$ 1,122	$ 1,243	$ 1,394
INVENTORIES	$ 829	$ 928	$ 1,042	$ 1,166	$ 1,312	$ 1,464	$ 1,651	$ 1,845	$ 2,077	$ 2,317	$ 2,617
TOTAL CURRENT ASSETS	$ 1,430	$ 1,607	$ 1,800	$ 1,981	$ 2,218	$ 2,510	$ 2,802	$ 3,125	$ 3,485	$ 3,906	$ 4,371
LAND	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292	$ 292
PLANT	$ 2,729	$ 3,676	$ 3,676	$ 5,062	$ 5,062	$ 7,092	$ 7,092	$10,064	$10,064	$14,416	$14,416
LESS ACCUM DEPREC	$-1,420	$-1,488	$-1,580	$-1,672	$-1,799	$-1,925	$-2,103	$-2,280	$-2,532	$-2,783	$-3,144)
EQUIPMENT	$ 4,708	$ 5,269	$ 5,875	$ 6,528	$ 6,750	$ 7,502	$ 7,727	$ 7,948	$ 7,463	$ 7,667	$ 7,010
LESS ACCUM DEPREC	$-1,947	$-2,103	$-2,270	$-2,445	$-2,624	$-2,773	$-2,919	$-3,019	$-3,064	$-2,996	$-2,850)
NET FIXED ASSETS	$ 4,361	$ 5,645	$ 5,993	$ 7,765	$ 7,682	$10,187	$10,089	$13,005	$12,223	$16,596	$15,724
TOTAL ASSETS	$ 5,792	$ 7,252	$ 7,792	$ 9,747	$ 9,900	$12,697	$12,891	$16,130	$15,709	$20,502	$20,095
ACCOUNTS PAYABLE	$ 356	$ 395	$ 438	$ 487	$ 501	$ 602	$ 622	$ 694	$ 717	$ 866	$ 898
SHORT TERM DEBT	$ 531	$ 1,051	$ 1,594	$ 2,264	$ 282	$ 991	$ 1,202	$ 1,415	$ 962	$ 1,065	$ 387
TOTAL CURRENT LIAB	$ 887	$ 1,446	$ 2,032	$ 2,751	$ 784	$ 1,593	$ 1,824	$ 2,109	$ 1,678	$ 1,931	$ 1,285
LONG TERM DEBT	$ 1,319	$ 2,162	$ 2,050	$ 3,290	$ 3,130	$ 2,957	$ 2,770	$ 2,566	$ 2,346	$ 2,239	$ 2,123
CAPITAL	$ 2,857	$ 2,857	$ 2,857	$ 2,857	$ 5,121	$ 7,151	$ 7,151	$10,123	$10,123	$14,475	$14,475
RETAINED EARNINGS	$ 729	$ 786	$ 852	$ 849	$ 864	$ 995	$ 1,145	$ 1,331	$ 1,562	$ 1,858	$ 2,213
TOTAL EQUITY	$ 3,586	$ 3,644	$ 3,710	$ 3,706	$ 5,986	$ 8,147	$ 8,297	$11,455	$11,685	$16,332	$16,687
TOTAL LIAB + EQUITY	$ 5,792	$ 7,252	$ 7,792	$ 9,747	$ 9,900	$12,697	$12,891	$16,130	$15,709	$20,502	$20,095

EXHIBIT D-22

STEELCO CASE NO. 7

COMPARATIVE HISTORICAL COST INCOME STATEMENTS

TEN YEAR COMPARATIVE INCOME STATEMENT(HC)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
SALES REVENUE	$ 4,191	$ 4,692	$ 5,242	$ 5,837	$ 6,531	$ 7,247	$ 8,120	$ 9,025	$10,095	$11,189	$12,550
COST OF GOODS SOLD	$ 3,567	$ 3,993	$ 4,462	$ 4,968	$ 5,558	$ 6,169	$ 6,911	$ 7,682	$ 8,592	$ 9,524	$10,682
GROSS MARGIN	$ 624	$ 698	$ 780	$ 869	$ 972	$ 1,079	$ 1,209	$ 1,344	$ 1,503	$ 1,666	$ 1,868
SELLING EXPENSES	$ 120	$ 130	$ 142	$ 154	$ 168	$ 183	$ 200	$ 217	$ 237	$ 258	$ 281
GENERAL-ADM EXPENSES	$ 162	$ 176	$ 192	$ 209	$ 228	$ 248	$ 270	$ 294	$ 321	$ 349	$ 380
OPERATING RESULTS	$ 342	$ 392	$ 447	$ 505	$ 576	$ 648	$ 739	$ 832	$ 946	$ 1,059	$ 1,207
INTEREST EXPENSE	$ 227	$ 244	$ 277	$ 443	$ 484	$ 312	$ 354	$ 355	$ 355	$ 300	$ 298
GAIN ON SALE MKT SEC	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
TAXES	$ 41	$ 52	$ 59	$ 22	$ 32	$ 117	$ 135	$ 167	$ 207	$ 266	$ 318
NET INCOME	$ 75	$ 96	$ 110	$ 40	$ 60	$ 218	$ 250	$ 310	$ 384	$ 493	$ 591

EXHIBIT D-23

STEELCO CASE NO. 7

COMPARATIVE INDICES ANALYSIS

TEN YEAR COMPARATIVE RATIO ANALYSIS

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GROWTH INDICES											
SALES REVENUE	1.336	1.496	1.671	1.861	2.082	2.310	2.588	2.877	3.218	3.567	4.001
HISTORICAL COST NET INCOME	.553	.706	.809	.297	.439	1.603	1.839	2.279	2.824	3.628	4.347
CVA RESULTS OF OPERATIONS	-.857	-.825	-1.107	-2.028	-2.448	-1.780	-2.357	-2.601	-3.161	-3.141	-3.844
HISTORICAL CAST TOTAL ASSETS	1.590	1.991	2.139	2.675	2.718	3.485	3.538	4.428	4.312	5.628	5.516
CVA TOTAL ASSETS	1.974	2.483	2.773	3.460	3.697	4.656	4.962	6.099	6.301	7.908	8.192
PROFITABILITY RATIOS:											
GROSS MARGIN $ - HIST. COST	.149	.149	.149	.149	.149	.149	.149	.149	.149	.149	.149
GROSS MARGIN $ - CVA	.106	.107	.101	.097	.091	.087	.080	.077	.070	.067	.061
OPERATING PROFIT $ - HC	.082	.084	.085	.087	.088	.089	.091	.092	.094	.095	.096
OPERATING PROFIT $ - CVA	.038	.042	.038	.035	.030	.028	.022	.020	.015	.013	.008
NET INCOME $ - HIST. COST	.018	.020	.021	.007	.009	.030	.031	.034	.038	.044	.047
NET INC RESULTS OF OPNS $ - CVA	-.028	-.024	-.029	-.047	-.051	-.033	-.039	-.039	-.043	-.038	-.042
RETURN ON TOTAL ASSETS-HC	.013	.013	.014	.004	.006	.017	.019	.019	.024	.024	.029
RETURN ON TOTAL ASSETS-CVA	-.016	-.012	-.015	-.022	-.025	-.014	-.018	-.016	-.019	-.015	-.018
RETURN ON EQUITY-HC	.021	.026	.030	.011	.010	.027	.030	.027	.033	.030	.035
RETURN ON EQUITY-CVA	-.023	-.020	-.024	-.041	-.034	-.019	-.023	-.020	-.022	-.017	-.020
CREDIT CAPACITY RATIOS:											
CURRENT RATIO - HIST. COST	1.613	1.111	.886	.720	2.830	1.575	1.536	1.482	2.077	2.023	3.401
CURRENT RATIO - CVA	1.647	1.137	.909	.742	2.923	1.630	1.595	1.542	2.168	2.116	3.567
WORKING CAPITAL TO SALES-HC	.130	.034	-.044	-.132	.220	.126	.120	.113	.179	.177	.246
WORKING CAPITAL TO SALES-CVA	.137	.042	-.035	-.122	.231	.139	.134	.127	.194	.193	.263
TIMES INTEREST EARNED-HC	.665	.752	.671	.427	.379	.600	.475	.474	.371	.461	.314
TIMES INTEREST EARNED-CVA	.679	.763	.683	.443	.395	.616	.492	.490	.406	.477	.336
LONG-TERM DEBT TO EQUITY-HC	.368	.593	.553	.888	.523	.363	.334	.224	.201	.137	.127
LONG-TERM DEBT TO EQUITY-CVA	.233	.366	.310	.471	.306	.219	.185	.128	.111	.079	.067
OTHER RATIOS:											
ASSET TURNOVER-HC	.724	.647	.673	.599	.660	.571	.630	.560	.643	.546	.625
ASSET TURNOVER-CVA	.583	.519	.519	.463	.485	.427	.449	.406	.440	.388	.421
INVENTORY TURNOVER-HC	4.303	4.305	4.282	4.260	4.236	4.214	4.187	4.164	4.137	4.111	4.082
INVENTORY TURNOVER-CV	4.361	4.341	4.324	4.304	4.288	4.265	4.250	4.226	4.208	4.181	4.165
DIVIDEND PAYOUT RATE-HC	.490	.400	.400	1.089	.737	.400	.400	.400	.400	.400	.400
DIVIDEND PAYOUT RATE-CVA	-.317	-.342	-.292	-.160	-.132	-.360	-.312	-.351	-.357	-.462	-.452

EXHIBIT D-24

STEELCO CASE NO. 7

PERFORMANCE EVALUATION DATA ANALYSIS

PRICING DATA ANALYSIS

YEAR	HIST. COST % GROSS MARGIN	CVA % GROSS MARGIN	DIFFERENCE	DIFF AS % OF HCGM
1	0.149	0.106	0.043	0.291
2	0.149	0.107	0.042	0.282
3	0.149	0.101	0.048	0.319
4	0.149	0.097	0.052	0.349
5	0.149	0.091	0.058	0.391
6	0.149	0.087	0.062	0.415
7	0.149	0.080	0.069	0.462
8	0.149	0.077	0.072	0.486
9	0.149	0.070	0.079	0.528
10	0.149	0.067	0.081	0.547
11	0.149	0.061	0.088	0.591
12	0.149	0.059	0.090	0.605
13	0.149	0.053	0.095	0.641
14	0.149	0.052	0.097	0.653
15	0.149	0.046	0.103	0.692

DIVIDEND DATA ANALYSIS

YEAR	HIST. COST NET INCOME	DIVIDENDS	PAYOUT RATE	CV RESULTS OPERATIONS	PAYOUT RATE
1	75.2707	36.918	.49047	-116.512	-.316861
2	96.017	38.4068	.4	-112.172	-.342394
3	110.034	44.0137	.400001	-150.59	-.292275
4	40.3993	44.0137	1.08947	-275.855	-.159554
5	59.75	44.0137	.736631	-332.869	-.132225
6	218.014	87.2056	.4	-242.148	-.360134
7	250.149	100.06	.400002	-320.58	-.312121
8	309.954	123.982	.400001	-353.687	-.350541
9	384.04	153.616	.4	-429.837	-.357382
10	493.444	197.377	.399999	-427.218	-.462007
11	591.2	236.48	.4	-522.753	-.452374
12	730.359	292.144	.400001	-536.79	-.544242
13	880.568	352.227	.4	-623.966	-.564497
14	1033.81	413.526	.400002	-700.768	-.590104
15	1236.97	494.789	.400001	-805.659	-.614142

TAX DATA ANALYSIS

YEAR	HIST. COST NET INCOME	INCOME TAX	H/C TAXRATE	CV RESULTS OPERATIONS	REAL TAXRATE
1	$ 75.27	$ 40.53	0.350	$- 116.51	- 0.533
2	$ 96.02	$ 51.70	0.350	$- 112.17	- 0.855
3	$ 110.03	$ 59.25	0.350	$- 150.59	- 0.649
4	$ 40.40	$ 21.75	0.350	$- 275.85	- 0.086
5	$ 59.75	$ 32.17	0.350	$- 332.87	- 0.107
6	$ 218.01	$ 117.39	0.350	$- 242.15	- 0.941
7	$ 250.15	$ 134.70	0.350	$- 320.58	- 0.725
8	$ 309.95	$ 166.90	0.350	$- 353.69	- 0.894
9	$ 384.04	$ 206.79	0.350	$- 429.84	- 0.927
10	$ 493.44	$ 265.70	0.350	$- 427.22	- 1.645
11	$ 591.20	$ 318.34	0.350	$- 522.75	- 1.557
12	$ 730.36	$ 393.27	0.350	$- 536.79	- 2.740
13	$ 880.57	$ 474.15	0.350	$- 623.97	- 3.165
14	$ 1033.81	$ 556.67	0.350	$- 700.77	- 3.863
15	$ 1236.97	$ 666.06	0.350	$- 805.66	- 4.771

EXHIBIT D-24 (continued)

STEELCO CASE NO. 7

PERFORMANCE EVALUATION DATA ANALYSIS

	GROWTH INDICES		TREND ERRORS	
CV	RESULTS	HC NET INC	YEAR	CUM
-	0.857	0.553	0	0
-	0.825	0.706	0	0
-	1.107	0.809	1	1
-	2.028	0.297	0	1
-	2.448	0.439	1	2
-	1.780	1.603	0	2
-	2.357	1.839	1	3
-	2.601	2.279	1	4
-	3.161	2.824	1	5
-	3.141	3.628	0	5
-	3.844	4.347	1	6
-	3.947	5.370	1	7
-	4.588	6.475	1	8
-	5.153	7.602	1	9
-	5.924	9.095	1	10

	RETURN ON ASSETS		TREND ERRORS	
CV	ACCTG	HC ACCTG	YEAR	CUM
-	0.016	0.013	0	0
-	0.012	0.013	0	0
-	0.015	0.014	1	1
-	0.022	0.004	0	1
-	0.025	0.006	1	2
-	0.014	0.017	0	2
-	0.018	0.019	1	3
-	0.016	0.019	1	4
-	0.019	0.024	1	5
-	0.015	0.024	1	6
-	0.018	0.029	1	7
-	0.014	0.028	1	8
-	0.016	0.033	1	9
-	0.014	0.029	1	10
-	0.015	0.033	1	11

	RETURN ON EQUITY		TREND ERRORS	
CV	ACCTG	HC ACCTG	YEAR	CUM
-	0.023	0.021	0	0
-	0.020	0.026	0	0
-	0.024	0.030	1	1
-	0.041	0.011	0	1
-	0.034	0.010	1	2
-	0.019	0.027	0	2
-	0.023	0.030	1	3
-	0.020	0.027	1	4
-	0.022	0.033	1	5
-	0.017	0.030	1	6
-	0.020	0.035	1	7
-	0.015	0.031	1	8
-	0.017	0.037	1	9
-	0.015	0.032	1	10
-	0.016	0.037	1	11

EXHIBIT D-25

STEELCO CASE NO. 7

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

COMPARISON AMONG PREDICTION ERRORS

	CASH FLOW OPERATING
HISTORICAL COST NET INCOME	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 540.42
DIFFERENCE AS + OF ACTUAL TOTAL	0.05339
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.66667
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	9

	CASH FLOW OPERATING
CVA RESULTS OF OPERATIONS	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 498.98
DIFFERENCE AS + OF ACTUAL TOTAL	0.04930
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	7

	CASH FLOW OPERATING
CVA RESULTS + GROSS MONETARY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 464.09
DIFFERENCE AS + OF ACTUAL TOTAL	0.04585
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.55556
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	6

	CASH FLOW OPERATING
CVA RESULTS + GROSS NONMONEY VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 332.24
DIFFERENCE AS + OF ACTUAL TOTAL	0.03282
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.55556
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	2

	CASH FLOW OPERATING
CVA RESULTS + ALL GROSS VALUE CHANGES	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 313.42
DIFFERENCE AS + OF ACTUAL TOTAL	0.03099
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.55556
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	1

	CASH FLOW OPERATING
CVA RESULTS ADJUSTED FOR GEN. PRICE LEVEL	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 498.98
DIFFERENCE AS + OF ACTUAL TOTAL	0.04930
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.44444
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	8

	CASH FLOW OPERATING
CVA BOTTOM LINE AMOUNT	
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 365.10
DIFFERENCE AS + OF ACTUAL TOTAL	0.03607
PERCENTAGE OF CASES PREDICTION WITHIN 5+	0.55556
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	4

EXHIBIT D-25 (continued)

STEELCO CASE NO. 7

SUMMARY COMPARISON AMONG CASH FLOW PREDICTORS

	CASH FLOW
ADJ CVA RESULTS + NET NONMONEY VAL CHANGES	OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 345.91
DIFFERENCE AS % OF ACTUAL TOTAL	0.03418
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.66667
PERCENTAGE OF CASES PREDICTION WITHIN 10	0.88889
RANK (1ST = BEST; 9TH = WORST)	3

	CASH FLOW
ADJ. CVA RESULTS + NET MONEY VALUE CHANGES	OPERATING
TOTAL ABSOLUTE DOLLAR PREDICTION ERROR	$ 396.50
DIFFERENCE AS % OF ACTUAL TOTAL	0.03917
PERCENTAGE OF CASES PREDICTION WITHIN 5%	0.66667
PERCENTAGE OF CASES PREDICTION WITHIN 10	1.00000
RANK (1ST = BEST; 9TH = WORST)	5

APPENDIX E

ITEMS FOR FURTHER CONSIDERATION

The issues and problems examined in this appendix are related to the study but are not dealt with as a part of the study. However, they warrant investigation and consideration. They are not listed in any order and are intended only to constitute a listing of matters that came to the attention of the researchers during the course of the study. Although for some the discussion or recommendations contained in the study may suggest a solution, no solutions are proposed here. The issues and problems are:

1. The net effect of current values as a contributory cause of or deterrent to inflation merits investigation. Econometrics models provide a promising approach to this research.

2. The INFLAN simulation model demonstrated that the Touche Ross current-value accounting model is a better predictor of future operating cash flows in most situations than is historical cost accounting and also provides other benefits not available from historical cost accounting during inflationary periods. However, the British, Australian or another proposed curent-value system, or some individual aspects of these systems, may provide additional benefits that should be provided for in the current-value accounting system eventually adopted in the United States. This possibility should be explored, perhaps with a simulation model that compares several current-value approaches.

3. The orientation of this study was almost exclusively toward inflationary situations, and attention should also be given to whether current-value accounting has utility during deflationary periods and periods when the general price level is stable. One school of thought holds that current-value accounting is valuable for management purposes even when the general price level is stable because prices continue to change relative to each other.

4. It is argued in Chapter 8 that the price most useful for predicting future cash flows in most situations is the market replacement cost, and in Chapter 4 that net realizable value has utility as a liquidity indicator for fixed-income security investors and that current cost and net realizable value tend to converge. Consideration should be given to the extent to which current cost and net realizable value diverge in particular situations and whether it is useful to provide both measures where the two diverge significantly.

5. Assuming that a primary objective of financial statements should be that of providing information to assist users in their prediction of future cash flows, and noting that this

objective is only now coming to prominence, the fundamental structure of financial statements (which focus on income rather than cash flow) is brought into question with respect to the nature of the information they should provide, their format, and their interpretation.

6. In recognition of there being no "bottom line" figure in current-value financial statements that is directly analogous to the net income figure in historical cost financial statements, but instead there are several measurements of different types of increments and decrements to equity, additional attention based on experience in use should be given to the interpretation and usefulness of the various current-value measures.

7. Attention should be given to developing financial statements and formulating financial disclosures that communicate current-value data effectively to nonprofessional investors.

8. While Chapter 5 demonstrates that current values are particularly useful for managerial purposes, to realize this potential utility a body of techniques should be developed that serve to merge current values with existing managerial analysis methodologies.

9. In this study it was assumed to be appropriate to adjust for risks in certain circumstances by incorporating the risks into the discount rate. An alternative approach of using expected-value methodology to quantify the incremental risk merits consideration.

10. An investigation should be conducted into the extent to which risks that influence accounting values vary on a regional as well as on a country-wide basis.

11. Techniques should be developed to extend the use of present-value analysis for valuation purposes. One line of inquiry is the application of regression analysis, cluster analysis and other mathematical techniques to further disaggregate groups of resources with known cash flows, and then to impute the cash flows of the group of resources to specific resources.

12. Most of the body of commercial common law and legislation at all levels of government that embodies accounting concepts or is related to accounting practices is based on historical cost accounting. An important area of inquiry is the ways in which current-value accounting, if implemented, would be in conflict with the law and what problems would be involved in resolving these conflicts.

13. A vexing question is how auditors can evaluate whether current-value financial status and results, as provided in financial statements, adequately portray the economic reality of the company and are adequately communicated to users.

14. The issue of audit risk exposure and associated legal liability related to auditing of current values can be expected to become critical with the advent of current-value accounting. For example, audit risk could become more associated with the risk that the certified financial statements do not represent economic reality rather than with the risk that the statements do not conform to generally accepted accounting principles.

15. A fundamental current-value audit problem is that of defining the auditor's responsibility with respect to determining, disclosing, and assessing the reasonableness of management's assumptions implicit in current-value choices and measurements.

16. Given the increased importance attached to relevance of information in the relevance-objectivity tradeoff with current-value accounting, a significant question is whether a reinterpretation of the accounting construct of objectivity is needed. Empirical studies of current-value accounting financial statements may provide the data required to address this question.

17. A significant auditor problem with current-value systems will be determination of the requirements for auditor evaluation of the internal controls and how to extend accounting control to encompass the current-value determination and adjustment processes.

18. A problem of concern to auditors is determining those situations where: (a) current-value data must be audited, (b) current values need not be audited, and (c) current values may be partially rather than fully audited.

19. Valuation experts such as appraisers and engineers will become involved more in auditing with the advent of current-value accounting. Questions such as how auditors should train, supervise, work with and divide the audit responsibilities with these experts will become both germain and significant.

20. As companies begin to implement current-value accounting, empirical studies and evaluations of audits of current-value accounts will be necessary to disseminate experience-based knowledge about current-value accounting to the broader community of auditors.

21. As SEC ASR 190 and other current-value disclosures are made, empirical investigations should be undertaken to determine how this newly available information affects securities prices and is -- or could be -- used by market participants, managers, and public policy makers. These studies could significantly accelerate the transfer of utilization technology among financial statements users.

22. Banking, utility, extractive, pharmaceutical and other industries have unusual valuation problems when current-value accounting is used. These problems warrant considerable additional analysis.