PREFERENCES FOR ACCOUNTING STANDARDS:

THE USE OF DISCRIMINANT ANALYSIS IN

FORECASTING CORPORATE MANAGER

LOBBYING BEHAVIOR

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Submitted to the Faculty of the Graduate College
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in partial fulfillment of the requirements
for the Degree of
DOCTOR OF PHILOSOPHY
May, 1982

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ACKNOWLEDGMENTS

I wish to express my sincere appreciation to Dr. James R. Boatsman, Chairman of my advisory committee, for his guidance both in this study and throughout most of my Ph.D. program. The suggestions and recommendations of the other members of my committee, Dr. C. Dwayne Dowell, Dr. Scott Turner, and Dr. William D. Warde are also greatly appreciated.

Special thanks are expressed to my good friend, Tim Bell, who gave so freely of his time. Discussions with Tim were invaluable in resolving difficulties encountered during the preparatory stages of this work.

It is important that I recognize my gratitude to my mother, Mrs. Margaret M. McKee, who never lost faith in my ability, and to my father, Mr. Arnold J. McKee, who by example instilled in me the unwillingness to quit when the going gets rough.

Finally, I dedicate this dissertation to my wife, Susie, and our children Brett, Sarah, and Seth for their enduring patience and willing sacrifice during my years of doctoral study.

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CHAPTER I

INTRODUCTION

This study was an extension of the work done by Watts and Zimmerman (1978), hereafter W-Z. W-Z developed a positive theory which predicts managerial lobbying behavior toward proposed accounting standards. The theory is based on the premise that managers behave so as to maximize their personal wealth. In general, the theory describes management's position on a proposed accounting standard as a function of (1) firm size (which is purported to affect the magnitude of political costs which the firm may face), and (2) whether the proposed standard's implementation will increase or decrease reported earnings. The W-Z model did not include the effects of other confounding changes in future earnings such as trend changes, variance changes and the magnitudes of all such changes. This study analyzed the possible effects of such confounding changes in future earnings, on corporate lobbying behavior and empirically assessed the effects via generalizing the W-Z discriminant model. Conceivably such a model, if reasonably accurate, might be of value to the Financial Accounting Standards Board in setting accounting policy in a political environment.[1]

[1]For discussions of accounting policy-making in the political arena see Charles T. Horngren, "The Marketing of Accounting Standards," Journal of Accountancy (October 1973): 61-66, Dale S. Gerboth, "Muddling Through with the APB," Journal of Accountancy (May 1972): 42-49, Robert E. May and Gary L. Sundem, "Research for Accounting Policy: An Overview," Accounting Review (October 1976): 747-763, Stephen A. Zeff, "The Rise of Economic Consequences," Journal of Accountancy (December 1978): 56-63.

At least two theoretical reasons exist why a perception of increased variability in accounting earnings should affect management's attitude toward a proposed standard: management compensation and political costs.

Management Compensation

Incentive compensation has been found to be highly correlated with accounting income (Ronan and Saden, 1981). If one is willing to accept the assumption of general risk aversion it can be argued that management's utility can be enhanced simply by reducing volatility of reported earnings. The utility function that is quadratic contains two characteristics of probability distributions, the mean and the variance. One can think of the variance as measuring risk. Even if a utility function is not quadratic, it may be approximated by a quadratic function.[2] Consider the following quadratic utility function:

$$U(Y) = A + BY + CY^2$$

where

Y = payoff.

The corresponding expected value of the utility function, given that Y is a random variable is

$$E\,[U(\tilde{Y})] = A + BE\,[\tilde{Y}] + CE[\tilde{Y}^2]$$

The expected value of the payoff, E $[\hat{Y}]$, is the first moment of the

[2] In the Taylor series expansion, the third and successively higher moments are less important in determining the value of the function. Also, these higher moments can be expressed in terms of the first two moments, provided the probability distributions are normal.

distribution of the variable, or mean (i.e., $\bar{Y}$). The expected value of the square, $E[\tilde{Y}^2]$, is the second moment, or the variance of the distribution plus the mean squared (i.e., $\sigma_Y^2 + \tilde{Y}^2$). Therefore, the expected utility function can be expressed as:

$$E[U(\tilde{Y})] = A + B\bar{Y} + C(\sigma_Y{}^2 + \bar{Y}^2).$$

By successive rearrangement of terms

$$E[U(\tilde{Y})] = A + B\bar{Y} + C\bar{Y}^2 + C\sigma_Y{}^2 ,$$

$$E[U(\tilde{Y})] = (A + B\bar{Y} + CY^2) + C\sigma_Y{}^2$$

and generalizing

$$E[U(\tilde{Y})] = f(\bar{Y}) + g(\sigma_Y{}^2) .$$

The expression for the expected utility contains two characteristics of probability distributions: the mean and the variance. The variance can be viewed as measuring the risk of individuals who have quadratic utility functions. The sign of its coefficient (-, 0, +) indicating individual risk (averse, neutral, loving) determines the shape of the function.

Since incentive compensation (i.e., payoff) has been found to be highly correlated with accounting income it is reasonable to predict that management will oppose proposed standards which might increase variability in earnings and favor standards which might decrease variability.

Political Costs

Firms whose earnings are highly volatile will, at times, report what may appear to be abnormal profits and consequently may attract the attention of politicians prone to taxation or regulation. SFAS no. 8, "Accounting for the Translation of Foreign Currency Transactions and Foreign Currency Financial Statements" induced such volatility. For example, Exxon was highlighted in the news media for setting a record--the highest quarterly earnings ever for a United States publicly held corporation. SFAS no. 8 is responsible for 30% of those reported earnings[3] and, consequently, contributed significantly to the attention given Exxon, and Exxon is clearly a member of an industry that would probably have preferred a lower profile with respect to reported profits.

Generalizing the W-Z Model

The W-Z model, as developed, is applicable only to proposed accounting standards that are perceived by managers to cause a shift in the time series of future reported earnings. Consequently, the model's applicability is restricted severely. The generalized W-Z model (GM) incorporated, initially, the following independent variables:

1. Relating to the proposed accounting standard

    a. mean shift)
    b. volatility change) measuring magnitude
    c. trend (growth) change)

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[3]First quarter, 1980. See <u>Wall Street Journal</u> (April 24, 1980, p. 3).

2. Relating to the firm

   d. absolute size

   e. relative (monopolistic) size within industry

   f. debt-to-equity ratio

Details of the variable selection process including definition of the variable, explanation for inclusion, and calculations are given in a later section.

CHAPTER II

LITERATURE REVIEW

For years, accountants were concerned with finding ways of reporting "truth" as if accounting numbers were measurements of absolutes such as wealth of the firm and changes therein. In the 1960's, literature began to focus on the concept of "income smoothing." Much of this body of literature was stock market related.[1] The evidence suggested that the market participants can adjust for changes in accounting standards. In light of such findings it seemed reasonable to conclude that firm managements deliberately attempting to smooth income must be naive. More recently, research has been conducted regarding the political nature of accounting policy determination. The results suggest (1) that from the standpoint of a manager's individual wealth maximization, income smoothing might be fruitful, and

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[1] On investigations of security price behavior see John L. O'Donnell, "relationships Between Reported Earnings and Stock Prices in the Electric Utility Industry," Accounting Review (January 1965); 135-143, Ronald M. Copeland, "Income Smoothing," Empirical Research in Accounting; Selected Studies (1968) Supplemental to Journal of Accounting Research (1968): 101-116, Paul E. Dosher and Robert E. Malcolm, "A Note on Income Smoothing in the Chemical Industry," Journal of Accounting Research (Autumn 1970): 253-259, Russell M. Barefield and Eugene E Cominsky, "Depreciation Policy and the Behavior of Corporate Profits," Journal of Accounting Research (Autumn 1971): 351-358, C. R. Beidleman, "Income Smoothing: The Role of Management," Accounting Review (October 1973): 653-667. However, on management's motive (whether there was intent to smooth) see Gary E. White, "Discretionary Accounting Decisions and Income Normalization," Journal of Accounting Research (Autumn 1970): 260-273. White's findings were that smooth trends were achieved by chance and/or controlling variables other than the accounting policy decisions included in the study.

(2) that such a conclusion (that income smoothing managements are naive) was incorrect. Perhaps accounting researchers have been asking the wrong question; and the relevant question is "What factors influence preference for principles in the political arena?"[2] Watts and Zimmerman (1978) have addressed this question in their development of a positive theory of the determination of accounting standards.

W-Z developed a positive theory of accounting by exploring factors influencing management's attitudes on accounting standards which, in turn, affect lobbying behavior toward proposed accounting standards. Certain factors are expected to affect a manager's wealth either directly or indirectly through a firm's cashflows. These factors are taxes, regulation, management compensation plans, bookkeeping costs, and political costs; and W-Z combined them into a model which predicts that large firms experiencing reduced reported earnings due to changed accounting standards will favor the change. All other firms oppose the change <u>if the additional bookkeeping costs justify the costs of lobbying</u>. This prediction was tested using the corporate submissions to the FASB's Discussion Memorandum on General Price Level Adjustments. W-Z interpreted their results as supporting the theory.

Hagerman and Zmijewski (1978) utilized probit analysis in applying the W-Z theory to select among alternative accounting principles.

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[2]The literature relating accounting to the political arena can be traced back to writings where researchers argued accounting numbers report not "truth" (absolutes) but value judgments. See Yuji Ijiri and R. Jaedicke, "Reliability and Objectivity of Accounting and Measurements," <u>Accounting Review</u> (July 1966): 473-483, William H. Beaver, John W. Kennelly, and William M. Voss, "Predictive Ability as a Criterion for the Evaluation of Accounting Data," <u>Accounting Review</u> (October 1968): 675-683. Others, later, have argued that since accounting rules are value judgments it is only just that those parties affected by the rules be heard. In other words, the accounting choice involves a social choice.

The purpose of their study was to determine if size, risk, capital intensity, concentration, and the existence of incentive compensation plans, affect the choice of accounting principles. They concluded that they do, but not on a consistent basis. That is, the important explanatory variables tend to be different for each accounting principle tested.

Dhaliwal (1980) extended the W-Z theory to include capital structure as an economic variable that would affect management's attitude toward accounting standards. He argued that an accounting standard which causes a reduction in reported earnings or equity and/or increases the volatility of reported earnings may put a firm into technical default under its loan agreements. Therefore, he hypothesized that highly leveraged firms would be expected to oppose such an accounting standard. Dhaliwal interpreted the results of his study to be consistent with his hypothesis.

Volatility in Earnings

Each of the three studies previously cited is quite limited in terms of one of the possible consequences of adopting an accounting standard: a change in volatility of reported earnings. The W-Z study ignored this possible outcome and the attitude of corporate managers anticipating a change in volatility of earnings. Hagerman and Zmijewski (H-Z) acknowledged the possible effects of volatility on the lobbying behavior of corporate managers. However, H-Z excluded volatility from consideration in drawing inferences by choosing to employ empirical tests on accounting alternatives with effects on net income that are relatively unambiguous. As previously discussed, Dhaliwal extended the W-Z theory to include capital structure as a variable influencing management's attitude toward accounting standards. His hypothesis is the notion that firms with high debt-to-equity ratios (a surrogate expected to capture risk associated with possible violation of restrictive covenants in credit agreements and indentures) will lobby in favor of proposed standards perceived to increase earnings and/or decrease volatility. Although Dhaliwal's findings are consistent with his hypothesis, his research design was deficient in that it failed to control for a shift in the mean of reported earnings. To the extent there was interaction, the results are inconclusive in determining whether managers favored the method because of increased earnings, or lower volatility, or both. His scenario was full cost vs. successful efforts accounting in the oil and gas industry. For the firms required to switch from full cost to successful efforts accounting, any increase in variability of earnings is probably accompanied by a downshift in the mean. The Dhaliwal study and the H-Z study both failed to separate the effects of volatility from the effects of a shift in the mean of reported earnings.

Perhaps inclusion of volatility in the W-Z theory will both (1) enrich the theroy, and (2) improve the classificatory power of the discriminant function developed for explaining management lobbying behavior.

CHAPTER III

METHODOLOGY

The objective of the present chapter is to discuss the design of this study, the sample selection process, model formulation, and approach taken toward analysis of the data.

Design of the Study

The design of the study entailed the development of two discriminant models: (1) the original W-Z model (OM), and (2) the generalized model (GM). The OM contains the original variables used in the W-Z study, but the variables were restructured[1] so as to be comparable with the GM which contains additional variables. The difference in explanatory power of the OM and GM, therefore, was thus attributable to the additional variables contained in the GM.

Sample Selection

COMPUSTAT companies that filed letters of comment with the FASB in response to its Exposure Draft, "Financial Reporting in Units of General Purchasing Power" (hereafter ED) comprise the population frame. There are 94 such companies. Fourteen of them were excluded from the sample for various reasons including insufficient COMPUSTAT data

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[1]See Appendix A for the original W-Z model and modifications.

(ten companies), three changes in inventory valuation method within the time series, and one statistical outlier. Thus, 80 companies comprise the sample. Another sample, 30 companies, contained in the W-Z study that responded to the DM, was also studied to see to what extent the findings based on the W-Z data set are consistent with those based on the ED data set. Details of the two samples employed in this study are contained in Appendix D.

Data Source

The reason for choosing this particular proposed accounting standard warrants some comment. Other proposed accounting standards were initially regarded as viable candidates for inclusion in this empirical investigation. They include three exposure drafts that ultimately became:

1. SFAS No. 8, "Accounting for the Translation of Foreign Currency Transactions and Foreign Currency Financial Statements,"
2. SFAS No. 12, "Accounting for Certain Marketable Securities,"
3. SFAS No. 34, "Capitalization of Interest Cost."

SFAS no. 8 caused an increase in volatility of reported earnings; SFAS no. 12 caused a mean shift (downward) and increased volatility in earnings. The consequence of SFAS no. 34 appeared to be exactly opposite that of SFAS no. 12. That is, SFAS no. 34 tended to cause a mean shift upward and "smooth" reported income. It would be desirable to incorporate in the discriminant model the consequence of accounting standards such as these three. Unfortunately, the time series of *pro forma* data that was available in the response firm's annual reports was not long enough to enable measuring such consequences as: (1) mean shift, (2) volatility change, and (3) trend (growth) of reported earnings.

W-Z, in their empirical test, chose to investigate empirically firm response (letters of comment) to the FASB's general price level accounting discussion memorandum (GPLA-DM). This accounting issue, they contended, caused a mean shift in income. W-Z claimed to have investigated the consequence of a mean shift in income on the attitude of corporate managers although W-Z measured income changes in only one accounting period. The W-Z measurement of mean shift in income involved an approximation of restated net income using the Davidson and Weil (1975) procedure. Only the direction of the change, not its magnitude, was captured in the discriminant model.

Fortunately, Parker (1977) developed a procedure that also approximates restated earnings due to general price level accounting. The Parker algorithm has at least two advantages over the Davidson and Weil procedure. First, the Parker algorithm is in more strict compliance with the intent of the ED.[2] Second, the Parker algorithm, unlike the Davidson and Weil procedure, requires only data which is obtainable from COMPUSTAT. The adoption of the ED would have affected reported earnings of firms in terms of (1) mean shift, (2) volatility change, and (3) trend (growth). Use of the Parker algorithm enabled generating

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[2] For example, in Parker's study all adjustments were made in accordance with those methods set forth by the FASB since the purpose was to approximate financial statements prepared in accordance therwith. As such, the adjustment procedures are those being advocated by the FASB. Davidson and Weil, however, disagreed with the FASB adjustment factor for revenues and expenses, and adopted an alternative.

a maximum time series of 18 years, 1960-1978.[3] The ED was issued in 1974. Although managers may not perceive the effects of an accounting standard on net income beyond 5-6 years, this longer time series was needed to obtain reliable measures of such parameters as volatility and trend given fewer data points.

Data Collection

A computer program was written to develop summary income statements reflecting general price level changes. The program (Appendix B) is based on Parker's technique for approximating amounts which would have been reported had the companies been applying the restatement procedures proposed in the ED. The computer generated data (illustrated in Appendix C) which were then used in obtaining measures of the variables contained in the discriminant models. Details of (1) the variable selection process, (2) the development of the two discriminant models, and (3) the methods of assessing the classificatory power of the models are given in the following sections.

Description of the Variables

The selection of variables to be tested for inclusion in the generalized W-Z model (GM) was based on three criteria. First, the values used in calculating the variables had to be accessible or estimable. Second, some logical reason should exist for these variables to be related to the lobbying behavior of the corporate manager.

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[3]Some COMPUSTAT data are not available for the period 1960-1978 for all COMPUSTAT companies.

Third, the variables actually used in the model were ratios rather than absolute quantities. The ratios were selected in order to allow comparability of these values among the small and large firms.

The remainder of this section lists the variables included in the initial development of the discriminant function, giving (1) definition of the variable, and (2) an explanation of why it was proposed in this study.

Variables relating to the proposed accounting standard:

The tax benefits ratio:

$$T = \frac{\Delta tax}{tax}$$

This ratio, normalized tax change, is a measure of the tax benefits associated with the proposed accounting standard. Some accounting changes offer potential tax benefits (e.g., from FIFO to LIFO).[4] This variable, a modification of the W-Z variable, was initially included in the GM, for the sake of comparability between the OM and GM. However, the ED affords no tax relief to the firm unless probabilities[5] for tax adjustments (say in the form of indexing) are considered, which was beyond the scope of this study.

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[4]SFAS no. 44, "Accounting of Intangible Assets of Motor Carriers," which calls for an immediate charge to income of interstate operating rights that have been carried as assets by motor carriers, also, will reduce reported earnings with a corresponding tax benefit.

[5]SFAS no. 33, "Financial Reporting and Changing Prices," requires as supplemental disclosure, adjustments to reflect inflationary effects. Exxon, which favors general price level accounting (GPLA) cited, in its 1980 annual report, the erosion taking place in its capital base due to inflation. One might argue that large firms such as Exxon perceive eventual tax relief resulting from the future reporting of GPLA data.

The mean shift ratio:

$$M = \frac{\Delta NI}{NI}$$

This ratio, normalized change in net income, is a measure of the shift in the mean of net income attributable to the ED. This is one of the proxy variables intended to capture "political costs," the argument being that large firms prefer accounting standards that reduce reported earnings and, in turn, their visibility in the public eye.

3. Volatility of earnings ratio:

$$V = \frac{\Delta\sigma^2 NI}{\sigma^2 NI}$$

where

σ^2_{NI} = variance of the residuals of the regression of reported earnings on time

σ^2_{ED} = variance of the residuals of the regression of restated earnings on time

and

$$\Delta\sigma^2_{NI} = \sigma^2_{ED} - \sigma^2_{NI}$$

This ratio, V, measures the effect of the ED on the volatility of earnings (exclusive of linear trend). The explanation for inclusion of this variable has been discussed earlier.

4. The linear trend ratio:

$$B = \frac{\Delta\beta}{\beta}$$

where

β = the coefficient of the regression of reported net income on time

β_{ED} = the coefficient of the regression of restated net income on time

$\Delta\beta = \beta_{ED} - \beta$

This ratio, normalized change in growth of net income, is a measure of the effect, if any, of the ED on the linear trend in net income. Some research suggests it is important to corporate managers that they be able to exhibit some target growth in reported earnings.[6]

Variables relating to the firm:

5. The firm size ratio:

$$S = \frac{SALES}{ASALES}$$

The factor, $\frac{SALES}{ASALES}$, measures the sales size of the firm normalized by the average sales of the firms comprising the sample. The values correspond to the year 1974, the year in which the ED was issued. The term S is another proxy variable for "political costs," and purports to capture absolute size. Absolute size has been said to attract the attention of regulators.[7]

6. The firm concentration ratio:

$$C = \frac{SALES}{TSALES}$$

where

$\frac{SALES}{TSALES}$ = firm sales to total of the COMPUSTAT firms in the same (SIC) industry for the year 1974.

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[6] See Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares", Journal of Business (October 1961): 411-433.

[7] Size *per se* has been mentioned specifically as a criterion for action against corporations. See the "Curse of Bigness," Barron's June 30, 1969, pp. 1 and 8.

The factor, $\frac{\text{SALES}}{\text{TSALES}}$, is an attempted measure of visibility of the firm due to relative, rather than absolute, size of the firm within its industry.

7. The debt-to-equity ratio:

$$R = \frac{\text{DEBT}}{\text{EQUITY}}$$

This measure of financial leverage serves as a proxy variable for financial "risk." The higher this ratio, the greater the risk of the firm being in technical default on loan covenants. The calculation is based on 1974 data, the issuance date of the ED.

In summary, the discriminant functions, OM and GM, can be expressed as:

<u>OM</u>

$$Z = \beta_1 T \qquad\qquad \beta_5 S + \beta_6 C$$

<u>GM</u>

$$Z = \beta_1 T + \beta_2 M + \beta_3 V + \beta_4 B + \beta_5 S + \beta_6 C + \beta_7 R$$

where:

Z = the discriminant score

T = tax benefits ratio

M = mean shift ratio

V = volatility of earnings ratio

B = trend (growth) ratio

S = size ratio

C = concentration ratio

R = debt-to-equity ratio

Certainly the set of ratios proposed above is not in the least unique. Among many other possible variations one might measure R, debt-to-equity ratio, in terms of market values rather than accounting values.[8]

Development of the Discriminant Functions

The statistical technique in this study involved the use of multiple discriminant analysis (hereafter MDA). MDA allows the classification of an observation into one of several a priori groups, based on the characteristics of that observation. In this study an attempt was made to classify firms into two groups, those which favored the ED and those firms that opposed the ED. The characteristics of the two groups must be quantifiable in order to employ MDA. The characteristics were measured in terms of ratios so as to diminish the effects of scale, which was important since the response firms differed greatly in size.

In development of the discriminant function, the intent was to select that set of variables (ratios) which were most similar within groups (favoring and opposing firms). The entire profile of variables and their interactions are considered by MDA, which is an obvious advantage when the number of variables is large. The initial GM contained seven variables. Since interactions are considered, variables sometimes are very important in a multivariate analysis when they would be insignificant in a univariate analysis (Altman, 1968). The models (OM and GM) were developed using stepwise discriminant analysis. This approach allows for specification of a minimum amount of ability before a variable enters the model.

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[8]Although a recent study concludes accounting and market measures of leverage are substitutes. See Robert G. Bowman, "The Debt Equivalence of Leases: An Empirical Investigation," Accounting Review (April 1980): 237-253.

Analysis of Data

Analysis of the data included a determination of the extent to which the generalized model (GM) outperformed the original model (OM) in classifying the sample firms. Also, the relative importance of the variables comprising the two models was investigated. Details to both approaches follow.

Classificatory Power of the Functions

One way to assess the classificatory[9] power of the discriminant function is to determine whether the results are significantly different from those which a chance assignment would give. W-Z tested each observation with the discriminant function computed from all the observations. This method of estimating misclassification probabilities has been known for sometime to be subject to serious bias (Miller, 1974). W-Z were apparently aware of this bias for they stated the sample size used in the empirical test precluded them from employing an alternative approach, the holdout method. However, Lachenbruch and Mickey (1969) cited a number of drawbacks to the holdout method. One of the drawbacks relates to the size of the holdout sample, n. If n is large a good estimate of performance is obtained but the performance is likely to be poor. Lachenbruch and Mickey regard the "cross-validation" technique as an example of a large holdout. If n is small ("leave-one-out", being the extreme) the discriminant function will perform

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[9] If the coefficients of the discriminant function were employed on a separate data set, we would be testing the predictive (rather than classificatory) power of the function.

better but the estimate of its performance will be highly variable. This study employed a nonparametric procedure termed the U method and recommended by Lachenbruch and Mickey. It made use of all observations, yet did not have the disadvantage of serious (favorable) bias.[10] The U method tested each observation with the discriminant function computed from the data with that particular observation removed. This iterative process required the computation of a discriminant function for each observation, but yielded unbiased estimates of the misclassification probabilities. The misclassification probabilities were determined by summing the number of misclassified observations and dividing by the number in each group.

The Goodman and Kruskal (1978) index of predictive association was then used for calculating the percentage error reduction attributable to the discriminant function. To construct the index, let P_1 be the probability of misclassifying a response firm (to the ED) given that the discriminant test has not been applied, and let P_2 be the probability of misclassifying a response firm given the results of the discriminant analysis are available. Then

$$\lambda = \frac{P_1 - P_2}{P_1}$$

where λ denotes the percent of reduction in error.

A random assignment of a particular firm (in a two-group

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[10]W. G. Cochran, "Commentary on 'Estimation of Error Rates in Discriminant Analysis'," Technometrics (February 1968): 204-206, referred to the U method as an application of the jackknife principle. B. Efron, "Bootstrap Methods: Another Look at the Jackknife," Annals of Statistics (1979): Vol. 7, 1-26 showed that the bootstrap, a primitive variation of the jackknife, outperformed the cross-validation method in estimating misclassification probabilities in linear discriminant analysis.

classification scheme) has a probability of .50 of being incorrect; thus $P_1 = .50$. Suppose the probability of incorrect classification using MDA is $P_2 = .20$,

then

$$\frac{.50 - .20}{.50} = \frac{.30}{.50} = .60$$

which is the percent of reduction in error. The index of predictive association also can be calculated directly from the classification matrix.

It was possible that the GM might yield significantly greater explanatory power than the OM and still both models produce identical error rates. Consequently, in this study a complementary measure of classificatory power of the function, called the "margin of safety" (MS) measure was developed. The MS value was obtained by summing the signed differences between the posterior probability and the corresponding probability based on chance assignment for each observation (Table I).

TABLE I

MARGIN OF SAFETY ASSOCIATED WITH POSTERIOR PROBABILITY CLASSIFICATION

OM					GM				
			Margin					Margin	
n	Posterior	Prior	Correct	Wrong	n	Posterior	Prior	Correct	Wrong
1	.65	.50	.15		1	.74	.50	.24	
2	.70	.50	.20		2	.72	.50	.22	
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
N	.40	.50		.10	N	.45	.50		.05
			2.85	.76				4.39	.56
Margin of safety, net			2.09		Margin of safety, net			3.83	

The margin of safety can be applied to an index comparable to λ:

$$\lambda' = \frac{MS_{GM} - MS_{OM}}{MS_{OM}} = \frac{3.83 - 2.09}{2.09} = .8325$$

where

λ' = percent increase in "margin of safety"

MS_{GM} = margin of safety attributable to the GM

MS_{OM} = margin of safety attributable to the OM

Thus, while both models may produce identical success rates, the extent to which additional variables in the GM increase the difference between posterior and prior probabilities can be determined. This increase as percentage increase in margin of safety is attributable to the additional variables.

Relative Importance of Each Variable

To be able to interpret reason(s) for corporate manager lobbying behavior across issues (in future studies) the relative importance of each variable had to be investigated. The stepwise discriminant technique was employed to measure the importance of each variable.

CHAPTER IV

ANALYSIS OF DATA

The objective of the present chapter is to discuss the data analysis. The chapter is divided into the following areas:

1. Reasonableness of Approximations Obtained from the Parker Algorithm
2. Relative Importance of Each Variable
3. Classificatory Power of the Models
   A. Error Reduction in Classification
   B. Margin of Safety in Classification

Reasonableness of Approximations Obtained from the Parker Algorithm

The conclusions drawn by W-Z from their test rely heavily on two important assumptions: (1) perceived rather than actual directional shift in reported net income attributable to inflation motivates corporate management behavior, and (2) the directional shift in net income approximated in one year, 1974, represents the direction of a permanent shift in net income. The reasonableness of these two assumptions warrants some consideration.

In addressing the first assumption no argument is presented here to oppose the assertion that human behavior is motivated by the perceived rather than the actual outcome. W-Z employed the directional shift in net income based on the Davidson and Weil procedure as a surrogate for corporate managers' perceptions of directional shift in earnings. It is reasonable to assume a positive correlation between perceived and actual directional shift in net income, but the Davidson and Weil procedure approximated only actual. Hence, to the extent this procedure approximates restated net income in the wrong direction one can argue W-Z were wrong in assessing what corporate managers perceived to be the directional shift in reported earnings. Thirty of the thirty-four[1] sample companies in the W-Z study were also employed in this study to test for consistency of results using two competing models for approximating restated net income. Six of the thirty W-Z companies indicated directional shift in net income that disagreed with directional shift in net income based on the Parker algorithm (see Table II). Unfortunately W-Z did not disclose the magnitude of the directional shift. However, those six companies that conflicted with the W-Z study indicated a magnitude shift ranging from only 2.8% to 16% with an average of 8.4%. On the surface, the magnitude of shift associated with those companies in which the two approximation procedures conflicted does not seem so large as to suggest one of the two approximation procedures is necessarily inferior to the other. Still it is worth investigating which of the two competing procedures performed better on the W-Z sample companies. W-Z had four companies showing an increase in earnings for which the Parker algorithm showed decreases ranging from 8.1% to 16% (averaging 11.5%). Each of these four companies in which the Parker algorithm indicated a decrease also showed a decrease in mean shift for the time series in this study. For two of these

[1]Four were excluded for reasons discussed in Appendix D.

TABLE II

COMPANIES IN THE W-Z STUDY WHICH DISAGREE WITH DIRECTION OF RESTATED (1974) NET INCOME BASED ON THE PARKER ALGORITHM

Company	Positive change in 1974 net income, adjusted for inflation, based on: W-Z Study	Parker Algorithm	Percentage shift in net income based on the Parker algorithm: 1974	Average for the COMPUSTAT Series	COMPUSTAT years NI ↑ / total	1979 percentage shift in income based on the company's Annual Report*: NOI	NI
1. Caterpillar Tractor Co.		↑	↑ 5.6	↓ 3.9	2 / 18	↓18.	↑13.
2. General Mills Inc.	↑		↓ 9.6	↓ 9.1	1 / 16	↓24.	↑16.
3. Grace (W.R.) & Co.	↑	↑	↑ 4.1	↓21.3	2 / 16	↓55.	↓ 6.
4. Owens-Illinois	↑		↓ 8.1	↓21.3	1 / 17	↓80.	↓ 4.
5. Reliance Electric		↑	↑ 2.8	↓ 8.8	1 / 17	Not available	
6. Rockwell International Corp.	↑		↓16.0	↓34.4	0 / 17	↓31.	↓17.
7. Texaco Inc.	↑		↓12.4	↓12.3	0 / 13	↓47.	↓12.

* For purpose of analysis, here, NOI represents net income from operations or net income exclusive of any purchasing power gain or loss, whereas NI represents NOI adjusted for this reported purchasing power gain or loss.

companies the level of disagreement was quite severe. W-Z categorized Rockwell International Corp. and Texaco Inc. as each having enhanced 1974 earnings, whereas the Parker algorithm approximated 1974 decreases of 16.0% and 12.4%, respectively, and an average downward shift in net income for their respective time series of 34.4% and 12.3%. The companies' annual report for 1979, the first year in which corporations were required to disclose restated earnings as supplemental information disclosed statistics that support the Parker algorithm. Even after netting for significant purchasing power gains these companies showed decreases of 17% and 12% which are contrary to the positive (permanent) shift in net income assumed in the W-Z study. Both companies in their 1979 annual report commented, in general, on the depressing effect inflation has on corporate earnings.

The second W-Z assumption was that the directional shift in net income approximated in one year is indicative of a permanent shift in net income in <u>that</u> direction. Findings based on the Parker algorithm offered support for this assertion. However, of the thirty W-Z companies tested in this study using the Parker algorithm, five indicated a <u>temporary</u> shift in an opposite (positive) direction. Three of those companies had such "outlier" earnings increases in 1974, with magnitudes approximated as 2.8%, 4.1%, and 5.6%. This evidence suggested W-Z's sample might have contained companies that, based on the Davidson and Weil procedure, were outliers for 1974 and consequently W-Z were incorrect in categorizing companies such as Rockwell International Corp. and Texaco Inc. as having permanently <u>enhanced</u> reported income when restated for the effects of inflation.

In summary, the Parker algorithm appeared to have outperformed the

Davidson and Weil procedure when applied to the companies used in the W-Z study. Therefore, the approximations generated from the Parker algorithm for purposes of formulating discriminant models in this study were assumed to be more valid than those employed by W-Z.

Relative Importance of Each Variable

The W-Z study indicated the single variable model based on sales (a measure of company size) had an R^2 of 20.1% which represents 56% of the explanatory power of their full model having an R^2 of 35.8%. W-Z did not, however, compare the single variable model based on sales with any other single variable model. Possibly with strong interaction some other variable could have outperformed sales. Therefore, in this study, those companies in the W-Z data set that were also COMPUSTAT companies (30 of 34) were used to replicate the W-Z experiment.

Replication of the W-Z experiment in this study using 30 of the 34 companies contained in the W-Z sample yielded a full model with explanatory power of 32.9%. This was somewhat less than the W-Z statistic of 35.8% and could be attributed to exclusion of the four companies and the modification of the W-Z model (discussed in Appendix A). The single variable model based on sales compared to all other single variable models (see Table III) unquestionably was the principal contributor to the total R^2 of either the W-Z original model (OM) or the expanded, generalized model (GM).

The R^2 for the OM was 32.9%. For the GM which contained three additional variables the R^2 was 33.8%. That meant that the three new variables contributed, in the aggregate, less than one percent to the expanded model. Yet two of those variables, (1) volatility in earnings (an accounting issue attribute) and (2) debt-to-equity ratio (a company attribute), were deemed significant in the Dhaliwal study. This evidence suggests that if corporate managers are motivated to respond to proposed accounting changes based on certain accounting variables, they react to different issues based on different variables. In other words, corporate managers do not behave consistently across issues based on the variables contained in this study.

This same experiment was applied to a larger data set of 80 companies that responded to the subsequent exposure draft (ED). The results are also summarized in Table III. There was no change in the order of entry of the variables into the model with the exception that the last two variables to enter based on the DM data set reversed sequence when based on the ED data set. Size remained the principal contributor to the R^2 for the total model. Yet meanshift in net income, W-Z's other important theoretical variable, was one of the last two variables to enter the model being outperformed by trend and volatility in each analysis. The explanatory power of the model was reduced to 16.6%, one half the R^2 corresponding to the (smaller, N = 30) DM data set. One might assert that the W-Z inferences were drawn from an experiment based on a data set less representative of those companies that responded to the GPLA issue than those contained in the ED data set and to that extent their inferences may be misleading.

TABLE III

RELATIVE IMPORTANCE OF EACH VARIABLE BASED ON STEPWISE MDA

Variable Number	Variable	Discriminant Coefficient	Standard Error	Order of Entry	Contributing to R^2	Total R^2 after Including in the Model	All Possible One Variable Models Rank	All Possible One Variable Models R^2
	Data Set: Sample Respondents to the GPLA-Discussion Memorandum (N=30)							
	Constant	-0.0520						
1	Mean shift in net income	-0.1123	0.9203	5	.00045	.33841	5	.00471
2	Volatility in net income	-0.0322	0.0748	4	.00514	.33796	6	.00417
3	Trend in net income	-0.0769	0.1540	3	.00718	.33282	2	.05530
4	Size (sales)	0.8508	0.3202	1	.27302	.27302	1	.27302
5	Concentration (relative size)	0.4129	0.4521	2	.05262	.32564	3	.05374
6	Debt-to-Equity	0.0016	0.2452	6	.00000	.33841	4	.00851
	Total R^2, 6 - variable model =				.33841			
	Data Set: Sample Respondents to the (1974) Exposure Draft (N=80)							
	Constant	0.0440						
1	Mean shift in net income	0.0133	0.0663	6	.00046	.16603	5	.00022
2	Volatility in net income	0.0479	0.0658	4	.00513	.16467	3	.01248
3	Trend in net income	-0.0716	0.0491	3	.02479	.15954	4	.01182
4	Size (sales)	0.6127	0.2236	1	.11313	.11313	1	.11313
5	Concentration (relative size)	0.3598	0.2204	2	.02162	.13475	2	.04309
6	Debt-to-Equity	0.0184	0.0801	5	.00090	.16557	6	.00011
	Total R^2, 6 - variable model =				.16603			

Classificatory Power of the Models

Table IV is a summary of the performance of the models formulated from the DM data set.

TABLE IV

CLASSIFICATION OF MATRIX I

			Predicted			
		Total	W-Z Modified Model		Generalized Model	
			Oppose	Favor	Oppose	Favor
Actual	Oppose	20 100%	16 80%	4 20%	17 85%	3 15%
	Favor	10 100%	4 40%	6 60%	3 30%	7 70%
	Total	30 100%	20 66.67%	10 33.33%	20 66.67%	10 33.33%

Data Set: Sample Respondents to the GPLA Discussion Memorandum

It was expected that by expanding the W-Z model to include three additional variables that the generalized model (GM) would outperform the original model (OM). The OM misclassified eight out of thirty companies (26.67%) used in the experiment. The GM misclassified six out of thirty companies (20.00%). Therefore the improvement in classification attributable to inclusion of the three additional variables is an error reduction of 25.00% ≑ ([26.67-20.00]/26.67). This calculation of improved classificatory power, although not very meaningful, was more impressive than the 1% growth in R^2 attributable to the three additional variables. The complementary measure of classificatory power, "margin of safety" or MS was analyzed. The OM yielded an MS of 5.6550 as opposed to the GM's MS of 8.7726 (see Appendix E). The MS improvement, then, attributable to the three additional variables was 55.13%=([8.7726-5.6550]/5.6550).

The performance of the OM and GM upon application to the ED data is summarized in Table V.

TABLE V

CLASSIFICATION OF MATRIX II

			Predicted			
		Total	W-Z Modified Model		Generalized Model	
			Oppose	Favor	Oppose	Favor
Actual	Oppose	64 100%	44 68.75%	20 31.25%	28 43.75%	36 56.25%
	Favor	16 100%	11 68.75%	5 31.25%	11 68.75%	5 31.25%
	Total	80 100%	55 68.75%	25 31.25%	33 48.75%	41 51.25%

Data Set: Sample Respondents to the (1974) Exposure Draft

The results were extremely poor especially in comparison with those summarized in Table IV. The OM misclassified thirty-one out of eighty companies (38.75%). The GM misclassified forty-seven out of eighty companies (58.75%).[2] The expanded model increased the error rate by 51.61% and reduced the net margin of safety (Appendix F) from 8.7476 to 1.8138, a drop of 79.27%. Obviously the poor performance of both models on the ED data set was consistent with the effects on the models' R^2 due to switching from the DM data set to the ED data set.

In summary, both the OM and GM yielded R^2 measures based on the W-Z DM data set (N = 30) that were twice as great as measures based on the ED data set (N = 80). Also, the classificatory power of the OM and GM based on the former data set indicates the GM, having three additional variables, significantly outperformed the OM in terms of correct classification and margin of safety measures. However on the larger, ED data set, both the OM and GM performed very poorly. In fact, a random chance assignment in classification of companies was superior to the results obtained by using the GM.

---

[2]The estimate of error rate (58.75%) associated with the GM was obtained using the jackknife technique (i.e., the U method) which yields unbiased results. For sake of comparison the Mahalanobis sample distance method, which includes all observations in formulating the discriminant function and consequently yields a favorable bias, was employed. This latter method estimated an error rate of only 45% (36/80).

CHAPTER V

SUMMARY OF STUDY

The primary objective of the present chapter is to summarize and evaluate the findings of the study. In doing so, the chapter is divided into the following areas:

1. A General Review
2. Summary of Findings
3. Limitations of Findings
4. Recommendations for Further Research

A General Review

A proposed accounting standard, if adopted, could result in changes in the form and nature of the time series of future earnings. W-Z investigated the effect that the direction of changes in future earnings (i.e., increase vs. decrease) coupled with firm size has on corporate lobbying behavior towards proposed standards. The intent of this study was to enrich the W-Z theory and to generalize their model so as to be applicable to proposed accounting standards that could affect volatility and trend of reported earnings as well as a shift in the mean of reported earnings. The original W-Z model (OM) and the generalized model (GM) were formulated based on two data sets relating to the GPLA issue: the Discussion Memorandum (DM) data set comprising the sample in the W-Z study and the subsequent Exposure Draft (ED) data set. The smaller

DM data set (N = 30) was used to test for consistency of results of the W-Z study and the current study. This was important because the former study employed the Davidson and Weil procedure for determining the direction of change in reported earnings, whereas the current study employed the Parker procedure. In the event of inconsistent results, inferences drawn would be dependent upon the validity of the procedure used in the study. After the competing GPLA restatement procedures were tested for reasonableness of approximations the models were applied to the larger ED data set (N = 80). This larger data set was used because the sample was believed to be more representative of the population of companies that responded to the GPLA issue than the sample used in the W-Z study. The explanatory power of the models were investigated by determining the relative importance of each variable and its contribution to total model R^2. The classificatory power of the models were also investigated in terms of (1) estimates of error rates, and (2) margin of safety (MS) measures. Unbiased estimates of error rates were obtained using a jackknife procedure termed the U method. The MS procedure, developed in this study, measured the difference between the posterior probability due to the discriminant function and the probability due to chance assignment.

Summary of Findings

Instances were determined in which approximations obtained from the Davidson and Weil procedure used in the W-Z study conflicted with approximations obtained from the Parker procedure used in this study. Test results suggested the approximations obtained from the latter procedure appeared to be more reasonable than those obtained from the former. Hence, inferences drawn in the current study were considered to be based on better approximations than those contained in the W-Z study.

The current study contained a larger data set that was assumed to be more representative of the population of companies that responded to the GPLA issue than the sample contained in the W-Z study. The discriminant function when applied to this GPLA issue was found to be of little practical value in explaining corporate manager behavior. The results of this study contradict the findings of the W-Z study. The positive theory for determination of accounting standards developed by W-Z and generalized in this study was not supported by empirical tests applied to the GPLA issue in this study.

However, the results of the study do not warrant the conclusion that corporate managers are <u>not</u> concerned with consequences of accounting changes on reports of net income in terms of such variables as mean shift, trend, and volatility given such firm attributes as absolute size, industry concentration, and capital structure. The Dhaliwal study indicated a strong concern with reduced reported earnings and/or increased volatility in earnings among highly leveraged companies.

One might argue that if the W-Z theory has validity, the corporate managers who lobby are inconsistent in their response to accounting variables across issues. This suggestion that corporate managers are inconsistent is not very palatable. An alternative interpretation is that corporate managers, in fact, respond to proposed accounting changes on the basis of their perception of the theoretical merits of the issue (benefits) tempered by the practical problems of the company in implementation (costs), i.e., that the W-Z theory is weak.

Limitations of Findings

Three limitations were associated with the present research. First, the results of the present research did not apply to companies outside the study. Only COMPUSTAT companies were candidates for inclusion in the data set contained in the study. To the extent the COMPUSTAT data base is not representative of companies that responded to the GPLA issue, the inferences drawn from the study are biased.

The second limitation is the inability to apply the discriminant function formulated from the data set employed in this study to companies responding to a different accounting issue. That is, the models developed from the ED were not applied to a different exposure draft to assess the <u>predictive</u> power of the models across issues. However, the <u>classificatory</u> power of the model was tested. Unbiased estimates of misclassification probabilities were obtained by testing each observation in the sample of companies in this study (N = 80) with the discriminant function computed from the data with that particular observation removed. Finally, some of the data employed in model formulation involved only approximations obtained from the Parker procedure.

Recommendations for Further Research

The W-Z theory asserts the smaller companies that would be affected by a proposed accounting change would respond only if they oppose the proposal. This assertion could be tested easily by constructing a data base across issues and comparing the favorable response rate of the smaller companies with that of the larger companies. Also, one might test for consistency of behavior among "multiple response" companies, one objective being to assess the extent to which reasons (for or against an exposure draft) are consistently cited in the company's letter of comment. Finally, the correlation between the position of the response company and its auditing firm might be investigated. If there is a high positive correlation, the FASB would need only to solicit and focus on the response of the major accounting firms that would be surrogates for corporate responses. The rationale for a high positive correlation might be one of coalition among the audit firm and its clientele. Alternatively, coalition among companies within major industries might be investigated by determining the extent to which the companies agree within the group.

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APPENDICES

APPENDIX A

THE ORIGINAL W-Z MODEL AND MODIFICATIONS

Original Model

The original model developed by W-Z was as follows:

$$\rho_i = \alpha_1 + \alpha_2\left(\frac{DEP_i}{MKTVL_i}\right) + \alpha_2\left(\frac{NMA_i}{MKTVL_i}\right) + \alpha_3\ (SALES_i)CHG_i$$

$$+ \alpha_4\left(\frac{SALES_i}{TSALES_i}\right)CHG_i + \alpha_5 MCOMP_i + \alpha_6\ REG_i$$

where

$$\rho_i = \begin{cases} \dfrac{\text{Number of oposing firms}}{\text{Total firms in sample}} & \text{if the } i^{th} \text{ firm favored GPLA} \\[2ex] \dfrac{\text{Number of supporting firms}}{\text{Total firms in sample}} & \text{if the } i^{th} \text{ firm opposed GPLA} \end{cases}$$

$MKTVL_i$ = the market value of the firm's equity (number of common shares outstanding x average share price)

REG_i = 1 if the i^{th} firm was regulated
0 if otherwise

$MCOMP_i$ = 1 if the i^{th} firm had a management incentive scheme
0 if otherwise

DEP_i = unadjusted depreciation expense in the 1973 for the i^{th} firm

NMA_1 = net monetary asset position in 1973 for the i^{th} firm

CHG_i =
+1 if the price-level adjusted income is below unadjusted income or if the firm is regulated
+1 if price-level adjusted income is above unadjusted income
0 otherwise

$SALES_i$ = sales of the i^{th} firm

$TSALES_i$ = total sales of the compustat firms with the same SIC code as firm i

$\dfrac{SALES_i}{TSALES}$ = a proxy variable for market share

W-Z asserted that the first two terms,

$$\frac{NMA}{MKTVL} \text{ and } \frac{DEP}{MKTVL}$$

normalized the unadjusted figures by the market value of the equity and the estimated coefficients measured the extent to which an increase in relative depreciation or net monetary assets affected voting behavior. These coefficients were expected to capture the effect of taxes and were predicted to be positive under the W-Z assertion the larger the depreciation and net monetary assets the greater the decline in adjusted income and the greater the tax benefits .

W-Z also asserted that the next two variables

$(SALES)CHG$ and $\left(\frac{SALES}{TSALES}\right) CHG$, were proxies for political costs.

Modified Model

The original model was modified in the following respects. The estimated coefficients of the first two terms

$$\frac{NMA}{MKTVL} \text{ and } \frac{DEP}{MKTVL}$$

were said to capture the "tax benefits." The two terms were replaced with the more generalized measure of tax benefits associated with different proposed accounting standards:

$$\frac{\Delta TAX}{TAX} = \text{normalized tax change .}$$

The next two variables,

$$(\text{SALES})\text{CHG and } \left(\frac{\text{SALES}}{\text{TSALES}}\right)\text{CHG}$$

were said to be proxies for "political costs." However, only the direction of earnings (indicated by CHG) and not the magnitude of change in earnings was reflected in the model. These two terms reflected the magnitude, as well, via the following expansion into three variables:

$$\frac{\text{SALES}}{\text{ASALES}} \quad \text{and} \quad \frac{\text{SALES}}{\text{TSALES}} \quad \text{and} \quad \frac{\Delta\text{NI}}{\text{NI}}$$

where

$\frac{\Delta\text{NI}}{\text{NI}}$ = change in net income, normalized.

The factor, CHG, was no longer required because $\frac{\Delta\text{NI}}{\text{NI}}$ carried the (±) sign, indicating direction as well as magnitude. The factor, SALES, was normalized by ASALES, a measure of the average sales of the firms comprising the sample.

The two remaining terms were dummy variables which simply allowed for classification of the firm as to regulation and/or existence of a management compensation plan. This classification scheme for the purpose of this study was not relevant and, therefore, these two terms were ignored.

The modified model was as follows:

$$\rho_i = \alpha_0 + \alpha_1\left(\frac{\Delta\text{TAX}_i}{\text{TAX}_i}\right) + \alpha_2\left(\frac{\text{SALES}}{\text{ASALES}}\right) + \alpha_3\left(\frac{\text{SALES}_i}{\text{TSALES}_i}\right) + \alpha_4\left(\frac{\text{NI}}{\text{NI}}\right) .$$

After changes in notation to conform with the variables discussed on pages 16-19, the modified model can be written as

$$Z = \beta_1 T + \beta_2 M + \beta_5 S + \beta_6 C .$$

APPENDIX B

LISTING OF FORTRAN COMPUTER PROGRAM

```
1
C
C     TITLE:    GPLA ALGORITHM
C
C     PURPOSE:  THIS ALGORITHM DEVELOPS  SUMMARY INCOME STATEMENTS
C               REFLECTING GENERAL PRICE LEVEL CHANGES. THE  ALGO-
C               RITHM IS BASED ON PARKER'S TECHNIQUE FOR  APPROXI
C               MATING AMOUNTS WHICH WOULD HAVE BEEN REPORTED  HAD
C               THE FIRMS BEEN APPLYING THE RESTATEMENT PROCEDURES
C               PROPOSED IN THE FASB (1974) EXPOSURE DRAFT.
C
C     AUTHOR:   A. JAMES MCKEE, JR.
C
C     INPUT DATA:
C
C          1. DATA FROM THE COMPUSTAT ANNUAL INDUSTRIAL FILES.
C          2. GNP PRICE DEFLATOR INDEX TABLE, 1947-78.
C
C
C
C     OUTPUT DATA:
C
C          1. COMPARATIVE INCOME STATEMENTS, UNADJUSTED AND
C             ADJUSTED FOR INFLATION. THE ADJUSTED   INCOME
C             STATEMENTS ARE INTENDED TO APPROXIMATE COMMON
C             DOLLAR AMOUNTS BASED ON THE PRICE INDEX OF THE
C             END OF THE REPORTING PERIOD.
C
C          2. COMPARATIVE INCOME STATEMENTS, UNADJUSTED  AND
C             ADJUSTED TO "CONSTANT" DOLLARS ( I.E., ADJUSTED
C             INCOME STATEMENTS ARE ROLLED FORWARD TO THE '78
C             YEAR END PRICE INDEX ).
C
C          3. KEY LINE ITEMS OF THE INCOME STATEMENTS ARE PRINTED
C             AND PUNCHED FOR ADDITIONAL PROCESSING AT THE USER'S
C             OPTION.
C
C     NOTE-   ALL OF THE KEY STEPS IN THE RESTATEMENT PROCEDURES
C             ARE  PRINTED TO  ASSIST THE USER IN  UNDERSTANDING
C             THE PROGRAM.
C
C     LIST OF PRINCIPAL VARIABLES .
C
C     VARIABLE                  EXPLANATION
C
C    ( SUBSCRIPT J DENOTES YEAR )
C
C     ACC(J)       - ACCUMULATED DEPRECIATION.
C     ACQ(J)       - ACQISITION DATE OF DEPRECIABLE ASSETS.
C     ACQDEX(J)    - GNP PRICE DEFLATOR INDEX RELATING TO ACQISITION
C                    DATE OF DEPRECIABLE ASSETS.
C     ACQYR(J)     - ACQISITION YEAR OF DEPRECIABLE ASSETS.
C     ADP(J)       - AVERAGE DAILY PURCHASES.
C     ADPO(J)      - AVERAGE (MONETARY) DEBTOR POSITION FOR THE YEAR.
C     AGE(J)       - AVERAGE AGE OF THE DEPRECIABLE ASSETS.
C     ARI(J)       - AVERAGE RATE OF INFLATION FOR THE YEAR.
C     BOT(J)       - NET INCOME (OR BOTTOM LINE).
C     CAE(J)       - DATA(1,J)= CASH AND SHORT-TERM INVESTMENTS.
C     CAR(J)       - DATA(8,J)= PLANT, NET.
C     CGA(J)       - COST OF GOODS AVAILABLE.
C     CGAA(J)      - CGA(J), ADJUSTED FOR INFLATION.
C     CGS(J)       - COST OF GOODS SOLD.
```

```
C       CONAME(7      - COMPUSTAT FIRM NAME.
C       CUL(J)        - DATA(5,J)=CURRENT LIABILITIES(TOTAL).
C       DATA(K,J)     - COMPUSTAT VARIABLE, WHERE K DENOTES THE DATA ITEM.
C       DEL(J)        - DATA(9,J)=LONG-TERM DEBT(TOTAL).
C       DEP(J)        - DATA(14,J)=DEPRECIATION AND AMORTIZATION.
C       DEPA(J)       - DEP(J), ADJUSTED FOR INFLATION.
C       DER           - DEBT TO EQUITY RATIO FOR 1974.
C       DEV(J)        - NUMBER OF DAYS PURCHASES IN ENDING INVENTORY,FIFO.
C       DEX(J,K)      - GNP PRICE DEFLATOR INDEX.
C       ENV(J)        - DATA(3,J)= ENDING INVENTORY.
C       ENVA(J)       - ENV(J), ADJUSTED FOR INFLATION, FIFO.
C       ENVR(J)       -    "      "       "      "     , AVERAGE.
C       ENVRR(J)      - ENVR(J), ROLLED FORWARD.
C       FISH(J)       - ENDING INVENTORY,LIFO (FIRST-IN, STILL-HERE).
C       FISHA(J)      - FISHA(J), ADJUSTED FOR INFLATION.
C       FISHAA(J)     - FISHA(J) ROLLED FORWARD.
C       FISHR(J)      - BEGINNING INVENTORY ROLLED FORWARD TO END OF
C                       YEAR PRICE INDEX.
C       FIX(J)        - DATA(15,J)= DEPRECIATION AND AMORTIZATION.
C       FYR(J)        - COMPUSTAT FISCAL YEAR.
C       GRO(J)        - DATA(7,J)=PLANT, GROSS.
C       INAME(7)      - COMPUSTAT INDUSTRY NAME.
C       J1            - START OF TIME SERIES OF FINANCIAL DATA. FOR
C                       EXAMPLE, J1=3 DENOTES COMPUSTAT YEAR 3, 1961.
C       JK            - END OF TIME SERIES.
C       OPB(J)        - DATA(13,J)= OPERATING INCOME BEFORE DEPRECIATION.
C       OPI(J)        - OPERATING INCOME.
C       OPX(J)        - OPERATING INCOME EXCLUSIVE OF DEPRECIATION AND
C                       AMORTIZATION.
C       OTH(J)        - OTHER INCOME OR LOSS.
C       OXP(J)        - OPERATING INCOME EXCLUSIVE OF PURCHASING POWER
C                       GAIN OR LOSS.
C       PBX(J)        - PROFIT BEFORE EXTRAORDINARY ITEMS.
C       PNM(J)        - NET MONETARY POSITION.
C       POOL(J)       - LIFO INVENTORY POOL (I.E., JTH LAYER).
C       POOLA(J)      - POOLA(J), ADJUSTED FOR INFLATION.
C       PPG(J)        - PURCHASING POWER GAIN OR LOSS.
C       PUR(J)        - PURCHASES.
C       PURA(J)       - PURCHASES, ADJUSTED FOR INFLATION.
C       PURL1(J)      - PURCHASE LAYER 1 ( I.E., PURCHASES FROM THE FIRST
C                       QUARTER COMPRISING ENDING INVENTORY ), FIFO.
C       RATIO         - RATIO OF ENDING INVENTORY TO COST OF  GOODS
C                       AVAILABLE.
C       REC(J)        - DATA(2,J)= RECEIVABLES.
C       SAL(J)        - DATA(12,J)= SALES, NET.
C       TAX(J)        - DATA(16,J)= INCOME TAXES (TOTAL).
C       YEAR(J)       - COMPUSTAT YEAR.
C       XTR(J)        - DATA(48,J)= EXTRAORDINARY ITEMS AND DISCONTINUED
C                       OPERATIONS.
C
C
C
C
C                     THE ABOVE LIST IS NOT ALL-INCLUSIVE. THOSE OMITTED
C                     VARIABLES ARE BELIEVED TO BE SELF-EXPLANATORY WITHIN
C                     THE CONTEXT OF THE PROGRAM.
C
C
C
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C       DEPRECIATION:
        DIMENSION  DEX(50,9)
         DIMENSION GRO(20),CAR(20),DEP(25),ACC(20),AGE(20),ACQ(20),
      1   ACQYR(20),DEPA( 25),ACQDEX(34,9)
        DIMENSION DATA(60,20),YEAR(21),CONAME(7),INAME(7),FYR(20),
      1           BLANK(17),NAME(10)
C       LIFO:
        DIMENSION  ENV(20), CGS(25), FLO(20), PUR(20), POOL(20),
      1            POOLA(20), FISH(20), FISHA(20), FISHR(20),
      1            PURA(20), CGSA(25) , YR(25), FISHAA(20)
C       FIFO:
        DIMENSION ADP(20),DEV(20),PURL4(20), PURL3(20), PURL2(20)
        DIMENSION PURL1(20), PURL4A(20), PURL3A(20), PURL2A(20),PURL1A(20)
        DIMENSION ENVA(20), ENVR(20)
        DIMENSION                   ENVRR(20),CGA(20), CGAA(20),RATIO(20)
C       PPG:
        DIMENSION CAE(20),REC(20),CUL(20),DEL(20),PNM(20),ADPO(20),
      1        ARI(20),PPG(25)
        DIMENSION SAL(25),OPX(25),OPB(25),OXP(25),OPI(25),FIX(25),TAX(25),
      1        OTH(25),PBX(25),XTR(25),BOT(25),XNN(25),SALA(25),OPXA(25),
      1        OPBA(25),OXPA(25),OPIA(25),FIXA(25),TAXA(25),OTHA(25),
      1        PBXA(25),XTRA(25),BOTA(25),RES(25)
C       INITIALIZE VARIABLES
        IN=10
        LP = 6
        PUR( 1)  = 0.0
        PURA( 1) = 0.0
        ENVA(1)  = 0.0
        CGA(1)   = 0.0
        CGAA(1)  = 0.0
        RATIO(1) = 0.0
        ADPO(1)  = 0.0
        ARI(1)   = 0.0
        CGSA( 1) = 0.0
        PPG(1)   = 0.0
        DEPA(1)  = 0.0
        RES(1)   = 0.0
        J1 = 1
        JK = 20
        J2 = J1 + 1
        KTR=1
           READ( IN, 2)(CONAME(I),I=1,7),(INAME(II),II=1,7),CNUM,DNUM
           WRITE(LP, 2)(CONAME(I),I=1,7),(INAME(II),II=1,7),CNUM,DNUM
    2      FORMAT(1X,7A4,7A4,2F8.0)
           WRITE(LP, 3)
    3      FORMAT(2X,'YEAR',13X,'FYR',1X,'INVENTORY',2X,'COST-SALES',1X,
      1          'VALUATION',2X,'GR. PLANT',2X,'NET PLANT'/)
           DO  140    K=1, 20
                      READ (IN, 4)YEAR(K),FYR(K),DATA(3,K),DATA(41,K),
      1                       DATA(59,K),DATA(7,K),DATA(8,K)
                      WRITE(LP, 4)YEAR(K),FYR(K),DATA(3,K),DATA(41,K),
      1                       DATA(59,K),DATA(7,K),DATA(8,K)
    4                 FORMAT(1X,7(F10.3,1X))
  140      CONTINUE
           WRITE(LP,5)
    5      FORMAT(2X,'YEAR',6X,'DEP,+AMORT',1X,'CASH + EQ.',1X,
      1               'RECEIVABLE',1X,'CURR.LIAB',2X,'LT. DEBT',3X,
      1               'NET SALES'/)
           DO  141    K=1, 20
                      READ (IN,4)YEAR(K),DATA(14,K),DATA(1,K),DATA(2,K),
      1                            DATA(5,K),DATA(9,K),DATA(12,K)
                      WRITE(LP,4)YEAR(K),DATA(14,K),DATA(1,K),DATA(2,K),
      1                            DATA(5,K),DATA(9,K),DATA(12,K)
  141      CONTINUE
           WRITE(LP,6)
    6      FORMAT(2X,'YEAR',6X,'NOI.B.DEP',2X,'EXTRA.B.TAX',1X,'NET INC',
      1           2X,'X-ITEMS',4X,'PR.STOCK',3X,'COMM.STOCK'/)
           DO  142    K=1, 20
```

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                    READ (IN,4)YEAR(K),DATA(13,K),DATA(17,K),DATA(18,K),
     1                          DATA(48,K),DATA(10,K),DATA(11,K)
                    WRITE(LP,4)YEAR(K),DATA(13,K),DATA(17,K),DATA(18,K),
     1                          DATA(48,K),DATA(10,K),DATA(11,K)
  142     CONTINUE
          WRITE(LP,7)
    7     FORMAT(2X,'YEAR',6X,'INTANGIBLES',1X,'FIXED CHARG',1X,
     1                                           'INC. TAXES'/)
          DO  143   K=1,  20
                    READ (IN,8)YEAR(K),DATA(33,K),DATA(15,K),DATA(16,K)
                  WRITE(LP,8)YEAR(K),DATA(33,K),DATA(15,K),DATA(16,K)
    8               FORMAT(1X,4(F10.3,1X))
  143     CONTINUE
        IN = 5
C       READ IN TABLE OF GNP PRICE DEFLATOR INDICES
C
        WRITE(LP,12)
   12 FORMAT(///31X,'GNP PRICE DEFLATOR',16X,'AVERAGE FOR FISCAL YEARS')
        WRITE(LP,13)
   13 FORMAT(31X,'QUARTERLY INDEX',28X,'ENDING')
        WRITE(LP,14)
   14 FORMAT(/21X,'YEAR',4X,'FIRST SECOND  THIRD  FOURTH',8X,
     1                      'FIRST SECOND  THIRD  FOURTH'/)
C
        DO 144  J=1,34
               READ(IN, 1) ( DEX(J,K),K=1, 9)
    1          FORMAT(F5.0,1X,4F7.2,7X,4F7.2)
C
               WRITE(LP,15) ( DEX(J,K), K=1, 9)
   15          FORMAT( 21X, F5.0,1X,4F7.2,7X,4F7.2)
C
  144 CONTINUE
C
C       CALCULATION OF PURCHASES
C C
C         WRITE(LP,16)
C   16    FORMAT(//40X,'STEP 1-DETERMINE PURCHASES FOR ALL YEARS'//)
C         WRITE(LP,17)
C   17    FORMAT(39X,'COST OF')
C         WRITE(LP,18)
C   18    FORMAT( 39X,'ENDING',6X,'GOODS',7X,'BEGINNING')
C         WRITE(LP,19)
C   19    FORMAT(20X,'YEAR',15X,'INVENTORY',3X,'+',1X,'SOLD',6X,'-',
C    1           'INVENTORY',1X,'=',1X,'PURCHASES')
C 1240
C C
C       J=1
C       YR(J)    = DEX((J+12),1)
C       ENV(J)   =  DATA(3,J)
C       CGS(J)   =  DATA(41,J)
C C
C       DO  145  J=2,  JK
C C
C       YR(J)    = DEX((J+12),1)
C       ENV(J)   =  DATA(3,J)
C       CGS(J)   =  DATA(41,J)
C       CGSA( J) = 0.0
C          PUR(J)  =  ENV(J)  +  CGS(J) -  ENV(J-1)
C       PPG(J)    = 0.0
C       DEPA(J) =0.0
C          WRITE(LP,21) YR(J),ENV(J),CGS(J),ENV(J-1),PUR(J)
C   21     FORMAT(19X,F6.0,13X,4(F10.3,2X))
C  145 CONTINUE
C C   INV. CODE: 1.0=FIFO, 2.0=LIFO, 4.0=AVERAGE
C         IF ( DATA(59,15).EQ.(1.0) ) GO TO 2110
C         IF ( DATA(59,15).EQ.(2.0) ) GO TO 1000
C         IF ( DATA(59,15).EQ.(4.0) ) GO TO  146
C                                     GO TO 1600
C  146 WRITE(LP,22)
C   22 FORMAT(///19X,'STEP 2- RESTATE BEGINNING INVENTORY OF THE PERIOD')
C       WRITE(LP,23)
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   23 FORMAT(/10X,'ASSUMPTION: INVENTORY-BEGINNING WAS ACQUIRED AT ',
     1             'THE AVERAGE OF PREVIOUS 3RD AND 4TH QUARTER PRICE ',
     1                                                        'INDEX')
      WRITE(LP,24)
   24 FORMAT(/19X,'3RD-QTR',3X,'+',3X,'4TH-QTR',2X,'/',1X,'2',2X,'=',
     1                             1X,'AVERAGE INDEX OF INV(B)'/)
      J=J1
      ADEX = (  DEX((J+12),4) + DEX((J+12),5) )/ (2.0)
      ENVA(J) = ENV(J)*DEX((J+12),5)/ADEX
C
      WRITE(LP,25)
   25 FORMAT(19X,'RESTATED BEGINNING INVENTORY:'/)
      WRITE(LP,26) ENV(J), DEX((J+12),5), ADEX , ENVA(J)
   26 FORMAT(25X,F8.2,2X,'X',1X,F7.2,'/',F7.2,2X,'=',F8.2)
      WRITE(LP,27)
   27 FORMAT(///19X,'STEP 3--RESTATE INV(B), ADJUSTED, TO 1959 DOLLARS')
C
C     STEP #3
C
      J=J2
      ENVR(J-1) = ENVA(J-1)*DEX((J+12),5)/DEX((J+11),5)
C
      WRITE(LP,28) ENV(J-1), DEX((J+12),5), DEX((J+11),5), ENVR(J-1)
   28 FORMAT(/19X,F8.2,1X,'X',1X,F7.2,' /',F7.2,'=',F8.2)
      WRITE(LP,29)
   29 FORMAT(///19X,'STEP 4--RESTATE ENDING INVENTORY AND COST OF',
     1                   ' GOODS SOLD FOR ALL PERIODS')
      J=1
      DO 399 J=1, JK
      CGA(J)   = 0.0
      CGAA(J)  = 0.0
  399 CONTINUE
C
      J=J1
      ENVR(J)  = ENVA(J)
       DO 400 J=J2, JK
             ENVRR(J-1)  = ENVR(J-1)*DEX((J+12),5)/DEX((J+11),5)
             PURA(J)     = PUR(J)*DEX((J+12),5)/DEX((J+12),9)
             CGA(J)      = ENV(J-1) + PUR(J)
             CGAA(J)     = ENVRR(J-1) + PURA(J)
             RATIO(J)    = ENV(J)/CGA(J)
             ENVR(J)     = RATIO(J)*CGAA(J)
C
             WRITE(LP, 30)
   30        FORMAT    FORMAT (/) 52X.'HIST. COST' . 9X,' CONVERSION', 9X ,' PR. LEVEL'
             WRITE(LP, 31)
   31        FORMAT(52X,'UNADJUSTED',9X,'FACTOR',13X,'ADJUSTED'/)
             WRITE(LP, 32)ENV(J-1), ENVRR(J-1)
   32        FORMAT(21X,'BEGINNING INVENTORY',11X,F10.3,27X,F10.3)
            WRITE(LP, 33)PUR(J),DEX((J+12),5),DEX((J+12),9), PURA(J)
   33        FORMAT(21X,'PURCHASES',21X,F10.3,7X,F7.2,'/',F7.2,6X,F10.3)
             WRITE(LP,34)
   34        FORMAT(51X,'----------',28X,'----------'/)
             WRITE(LP,35) CGA(J), CGAA(J)
   35        FORMAT(21X,'COST OF GOODS AVAILABLE',7X,F10.3,28X,F10.3)
             WRITE(LP,36)
   36        FORMAT(56X,'X',37X,'X')
             WRITE(LP,37)
   37        FORMAT(21X,'RATIO OF INV(E) TO COST OF')
             WRITE(LP,38) ENV(J), CGA(J), ENV(J),  CGA(J)
   38        FORMAT(26X,'GOODS AVAILABLE',6X,F10.3,'/',F10.3,18X,F10.3,
     1                                              '/',F10.3)
             WRITE(LP,34)
             WRITE(LP,39) ENV(J), ENVR(J)
   39        FORMAT(21X,'ENDING INVENTORY',14X.F10.3,28X.F10.3/)
             WRITE(LP,34)
             CGSA(J)  =  CGAA(J) - ENVR(J)
             WRITE(LP, 40)CGS(J), CGSA(J)
   40        FORMAT(21X,'COST OF GOODS SOLD',12X,F10.3,28X.F10.3////)
  400 CONTINUE
        GO TO 1600
```

```
2110    CONTINUE
C     DETERMINE AVERAGE DAILY PURCHASES(ADP) DURING THE CURRENT YEAR
C
      J=J1
      ADP(J)=0.0
C
      DO  200 J=J2, JK
         ADP(J) = PUR(J)/(365.0)
         WRITE(LP,41) ADP(J)
   41    FORMAT(1X,'ADP = ',2X,F10.3)
  200 CONTINUE
C
C
C     CALCULATE # OF DAYS PURCHASES(DEV) IN ENDING INVENTORY
C
      J=J1
      DEV(J)=0.0
C
      DO  300 J=J2, JK
         DEV(J)= ENV(J)/ADP(J)
         WRITE(LP,42) DEV(J)
   42    FORMAT(1X,'DEV(J) = ',1X, F9.3)
  300 CONTINUE
C
C
C     DECOMPOSE INV(E) INTO PURCHASE LAYERS
C
C
      WRITE(LP, 43)
   43 FORMAT(38X,'DECOMPOSITION OF YEAR-END INVENTORY'//)
      WRITE(LP, 44)
   44 FORMAT(19X,'YEAR',7X,'TOTAL',8X,'4TH-QTR',8X,'3RD-QTR',8X,
     1                '2ND-QTR',8X,'1ST-QTR'/)
C
C
C
      J=1
      PURL4(J) = 0.0
      PURL3(J) = 0.0
      PURL2(J) = 0.0
      PURL1(J) = 0.0
C
      J=J1
      PURL4(J) = 0.0
      PURL3(J) = 0.0
      PURL2(J) = 0.0
      PURL1(J) = 0.0
      DO  500  J=J2, JK
C
         PURL4(J) = 0.0
         PURL3(J) = 0.0
         PURL2(J) = 0.0
         PURL1(J) = 0.0
                 IF(DEV(J).LE.( 92.))  GO TO 401
                 IF(DEV(J).LE.(183.))  GO TO 402
                 IF(DEV(J).LE.(274.))  GO TO 403
                 IF(DEV(J).LE.(365.))  GO TO 404
                 IF(DEV(J).GT.(365.))  GO TO 405
C
C                NUMBER OF DAYS INVENTORY < 92
C
  401                PURL4(J) = ENV(J)
                     GO TO 410
C
C                NUMBER OF DAYS INVENTORY < 183
C
  402                PURL4(J) = ADP(J)*( 92.0)
                     PURL3(J) = ENV(J) - PURL4(J)
                     GO TO 410
```

```
   51         FORMAT(18X,'3RD-QTR',3X,F8.2,3X,F7.2,'-/',F7.2,7X,F8.2)
              WRITE(LP,52) PURL2(J), DEX((J+12),5),DEX((J+12),3),
     1                                   PURL2A(J)
   52         FORMAT(18X,'2ND-QTR',3X,F8.2,3X,F7.2,'-/',F7.2,7X,F8.2)
              WRITE(LP,53) PURL1(J), DEX((J+12),5),DEX((J+12),2),
     1                                   PURL1A(J)
   53         FORMAT(18X,'1ST-QTR',3X,F8.2,3X,F7.2,'-/',F7.2,7X,F8.2)
              WRITE(LP,54) ENV(J), ENVA(J)
   54        FORMAT(/18X,'TOTAL',5X,F8.2,26X,F8.2//)
  600 CONTINUE
C     RESTATE PURCHASES TO $J
      WRITE(LP, 55)
   55 FORMAT(///19X,'STEP 6--RESTATE PURCHASES TO PRICE LEVEL ADJUSTED',
     1                                                  ' BASIS'//)
              WRITE(LP, 47)
              WRITE(LP, 56)
   56         FORMAT(19X,'     ',4X,'UNADJUSTED',2X,'(INDEX-TO)',
     1              '/(INDEX-FROM)',2X,'ADJUSTED'/)
C
C
C
C
          PURA(J) = PUR(J)*DEX((J+12),5)/DEX((J+12),9)
          WRITE(LP, 57) DEX((J+12),1), PUR(J), DEX((J+12),5),
     1                                      DEX((J+12),9), PURA(J)
   57     FORMAT(/18X,F6.0,3X,F8.2,3X, F7.2,' /',F7.2,7X,F8.2)
C     RESTATE BEGINNING INVENTORY TO $J
C
C
      J=J1
      WRITE(LP,58)
   58 FORMAT(///19X,'STEP 7--RESTATE INV(B) , ADJUSTED, TO EOY INDEX'//)
              WRITE(LP, 20)
             WRITE(LP, 61)
      ENVA(J) = ENV(J)
C
      DO  888 J=J2,  JK
         ENVR(J-1) = ENVA(J-1)* DEX((J+12),5)/DEX((J+11),5)
         WRITE(LP, 57) DEX((J+12),1), ENVA(J-1), DEX((J+12),5),
     1            DEX((J+11),5), ENVR(J-1)
  888 CONTINUE
C
C
C     RESTATE COST OF GOODS SOLD TO $J
C
C
      J=J1
      CGSA(J) = 0.0
C
C
               WRITE(LP,60)
   60          FORMAT(//37X,'RESTATEMENT OF COST OF GOODS SOLD'/)
C
      DO  900 J=J2, JK
         CGSA(J) = ENVR(J-1) + PURA(J) - ENVA(J)
               WRITE(LP,61)
   61          FORMAT(77X,'COST OF')
               WRITE(LP,62)
   62          FORMAT(41X,'BEGINNING',15X,'ENDING',6X,'GOODS')
               WRITE(LP,63) DEX((J+12),1)
   63          FORMAT(19X,F6.0,16X, 'INVENTORY',1X,'+',1X,'PURCHASES',
     1             1X,'-',1X,'INVENTORY',1X,'=',1X,'SOLD'/)
               WRITE(LP,64) ENV(J-1), PUR(J), ENV(J), CGS(J)
   64          FORMAT(19X,'UNADJUSTED',10X,F8.2,4X,F8.2,4X,F8.2,4X,F8.2)
               WRITE(LP,65)
   65          FORMAT(19X,'ADJUSTMENT(S)',8X,'VARIOUS')
               WRITE(LP,66)
   66          FORMAT(19X,'ADJUSTED-BEGINNING')
               WRITE(LP,67) ENVA(J-1)
   67          FORMAT(28X,'OF YEAR',  4X,F8.2)
```

```
C
C               NUMBER OF DAYS INVENTORY < 274
C
  403               PURL4(J) = ADP(J)*( 92.0)
                    PURL3(J) = ADP(J)*(91.0)
                    PURL2(J) = ENV(J)-(PURL4(J) + PURL3(J))
                    GO TO 410
C
C               NUMBER OF DAYS INVENTORY < 365
C
  404               PURL4(J) = ADP(J)*( 92.0)
                    PURL3(J) = ADP(J)*( 91.0)
                    PURL2(J) = ADP(J)*( 91.0)
                   PURL1(J) = ENV(J)-(PURL4(J)  + PURL3(J) + PURL2(J) )
                    GO TO 410
C
C               NUMBER OF DAYS INVENTORY > 365
C
  405               WRITE(LP,  45)
   45               FORMAT(1X,'INVENTORY EXCEEDS 365 DAYS PURCHASES')
                    GO TO 1000
 410                WRITE(LP, 46) YR(J),ENV(J),PURL4(J),PURL3(J),
     1                   PURL2(J),PURL1(J)
   46               FORMAT(18X,F6.0,4X,F8.2,6X,F8.2,6X,F8.2,6X,F8.2,
     1                                6X,F8.2)
  500 CONTINUE
C
      WRITE(LP, 47)
   47 FORMAT(///19X,'STEP -5--RESTATE ENDING INVENTORY TO PRICE LEVEL',
     1             ' ADJUSTED BASIS'//)
             WRITE(LP, 48)
   48       FORMAT(27X,'HIST. COST',2X,'GNP PRICE DEFLATOR',
     1                       7X,'PR. LEVEL')
             WRITE(LP, 49)
   49        FORMAT(19X,'POOL',4X,'UNADJUSTED',2X,'(INDEX-TO)',
     1             '/(INDEX-FROM)',2X,'ADJUSTED'/)
C
C
C
C
      J=1
      PURL4A(J)  = 0.0
      PURL3A(J)  = 0.0
      PURL2A(J)  = 0.0
      PURL1A(J)  = 0.0
      ENVA(J)    = 0.0
      J=J1
      PURL4A(J)  = 0.0
      PURL3A(J)  = 0.0
      PURL2A(J)  = 0.0
      PURL1A(J)  = 0.0
      ENVA(J)    = 0.0
C
       DO  600  J=J2, JK
C
             PURL4A(J)  = 0.0
             PURL3A(J)  = 0.0
             PURL2A(J)  = 0.0
             PURL1A(J)  = 0.0
             PURL4A(J)  =  PURL4(J)*DEX((J+12),5)/DEX((J+12),5)
             PURL3A(J)  =  PURL3(J)*DEX((J+12),5)/DEX((J+12),4)
             PURL2A(J)  =  PURL2(J)*DEX((J+12),5)/DEX((J+12),3)
             PURL1A(J)  =  PURL1(J)*DEX((J+12),5)/DEX((J+12),2)
C
             ENVA(J)  =  PURL4A(J) + PURL3A(J) + PURL2A(J) + PURL1A(J)
C
             WRITE(LP,50) DEX((J+12),1),PURL4(J),DEX((J+12),5),
     1                         DEX((J+12),5),PURL4A(J)
   50        FORMAT(10X,F6.0,2X,'4TH-QTR',3X,F8.2,3X,F7.2,'-/',F7.2,
     1                                          7X,F8.2)
             WRITE(LP,51) PURL3(J), DEX((J+12),5),DEX((J+12),4),
     1                                PURL3A(J)
```

```
            WRITE(LP,68) DEX((J+12),5),DEX((J+12),9)
   68       FORMAT(19X,'ADJUSTMENT(S)',16X,F7.2,'/',F7.2,1X,
     1                                                'VARIOUS')
            WRITE(LP,69)
   69       FORMAT(19X,'ADJUSTED-END OF')
         WRITE(LP,70) DEX((J+12),1),ENVR(J-1),PURA(J),ENVA(J),CGSA(J)
   70       FORMAT(25X,F7.0  ,7X,F8.2,4X,F8.2,4X,F8.2,4X,F8.2///)
  900 CONTINUE
      GO TO 1600
 1000 CONTINUE
C
C     CALCULATE  LIFO POOLS AND  POOLS,ADJUSTED
C
         WRITE(LP,71)
   71    FORMAT(//40X,'STEP 2--DETERMINE LIFO POOLS'///)
         J=J1
         POOL(J) = ENV(J)
            FISHAA(J1)= POOL(J1)* DEX((J+12),5)/DEX((J+12),9)
C
      DO  700  J=J2, JK
C
         WRITE(6,72) ENV(J), ENV(J-1)
   72    FORMAT(1X,2F10.3)
         IF(ENV(J).GE.ENV(J-1) )  GO  TO  500
         POOL(J) = 0.0
         DELTA  =  ENV(J-1) - ENV(J)
             IF ( DELTA.LE.POOL(J-1)  )  GO  TO  160
                IF((J-2).LE.0)  GO TO  900
                BAL  =  POOL(J-1) + POOL(J-2)
             IF(DELTA.LE.BAL)  GO  TO  200
                IF((J-3).LE.0) GO  TO  900
                BAL  = POOL(J-1) +  POOL(J-2)  +  POOL(J-3)
             IF(DELTA.LE.BAL)  GO  TO  300
                IF((J-4).LE.0)  GO TO  900
                BAL  = POOL(J-1) +  POOL(J-2) + POOL(J-3) +  POOL(J-4)
             IF(DELTA.LE.BAL)  GO  TO  400
                IF((J-5).LE.0)  GO TO  900
                BAL  = POOL(J-1) +  POOL(J-2) + POOL(J-3) +  POOL(J-4)
     1                + POOL(J-5)
            IF(DELTA.LE.BAL)  GO  TO   450
                IF((J-6).LE.0)  GO TO  900
                BAL  = POOL(J-1) +  POOL(J-2) + POOL(J-3) +  POOL(J-4)
     1                + POOL(J-5) + POOL(J-6)
             IF(DELTA.LE.BAL)  GO  TO  460
                WRITE(LP,73)
   73           FORMAT(1X,'INVENTORY  EXCEEDS FOUR LAYERS')
                GO  TO    1600
C            LIQUIDATION OF INVENTORY < 1 POOL
  160        POOL(J-1) = POOL(J-1) - DELTA
             GO TO 550
C            LIQUIDATION OF INVENTORY < 2POOLS
  200        POOL(J-2) = BAL - DELTA
             POOL(J-1) = 0.0
             GO TO 550
C            LIQUIDATION OF INVENTORY < 3POOLS
  300        POOL(J-3) = BAL - DELTA
             POOL(J-2) = 0.0
             POOL(J-1) = 0.0
             GO TO 550
C            LIQUIDATION OF INVENTORY < 4POOLS
  400        POOL(J-4) = BAL - DELTA
             POOL(J-3) = 0.0
             POOL(J-2) = 0.0
             POOL(J-1) = 0.0
             GO TO 550
C            LIQUIDATION OF INVENTORY < 5POOLS
  450        POOL(J-5) = BAL - DELTA
             POOL(J-4) = 0.0
             POOL(J-3) = 0.0
             POOL(J-2) = 0.0
             POOL(J-1) = 0.0
             GO TO 550
```

```
C           LIQUIDATION OF INVENTORY < 6POOLS
 460        POOL(J-6) = BAL - DELTA
            POOL(J-5) = 0.0
            POOL(J-4) = 0.0
            POOL(J-3) = 0.0
            POOL(J-2) = 0.0
5100
            GO TO 550
C           ADD JTH POOL TO LIFO INVENTORY
 500        POOL(J) = ENV(J) - ENV(J-1)
C
C
C
C           ADJUST INVENTORY POOLS TO END OF YEAR J DOLLARS
C           POOLA(J) = POOL(J), ADJUSTED
C
C           FISH = FIRST-IN,STILL-HERE(IE,LIFO VALUE ENV(J))SUM OF POOL
C           FISHA = FISH ENV, ADJUSTED
 550        POOLA(J1)= POOL(J1)* DEX((J+12),5)/DEX((J+12),9)
            FISHA(J1)= POOLA(J1)
            FISH(J1)= POOL(J1)
            WRITE(LP, 74)
  74        FORMAT(///27X,'HIST. COST',2X,'GNP PRICE DEFLATOR',
   1                      7X,'PR. LEVEL')
            WRITE(LP, 75)
  75        FORMAT(19X,'POOL',4X,'UNADJUSTED',2X,'(INDEX-TO)',
   1                '/(INDEX-FROM)',2X,'ADJUSTED'/)
               I  = J1
            WRITE(LP,76) DEX((I+12),1),POOL(I    ),DEX((J+12),5),
   1                 DEX((I+12),9),POOLA(I    )
  76        FORMAT(18X,F6.0,2X,F10.3,5X,F7.2,1X,'/',F7.2,5X,F10.3)
C
C     CALCULATE  SUBSEQUENT  POOLA  ,  FISH,  AND  FISHA
C
            DO  580  K=J2, J
               POOLA(K)  = POOL(K)* DEX((J+12),5)/DEX((K+12),9)
               FISH(K)   =  FISH(K-1) +  POOL(K)
               FISHA(K)=FISHA(K-1) + POOLA(K)
               WRITE(LP,76)DEX((K+12),1),POOL(K),DEX((J+12),5),
   1                       DEX((K+12),9),POOLA(K)
 580        CONTINUE
            FISHAA(J) = FISHA(J)
            WRITE(LP,77)FISH(J),FISHA(J)
  77        FORMAT(19X,'TOTAL',2X,F10.3,26X,F10.3///)
 700 CONTINUE
C
C     CALCULATE  COST  OF  GOODS  SOLD,   PRICE  LEVEL  ADJUSTED
              WRITE(LP,78)
  78          FORMAT(//40X,'STEP 3--RESTATE COST OF GOODS SOLD'//)
     DO  800  L=J2, JK
            FISHR(L-1) = FISHAA(L-1)*( DEX((L+12),5)/DEX((L+11),5))
            PURA(L)  = PUR(L)* DEX((L+12),5)/DEX((L+12),9)
            CGSA(L) =  FISHR(L-1) + PURA(L) -FISHAA(L)
              WRITE(LP,79)
  79          FORMAT(77X,'COST OF')
              WRITE(LP,80)
  80          FORMAT(41X,'BEGINNING',15X,'ENDING',6X,'GOODS')
              WRITE(LP,81) DEX((L+12),1)
  81          FORMAT(19X,F6.0,16X, 'INVENTORY',1X,'+',1X,'PURCHASES',
   1                 1X,'-',1X,'INVENTORY',1X,'=',1X,'SOLD'/)
              WRITE(LP,82)  ENV(L-1),PUR(L), ENV(L),CGS(L)
  82          FORMAT(19X,'UNADJUSTED', 8X,4(F10.3,2X))
              WRITE(LP,83)
  83          FORMAT(19X,'ADJUSTMENT(S)',8X,'VARIOUS')
              WRITE(LP,84)
  84          FORMAT(19X,'ADJUSTED-BEGINNING')
              WRITE(LP,85) FISHAA(L-1)
  85          FORMAT(28X,'OF YEAR', 2X,F10.3 )
              WRITE(LP,86) DEX((L+12),5),DEX((L+12),9)
  86          FORMAT(19X,'ADJUSTMENT(S)',16X,F7.2,'/',F7.2,1X,
   1                                               'VARIOUS')
```

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              WRITE(LP,87)
  87          FORMAT(19X,'ADJUSTED-END OF')
        WRITE(LP,88)DEX((L+12),1),FISHR(L-1),PURA(L),FISHAA(L),CGSA(L)
  88          FORMAT(25X,F7.0  ,5X,4(F10.3,2X))
 800   CONTINUE
 820   GO  TO  1600
C     PRINT  MESSAGE  AS  APPROPRIATE
C
 900   WRITE(LP,89)
  89    FORMAT( 1X,  'LOGIC  ERROR  IN  CALCULATION OF  LIQUIDATION')
       GO  TO  1600
1600  CONTINUE
C
      J=1
       DO  1041  J=1, JK
      GRO(J)   = DATA(7,J)
      CAR(J)   = DATA(8,J)
      DEP(J)   = DATA(14,J)
      ACC(J)   = 0.0
      AGE(J)   = 0.0
      ACQ(J)   = 0.0
      ACQYR(J) = 0.0
      ACQDEX(1,1) = 0.0
 1041  CONTINUE
      YEAR(21) = 79.0
C
       DO  1650  J=J2,  JK
      GRO(J)   = DATA(7,J)
      CAR(J)   = DATA(8,J)
      DEP(J)   = DATA(14,J)
       ACC(J) = GRO(J) - CAR(J)
         AGE(J) = ACC(J)/DEP(J)
         ACQ(J) = YEAR(J+ 1 ) + 1900.0 - AGE(J)
         ACQYR(J) = AINT(ACQ(J))
         FRA     = ACQ(J) - ACQYR(J)
         IF(FRA.LE.(0.25))  GO TO 1201
         IF(FRA.LE.(0.50))  GO TO 1202
         IF(FRA.LE.(0.75))  GO TO 1203
         IF(FRA.GT.(0.75))  GO TO 1204
 1201        KFRA  = 2
             GO TO 1220
 1202        KFRA  = 3
             GO TO 1220
 1203        KFRA  = 4
             GO TO 1220
 1204        KFRA  = 5
             GO TO 1220
C
 1220     CONTINUE
      WRITE(LP,90)
   90 FORMAT(///23X,'STEP 1- DETERMINE AVERAGE AGE ')
      WRITE(LP,91)
   91 FORMAT(//96X,'AVERAGE AGE OF')
       WRITE(LP,92)
   92   FORMAT(65X,'ACCUMULATED',5X,'DEPRECIATION',3X,'ASSETS ON HAND')
        WRITE(LP,93)
   93    FORMAT(23X,'YEAR',9X,'GROSS PLANT',4X,'NET PLANT',5X,
    1          'DEPRECIATION'  ,  4X,'EXPENSE',8X,'AT YEAR END'/)
        WRITE(LP,94) DEX((J+12),1) ,GRO(J),CAR(J),ACC(J),DEP(J),AGE(J)
   94   FORMAT(21X,F10.3,5X,F10.3,2X,'-',2X,F10.3,2X,'=',2X,F10.3,
    1   2X,'/',2X,F10.3,2X,'=',2X,F10.3)
        WRITE(LP,95)
   95   FORMAT(///23X,'STEP 2- DETERMINE ACQUISITION DATE')
        WRITE(LP,96)
   96   FORMAT(//32X,'FOR ASSETS',38X,'GNP PRICE')
        WRITE(LP,97)
   97   FORMAT(32X,'ON HAND AT',19X,'ACQUISITION',7X,'DEFLATOR')
        WRITE(LP,98)
   98   FORMAT(32X,'FISCAL YR-END',8X,'AGE',5X,'DATE',14X,'INDEX')
```

```
        DO 1308  JJ=1, 34
            IF( ACQYR(J).NE.DEX(JJ,1)) GO TO 1305
                K  =  KFRA
            ACQDEX(JJ,K)  = DEX(JJ,KFRA)
        WRITE(LP,99)YEAR(J),AGE(J),ACQ(J),ACQDEX(JJ,K)
   99   FORMAT(33X,F10.3,5X,F10.3,4X,F10.3,5X,F7.2)
            GO TO 1318
 1305     CONTINUE
 1308    CONTINUE
 1318    CONTINUE
C
        WRITE(LP,100)
  100   FORMAT(///23X,'STEP 3-RESTATE DEPRECIATION')
         DEPA(J) = DEP(J)*DEX((J+12) ,5)/ACQDEX(JJ,K)
           WRITE(LP,101)
  101      FORMAT(//52X,'HIST. COST',9X,'CONVERSION',9X,'PR. LEVEL')
           WRITE(LP,102)
  102      FORMAT(52X,'UNADJUSTED',9X,'FACTOR',13X,'ADJUSTED'/)
        WRITE(LP,103) DEP(J),DEX((J+12) ,5),ACQDEX(JJ,K),DEPA(J)
  103   FORMAT(51X,F10.3,7X,F7.2,'/',F7.2,6X,F10.3)
 1650 CONTINUE
      WRITE(LP, 104)
  104 FORMAT(///21X,'STEP 1- DETERMINE AVERAGE DEBTOR POSITION'/)
      WRITE(LP,105)
  105 FORMAT(27X,'NET MONETARY POSITION AT YEAR END:'/)
      WRITE(LP,106)
  106 FORMAT(94X,'NET')
      WRITE(LP,107)
  107 FORMAT(94X,'MONETARY')
      WRITE(LP,108)
  108 FORMAT(34X,'CASH AND',22X,'CURRENT',8X,'LONG-TERM',6X,'POSITION')
      WRITE(LP,109)
  109 FORMAT(27X,'YEAR',3X,'EQUIVALENT',5X,'RECEIVABLES',4X,
     1     'LIABILITIES',4X,'DEBT',11X,'AT YEAR'/)
      DO  2900  J=J1,20
         CAE(J) = DATA(1,J)
         REC(J) = DATA(2,J)
         CUL(J) = DATA(5,J)
         DEL(J) = DATA(9,J)
         PNM(J) = CAE(J) + REC(J) - CUL(J) - DEL(J)
         WRITE(LP,110) DEX((J+12),1),CAE(J),REC(J),CUL(J),DEL(J),PNM(J)
  110    FORMAT(27X,F6.0,2X,F10.3,2X,'+',2X,F10.3,2X,'-',2X,F10.3,2X,
     1         '-',2X,F10.3,2X,'=',2X,F10.3)
 2900 CONTINUE
      WRITE(LP,111)
  111 FORMAT(///27X,'AVERAGE FOR CURRENT YEAR'/)
      WRITE(LP,112)
  112 FORMAT(37X,'AT END OF',8X,'AT END OF',11X,'AVERAGE FOR')
      WRITE (LP,113)
  113 FORMAT(27X,'YEAR',6X,'CURRENT YEAR',5X,'PRIOR YEAR',10X,
     1                                          'CURRENT YEAR'/)
      DO  3000  J=J2, JK
         ADPO(J)  = -( PNM(J-1) + PNM(J) )/(2.0)
         ARI(J)   = DEX( (J+12),5 )/DEX ( (J+11),5 ) - 1.0
         PPG(J)   = ADPO(J)*ARI(J)
         WRITE(LP,114) DEX((J+12),1),PNM(J),PNM(J-1),ADPO(J)
  114    FORMAT(27X,F6.0,4X,'(',1X,F10.3,3X,'+',2X,F10.3,1X,')',1X,'/',
     1                                  1X,'2',3X,'=',1X,F10.3)
 3000 CONTINUE
      WRITE(LP,115)
  115 FORMAT(///21X,'STEP 2- DETERMINE ANNUAL RATES OF INFLATION'/)
      WRITE(LP,116)
  116 FORMAT(37X,'INDEX AT END OF ',4X,'INDEX AT END OF',3X,
     1                                  'ANNUAL RATE OF')
      WRITE(LP,117)
  117 FORMAT(27X,'YEAR',6X,'CURRENT YEAR',8X,'PRIOR YEAR',5X,'=',2X,
     1                                              'INFLATION'/)
      DO  3100  J=J2, JK
         WRITE(LP,118)DEX((J+12),1)  ,DEX((J+12),5),DEX((J+11),5),ARI(J)
  118    FORMAT(27X,F6.0,6X,F10.3,3X,'/',2X,F10.3,8X,F10.3)
 3100 CONTINUE
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      WRITE(LP,119)
  119 FORMAT(///21X,'STEP 3- DETERMINE PURCHASING POWER GAIN/(LOSS)'/)
      WRITE(LP,120)
  120 FORMAT(37X,'AVERAGE',7X,'INFLATION',7X,'GAIN/')
      WRITE(LP,121)
  121 FORMAT(27X,'YEAR',6X,'NET DEBT',6X,'RATE',11X,'(LOSS)'/)
      DO  3200  J=2, JK
         WRITE(LP,122)DEX((J+12),1) ,ADPO(J),ARI(J),PPG(J)
  122    FORMAT(27X,F6.0,4X,F10.3,2X,'X',2X,F6.3,4X,'=',1X,F10.3)
 3200 CONTINUE
                    J = 1
       DO 3250 J=1, JK
         SALA(J) = 0.0
         OPXA(J) = 0.0
         OPBA(J) = 0.0
        FIXA(J) =  0.0
         OPIA(J) = 0.0
        OXPA(J) =  0.0
         TAXA(J) = 0.0
         OTHA(J) = 0.0
         PBXA(J) = 0.0
         XTRA(J) = 0.0
         BOTA(J) = 0.0
 3250  CONTINUE
      DO  4000  J=J1, JK
         SAL(J)  = DATA(12,J)
C        CGS(J)  = VALUE PREV. ASSGNED
C        OPX(J)  = DATA(12-41-13,J), DETERMINED BELOW
         OPB(J)  = DATA(13,J)
C        DEP(J)  = VALUE PREV. ASSGNED
C        OXP(J)  = DATA(13-14,J), DETERMINED BELOW
C        PPG(J)  = VALUE PREV. ASSIGNED
C        OPI(J)  = DATA(13-14,J) - PPG(J), DETERMINED BELOW
         FIX(J)  = DATA(15,J)
         TAX(J)  = DATA(16,J)
C        OTH(J)  = DATA(13-14-15-16-18-17-48,J), DETERMINED BELOW
C        PBX(J)  = OPI(J)-FIX(J)-TAX(J)--OTH(J), DETERMINED BELOW
         XTR(J)  = DATA(48,J)
         BOT(J)  = DATA(18,J)
             OPX(J)  = SAL(J)-CGS(J)-OPB(J)
             OXP(J)  = OPB(J)-DEP(J)
             OPI(J)  = OXP(J)
                 XNN(J) = DATA(17,J)
             OTH(J) = OPB(J)-DEP(J)-FIX(J)-TAX(J)-BOT(J)       -XTR(J)
             PBX(J)  = OPI(J)-FIX(J)-TAX(J)-OTH(J)
         SALA(J) = SAL(J)*DEX((J+12),5)/DEX((J+12),9)
C        CGSA(J) = VALUE PREV. ASSIGNED
         OPXA(J) = OPX(J)*DEX((J+12),5)/DEX((J+12),9)
         OPBA(J) = SALA(J) -CGSA(J) -OPXA(J)
C        DEPA(J) = VALUE PREV. ASSIGNED
         OXPA(J) = OPBA(J) - DEPA(J)
C        PPG(J)  = VALUE PREV. ASSIGNED
         OPIA(J) = OXPA(J) + PPG(J)
         FIXA(J) = FIX(J)*DEX((J+12),5)/DEX((J+12),9)
         TAXA(J) = TAX(J)*DEX((J+12),5)/DEX((J+12),9)
         OTHA(J) = OTH(J)*DEX((J+12),5)/DEX((J+12),9)
         PBXA(J) = OPIA(J)-FIXA(J)-TAXA(J)-OTHA(J)
         XTRA(J) = XTR(J)*DEX((J+12),5)/DEX((J+12),9)
         BOTA(J) = PBXA(J)-XTRA(J)
 4000 CONTINUE
      WRITE(LP, 4255)
 4255 FORMAT(///21X,'RESTATEMENT OF INCOME STATEMENT'//)
      WRITE(LP,4256)
 4256 FORMAT(//21X,'STEP 1- DETERMINE RESTATEMENT FACTORS FOR:',
     1    1X, 'NET SALES , OPERATING EXPENSES(EXCL. OF CGS + DEP.)'/)
      WRITE(LP,4257)
 4257 FORMAT(63X,'FIXED CHARGES, INCOME TAXES, AND "OTHER" INCOME'//)
      WRITE(LP,4258)
 4258 FORMAT(59X,'4TH-QTR',3X,'AVERAGE',5X,'RESTATEMENT')
      WRITE(LP,4259)
 4259 FORMAT(51X,'YEAR',4X,'INDEX',5X,'INDEX',7X,'FACTOR'/)
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      DO 4280  J=1 ,20
         RES(J) = DEX((J+12),5)/DEX((J+12),9)
          WRITE(LP,4260) DEX((J+12),1), DEX((J+12),5), DEX((J+12),9),
     1                        RES(J)
 4260    FORMAT(51X,F6.0,3X,F7.2,'/',F7.2,3X,'=',F7.4)
 4280 CONTINUE
      WRITE(LP,4281)
 4281 FORMAT(//21X,'STEP 2- RESTATE THE INCOME STATEMENT'//)
         JKK = 1
 4290 CONTINUE
      JJ=J2
      DO  4700  J=J2, JK , 4
         J4 = J + 3
         WRITE(LP,4301) ( DEX( (JJ+12),1), JJ=J,J4 )
 4301    FORMAT(///40X,F5.0,3(17X,F5.0))
         WRITE(LP,4302)
 4302 FORMAT(31X,'---------------------',3(1X,'---------------------'))
         WRITE(LP,4303)
 4303    FORMAT(31X,4('HIST. COST   PR. LEVEL',1X))
         WRITE(LP,4304)
 4304    FORMAT(31X,4('UNADJUSTED  ADJUSTED',2X))
         WRITE(LP,4305)
 4305    FORMAT(31X,4('---------- ----------',1X))
         WRITE (LP,4306)
 4306    FORMAT(2X,'INCOME STATEMENT')
         WRITE(LP,4307) (    SAL(JJ),SALA(JJ) , JJ=J,J4 )
 4307 FORMAT(6X,'NET SALES',16X,                8(F10.3,1X))
         WRITE(LP,4308) (    CGS(JJ),CGSA(JJ) , JJ=J,J4 )
 4308 FORMAT(6X,'COST OF GOODS SOLD',7X,        8(F10.3,1X))
         WRITE(LP,4309) (    OPX(JJ),OPXA(JJ) , JJ=J,J4 )
 4309 FORMAT(6X, 'OP.EXP.(EXCL-DEP +AMORT)',1X,8(F10.3,1X) )
         WRITE(LP,4310) (    DEP(JJ),DEPA(JJ) , JJ=J,J4 )
 4310 FORMAT(6X,'DEPR. + AMORT.',11X,           8(F10.3,1X) )
         WRITE(LP,4305)
         WRITE(LP,4312) (    OXP(JJ),OXPA(JJ) , JJ=J,J4 )
 4312 FORMAT(6X,'OPER ICOME(EXCL-PPG)',5X,      8(F10.3,1X) )
         WRITE(LP,4313)     (PPG(JJ),JJ=J,J4 )
 4313 FORMAT(6X,'PURCH PWR GAIN/(LOSS)',15X,4(F10.3,12X))
         WRITE(LP,4305)
         WRITE(LP,4315) (    OPI(JJ),OPIA(JJ) , JJ=J,J4 )
 4315 FORMAT(6X,'OPERATING INCOME',9X,          8(F10.3,1X) )
         WRITE(LP,4316) (    FIX(JJ),FIXA(JJ) , JJ=J,J4 )
 4316 FORMAT(6X,'FIXED CHARGES',12X,            8(F10.3,1X) )
         WRITE(LP,4317) (    TAX(JJ),TAXA(JJ) , JJ=J,J4 )
 4317 FORMAT(6X,'INCOME TAXES',13X,             8(F10.3,1X) )
         WRITE(LP,4318) (    OTH(JJ),OTHA(JJ) , JJ=J,J4 )
 4318 FORMAT(6X,'OTHER(INCOME) OR LOSS',4X,     8(F10.3,1X) )
         WRITE(LP,4305)
         WRITE(LP,4320) (    PBX(JJ),PBXA(JJ) , JJ=J,J4 )
 4320 FORMAT(6X,'INCOME BEFORE X-ITEMS',4X,     8(F10.3,1X) )
         WRITE(LP,4321) (    XTR(JJ),XTRA(JJ) , JJ=J,J4 )
 4321 FORMAT(6X,'EXTRAORDINARY ITEMS',6X,       8(F10.3,1X) )
         WRITE(LP,4305)
         WRITE(LP,4323) (    BOT(JJ),BOTA(JJ) , JJ=J,J4 )
 4323 FORMAT(6X,'NET INCOME',15X,               8(F10.3,1X) )
         WRITE(LP,4305)
         WRITE(LP,4305)
 4700 CONTINUE
C
      DER = ( CUL(16) + DEL(16) )/ ( DATA(10,16) + DATA(11,16) )
      WRITE(LP,5001)
 5001 FORMAT(7X,'DEBT TO EQUITY RATIO(1974):'//)
      WRITE(LP,5002)
 5002 FORMAT(11X,'C.LIABILITY',2X,'LT.DEBT',6X,'PR.STOCK',5X,
     1                'COMM.STOCK',4X,'D/E RATIO'/)
      WRITE(LP,5003) CUL(16),DEL(16),DATA(10,16),DATA(11,16),DER
 5003 FORMAT(10X,'(',F10.3,1X,'+',1X,F10.3,')/(',F10.3,1X,'+',1X,F10.3,
     1                   ')',1X,'=',1X,F10.3///)
      WRITE(LP,5004)(CONAME(I),I=1,6),CNUM,(INAME(II),II=1,6),DNUM,KTR
      WRITE( 7,5004)(CONAME(I),I=1,6),CNUM,(INAME(II),II=1,6),DNUM,KTR
 5004 FORMAT(1X,6A4,1X,F10.3,1X,6A4,F10.3,1X,'CARD#=', I2/)
```

```
      WRITE(LP,5005)
 5005 FORMAT(2X,'YR',5X,'NET SALES',8X,'OPI-EXC-PPG',6X,'PPG',9X,
     1                                            'N.I.B.X.')
      WRITE(LP,5006)
 5006 FORMAT(/1X,2(8X,'U---------A'),16X,'U---------A',13X,I2)
       DO 5100 J=J2, JK
         YR(J) = YEAR(J)
         KTR = KTR + 1
         WRITE(LP,5007) YR(J),SAL(J),SALA(J),OXP(J),OXPA(J),PPG(J),
     1                        PBX(J),PBXA(J),KTR
         WRITE( 7,5007) YR(J),SAL(J),SALA(J),OXP(J),OXPA(J),PPG(J),
     1                        PBX(J),PBXA(J),KTR
5007   FORMAT(1X,F3.0,1X,7F9.2,10X,I2)
5100  CONTINUE
      WRITE(LP,5111)
5111  FORMAT(/2X,'YR',5X,'NET INCOME'/)
      WRITE(LP,5112)
5112  FORMAT(8X,'U        A'/)
      DO 5200 J=J2 , JK
              KTR = KTR + 1
              WRITE(LP,5114) YR(J),BOT(J),BOTA(J),KTR
              WRITE( 7,5114) YR(J),BOT(J),BOTA(J),KTR
5114  FORMAT(1X,F3.0,1X,2F9.2,55X,I2)
5200  CONTINUE
      WRITE(LP,5201)
5201  FORMAT(1X,'FINANCIAL DATA RELATING TO 1974:'/)
              KTR = KTR + 1
         SAL(16) = DATA(12,16)
      WRITE(LP,5202) SAL(16),DER,KTR
      WRITE( 7,5202) SAL(16),DER,KTR
5202  FORMAT(9X,'NET SALES, UNADJUSTED =',F10.3,1X,',',1X,
     1             ' DEBT/EQUITY RATIO =',F10.3,3X,I2)
C
         JKK = JKK + 1
      IF(JKK.GT.2)  GO TO 5400
      WRITE(LP, 4701)
 4701 FORMAT(//21X,'STEP 3- RESTATE THE INCOME STATEMENT TO CONSTANT',
     1                    1X,'( 1978 ) DOLLARS'//)
C
C
          KTR = KTR + 1
       DO 4710 J=J1, JK
         SALA(J) = SALA(J) * DEX(32,5)/DEX( (J+12),5)
         CGSA(J) = CGSA(J) * DEX(32,5)/DEX( (J+12),5)
         OPXA(J) = OPXA(J) * DEX(32,5)/DEX( (J+12),5)
         DEPA(J) = DEPA(J) * DEX(32,5)/DEX( (J+12),5)
         OXPA(J) = OXPA(J) * DEX(32,5)/DEX( (J+12),5)
         PPG(J)  = PPG(J)  * DEX(32,5)/DEX( (J+12),5)
         OPIA(J) = OPIA(J) * DEX(32,5)/DEX( (J+12),5)
         FIXA(J) = FIXA(J) * DEX(32,5)/DEX( (J+12),5)
         TAXA(J) = TAXA(J) * DEX(32,5)/DEX( (J+12),5)
         OTHA(J) = OTHA(J) * DEX(32,5)/DEX( (J+12),5)
         PBXA(J) = PBXA(J) * DEX(32,5)/DEX( (J+12),5)
         XTRA(J) = XTRA(J) * DEX(32,5)/DEX( (J+12),5)
         BOTA(J) = BOTA(J) * DEX(32,5)/DEX( (J+12),5)
 4710 CONTINUE
      GO TO 4290
C
5400  CONTINUE
       STOP
       END
```

1947.	48.47	49.00	49.86	51.42	49.20	49.40	49.60	49.70
1948.	52.29	52.90	53.79	53.53	50.64	51.62	52.10	53.13
1949.	52.98	52.49	52.43	52.44	53.30	53.20	52.86	52.59
1950.	52.28	52.72	54.30	55.16	52.41	52.47	52.94	53.64
1951.	56.89	57.18	57.20	57.80	54.77	55.88	56.61	57.27
1952.	57.69	57.64	58.00	58.65	57.47	57.58	57.78	58.00
1953.	58.73	58.88	59.08	58.81	58.26	58.57	58.84	58.88
1954.	59.54	59.74	59.61	59.90	59.08	59.29	59.43	59.69
1955.	60.44	60.76	61.18	61.50	59.92	60.18	60.57	60.98

1956.	62.03	62.54	63.25	63.77	61.37	61.81	62.33	62.90
1957.	64.51	64.77	65.37	65.44	63.52	64.08	64.61	65.02
1958.	65.69	65.83	66.21	66.41	65.32	65.58	65.84	66.01
1959.	66.98	67.45	67.70	67.95	66.36	66.76	67.14	67.52
1960.	68.40	68.60	68.90	69.00	67.88	68.16	68.46	68.73
1961.	68.90	69.20	69.50	69.6	68.85	69.00	69.15	69.30
1962.	70.20	70.50	70.60	71.10	69.63	69.95	70.23	70.60
1963.	71.40	71.50	71.70	72.20	70.90	71.15	71.43	71.70
1964.	72.40	72.60	73.00	73.20	71.95	72.23	72.55	72.80
1965.	73.80	74.10	74.60	75.00	73.15	73.53	73.93	74.38
1966.	75.70	76.60	77.00	77.70	74.85	75.48	76.08	76.75
1967.	78.20	78.50	79.30	80.10	77.38	77.85	78.43	79.03
1968.	81.10	82.10	82.80	84.00	79.75	80.65	81.53	82.50
1969.	85.00	86.10	87.50	88.60	83.48	84.48	85.65	86.80
1970.	89.90	91.10	91.80	93.00	88.03	89.28	90.35	91.49
1971.	94.40	95.70	96.50	97.40	92.58	93.73	94.90	96.00
1972.	98.70	99.40	100.20	101.50	97.08	98.00	98.93	99.95
1973.	102.90	104.70	106.40	108.70	101.00	102.33	103.88	105.68
1974.	110.60	113.30	116.30	119.60	107.60	109.75	112.23	114.95
1975.	122.70	124.20	126.40	128.70	117.98	120.70	123.23	125.50
1976.	129.90	131.10	132.70	134.70	127.30	129.03	130.60	132.10
1977.	136.60	138.90	140.70	142.90	133.78	135.73	137.73	139.78
1978.	144.90	148.90	151.40	155.00	141.85	144.35	147.03	149.98
1979.	158.20	161.20	164.20	167.50	153.38	156.45	159.65	162.78
1980.	171.20	175.30	179.20	184.00	166.03	169.55	173.30	177.43

```
END OF DATA
end save
READY
logoff
```

APPENDIX C

COMPUTER GENERATED PRINTOUT

Description of Data on Computer Generated Printout

This appendix describes and illustrates the various procedures incorporated in the computer program for generating partial income statements on both an historical cost basis and a price-level-adjusted basis. The procedures are discussed in the same sequence in which they were applied to the COMPUSTAT data of Caterpillar Tractor Co.

Printout of COMPUSTAT DATA. The company's financial data to be used in the program was printed out (Figure 1).

Printout of GNP Price Deflator Index. The index table (Figure 2) was then generated for the purpose of easy reference in testing the logic of computer computations.

Restating LIFO Inventories. The logic of the computer coding for LIFO inventories was rather difficult to follow and so Caterpillar Tractor Co., which used LIFO, was selected for illustration. Coding for FIFO and AVERAGE inventory was relatively straightforward and for sake of brevity is not illustrated. The reader might wish to refer to Parker's (1977) paper in which these simple steps are clearly presented.

Caterpillar Tractor Co.'s base year was assumed to be 1959. Observe in Figure 1 that the time series of COMPUSTAT data was from 1959 to 1978 and during that period the "valuation" was code 2, denoting LIFO. The assumption that 1959 was the base year was reasonable because the inventory level of 1959 was not subsequently eroded and, hence the arbitrary base year price index of 1959 did not impact on computations of future cost of goods sold.

$ENTRY
CATERPILLAR TRACTOR CO CONSTRUCTION MACHINERY & EQP 149123. 3531.

YEAR	FYR	INVENTORY	COST-SALES	VALUATION	GR. PLANT	NET PLANT
59.000	12.000	206.400	559.340	2.000	352.100	249.700
60.000	12.000	227.100	540.560	2.000	403.200	274.200
72.000	12.000	706.894	1890.352	2.000	1328.571	740.458
73.000	12.000	818.300	2396.700	2.000	1563.000	888.100
74.000	12.000	1061.800	3192.500	2.000	1890.200	1110.300
75.000	12.000	1183.400	3702.800	2.000	2310.200	1389.900
76.000	12.000	1244.900	3720.200	2.000	2781.200	1658.600
77.000	12.000	1288.600	4312.098	2.000	3221.199	1999.099
78.000	12.000	1522.300	5349.297	2.000	3699.900	2281.400

YEAR	DEP.+AMORT	CASH + EQ.	RECEIVABLE	CURR.LIAB	LT. DEBT	NET SALES
59.000	28.010	18.500	51.800	110.700	100.000	742.300
60.000	28.310	17.400	65.900	157.300	100.000	716.000
72.000	100.848	81.248	273.449	436.353	315.948	2602.178
73.000	105.300	47.100	343.600	575.800	320.200	3182.400
74.000	125.500	80.300	488.800	814.600	655.900	4082.100
75.000	156.400	121.300	477.900	774.900	851.000	4563.695
76.000	184.100	88.100	604.600	821.200	1034.100	5042.297
77.000	210.500	209.400	648.100	955.800	1011.000	5848.898
78.000	257.100	244.500	767.800	1237.100	1019.000	7219.199

YEAR	NOI.B.DEP	EXTRA.B.TAX	NET INC	X-ITEMS	PR.STOCK	COMM.STOCK
59.000	117.060	0.000	46.520	0.000	18.400	206.446
60.000	107.460	0.000	42.580	0.000	17.900	322.322
72.000	461.693	0.000	206.445	0.000	0.000	1159.577
73.000	487.900	0.000	246.800	0.000	0.000	1326.800
74.000	515.000	0.000	229.200	0.000	0.000	1463.500
75.000	809.596	0.000	398.700	0.000	0.000	1760.700
76.000	868.897	0.000	383.200	0.000	0.000	2027.299
77.000	1047.601	0.000	445.100	0.000	0.000	2342.800
78.000	1283.902	0.000	566.300	0.000	0.000	2752.099

YEAR	INTANGIBLES	FIXED CHARG	INC. TAXES
59.000	0.970	0.000	0.000
60.000	0.000	0.000	0.000
72.000	0.000	0.000	0.000
73.000	0.000	0.000	0.000
74.000	0.000	0.000	0.000
75.000	0.000	0.000	0.000
76.000	0.000	0.000	0.000
77.000	0.000	0.000	0.000
78.000	0.000	0.000	0.000

Figure 1. Financial Data Relating to Caterpillar Tractor Co.

YEAR	GNP PRICE DEFLATOR QUARTERLY INDEX FIRST	SECOND	THIRD	FOURTH	AVERAGE FOR FISCAL YEARS ENDING FIRST	SECOND	THIRD	FOURTH
1947.	48.47	49.00	49.86	51.42	49.20	49.40	49.60	49.70
1948.	52.29	52.90	53.79	53.53	50.64	51.62	52.10	53.13
1949.	52.98	52.49	52.43	52.44	53.30	53.20	52.86	52.59
1950.	52.28	52.72	54.30	55.16	52.41	52.47	52.94	53.64
1951.	56.89	57.18	57.20	57.80	54.77	55.88	56.61	57.27
1952.	57.69	57.64	58.00	58.65	57.47	57.58	57.78	58.00
1953.	58.73	58.88	59.08	58.81	58.26	58.57	58.84	58.88
1954.	59.54	59.74	59.61	59.90	59.08	59.29	59.43	59.69
1955.	60.44	60.76	51.18	61.50	59.92	60.18	60.57	60.98
1956.	62.03	62.54	63.25	63.77	61.37	61.81	62.33	62.90
1957.	64.51	64.77	55.37	65.44	63.52	64.08	64.61	65.02
1958.	65.69	65.83	66.21	66.41	65.32	65.58	65.94	66.01
1959.	66.98	67.45	67.70	67.95	66.36	66.76	67.14	67.52
1960.	68.40	68.60	68.90	69.00	67.88	68.16	68.46	68.73
1961.	68.90	69.20	69.50	69.60	68.85	69.00	69.15	69.30
1952.	70.20	70.50	70.60	71.10	69.63	69.95	70.23	70.60
1963.	71.40	71.50	71.70	72.20	70.90	71.15	71.43	71.70
1954.	72.40	72.60	73.00	73.20	71.95	72.23	72.55	72.80
1965.	73.80	74.10	74.60	75.00	73.15	73.53	73.93	74.38
1966.	75.70	76.60	77.00	77.70	74.85	75.48	76.08	76.75
1967.	78.20	78.50	79.30	80.10	77.38	77.85	78.43	79.03
1968.	81.10	82.10	82.80	84.00	79.75	80.65	81.53	82.50
1969.	85.00	86.10	87.50	88.60	83.48	84.48	85.65	86.80
1970.	89.90	91.10	91.80	93.00	88.03	89.28	90.35	91.49
1971.	94.40	95.70	96.50	97.40	92.58	93.73	94.90	96.00
1972.	98.70	99.40	100.20	101.50	97.08	98.00	98.93	99.95
1973.	102.90	104.70	106.40	108.70	101.00	102.33	103.88	105.68
1974.	110.60	113.30	116.30	119.60	107.60	109.75	112.23	114.95
1975.	122.70	124.20	126.40	128.70	117.98	120.70	123.23	125.50
1976.	129.90	131.10	132.70	134.70	127.30	129.03	130.60	132.10
1977.	136.60	138.90	140.70	142.90	133.78	135.73	137.73	139.78
1978.	144.90	148.90	151.40	155.00	141.85	144.35	147.03	149.98
1979.	158.20	161.20	164.20	167.50	153.38	156.45	159.65	162.78
1930.	171.20	175.30	179.20	184.00	166.03	169.55	173.30	177.43

Figure 2. GNP Price Deflator Index

The purchases component of cost of goods sold was needed and so computed for all years in the time series (Figure 3).

STEP 1-DETERMINE PURCHASES FOR ALL YEARS

YEAR	COST OF ENDING INVENTORY	GOODS + SOLD	BEGINNING -INVENTORY	= PURCHASES
1960.	227.100	540.560	206.400	561.260
1961.	239.100	522.820	227.100	534.820
1962.	238.300	592.750	239.100	591.950
1963.	251.200	681.430	238.300	694.330
1964.	304.600	788.760	251.200	842.160
1965.	370.000	958.540	304.600	1023.940
1966.	422.400	1085.520	370.000	1137.920
1967.	478.300	1100.770	422.400	1156.670
1968.	488.800	1252.933	478.300	1263.433
1969.	599.018	1441.417	488.800	1551.635
1970.	678.170	1546.307	599.018	1625.459
1971.	698.875	1612.811	678.170	1633.516
1972.	706.894	1890.352	698.875	1898.371
1973.	818.300	2396.700	706.894	2508.106
1974.	1061.800	3192.500	818.300	3435.997
1975.	1183.400	3702.800	1061.800	3824.399
1976.	1244.900	3720.200	1183.400	3781.698
1977.	1288.600	4312.098	1244.900	4355.793
1978.	1522.300	5349.257	1288.600	5582.992

Figure 3. Computation of Purchases

For each year in which the ending inventory exceeded beginning inventory, the increment, or new "layer", was regarded as the result of a uniform addition throughout the current year and, hence, indexed at the average for the year. For example, Caterpillar Tractor Co.'s inventory (in millions) grew from 818.300 to 1061.800 in 1974, a new layer of 243.500, unadjusted (Figures 4, 5). This 1974 layer was adjusted using a conversion factor based upon the average index for the year in relation to the index for the last quarter of that year. The restated 1974 layer was (243.500 x 119.60/114.95 = 253.350).

STEP 2--DETERMINE LIFO POOLS

POOL	HIST. COST UNADJUSTED	GNP PRICE DEFLATOR (INDEX-TO)/(INDEX-FROM)	PR. LEVEL ADJUSTED
1959.	206.400	108.70 / 67.52	212.298
1960.	20.700	108.70 / 68.73	32.738
1961.	11.200	108.70 / 69.30	17.568
1962.	0.000	108.70 / 70.60	0.000
1963.	12.900	108.70 / 71.70	19.557
1964.	53.400	108.70 / 72.80	79.733
1965.	65.400	108.70 / 74.38	95.576
1966.	52.400	108.70 / 76.75	74.213
1967.	55.900	108.70 / 79.03	76.887
1968.	10.500	108.70 / 82.50	13.835
1969.	110.218	108.70 / 86.80	138.026
1970.	79.152	108.70 / 91.49	94.041
1971.	20.705	108.70 / 96.00	23.444
1972.	8.019	108.70 / 99.95	8.721
1973.	111.406	108.70 / 105.68	114.590
TOTAL	818.300		1001.226

Figure 4. Composition of LIFO Inventory, 1973

POOL	HIST. COST UNADJUSTED	GNP PRICE DEFLATOR (INDEX-TO)/(INDEX-FROM)	PR. LEVEL ADJUSTED
1959.	206.400	119.60 / 67.52	214.749
1960.	20.700	119.60 / 68.73	36.021
1961.	11.200	119.60 / 69.30	19.329
1962.	0.000	119.60 / 70.60	0.000
1963.	12.900	119.60 / 71.70	21.518
1964.	53.400	119.60 / 72.80	87.729
1965.	65.400	119.60 / 74.38	105.160
1966.	52.400	119.60 / 76.75	81.655
1967.	55.900	119.60 / 79.03	84.556
1968.	10.500	119.60 / 82.50	15.222
1969.	110.218	119.60 / 86.80	151.867
1970.	79.152	119.60 / 91.49	103.471
1971.	20.705	119.60 / 96.00	25.795
1972.	8.019	119.60 / 99.95	9.596
1973.	111.406	119.60 / 105.68	126.080
1974.	243.500	119.60 / 114.95	253.350
TOTAL	1061.800		1336.138

Figure 5. Composition of LIFO Inventory, 1974

The restatement of cost of goods sold for 1974 is illustrated in Figure 6.

STEP 3--RESTATE COST OF GOODS SOLD

1974.	BEGINNING INVENTORY	+ PURCHASES	− ENDING INVENTORY	= COST OF GOODS SOLD
UNADJUSTED	818.300	3435.997	1061.800	3192.500
ADJUSTMENT(S)	VARIOUS			
ADJUSTED-BEGINNING OF YEAR	1001.226			
ADJUSTMENT(S)		119.60/ 114.95	VARIOUS	
ADJUSTED-END OF 1974.	1101.625	3574.991	1336.138	3340.476

Figure 6. Restatement of Cost of Goods Sold

Restating Depreciation. Parker's procedures used for restating depreciation assume that all companies employ a straight line allocation scheme. He defends this assumption citing the 1975 edition of Accounting Trends and Techniques (AICPA, 1975), wherein 563 out of 600 companies (or 94 percent) depreciated all or part of their assets on a straight line basis for financial reporting purposes. Figure 7 illustrates that the average age of depreciable assets was obtained by dividing accumulated depreciation by depreciation expense. Next, the acquisition date was determined by subtracting the average from the current year. The price index corresponding to the acquisition date was then used as a basis for restatement.

STEP 1- DETERMINE AVERAGE AGE

YEAR	GROSS PLANT		NET PLANT		ACCUMULATED DEPRECIATION		DEPRECIATION EXPENSE		AVERAGE AGE OF ASSETS ON HAND AT YEAR END
1974.000	1890.200	-	1110.300	=	779.900	/	125.500	=	6.214

STEP 2- DETERMINE ACQUISITION DATE

FOR ASSETS ON HAND AT FISCAL YR-END	AGE	ACQUISITION DATE	GNP PRICE DEFLATOR INDEX
74.000	6.214	1968.786	84.00

STEP 3-RESTATE DEPRECIATION

HIST. COST UNADJUSTED	CONVERSION FACTOR	PR. LEVEL ADJUSTED
125.500	119.60/ 84.00	178.688

Figure 7. Three Step Procedure for Restatement of Depreciation

Recognizing Purchasing Power Gain or Loss on Net Monetary Position. The procedure used by Parker for measuring purchasing power gain or loss is as follows. Determine net monetary position (NMP) held at year end. Then average the NMP for the current year by adding NMP at the start and end of the year and divide by 2. The percentage increase in the GNP Price Deflator Index, a measure of annual inflation was then applied to the average NMP yielding an approximation of purchasing power gain or loss for the year. Figures 8 and 9 illustrate this procedure as applied to the COMPUSTAT data of Caterpillar Tractor Co. over the year. Also, the price level was assumed to have changed at a constant rate. Therefore, the restatement factor was the ratio of the price index of the fourth quarter to the average for the year. The remaining line items were restated via the conversion factor. Finally, price-level-adjusted income statements were prepared by combining the restatement factors and restated income statements for the years 1972-1974.

Summary Financial Data. After preparing restated income statements the computer program generated additional data, some of which were variable measures to be used in formulating the discriminant functions. The additional data generated in card and printout form included: (1) the 1974 debt-to-equity ratio, (2) a summary of key line items in the income statements, and (3) 1974 net sales. Figure 11 illustrates this output for Caterpillar Tractor Co. Finally, the computer program restates the price-level-adjusted income statements to constant (1978) dollars (Figure 12) and generates a corresponding summary (Figure 13).

STEP 1- DETERMINE AVERAGE DEBTOR POSITION

NET MONETARY POSITION AT YEAR END:

YEAR	CASH AND EQUIVALENT		RECEIVABLES		CURRENT LIABILITIES		LONG-TERM DEBT		NET MONETARY POSITION AT YEAR
1959.	18.500	+	51.800	-	110.700	-	100.000	=	-140.400
1960.	17.400	+	66.900	-	157.300	-	100.000	=	-173.000
1961.	19.400	+	94.000	-	119.100	-	146.800	=	-152.500
1962.	32.800	+	97.400	-	108.900	-	143.500	=	-122.200
1963.	109.300	+	102.400	-	171.200	-	136.800	=	-96.300
1964.	111.500	+	134.600	-	204.400	-	130.000	=	-88.300
1965.	94.300	+	171.100	-	233.200	-	123.300	=	-91.100
1966.	28.500	+	205.100	-	239.400	-	145.100	=	-150.900
1967.	34.000	+	210.600	-	274.100	-	292.900	=	-322.400
1968.	43.100	+	215.600	-	361.600	-	318.500	=	-421.400
1969.	37.838	+	234.628	-	453.086	-	306.471	=	-487.091
1970.	37.471	+	274.773	-	551.588	-	283.865	=	-523.609
1971.	49.316	+	224.430	-	543.291	-	236.997	=	-506.542
1972.	81.248	+	273.449	-	436.353	-	315.948	=	-397.604
1973.	47.100	+	343.600	-	575.800	-	320.200	=	-505.300
1974.	80.300	+	488.800	-	814.600	-	655.900	=	-901.400
1975.	121.300	+	477.900	-	774.900	-	851.000	=	-1026.700
1976.	88.100	+	604.600	-	821.200	-	1034.100	=	-1162.600
1977.	209.400	+	648.100	-	955.800	-	1011.000	=	-1109.300
1978.	244.500	+	767.800	-	1237.100	-	1018.000	=	-1242.800

AVERAGE FOR CURRENT YEAR

YEAR		AT END OF CURRENT YEAR		AT END OF PRIOR YEAR			AVERAGE FOR CURRENT YEAR
1960.	(	-173.000	+	-140.400	) / 2	=	156.700
1961.	(	-152.500	+	-173.000	) / 2	=	162.750
1962.	(	-122.200	+	-152.500	) / 2	=	137.350
1963.	(	-96.300	+	-122.200	) / 2	=	109.250
1964.	(	-88.300	+	-96.300	) / 2	=	92.300
1965.	(	-91.100	+	-88.300	) / 2	=	89.700
1966.	(	-150.900	+	-91.100	) / 2	=	121.000
1967.	(	-322.400	+	-150.900	) / 2	=	236.650
1968.	(	-421.400	+	-322.400	) / 2	=	371.900
1969.	(	-487.091	+	-421.400	) / 2	=	454.246
1970.	(	-523.609	+	-487.091	) / 2	=	505.350
1971.	(	-506.542	+	-523.609	) / 2	=	515.075
1972.	(	-397.604	+	-506.542	) / 2	=	452.073
1973.	(	-505.300	+	-397.604	) / 2	=	451.452
1974.	(	-901.400	+	-505.300	) / 2	=	703.350
1975.	(	-1026.700	+	-901.400	) / 2	=	964.050
1976.	(	-1162.600	+	-1026.700	) / 2	=	1094.650
1977.	(	-1109.300	+	-1162.600	) / 2	=	1135.950
1978.	(	-1242.800	+	-1109.300	) / 2	=	1176.050

Figure 8. Procedure for Determining Net Monetary Position

STEP 2- DETERMINE ANNUAL RATES OF INFLATION

YEAR	INDEX AT END OF CURRENT YEAR		INDEX AT END OF PRIOR YEAR	=	ANNUAL RATE OF INFLATION
1960.	69.000	/	67.950		0.015
1961.	69.600	/	69.000		0.009
1962.	71.100	/	69.600		0.022
1963.	72.200	/	71.100		0.015
1964.	73.200	/	72.200		0.014
1965.	75.000	/	73.200		0.025
1966.	77.700	/	75.000		0.036
1967.	80.100	/	77.700		0.031
1968.	84.000	/	80.100		0.049
1969.	88.600	/	84.000		0.055
1970.	93.000	/	88.600		0.050
1971.	97.400	/	93.000		0.047
1972.	101.500	/	97.400		0.042
1973.	108.700	/	101.500		0.071
1974.	119.600	/	108.700		0.100
1975.	128.700	/	119.600		0.076
1976.	134.700	/	128.700		0.047
1977.	142.900	/	134.700		0.061
1978.	155.000	/	142.900		0.085

STEP 3- DETERMINE PURCHASING POWER GAIN/(LOSS)

YEAR	AVERAGE NET DEBT		INFLATION RATE		GAIN/ (LOSS)
1960.	156.700	X	0.015	=	2.421
1961.	162.750	X	0.009	=	1.415
1962.	137.350	X	0.022	=	2.960
1963.	109.250	X	0.015	=	1.690
1964.	92.300	X	0.014	=	1.278
1965.	89.700	X	0.025	=	2.206
1966.	121.000	X	0.036	=	4.356
1967.	236.650	X	0.031	=	7.310
1968.	371.900	X	0.049	=	18.107
1969.	454.246	X	0.055	=	24.875
1970.	505.350	X	0.050	=	25.096
1971.	515.075	X	0.047	=	24.369
1972.	452.073	X	0.042	=	19.030
1973.	451.452	X	0.071	=	32.024
1974.	703.350	X	0.100	=	70.529
1975.	964.050	X	0.076	=	73.351
1976.	1094.650	X	0.047	=	51.032
1977.	1135.950	X	0.061	=	69.152
1978.	1176.050	X	0.085	=	99.581

Figure 9. Procedure for Determining Purchasing Power Gain/ (Loss)

RESTATEMENT OF INCOME STATEMENT

STEP 1- DETERMINE RESTATEMENT FACTORS FOR: NET SALES , OPERATING EXPENSES(EXCL. OF CGS + DEP.)
FIXED CHARGES, INCOME TAXES, AND "OTHER" INCOME

YEAR	4TH-QTR INDEX	AVERAGE INDEX	RESTATEMENT FACTOR
1959.	67.95/	67.52	= 1.0064
1960.	69.00/	68.73	= 1.0039
1961.	69.60/	69.30	= 1.0043
1962.	71.10/	70.60	= 1.0071
1963.	72.20/	71.70	= 1.0070
1964.	73.20/	72.80	= 1.0055
1965.	75.00/	74.38	= 1.0083
1966.	77.70/	76.75	= 1.0124
1967.	80.10/	79.03	= 1.0135
1968.	84.00/	82.50	= 1.0182
1969.	88.60/	86.80	= 1.0207
1970.	93.00/	91.49	= 1.0165
1971.	97.40/	96.00	= 1.0146
1972.	101.50/	99.95	= 1.0155
1973.	108.70/	105.68	= 1.0286
1974.	119.60/	114.95	= 1.0405
1975.	128.70/	125.50	= 1.0255
1976.	134.70/	132.10	= 1.0197
1977.	142.90/	139.78	= 1.0223
1978.	155.00/	149.98	= 1.0335

STEP 2- RESTATE THE INCOME STATEMENT

	1972.		1973.		1974.	
	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED
INCOME STATEMENT						
NET SALES	2602.178	2642.532	3182.400	3273.342	4082.100	4247.230
COST OF GOODS SOLD	1890.352	1928.291	2396.700	2477.359	3192.500	3340.476
OP.EXP.(EXCL-DEP +AMORT)	250.133	254.012	297.800	306.310	374.600	389.753
DEPR. + AMORT.	100.848	130.896	106.400	145.847	125.500	178.688
OPER ICOME(EXCL-PPG)	360.845	329.333	381.500	343.826	389.500	338.313
PURCH PWR GAIN/(LOSS)		19.030		32.024		70.529
OPERATING INCOME	360.845	348.363	381.500	375.849	389.500	408.842
FIXED CHARGES	0.000	0.000	0.000	0.000	0.000	0.000
INCOME TAXES	0.000	0.000	0.000	0.000	0.000	0.000
OTHER(INCOME) OR LOSS	154.400	156.794	134.700	138.549	160.300	166.785
INCOME BEFORE X-ITEMS	206.445	191.568	246.800	237.300	229.200	242.058
EXTRAORDINARY ITEMS	0.000	0.000	0.000	0.000	0.000	0.000
NET INCOME	206.445	191.568	246.800	237.300	229.200	242.058

Figure 10. Restatement of the Income Statement

DEBT TO EQUITY RATIO(1974):

C.LIABILITY		LT.DEBT	PR.STOCK		COMM.STOCK	D/E RATIO
(814.600	+	655.900)/(	0.000	+	1463.500) =	1.005

CATERPILLAR TRACTOR CO 149123.000 CONSTRUCTION MACHINERY & 3531.000 CARD#= 1

YR	NET SALES		OPI-EXC-PPG		PPG	N.I.B.X.		
	U	A	U	A		U	A	
60.	715.00	718.81	79.15	72.94	2.42	42.58	38.64	2
61.	734.30	737.48	114.31	110.33	1.42	55.82	53.00	3
62.	827.00	832.86	118.41	112.43	2.96	61.92	58.50	4
63.	950.10	972.34	158.96	153.13	1.69	77.27	72.56	5
64.	1161.00	1167.38	236.60	230.62	1.28	123.83	118.51	6
65.	1405.30	1417.01	286.92	280.87	2.21	158.53	153.62	7
66.	1524.00	1542.86	256.65	247.21	4.36	150.09	143.68	8
67.	1472.50	1492.44	167.17	155.48	7.31	106.39	101.18	9
68.	1707.10	1738.14	215.40	198.15	18.11	121.60	120.75	10
69.	2001.64	2043.15	281.55	258.22	24.88	142.47	141.14	11
70.	2127.75	2162.87	286.88	256.03	25.10	143.79	135.67	12
71.	2175.17	2206.89	241.95	204.73	24.37	128.29	113.78	13
72.	2602.18	2642.53	360.84	329.33	19.03	206.45	191.57	14
73.	3182.40	3273.34	381.50	343.83	32.02	246.80	237.30	15
74.	4082.10	4247.23	389.50	338.31	70.53	229.20	242.06	16
75.	4963.70	5090.26	653.20	586.91	73.35	398.70	399.28	17
76.	5042.30	5141.54	684.80	612.24	51.03	383.20	355.74	18
77.	5848.90	5979.45	837.10	753.96	69.15	445.10	422.36	19
78.	7219.20	7460.83	1026.80	930.70	99.58	566.30	554.37	20

YR	NET INCOME		
	U	A	
60.	42.58	38.64	21
61.	55.82	53.00	22
62.	61.92	58.50	23
63.	77.27	72.56	24
64.	123.83	118.51	25
65.	158.53	153.62	26
66.	150.09	143.68	27
67.	106.39	101.18	28
68.	121.60	120.75	29
69.	142.47	141.14	30
70.	143.79	135.67	31
71.	128.29	113.78	32
72.	206.45	191.57	33
73.	246.80	237.30	34
74.	229.20	242.06	35
75.	398.70	399.28	36
76.	383.20	355.74	37
77.	445.10	422.36	38
78.	566.30	554.37	39

FINANCIAL DATA RELATING TO 1974:

NET SALES, UNADJUSTED = 4082.100 , DEBT/EQUITY RATIO = 1.005 40

Figure 11. Summary of Financial Data

STEP 3- RESTATE THE INCOME STATEMENT TO CONSTANT (1978) DOLLARS

	1972.		1973.		1974.	
	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED	HIST. COST UNADJUSTED	PR. LEVEL ADJUSTED
INCOME STATEMENT						
NET SALES	2602.178	4035.393	3182.400	4667.598	4082.100	5504.352
COST OF GOODS SOLD	1890.352	2944.680	2396.700	3532.573	3192.500	4329.211
OP.EXP.(EXCL-DEP +AMORT)	250.133	387.900	297.800	436.781	374.600	505.115
DEPR. + AMORT.	100.848	199.890	106.400	207.970	125.500	231.577
OPER ICOME(EXCL-PPG)	360.845	502.922	381.500	490.276	389.500	438.449
PURCH PWR GAIN/(LOSS)		29.060		45.664		91.405
OPERATING INCOME	360.845	531.982	381.500	535.940	389.500	529.854
FIXED CHARGES	0.000	0.000	0.000	0.000	0.000	0.000
INCOME TAXES	0.000	0.000	0.000	0.000	0.000	0.000
OTHER(INCOME) OR LOSS	154.400	239.440	134.700	157.563	160.300	216.150
INCOME BEFORE X-ITEMS	206.445	292.542	246.800	338.377	229.200	313.703
EXTRAORDINARY ITEMS	0.000	0.000	0.000	0.000	0.000	0.000
NET INCOME	206.445	292.542	246.800	338.377	229.200	313.703

Figure 12. Restatement of the Income Statement to Constant (1978) Dollars

CATERPILLAR TRACTOR CO 149123.000 CONSTRUCTION MACHINERY & 3531.000 CARD#=41

YR	NET SALES		OPI-EXC-PPG		PPG	N.I.B.X.		
	U---------A		J---------A			U---------A		
60.	716.00	1614.72	79.15	163.84	5.44	42.58	86.81	42
61.	734.30	1642.37	114.31	245.71	3.15	55.82	118.04	43
62.	827.00	1815.65	118.41	245.10	6.45	61.92	127.53	44
63.	966.10	2088.50	158.96	328.74	3.63	77.27	155.77	45
64.	1161.00	2471.91	236.60	488.33	2.71	123.83	250.94	46
65.	1405.30	2928.49	286.92	580.47	4.56	158.53	317.48	47
66.	1524.00	3077.78	256.65	493.14	8.69	150.09	286.63	48
67.	1472.50	2887.98	167.17	300.86	14.14	106.39	195.80	49
68.	1737.10	3207.28	215.40	365.63	33.41	121.60	222.81	50
69.	2001.64	3574.35	281.55	451.75	43.52	142.47	246.92	51
70.	2127.75	3604.78	286.88	426.72	41.83	143.79	226.12	52
71.	2175.17	3511.99	241.95	325.81	38.78	128.29	181.07	53
72.	2602.18	4035.39	360.84	502.92	29.06	206.45	292.54	54
73.	3182.40	4667.60	381.50	490.28	45.66	246.80	338.38	55
74.	4082.10	5504.35	389.50	438.45	91.40	229.20	313.70	56
75.	4963.70	6130.46	653.20	705.85	88.34	398.70	480.87	57
76.	5042.30	5916.39	684.80	704.51	58.72	383.20	409.35	58
77.	5848.90	6485.75	837.10	817.80	75.01	445.10	458.12	59
78.	7219.20	7460.82	1026.80	930.70	99.58	566.30	554.36	60

YR	NET INCOME		
	J	A	
60.	42.58	86.81	61
61.	55.82	118.04	62
62.	61.92	127.53	63
63.	77.27	155.77	64
64.	123.83	250.94	65
65.	158.53	317.48	66
66.	150.09	286.63	67
67.	106.39	195.80	68
68.	121.60	222.81	69
69.	142.47	246.92	70
70.	143.79	226.12	71
71.	128.29	181.07	72
72.	206.45	292.54	73
73.	246.80	338.38	74
74.	229.20	313.70	75
75.	398.70	480.87	76
76.	383.20	409.35	77
77.	445.10	458.12	78
78.	566.30	554.36	79

FINANCIAL DATA RELATING TO 1974:

NET SALES, UNADJUSTED = 4082.100 , DEBT/EQUITY RATIO = 1.005 80

Figure 13. Summary of Financial Data in Constant Dollars

APPENDIX D

LIST OF COMPANIES INCLUDED IN STUDY

TABLE VI

COMPUSTAT COMPANIES THAT FILED LETTERS OF COMMENT IN RESPONSE TO THE GPLA DISCUSSION MEMORANDUM AND/OR THE SUBSEQUENT (1974) EXPOSURE DRAFT

Company	Company Position in Response to: Discussion Memorandum	Exposure Draft	Reason for Exclusion from Sample:
AMF Inc.		No	
Amax Inc.		No	
American Cyanamid Co.	No	No	
American Tele & Telegraph		Yes	
Arkansas Best Corp.		No	
Armco Inc		Yes	
Avery International		No	
Avon Products		No	
Beatrice Foods Co.		No	
Bliss & Laughlin Inds.		No	
Boeing Co.		No	
Boise Cascade Corp.		No	
Bunker Ramo Corp.		Yes	
Caterpillar Tractor Co.	Yes	Yes	
Checker Motors Corp.		No	
Chrysler Corp.		No	
Coca-Cola Bottling Co. of NY		No	
Coca-Cola Co.		No	
Conoco Inc.	No	No	
Consolidated Freightways Inc.		No	
Copeland Corp.	No	No	
Corning Glass Works		No	
Dart Industries		No	
Dillingham Corp.		No	
Dr. Pepper Co.		No	
Dresser Industries Inc.		No	
DuPont (E.I.) De Nemours	Yes*		Statistical outlier
Eaton Corp.		No	
Ex-Cell-O Corp.		Yes	
Exxon Corp.	Yes		
FMC		No	
Federal Paper Board Co.		No*	Insufficient COMPUSTAT data
Ford Motor Co.	Yes		
Frontier Airlines Inc.		No	
Gelman Sciences Inc.		No	
General Dynamics Corp.		No*	Insufficient COMPUSTAT data
General Electric Co.	No	Yes	
General Foods Corp.		No	
General Mills Inc.	No	No	
General Motors Corp.	Yes		
Gerber Products Co.		No	
Gillette Co.	No*		Inconsistency in inventory valuation methods

TABLE VI (Continued)

Company	Company Position in Response to: Discussion Memorandum	Exposure Draft	Reason for Exclusion from Sample:
Glen Gery		No*	Insufficient COMPUSTAT data
Goodrich (B.F.) Co.		No*	Inconsistency in inventory valuation methods
Grace (W.R.) & Co.	No		
Greyhound Corp.		No*	Insufficient COMPUSTAT data
Guardsman Chemicals Inc.		No	
Gulf Oil Corp.	Yes	Yes	
Halliburton Co.		No	
Harsco Corp.	No		
Hastings Mfg. Co.		No	
Heinz (H.J.) Co.		No	
Hoover Co.		No	
Ideal Basic Industries Inc.		No*	Insufficient COMPUSTAT data
Imperial Industries Inc.		Yes	
Ingersoll-Rand Co.		No	
Inland Steel Co.	No	No	
Intermark Inc.		No*	Insufficient COMPUSTAT data
Intl. Harvester Co.	No		
Intl. Paper Co.		Yes	
Intl. Tele & Telegraph	No	No	
Kraft Inc.		No	
Kroehler Mfg. Co.		No	
Lilly (Eli) & Co.	No	No	
Lone Star Industries		No	
Marriott Corp.		No	
Masonite Corp.	No	No	
Maytag Co.		No	
Merck & Co.	No	No	
Mobil Corp.		Yes	
Monumental Corp.		No*	Insufficient COMPUSTAT data
Northern Natural Gas		No	
Northwest Industries		No	
Occidental Petroleum Corp.		No	
Owens-Illinois Inc.	No		
Panhandle Eastern Pipeline		No	
Pargas Inc.		No	
Penny (J.C.) Co.		No	
Pennwalt Corp.		No	
Peoples Gas		No*	Insufficient COMPUSTAT data

TABLE VI (Continued)

Company	Company Position in Response to: Discussion Memorandum	Company Position in Response to: Exposure Draft	Reason for Exclusion from Sample:
Reliance Electric	No		
Reynolds (R.J.) Inds.		No*	Insufficient COMPUSTAT data
Rockwell International Corp.	No	Yes	
Safeway Stores Inc.		No	
Schering-Plough		No	
Schlitz (Joseph) Brewing		No*	LIFO base layer eroded in subsequent years (1)
Seagram Co. Ltd.	No		
Searle (G.D.) & Co.		Yes	
Sears, Roebuck & Co.	No	No	
Shell Oil Co.	Yes	Yes	
Sherwin-Williams Co.		No	
Southern Natural Resources		No	
Standard Oil Co. (Calif.)	Yes		
Standard Oil Co. (Indiana)	No	No	
TRW Inc.		No*	Inconsistency in inventory valuation method
Texaco Inc.	No	No	
Texas Instruments Inc.	No	No	
Times Mirror Co.		No	
Trans Union Corp.		No	
Union Carbide Corp.	No	Yes	
Union Oil Co. of Calif.		Yes	
United Aircraft Products Inc.	No		
Varian Associates Inc.		Yes	
Vermont American		No*	Insufficient COMPUSTAT data
Western Union Corp.		No	
White Motor Corp.		No*	Inconsistency in inventory valuation method
Wolverine World Wide		No	
Total responses	32	94	
Total exclusions (*)	2	14	
Total in sample	30	80	

(1) For the purpose of restating LIFO inventory, the earliest year in the COMPUSTAT time series was assumed to be the base layer and valued on the basis of that year's fourth quarter GNP Price Deflator Index. This assumption was reasonable provided the base layer did not subsequently erode and include the arbitrarily indexed cost of inventory in the computation of cost of goods sold. Schlitz violated this condition and so was excluded from the sample.

APPENDIX E

POSTERIOR PROBABILITIES: DISCUSSION MEMORANDUM DATA SET

TABLE VII

POSTERIOR PROBABILITIES ASSOCIATED WITH THE SAMPLE COMPANIES THAT RESPONDED TO THE GPLA DISCUSSION MEMORANDUM

Company	Actual Vote (0=No, 1=Yes)	W-Z Modified Model: Posterior Probability of Correct Classification	W-Z Modified Model: Margin of Safety Correct	W-Z Modified Model: Margin of Safety Incorrect	Generalized Model: Posterior Probability of Correct Classification	Generalized Model: Margin of Safety Correct	Generalized Model: Margin of Safety Incorrect
1. American Cyanamid Co.	0	.8827	.3827		.7662	.2662	
2. Caterpillar Tractor Co.	1	.3378		.1622	.7479	.2479	
3. Conoco Inc.	0	.6849	.1849		.9238	.4238	
4. Copeland Corp.	0	.9050	.4050		.8805	.3805	
5. Exxon Corp.	1	.9758	.4758		.9946	.4946	
6. Ford Motor Co.	1	.8346	.3346		1.0000	.5000	
7. General Electric Co.	1	.8841	.3841		.9700	.4700	
8. General Mills Inc.	0	.8765	.3765		1.0000	.5000	
9. General Motors Corp.	1	.9546	.4546		1.0000	.5000	
10. Grace (W.R.) & Co.	0	.8634	.3634		1.0000	.5000	
11. Gulf Oil Corp.	1	.7974	.2974		.9258	.4258	
12. Harsco Corp.	0	.6764	.1764		1.0000	.5000	
13. Inland Steel Co.	0	.8365	.3365		.7520	.2520	
14. Intl. Harvester Co.	0	.3588		.1412	.3963		.1037
15. Intl. Tele & Telegraph	0	.3982		.1018	.9989	.4989	
16. Lilly (Eli) & Co.	0	.8927	.3927		.9797	.4797	
17. Masonite Corp.	0	.8887	.3887		.9998	.4998	
18. Merck & Co.	0	.8915	.3915		.9301	.4301	
19. Owens-Illinois Inc.		.6800	.1800		.7099	.2099	
20. Reliance Electric	0	.9045	.4045		.9964	.4964	
21. Rockwell Intl. Corp.	1	.6820	.1820		.9996	.4996	
22. Seagram Co. Ltd.	0	.8258	.3258		1.0000	.5000	
23. Sears, Roebuck & Co.	0	.2425		.2565	.4142		.0858
24. Shell Oil Co.	1	.3343		.1657	.1145		.3858

TABLE VII (Continued)

Company	Actual Vote (0=No, 1=Yes)	Posterior Probability of Correct Classification	Margin of Safety		Posterior Probability of Correct Classification	Margin of Safety	
			Correct	Incorrect		Correct	Incorrect
25. Standard Oil Co. (Calif.)	1	.4967		.0033	.4844		.0156
26. Standard Oil Co. (Indiana)	0	.6003	.1003		.6441	.1441	
27. Texaco Inc.	0	.0639		.4361	.0359		.4641
28. Texas Instruments Inc.	0	.7028	.2028		.9841	.4841	
29. Union Carbide Corp.	1	.2968		.2032	.1239		.3761
30. United Aircraft Products Inc.	0	.8848	.3848		1.0000	.5000	
Total posterior probabilities		20.6550			23.7726		
Total equal priors (0.5000 x 30)		-15.0000			-15.0000		
Margin of safety		5.6550 =	7.1250 -	1.4700	8.7726 =	10.2034 -	1.4308

APPENDIX F

POSTERIOR PROBABILITIES: EXPOSURE DRAFT DATA SET

TABLE VIII

POSTERIOR PROBABILITIES ASSOCIATED WITH THE SAMPLE COMPANIES THAT RESPONDED TO THE (1974) EXPOSURE DRAFT

Company	Actual Vote (0=No, 1=Yes)	W-Z Modified Model: Posterior Probability of Correct Classification	W-Z Modified Model: Margin of Safety: Correct	W-Z Modified Model: Margin of Safety: Incorrect	Generalized Model: Posterior Probability of Correct Classification	Generalized Model: Margin of Safety: Correct	Generalized Model: Margin of Safety: Incorrect
AMF Inc.	0	.4971		.0029	.9999	.4999	
Amax Inc	0	.8340	.3340		.3770		.1230
American Cyanamid Co.	0	.6748	.1748		.1471		.3529
American Tele & Telegraph	1	1.0000	.5000		1.0000	.5000	
Arkansas Best Corp.	0	.8816	.3816		1.0000	.5000	
Armco Inc	1	.3867		.1133	.8884	.3884	
Avery International	0	.6032	.1032		.1063		.3937
Avon Products	0	.8360	.3360		.6900	.1900	
Beatrice Foods Co.	0	.5361	.0361		.1063		.3937
Bliss & Laughlin Inds.	0	.7390	.2390		.1625		.3375
Boeing Co.	0	.2514		.2486	.9884	.4884	
Boise Cascade Corp.	0	.8478	.3478		.3152		.1848
Bunker Ramo Corp.	1	.1006		.3994	.8567	.3567	
Caterpillar Tractor Co.	1	.5975	.0975		.9068	.4068	
Checker Motors Corp.	0	1.0000	.5000		1.0000	.5000	
Chrysler Corp.	0	1.0000	.5000		1.0000	.5000	
Coca-Cola Bottling Co. of NY	0	.6993	.1993		.1706		.3294
Coca-Cola Co.	0	.3437		.1563	.9762	.4762	
Conoco Inc.	0	.3166		.1834	.1480		.3520
Consolidated Freightways Inc.	0	.8583	.3583		.8808	.3808	
Copeland Corp.	0	.7634	.2634		.1837		.3163
Corning Glass Works	0	.0912		.4088	.2746		.2254
Dart Industries	0	.4678		.0322	.3813		.1187
Dillingham Corp.	0	.9687	.4687		1.0000	.5000	
Dr. Pepper Co.	0	.8193	.3193		.9040	.4040	

TABLE VIII (Continued)

Company	Actual Vote (0=No, 1=Yes)	W-Z Modified Model: Posterior Probability of Correct Classification	W-Z Modified Model: Margin of Safety Correct	W-Z Modified Model: Margin of Safety Incorrect	Generalized Model: Posterior Probability of Correct Classification	Generalized Model: Margin of Safety Correct	Generalized Model: Margin of Safety Incorrect
Dresser Industries Inc.	0	.4480		.0520	.0741		.4259
Eaton Corp.	0	.6356	.1356		.3076		.1924
Ex-Cell-O Corp.	1	.3959		.1041	.5377	.0377	
FMC	0	.5799	.0799		.6642	.1642	
Frontier Airlines Inc.	0	.9712	.4712		1.0000	.5000	
Gelman Sciences Inc.	0	.5876	.0876		1.0000	.5000	
General Electric Co.	1	.9967	.4967		.7755	.2755	
General Foods Corp.	0	.6088	.1088		.2268		.2732
General Mills Inc.	0	.8093	.3093		.9812	.4812	
Gerber Products Co.	0	.8168	.3168		.4656		.0344
Guardsman Chemicals Inc.	0	.5763	.0763		.0824		.4176
Gulf Oil Corp.	1	.9947	.4947		.9995	.4995	
Halliburton Co.	0	.4992		.0008	.1530		.3470
Hastings Mfg. Co.	0	.5132	.0132		.3812		.1188
Heinz (H.J.) Co.	0	.3712		.1288	.0548		.4452
Hoover Co.	0	.5875	.0875		.1583		.3417
Imperial Industries Inc.	1	.9988	.4988		.0000		.5000
Ingersoll-Rand Co.	0	.6655	.1655		.1814		.3186
Inland Steel Co.	1	.6285	.1285		.0847		.4153
Intl. Paper Co.	1	.6285	.1285		.1379		.3621
Intl. Tele. & Telegraph	0	.0904		.4096	.0757		.4243
Kraft Inc.	0	.2118		.2882	.0778		.4222
Kroehler Mfg. Co.	0	1.0000	.5000		1.0000	.5000	
Lilly (Eli) & Co.	0	.7327	.2327		.4622		.0378
Lone Star Industries	0	.4238		.0762	.0769		.4231
Marriott Corp.	0	.9992	.4992		1.0000	.5000	
Masonite Corp.	0	.5591	.0591		.4126		.0874
Maytag Co.	0	.7426	.2426		.8515	.3515	

TABLE VIII (Continued)

Company	Actual Vote (0=No, 1=Yes)	W-Z Modified Model: Posterior Probability of Correct Classification	W-Z Modified Model: Margin of Safety Correct	W-Z Modified Model: Margin of Safety Incorrect	Generalized Model: Posterior Probability of Correct Classification	Generalized Model: Margin of Safety Correct	Generalized Model: Margin of Safety Incorrect
Merck & Co.	0	.7826	.2826		.5567	.0567	
Mobil Corp.	1	.9990	.4990		.9992	.4992	
Northern Natural Gas	0	.0001		.4999	.0008		.4992
Northwest Industries	0	.7713	.2713		.9996	.4996	
Occidental Petroleum Corp.	0	.2082		.2918	.7396	.2396	
Panhandle Eastern Pipe-line	0	.9743	.4743		1.0000	.5000	
Pargas Inc.	0	.7454	.2454		1.0000	.5000	
Penny (J.C.) Co.	0	.4129		.0871	.0613		.4387
Pennwalt Corp.	0	.5520	.0520		.3174		.1826
Rockwell Intl. Corp.	1	.9850	.4850		.1818		.3082
Safeway Stores, Inc.	0	.2996		.2004	.0527		.4428
Schering-Plough	0	.7909	.2909		.6532	.1532	
Searle (G.D.) & Co.	1	.0295		.4705	.0000		.5000
Sears, Roebuck & Co.	0	.0182		.4818	.0010		.4990
Shell Oil Co.	1	.6905	.1905		.5391	.0391	
Sherwin-Williams Co.	0	.5096	.0096		1.0000	.5000	
Southern Natural Resources	0	.9198	.4198		.9999	.4999	
Standard Oil Co. (Indiana)	0	.1695		.3305	.0418		.4582
Texaco Inc.	0	.0000		.5000	.0000		.5000
Texas Instruments	0	.2885		.2115	.1287		.3713
Times Mirror Co.	0	.6574	.1574		.8310	.3310	
Trans Union Corp.	0	.9975	.4975		1.0000	.5000	
Union Carbide Corp.	1	.5124	.0124		.8952	.3952	
Union Oil Co. of Calif.	1	.5194	.0194		.8660	.3660	
Varian Associates Inc.	1	.0884		.4116	.2479		.2521

TABLE VIII (Continued)

Company	Actual Vote (0=No, 1=Yes)	W-Z Modified Model: Posterior Probability of Correct Classification	W-Z Modified Model: Margin of Safety: Correct	W-Z Modified Model: Margin of Safety: Incorrect	Generalized Model: Posterior Probability of Correct Classification	Generalized Model: Margin of Safety: Correct	Generalized Model: Margin of Safety: Incorrect
Western Union Corp.	0	.9733	.4733		.0000		.5000
Wolverine World Wide	0	.7164	.2164		1.0000	.5000	
Total posterior probabilities		48.7476			41.8138		
Total equal priors (0.5000 x 80)		-40.0000			-40.0000		
Margin of safety		8.7476 =	14.8373	6.0897	1.8138 =	15.4803 -	13.6665

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VITA

Arnold James McKee, Jr.

Candidate for the Degree of

Doctor of Philosophy

Thesis: PREFERENCES FOR ACCOUNTING STANDARDS: THE USE OF DISCRIMINANT ANALYSIS IN FORECASTING CORPORATE MANAGER LOBBYING BEHAVIOR

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