THE REPLACEMENT COST DISCLOSURE REQUIREMENTS OF ASR-190: A TEST FOR INFORMATION

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CHAPTER I

INTRODUCTION

The Perspective

In March 1976, the Securities and Exchange Commission (SEC) issued Accounting Series Release No. 190 (ASR-190), which required a certain class of corporations to disclose data related to replacement cost.[1] The purpose was to fill a vacuum which supposedly exists when only historical costs are reported in financial statements. With the continual decline in the purchasing power of the monetary unit due to inflation, the credibility and usefulness of the data generated by the historical cost model have been severely questioned.

Alternative valuation models based on exit values, entry values and discounted cash flows have been recommended as substitutes or supplements to the historical cost statements.[2] Proponents of each model have argued that their particular choice generated information more useful to the decision making process of financial statement users than the other alternatives. In the absence of substantive empirical evidence of the impact of such data on the behavior of users, these arguments remain conjecture and the controversy continues.

Hypothesis and Methodology

The purpose of this research is to provide empirical evidence

regarding whether information was imparted by the mandatory disclosure of replacement cost.[3] It is usually contended that any incurrence of marginal information production costs can only be justified by a corresponding generation of additional benefits. This study, however, does not attempt to undertake a cost-benefit analysis. Rather, it merely looks for evidence of information content in the data mandatorily disclosed to financial statement users. If information content is found, other researchers might investigate into the cost-benefit trade-offs.

This study observes the market response (identifying long-term equity investors as a specific user group), and thereby facilitates inference as to whether the required disclosures furnished information to market agents. It is hypothesized that the replacement value data, as disclosed in the financial statements, do not possess any information content for the specified user group.

Prior studies in finance and accounting evidence widespread acceptance of the two parameter asset pricing model. This model predicts identical equilibrium expected returns for any two securities (or a group of securities) with the same risk. Accordingly, firms in a treatment sample, selected to conform to the ASR-190 reporting and other criteria (specified subsequently in Chapter III), shall be matched with firms in a control sample (also defined in Chapter III) to which the SEC ruling is not applicable.[4] The riskiness of each such pair of firms shall be equated with the objective of controlling all factors applicable to the firms except one, viz., the compliance with ASR-190. Consequently, with the equality of expected returns predicted

by the capital asset pricing model, any observed differences can be attributed to the differential level of replacement cost disclosure. Treatment and control distributions are assumed multivariate normal and testing will be directed to the equality of the vectors of the means of the market returns of the two groups.

Scope of Study

This study questions whether a particular user group derived any information from the replacement cost data disclosed in financial statements. Few studies, if any, exist which have attempted to evaluate market responses to such data, primarily because such data were not publicly available prior to early 1977. And as stated earlier, this study does not raise the issue of social desirability of such reporting mandates.

The conclusions drawn from the evidence of this study, though pertinent to the issue of information generation, should be generalized with caution. Since the 1977 disclosures were the first replacement cost disclosures in the U.S., the methods for computing replacement cost were unfamiliar and somewhat subjective. Thus there existed some grounds for users to anticipate imprecise data and doubt their reliability.[5] Secondly, the proxy for market expectations used in this study was implicitly the historical cost model. To the extent that this expectations model is inappropriate, this study may have failed to assess information content adequately.

Organization

The following chapter addresses the theoretical justification for

turning to market responses for evidence of information content. Chapter III contains the description of the data and the discussion of the methodology. Results along with their implications are presented in the final chapter.

FOOTNOTES

[1]The reporting criteria of ASR-190, as contained in Peat, Marwick, Mitchell & Co., (1976, p. 1) are as follows:

> . . . The required replacement cost disclosures must be made by all companies filing with the SEC if, at the beginning of the year:
>
> *their total of inventories and gross property, plant and equipment (i.e., before deducting accumulated depreciation, depletion and ammortization) is $100 million or more; and
> *that total is 10% or more of total consolidated assets.
>
> The required disclosures, which are to be presented in a note to the financial statement or in a separate section following the notes, are summarized below:
>
> a. Current replacement cost of inventories shown in annual balance sheet
> b. Cost of sales for two years approximated on the basis of current replacement cost at time of sale
> c. Replacement cost (new) of "productive" capacity" and depreciated replacement cost of such assets shown in the annual balance sheets
> d. Depreciation, depletion and ammortization for two years based on average replacement cost of productive capacity
> e. A description of the methods used in determining the disclosures required by (a) through (d) above
> f. Any additional information which management believes is necessary to prevent the above information from being misleading.

[2]Chambers (1965) and (1966) argues for the current cash equivalent model. McKeown (1971) encountered several difficulties in testing this model.

The discounted flow model, though generally thought to be the most conceptually sound model, suffers from severe practical limitations. See Ronen (1971) and Hendriksen (1977).

The FASB (1974, p. 1) advocated restating historical costs ". . . in terms of common purchasing power as of a specified date . . .," and thus, preparing general price-level financial statements.

For a good comparative analysis of valuation models, see Andersen (1976).

[3] Information has been widely defined as an alteration in the probabilities of state occurrence. See Lev (1969), Demski (1972), Feltham (1968) and Boatsman (1977).

[4] See Gonedes (1975) for a detailed explanation of this methodology.

[5] The overall corporate response to this ruling has been negative and skeptical. Arthur Andersen & Co., (1977, p. 13) reported that 88% of the companies in their selected sample thought the disclosed data were imprecise, 76% viewed these as not representing current value and 80% were of the opinion that these did not consider all effects of inflation. Also consider the following excerpts from the financial statements of two corporations (probably representing the common sentiments of other corporations as well), as quoted in Haskins & Sells (1977, pp. 4 - 5):

MAPCO Inc.

> . . . The purported conclusions represent only a portion of the story -- and because only a portion of the story is set forth, present a misleading, highly distorted picture. In short, the conclusions are hogwash.
> The final tragedy is that this wasted money simply adds to the already staggering burden borne by U.S. companies for compliance with a growing body of rules and regulations. The cost is inevitably built into consumer selling prices and guess who pays? WHY THE CONSUMER, OF COURSE!

U. S. STEEL

> . . . U.S.Steel management continues to caution that the replacement cost data required by ASR 190 provide no basis for adjusting reported net income and balance sheet values and do little to assist investors in understanding either the current costs of operating the business or the economic investment in productive capacity.

CHAPTER II

THE HYPOTHESIS AND A MODEL FOR TESTING INFORMATION CONTENT

Prior Evidence

To date, there have been few published empirical examinations of market responses to either specific or general price-level disclosures. Rather the published empirical evidence is almost totally of the behavioral type, using in a majority of cases, either questionnaires or subjects in a laboratory environment. The conclusions drawn from observed responses to differing treatments (generally the introduction of financial statements using varying accounting alternatives) invariably suffered from either poor response rates and/or the usual internal and external validity problems.

Such studies generally indicated that users are reluctant to give up the conventional historical cost model. At best, they showed preference for current value only if it was disclosed in a format supplemental to historical cost. This user preference was consistently noticed by Horngren (1955), Warner (1954), Estes (1968) and Brenner (1970). The predictive ability of different income measuring models has also been tested. Evidence in Frank (1969), Simons and Gray (1969) and Samuelson (1972) did not suggest that current valuation models

provided better prediction of future earning streams than did the historical cost model. Moreover, Sterling and Radosevich (1969) observed historical cost to be more objective than current values.

Revsine (1973) demonstrated that under a perfectly competitive economy, replacement cost income is a surrogate for economic income. Since economic income embodies cash flow, replacement cost income also embodies cash flow. Presumably then, replacement cost data would provide useful information to long-term equity investors. Given the primacy of cash flow, Revsine (1977, p. 131) rejected the conclusions of both Frank and Simons and Gray:

> . . . Income prediction tests are thus irrelevant unless a transformation is specified between income and some ultimate object of prediction. Since Frank and S & G proposed no such transformation, their findings are not directly relevant for assessing the predictive ability of current operating profit . . .

Absent a perfectly competitive economy, however, the relevance of replacement cost income is ambiguous.

General Inflation and Security Prices

The arguments favoring accounting for inflation are often based on the notion that since inflation erodes the real purchasing potential of investments in securities, inflation related information is pertinent to security valuation. Fisher (1930) hypothesized that the nominal interest rate reflected current information regarding investor expectations of future rates of inflation. This hypothesis, when extended to security returns, suggests that current security prices incorporate the anticipated effects of inflation and thereby provide a

hedge against the loss of purchasing power of their investments. More formally:

$$\tilde{R}_{it} = E(\tilde{R}) + E(\tilde{R}_I) \qquad (1)$$

where,

$\tilde{R}_{it}$ = Rate of return on security i, at time period t,

$E(\tilde{R})$ = Expected real rate of return, and

$E(\tilde{R}_I)$ = Expected rate of inflation.

Evidence favoring the Fisher effect in the debt and government securities markets is provided in Sargent (1969), Gibson (1970) and (1972), Cargill (1976) and Fama (1975). But for the most part, evidence has been against this proposition in the equities market.[1] Jaffe and Mandlekar (1976) even detected a negative correlation between security returns and the rate of inflation in the short run.

Ang, Chua and Desai (1977) attributed these contradictory observations to the inability of the previously used models to measure the Fisher effect. They then provided evidence consistent with Fisher's theory. Their work has been supported by Hong (1977). If Fisher's theory is valid, one would be surprised if market agents did not attempt to adjust nominal accounting signals to real terms.

General and Specific Price Changes

The replacement cost disclosures mandated by ASR-190 provide data on specific, not general, price-level changes. However, there is reason to believe that any conclusions regarding accounting signals and general inflation can be extended to less aggregate levels. Beaver and

Dukes (1973) obtained evidence that market agents utilize an income notion based on highly accelerated depreciation in setting equilibrium security prices. Further, there is a long standing tradition in the literature on current value accounting of treating general and specific changes as virtual synonyms.[2] For example, Zeff (1962, p. 613) states that ". . . the average of the individual price movements of all articles [or assets], properly weighted, will necessarily be identical to the Type A [general price-level] price movement . . ." [3]

Further, Revsine and Weygandt (1974) argued that financial statements adjusted for specific price changes would converge on general price-level adjusted statements in the case of a highly diversified firm. Hohl (1977) provided some evidence on this issue. Using actual price series and simulated merger patterns, she concluded that averages of specific price changes converged very rapidly on the GNP Price Deflator. Further, she noticed that merger patterns, combining homogeneous and heterogeneous assets, had very little effect on the rapidity of this convergence. Thus the Revsine and Weygandt effect may hold for smaller firms as well as larger firms. Peasnell and Skerrat (1977) also provided evidence consistent with that of Hohl. They observed that a single aggregate index closely represented the combined effects of several specific indices of capital assets (plant and machinery) mentioned by the Sandilands report.[4]

Information and Market Equilibrium[5]

Information was earlier defined as an alteration in a subjective probability distribution of state occurrence. In order to illustrate

the correspondence between this notion of information and prices, let us visualize a highly simplified market scenario. Consider a two-person market wherein each individual is endowed with a quantity of some current commodity, denoted by X_1. Also held are two quantities, X_2 and X_3, of state-dependent claims to this commodity. Let i = 1, 2, denote the two individuals and j = 1, 2, 3, denote the states, where j = 1, refers to the current state and j = 2, 3, refers to the future states. The endowed quantities held by each person are shown in the table below.

TABLE I

TABLE OF ENDOWED QUANTITIES

i/j	1	2	3
1	20	20	0
2	20	0	20

Assume each individual's expected utility function is:

$$E(U_i) = \log_e X_{1i} + \phi_{1i} \log_e X_{2i} + \phi_{2i} \log_e X_{3i} \qquad (2)$$

where ϕ_{1i} and ϕ_{2i} are the ith individual's probability assessments of the occurrences of states 2 and 3 respectively. Each individual seeks to maximize his expected utility, subject to the constraint that the value of his initial holding is equal to the value of his consumption preference, i.e., subject to:

$$P_1 X_{1i}^1 + P_2 X_{2i}^1 + P_3 X_{3i}^1 = P_1 X_{1i} + P_2 X_{2i} + P_3 X_{3i} \qquad (3)$$

where,

$P_1 \equiv 1$, the price of each unit of current commodity,

P_2 = the price of a state 2 claim of each unit of the current commodity,

P_3 = the price of a state 3 claim of each unit of the current commodity, and

$(\cdot)^1$ = the current time period.

First order conditions provide the following individual demand functions:

$$X_{1i} = X_{1i}^1 + P_2(X_{2i}^1 - X_{2i}) + P_3(X_{3i}^1 - X_{3i}) \qquad (4)$$

$$X_{2i} = (\phi_{1i} X_{1i})/P_{2i} \qquad (5)$$

$$X_{3i} = (\phi_{2i} X_{1i})/P_{3i} \qquad (6)$$

Suppose both individuals expect the occurrence of each future state with a 0.5 probability. By setting the sum of the individual demands equal to the initial endowments (supply) and solving the

resultant set of equations simultaneously, the following equilibrium is obtained:

$P_2 = 1$ and $P_3 = 1$

$X_{11} = 20$ and $X_{12} = 20$

$X_{21} = 10$ and $X_{22} = 10$

$X_{31} = 10$ and $X_{32} = 10$

Now suppose information changes the original probability distribution to:

$\phi_{11} = 0.8$

$\phi_{21} = 0.2$

$\phi_{12} = 0.7$

$\phi_{22} = 0.3$

The new equilibrium will be:

$P_2 = 1.50$ and $P_3 = 1.50$

$X_{11} = 20.00$ and $X_{12} = 20.00$

$X_{21} = 10.67$ and $X_{22} = 9.33$

$X_{31} = 8.00$ and $X_{32} = 12.00$

It can be seen that information results in an altered set of asset prices. This will necessarily be the case unless the information effects are symmetrical, i.e., one individual's probability assessments are merely substituted for the others. Accordingly, there is a basis for assessing whether replacement cost disclosure constituted information by looking at equilibrium security prices. This suggests an interest in a model of equilibrium security prices.

The Risk-Return Equilibrium Model

The Sharpe-Lintner capital asset pricing model predicts the expected return of a security, $E(\tilde{R}_i)$, to be a linear function of its systematic risk, β_i, under conditions of market equilibrium. Stated formally:

$$E(\tilde{R}_i) = R_f + [E(\tilde{R}_m) - R_f]\beta_i \qquad (7)$$

where,

$E(\tilde{R}_m)$ = the expected return on the market portfolio,

R_f = the return on a riskfree security, and

β_i = $Cov(\tilde{R}_i, \tilde{R}_m)/Var(\tilde{R}_m)$

This model assumes risk averse and wealth maximizing investors having common one-period expectations, an access to a uniform rate of borrowing and lending, and trading in a market without any transaction costs.[6]

The model predicts that, in a state of equilibrium, the expected returns of two or more equally risky securities will be the same. The conventional empirical estimate of the systematic risk is the slope coefficient of the linear regression of $\tilde{R}_i$ on $\tilde{R}_m$. Therefore:

$$[E(\tilde{R}_1)|\beta_1] = [E(\tilde{R}_2)|\beta_2],\ \beta_1 = \beta_2 \qquad (8)$$

where β_1 and β_2 are estimated using ordinary least squares procedures. If the validity of this model is conceded, then any inequality in the expectations of the two series of returns would indicate an alteration in the structure of equilibrium security returns which, as outlined in the previous section, can be attributed to information.

Research Design

Pursuant to the earlier description of the relationship between information and market equilibrium, a signal denoted by S, is said to possess information if the distribution of security returns, (reflecting probability distributions of market agents), conditional upon some realization of S is not equal to its counterpart marginal distribution. Stated alternatively, there is information content in S if:

$$F(R_i|S) \neq F(R_i) \tag{9}$$

where F(.) is the distribution function of the return on security i. In the design construct adopted in this study, S represents the disclosure of replacement value data required by ASR-190.

Security returns, $\tilde{R}_i$, are assumed to follow a multivariate normal distribution such that any differences in distribution functions can be characterized in terms of a difference in mean vectors or a difference in variance-covariance matrices. Of current concern is a difference in the multivariate distributions of returns on a treatment sample (subject to the ASR-190 reporting requirements) and those of a control sample (not subject to ASR-190). Further, for want of an equilibrium theory of variance-covariance matrices, attention is confined to differences in mean vectors.

Assume an (n x p) matrix of rates of return on a treatment sample, denoted by $\underset{\sim}{\tilde{R}}_T$, where n is the number of firms and p is the number of observations in a time series of returns on each firm. Now

assume a (n x p) matrix of returns on a control sample, denoted by $\underset{\sim}{\tilde{R}}_C$, where the firms in corresponding rows of $\underset{\sim}{\tilde{R}}_T$ and $\underset{\sim}{\tilde{R}}_C$ have been selected such that their beta values are equal. Denote the (n x p) matrix of differences in the observed rates of return, $\underset{\sim}{\tilde{\delta}}$:

$$\underset{\sim}{\tilde{\delta}} = \underset{\sim}{\tilde{R}}_T - \underset{\sim}{\tilde{R}}_C \tag{10}$$

Denote the vector of mean differences $\underset{\sim}{\bar{\delta}}$ ($= \frac{1}{n} \underset{\sim}{\tilde{\delta}}' J$, where J is a (n x 1) vector, all of whose elements are 1). If all returns are equilibrium returns, then the capital asset pricing model implies that $\underset{\sim}{\bar{\delta}}$ is expected to be a null vector. Observation of any element of $\underset{\sim}{\bar{\delta}}$ significantly different from zero thus implies that the returns in at least one of the p periods is not an equilibrium return -- its expected value is not zero. And from the earlier discussion, disequilibrium in some period is a manifestation of information in the signal S.

Formally, the null hypothesis that the signal S (the replacement cost disclosures mandated by ASR-190) did not possess information can be stated:

$$H_0: \quad E(\underset{\sim}{\bar{\delta}}) = \underset{\sim}{0}$$

where $\underset{\sim}{0}$ is a null vector. The alternative hypothesis is:

$$H_1: \quad E(\underset{\sim}{\bar{\delta}}) \neq \underset{\sim}{0}$$

Under the assumption of multivariate normalcy, the appropriate test of the null hypothesis is Hotelling's T^2 test. Notationally:

$$T^2 = n\underset{\sim}{\bar{\delta}}' \underset{\sim}{V}^{-1} \underset{\sim}{\bar{\delta}} \tag{11}$$

where,

$\underline{\bar{\delta}}'$ = the transpose of $\underline{\bar{\delta}}$, and

V^{-1} = the inverse of the variance-covariance of the multivariate matrix $\underline{\tilde{\delta}}$.

The T^2 statistic is a function of the F distribution with p and (n - p) degrees of freedom. The calculated value of the F statistic is:

$$F_{cal} = T^2\left(\frac{n - p}{p(n - p)}\right) \tag{12}$$

Rejection of H_0 implies that, in at least one of the p periods, there exists a difference in the averages of treatment and control sample rates of returns. Again, when treatment and control samples have been matched according to β, such differences are evidence of information content. In the next chapter, the sample selection criteria, data sources and other methodological details are discussed.

FOOTNOTES

[1] See Roll (1972) for a review of prior empirical evidence.

[2] For example, Zeff (1962, p. 612) notes:

> . . . An alternative approach called 'price-level accounting' is urged. Sometimes it is called replacement cost accounting although many writers contend that these are separate and distinct concepts . . .

Hendriksen (1963, p.483) while agreeing, states:

> . . . Professor Zeff points out very clearly that these are different economic phenomenom and accountants have frequently failed to distinguish the two even at a conceptual level . . .

[3] Similar instances can be seen in Trumbull (1958) and Hendriksen (1963).

[4] Peasnell and Skerrat (1977, p. 119) suggested that their results:

> . . . on U.K. data might not be replicated in other countries . . . (such as the U.S.) which have not had such explosive rates of inflation as the United Kingdom, detailed indices may behave more heterogeneously . . .

Their results, however, appear to be quite similar to the results of Hohl (1977).

[5] Gratitude is expressed to Dr. James R. Boatsman for his permission to use in this section, the illustration from Boatsman (1977).

[6] For a concise discussion, see Ball and Brown (1969) and Lev (1974).

CHAPTER III

APPLICATION OF THE MODEL

Sample Selection

A preliminary treatment sample was selected and consisted of firms:

1. Which meet the ASR-190 disclosure criteria;[1]
2. Whose securities are traded on the New York Stock Exchange;
3. Whose financial year ends December 31.

A control sample was selected using all but the first criterion. A scan of the Compustat Industrial file using the above criteria identified preliminary samples of 291 treatment and 141 control firms. Requests for annual reports and Forms 10-K were sent to each of these firms.[2]

The following data were obtained from these documents:

1. The date on which the Form 10-K was filed with the SEC;
2. Whether the replacement cost data were disclosed for all the assets of the firms;[3]
3. The ratio of the gross margin based on replacement cost to that based on historical cost for the firms reporting replacement cost data, expressed notationally:

$$G = \frac{(GM)_{RC}}{(GM)_{HC}} \qquad (13)$$

where,

G = Ratio of gross margins;

$(GM)_{RC}$ = Gross margin on a replacement cost basis;

$(GM)_{HC}$ = Gross margin on a historical cost basis.

Those firms for which data in either (1) or (2) above, were not available were eliminated from the sample. Also eliminated from the sample were those firms whose Forms 10-K were not made available for this study. Eighty-three firms remained in the control group. Next, from the number of firms remaining in the treatment group, the eighty-three firms (to be matched with each of the control firms) reporting the largest values of (1 - G) were selected. And finally, for the period January 1, 1977 to March 31, 1977, the following market data were collected:

1. Daily stock prices for the 166 firms;
2. Discount rates for short-term U.S. Treasury bills (to be used as returns on the risk-free asset) from the Wall Street Journal;
3. The Standard and Poor's composite average prices (to be used as a proxy for the return on the market portfolio).

Methodology

Returns

The security prices were converted to daily returns (after adjusting for stock dividends and stock splits). Notationally, the

rate of return is:

$$R_{it} = \frac{(P_{i,t+1} - P_{it}) + D_{i,t+1}}{P_{it}} \qquad (14)$$

where,

$(P_{i,t+1} - P_{it})$ = Price differential between any two periods;

$D_{i,t+1}$ = The cash dividends paid between the two periods t and t+1.

The returns on the market portfolio were computed in a similar fashion.

The dollar prices for the treasury bills were computed using the formula in Darst (1975, pp. 119 - 122):

$$(P|B_s) = B_s - (d)(m)(k) \qquad (15)$$

where,

P = The price of the bond on any assumed par value dollar price base, B_s;

d = Discount rate in basis points;

m = Days to maturity excluding the first day and including the last day;

k = Value of one basis point.

These dollar prices were then converted to rates of return and utilized as a proxy for the return on the riskfree asset. Finally, beta values were computed for each of the eighty-three treatment and control firms, as well as the riskfree asset, using the slope coefficient of the ordinary least squares regression model:

$$R_{it} = \alpha + \beta R_{mt} + \varepsilon_{it} \qquad (16)$$

Portfolio Formation

Treatment and control firms were then ranked in ascending order according to the beta values. A matching was achieved by pairing a firm having the highest beta value in the control group with a firm having the highest beta value in the treatment group, and so on. Each pair of firms thus had a larger beta value, within its corresponding group, than the firm in the succeeding pairs. Thus $\beta_{C1} > \beta_{C2} > \ldots > \beta_{C83}$, and $\beta_{T1} > \beta_{T2} > \ldots > \beta_{T83}$. Matched pairs formed in this manner possessed similar but not equal betas.

Equality was achieved by combining each treatment firm with the riskfree asset in a proportion, denoted by w, which equated the portfolio beta value with the beta value of its paired control firm. More formally:

$$\beta_{Ci} = w_i \beta_{Ti} + (1 - w_i)\beta_{rf} \qquad (17)$$

The beta of the riskfree asset, β_{rf}, had a value (computed as described earlier), of 0.008428.

Testing

A fifty-day testing period, 30 days preceding to 19 days following the filing date (the date on which each firm filed the Form 10-K with

the SEC), was observed. The underlying premise is that any differences in returns attributable to the disclosure of replacement cost data by the treatment firms, would be most likely to occur around the period when the financial statements were made publicly available, i.e., around the filing date. The returns for each of the treatment portfolios were computed as follows:

$$\hat{R}_{it} = (w_i)(\tilde{R}_{it}) + (1 - w_i)(R_{ft}) \qquad (18)$$

where,

$\hat{R}_{it}$ = the portfolio returns;

$t = 1, 2, \ldots, p;$

$p = 50$

The (83 x 50) matrix of differences, $\underline{\delta}$, was obtained by subtracting the (83 x 50) matrix of control firm returns from the (83 x 50) matrix of treatment portfolio returns. Hotelling's T^2 test (described in the preceding chapter) was then employed to test the null hypothesis that the means of the 50 columns were all equal to zero -- that on no one of the 50 days was there a systematic difference in treatment and control firms' rates of return. As discussed in the previous chapter, such a difference is indicative of disequilibrium, which is in turn indicative of information.

The F_{cal} value was 1.006 (with 50 and 33 degrees of freedom) and the associated probability was determined to be 0.4989. Thus the null hypothesis could not be rejected at any reasonable significance level. Therefore, the sample data provide no evidence consistent with the

assertion that the disclosure of replacement cost data would produce a systematic alteration in the structure of equilibrium security prices. The implications of these results are presented in the last chapter.

FOOTNOTES

[1] See note (1) in Chapter I, page 5.

[2] Gratitude is expressed to those corporations who have supplied their financial statements and Forms 10-K for this study.

[3] The SEC exempted certain industries from the disclosure requirements for a year.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The findings in the previous chapter are consistent with the statement that market agents did not revise their expectations in response to the disclosure of replacement values. In this context, consider the following question posed with reference to the stock of Western Union Corporation, as noted by the Wall Street Journal (February 9, 1977):

> . . . Suppose a company reports it earned $34 million . . . but in a footnote . . . discloses its depreciation charges . . . could be . . . understated by $47.8 million. That should knock the stuffing out of the company's stock price, shouldn't it ?

One would expect that very reaction but the Wall Street Journal (February 9, 1977) noted ". . . the market reaction . . . was imperceptible." Perhaps the subjective nature of the disclosures, as forewarned by both the SEC and most reporting corporations, helped promote skepticism to such data on the part of market agents.[1]

However, it is important to note that in this study, a naive historical cost model has been implicitly invoked as a proxy for market expectations. In other words, the reporting of current operating profit less than last period's historical cost net income is presumed to be interpreted by market agents as either uninformative or as unexpected "bad news". The effect of the latter would be a downward

price movement and therefore, a diminished one period rate of return. Thus the effect, if any, of the ASR-190 disclosures would be to reduce the equilibrium prices of all treatment firms. And such reductions would be observable in the across-firms averages of returns. The results certainly did not indicate any such massive downward revision of market expectations and prices.

To the extent, however, that market agents held expectations other than last period's historical cost net income, the information effect might not result in price changes of the same sign. The ASR-190 disclosures could have been higher than expected for some and lower than expected for others. Thus the ASR-190 disclosures might have triggered considerable price movements which, across firms, averaged out to zero. Since the methodology of this study has confined attention to averages, such information effects would not have been detected.[2]

A variety of alternative replacement cost data sources existed prior to the dates when such data were publicly reported by corporations. Thus there is some basis for believing that the historical cost expectations model might not have been a very good proxy for the market's expectations as to the replacement cost disclosures. Forecasts were published by Value Line Investment Survey beginning in November 1976 and Abdel-Khalik and McKeown (1978) have suggested that similar forecasts were sold by Faulkner, Dawkins and Sullivan prior to March 1977. Thus market expectations could have been revised prior to the period of public disclosure and as noted by the Wall Street Journal (February 9, 1977), ". . . current market prices

may already have a built-in deflator . . ." Eskew and Ro (1978) have shed some light on this possibility. They noted a weak but statistically significant correlation between the average of squared residual rates of return during late 1976 and the first half of 1977 and a set of replacement cost accounting ratios derived from March 1977 Form 10-K filings. This correlation was observed over 25 weeks and could be attributable to replacement cost data which became available from competing earlier sources.

Finally, these conclusions must be interpreted with caution. A failure to detect any information content in the replacement values disclosed in the financial statements could suggest that market agents were altogether disinterested in these disclosed data. Benston and Krasney (1978) provide survey evidence that this might indeed be the case. However, it does not follow that ASR-190 was itself undesirable. It is entirely possible that the mandate stimulated private agencies to produce and sell forecasts of replacement values and therefore obviated whatever information content the replacement value financial statements might have had.[3]

Implications For Future Research

The study examined market responses using a conventional historical cost expectations model. Future research might involve developing a more appropriate expectation model to use as a proxy for market expectations. Moreover, with additional data available with the passing of years, testing over several years could be undertaken. The valuation controversy, though existent for several decades, has only

recently been amenable to such empirical evaluation. The ready availability of market data now offers some promise of identifying an appropriate method of reporting and accounting for inflation. Hopefully, this study has provided an initial step in this process.

FOOTNOTES

[1] See note (3) in Chapter I, page 6.

[2] For a more complete discussion, see Beaver (1976).

[3] Abdel-Khalik and McKeown (1978) suggest otherwise. However, the validity of their conclusions were questioned by Boatsman and Revsine (1978).

A SELECTED BIBLIOGRAPHY

Abdel-Khalik, A. and J. Mckeown, "Disclosure of Estimates, of Holding Gains and the Assessment of Systematic Risk," Empirical Research in Accounting: Selected Studies, Supplement to Journal of Accounting Research (1978), forthcoming.

Anderson, James A., A Comparative Analysis of Selected Income Measurement Theories in Financial Accounting, Studies in Accounting Research #12 (American Accounting Association, 1976).

Ang, James S., Jess H. Chua and Anand Desai, "The Response of Common Stock Returns to Inflation: Evidence for the Fisher Effect," Faculty Working Papers, (Oklahoma State University, April 1977).

Arthur Andersen & Co., Disclosure of Replacement Cost Data - Illustrations and Analysis (Arthur Andersen & Co., 1977).

Backer, Morton, Financial Reporting for Security Investments and Credit Decisions (National Association of Accountants, 1969).

___, Current Value Accounting (Financial Executives Research Foundation, 1973).

Ball, Ray and Philip Brown, "Portfolio Theory and Accounting," Journal of Accounting Research (Autumn 1969), pp. 300 - 323.

Beaver, William H., "The Implications of Security Price Research for Disclosure Policy and the Analyst Community," in A. R. Abdel-Khalik and T. F. Keller (eds.), Financial Information Requirements for Security Analysis, Duke Second Accounting Symposium, Duke University (December 1976), pp. 65 - 81.

___, John W. Kennelly and William M. Voss, "Predictive Ability as a Criterion for the Evaluation of Accounting Data," The Accounting Review (October 1968), pp. 675 - 683.

Benston, George J., "The Value of the SEC's Accounting Disclosure Requirements," The Accounting Review (July 1969), pp. 515 - 532.

___, and M. Krasney, "The Demand for Alternative Accounting Measurements," Empirical Research in Accounting: Selected Studies, Supplement to Journal of Accounting Research (1978), forthcoming.

Boatsman, James R., "Why Are There Tigers and Things?", Abacus (December 1977), pp. 155 - 167.

___, and Lawrence Revsine, "Discussion of Disclosure of Estimates of Holding Gains and the Assessment of Systematic Risk," Empirical Research in Accounting: Selected Studies, Supplement to Journal of Accounting Research (1978), forthcoming.

Brenner, Vincent C., "Financial Statement Users' Views of the Desirability of Reporting Current Cost Information," Journal of Accounting Research (Autumn 1970), pp. 159 - 165.

Cargill, T. F., "Anticipated Price Changes and Nominal Interest Rates in the 1950's," Review of Economics and Statistics (August 1976), pp. 364 - 367.

Chambers, R. J., "Measurement in Accounting," Journal of Accounting Research (Spring 1965), pp. 32 - 62.

___, Accounting Evaluation and Economic Behavior (Prentice-Hall, Inc., 1966).

Cooley, William W. and Paul R. Lohnes, Multivariate Data Analysis (John Wiley & Sons, Inc., 1971).

Darst, David M., The Complete Bond Book (McGraw-Hill Book Company, 1975).

Demski, J. S., "Choice Among Financial Reporting Alternatives," The Accounting Review (April 1974), pp. 221 - 232.

___, Information Analysis (Addison-Wesley Publishing Co., 1972).

Downes, David and Thomas R. Dyckman, "A Critical Look at the Efficient Market Empirical Research as it Relates to Accounting Literature," The Accounting Review (July 1973), pp. 300 - 317.

Draper, Norman R. and Harry Smith, Applied Regression Analysis (John Wiley & Sons, Inc., 1966).

Edwards, Edgar O. and Philip W. Bell, The Theory and Measurement of Business Income (University of California Press, 1972).

Eskew, R. and B. Ro, "SEC Mandated Replacement Cost Disclosure, Security Returns and Transaction Volumes," Unpublished paper (Purdue University, 1978).

Estes, Ralph W., "An Assessment of the Usefulness of Current Cost and Price-Level Information by Financial Statement Users," Journal of Accounting Research (Autumn 1968), pp. 200 - 207.

Fama, Eugene F., "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance (May 1970), pp. 383 - 417.

___, "Short-Term Investment Rates as Predictors of Inflation," American Economic Review (June 1975), pp. 269 - 282.

Feltham, Gerald A., "The Value of Information," The Accounting Review (October 1968), pp. 684 - 696.

Financial Accounting Standards Board, Reporting the Effects of General Price-Level Changes in Financial Statements: FASB Discussion Memorandum, (Financial Accounting Standards Board, February 15, 1974).

Fisher, I., The Theory of Interest, (Macmillan Company, 1930).

Frank, Werner, "A Study of the Predictive Significance of Two Income Measures," Journal of Accounting Research (Spring 1969), pp. 123 - 136.

Gibson, W. E., "Price-Expectations Effect on Interest Rates," Journal of Finance (March 1970), pp. 19 - 34.

___, "Interest Rates and Inflationary Expectations: New Evidence," American Economic Review (December 1972), pp. 854 - 865.

Gonedes, Nicholas J., "Risk, Information, and the Effects of Special Accounting Items on Capital Market Equilibrium," Journal of Accounting Research (Autumn 1975), pp. 220 - 256.

Haskins & Sells, "The Week in Review," (Haskins & Sells, April 22, 1977).

Hendriksen, Eldon S., Accounting Theory, (Richard D. Irwin, 1977).

___, "Purchasing Power and Replacement Cost Concepts - Are They Related?", The Accounting Review (July 1963), pp. 483 - 491.

Hohl, Katherine Jane, "An Investigation of the Surrogateship of the GNP Deflator for Wholesale Price Indices," Unpublished dissertation (Oklahoma State University, 1977).

Hong, H., "Inflation and the Market Value of the Firm: Theory and Tests," Journal of Finance (September 1977), pp. 1031 - 1048.

Horngren, Charles T., "Security Analysts and the Price Level," The Accounting Review (October 1955), pp. 573 - 581.

Jaffey, Jeffrey F. and Gershon Mandelker, "The 'Fisher Effect' for Risky Assets: An Empirical Investigation," Journal of Finance (May 1976), pp. 447 - 458.

Lev, Baruch, Accounting and Information Theory, Studies in Accounting Research #2, (American Accounting Association, 1969).

___, Financial Statement Analysis: A New Approach, (Prentice-Hall, Inc., 1974).

McKeown, James C., "An Empirical Test of a Model Proposed by Chambers," The Accounting Review (January 1971), pp. 12 - 29.

Morrison, Donald F., Multivariate Statistical Methods, (McGraw-Hill Book Company, 1967).

Peasnell, K. and L. Skerrat, "How Well Does a Single Index Represent the Nineteen Sandilands Plant and Machinery Indices?", Journal of Accounting Research (Spring 1977), pp. 108 - 119.

Peat, Marwick, Mitchell & Co., Replacement Cost: Implementation of ASR-190 (Peat, Marwick, Mitchell & Co., 1976).

Revsine, Lawrence, Replacement Cost Accounting, (Prentice-Hall, Inc., 1973).

___, and Jerry Weygandt, "Accounting for Inflation: The Controversy," Journal of Accountancy (October 1974), pp. 72 - 78.

Roll, R., "Interest Rates on Monetary Assets and Commodity Index Changes," Journal of Finance (May 1972), pp. 251 - 277.

Ronen, Joshua, "Discounted Cash Flow Accounting," in J. J. Crammer, Jr., and G. H. Sorter (eds.), Objectives of Financial Statements, Volume 2: Selected Papers (American Institute of Certified Public Accountants, 1974), pp. 202 - 212.

___, "A Test of the Feasibility of Preparing Discounted Cash Flow Accounting Statements," in J. J. Crammer, Jr., and G. H. Sorter (eds.) Objectives of Financial Statements, Volume 2: Selected Papers (American Institute of Certified Public Accountants, 1974), pp. 202 - 212.

Samuelson, Richard A., "Prediction and Price-Level Adjustment," Journal of Accounting Research (Autumn 1972), pp. 322 - 344.

Sargent, T., "Commodity Price Expectations and the Interest Rate," Quarterly Journal of Economics (February 1969), pp. 127 - 140.

Simmons, John K., and Jack Gray, "An Investigation of the Effect of Differing Accounting Frameworks on the Prediction of Net Income," The Accounting Review (October 1969), pp. 757 - 776.

Sterling, Robert R., and Raymond Radosevich, "A Valuation Experiment," Journal of Accounting Research (Spring 1969), pp. 90 - 95.

Trumbull, Wendell P., "Price-Level Depreciation and Replacement Cost," The Accounting Review (January 1958), pp. 26 - 34.

Wall Street Journal (The), "Heard on the Street," (February 1977).

Zeff, Stephen A., "Replacement Cost: Member of the Family, Welcome Guest, or Intruder?", The Accounting Review (October 1962), pp. 611 - 625.

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