MARKET UTILIZATION OF PRICE
ADJUSTED EARNINGS

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ABSTRACT

The degree of market utilization of price adjusted earnings is examined in this paper by constructing a statistical model which estimates the market weights or the degrees of emphasis which the market places on current cost and constant dollar earnings. The market weights for these price adjusted earnings are found to be significant at the 99% level, implying that the market does utilize current cost and constant dollar data in assessing the values of firms.

INTRODUCTION

Accounting earnings is defined to be the excess of revenues over costs; three widely used accounting methods for measuring costs are: 1. Historical Cost (original cost), 2. Current Cost (replacement cost today), and 3. Constant Dollar (original cost adjusted for general inflation). The difference among these three accounting methods is depicted in the following simplified illustration:

Company A has recently sold a ton of metal for $150 which has been bought one year ago for $100. If the general inflation rate during last year is 10%, then the cost of the metal adjusted for general inflation is $110 (constant dollar cost). This metal, if purchased today by Company A, would cost $130 (current cost). Note that there are three different cost measurements for the same commodity. As a result, each accounting method generates a different earning figure as presented in the table below:

<table>
<thead>
<tr>
<th>Historical Cost</th>
<th>Earning = Revenue - Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 = 150 - 100</td>
<td></td>
</tr>
<tr>
<td>40 = 150 - 110</td>
<td></td>
</tr>
<tr>
<td>20 = 150 - 130</td>
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Prior to 1979, financial statements based on historical cost accounting would suffice for corporate financial disclosures; however, many have felt that historical cost information may be inadequate and even misleading in periods with relatively high inflation rates since accounting figures of different periods ($100 in 1970 and $100 in 1980 for example) would no longer be comparable. In 1979, Financial Accounting Standard Board, the authoritative organization which sets standards for accounting principles, issued Financial Accounting Standard Statement No.33 which required all large publicly held companies with over $1 billion in assets to disclose current cost and constant dollar information as supplementary data to historical cost financial statements. This experiment lasted until December 1986 when FASB issued Statement No.89 which superseded Statement No.33 and made voluntary the supplementary disclosure of current cost and constant purchase power informa-
tion. Reasons cited for rescinding the requirement of providing supplementary information of the effects of inflation and changes in specific prices were: 1. The data did not appear to have been widely used by the institutional investment community or investors in general, due to the complexity of the data and confusions which they caused. 2. General decline in inflation rate during recent years reduced the need for these supplementary information. 3. Cost of preparing the disclosures outweighed the benefits.

However, opponents of FASB No.89 state that the basic proposition underlying Statement No.33 - that inflation causes historical cost financial statements to show illusory profits and mask erosion of capital- is virtually undisputed. This distortive influence on financial statement will now go unmeasured and undisclosed. Thus, the elimination of disclosure requirements for current cost and constant dollar data is still highly controversial. The objective of this paper is to shed light on this controversy by constructing a model which enables us to estimate the relative significance of historical cost earnings, constant dollar earnings, and current cost earnings in determining share prices. The result would provide us the insight as to the degree of importance which the market places on these three alternative accounting measures for earnings.

MODEL FRAMEWORK

Up to now, we are uncertain as to the degree of emphasis that the market places on each of these earning measures. Assuming the market determines true earnings based on current cost earnings and historical cost earnings reported by firms and that the weight assigned to each earning measure is in proportion to its perceived level of importance, we may specify that the true earning, as viewed by the market, to be a weighted average of current cost and historical cost earnings.

Let WCC and 1-WCC represent the weights which the market implicitly assigns to current cost earnings per share and historical cost earning per share for determining the true or correct earnings per share, respectively. The true earnings per share, as perceived by the market, is specified to be a linear function of historical cost EPS and current cost EPS:

\[
(1) \quad \text{EAM} = \text{WCC EACC} + (1-\text{WCC}) \text{EAHC} + \text{va}
\]

where:

\[
\text{EAM} = \text{actual EPS as perceived by the market}
\]
\[
\text{EACC} = \text{actual EPS based on current cost accounting}
\]
\[
\text{EAHC} = \text{actual EPS based on historical cost accounting}
\]
\[
\text{va} = \text{disturbance term for EAM}
\]

The coefficients WCC and 1-WCC represent the weight which correspond to the levels of relative importance the market places on current cost earnings and historical cost earnings for determining true earnings, respectively. If WCC=0, this would imply that the market ignores current cost earnings. On the other extreme, if WCC=1, then this implies that the market considers current cost earnings to be the true earnings. Similarly, the projected true EPS, as perceived by the market, is expressed as a weighted average of the projected current cost EPS and the projected historical cost EPS:

\[
(2) \quad \text{EPM} = \text{WCC EPCC} + (1-\text{WCC}) \text{EPHC} + \text{vp}
\]

where:

\[
\text{EPM} = \text{projected EPS as perceived by the market}
\]
\[
\text{EPCC} = \text{projected EPS based on current cost accounting}
\]
\[
\text{EPHC} = \text{projected EPS based on historical cost accounting}
\]
\[
\text{vp} = \text{disturbance term for EPM}
\]
The variables in (1) and (2) are measured in absolute dollar terms which are transformed into percentage terms as both sides of (1) and (2) are divided by stock price at the beginning of the period or year (PB):

\[ 3 \] \[ EAM/PB = WCC \ EACC/PB + (1-WCC) \ EAHC/PB + ua \]

\[ 4 \] \[ EPM/PB = WCC \ EPCC/PB + (1-WCC) \ EPHC/PB + up \]

EAM/PB in (3) can be interpreted as the portion of the actual rate of return on one share that is attributed to earnings; and EPM/PB in (4) can be interpreted as the portion of the expected return on one share that is attributed to projected earnings for the coming year; ua and up are the disturbance terms in (3) and (4), respectively.

PB, stock prices at the beginning of the period, is assumed to be an exogenous variable since it has been determined prior to the sample period under study. Note that regression for estimating WCC cannot be applied to (3) and (4) because EAM and EPM are not observable; thus, data cannot be obtained for these true earnings. However, these unobservable variables can be eliminated by being substituted into equations (5) and (6), as we will see.

The holding period return of a stock or total rate of return (RAT) can be obtained by dividing the capital gain plus dividend (D) by the stock price at the beginning of the period (PB), which is illustrated in equation (13). The total rate of return on one share during a year can be separated into return attributed to earnings of the corporation and return attributed to non-earning factors or simply other factors such as changes in interest rate or changes in risk of the stock:

\[ 5 \] \[ RAT = RAE + RAO \]

where:

\[ RAT = \text{total rate of return on one share} \]
\[ RAE = \text{EAM/PB or return attributed to earnings} \]
\[ RAO = \text{return attributed to other factors} \]

The expected or projected rate of return of a stock (RPT) is computed by using the Capital Asset Pricing Model as illustrated in equation (12). Similarly, the projected or expected total rate of return can be separated into expected return attributed to projected earnings and expected return attributed to market’s expectation regarding other factors:

\[ 6 \] \[ RPT = RPE + RPO \]

where:

\[ RPT = \text{projected or expected rate of return for one share} \]
\[ RPE = \text{EPM/PB or expected return attributed to projected earnings} \]
\[ RPO = \text{expected return attributed to other factors} \]

Substituting (3) for RAE and (4) for RPE, we can express (5) and (6) as:

\[ 7 \] \[ RAT = WCC \ EACC/PB + (1-WCC) \ EAHC/PB + ua + RAO \]

\[ 8 \] \[ RPT = WCC \ EPCC/PB + (1-WCC) \ EPHC/PB + up + RPO \]

Note that the variables RAO and RPO are also unobservable; however, assuming that the expected return attributed to market’s expectation regarding other factors (RPO) is unbiased with respect to the actual return attributed to other factors (RAO), we can write

\[ 9 \] \[ RPO = RAO + uo \]

where \( uo \) is the error or deviation of RPO from RAO and is assumed to be normally distributed with zero mean. Subtracting (7) from (8) and using (9), we obtain a difference form which is not a function of these unobservable
variables:

(10) \[ \text{RPT} - \text{RAT} = \text{EPHC/PB} - \text{EAHC/PB} + \text{WCC} (\text{EPCC/PB} - \text{EACC/PB} + \text{EAHC/PB}) + \text{up} - \text{ua} - \text{uo} \]

The disturbance terms up, ua, and uo are combined into one aggregate disturbance term ut so that (10) is reduced to the final operational form to which ordinary least square can be applied:

(11) \[ \text{RPT} - \text{RAT} = \text{EPHC/PB} - \text{EAHC/PB} + \text{WCC} (\text{EPCC/PB} - \text{EPHC/PB} - \text{EACC/PB} + \text{EAHC/PB} + \text{ut}) \]

The first two terms on the right hand side of (11) constitute the intercept and the bracketed term constitute the explanatory variable. Since up, ua, and uo are all assumed to be normally distributed with zero means, their sum ut is also normally distributed with zero mean; thus, application of ordinary least square to (11) would yield an unbiased and consistent estimate of the coefficient WCC.

DATA

The values for the expected return RPT is derived from the capital asset pricing model in which the expected return of a stock RPT is computed from the security market line function:

(12) \[ \text{RPT} = \text{RF} + \text{B (RM - RF)} \]

where:

\text{RF} = \text{the risk free interest rate}
\text{RM} = \text{the expected market return}
\text{B} = \text{beta which measures the degree of systematic risk of stocks}

1983 is chosen to be the study period because this is the last year in which constant dollar financial statement disclosure is required. Thus, in 1983, data for both constant dollar and current cost are available. Since this is a cross sectional study for the calendar year 1983, treasury bill yield in January 1983 is used as a proxy for RF and the average return of S&P 500 index for the five year period preceding 1983 as a proxy for RM. RAT, the actual total return, is equal to the holding period return of the stock which is defined to be capital gain plus dividends received during the year as a percentage of stock price at the beginning of the year:

(13) \[ \text{RAT} = (\text{PE - PB + D}) / \text{PB} \]

where:

\text{PE} = \text{stock price at year end}
\text{PB} = \text{stock price at beginning of year}
\text{D} = \text{dividends per share for the year}

The sample in this study consists of the Dow Jones Industrial corporations for the calendar year 1983. Since they represent the companies that are the most closely followed by the market, it is expected that their financial reports are analyzed in greater depths than most other firms; thus, their stock prices should reflect the intrinsic values of the firms as determined by their earnings more closely than non-Dow Jones companies. For this reason, these companies are the most appropriate for our purpose of analyzing the implied relationships between the various accounting earnings and the true earnings as perceived by the market or as reflected in the share prices.

The data on actual historical cost, constant dollar, and current cost earnings are obtained from annual reports, whereas the data on projected earnings and betas are obtained from the Value Line Investment Survey published in the first quarter of 1983. These earnings projected by Value Line are used as proxies for the market’s expected earnings for these companies.

EMPIRICAL RESULTS

Applying ordinary least square to (11), we obtain an estimated value of .66 for WCC with a t-statistics of 2.51.
Based on a 99% confidence interval, we reject the null hypothesis WCC=0 or the hypothesis which states that the market ignores current cost earnings in determining the true earnings or the share prices of firms. The results here suggest that FASB policy regarding the financial disclosure of current cost accounting data should be reviewed further since such information is found to be utilized significantly by the market for assessing the value of firms.

The foregoing process of estimating the market weight for current cost earnings (WCC) is applied in the same way for constant dollar earnings. Beginning with (1), we assume that the true earnings, as perceived by the market, to be a linear function or weighted average of historical cost earnings and constant dollar earnings and continue the derivation procedure for the final regression equation in the same manner as before, generating equations which are almost the same as (1) to (11), with all current cost earnings per share terms being replaced by constant dollar earnings per share terms. Thus, the final regression equation for estimating the market weight of constant dollar earnings is very similar to the final regression equation for estimating the market weight of current cost earnings (11):

\[
(14) \text{RPT - RAT = EPHC/PB - EAHC/PB} \\
+ \text{WCD} (\text{EPCC/PB} - \text{EPCD/PB} - \text{EACD/PB} + \text{EAHC/PB}) + \text{ut}
\]

where the coefficient WCD represents the market weight for constant dollar earnings.

Applying OLS to (14), we obtain an estimated value of .96 for WCD with a t-statistics of 3.67. Based on a 99% confidence interval, we reject the null hypothesis which states that WCD=0; moreover, it is highly likely that the value of WCD is above .5, which would suggest that the market places a heavier weight on constant dollar earnings than on historical cost earnings, although the latter is regarded as the principal earnings measure under the present reporting system. The results obtained from regressing (11) and (14) suggest that the market does utilize current cost and constant dollar data in assessing the values of firms. If this is the case, then this would imply that FASB should consider reinstating the requirement of disclosing the current cost and constant dollar information for large publicly held companies. However, it may not be necessary to require firms to disclose both current cost and constant dollar information in conjunction with historical cost financial statements since there may be significant information overlap between the two price adjusted accounting approaches. Thus, if cost of compliance incurred by firms is to be kept to a minimum, the Board may require disclosure of price adjusted data based on only one method; and if only one price adjusted accounting method is required for disclosure, then the method that provides greater incremental information beyond that provided by historical cost data would be preferred. The earnings measure which has the lower correlation with historical cost earnings would generally provide greater incremental information on earnings beyond what has already been revealed by historical cost financial statements. The correlation coefficient for current cost earnings with historical earnings is found to be .88, whereas the correlation coefficient for constant dollar earnings with historical cost earnings in the same period is found to be .95, which suggests that current cost financial statements provide greater incremental information to users and therefore current cost information is preferred over constant dollar if only one price adjusted accounting method is required.

**CONCLUSION**

Since the results here suggest that the market does consider these price
adjusted earnings when assessing the values of firms, an implication one may derive from this is that the level of perceived risk may rise when such information is not available; thus, firms which are not required to disclose current cost or constant dollar financial statements may choose to do so anyway, for the disclosure of such information may be to the firms’ advantage as it decreases the number of unknown variables in the minds of the investors and lowers the level of perceived risk and thus may reduce the cost of equity for these firms.

References

