

EPS Reporting Revisited: An Evaluation of Proposed Changes

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Abstract

In 1969 the Accounting Principles Board issued Opinion No. 15, "Earnings Per Share," requiring firms with complex capital structures to disclose primary and fully diluted earnings per share. A recent article by Mautz and Hog the treasury stock method used in the computation of primary and fully-diluted earnings, and the three percent materiality standard. The purpose of this paper is to evaluate these proposed changes by examining empirical evidence from studies investigating conversion predictability and the information content of earnings.

Introduction

In 1969 the Accounting Principles Board (APB) issued Opinion No. 15, "Earnings Per Share."⁽¹⁾ This pronouncement required firms with complex capital structures⁽²⁾ to present two types of earnings per share (EPS) numbers: (i) primary earnings per share, based on the assumption that common stock equivalents are converted into common shares during the fiscal year, and (ii) fully diluted earnings per share based on the assumption that all dilutive securities are converted into common shares during the fiscal year. The APB predicted that the increased disclosure would provide users of financial statements with information as to the impact of potentially dilutive securities on earnings per share.

Under APB Opinion No. 15, a security whose value is "derived in large part from the value of the common stock to which it is related"⁽³⁾ is treated as a common stock equivalent. Examples of this are stock rights, warrants, and options. For convertible debentures and convertible preferred stock, Opinion No. 15 states that if the cash yield of the security is less than two-thirds of the prime interest rate⁽⁴⁾ at the time of issuance, then a security is deemed to be a common stock equivalent. A determination of common stock equivalency is made only at the time of issuance and once that status is achieved, it remains regardless of ensuing economic conditions of the issuing corporation. Fully diluted earnings per share is computed under the assumption that all potentially dilutive securities are converted into common shares during the fiscal year. This number represents a theoretical maximum potential dilution.

Earnings per share figures are relevant to investors' buy/sell decisions. Moreover, such figures provide a means of comparing alternative investments. Yet, there has been substantial criticism about the earnings per share calculations since the issuance of APB Opinion No. 15

(see Arnold and Humann [1973], Beatty and Johnson [1985], Bierman [1986], Frank and Weygandt [1970],[1971], Fulmer and Moon [1984], Gaumnitz and Thompson [1987], Hofstedt and West [1971], and Sterner [1983]). Recently, Mautz and Hogan [1989] proposed a modification of EPS reporting to improve the decision usefulness of earnings numbers. Specifically, they recommend replacing primary earnings per share with basic (raw) earnings per share, (i.e., net income less preferred dividends divided by a weighted average number of common shares outstanding) as well as eliminating the treasury stock method and the three percent materiality standard for presentation on the income statement, among other things. The purpose of this paper is to evaluate these proposed changes by examining empirical evidence from studies investigating conversion predictability and the information content of earnings per share numbers.

Studies Investigating Conversion Predictability

APB Opinion No. 15 has been subject to substantial criticism since its issuance in 1969. Much of this criticism centers on the Board's choice of criteria for determining common stock equivalency. Of major concern was the Board's failure to use the future probability of conversion of the dilutive securities in the calculation of primary earnings per share. APB Opinion No. 15 states that "Neither conversion nor the imminence of conversion is necessary to cause a security to be a common stock equivalent."⁽⁵⁾ Many academicians and practitioners disagree with this statement and argue that if the possible dilutive effect of convertible securities is to be measured, then the criterion of ultimate conversion is a necessary one.

Stock options and warrants are always classified as common stock equivalents provided they are dilutive and their effects are in the aggregate material. In order for convertible debentures and convertible preferred stock

issues to be classified as common stock equivalents, generally accepted accounting principles require that the effective yield be less than two-thirds of the average effective yield on a Aa corporate bond at the time of issuance. This "yield test" is conducted only at issuance.

Once a determination of common stock equivalency status is made, that status remains until the security is converted or retired. Frank and Weygandt [1970] argue that the permanent classification of convertible securities according to the conditions prevailing at the time of issuance may subsequently lead to a misleading earnings per share figure. If, for example, at some later date conditions have changed to such an extent that the probability of conversion has been substantially altered, a determination made at the date of issuance may have little relevance. It should be noted that the inclusion or exclusion of common stock equivalents in the earnings per share calculations can depend on the common stock equivalency status of past and recently issued convertibles, but the status per se never changes. Dilution of the EPS measures takes place through actual conversion of dilutive securities. Thus, one may argue that common stock equivalents should be those securities for which conversion is to be expected within a reasonable period of time.

Many studies have empirically investigated whether the two-thirds cash yield rule was an adequate predictor of future conversion. For example, Frank and Weygandt [1970] investigated how effectively the yield test discriminated between convertible debenture issues. They found that, on the basis of a sampling of 28 convertible debentures outstanding in 1965, only one issue was classified as a common stock equivalent. There was no conversion of this issue into common stock during 1965 through 1968. In addition, for the 27 other issues not classified as common stock equivalents, significant amounts of conversion (at least 25%) occurred during 1965 through 1968 in 13 cases. Consequently, they concluded that the APB's yield test was not an effective indicator of future conversion.

In a similar study, Rhodes and Snavelly [1973] examined how effectively the yield test discriminated between convertible debenture issues. In this study, a sample of 615 firms having outstanding convertible bond issues was identified. In the sample, 329 bond issues were partially converted, of which only 48 of these conversions occurred after APB No. 15 took effect. Applying the rules of the Opinion, only one of the 48 issues was considered to be a CSE. The authors concluded that the Board's rules were not relevant to determining potential dilution of convertible securities since the "yield-test" did not adequately surrogate conversion or probability of conversion.

Stern [1983] found that of 17 convertible debentures classified as common stock equivalents (CSE) by the two-thirds rule as amended by SFAS 55, 11 experienced some degree of partial conversion. In addition, of 39 convert-

ible debentures that were not classified as common stock equivalents, 17 issues exhibited no degree of partial dilution. Thus, the classification procedure exhibited a 50 percent error rate. Stern also found that if the cash yield rule was modified to allow classification of common stock equivalency status at the end of each succeeding year rather than only at the date of issuance, the error rate of misclassification decreased to 33 percent.

Several researchers have attempted to identify superior classification schemes. Frank and Weygandt [1971], for example, used discriminant analysis to classify convertible debentures into common stock equivalents and non-common stock equivalents. They found that a debenture's conversion value to call price ratio was a better indicator of future conversion than the two-thirds cash yield rule. Specifically, for 1962, 85 percent of the bonds classified as CSE exhibited some degree of conversion while 94 percent of those classified as nonCSE did not convert in the succeeding year. Recognizing that over time economic conditions might change and that the ratio of the conversion value to call price might not predict conversion accurately, the authors replicated their results for 1966. They found similar results in that 89 percent of those converted and 90 percent of those not converted were correctly classified.

Hofstedt and West [1971] also examined the theoretical problems with the Board's classification criterion and suggested a different classification scheme. This study began by stating the major theoretical deficiencies in the Board's two-thirds rule: 1) it compares long-term yields on bonds with a short-term rate on commercial loans; 2) it makes no allowance for the issuer's credit rating; 3) it advocates a permanent classification of bonds on the basis of conditions prevailing at the time of issuance, regardless of future developments. The authors argue that a classification scheme based on the ratio of a convertible debenture's cash yield to Moody's Baa average interest rate would be superior. Their empirical results, however, did not support their theory; their measure did not significantly outperform the Board's cash yield to prime rate ratio.

Arnold and Humann [1973] also examined two alternative conversion prediction methods that the Board rejected in Opinion No. 15, the market parity and the investment value methods. The market parity method compares a convertible security's market value with its conversion value, or the market value of common stock that would be obtained if the conversion option was exercised. Using a sample of 16 convertible bond issues in 1965, the authors conclude that there was some predictive power for the parity method when a classification of CSE was based upon an 80 percent limit (i.e., the ratio of conversion value to market value was at least 80 percent).

The investment value method involves a comparison between a convertible security's investment value (mea-

sured by Moody's Baa rating or by the present value of a security's future cash flows) with its market value. Using a variety of cutoff levels for the investment value/market value ratio for a sample of 17 convertible debt issues in 1965, the authors found no significant discrimination existed between predicted conversion and actual conversion as well as between predicted nonconversion and actual nonconversion.

Gaumnitz and Thompson [1987] suggested an alternative to the APB/FASB's rule for classifying convertible debentures as common stock equivalents: a convertible bond is a common stock equivalent if and only if it is priced in the market essentially as though it were a common stock. The authors randomly sampled 50 convertible debentures from those convertible debentures outstanding at the beginning of 1983. Ordinary least squares regression analysis was performed, regressing the market price of the convertible debenture on the price of the common stock. The authors found empirical support for their market-based classification procedure, and no support for the APB/FASB's classification procedure.

Beatty and Johnson [1985] used a similar market-based method of classifying convertible securities as either debt or equity. The authors argued that the economic substance of a convertible security should be used in classification rather than relying upon the legal form of the security as is currently mandated by generally accepted accounting principles. The authors argue that a convertible security should be classified as equity if its conversion value to call price ratio is high and should be classified as debt if that ratio is low. Using a sample of 96 convertible debentures and 92 convertible preferred stocks from the period 1976-1979, Beatty and Johnson concluded that it was feasible to classify convertible securities in this manner and that the resultant accounting classification may be more compatible with the debt or equity nature of a security's market-determined return generating process.

In a different vein, Jerris [1991] used an option pricing model(6) to derive an alternative earnings per share number based on a specific probability of future conversion. In his study, 392 convertible debentures were collected from a sample of 101 firms during the period 1976 through 1979. The option pricing model was used to generate probabilities of future stock prices attaining levels for which conversion was likely to occur. An alternative earnings per share number was created, called conversion probability earnings per share, which was a weighted earnings per share number where the weights were the relative probabilities of conversion and nonconversion. Correlation and regression analyses were used to test the strength of the association between cumulative abnormal security returns and the unexpected earnings for the alternative earnings per share number and for the two numbers required by generally accepted accounting principles. Results in both analyses showed that the earnings number

which incorporated specific probabilities of conversion were more highly correlated with stock price movements than those computed under the rules of the APB.

Finally, in a comprehensive study of tests for common stock equivalency status, Fulmer and Moon [1984] identified 178 convertible debentures issued during the period 1965-1968. The history of these debentures was traced through December 1982 to determine ultimate conversion or nonconversion. In this study, a convertible issue was defined as converted if 50 percent or more of the issue was converted. The authors investigated how effectively eight common stock equivalency tests discriminated between issues that were ultimately converted and those that were not. The eight tests of common stock equivalency were: (1) cash yield/prime rate ratio (as required by APB No. 15), (2) yield to maturity/prime rate ratio, (3) yield to maturity/Moody's Baa bond rate ratio, (4) cash yield/Aa corporate bond rate ratio (as required by SFAS No. 55), (5) yield to maturity/Aa corporate bond rate ratio, (6) the parity method, (7) the investment value method and (8) conversion value/call price ratio. The authors found that none of the ratios were successful over the study period in correlating predicted conversion and ultimate conversion. Moreover, the cash yield test required by generally accepted accounting principles had no more discriminating power than any other test.

In summary, studies investigating the conversion predictability of earnings per share numbers (outlined in Table 1) question against the arbitrary classification schemes and calculations set forth in APB Opinion No. 15 and as later amended. Hence, the available empirical evidence appears to provide considerable support for a reexamination and replacement of primary earnings per share.

Studies Investigating The Information Content Of Earnings Per Share Numbers

APB Opinion No. 15 requires firms with complex capital structures to report primary earnings (PEPS) and fully diluted earnings per share (FDEPS). Several studies have investigated whether the latter measure conveys incremental information to financial statement users once primary has been reported.

Rice [1978] investigated the incremental information issue using a control group study design. An "experimental" group consisted of 187 firms for which FDEPS was less than PEPS for the first fiscal year in which Opinion No. 15 was required (1969), while the "control" group consisted of 152 firms for which FDEPS was equal to PEPS. Abnormal security returns were cumulated monthly for the two groups around each sample firm's earnings announcement date. Defining year 0 as the first fiscal year which Opinion No. 15 was required, cumulative abnormal returns for the "experimental" group were significantly

greater (at the .05 level) than those for the "control" group during years -1, 0, and +1. No significant differences were found for the succeeding years +2 and +3. Based on these results the author concluded that FDEPS provided incremental information content because the market apparently reacted to the FDEPS measure during years -1, 0, and +1.

Kross, Chapman and Strand [1980] also examined the incremental information content of FDEPS. To avoid any problems of omitted variables or misspecification of security returns models, the authors used a control-group design in which each firm acted as its own control. The authors posited that if FDEPS better incorporates market expectations regarding future conversions into common stock, then security return changes would be more highly associated with FDEPS numbers than with PEPS numbers for a sample of firms that report both. Hence, the authors examined the correlation between cumulative abnormal returns and earnings forecast errors.

Unexpected returns were obtained from the market model and cumulated monthly beginning nine months before the annual earnings announcement and ending three months after the earnings announcement date. The product moment correlation coefficients between cumulative abnormal returns and unexpected earnings were significant at the .05 level for all years of the study 1971-1974, and for all annual earnings forecast models both for PEPS and FDEPS. However, the correlation coefficients for FDEPS were not significantly greater than those for PEPS in any of the years studied. Hence, Kross, Chapman and Strand concluded that there was no incremental information content for FDEPS.

In addition, Jerris [1990-1991] also compared primary and fully diluted earnings per share with a simple benchmark, raw earnings per share. The simple benchmark was calculated as net income available to common shareholders (net income minus preferred stock dividends) divided by a weighted average number of common shares outstanding during the year. Correlation and regression analyses were used to test the strength of the association between cumulative abnormal security returns and unexpected earnings for the two numbers required under APB Opinion No. 15 and the simple benchmark. Results in both analyses show that earnings numbers required by the APB were less correlated with market movements than the benchmark earnings number.

In summary, studies investigating the information content of earnings per share numbers (outlined in Table 2) do not universally concur that two reported dilutive earnings per share numbers convey incremental information. Whereas Rice claimed that fully-diluted EPS contained incremental information content over primary, Kross et al. found results to the contrary. In addition, Jerris provided evidence that primary and fully-diluted EPS had minimal or no incremental information content beyond raw EPS.

Again, the preponderance of empirical evidence appears to support Mautz and Hogan's [1989] recommendation that basic (raw) earnings should be disclosed on the income statement, replacing primary earnings per share.

Summary And Conclusion

APB Opinion No. 15 was issued in 1969 requiring firms with complex capital structures to present on the face of the income statement primary and fully diluted earnings per share. The Opinion states that neither conversion nor the imminence of conversion is necessary to cause a security to be a common stock equivalent. Yet, actual dilution only takes place through conversion. Studies have shown that the two-thirds rule of classifying securities as common stock equivalents has been a very poor predictor of future conversion, in addition to being theoretically flawed.

Studies have also investigated whether the two required earnings measures, primary and fully diluted earnings per share, have incremental information content to users of financial statements. The weight of evidence showed that fully diluted earnings per share had no incremental information content over primary earnings. In addition, alternative earnings per share numbers such as earnings based on conversion probabilities and basic (raw) earnings have been shown to be more correlated with stock price changes that either primary or fully diluted earnings per share.

Mautz and Hogan [1989] propose several modifications to EPS reporting. Specifically they recommend the replacing of primary earnings per share with basic earnings per share, as well as eliminating the treasury stock method and the three percent materiality standard. This author agrees with the Mautz and Hogan [1989] recommendations in light of the evidence cited in the accounting literature. It is up to the FASB to place earnings per share reporting on its upcoming agenda. Current EPS reporting is lacking in many dimensions and it is time for the regulatory board to respond.

Endnotes

1. Accounting Principles Board, APB Opinion No. 15., "Earnings Per Share," May 1969.
2. Firms with complex capital structures are those that have issued potentially dilutive securities (e.g. convertible debentures, convertible preferred stock, options, or warrants) that upon conversion or exercise could in the aggregate materially dilute earnings per share.
3. APB Opinion No. 15, paragraph 25.
4. Current generally accepted accounting principles (FASB Nos. 55 and 85) now require that the effective yield of the security be less than two-thirds the effective yield on an average Aa corporate bond.

5. APB Opinion No. 15, paragraph 25.

6. Vigeland argued that the option pricing model provided a theoretical framework that in general had been lacking in the treatment of potentially dilutive securities, permitted fairly precise statements to be made about the exercise of those securities, and permitted assessments of the probabilities of future stock prices reaching levels that would encourage conversion. Utilizing the properties of the normal distribution, it was possible to assess the probability that the future stock price will exceed the exercise or conversion price, which is the point where conversion will take place.

Consider a common stock with price $S(t)$ whose logarithm follows a Wiener process:

$$d \ln S(t) = A dt + B dz(t)$$

where:

t = time;

A = instantaneous mean of the process;

B = instantaneous standard deviation of the process; 0.5

$dz(t)$ = a standard Wiener process equal to $e(dt)$,

where

e is a standard normal random variable.

Then the distribution of $\ln S(t)$ is normal with parameters: mean = \ln

$$S(0) + At^2, \text{ and variance} = Bt.$$

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Table 1
Studies Investigating Conversion Predictability

Study: Frank and Weygandt [1970]

Methodology: Descriptive Statistics

Findings: Of 28 convertible debentures sampled in the period 1965-1968: 1 was classified as a CSE which did not subsequently convert, and 27 were classified as non-CSEs of which 13 subsequently converted.

Study: Frank and Weygandt [1971]

Methodology: Discriminant Analysis

Findings: A convertible debenture's conversion value/call price ratio was a better indicator of future dilution of EPS than the two-thirds rule. For a sample of 124 convertible debentures in 1962, 85% of the converted debentures and 94% of those not converted in 1963 were correctly predicted using the better discriminator.

Study: Hofstedt and West [1971]

Methodology: Discriminant Analysis

Findings: Of 20 convertible debentures outstanding in 1965, no superior discriminator was found on the basis of subsequent conversion.

Study: Arnold and Humann [1973]

Methodology: Discriminant Analysis

Findings: The Investment Value and Market Parity methods, alternatives to the two-thirds rule, did not generate any predictive power in assessing conversion and nonconversion for a sample of 17 convertible debentures outstanding in 1965.

Study: Rhodes and Snavely [1973]

Methodology: Descriptive Statistics

Findings: From a sample of 615 firms having outstanding convertible debentures, the two-thirds rule did not adequately surrogate subsequent conversion.

Study: Sterner [1983]

Methodology: Descriptive Statistics

Findings: From a sample of 56 convertible bonds, the two-thirds rule amended by SFAS 55 produced a 50% misclassification rate. This rate dropped to 33% when the two-thirds rule was modified to classify CSEs at the end of each year rather than only at the date of issuance.

Study: Fulmer and Moon [1984]

Methodology: Descriptive Statistics

Findings: Of 178 convertible debentures issued during the period 1965-1968, no discriminator was found that adequately predicted ultimate conversion or non-conversion through December 1982.

Study: Beatty and Johnson [1985]; Gaumnitz and Thompson [1987]

Methodology: Regression Analysis

Findings: Both of these studies used a market-based method of classifying convertible debentures as either debt or equity, depending upon a security's market-determined return generating process or systematic risk. Results of both studies showed significant improvement in the classification of CSEs over the required method.

Study: Jerris [1991]

Methodology: Regression Analysis

Findings: The option pricing model was used to derive alternative EPS numbers based on a specific probability of future conversion. For a sample of 101 convertible debentures, these alternative EPS measures were found to be more correlated with stock price movements than either primary or fully-diluted EPS.

Table 2
Studies Investigating the Information Content of EPS Numbers

Study: Rice [1978]

Findings: This study investigated whether there was an impact upon financial statement users to APB No. 15's requirement to report fully-diluted earnings per share. The author observed different patterns of stock prices between a group of firms which reported fully-diluted earnings in 1968, 1969, and 1970 from a group of firms which did not.

Study: Kross, Chapman, and Strand [1980]

Findings: Using a control-group design, this study examined the incremental information content of fully-diluted earnings over primary. Correlation coefficients between cumulative abnormal returns and

unexpected earnings were computed for a sample of firms in the period 1971-1974 for both primary and fully-diluted EPS. The authors concluded that there was no incremental information content for fully-diluted earnings since the correlation coefficients were not significantly different from those for primary earnings per share.

Study: Jerris [1990-1991]

Findings: This study compared primary and fully-diluted earnings to a simple benchmark, raw earnings per share. Using a methodology similar to that of Kross et al. [1980], correlation coefficient for raw earnings were significantly greater than that for either primary or fully-diluted earnings.