

1-1976

## New Approach to Calculating Earnings Per Share

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### Recommended Citation

Harmelink, Philip J. and Posey, Imogene A. (1976) "New Approach to Calculating Earnings Per Share," *Woman C.P.A.*: Vol. 38 : Iss. 1 , Article 3.

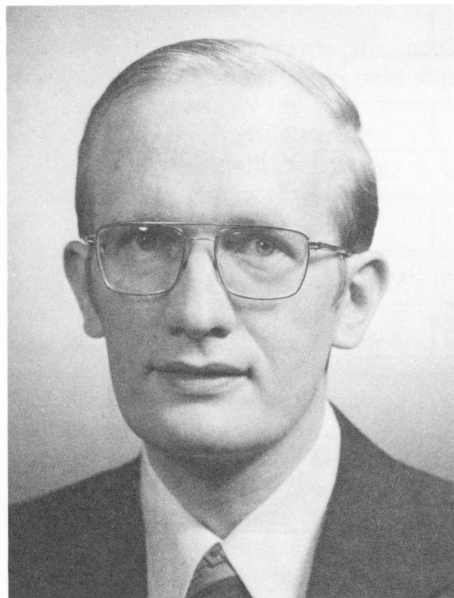
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# A New Approach to Calculating Earnings Per Share

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**The authors describe a worksheet they devised to aid in the calculation of earnings per share.**

Since the issuance of *APB Opinion 15* in 1969 one of the more difficult accounting topics to understand has been Earnings Per Share (EPS). The Opinion and other informational and interpretive sources invariably present examples in "segments" and therefore readers seldom get to see a comprehensive illustration. Further, no efficient method for calculating EPS is ever presented.

The intent of this article is to illustrate a different, more efficient approach to solving comprehensive EPS problems — an approach that should be of assistance to practitioners in staff training or professional development programs. The cases or examples in this article, which include numerous essential points, also cover many of the types of problems and ques-

tions actually arising as a result of the ambiguities of the Opinion. The approach would also be useful as a basis for computerization of EPS calculations — something that is done in practice, especially by companies with complex capital structures.

Although this article covers or reviews many of the more important points of *APB Opinion 15* essential for coverage at varying levels for different purposes, instructors or discussion leaders will want, of course, to supplement this article with the reading of the Opinion and probably some additional interpretive material.

## **Format**

The format used in the illustrations is a worksheet approach. This approach is convenient both for original calculations and for illustration of different alternatives and assumptions. The step-wise method used is necessary in order to determine whether a particular common stock equivalent or security is "dilutive," i.e., decreases EPS.

The worksheet is divided vertically into four sections: use of the assumed proceeds from assumed exercise of stock options

and warrants; adjustment of earnings ( $E_i$ ); adjustment of the number of shares ( $S_i$ ); and consecutive  $EPS_i$  figures necessary to determine dilutiveness of individual items.

The basic data used in the illustrations are given in Table 1. Three cases (Table 2) are illustrated in this article. Note that Cases 2 and 3 have changes in order to cover additional points and refinements.

## **The Illustrations**

The description of Case 1 is more detailed than that of the remaining two cases because the latter descriptions include only an account of the changes that were made in order to illustrate very specific points.

*Case 1* A good opening point is to explain that pre-Opinion 15 EPS would be — labeled  $EPS_1$  in this article and equal to \$1.83 in this case [ $\$880,000 (E_1)$  divided by the weighted average number of shares outstanding of 480,000 ( $S_1$ )]. This is done to determine whether there is 3% or greater dilution in subsequent  $EPS_i$  calculations.

The next step in discussion of the problem would be the term "common stock

equivalent" (CSE); which is "a security which is not in form a common stock but which usually contains provisions to enable its holder to become a common stockholder and which, because of its terms and the circumstances under which it was issued, is in substance equivalent to a common stock" (*APB Opinion 15*, paragraph 25). Included for consideration as possible CSE's are stock options and warrants, convertible debt, and convertible preferred stock.

Stock options and warrants are always CSE's *except* that it should be explained that if the exercise price is greater than the market price, options and warrants should not be assumed to be exercised because such an assumption would be antidilutive.<sup>1</sup> In Case 1, the market price (\$27) is above the exercise price (\$23) which makes the assumed exercise dilutive. Actually, where there is a low net income (Case 3) or a net loss, assumed exercise of stock options and warrants can be antidilutive even where average price is greater than exercise price.

In Case 1, the assumed exercise of the options gives rise to a new earnings ( $E_2$ ) through interest savings on assumed retirement of the long-term nonconvertible debt and the convertible debt.<sup>2</sup>  $S_2$  is the result of adding to  $S_1$  the number of shares issued from the assumed exercise of the stock warrants less the number of treasury shares acquired.  $E_2/S_2$  gives us our  $EPS_2$  which is less than  $EPS_1$ , making the stock warrants dilutive. The difference between primary and fully diluted  $EPS_2$  relative to stock options or warrants is due to the assumption of a higher year-end market price of common stock as compared to the average market price (*APB Opinion 15*, paragraph 42). In addition, for fully diluted EPS, where we assume retirement of convertible debt (\$1,200,000), a smaller amount is left to be converted (\$800,000).

In determining whether the convertible securities are CSE's, we must apply the 66 2/3% rule. If the yield rate of interest at time of issuance is less than 66 2/3% of the prime rate of interest at time of issuance, then the security is a CSE (*APB Opinion 15*, paragraph 33). The convertible debt is not a CSE for primary EPS because 4% is not less than 66 2/3% of 5%. It is assumed that the 4% convertibles were issued at par which makes the nominal rate of interest equal to the yield rate of interest. Because the convertible debt is not a CSE and therefore not assumed converted for primary EPS, we have no adjustment to E for any interest savings or any adjustment to S. However, for fully diluted EPS, any convertible security is treated as if it were converted if it is dilutive. Therefore, there

#### DATA FOR THE THREE CASES

Long-term nonconvertible debt (7½%)	\$ 400,000
4% convertible debt (issued at 100 on 1/1/70 when prime rate of interest was 5%; each \$1,000 bond can be converted into 20 common shares)	\$2,000,000
6% convertible preferred (20,000 shares, \$100 par, issued on 1/1/71 at \$120 when prime rate of interest was 6%. Each share is convertible into 5 common shares)	\$2,000,000
Common stock, shares outstanding at 1/1/75	420,000
Common stock, shares issued on 4/2/75	80,000
The company had 200,000 warrants outstanding. Each warrant could be exercised for one share of common stock at a price of \$23.	
Average market price of common stock for 1975	\$27
Market price of common stock at 12/31/75	\$30
After-tax net income for 1975	\$1,000,000
Income tax rate	40%
Interest on government securities	8%

#### Required:

- Case 1. Compute primary and fully diluted EPS from the above information for 1975.
- Case 2. Repeat (1) assuming that the 4% convertible debt is 6% and the prime rate of interest is 7%.
- Case 3. Repeat (1) assuming a net income of \$200,000.

would be an adjustment in E to arrive at  $E_3$  and an adjustment to S to arrive at  $S_3$  and a new  $EPS_3$  which is lower than  $EPS_2$  making the convertible debt dilutive for fully diluted EPS.

The preferred stock is not a CSE because \$6 divided by \$120 is 5% which is not less than 66 2/3% of 6%. The effect of this for primary EPS is that dividends were deducted to arrive at  $E_1$ , whereas for fully diluted EPS, because all convertibles are treated as if they were converted, the dividends (savings) have to be added back to arrive at  $E_4$ . Also, for fully diluted EPS, there is an effect on S. If the preferred stock were a CSE, preferred stock would, of course, be given the same treatment in primary EPS as described for fully diluted EPS. In Case 1, the convertible preferred stock is dilutive for fully diluted EPS because  $EPS_4$  is less than  $EPS_3$ .

Each item considered in Case 1 is dilutive. It is helpful to mention the "3% rule" whereby both primary and fully diluted EPS must be at least 3% less than pre-*Opinion 15* EPS in order to be reported unless more dilution is anticipated in a

subsequent period (*APB Opinion 15*, footnote 2). In other words, in Case 1, primary and fully diluted EPS would have to be less than \$1.77 in order to be reported.

*Case 2.* In Case 2, we changed the 4% convertible debt to 6% convertible debt and the prime rate of interest at the time of issuance to 7%, which means that the convertible debt is still not a CSE. But the convertible debt is now antidilutive in the fully diluted EPS calculation to arrive at  $E_3$ ; i.e.,  $EPS_3$  is greater than  $EPS_2$ . Therefore, the additions to convert from  $E_2$  and  $S_2$  to  $E_3$  and  $S_3$  must be excluded in arriving at  $E_4$  and  $S_4$ . The assumed preferred stock conversion for fully diluted EPS is still dilutive since  $EPS_4$  is less than  $EPS_2$ .

*Case 3.* The third case has the same assumptions as Case 1 except for a lower reported net income of \$200,000. Here even the assumed exercise of stock warrants is antidilutive since  $EPS_2$  is greater than  $EPS_1$ . Therefore, the adjustments to  $E_2$  and  $S_2$  must be eliminated in testing whether the convertible debt and convertible preferred stock are dilutive for fully diluted EPS. (The latter two securities are

SOLUTIONS TO EPS PROBLEMS

	Case 1		Case 2		Case 3		
	Primary	Fully Diluted	Primary	Fully Diluted	Primary	Fully Diluted	
Assumed proceeds (200,000 x \$23 each)	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	
Application of proceeds:							
Acquisition of treasury stock (1)	\$2,700,000	\$3,000,000	\$2,700,000	\$3,000,000	\$2,700,000	\$3,000,000	
Retirement of 7½% L-T nonconvertibles	400,000	400,000	400,000	400,000	400,000	400,000	
Retirement of convertible debt (remainder of proceeds)	1,500,000	1,200,000	1,500,000	1,200,000	1,500,000	1,200,000	
	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	\$4,600,000	
Adjustment of net income:							
Reported net income	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$ 200,000	\$ 200,000	
Preferred stock dividends	(120,000)	(120,000)	(120,000)	(120,000)	(120,000)	(120,000)	
	E1	\$ 880,000	\$ 880,000	\$ 880,000	\$ 880,000	\$ 80,000	\$ 80,000
Interest on L-T nonconvertibles [\$400,000 × 7½% × (1 - 40%)]	18,000	18,000	18,000	18,000	18,000	18,000*	
Interest on convertible debt retired (2)	36,000	28,800	54,000	43,200	36,000	28,800*	
	E2	\$ 934,000	\$ 926,800	\$ 952,000	\$ 941,200	\$ 134,000	\$ 126,800*
Interest on convertible debt converted [remaining convertible debt × interest rate × (1 - 40%)]		19,200		28,800*		48,000* (7)	
	E3	\$ 946,000		\$ 970,000*		\$ 128,000*	
Preferred Dividend Savings		120,000		120,000		120,000	
	E4	\$1,066,000		\$1,061,200		\$ 200,000	
Adjustment of shares:							
Weighted average no. of shares, S <sub>1</sub> (3)	480,000	480,000	480,000	480,000	480,000	480,000	
Exercise of warrants (200,000-100,000) (4)	100,000	100,000	100,000	100,000	100,000	100,000*	
	S <sub>2</sub>	580,000	580,000	580,000	580,000	580,000*	
Convertible debt (conversion) (5)		16,000		16,000*		40,000* (7)	
	S <sub>3</sub>	596,000	596,000	596,000*	596,000	520,000*	
Convertible preferred stock (6)		100,000		100,000		100,000	
	S <sub>4</sub>	696,000	696,000	680,000	680,000	580,000	
EPS <sub>1</sub> (E <sub>1</sub> /S <sub>1</sub> )	1.83	1.83	1.83	1.83	.17	.17	
EPS <sub>2</sub> (E <sub>2</sub> /S <sub>2</sub> )	1.61	1.60	1.64	1.62	.23**	.23**	
EPS <sub>3</sub> (E <sub>3</sub> /S <sub>3</sub> )		1.59		1.63**		.25**	
EPS <sub>4</sub> (E <sub>4</sub> /S <sub>4</sub> )		1.53		1.56		.34**	

\* This item is excluded from succeeding E and S calculations, since the CSE or security under consideration was antidilutive.

\*\* This figure would not be reported since it is antidilutive.

(1) Primary EPS: (500,000 shares × 20% limitation) × \$27; Fully diluted EPS: (500,000 shares × 20% limitation) × \$30.

(2) Amount of convertible debt retired × interest rate × (1 - tax rate).

(3) 420,000 + (9/12 × 80,000).

(4) 200,000 shares from the exercise of warrants minus (500,000 shares × 20% limitation).

(5) [(\$2,000,000 minus convertible debt retired)/\$1,000] × 20 shares.

(6) (20,000 shares × 5).

(7) Since previous adjustments are antidilutive, it must be assumed that there is no retirement of convertible debt. Therefore, the full amount of debt is used in this adjustment.

not CSE's for primary EPS.) In considering the effect of the convertible debt on  $E_3$  and  $S_3$  (with elimination of the adjustments to arrive at  $E_2$  and  $S_2$ ), one adds the convertible debt adjustments directly to  $E_1$  and  $S_1$  instead of to  $E_2$  and  $S_2$  in order to arrive at  $E_3$  and  $S_3$ .  $EPS_3$  is larger than  $EPS_1$  and therefore the convertible debt is also antidilutive. In calculating  $E_4$  and  $S_4$  to consider whether the convertible preferred stock is dilutive, the adjustments will be added to  $E_1$  and  $S_1$  (because adjustments to arrive at  $E_2$ ,  $E_3$ ,  $S_2$ , and  $S_3$  are eliminated).  $EPS_4$  is greater than  $EPS_1$ , indicating antidilutiveness of the convertible preferred stock also. Thus, the assumed exercise of the stock warrants, the convertible debt, and the convertible preferred stock (the latter two considered only for *fully diluted* EPS) are all antidilutive and  $EPS_1$  would be the reported figure. The solution to Case 3 shows that the step-by-step procedure in our worksheet format is an effective and desirable approach.

Other factors might cause antidilutiveness. Even with a higher income (say \$1,000,000 as in Case 1), a higher interest rate on the convertible debt or a lower conversion rate for either bonds or preferred stock could cause antidilutiveness.

### Concluding Comments

In addition to the unique worksheet format which facilitates both original computations and illustrations, the cases illustrate many specific points with just one set of data. The cases include pre-Opinion 15 EPS calculations; stock warrants with ending market price of stock greater than the average price for treasury stock acquisition purposes and the accompanying 20% rule; convertible debt and convertible preferred stock; calculation of a yield rate of interest different from the nominal rate of interest; an income tax rate other than 50% to more clearly illustrate the net-of-tax savings; and the weighted average calculation of the number of shares for the denominator. Many of these individual points arise in practice although they are seldom given attention in examples in informational and interpretive sources.

For additional illustrations, instructors or discussion leaders could increase the number of cases by including other things — all within the same format. For example, one could have two issues of convertible debt and all convertible debt could be assumed to be CSE's or convertible preferred stock could be assumed to be a CSE. These changes can be made with only minor changes in the data. One could illustrate that most items are antidilutive

when a net loss is shown. Introducing the issuance of a convertible debt during the current year, or an even more challenging actual conversion of a convertible security during the current year would provide ample opportunity for expanding the problem to the degree desired by the instructor.

The format would facilitate computerization of EPS calculations and thus would have the advantage of providing an opportunity for the instructor to explain to practitioners that some large companies do computerize their EPS calculations — that computerization may, in fact, be the most feasible way of calculating EPS for companies with complex capital structures.

Another advantage of the illustrations in this article is that the problem(s) can be adapted to fit the needs of different types or levels of practitioners. For example, if an instructor is working with practitioners who are concerned with EPS calculations for purposes of general understanding only, he or she would cover only the basics of this problem (probably only Case 1). If the instructor is working with those involved with EPS calculations for corporations with complex capital structures, he or she could include all of the material covered in this article or introduce other variations which may be important into the format described in this article.

*The authors wish to express their appreciation to Dr. Bradley J. Schwieger, The University of Tennessee-Knoxville, for his helpful comments and suggestions.*

### Notes

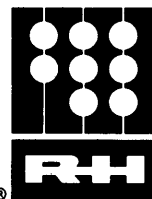
<sup>1</sup>There are some other requirements as well, such as: issuance must be exercisable within five years (*APB Opinion 15*, paragraph 57) and market price must have exceeded the exercise price for "substantially all of three consecutive months ending with the last month of the period to which earnings per share data relate" (*APB Opinion 15*, paragraph 36).

<sup>2</sup>Paragraph 38(b) of *APB Opinion 15* regarding the order of the assumed use of the proceeds from the assumed exercise of the options or warrants is confusing. It appears that the order after assumed retirement of 20% of outstanding shares is retirement of short-term borrowings and long-term borrowings. These long-term borrowings include any long-term debt to the extent that the debt may be retired. "Debt is eligible to be retired when it either may be "called" or is trading and could be purchased in the market" (*Unofficial Accounting Interpretations of APB Opinion No. 15*, paragraph 77). Since any long-term debt can be retired, this *does* include convertible debt, both CSE's and other potentially dilutive securities; therefore, in general, it should be assumed that all convertible debt is retired before proceeds are invested in government securities, and this is the assumption in the present article.

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