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Practical Considerations in Common Stock Repurchase

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Repurchase of their own common stock by companies is becoming more and more popular. However, such repurchase should be decided on only after a few simple factors are weighed. Here they are —

PRACTICAL CONSIDERATIONS IN COMMON STOCK REPURCHASE

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ALTHOUGH much good theoretical analysis of common stock repurchase has been published in recent years, little of practical value has filtered into the everyday world of business finance. Scholarly journals and academic texts almost invariably treat common stock repurchase as a decision in dividend policy.[1] While such an approach is logical and assists in understanding difficult questions in the financial theory surrounding capital structure, it is of nominal assistance to the corporate treasurer facing the complex problems of common share earnings and, by extension, of market price. As a consequence, senior management has no practical guidelines by which to evaluate stock repurchase, and its direct effects on earnings.

Repurchase of common stock by the corporate issuer is the converse of equity financing through distribution of new or treasury shares for cash. In the same sense that issuance of common shares results in new capital, repurchase is an "investment" in the issuer's own stock, a partial liquidation which results in a contraction of capital. Repurchase is, therefore, a valid employment of excess funds which may yield greater returns, in earnings per share and market price gains to remaining stockholders, than alternate investments, e.g., treasury bills. Whereas new equity issues (without pre-emptive rights) dilute earnings per share, repurchase by the issuer is counter-dilutive, by withdrawing outstanding stock from public circulation. The knowledgeable and experienced corporate financial officer would, therefore, do well to understand the nature and practice of repurchase as the mirror strategy of equity financing. Well-rounded and effective financial management requires nothing less.

It is a basic premise of this article that common stock repurchase is a valuable financial tool which can

[1] See for example: Harold Bierman, Jr., and Richard West, "The Acquisition of Common Stock by the Corporate Issuer," *Journal of Finance,* December, 1966, pp. 687-96; E. J. Elton and M. Gruber, "The Effect of Share Repurchase on the Value of the Firm," *Journal of Finance,* March, 1968, pp. 135-49; James C. Van Horne, *Financial Management and Policy,* Prentice-Hall, Englewood Cliffs, N.J., 1968, pp. 208-211.

To be truly useful, however, repurchase must be measurable in terms of end result. Also helpful would be a determination of how to finance a repurchase program. Most desirable would be a method of measuring the efficiency of a given repurchase proposal—in effect relating gains resulting from an actual repurchase to potential gains from a no-cost reduction in stock outstanding, i.e., donated capital.

be used to fund stock options, acquisitions for stock, and convertible obligations of the company.[2] Additionally, current and future years' earnings per share can be enhanced through repurchase, either to offset dilution from one or more of the foregoing transactions; or to improve an unfavorable comparison with past period operating results. To be truly useful, however, repurchase must be measurable in terms of end result. Also helpful would be a determination of how to finance a repurchase program. Most desirable would be a method of measuring the efficiency of a given repurchase proposal–in effect relating gains resulting from an actual repurchase to potential gains from a no-cost reduction in stock outstanding, i.e., donated capital. This article addresses these questions and attempts to develop a practical method of evaluating repurchase under given, real world market conditions.

Effect on earnings per share

Stripped of irrelevant considerations (for the purposes of this article), earnings per share, according to generally accepted accounting principles, is simply the period income after tax divided by the average number of common shares outstanding. All other things being equal, a repurchase of common stock will affect both the numerator and denominator of the earnings per share expression by decreasing both earnings and the average number of shares outstanding. Furthermore, unless the repurchase takes place on the first day of the corporate fiscal year, effects of the repurchase on both numerator and denominator must be time adjusted, in order to correctly arrive at current year EPS. (EPS in future periods is subject to the full effect of the repurchase, barring any future distribution of shares.)

A formula for repurchase

Construction of an expression depicting the effects of repurchase is facilitated by algebraic substitution. Therefore, let:

- E = period income after tax.
- N = average number of shares outstanding for period given no repurchase.
- n_t = number shares repurchased, adjusted for time (i.e., 10,000 shares repurchased half way through the fiscal year is 5,000 shares time adjusted).[3]
- P = repurchase price per share.
- D_t = dividend per share, time adjusted (for customary quarterly payment).
- i = after-tax opportunity cost.

Earnings per share (EPS) given no repurchase is, therefore:

Equation 1:

$$EPS = E/N$$

Given the repurchase decision earnings will be affected in two ways:

- Dividends not paid on repurchased shares, i.e., treasury stock, may be invested at the opportunity rate, raising earnings. Algebraically, $E + [(i)(D_t)(n_t)]$.
- Funds used for purchase are not available for investment at the opportunity rate, lowering earnings. Again algebraically, $E - [(i)(P)(n_t)]$.

Similarly, average number of shares will decline by the time adjusted number of shares repurchased, $N - n_t$. From Equation 1 earnings per share with repurchase becomes:

[2] Recent APB opinions may discourage the issuance of repurchased stock for certain acquisitions. As a result, it would be prudent to consult a knowledgeable public accounting firm regarding repurchase prior to actually implementing the repurchase plan.

[3] Earnings per share gains from a given repurchase transaction may be estimated for a future year by setting n equal to the complete number of shares repurchased in the given transaction (in effect, letting $n_t = n$, the number of shares unadjusted). All other variables will, of course, be estimated for future years.

Equation 2:

$$EPS_r = (E + [(i)(D_t)(n_t)] - [(i)(P)(n_t)]) \div (N - n_t)$$

Example calculation

An example may help to clarify any loose ends before proceeding further:

Let: $E = \$50{,}000{,}000$
$N = 10{,}000{,}000$ shares
$n_t = 100{,}000$ shares
$P = \$45$
$D_t = \$2.00$
$i = 5.0\%$

Accordingly, Equation 1 yields:

$$EPS = \frac{50{,}000{,}000}{10{,}000{,}000} = \$5.00$$

and for Equation 2:

$$EPS_r = (\$50{,}000{,}000 + [(0.05)(2.00)(100{,}000)] - [(0.05)(45)(100{,}000)]) \div (10{,}000{,}000 - 100{,}000)$$

$$= (50{,}000{,}000 + 10{,}000 - 225{,}000) \div (9{,}900{,}000)$$

$$EPS_r = \$5.029 = \$5.03$$

Clearly in this example, as in most actual cases, the positive effect on earnings per share of the decline in the average number of shares outstanding by 100,000 overrode the negative net effect on earnings of $215,000. Consequently, $EPS_r >$ EPS.

Sensitivity analysis of Equation 2 admits some interesting conclusions applicable to a wide range of plausible cases, including the example:

- Earnings per share are not appreciably increased by the non-payment of dividends on recovered treasury stock. In fact, the dividend investment effect is so small as to be relatively insignificant in almost all cases.
- Earnings per share are only slightly increased by a moderate reduction in purchase price. As a practical matter any point in the trading range of the normal stock ("base" price ± 10-15 per cent) would yield essentially equivalent results in Equation 2.
- Equation 2 is moderately sensitive to changes in opportunity cost, with earnings per share upon repurchase inversely related to the opportunity rate, as expected.
- Equation 2 is quite sensitive to n_t, the time adjusted number of repurchased shares. In effect, 100,000 shares purchased in June will cause only half the gain in per share earnings as 100,000 shares purchased in January, all other factors remaining unchanged.

Financing repurchase

The preceding equations and examples have implicitly assumed internal financing in the use of i to represent the after-tax opportunity rate. The logic hopefully apparent in Equation 2 is, of course, equally valid if the variable b, indicating the after-tax borrowing rate, replaces i in the last term of the numerator (the cost of repurchase). The cost of external funds, b, is applicable only to the cost term of the numerator because dividends not paid on treasury stock will be invested at the internal or opportunity rate, i, regardless of the financing method.

Fortunately, it is not necessary to calculate Equation 2 for both i and b. As was concluded above, the cost of repurchase dominates the dividend investment term, and, therefore, the entire numerator. Hence it follows that the lowest cost source of funds as measured by i or b will yield the highest EPS, e.g., if $i > b$ then $EPS_b > EPS_i$. Other reasons may exist mandating the dual calculation, i.e., company policy prohibits debt for repurchase, seasonal cash shortage, etc., therefore, alternative Equation 2

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expressions are set forth below:

- Repurchase using Internal Funds

Equation 2i:

$$EPS_1 = (E + [(i)(D_t)(n_t)] - [(i)(P)(n_t)]) \div (N - n_t)$$

- Repurchase using External Funds

Equation 2b:

$$EPS_b = (E + [(i)\ (D_t)\ (n_t)] - [(b)(P)(n_t)]) \div (N - n_t)$$

An efficiency measure

Conclusions resulting from the sensitivity analysis described above indicate that the critical element in the repurchase expression is the time adjusted number of shares repurchased. The reader has noted that gains in EPS are directly proportional to n_t. A company with publicly traded common stock cannot always plan on a fixed number of shares being available at a given price on a particular date. Diverse market conditions and the effects of large single purchases by the corporation may temporarily influence prices. For these and other reasons it may be prudent to extend the repurchase program over a moderate period of time. Facing various offers of stock over the time frame of such a program, the corporate treasurer requires a means of relating offers to one another and to the ideal situation of a no-cost reduction in outstanding stock. (Stock price can be a guide, but may mislead over longer time periods as other underlying variables change.)

The "efficiency measure," k, described below gives the corporate decision maker an absolute measurement of each offer, based on its EPS effect as a percentage of EPS gain expected from a like amount of donated shares. The calculated k for each offer of stock is, therefore, a measure of the EPS "efficiency" which would result from that particular repurchase. Comparison of k, therefore, yields an ordinal measure of the optimal repurchase, as represented by the highest k.

Some may object that k cannot be used in evaluating alternative offers, that it is only useful in evaluating against a predetermined standard. We believe, however, that k is useful in evaluating offers against one another insofar as the offers differ in regard to price or financing terms. The size of various offers is automatically adjusted out by k. Evaluation of k against a predetermined standard is, of course, possible; however, each company would have to determine its own unique standard taking into account cash balances, urgency, etc.

Results of the foregoing sensitivity analysis indicate that the earnings increment from investment of unpaid dividends on donated or repurchased stock is not material. Therefore, the calculation of k is simplified by omitting the dividend effect. The three-step determination of k is as follows:

(1) Calculate the gain in EPS which could be expected from a no-cost reduction in equivalent outstanding shares; the ratio of average shares without repurchase to average shares with repurchase:

$$k_1 = \frac{N}{N - n_t}$$

(2) Calculate the gain in EPS which can be expected from the actual repurchase offer under consideration. In abbreviated form the value EPS_i/EPS can be expanded as follows:

$$k_2 = \left\{\frac{E - [(i)(P)(n_t)]}{N - n_t}\right\} \Big/ (E/N)$$

(3) Let k, the "efficiency measure," equal the expected actual gain in EPS, k_2, as a percentage of expected no-cost equivalent gain in EPS, k_1, (less one in both numerator and denominator to obtain gain ratio).

$$k = \frac{k_2 - 1}{k_1 - 1}$$

A final example

At its June 15, 197x meeting the Board of Directors of ABC Corp. resolved to purchase 10 per cent of outstanding ABC common stock, (500,000 shares) over a 120-day period commencing immediately, in order to fund several consummated acquisitions; thus counteracting expected dilution from these acquisitions amounting to five cents per share. Consolidated after-tax earnings for the year ending December 31, 197x are expected to reach approximately $10,000,000 or $2.00 per share indicated on an average 5,000,000 shares outstanding (without repurchase).

Offers to sell ABC stock which were accepted are listed below:

June 30th–50,000 at 18
July 29th–350,000 at 20
Sept. 16th–100,000 at 17

Evaluation of the purchases should determine: (a) whether the five cents per share dilution (to $2.00 pre-repurchase) is covered; and (b) how efficient are the purchase transactions in terms of k values. See Exhibit 1 on page 39.

30th June Purchase

$$EPS_i = (E - [(i)(P)(n_t)]) \div (N - n_t)$$

$$EPS_i = (10{,}000{,}000 - 22{,}500) \div (4{,}975{,}000)$$

$$EPS_i = \$2.0055$$

$$k_1 = \frac{N}{N - n_t} = \frac{5{,}000{,}000}{4{,}975{,}000} = 1.0050$$

$$k_2 = EPS_i/EPS = \frac{2.0055}{2.00} = 1.0027$$

$$k = \frac{k_2 - 1}{k_1 - 1} = \frac{0.0027}{0.0050} = .540$$

EXHIBIT I

Variable	Purchase Date 30th June	29th July	16th Sept.
P	18	20	17
N	5,000,000	4,975,000	4,829,190
n	50,000	350,000	100,000
n_t	25,000	145,810	29,160
i	.05	.05	.06
b*	—	.04	—

* Funds borrowed at 8 per cent pre-tax interest for 7/29 purchase; (tax rate 50 per cent).

29th July Purchase (base variables revised to reflect June 30th purchase)

$$EPS_b = \frac{9,977,500 - 116,648}{4,829,190} = \$2.0419$$

$$k_1 = \frac{4,975,000}{4,829,190} = 1.0302$$

$$k_2 = \frac{2.0419}{2.0054} = 1.0182$$

$$k = \frac{0.0182}{0.0302} = .6026$$

16th September Purchase (base variables revised to reflect both prior purchases)

$$EPS_j = \frac{9,860,852 - 29,743}{4,800,030} = \$2.0481$$

$$k_1 = \frac{4,829,190}{4,800,030} = 1.0060$$

$$k_2 = \frac{2.0481}{2.0419} = 1.0030$$

$$k = \frac{0.0030}{0.0060} = .500$$

The results of our example calculations indicate: (a) the five cent dilution *is* covered, as the cumulative gain in EPS is \$2.0481 − \$2.00 = \$0.05 (rounded); and (b) that the second purchase, that of July 29th, is most efficient, yielding a value of .6013. As clearly shown by the example, price is not a sufficient guide to efficiency. Purchase at 17 is clearly less efficient than purchase at the higher price of 20 because the significant cost rate b of .04 in the July example has increased, (as i) to .06 in the September example, when external funds are not available.

Understood as the direct opposite of equity financing, repurchase by a corporation of portions of its own outstanding stock is a valuable addition to financial management's range of strategic alternatives. Repurchase can counter EPS dilution from various employee options, convertible obligations or acquisitions for stock, and additionally provides an ever present alternate investment for excess or idle corporate funds. Recognizing the unavoidable gap between financial theory and practice, the author attempted to develop a series of practical steps to determine:

- repurchase effects on EPS
- use of internal vs. external funds
- efficiency of a particular repurchase transaction.

Sensitivity analysis of key expressions developed in the article yields several notable conclusions:

- Dividend savings on repurchased shares are insignificant as a practical matter.
- Purchase price within broad ranges has relatively slight effect on the efficacy of repurchase.
- Opportunity cost and borrowing rates are important determinants of the repurchase decision.
- Current year EPS is very sensitive to repurchase timing, as a result of the "average share" accounting concept of earnings. Future year EPS are, of course, unaffected by timing.

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