

How to Estimate the Effect of a Stock Repurchase on Share Price

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What is the smallest amount of stock you need to repurchase in order to prevent the share price from decreasing?

Each year, many companies buy back some of their own stock. They repurchase it instead of issuing regular cash dividends, or they have limited investment opportunities and want to return cash to stockholders.

Whatever the reason for the repurchase, there are five basic effects on companies and/or stockholders when stock is repurchased:

1. *Information or Signaling*- A company's willingness to distribute cash to its stockholders may be interpreted as a signal in two ways: The company expects future cash flows to increase, or it has no profitable investment projects available and has chosen to return cash to stockholders.
2. *The Leverage Effect*- If a firm buys back stock by issuing debt, its leverage will change, creating a twofold effect on the stock price. The firm will seem more risky to investors, so its market value may go down, but there may be an offsetting effect in that dividends and earnings per share may increase with a positive effect on the stock price.
3. *Dividend Tax Avoidance*- The income received by stockholders in a stock repurchase may be taxed as capital gain rather than as ordinary income if the repurchase meets IRS guidelines. In such a case, stockholders may prefer repurchases to a large extraordinary dividend. Because capital gains treatment was eliminated by the Tax Reform Act of 1986, this motivation for stock repurchase will disappear.
4. *Bondholder Wealth Expropriation*- If stock repurchase reduces a firm's asset base, then fewer assets will be available to distribute to bondholders, so the company's "wealth" might transfer from bondholders to stockholders. In effect, some stockholders will get first priority in the distribution of company assets.
5. *Wealth Transfer among Stockholders*- When stock repurchase is carried on through a tender offer, wealth may be transferred from tendering to non tendering stockholders.

Preventing a Price Decrease

No matter what reason exists for a repurchase, this repurchase will affect the stock's price. In most cases, companies buy back a relatively small percentage of their outstanding stock. The amount shouldn't be too small, however, or under most normal operating conditions the added

risk from heavier debt would outweigh the additional earnings per share gained from the reduction in shares outstanding- causing the stock price to drop.

Can this situation be prevented? Yes, if financial decision makers know the smallest percentage of outstanding stock that must be repurchased for the price of the stock to remain at least at its pre-purchase price. Until now, no easy way to determine this amount has been available. We have developed one- a method that is practical but theoretically sound and that estimates the minimum amount of stock a company must buy back without lowering the price per share.

Our analytical model can help decision makers estimate the leverage effect of buying back stock in the open market before the repurchase takes place. The model is based on five relatively realistic assumptions: (1) There is a risk-return trade-off in the economy, and a capital asset pricing model (CAPM) approximates this relationship. (2) The company remains the same size after the repurchase; that is, total assets do not change. (3) Because assets are unchanged, the repurchase doesn't affect expected operating earnings. (4) Because equity is repurchased and assets remain constant, the repurchase is made by replacing equity with debt. (5) The company's growth is relatively steady.

Our model deals only with the lower limit of stock repurchases. At some point, a repurchase and the subsequent increase in debt would cause the company to become extremely risky as the chance of financial distress or even bankruptcy becomes greater. Developing a model to determine the upper limit of a repurchase would involve more complex considerations and would be extremely difficult. This issue really is not important because the vast majority of repurchases involve a relatively small percentage of the company's outstanding stock.

What Affects the Stock Price?

Again, the stock price will be affected by two factors. First, the repurchase would reduce the number of shares outstanding. This reduction in stockholder's equity and the increase in the debt would shift the firm's capital structure to a higher debt-equity ratio. If the firm's operating earnings do not change, the firm's pretax earnings would decrease because of the added interest payments brought about by the increased debt. Therefore, the firm's future earnings per share, as well as dividends per share, would be different from the present amounts. Thus, investors would change their expectations about the future cash flows to be received from the stock, which would cause the price to change.

Second, additional debt issued to finance the repurchase would shift the company's capital structure to a higher debt-to-equity ratio. Thus, the company would have greater financial leverage after the repurchase, causing an increase in the firm's risk as measured by the well-known systematic measure, beta. As the leverage increases, so would the return investors require from the company's stock. Using the CAPM, decision makers can estimate the new, higher risk-adjusted rate of return that stockholders would now require from the stock.

Because the current market price of a company's stock equals the present value of all cash flows expected from the stock, using the risk-adjusted rate of return as the discount rate, it is possible to estimate the overall effect of stock repurchase on the stock price.¹

A Simple Equation

For example, in Equation 1 it can be shown that:

Percentage change in stock price = $-(dI/EBT) \times [1 + (R.P.)/(D.Y.)] - dn/n$

where:

dI = Change in interest charge because of the added debt,

EBT = Pretax earnings,

R.P. = Risk premium on the stock,

D.Y. = Dividend yield of the stock, and

Dn/n = Percentage of outstanding stock repurchased.

Equation 1 may seem to suggest that under no circumstances would the leverage effect of stock repurchase be positive because both terms on the right side have a negative sign. The second term on the right side, however, percentage of stock repurchased, is always negative. In a repurchase, the amount of outstanding stock is reduced, so the overall leverage effect of a stock repurchase may be positive, negative, or zero depending on the riskiness of the firm's stock, the increase in the interest burden as a percentage of the firm's pretax earnings, and the percentage of stock repurchased.

This equation is a useful analytical tool that decision makers can use to estimate the leverage effect of a stock repurchase. Empirical research suggests that the overall change in stock price because of stock repurchase may be the result of the sum of two effects: the leverage signaling effect and the pure leverage effect. As yet, we can't predict the size of the leverage signaling effect, but an estimate of the pure leverage effect would give decision makers a lower limit for the expected price change.

A more useful tool can be developed from Equation 1 that calculates the minimum percentage of stock that should be repurchased to prevent a drop in the stock price- a break-even repurchase percentage. This equation is:

$$-(dI/EBT) \times (1 + \text{Risk Premium}/\text{Dividend Yield}) - dn/n = 0$$

or

$$\text{Minimum repurchase percentage} = -(dI/EBT) \times [1 + (R.P.)/(D.Y.)] \quad (\text{Equation 2})$$

Ignoring the negative sign, notice that the breakeven percentage of stock repurchase is a function of the ratio of the added interest to pretax earnings, the risk premium on the stock, and the dividend yield of the stock. The first two factors affect the minimum percentage of stock repurchase adversely. For example, if the stock is risky, then the percentage of stock repurchased just to maintain the pre-repurchase price would be higher than if it were a low-risk stock. The third factor, dividend yield, is inversely related to the breakeven percentage. The higher the dividend yield, the lower the breakeven percentage.

The relationship between these variables and the breakeven percentage of stock repurchased is depicted in Table 1, which shows how the breakeven repurchase percentage varies as the company's characteristics vary. For a firm with a high "risk premium to dividend yield" ratio, the percentage of stock repurchase necessary to maintain its stock price would be higher. For example, if a company has a dI/EBT ratio of 5% and a risk premium dividend yield ratio of .60, at least 8% of the company's stock would have to be repurchased to avoid a price decline.

Table 1
Minimum Percentage of Stock Repurchase to Break Even

dI/EBT Ratio	Risk Premium/Dividend Yield Ratio					
	0.40	0.60	0.80	1.00	1.20	1.40
2.00%	2.80%	3.20%	3.60%	4.00%	4.40%	4.80%
3.00	4.20	4.80	5.40	6.00	6.60	7.20
4.00	5.60	6.40	7.20	8.00	8.80	9.60
5.00	7.00	8.00	9.00	10.00	11.00	12.00
6.00	8.40	9.60	10.80	12.00	13.20	14.40
7.00	9.80	11.20	12.60	14.00	15.40	16.80
8.00	11.20	12.80	14.40	16.00	17.60	19.20
9.00	12.60	14.40	16.20	18.00	19.80	21.60
10.00	14.00	16.00	18.00	20.00	22.00	24.00
11.00	15.40	17.60	19.80	22.00	24.20	26.40
12.00	16.80	19.20	21.60	24.00	26.40	28.80
13.00	18.20	20.80	23.40	26.00	28.60	31.20
14.00	19.60	22.40	25.20	28.00	30.80	33.60
15.00	21.00	24.00	27.00	30.00	33.00	36.00

Plugging in the Numbers

An example using a real situation illustrates the estimation process. Say IBM is considering a repurchase for stock option purposes. Management would want to know the smallest repurchase that would be necessary to avoid a price decline. The following information is used:

1. Expected pre-tax income (EBT): \$11 billion (Based on IBM's history, but would be available for future periods based on internal projections.)
2. Annual interest rate on debt: 14.3% (Based on current balance sheet information, but current interest rates would be available from lenders or investment bankers.)
3. Market value of common stock: \$90 billion
4. Beta (from ValueLine): 0.73

Step 1: Calculate the "change in interest/earnings before taxes" ratio.

If 1% of IBM stock is repurchased, the additional debt required, assuming debt is issued to replace the stock, is:

Market value of common stock x .01 = \$900 million

Additional interest:

\$900 million x 14.3% = \$129 million

Change in interest/earnings before taxes ratio:

$$\frac{\$129 \text{ million}}{\$ 11 \text{ billion}} = .0117 \text{ or } 1.17\%$$

Step 2: Calculate the “risk premium/ dividend yield” ratio.

The market risk premium is the difference in the future expected return on an average stock less the current risk-free rate of return. The market risk premium is an estimate by the decision maker, which isn't always easy. Long-term returns on the stock market historically have averaged 10 to 12%, but higher inflation in recent years and expected inflation in future years may drive this up. The estimate we used here is 15% and a current risk-free return of 5% for a market risk premium of 10%.

IBM's dividend yield, based on the past year's average dividend and average stock price, is:

$$\frac{\$4.40}{\$130} = 3.4\%$$

Thus, the “risk premium/dividend yield” ratio is:

$$\frac{7.3}{3.4} = 2.15$$

Step 3: Calculate the repurchase break-even point using Equation 2:

$$1.17 (1 + 2.15) = 3.69\%$$

If IBM were to enter a stock repurchase program, it would have to repurchase at least 3.69% of its outstanding stock or the stock's price would go down. At current prices, the repurchase would total approximately \$3.3 billion.

Making the Decision

Before a company decides to repurchase any of its stock, financial decision makers need to analyze possible effects on the stock's price per share. If a company's financial managers follow our practical, relatively simple, conceptually sound tool, they can estimate the minimum repurchase necessary to avoid a negative effect on share price.

¹ Derivation of the model can be obtained by writing the authors at University of North Florida, 4567 St. Johns Bluff Rd., South, Jacksonville, Fla. 32216.

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