

My Favorite Two Corporate Finance Puzzles

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My favorite two corporate finance puzzles are:

1. The dividend puzzle.
2. The capital structure puzzle.

Long ago, Fischer Black (1976) wrote the classic paper, “The Dividend Puzzle.” But even though the paper clearly defined the puzzle, it is appropriate that more attention be paid now to this interesting issue. It is not sufficient that we conclude as Fischer Black did with “We don’t know.”

The Dividend Puzzle

When Black wrote his paper, there was a wide gap between the tax rate on ordinary (dividend) income and capital gains. The puzzle was why corporations forced their investors to pay high ordinary tax rates when a lower capital gains tax rate was available.

Example: A firm has 1,000 shares outstanding. Assume an investor owns 100 shares of a common stock. The stock price is \$100. The investor’s tax basis is \$98 per share. The corporation can pay a cash dividend of \$2 per share or can do a share repurchase of \$2,000 and the investor who does not sell will have a \$200 unrealized capital gain (with the 100 shares). Assume the investor pays a tax rate of 60% on ordinary income and a 25% tax rate on realized capital gains.

With a dividend, the investor receives \$200 and nets after tax:

$$200 (1 - 0.6) = \$80$$

and owns 100 shares (10% of the outstanding shares) worth \$9,800 or total assets of \$9,880.

With share repurchase, assume the investor sells two shares for \$200 in total (\$100 per share) and has a \$4 capital gain. The tax is \$1:

$$4 (0.25) = \$1$$

The investor nets \$199 and still owns 98 shares worth \$9,800 and total assets of \$9,999. The investor who does not sell has 100 shares worth \$10,000.

With share repurchase, the firm buys \$2,000 of stock or 20 shares. There are then 980 shares outstanding. Assume the investor sells two shares, thus has 98 shares left or 10% of the firm's outstanding shares (same as with the dividend).

But with share repurchase the investor has \$199 of cash whereas with the dividend the investor only has \$80.

With the above facts, it is obvious that share repurchase is more beneficial for the investor who sells than a cash dividend. Let us change the tax basis for the 200 shares. If the investor's tax basis was \$100 per share, the investor selling two shares would have netted \$200. If the investor's tax basis was zero, the investor would have a \$200 capital gain and netted \$150 cash after tax:

$$200 (1 - 0.25) = \$150$$

Today (2007) the tax rates on eligible dividends and capital gains are both 0.15; but thanks to a tax basis greater than zero, or the investor choosing the alternative not to sell, share repurchase is at least as good as dividends for the investor and is likely to be preferred if the investor's tax basis is greater than zero. Thus to benefit taxed investors, corporations in general should do share repurchase rather than cash dividends.

But the more significant puzzle has to do with why managers and the board of directors insist on paying ever-increasing dividends rather than do more and larger share repurchases. We will assume the members of the firm's board of directors own a material amount of stock and pay income taxes.

We should note that there should be a set of corporations with little or no growth opportunities that should (strategically) pay dividends. These corporations will tend to appeal to investors with low tax rates who want a relatively secure set of cash flows. In this paper, we consider investors paying a high rate of taxes who are not indifferent as to whether or not the corporation pays them dividends or pays them in some other format.

We now consider the distribution decision from the viewpoint of management (including the board of directors). For simplicity, we will consider a firm that is not growing; and, consistent with the previous example, the firm has \$2,000 that it can use to pay a dividend (\$2 per share) or to repurchase shares. Each year, the firm earns \$2,000.

If the firm pays a \$2,000 dividend, the total stock value before the dividend is \$100,000 at the end of the year, and the price per share is \$100 before the dividend. After the cash dividend, neglecting the tax factor, the firm value is \$98,000 in total

and \$98 per share. These facts are valid for the end of each year (the firm size is constant each year at the same time of the year).

Now consider what happens with a \$2,000 share repurchase. The firm buys 20 shares at a price of \$100 per share. The total firm value after the \$2,000 repurchase is \$98,000 and the value per share is:

$$\frac{98,000}{980} = \$100$$

If the firm earns \$2,000 in the next year, the value at the end of the second year is again \$100,000 and the value per share is:

$$\frac{100,000}{980} = \$102.04$$

With \$2,000 of available cash at the end of the year, the firm can buy

$$\frac{2,000}{102.04} = \$19.60 \text{ shares}$$

and after the repurchase of \$2,000 of common stock (19.6 shares) the value per share is again \$102.04:

$$\frac{98,000}{980 - 19.60} = \frac{98,000}{960.40} = \$102.04 \text{ shares}$$

The firm is buying back 2% of its shares:

$$p = \frac{19.60}{980} = 0.02 \text{ or } 2\%$$

The growth rate in stock price for this zero growth firm is

$$g = \frac{p}{1 - p} = \frac{0.02}{0.98} = 0.0204$$

Initially, the stock price is \$100. After 1 year, it is

$$P_1 = 100 (1.0204) = \$102.04$$

For verification, see the above calculations.

After 10 years, the stock price will be \$122.38:

$$P_{10} = 100 (1.0204)^{10} = \$122.38$$

If the firm had been more profitable, the growth rate would be larger (remember that this is a zero real growth firm). For example, if the firm could buy back 0.10 of its stock each year

$$g = \frac{p}{1-p} = \frac{0.10}{1-0.10} = 0.111$$

and now at time 10:

$$P_{10} = 100 (1.111)^{10} = \$286.51$$

By doing a share repurchase instead of a dividend, the stock price goes up by 2.865 times over a 10-year period if the firm can buy 0.10 of its shares each year.

Other Studies of the Puzzle

In 1990 Fischer Black returned to the dividend issue and in half a page summarized the issues “Why do firms pay dividends? I think investors simply like dividends.” He concludes with “I think dividends that remain taxable will gradually vanish.” They are being paid but decreasing in importance. But the puzzle remains, if not actually stated.

As P.L. Bernstein (1996) first notes (p. 16), “Today with the yield on the S&P 500 down below 2.50% investors are more puzzled than ever.” Yields were about 4% when Black wrote his first piece. Bernstein then concludes (p. 16), “My analysis suggests that dividend yields have no particular significance as a stock market forecasting device.” He notes that the total returns of stock have been good (he includes share repurchases in his analysis (p. 17)). His final conclusion (p. 21) is “The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don’t fit together.” This is perfectly consistent with Black (1976), who used the exact same words.

Frankfurter (1999) offers an excellent summary of academic thinking regarding dividends. He summarizes the literature into four major groups of papers. However, he fails to find here the answers to the puzzle. Like Black he concludes (p. 80) “Investors love dividends.” He then asks, “Is the Puzzle Solvable?” His conclusion is that (p. 83) “it is either not possible, or extremely difficult, to find an economically rational solution to the dividend puzzle.” At least I think it is his conclusion.

My Conclusion

To obtain a different perspective on the dividend puzzle, I will redefine the issue. Remember that a share repurchase program is basically a dividend policy with tax and other advantages for investors.

The advantages of share repurchase to management that owns stock options is obvious. Rather than a flat stock price through time, management can manufacture a significant growth rate of earnings per share with share repurchase that can lead to a much larger stock price.

The puzzle is “Why would management support a dividend policy that leads to a constant stock price with cash dividends rather than a share repurchase policy that

leads to an increasing stock price?" If management owns stock options, the dividend policy (an increasing cash dividend) is costly to management. Management is casting aside self-interest in order to benefit the stockholders. But unfortunately, this policy that does not benefit management also does not benefit the taxed stockholders. It is a puzzle why so many corporations pay dividends.

In 1976 Fischer Black wrote (p. 8), "What should the corporation do about dividend policy? We don't know." In 1990 he wrote (p. 5) "I think dividends that remain taxable will gradually vanish." This 1990 quote implies that by 1990 Black thought that corporations either should not pay taxable dividends or thought that they should not pay dividends.

The Capital Structure Puzzle

In the 1980s, corporate raiders made money-acquiring firms with little debt, leveraging them, and reaping the benefits from the debt tax shields. When the corporate tax rates were reduced from 0.46 to 0.35, the benefits of this acquisition strategy were also reduced. Higher interest rates and higher price multiples, as well as changes in the investment banking industry, reduced merger activity by the end of the 1980s.

With the new millennium came the surge in private equity deals. More and more studies showed it was difficult to beat the stock index funds by picking the winning stocks (the stocks that did better than the market). Private equity firms posted ROI records that frequently beat the returns earned by buying the overall market.

We will focus here on two of the primary ways that the private equity firms were able to record a history of earning superior returns.

Consider a 1-year \$1,000 market investment that yields 0.15.

0	1
- 1,000	+ 1,150

The investors earn 0.15 investing in the market. Now assume that funds can be borrowed at 0.05 and that \$900 of debt is raised:

0	1	
- 1,000	+ 1,150	Investment in market Debt
+ 900	- 945	
- 100	+ 205	Equity investment

The 15% return on equity with zero debt is increased to 105% by the use of debt. If only \$800 of debt is used, we have:

0	1
- 1,000	+ 1,150
+ 800	- 840
- 200	+ 310

The return on equity is reduced from 105 to 55%. Of course, if less than \$1,150 is earned at time one, the ROE will be reduced to less than 55%. The use of

debt increases the risk to the equity investors given that the 0.15 basic return on investment is uncertain.

We can generalize. If the investment can earn a higher expected return than the cost of debt, the expected ROE can be increased by the use of debt. The more debt, the higher the expected return on equity. If the investor's focus is on the expected ROE with no (or little) attention on the amount of leverage being used, a comparison of the 55% versus the 15% earned in the market demonstrates the apparent superiority of the private equity investment (the comparison is not correct since it ignores the different amounts of leverage and the risk).

Continuing the example that uses \$800 of 5% debt, now assume that the \$1,150 benefits of year one is an after-tax return and that debt interest is tax deductible. The corporate tax rate is 0.35, and thus the after-tax cost of the debt is 0.05 $(1 - 0.35) = 0.0325$ and we have for the investment flows:

0	1	
- 1,000	+ 1,150	Investment in market Debt
+ 800	- 826	
- 200	+ 324	Equity investment

The ROE is increased from 15 to 62% because of the tax advantage of using debt rather than equity as well as the leverage effect of using 0.05 debt to finance an investment yielding 15%.

We know that the prime strategy of a private equity firm is to substitute debt for the use of equity of the firm being acquired. A simple calculation of the value added is tB where t is the corporate tax rate and B is the amount of debt substituted for equity. While tB somewhat overstates the value added, it is a reasonable rough estimate of the value added. In addition, if the use of leverage inflates the ROE earned by the equity investor (who fails to consider that debt is being used and thus risk to the equity investment is increased), value is increased for the private equity firm that is rewarded based on both profitability of the equity and the amount of equity.

The private equity firm must find public corporations that are using less debt than the firms could support. There are many such corporations. Thus, this is the first capital structure puzzle. Why do so many corporations use less debt than is feasible if debt is less costly a capital source than equity?

One answer is that the CEO and CFO want to control the amount of risk of the investor. But the investor can control risk by buying a mix of the firm's debt and equity. The CEO is likely not to be aware of this, but it is basic finance.

A second answer is that more volatility of equity returns puts the CEO's job at risk, and the CEO likes his/her job. It is up to the board of directors to solve this obstacle.

There is a third answer. The CEO wants the firm to be raided by private equity. The private equity firm is likely to explain how going private can result in the CEO becoming very rich. Why should the CEO try to avoid this welcome fate?

Thus we can explain (to some extent) why corporations use less debt than theory suggests is desirable. But it is easy to suspect that in many cases none of the above

three explanations apply; and we are left with corporations using less than optimum debt and a vibrant private equity industry willing to exploit the situation by taking firms private.

Strebulaev (2007) finds that (p. 1747) “firms seem to use debt financing too conservatively, and the leverage of stable, profitable firms appears particularly low.” But his main concern is how firms move to their target level of leverage, rather than explaining why that target is too low.

Conclusion

This paper has defined two corporate finance puzzles where corporate practice is not completely consistent with what one might expect a maximizing practice would define.

The two puzzles explored in this paper do not exhaust the corporate finance practices that defy good explanations. For example:

- a. Why is leasing so extensive?
- b. Why do firms insist on hedging when hedging is not feasible (see the Skilling-Lay trial)?
- c. Why do firms do many things to maintain their stock price when it would be more beneficial to all for the stock price to drop? If the price drops excessively, the firm can buy shares.
- d. Why is ROI still used to evaluate investments by so many firms?
- e. Why are income bonds not more widely used?

Despite the length of the above list, the capital structure and dividend puzzles remain at or near the top of the list. Obviously, those of us who teach corporate finance also have a puzzle. Why have we been so ineffective for so many years?

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