

- 4.2.13 Convertible's behavior is equity-like when its conversion value exceeds its investment value, and the bond behaves like an in-the-money option. Its value fluctuates almost directly with the underlying stock price.
- 4.2.14 The convertible's behavior is hybrid- or option-like at lower stock prices where the conversion value is less than the investment value but there is still a reasonable likelihood of the stock price rising enough to make conversion attractive. In this state, the convertible exhibit's truly hybrid behavior. Its market price is sensitive to the underlying stock price, interest rates, implied volatilities and the issuer's credit quality.
- 4.2.15 At still lower stock prices, the conversion option is so far out-of-the-money that it is almost worthless. Here, the convertible is called busted. Its behavior is much like a non-convertible bond or other fixed income instrument. Its market price fluctuates with interest rates and the issuer's credit quality.
- 4.2.16 Finally, if the issuer becomes financially troubled, its credit rating will fall well below investment grade and the stock price will plummet to very low levels. Here the conversion feature is all but irrelevant. The convertible is a distressed security whose market price fluctuates primarily with the credit quality of the issuer.
- 4.2.17 As convertibles can be so difficult to value, there is a perception that they are frequently mis-priced in the market. Convertible arbitrage is a market neutral trading strategy that seeks to profit from such mis-pricings. Due to several internal and external factors altering the fortunes of the issuer between the issue date and conversion date, any or all above possibilities are unavoidable.

4.3. PREFERRED STOCK

- 4.3.1 Preferred stock is a hybrid corporate security. It represents an equity interest in the issuing company. Unlike common stock, which pays a variable dividend depending on the corporation's earnings, preferred stock pays a fixed quarterly dividend based on a stated par value. For example, an XYZ corporation might issue preferred stock with a par value of Rs 50.00 and paying a quarterly 2% dividend. This would translate into a Rs 1.00 dividend paid each quarter.
- 4.3.2 Most corporations do not issue preferred shares. Those that do, often issue multiple classes of preferred shares over time. There are three naming conventions used for distinguishing between the different preferred issues of a corporation :
1. Annualized dividend: the shares in our example would be called XYZ Rs 4.00 preferred.
 2. Annualized dividend yield: the shares in our example would be called XYZ 8% preferred.
 3. A letter indicating the order of issuance: If the shares in our example were the corporation's third preferred issuance, they would be called XYZ preferred C.



- 4.3.3 With fixed dividends, preferred shares resemble fixed income instruments. As they don't mature, they most resemble a perpetuity. Preferred shareholders generally don't have voting rights. Also, the board of directors have less of a fiduciary obligation to preferred shareholders than to common shareholders. Some Delaware court decisions have treated the board's obligation to preferred shareholders as purely contractual.
- 4.3.4 Preferred stock differs from fixed income instruments in their tax treatment. Interest payments are an expense, so they are tax deductible for the corporation. Dividends are distributions of earnings, so they are not tax deductible. Also, depending on the investor's tax jurisdiction, dividends may be taxed differently from interest income.
- 4.3.5 When it is first issued, preferred stock is priced by the market based on prevailing interest rates. Generally, the issuer will set the preferred's dividend yield so it issues at a price close to par. After issuance, the preferred shares trade in the stock market just like common stock. Credit rating agencies rate preferred stocks based on the issuing corporation's ability to pay dividends. Market prices of highly rated issues tend to fluctuate with interest rates. Prices of lower rated issues - just like prices of lower rated bonds - tend to fluctuate with the issuing corporation's fortunes.
- 4.3.6 Preferred stock is subordinate to all the issuing corporation's fixed income obligations. If the issuer is not current on the fixed income obligations, it can pay no preferred dividends. If the issuer is liquidated, creditors must be paid in full before preferred stockholders can receive anything. However, preferred shares are superior to common shares. No dividends may be paid to holders of common stock unless dividends to preferred shareholders are also paid in full. In liquidation, preferred shareholders are entitled to at least their par value before common shareholders can receive anything.
- 4.3.7 Unlike fixed income instruments, failure of a corporation to make preferred dividend payments cannot force the firm into bankruptcy. However, while dividends are not being paid, mandatory restrictions may be placed on management and preferred shareholders may be granted the right to vote for a number of board members. Because it is dependent on dividends not being paid, this is called contingent voting.
- 4.3.8 Most preferred stock is cumulative. This means that, if a dividend is ever missed, it must eventually be made up to investors. No dividends can be paid to common stockholders until all missed dividends have been paid to preferred stockholders. If preferred shares are issued with no obligation to make up missed dividends, the shares are called non-cumulative.
- 4.3.9 Callable preferred stock has an embedded option allowing the issuer to call shares, either at par or at a slight premium above par. In a typical arrangement, shares are not callable for the first few years following issuance but can be called, perhaps with a month's notice, any time thereafter. As with callable bonds, the price behavior of callable preferreds depends on whether the call option is in-the-money or out-of-the-money as well as the financial strength of the issuer.
- 4.3.10 Most preferred stock is issued with a sinking fund provision that requires that the issuer set aside funds to gradually retire the issue over time.

4.3.11 There are a number of other variations on preferred stock:

- a. Adjustable-rate preferred stock (ARPS) has a dividend yield that, instead of being fixed, floats with specified interest rates according to some formula.
- b. Convertible preferred stock has an embedded option that allows the holder to exchange each preferred share for a specified number of common shares. Convertible preferred is usually callable. This allows the issuers to call the stock and force preferred shareholders to choose between accepting either par value or common shares. This is called a forced conversion.
- c. Participating preferred stock pays a regular fixed dividend plus an additional dividend if the common stock dividend exceeds some specified value. Today, this feature is rare.

4.4. TRUST PREFERRED SECURITIES

- 4.4.1 Trust preferred securities (TruPS) are cumulative preferred stock issued by bank holding companies through a special purpose vehicle. The special purpose vehicle is wholly owned by the bank holding company and is usually a trust. It sells the TruPS to investors and uses the proceeds to purchase a subordinated note from the bank holding company. This becomes its sole asset and cash flows from the note largely mirror the dividends payable on the TruPS. The note has an initial maturity of at least 30 years. Dividends are paid quarterly or semi-annually. Dividends may be deferred for at least five years without creating an event of default or acceleration.
- 4.4.2 From a tax standpoint, TruPS have a significant advantage over the direct issuance of preferred shares. This is because dividends on preferred shares are not deductible as a business expense, but interest on a subordinated note is. In this regard, the TruPS behaves like debt. In another regard, it behaves like equity.
- 4.4.3 Initially, TruPS were only issued by larger bank holding companies. This changed in 2000, when several institutions issued TruPS, which were pooled in a CDO. Since then, the TruPS CDO market has grown dramatically and has become a significant source of capital for small and medium sized bank holding companies.
- 4.4.4 TruPS are also issued by insurance holding companies and REITS. Those securities have also been packaged in CDOs.

4.5. EQUITY DEFAULT SWAP

- 4.5.1 An equity default swap (EDS) is a form of OTC derivative. While technically an equity derivative, it behaves like a hybrid of a credit derivative and an equity derivative. The name “equity default swap” may seem peculiar—how can equity default? The answer is that the product is named by analogy with credit default swaps (CDSs), whose structures it mimics.
- 4.5.2 As with a credit default swap, an equity default swap is a vehicle for one party to provide another protection against some possible event relating to some reference asset. With a credit default swap, the reference asset is a debt instrument and protection is



provided against a possible default or other credit event. With an equity default swap, the reference asset is some company's stock and protection is provided against a dramatic decline in the price of that stock. For example, the equity default swap might provide protection against a 70% decline in the stock price from its value when the equity default swap was initiated. The event being protected against is called the trigger event or knock-in event.

- 4.5.3 Other than the difference in the type of event being protected against, a credit default swap and equity default swap are structured identically. There are two parties to the agreement. Maturities are for several years, with five years being typical. The party buying protection pays the other a fixed periodic coupon for the life of the agreement. The other party makes no payments unless the trigger event occurs. If it does occur, the equity default swap terminates, and the protection seller makes a specified payment to the protection buyer. This is calculated as follows:

$$\text{notional amount} (1 - \text{recovery rate}) \quad [1]$$

where the notional amount is simply a dollar sum. In formula [1], recovery rate serves only to make the equity default swap more analogous to a credit default swap. Its role is similar to the recovery rate that would be realized on a defaulted debt obligation. However, the recovery rate for an equity default swap is fixed—typically at 50%.

- 4.5.4 An equity default swap is similar to a deep out-of-the-money, long-dated American digital put. A difference is that the option premium is paid in installments that cease when the option is triggered. It is more useful to think of the equity default swap as an extension of the credit default swap concept. When a credit default swap is triggered by a corporate default, that corporation's stock price will typically have fallen to almost 0. Because equity default swap triggers are set for such steep stock price declines, trigger events will almost always be associated with some sort of deterioration in the corporation's credit. For example, if an equity default swap is triggered by a 70% decline in the stock price, it provides protection against less severe corporate impairment than that which a credit default swap protects against. In this regard, the equity default swap truly behaves as a form of hybrid between a credit derivative and an equity derivative.
- 4.5.5 Equity default swap are quoted as spreads over Libor. As an equity default swap is more likely to be triggered than a credit default swap, they generally trade at higher spreads than credit default swap.
- 4.5.6 Equity default swaps have a number of advantages over credit default swaps. Their trigger events are easier to define—there is generally little ambiguity as to whether a given stock price has or has not fallen to a specified level, but with credit default swaps, there can be corporate events that may or may not constitute default. Also, recovery rates are fixed for equity default swaps while they must somehow be determined for a credit default swap following an actual default. Finally, credit default swaps are limited in that they protect against only the most severe form of corporate impairment. Equity default swaps can be structured with various trigger levels loosely corresponding to various degrees of corporate impairment.

- 4.5.7 Equity default swaps are employed in ways similar to credit default swaps. They may be used to structure synthetic CDO's. Some, CDOs use them exclusively. These are called equity collateralized obligations or ECOs.
- 4.5.8 As long-dated far out-of-the-money options, equity default swaps pose financial engineering challenges. One approach is to employ techniques of equity derivatives pricing. The other is to use techniques of credit derivatives pricing. Equity default swaps clearly present an opportunity to arbitrage between equity derivatives markets and credit derivatives markets, which should cause convergence in pricing. Research on pricing methodologies is ongoing.
- 4.5.9 Equity default swaps can be structured with multiple reference stocks. These structures may have a first to "default" or n^{th} to "default" trigger.
- It is the Composition of Debt and Equity in the 'Means of Financing' the financial needs of the company.

What is Debt and Equity?

What is leverage?

Does it or Does it not affect Cost of Capital?

Is it relevant in the valuation of the firm?

There are different methods and approaches to analyse the capital structure & the valuation of the firm.

EXERCISES & ILLUSTRATIONS :

Recap the differences between warrants and convertibles:

- 3 Warrants bring in new capital, while convertibles do not.
- 4 Most convertibles are callable, while warrants are not.
- 5 Warrants typically have shorter maturities than convertibles, and expire before the accompanying debt.
- 6 Warrants usually provide for fewer common shares than do convertibles.
- 7 Bonds with warrants typically have much higher flotation costs than do convertible issues.
- 8 Bonds with warrants are often used by small start-up firms. Why?

How do convertibles help minimize agency costs?

- 4 Agency costs are due to conflicts between shareholders and bondholders
 - 4.1 Asset substitution (or bait-and-switch). Firm issues low cost straight debt, then invests in risky projects
 - 4.2 Bondholders suspect this, so they charge high interest rates
 - 4.3 Convertible debt allows bondholders to share in upside potential, so it has low rate.
- 5 Information asymmetry: company knows its future prospects better than outside investors
 - 5.1 Outside investors think company will issue new stock only if future prospects are not as good as market anticipates
 - 5.2 Issuing new stock send negative signal to market, causing stock price to fall
- 6 Company with good future prospects can issue stock “through the back door” by issuing convertible bonds
 - 6.1 Avoids negative signal of issuing stock directly
 - 6.2 Since prospects are good, bonds will likely be converted into equity, which is what the company wants to issue

How does preferred stock differ from common stock and debt?

- 4 Preferred dividends are specified by contract, but they may be omitted without placing the firm in default.
- 5 Most preferred stocks prohibit the firm from paying common dividends when the preferred is in arrears.
- 6 Usually cumulative up to a limit.
- 7 Some preferred stock is perpetual, but most new issues have sinking fund or call provisions which limit maturities.
- 8 Preferred stock has no voting rights, but may require companies to place preferred stockholders on the board (sometimes a majority) if the dividend is passed.
- 9 Is preferred stock closer to debt or common stock? What is its risk to investors? To issuers?

What are the advantages and disadvantages of preferred stock financing?

4 Advantages

4.2 Dividend obligation not contractual

4.3 Avoids dilution of common stock

4.4 Avoids large repayment of principal

5 Disadvantages

5.2 Preferred dividends not tax deductible, so typically costs more than debt

5.3 Increases financial leverage, and hence the firm's cost of common equity

Assume that the warrants expire 10 years after issue. When would you expect them to be exercised?

Generally, a warrant will sell in the open market at a premium above its value if exercised (it can't sell for less).

Therefore, warrants tend not to be exercised until just before expiration.

In a stepped-up exercise price, the exercise price increases in steps over the warrant's life. Because the value of the warrant falls when the exercise price is increased, step-up provisions encourage in-the-money warrant holders to exercise just prior to the step-up.

Since no dividends are earned on the warrant, holders will tend to exercise voluntarily if a stock's payout ratio rises enough.

Will the warrants bring in additional capital when exercised?

When exercised, each warrant will bring in the exercise price, \$25.

This is equity capital and holders will receive one share of common stock per warrant.

The exercise price is typically set some 20% to 30% above the current stock price when the warrants are issued.

As warrants lower the cost of the accompanying debt issue, should all debt be issued with warrants?

No. As we shall see, the warrants have a cost which must be added to the coupon interest cost.



What is the expected return to the bond- with-warrant holders (and cost to the issuer) if the warrants are expected to be exercised in 5 years when $P = \$36.75$?

The company will exchange stock worth \$36.75 for one warrant plus \$25. The opportunity cost to the company is $\$36.75 - \$25.00 = \$11.75$ per warrant.

Bond has 50 warrants, so the opportunity cost per bond = $50(\$11.75) = \587.50 .

Here are the cash flows on a time line:

0	1	4	5	6	19	20
+1,000	-100	-100	-100	-100	-100	-100
				<u>-587.50</u>		<u>-1,000</u>
				-687.50		-1,100

Input the cash flows and calculate IRR = 14.7%. This is the pre-tax cost of the bond and warrant package.

The cost of the bond with warrants package is higher than the 12% cost of straight debt because part of the expected return is from capital gains, which are riskier than interest income.

The cost is lower than the cost of equity because part of the return is fixed by contract.

When the warrants are exercised, there is a wealth transfer from existing stockholders to exercising warrant holders.

But, bondholders previously transferred wealth to existing stockholders, in the form of a low coupon rate, when the bond was issued.

At the time of exercise, either more or less wealth than expected may be transferred from the existing shareholders to the warrant holders, depending upon the stock price.

At the time of issue, on a risk-adjusted basis, the expected cost of a bond-with-warrants issue is the same as the cost of a straight-debt issue.

Assume the following convertible bond data:

20-year, 10.5% annual coupon, callable convertible bond will sell at its \$1,000 par value; straight debt issue would require a 12% coupon.

Call protection = 5 years and call price = \$1,100. Call the bonds when conversion value > \$1,200, but the call must occur on the issue date anniversary.

$P_0 = \$20$; $D_0 = \$1.48$; $g = 8\%$.

Conversion ratio = CR = 40 shares.

What conversion price (Pc) is built into the bond?

$$\begin{aligned} P_c &= \text{Par Value} / \text{No. of shares received.} \\ &= 1000 / 40 = \$25 \end{aligned}$$

Like with warrants, the conversion price is typically set 20%-30% above the stock price on the issue date.

Implied Convertibility Value:

As the convertibles will sell for \$1,000, the implied value of the convertibility feature is \$1,000 - \$887.96 = \$112.04.

The convertibility value corresponds to the warrant value in the previous example.

What is the formula for the bond's expected conversion value in any year?

$$\text{Conversion value} = CV_t = CR(P_0)(1 + g)^t.$$

$$t = 0$$

$$CV_0 = 40(\$20)(1.08)^0 = \$800.$$

$$t = 10$$

$$\begin{aligned} CV_{10} &= 40(\$20)(1.08)^{10} \\ &= \$1,727.14. \end{aligned}$$

What is meant by the floor value of a convertible? What is the floor value at t = 0? At t = 10?

The floor value is the higher of the straight debt value and the conversion value.

$$\text{Straight debt value}_0 = \$887.96.$$

Besides cost, what other factors should be considered?

The firm's future needs for equity capital:

Exercise of warrants brings in new equity capital.

Convertible conversion brings in no new funds.

In either case, new lower debt ratio can support more financial leverage

Does the firm want to commit to 20 years of debt?

Convertible conversion removes debt, while the exercise of warrants does not.

If stock price does not rise over time, then neither warrants nor convertibles would be exercised. Debt would remain outstanding.