MN50412: Spring 2010

Extra Convertible debt Slides.

Section 6: Convertible Debt.

- -Valuation of Convertibles.
- -Impact on Firm Value.
- -Why firms issue convertibles.
- -When are they converted (call policy)?
- **Convertible bond** -holder has the right to exchange the bond for common stock (equivalent to a call option).
- Conversion Ratio = number of shares received for each bond.
- Value of Convertible Bond = Max{ Straight bond value, Conversion Value} +option value.



Firm Value

<u>Conflict between Convertible Bond holders</u> and managers.

- Convertible Bond = straight debt + call option.
- Value of a call option increases with:
- Time.
- Risk of firm's cashflows.
- Implications: Holders of convertible debt maximise value by not converting until forced to do so => Managers will want to force conversion as soon as possible.
- Incentive for holders to choose risky projects => managers want to choose safe projects.

Reasons for Issuing Convertible Debt.

Much real world confusion.

Convertible debt - lower interest rates than straight debt.

=> cheap form of financing?

No! Holders are prepared to accept a lower interest rate because of their conversion privilege.

$$CD = \sum_{t=1}^{N} \frac{I_C}{(1+K_C)^t} + \frac{PR}{(1+K_C)^N}.$$
$$D = \sum_{t=1}^{N} \frac{I_D}{(1+K_D)^t} + \frac{M}{(1+K_D)^N}.$$

 $I_D > I_C, PR > M, K_D > K_C \implies CD > D.$

• Example of Valuation of Convertible Bond.

- October 1996: Company X issued Convertible Bonds at October 1996: Coupon Rate 3.25%, Each bond had face Value £1000.
- Bonds to mature October 2001.
- Convertible into 21.70 Shares per bond until October 2001.
- Company rated A-. Straight bonds would yield 5.80%.
- Now October 1998:
- Convertible Bonds trading at £1255 per bond.
- The value of the convertible has two components; The straight bond value + Value of Option.

Valuation of Convertible Bond- Continued.

If the bonds had been straight bonds: Straight bond value = PV of bond =

•
$$\sum_{t=0.5}^{t=3} \frac{16.25}{(1.058)^t} + \frac{1000}{(1.058)^3} = 932.83$$

Price of convertible = 1255.

Conversion Option = 1255 - 933 = 322.

Oct 1998 Value of Convertible = 933 + 322 = 1255. = Straight Bond Value + Conversion Option.

Alternative Analysis of Irrelevance of Convertible Debt.

	Firm Does	Firm Does
	Badly.	Well.
Convertible Debt	No Conversion.	Conversion.
Compared with:	CD cheaper	CD expensive,
Straight Bonds.	financing, lower	Bonds are
	coupon rate.	converted,
		Existing Equity
		Dilution.
Equity.	CD expensive.	CDs cheaper.

Firm Indifferent between issuing CD, debt or equity.

-MM.

Why do firms issue convertible debt?

 If convertible debt is not a cheap form of financing, why is it issued?

• A. Equity through the Back Door (Stein, Mayers).

- -solves asymmetric information problems (see Myers-Majluf).
- -solves free cashflow problems.
- B. Convertible debt can solve risk-shifting problems.
- If firm issues straight debt and equity, equity holders have an incentive to go for risky (value reducing) NPV projects.
- Since CD contains an option feature, CD value increases with risk.
- -prevents equity holders' risk shifting.

<u>Convertible Debt and Call Policy.</u>

- Callable Convertible debt =>firms can force conversion.
- When the bond is called, the holder has 30 days to either:
- a) Convert the bond into common stock at the conversion ratio, or
- b) Surrender the bond for the call price.
- When should the bond be called?
- Option Theory: Shareholder wealth is maximised/ CD holders wealth is minimised if
- Firm calls the bond as soon as value = call price.

• Call Puzzle.

- Manager should call the bond as soon as he can force conversion.
- Ingersoll (1977) examined the call policies of 124 firms 1968-1975.
- He found that companies delayed calling far too long.
- median company waited until conversion value was 44% above call price - suboptimal.
- Call Puzzle addressed by Harris and Raviv.
- - signalling reasons for delaying calling.
- early calling might signal bad news to the market.

Investment Banks and Convertible Debt

- Henderson and Tookes (2010):
- Hypothesis less underpricing in CDs than equity
- Less info asymmetries (see Stein)
- Less agency problems (downside protection)
- But they still find underpricing in CDs. Why?

Investment Banks and Convertible Debt (continued)

- Henderson and Tookes (2010): continued
- Search frictions in CD pricing
- 2 channels for search frictions
- Ease of attracting initial investors
- Expected after-market liquidity
- => depresses price
- IBs can add value through repeated interactions with investors
- In contrast to conflicts of interest hypothesis, where banks use underpricing to reward favoured clients.

Delayed Calls of Convertibles, financial distress and Investment Banks: Jaffee and Shleifer 1988

- Firms should force conversion as soon as bond comes into-the-money
- In practice, firms delay considerably.
- Costs to shareholders of a failed conversion => financial distress costs
- Firms delay to avoid self-fulfilling outcome where bondholders expect conversion to fail
- => bondholders sell bonds, and stock prices
 Due to FD.
- IBs can eliminate self-fulfilling bad outcome