

class / week #6

Pre-quiz #6, Q #2

Pre-quiz #6, Q11				Bad 90%		Good 10%		E(CF)	
Equity Holder Payoff	{	Proj. #1 (A)	-100	∅	90%	45	10%	⇒	4.5
		#2 (B)	-100	∅	90%	90	10%		9 ✓
		#3 (C)	-100	∅	90%	∅	10%		∅
						~ ~ ~ Limited Liability			

Q#3 Pre-quiz #6:

$$r_D = r_F + \beta_D \text{MRP}$$

Bankruptcy & Private Workouts

Bankruptcy

Economic reasons
for insolvency:

- good business model
but temporary CF deficiency

- bad business model
(so need to restructure both
assets & liabilities)

Δ this kind of
bankruptcy is known
as a "bear hug"

Ch. 7
liquidation

Ch. 11

reorganization

T.I.B. = trustee in bankruptcy

Defaulted
Debtor

Estate

T.I.B. in
Ch. 11 → CEO

[Debtor-in-
Possession]

4 month → reorg. plan
(then, T.I.B. can be granted an extension of
another 4 months)

Note the separation
of the bankrupt
company's assets in
two legal entities:

- Estate

(including all
assets at time
of bankruptcy)

- Defaulted Debtor
in Possession (DIP)

(including any assets after declaration of
default)

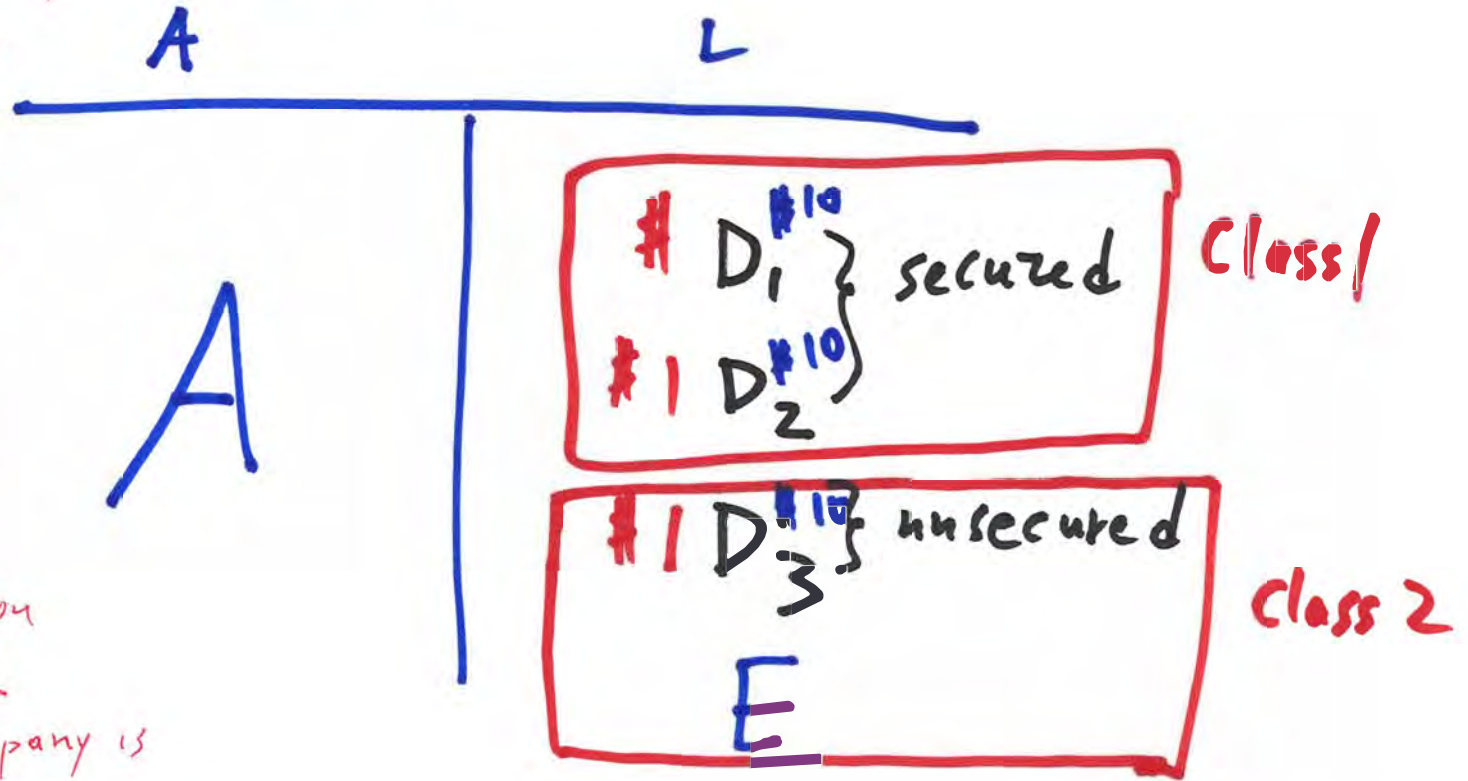
Private Workouts

- ✓ (— "coercive" ^{bond} exchange offers can be accepted with simple majority → apply to all credits
- ✓ — can do coercive debt exchanges on the basis of the Trust Indenture Act of 1939

Reasons to want to participate in such exchange offers for bondholders:

- (*) New (substitute) debt more senior than existing (old) debt → non-tendering bondholders is more junior in the capital structure
- (*) Bondholders have likely purchased bonds at a discount
- (*) Usually new debt offers a higher coupon

Bankruptcy in Chapter 11



The mechanics of a reorganization plan in bankruptcy:

(1) T.I.B. forms classes of homogenous debts

(2) Classes vote on proposed reorganization plan

(3) Plan is adopted & company is discharged from bankruptcy as long as all classes (but one) vote in favor

(4) Judge can accept settlement (reorganization) plan by "cramming down" dissenting creditor class

Settlement:

proposed reorganization plan

$\$0.50 / \1 to Class 1 ✓

$\$0.10 / \1 to Class 2 ✗

cram down

Strong Arms Clause →

Judge Can reject any unperfected claim!

Tax Benefits of Formal Bankruptcy

Bankruptcy

NOLs transferred



Private Workout

No NOLs if
original pre-bankruptcy
owners $< 50\%$

(COD)



Cancellation of Indebtedness
not taxable

COD is
taxable

The asymmetric tax treatment of private workouts
allows for bankruptcy formal filing to add value.

Features of the U.S. Bankruptcy Code

- Automatic Stay

Provides for immediate cessation of any payments (interest or principal) to pre-bankruptcy creditors. Any attempts to collect by said creditors are deemed unlawful. Security claims pre-bankruptcy continue to exist (and so interest & penalties continue to accrue).

- Absolute Priority Rule - a feature of the U.S.

Bankruptcy Code whereby no unsecured creditor is allowed payment before all secured creditors are paid.

- D.I.P. Financing

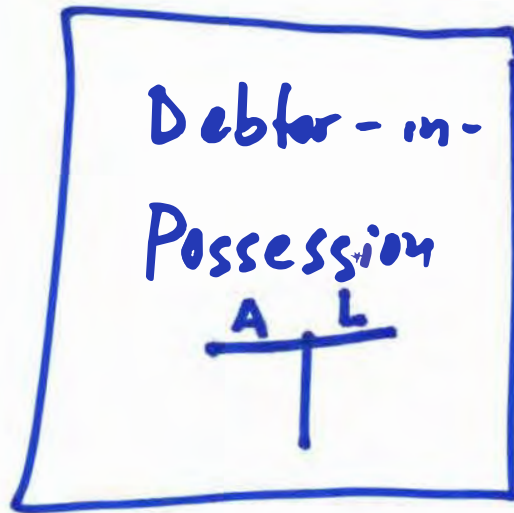
Allows for funding by financial markets of a firm undergoing bankruptcy

Illustration of D.I.P. Financing

(it is done through the legal separation of assets of firm before & after bankruptcy)

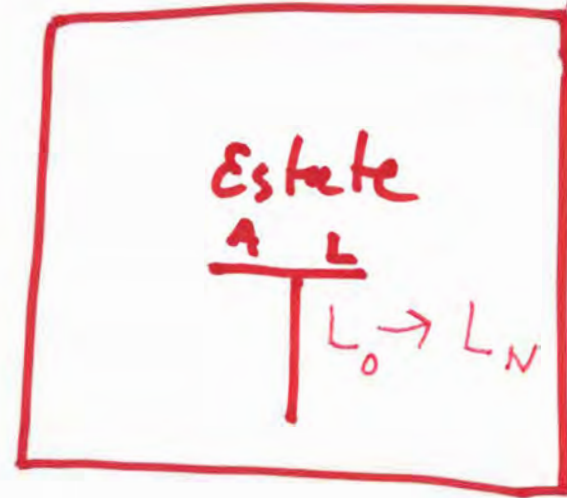
Suppliers

↑ ↓ goods & services



Goods & Services ↓ ↑ #
customers

Automatic Stay



Note that the automatic stay applies to any assets part of the estate of the

we also discussed the controversial practice of cross-collateralization

bankrupt firm

} the practice of allowing D.I.P. Claims (blue box) to post property liens on assets in the estate (red,



Fraudulent Conveyance / Transfer

Federal Codes { UFCA⁽¹⁹¹⁸⁾ — conveyance
 UFTA⁽¹⁹⁸⁴⁾ — transfer

§ 548 in

U.S. Bankruptcy Code

provides for a "look-back" period of 2 years! But



State Statutes → 6 years^{provide a "look-back" period of up to} before filing for bankruptcy
 fraudulent conveyance

Preferential Transfer — 90 days before petition

- 23 states have adopted UFCA
- 8 states have adopted UFTA

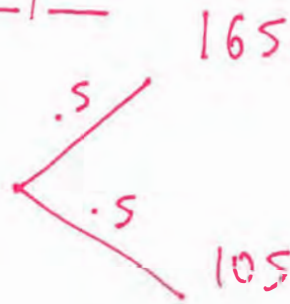
A transfer effected pre-bankruptcy within the "look-back" period is deemed "fraudulent" when transferor is insolvent (or insolvency is caused by the transfer itself) and transfer is in exchange for less than "reasonable equivalent value".

By § 548 of Bankruptcy Code, T.I.B. (or the D.I.P.) could avoid fraudulent transfers made in pre-petition "look-back" period!

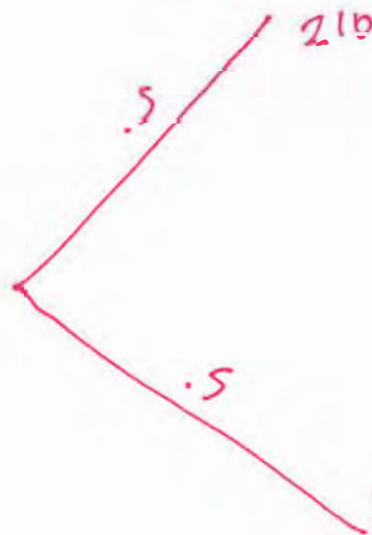
Costs of Financial Distress

Risk-Shifting Example

Optimal $\rightarrow$ Proj #1
(NPV = 12.5)



Equity $\rightarrow$ Proj. #2
(NPV = -8.3)



Creditor $\rightarrow$ Proj. #3
(NPV = -4.2)



On Interest Rates

Risk-free
Rate



r_F

$\leq$

Expected
Cost of
Debt

r_D

$\leq$

r_P

this is the coupon
payment in the debt
agreement

promised
yield

(written in
the contract)

system
risk

$\parallel$

idiosyncratic (or firm-specific)

$$r_F + \beta_D \text{MRP}$$

(CAPM)

credit risk

- {
- interest rate risk
 - credit risk (most important)
 - roll-over risk

Determination of Probability of Default

if α is recovery rate $\Rightarrow$

market
value of debt

$$D = \sum_{t=1}^{\infty} \frac{(1-p)^t r_p D + p(1-p)^{t-1} \alpha(1+r_p) D}{(1+r_D)^t}$$

$$\Rightarrow D = \frac{r_p D(1-p) + p \alpha (1+r_p) D}{r_D + p}$$

$$\Rightarrow p = \frac{r_p - r_D}{(1-\alpha)(1+r_p)}$$

certain benefit (compensation) to creditor

Anticipated Loss to Creditor

$$p(1-\alpha)(1+r_p) = r_p - r_D$$

Derivation of the cost of financial distress

LGD = Loss given default = % of firm value

$$NPV(CFD) = \sum_{t=1}^{\infty} \frac{p(1-p)^{t-1}(1+g)^{t-1} \times LGD \times V_F}{(1+r_D)^t} = \frac{p \times LGD \times V_F}{r_D + p - g}$$

$\overset{1-\alpha}{=}$

Derivation of the tax shield

$$NPV(TS) = (1-p) \frac{Tr_P D}{1+r_D} + (1-p)^2 \frac{Tr_P D}{(1+r_D)^2} + \dots = \frac{(1-p)Tr_P D}{r_D + p}$$

$r_p \geq r_D \geq r_F$

$\overset{V_F + \beta_D * M.R.P.}{=}$

← r_p is promised yield idiosyncratic risk systematic risk

DVN example - calculate prob. of default
(12/1/2020)

$$P = 135.417$$

$$r_p = 8.785\%$$

$$T = 11$$

$$r_D = (\text{BBB-}) \rightarrow \text{Corporate Bond (BBB) Yield Curve} \rightarrow 2.1682\%$$

$$\alpha = \text{recovery} = 60\% \text{ (assumed on basis of presented table of recovery rates)}$$

$\Rightarrow$ Using the default probability calculator

$$P = 4.88\%$$

Example of calculating the probability of default

Inputs

Coupon Rate =	7.95%	$= r_p$
Maturity of bond =	15	
r_D rate =	2.80%	$= r_D$
Recovery rate (alpha) =	60.40%	
Market Price of bond =	\$126.00	

To estimate the probability of distress

1. Please note the coupon rate for the bond.
2. Please set the maturity as an **integer** (i.e., please round to zero decimal)
3. Please set the r_D from your VP1 analysis here, correcting for any requ
4. Please set the recovery rate per the industry this firm belongs to.
5. Please set the value equal to the market price of bond.
6. Please open Goal Seek through "Data" tab, what-if analysis, please set F42 equal to market value of bond by changing D44.

$r_p * D \rightarrow$ Face value \$100
Col. (1) Col. (2) Col. (3)

15 years maturity

Year	Cash Flow	CF (1-p) ^t	Alpha CF p (1-p) ^{t-1}	Present Value
1	\$7.95	\$7.54	\$3.36	\$10.60
2	\$7.95	\$7.15	\$3.18	\$9.78
3	\$7.95	\$6.78	\$3.02	\$9.03
4	\$7.95	\$6.43	\$2.87	\$8.33
5	\$7.95	\$6.10	\$2.72	\$7.68
6	\$7.95	\$5.79	\$2.58	\$7.09
7	\$7.95	\$5.49	\$2.44	\$6.54
8	\$7.95	\$5.21	\$2.32	\$6.04
9	\$7.95	\$4.94	\$2.20	\$5.57
10	\$7.95	\$4.69	\$2.09	\$5.14
11	\$7.95	\$4.44	\$1.98	\$4.74
12	\$7.95	\$4.22	\$1.88	\$4.37
13	\$7.95	\$4.00	\$1.78	\$4.04
14	\$7.95	\$3.79	\$1.69	\$3.72
15	\$107.95	\$48.84	\$1.60	\$33.34
16	\$0.00	\$0.00	\$0.00	\$0.00
17	\$0.00	\$0.00	\$0.00	\$0.00
18	\$0.00	\$0.00	\$0.00	\$0.00
19	\$0.00	\$0.00	\$0.00	\$0.00
20	\$0.00	\$0.00	\$0.00	\$0.00
21	\$0.00	\$0.00	\$0.00	\$0.00
22	\$0.00	\$0.00	\$0.00	\$0.00
23	\$0.00	\$0.00	\$0.00	\$0.00
24	\$0.00	\$0.00	\$0.00	\$0.00
25	\$0.00	\$0.00	\$0.00	\$0.00
26	\$0.00	\$0.00	\$0.00	\$0.00
27	\$0.00	\$0.00	\$0.00	\$0.00
28	\$0.00	\$0.00	\$0.00	\$0.00
29	\$0.00	\$0.00	\$0.00	\$0.00
30	\$0.00	\$0.00	\$0.00	\$0.00
				\$0.00
Value of bond =				\$126.00

Probability of distress (Annual) =
Probability of distress over 5 years =
Probability of distress over 10 years =

5.15%
23.23%
41.06%

✓ can use Goal Seek to determine the probability of default.

✓ For shorter maturities, often times the probability of default can turn negative. (Why? → bondholders over-price short-term maturity debt claims)

In those instances you can set $p = 0$ instead of $p < 0$.

← Market price for the bond

Note 1: the above Excel formula is only an approximation of the actual formula to the right →

$$\sum_{t=1}^{\infty} \frac{(1-p)^t r_p D + p(1-p)^{t-1} \alpha (1-p) D}{(1+r_D)^t}$$

Annotations: D is in col. (2), α is in col. (3)

Merton Model (1974) of evaluating YTM &
prob. of default
(from Bloomberg)

Example of Calculating the Probability of Financial Distress Using the Default Probability Calculator, Tesla Bond, Date: 8/12/2021

TSLA 5.3 08/15/25\$↑102.768		+.000		Yld -15.042	
		As of 13 Aug		Source BMRK	
TSLA 5.3 08/15/25 Corp		Actions ▾		Settings ▾	
CALLED		94)  No Notes		95) Buy	
96) Sell		Page 1/12		Security Description: Bond	
25) Bond Description		26) Issuer Description			
Pages		Issuer Information		Identifiers	
1) Bond Info		Name TESLA INC		FIGI BBG00HDB0K71	
2) Addtl Info		Industry Automotive (BCLASS)		CUSIP 88160RAE1	
3) Reg/Tax		Security Information		ISIN US88160RAE18	
4) Covenants		Mkt Iss PRIV PLACEME...		Bond Ratings	
5) Guarantors		Ctry/Reg US		Moody's B1	
6) Bond Ratings		Currency USD		S&P BB	
7) Identifiers		Rank Sr Unsecured		Composite BB-	
8) Exchanges		Series 144A		Issuance & Trading	
9) Inv Parties		Type Fixed		Aggregated Amount Issued/Out	
10) Fees, Restrict		Coupon 5.300000		USD 1,800,000.00 (M) /	
11) Schedules		Cpn Freq S/A		USD 1,800,000.00 (M)	
12) Coupons		Day Cnt 30/360		Min Piece/Increment	
Quick Links		Iss Price 100.0000		2,000.00/ 1,000.00	
32) ALLQ Pricing		Maturity 08/15/2025		Par Amount 1,000.00	
33) QRD Qt Recap		CALLED ON 08/15/21@102.65		Book Runner JOINT LEADS	
34) TDH Trade Hist		Iss Sprd +320.00bp vs T 2 08/15/25		Reporting TRACE	
35) CACS Corp Action		Calc Type (1)STREET CONVENTION			
36) CF Prospectus		Pricing Date 08/11/2017			
37) CN Sec News		1st Coupon Date 02/15/2018			
38) HDS Holders		Call Announcement Date 07/19/2021			
		Call Effective Date 08/15/2021			

Example of Tesla Bond $\rightarrow$ calculation of p (prob. of financial distress)
(8/12/2021)

$$r_p = 5.3\%$$

$$T = 4$$

$$r_D = 2.74\% \text{ (from yield curve for BB debt)}$$

$$\alpha = 53\%$$

$$P = 102.768$$

$$\Rightarrow p = 3.60\% \text{ (using the goal seek function in the Excel file)}$$

$\rightarrow$ alternatively $r_D = r_F + \beta_D \text{ MRP}$

Note how different the estimate is as compared with the one provided by Bloomberg (based on the Merton model, which uses only equity market data)

Estimating the costs of financial distress (CFD)

$$NPV[CFD] = \sum_{t=1}^{\infty} \frac{p \times (1-p)^{t-1} \times (1+g)^{t-1} \times LGD \times V_F}{(1+r_D)^t}$$

$$= \frac{p \times LGD \times V_F}{r_D + p - g}$$

Estimating the tax shields (TS)

$$NPV[TS] = (1-p) \frac{T_C r_D D}{1+r_D} + (1-p)^2 \frac{T_C r_D D}{(1+r_D)^2} + \dots = \frac{(1-p) T_C r_D D}{r_D + p}$$

Estimating the probability of default (p)

$$D = \sum_{t=1}^{\infty} \frac{(1-p)^t r_D D + p(1-p)^{t-1} \alpha(1+r_P) D}{(1+r_D)^t}$$

$$\rightarrow D = \frac{r_D \times D \times (1-p) + p \times \alpha \times (1+r_P) \times D}{r_D + p}$$

$$\rightarrow p = \frac{r_P - r_D}{(1-\alpha)(1+r_P)}$$

equivalent to:

$p \times \text{Anticipated Loss}$

||

Certain Gains

$r_P - r_D$

Make-up Quiz #6 (Week #6) for FIN 5372

✓ Question #1 (0.5 pts)

Which of the following is not an indirect cost of financial distress?

- A. Management distraction and difficulties in running the business due to engagements in managing corporate liabilities restructuring during bankruptcy
- B. Loss of customers and suppliers
- C. Conflicts between shareholders and bondholders
- D. Court fees associated with administrative bankruptcy procedures**

✓ Question #2 (1 pts)

In the example of risk-shifting from slide set "Costs of Financial Distress: Risk-Shifting", which project will be preferred by the equity holders if the probability of the good state is 10% and the probability of the bad state is 90%?

- A. Project B**
- B. Project A
- C. Project C

✓ Question #3 (0.5 pts)

The probability of financial distress can be estimated as the ratio of the expected benefit and expected cost of holding risky debt.

- A. True**
- B. False

idio-sync. system risk
 $r_p \geq r_D \geq r_F$

$$P = \frac{r_p - r_D}{(1-\alpha)(1+r_p)} \quad \left. \begin{array}{l} \text{benefit} \\ \text{cost} \end{array} \right\}$$

✓ Question #4 (0.5 pts)

The manager of the bankrupt firm (also known as the "debtor-in-possession") has exclusivity in drafting reorganization plan first 120 days in Chapter 7 bankruptcy.

- A. False**
- B. True

✓ Question #5 (1 pts)

In the example of a poison pill effect from slide set "Common Takeover Tactics: Poison Pills, Pre- and Post-Offer Takeover Defenses", what will be the percent of ownership in the target stock by the acquiring firm after the trigger of the poison pill, if the poison pill provisions enable each target shareholder to buy three shares of target stock at a nominal price for each share they own?

- A. 40%
- B. 33%
- C. 25%
- D. 20%**

✓ Question #6 (0.5 pts)

A bear hug is an offer made by one company to buy the shares of another for a much higher per-share price than what that company is worth in the market.

- A. True**
- B. False