

Capital structure with Costs of Financial Distress

1

Capital structure with Costs of Financial Distress

- Who pays the costs of financial distress?
- What are the costs of financial distress? Are they high?
- Can we design capital structure that minimize the costs of financial distress?
- How do we measure costs of financial distress at the firm level?

2

Who pays the bankruptcy costs? An example

- Example:
- $I = \$60$
- Cashflow is 100 with prob .5 or 60 with prob. .5
- $D = \$60$, $r_D = 6.6\%$, $\beta_D = 0$
- $r_a = 15\%$

3

Who pays the bankruptcy costs? An example

| | Today | Next Year | | |
|---------------------------|-------|-----------|------------|----------|
| | | Bad State | Good State | Expected |
| Total Free Cash Flow | 0 | 60 | 100 | 80 |
| Bond Cash Flows | -60 | | | |
| Free Cash Flows to Equity | 60 | | | |

4

Who pays the bankruptcy costs? An example

| | Today | Next Year | | Expected |
|---------------------------|-------|-----------|------------|----------|
| | | Bad State | Good State | |
| Total free cash flow | 0 | 60 | 100 | 80 |
| Free Cash Flows to Debt | -60 | 60 | 68 | 64 |
| Free Cash Flows to Equity | 60 | 0 | 32 | 16 |

5

Who pays the bankruptcy costs? An example

- Value of the firm?
- Value of debt?
- Value of equity?

6

Who pays the bankruptcy costs? An example

- You can also calculate the equity value:

$$r_E = r_A + (r_A - r_D) \frac{D}{E}$$

$$E = \frac{E(\text{Equity Cash Flow})}{1 + r_E}$$

$$r_E = .6788, E = 9.56 \text{ where } D = 60, r_A = .15, r_D = .066$$

7

Who pays the bankruptcy costs? An example

- Without bankruptcy costs we have that:
- D=60
- E=9.56
- **V_F=69.56**

8

Who pays the bankruptcy costs? An example

- Now assume that in case of bankruptcy, you have to pay 7% to the lawyers (bankruptcy costs). This implies that in the bad state the asset cash flow is equal to \$56 instead than \$60.

9

Who pays the bankruptcy costs? An example

| | Today | Next Year | | Expected |
|------------------------|-------|-----------|------------|----------|
| | | Bad State | Good State | |
| Total Free Cash flow | 0 | 56 | 100 | 78 |
| Debt Free Cash Flows | -60 | | | |
| Equity Free Cash Flows | | | | |

10

Who pays the bankruptcy costs? An example

| | Today | Next Year | | Expected |
|------------------------|-------|-----------|------------|----------|
| | | Bad State | Good State | |
| Total Free Cash flow | 0 | 56 | 100 | 78 |
| Debt Free Cash Flows | -60 | 56 | 72 | 64 |
| Equity Free Cash Flows | | 0 | 28 | 14 |

11

Who pays the bankruptcy costs? An example

- Value of the firm?
- Value of debt?
- Value of equity?

12

Who pays the bankruptcy costs? An example

- Remember you can also calculate the equity value:

$$r_E = r_A + (r_A - r_D) \frac{D}{E}$$

$$r_E = \frac{E(\text{Equity Cash Flows})}{1 + r_E}$$

$$r_E = .7969, E = 7.79, \text{ where } D = 60, r_A = .15, r_D = .066$$

13

Who pays the bankruptcy costs? An example

- Note how cash flow to debtholders and shareholders has changed in the good state.
- The value of the firm has changed.
- Did debt value change?
- Did equity value change?

14

Who pays the bankruptcy costs? An example

- With bankruptcy costs we have that:
- $D=60$
- $E=7.79$
- $V_f=67.79$

15

Conclusion I:

- Bankruptcy costs are paid by shareholders.

16

What are the bankruptcy costs?

- Direct bankruptcy costs:
 - legal and administrative costs. Empirically 3.1% of [debt (book) + equity (market)] or 20% of mkt value of equity **at the time of bankruptcy**.
- Indirect bankruptcy costs
 - Asset specificity and illiquid assets
 - Conflict of interests between stakeholders of the firm
 - Bankruptcy laws

17

Indirect bankruptcy costs

- Asset specificity and illiquid assets
 - Intangible assets may be illiquid assets
 - Next best use of assets is lower
 - Fire sale prices. (Federated example)

18

Indirect bankruptcy costs

- Conflict of interest between stakeholders of the firm:

Risk shifting, i.e. conflicts of interest may be more difficult to avoid under financial distress.

19

Indirect bankruptcy costs

- Bankruptcy laws
 - Priority rule, absolute priority, timing as a form of priority. Note that priority is often violated (Weiss, JFE, in 78% of the cases debtholders receive less than the face value and equityholders still receive something). What happens to the promised yield of debt?
 - Equityholders can stall. Under Chapter 11 the managers have 120 days to propose the first reorganization plan.
 - International comparisons of bankruptcy laws.

20

Conclusion II:

- Direct bankruptcy costs are low. Indirect bankruptcy costs may be high; this implies that:
 - firms with volatile earnings should have less leverage
 - firms with external protection against bankruptcy may increase leverage
 - firms with assets not easily divisible and marketable should have lower leverage
 - firms that produce durable good, with long term servicing should have lower leverage

21

Design capital structure to minimize costs of financial distress

- Strip financing (debt with warrant) (more in Lect.14):
 - Advantage: reduce conflict of interest
 - Disadvantage: Tax deduction does not apply
- Main banks:
 - Advantages: cheaper credit, less credit rationing, less conflict of interest, more information, easier bailouts
 - Disadvantages: less competition, this is particularly bad for good company. Evidence: deregulation in Japan
- Bond covenants:
 - dividend covenants
 - issuing new debt of the same or senior class

22

Bond covenants

- Smith and Warner report some numbers on the prevalence of different classes of restrictions imposed by bondholders:
 - 90.8% restrict issuance of additional debt
 - 23% restrict dividend payment policy
 - 39% restrict merger activity
 - 35.6% restrict disposition (mostly sales) of assets

23

Conclusion III: Measure costs of financial distress

- the value of the firm (project) = NPV[all equity firm (project)] + NPV[tax shields] - NPV[costs of financial distress] (APV-adjusted PV)

24

Measure costs of financial distress

- Estimates of:
 - Probability of bankruptcy:
 - Use bond rating and empirical estimates of default probability for each rating (e.g. see Moody's Default Study)
 - Costs of bankruptcy:
 - Empirical studies of direct (3% of book assets) and indirect costs (only qualitative studies).
 - NPV of expected probability of default:

$$PV[CFD] = \sum_{t=1}^{\infty} \frac{p(1-p)^{t-1}CFD}{(1+r_D)^t} = \frac{pCFD}{(r_D+p)}$$

25

Conclusions

- Bankruptcy costs are paid by shareholders
- Indirect bankruptcy costs may be high
- Once we recognize the costs, we can design capital structure that minimize the CFD
- Measure costs of financial distress
 - to design the firm optimal capital structure
 - to value a project

26