

# **Financing Policy II: Bankruptcy Costs and Bondholder-Shareholder Conflicts**

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FIN 413 — Applied Corporate Finance

## Outline

- Bankruptcy
- Direct bankruptcy costs
- Bondholder-shareholder conflict
- Mitigating bondholder-shareholder conflicts of interest
- Empirical implications

## The U.S. Bankruptcy Code

- Chapter 7 bankruptcy, liquidation
- The bankruptcy court selects an outside trustee who liquidates the assets and distributes the proceeds among claim holders according to
- The absolute priority rule:
  - Bondholders must be paid in full before shareholders receive any proceeds
  - Secured debt holders must be paid before unsecured debt holders
  - Senior debt holders must be paid in full before junior debt holders

- Chapter 11 bankruptcy, reorganization
- After filing, the company has 120 days to submit a reorganization plan, which creditors can either accept to reject
- A plan forced on dissenting claimants is a cramdown, a necessary condition is that the dissenters receive at least what they would under a Chapter 7 liquidation
- The absolute priority rule is often violated in a Chapter 11 settlement

## Direct Costs of Bankruptcy

- Time managers must spend dealing with creditors, legal expense, advisory fees
- Warner (1977) estimates that direct costs of bankruptcy are on average only 5.3% of their debt and equity values before filing for large railroads
- The expected bankruptcy costs will be smaller because the percentage of loss must be multiplied by the default probabilities
- Debt holders charge an interest premium that reflects the expected costs they must bear in the event of default. Equity holders therefore indirectly bear the expected bankruptcy costs and must consider them in making financing decisions

## Bondholder-Shareholder Conflicts

- Direct bankruptcy costs are relatively small, now consider indirect costs of bankruptcy
- Also called financial distress costs: the threat of bankruptcy affects a firm's relationships with its lenders and affects its ability to operating efficiently
- Shareholder incentives to maximize the value of their shares are not necessarily consistent with the incentives to maximize the total value of debt and equity
- Sophisticated lenders anticipate shareholder incentives of self-interest and will charge higher interest rates accordingly, shareholders bear the distress costs
- Manifestations of bondholder-shareholder conflicts

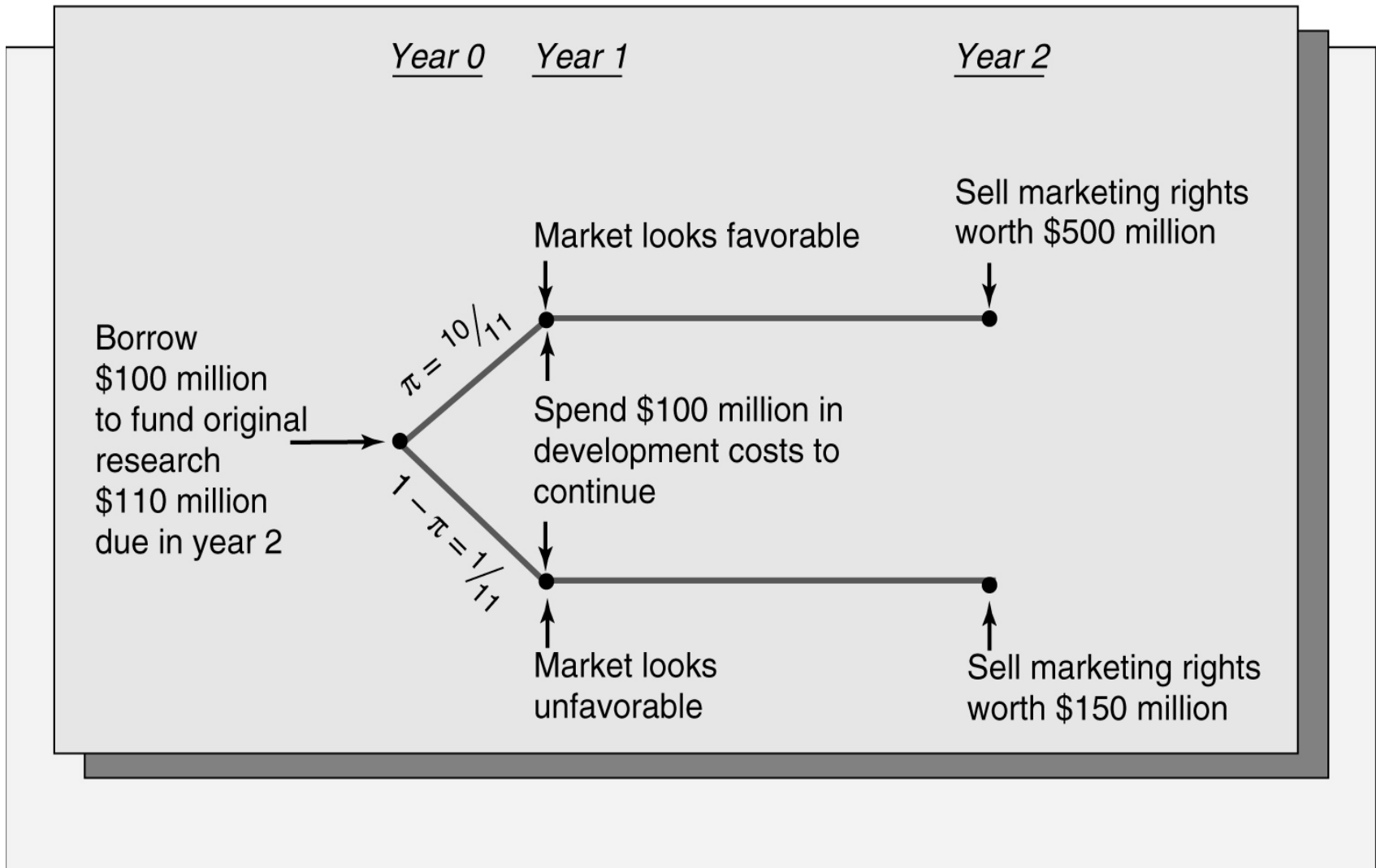
- The debt overhang problem: Shareholders underinvest, passing up profitable investment projects (with positive NPVs) because bondholders capture most of the profits, also called the underinvestment problem
- The asset substitution problem: shareholders have a tendency to take on overly risky projects, even with negative NPVs
- The horizon problem: Shareholders tend to pass up profitable projects that pay off over a long horizon in favor of less profitable projects (with lower NPVs) that pay off more quickly
- The liquidation problem: Shareholders tend to keep a firm operating when its liquidation value exceeds its operating value

## The Debt-Overhang Problem

- With risky debt, the NPV from discounting total cash flows at WACC can lead to negative NPVs of the cash flows to shareholders
- Example 13.16. A riskless project for Unitron returns 12%, risk free rate is 10%
- Unitron is highly levered, BBB credit rating, can only borrow at 13%, reject it
- Reject it if the goal is maximize equity value, take it if maximize firm value
- Taking the safe project benefits bondholders at the expense of shareholders — more assets in the event of default

- When firms have existing senior debt obligations, they may be unable to obtain financing for positive NPV projects
- Exhibit 16.1: Lily Pharmaceuticals Research
- Finance this project with a senior debt of \$100 million
- In the unfavorable case, the project has a positive NPV ( $\$150 - 100 = \$50$ ), the original \$100 million is sunk costs
- Given the initial \$110 million senior debt obligation, new investors will only provide \$40 million ( $\$150 - \$110$ )
- The outcome is default in this case with the senior lenders losing \$100 million

## Exhibit 16.1: Lily Pharmaceuticals Research



- But if the senior lenders provide additional \$100 million in Year 1, they only lose  $\$200 - \$150 = \$50$  million, difficult to enforce by a diffuse group of lenders
- Finance the project using unprotect debt can solve the underinvestment problem, but might worsen the asset substitution problem
- An example how debt seniority can affect real investments

## The Horizon/Shortsightedness Problem

- Firms with large amount of debt tend to pass up high NPV projects in favor of lower NPV projects that pay off sooner
- Intuitively, firms with large debt obligations must pay high borrowing rates on new subordinated debt used to refinance maturing debt
- Exhibit 16.2: Applied Textronics Cash Flows
- Assume zero riskless rate,  $PV(\text{long-term project}) > PV(\text{short-term project})$ , 50-50 chance for cash flows from assets-in-place
- The short-term project allows the firm to meet Year 1 debt obligation

## Exhibit 16.2: Applied Textronics Cash Flows

	<i>Debt Due</i>	<i>From Existing Assets</i>	<i>From Short-Term Project</i>	<i>From Long-Term Project</i>
Year 1	\$100 million	\$50 million	\$50 million	\$20 million
Year 2	40 million	60 million in favorable state; 10 million in unfavorable state	0 million	40 million

- The long-term project demands a \$30 million ( $\$100-50-20$ ) new debt
- If subordinated, the firm must offer \$50 million at the end of Year 2 to raise \$30 in Year 1 ( $\$30=0.5(\$50)+0.5(10+40-40)$ )
- In the bad state in Year 2, default, regardless of which project taken (short-term project, \$10 cash with \$40 debt; long-term project, \$50 cash with \$90 debt), zero equity value in bad state
- In the good state, long-term project gives \$10 equity value ( $\$40+60-(40+50)$ ), but short-term project gives \$20 ( $\$60-40$ )
- Shareholders choose short-term project with a lower NPV

## The Asset-Substitution Problem

- Debt provides incentives for firms to take on unnecessary risk, substituting riskier investment projects for less risky projects
- Example. Unistar has to decide between two designs with payoffs:

	Unfavorable(Prob = .5)	Favorable(Prob = .5)	Expected payoff
Project 1	\$50	\$100	\$75
Project 2	\$25	\$115	\$70

- Each project costs \$70 million to start
- Lender can observe which project the firm takes after lending
- For an all-equity firm, Project 1 is better with a positive NPV of \$5 million

- But if the firm uses \$40 million debt and \$30 million internal funds, the payoffs for shareholders become

	Unfavorable(Prob = .5)	Favorable(Prob = .5)	Expected payoff
Project 1	\$10	\$60	\$35
Project 2	\$0	\$75	\$37.5

- Equity gets \$0 instead of  $\$25 - 40 = -\$15$  in Unfavorable state, limited liability
- Equity of a levered firm prefers the high-risk, low or negative NPV project to a low-risk, high NPV project — asset substitution
- Sophisticated bondholders anticipate the equity's distorted incentives, will make a loan of only \$32.5 ( $0.5 \times 25 + 0.5 \times 40$ ); equity must provide \$37.5
- Equity can only take Project 2

- \$40 will be provided if equity commits to Project 1, but...
- \$40 mil is risky. What about \$25 mil riskless debt? Which project to take?

## The Liquidation Problem

- Because bondholders have priority in liquidation, they have a stronger interest in liquidating assets of a distressed firm than equity holders, who profit from the possible upside benefits if the firm stays in business
- Continuation value and liquidation value
- How capital structure affects liquidation policy? Eastern Airlines faced bankruptcy in the 1989 recession. \$500 mil debt, \$600 mil continuation value if the economy recovered (50% probability), \$200 mil otherwise, liquidation value \$480 mil
- Shareholders prefer continuing, \$0 versus \$100 with 50% chance

- Bondholders prefer liquidating, \$480 mil versus \$350 mil ( $.5(\$500)+.5(\$200)$ )
- Bankruptcy/liquidation policy with more than one class of debt, complicated!
- Assume bankruptcy if (i) insufficient cash flow (ii) unable to borrow sufficient amount to meet debt obligations
- Shareholders have incentives to delay bankruptcy/liquidation, call option value rises as time-to-maturity; junior creditors are also reluctant to force a firm into liquidation because of option-like features
- Example. Emruss Industries has no cash flow now, but \$1.5 or \$.5 mil next year with 50-50 chance, continuation value \$1 mil
- Liquidation value now \$1.2 mil, so liquidate with all-equity

- Emruss's debt obligations

	immediate	next year
senior debt	\$150,000	\$1 mil
junior venture capital	0	\$200,000

- Emruss's cash flow falls short of current debt obligation, if liquidate now

claimholders	payoffs
senior debt	\$1,150,000
junior vp	50,000
shareholders	0

Thus, both junior vp and shareholders want to continue even though liquidation is value-maximization

- Consider cash infusion of \$150,000 from the junior vp with interest of \$100,000

- Payoffs in the event of a cash infusion

	Now	Year 1 (Favorable)	Year 1 (Unfavorable)
senior debt	\$150,000	\$1,000,000	\$500,000
junior vp	-\$150,000	$\$450K (200 + 150 + 100)K$	0
equity	0	50,000	0

- Expected payoff for the junior vp =  $.5(\$450,000) - 150,000 = 75,000 > 50,000$  from liquidation, vp injects additional cash

- Equity and junior debt gain at the expense of senior debt, whose payoff is now  $\$150,000 + .5(1,000,000 + 500,000) = 900,000 < \$1,150,000$  from liquidation

## Chapter 11 and Bondholder-Shareholder Conflicts

- Debtor-in-Possession (DIP) financing allows bankruptcy companies to raise money necessary to fund investments
- DIP in Chapter 11 mitigates the debt overhang/underinvestment problem
- It also allows firms to continue operating when they are better off liquidating

## Mitigating Bondholder-Shareholder Conflicts

- Six ways to control the conflicts of interest other than Chapter 11
- Protective covenants
- Bank and privately placed debt
- Short-term instead of long-term debt
- The use of convertibles
- Project financing
- Management compensation contracts

## Protective Covenants

- Smith/Warner (1979), 90% of bonds issued in '74/'75 restricted additional debt issuance, 23% restricted dividends, 39% mergers, 35% assets sales
- Noninvestment-grade debt has more conflicts with equity than investment-grade debt, more severe covenants
- Incomplete contract (covenants), limited flexibility to firms

## Bank Loan

- Bank loan can mitigate the free-rider problem, controlling underinvestment
- Banks and other private providers of debt can better monitor investments/enforce covenants, controlling asset substitution
- Costs specific to bank loan
- Pure intermediation costs
- A hold-up problem, if a firm relies too much on any single bank, the bank can exploit this reliance by charging rates higher than market rates

## Short-Term versus Long-Term Debt

- Short-term debt value is less sensitive to investment policy than long-term debt value, less conflicts of interests between debt- and equity-holders
- Short-term debt does not overhang, interest payments would be renegotiated with the selection of new projects, mitigating underinvestment
- With short-term financing, the borrowing rate can be renegotiated to be higher if firms take riskier projects, mitigating asset substitution
- Short-term debt exposes firms to interest-rate risk

## Convertibles

- A convertible bond gives its holder the option to exchange bonds for a pre-specified number of shares, a combination of call option and straight bonds
- Mitigates asset substitution, high volatility devalues the straight-bond component but rises the call-option value
- Mikkelson (1981), highly levered, high-growth firms are most likely to issue convertibles; high leverage means severe conflicts of interest, high growth means great investment flexibility

## Project Financing

- Project financing: Finance a project for which both the project's cash flows and liabilities can be separated from the rest of the firm
- The parent firm is not responsible for the project's cash
- The project's debt has a senior claim on the project's cash flows
- Seniority mitigates overhang, small scope limits asset substitution
- But uncontrolled, multiple project financing exacerbates asset substitution by raising idiosyncratic volatility through less diversification

## Compensation Contracts

- Managers' undiversified wealth raises risk aversion, mitigating asset substitution
- Empire-building incentives counteract debt overhang/underinvestment