Corporate Finance: Capital structure and corporate control

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Grossman and Hart, BJE 1980

“Takeover Bids, the Free-Rider Problem, and the Theory of the Corporation”

The free rider problem

- The timing:

Period 1	Period 2
The firm is established by an entrepreneur and is worth X	A raider appears and can increase value by R; the raider makes a tender offer X+P

- Consider an individual equityholder with equity participation α

- Let γ_Y be the prob. that the raid succeeds if the equityholder tenders and and γ_N if he does not tender. The equityholder will tender iff

$$\underbrace{\alpha\left[\gamma_Y(X+P)+(1-\gamma_Y)X\right]}_{\text{Tender}} \geq \underbrace{\alpha\left[\gamma_N(X+R)+(1-\gamma_N)X\right]}_{\text{Don't tender}}$$

The free rider problem

- Suppose that each individual equityholder is atomistic $\Rightarrow \gamma_Y = \gamma_N = \gamma$

- The condition for tendering:

$$\underbrace{\alpha[\gamma(X+P)+(1-\gamma)X]}_{\text{Tender}} \geq \underbrace{\alpha[\gamma(X+R)+(1-\gamma)X]}_{\text{Don't tender}} \Rightarrow \underbrace{P}_{\text{Tender}} \geq \underbrace{R}_{\text{Don't tender}}$$

- The raider's profit:

$$\underbrace{(X+R)}_{\text{Ex post payoff}} - \underbrace{(X+P)}_{\text{Payment}} = R - P \leq 0$$

- The raider gets nothing and will not ride if the ride requires a cost C!

Toeholds

- The minimal P to induce atomistic equityholders to tender is R

- If the raider has a fraction β in the firm to begin with then his payoff is

$$\underbrace{(X+R)-(X+R)(1-\beta)}_{\text{Payoff with takeover}} - \underbrace{\beta X}_{\text{Absent takeover}} = \beta R$$

- The takeover will take place iff βR > C, where C is the cost of takeover

Dilution

- If the takeover succeeds, the raider can "steal" ϕ from the firm (ϕ is implied by the firm's charter)

- The condition for tendering:

$$\underbrace{\alpha\left[\gamma(X+P)+(1-\gamma)X\right]}_{\text{Tender}} \geq \underbrace{\alpha\left[\gamma(X+R-\phi)+(1-\gamma)X\right]}_{\text{Don't tender}} \Rightarrow \underbrace{P}_{\text{Tender}} \geq \underbrace{R-\phi}_{\text{Don't tender}}$$

- The raider's payoff

$$\underbrace{X+R}_{\text{Ex post payoff}} - \underbrace{(X+R-\phi)}_{\text{Payment}} - C = \phi - C$$

- The takeover will succeed iff $\phi > C$

Probabilistic C

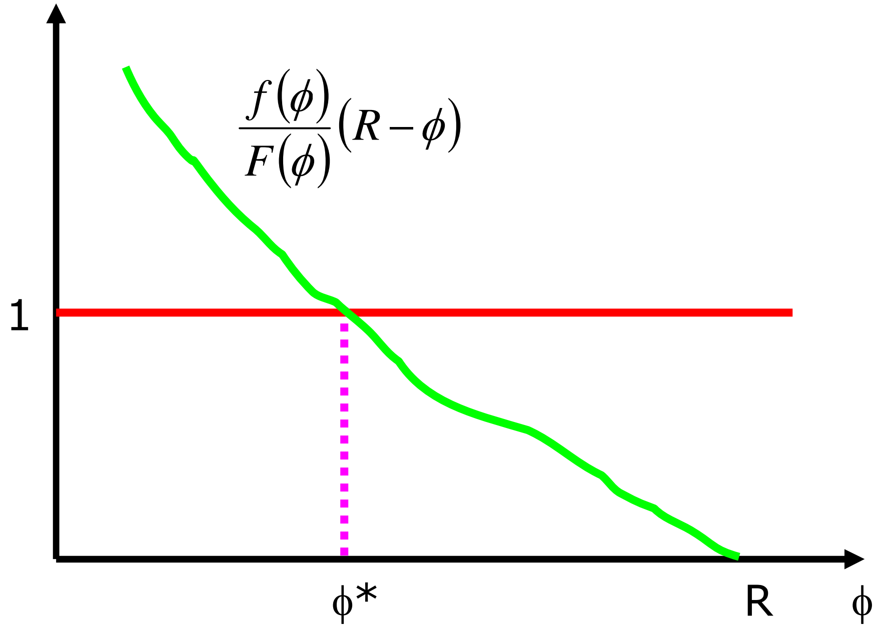
- Suppose that C ~ [0, ∞) according to F(C)
- The takeover succeeds with prob. F(ϕ)
- The firm's value ex ante:

$$V(\phi) = F(\phi)(X + P) + (1 - F(\phi))X = X + F(\phi)\underbrace{P}_{R-\phi}$$

The optimal choice of ϕ

- F.O.C for ϕ:

$$V'(\phi) = \underbrace{f(\phi)(R-\phi)}_{\text{Marginal benefit from increased prob of takeover}} - \underbrace{F(\phi)}_{\text{Marginal cost from decreased P}} = 0 \quad \Rightarrow \quad \frac{f(\phi)}{F(\phi)}(R-\phi) = 1$$



Stulz, JFE 1988

"Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control"

The model

- The timing:

Stage 0	Stage 1	Stage 2
The firm is established, the entrepreneur keeps equity α and issues $1-\alpha$ to outsiders	A raider shows up and may initiate a takeover	Cash flow X is realized irrespective of the takeover

- The raider has benefits of control $B \sim [0, \infty)$
- To take over the firm the raider needs ½ of the equity
- The raider can try to acquire shares from outsiders. The supply of shares is $(1-\alpha)S(p)$, where $S'(p) > 0$

Takeover

- To induce takeover, p needs to be

$$(1-\alpha)S(p)=\frac{1}{2} \quad \Rightarrow \quad p = p(\alpha)$$

- $p'(\alpha) > 0$: $\alpha\uparrow \Rightarrow p\uparrow$

- The raider will take over iff $B \geq p(\alpha) \Rightarrow$ the prob. of takeover is $1-F(p(\alpha))$

The optimal choice of α

- F.O.C for α:

$$Y'(\alpha)=\underbrace{[B_E-(1-\alpha)p(\alpha)]f(p(\alpha))p'(\alpha)}_{\text{Effect on the prob. of takeover}}$$

$$+\underbrace{(1-\alpha)(1-F(p(\alpha)))p'(\alpha)}_{\text{Price effect}}$$

$$-\underbrace{(1-F(p(\alpha)))p(\alpha)}_{\text{Ownership effect}}$$

$$=0$$

- When α → ½, then (1-α)S(p) = ½ iff S(p) → 1 ⇒ p → ∞ and F(p) → 1:

$$Y'(1/2)=\left[B_E-\underbrace{\frac{p(1/2)}{2}}_{=\infty}\right]f(p(1/2))p'(1/2)<0$$

The optimal choice of α

- When $\alpha = 0$:

$$Y'(0) = f\left(p(0)\right)\left[B_E - p(0)\right]p'(0) + \left(1 - F\left(p(0)\right)\right)\left(p'(0) - p(0)\right)$$