Assignment due Monday

Remedies against underinvestment problem

Callable bonds: give from the right to redeem debt before maturity at a given price schedule

Covenants to protect bondholders

- Secured debt
- Covenants restricting subsequent financing policy

Debt can be senior or subordinate/junior

Senior: higher priority gets paid first

Covenants that impose restrictions on investment policy of firm

e.g. restrictions on: investment; mergers; dividend policy

sinking fund: Fund established to retire debt before maturity.

Empirical evidence

Underinvestment problem more prevalent for firm with large growth opportunities.

Less prevalent for firms with more assets in place.

Informational asymmetries

Managers have more info about the value and potential of their firm than other agents.

Assume mgrs. Act in current shareholders' interest.

Then they're tempted to tell mkt. that firm is undervalued.

Mgrs. Of all firms are tempted to claim this, hence statement is not credible.

$\therefore$ Outsiders best guess about a firm's value is that firm is of avg. value. Then good firm are indeed undervalued, so drop out. Implores avg. value falls further.

$\Longrightarrow$More drop out (so they don't want to invest at the current price)…

Ex:

$\frac{1}{2}$ of firms are of value V_H (good)

$\frac{1}{2}$ of firms are of value V_L (bad) , $V_H > V_L$.

if outsiders knew firm quality, good firms would trade at price V_H and bad firms at price V_L.

But outsiders don't know value.

so willing to pay $P_0 = \frac{1}{2}V_H + \frac{1}{2}V_L$

But $P_0 < V_H$, so owner of good firm's stock not willing to sell. Only bad firm is trading.

Then price falls further to $P_1 = V_L$. So only bad firm gets financed.

Managers of good firms cannot simply announce that firm is good.

Can mgrs. credibly signal that their firm is good

The signal has to be costly for the mgr. (informer):

It must imply apparent losses for the informer, which in equilibrium will be offset by the advantage of passing the info.

If the cost/loss is only offset for good firms, only good firms will choose to signal, and outsiders can distinguish them.

Using the firm's debt level as a costly signal.

What is valued by the mkt. is the perceived stream of CF_S of the firm.

Changes in capital structure can change the mkt's perception of the value, even though the actual value remains unchanged.

Generally, the higher the debt level, the higher the risk of bankruptcy, therefore the higher the expected cost of bankruptcy.

For a given level of debt, the probability of bankruptcy is lower for a firm with good prospects than it is for a firm with bad prospects.

Hence, the loss from debt (i.e. the expected cost of bankruptcy) is higher for bad firms than for good.

Benefit from sending the signal is that you get financing for your project and thus get NPV of it.

Hence, benefit from signaling is higher for good projects/firms with higher NPV.

Thus, good firms have lower cost of signaling through a high debt level and higher benefit of signaling through a high debt level.

$\Longrightarrow$Many situations where good firm find it worthwhile to signal when bad firms will not.

$\Longrightarrow$Signal becomes credible

Thus, good firms can distinguish themselves from bad firms.

Ex:

MKT consists of two types of firm: A and B

Two points in time: 0 (now) and 1.

$a = total\ value\ of\ an\ A-firm\ at\ time\ 1.$

$b = total\ value\ of\ an\ B-firm\ at\ time\ 1.$

$a > b$

$r = interest\ rate$

Assume: Mgrs (insiders) know whether their own firm is an A-firm or B-firm.

If outsiders can also distinguish A-firms from B-firms.

Value at $t = 0$

$V_0^A = \frac{a}{1+r}$, $V_0^B = \frac{b}{1+r} < V_0^A$.

As in MM, capital structure is irrelevant.

If debt with face value F:

A-firm: $D_1 = min\{F, a\},\ S_1 = max\{a - F, 0\},\ D_0 = \frac{min\{F, a\}}{1+r}$

$S_0 = \frac{max\{a-F, 0\}}{1+r},\ so\ D_0 + S_0 = \frac{a}{1+r} = V_0^A$

when outsiders can NOT distinguish A-firms from B-firms

Let $q = fraction\ of\ all\ firms\ that\ are\ A-firms.$

Thus, given available info at time 0, any firm has probability q of being A-firm, $(1-q)$ of being B-firm.

Then all firms will have same perceived value: $V_0 = \frac{qa+(1-q)b}{1+r}$

with $V_0^A > V_0 > V_0^B$

A-firms don't have failer access to capital than B-firm.

Solution: Give mgr. incentive to signal the true value of the firm through the firm's level of debt.

Let mgr. be compensated by a known incentive schedule, i.e. a given rule which investors know.

F = face value of firm's debt, issued at time 0.

L = penalty imposed on mgr. if the firm is bankrupt at time 1.

i.e. if $V_1 < F$

Compensation to mgr.

$$M = (1+r)\gamma_0 V_0 + \gamma_1 V_1 \; if \; V_1 \geqslant F$$
$$= (1+r)\gamma_0 V_0 + \gamma(V_1 - L) \; if \; V_1 < F$$
$$V_0 = time\ 0\ perecived\ value\ of\ firm$$
$$V_1 = time\ 1\ value\ of\ firm.$$
$$\gamma_0\ and\ \gamma_1\ are\ fixed\ nonnegative\ constents.$$

Assume, mgr. acts to maximize his/her compensation M.