Class 4: debt overhang

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The lectures on debt overhang stress the difficulties of renegotiation; this problem set follows ★ Myers (1977) in emphasising the interests in which the firm acts.

Consider a two period world in which a firm first chooses a capital structure. There are N possible states of the economy in the future, $s_1, \ldots, s_N$, with the n^{th} expected to arise with probability π_n. Once the firm's managers learn which state occurs, they decide whether or not to undertake an investment. The investment costs I to undertake, and yields return $R(s_n)$ in state s_n, with states ranked so that $R(s_1) < \cdots < R(s_n) < \cdots < R(s_N)$. The firm has no other assets; there are no taxes or transactions costs; there are no agency costs, meaning that managers implement shareholders' wishes.

1. What is the efficient investment rule?
2. Suppose first that the firm initially raised I via equity financing.
   (a) What investment rule do the shareholders instruct management to adopt? Denote the least profitable state in which the shareholders agree to invest by s_a.
   (b) What is the expected value of the equity-financed firm initially?
3. Now suppose that the firm initially issued a mix of debt and equity to raise I, and that D must be repaid.

(a) What investment rule do the shareholders instruct management to adopt? Denote the least profitable state in which the shareholders agree to invest by s_b.

(b) What is the expected value of the equity-financed firm initially?

4. Optimal capital structure

   (a) Which capital structure maximises the value of the firm?

   (b) Comment on what happens in states $s_a, \ldots, s_{b-1}$.

   (c) What might debtholders try to do in states $s_a, \ldots, s_{b-1}$? Why might this not be possible?

References

S. C. Myers. Determinants of corporate borrowing. *Journal of Financal Economics*, 5(2):147 – 175, November 1977.