BEEM117

UNIVERSITY OF EXETER

BUSINESS SCHOOL

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Economics of Corporate Finance

Module Convenor: Simone Meraglia

Duration: TWO HOURS

Answer any 3 questions out of 4.
All questions are worth equal marks.

Materials to be supplied on request: None.

Approved calculators are permitted.
This is a closed note paper.

Question 1

Suppose you are an investor seeking to find new opportunities to invest. You have identified two firms: *L1 Corporation* and *BT Enterprises*. *L1 Corporation* is debt free, while *BT Enterprises* is highly leveraged. Each firm is run by a manager/entrepreneur, who can exert two levels of effort: high or low. The project undertaken by the manager of each firm yields either a high return $R^S > 0$ or a low return $R^F \geq 0$, with $R^F < R^S$. High effort by the manager increases the probability that the firm realizes a high return.

(a) Suppose there are perfect capital markets, no taxes, and no bankruptcy. Suppose also that you (and other outside investors) can perfectly observe the effort exerted by the managers of the two firms, and you can write a contract specifying the effort you want the managers to exert. Does the amount of leverage of each firm affect its market value? Explain your answer. **(30% of the marks)**

(b) Suppose now you and other outside investors cannot observe the effort exerted by the managers of the two firms. The project undertaken by the manager of each firm yields either a high return $R^S > 0$ or a low return $R^F = 0$. Does the amount of leverage of each firm affect its market value? If yes, is there an optimal amount of debt to be issued? Explain your answer. **(30% of the marks)**

(c) Let us continue with the framework described in point **(b)** above. Suppose $R^F > 0$, with with $R^F < R^S$. Does the amount of leverage of each firm affect its market value? If yes, is there an optimal amount of debt to be issued? Explain your answer. **(40% of the marks)**

Question 2

An entrepreneur has to finance a project of fixed size I. The entrepreneur has "cash-on-hand" A, where $A < I$. To implement the project, the entrepreneur (that is, the borrower) must borrow $I - A$ from lenders. If undertaken, the project either succeeds, in which case it yields a return $R > 0$, or fails, in which case it delivers a zero return. The probability of success depends on the effort exerted by the entrepreneur: if the entrepreneur exerts high effort, the probability of success is equal to p_H; if the entrepreneur exerts low effort, the probability of success is equal to p_L, where $\Delta p = p_H - p_L > 0$. If the entrepreneur exerts low effort, she also obtains a private benefit $B > 0$, while there is no private benefit when the entrepreneur exerts high effort. Define as R_b the amount of profit going to the entrepreneur, and as R_l the amount of profit going to the lenders in case of success, where $R = R_b + R_l$. We assume both players obtain zero in case the project fails. All the players are risk neutral and there is limited liability for the entrepreneur. Lenders behave competitively, and both entrepreneur and lenders receive zero if the project fails.

(a) Write down the "break-even constraint" for the lenders (IR_l) assuming that the entrepreneur exerts high effort. **(10% of the marks)**

(b) Write down the entrepreneur's "Incentive Compatibility Constraint" (IC_b) and derive the minimum level of R_b such that the entrepreneur exerts high effort. **(10% of the marks)**

(c) What is the highest level of income that the entrepreneur can pledge to investors? **(10% of the marks)**

(d) Compute the minimum level of cash-on-hand $\overline{A}$ the entrepreneur must have to be financed. Why are entrepreneurs with low cash-on-hand likely to be denied financing? Explain your answer. **(10% of the marks)**

(e) Let us define as R_b^S and R_b^F the return for the entrepreneur in case of success and failure, respectively. Recall that the limited liability for the entrepreneur implies that $R_b^S \geq 0$ and $R_b^F \geq 0$. Suppose the entrepreneur sets $R_b^F > 0$. Does the pledgeable income increase or decrease with respect to the case in which $R_b^F = 0$? Show your work. **(20% of the marks)**

(f) Let us now assume that lenders have market power. More specifically, lenders make a take-it-or-leave-it offer to the entrepreneur. This offer states the return R_b for the borrower in case of success, provided the project is financed. We assume that both lenders and entrepreneur receive zero in case of failure. If the entrepreneur rejects the offer, the project is not financed and the entrepreneur's utility is equal to A (her

"cash-on-hand"). Write down the constrained maximization problem solved by lenders, assuming that lenders want to induce the entrepreneur to exert high effort. **(10% of the marks)**

(g) Let us continue with the framework introduced in point **(f)** above. Suppose $A < p_H \frac{B}{\Delta p}$. Determine the optimal value of R_b chosen by lenders. What is the minimum value of "cash-on-hand" needed for financing to occur? **(30% of the marks)**

Question 3

An entrepreneur has to finance a project of fixed size I. The entrepreneur has no cash-on-hand ($A = 0$). To implement the project, the entrepreneur must borrow I from lenders. If undertaken, the project either succeeds, in which case it yields a return $R > 0$, or fails, in which case it delivers a zero return. The entrepreneur (borrower) can be one of two types. A "good" borrower has a probability of success equal to p. A "bad" borrower has a probability of success equal to q, where $p > q$. Define as R_b the borrower's level of compensation when the project is financed and succeeds. All the players are risk neutral and there is limited liability for the borrower. Lenders behave competitively, and both borrower and lenders receive zero if the project fails.
Assume $pR > I > qR$.

(a) Suppose first that lenders have complete knowledge of the borrower's type. Write down the lenders' break-even constraint when the borrower is (i) "good" or (ii) "bad". **(10% of the marks)**

(b) What is the highest level of compensation each type of borrower can obtain? Do both types of borrower obtain financing? **(10% of the marks)**

(c) Suppose now that lenders cannot observe the borrower's type. Lenders believe the borrower is "good" with probability α, and "bad" with probability $1 - \alpha$. Comment on the effect of asymmetric information on **(i)** the availability of credit to both types of borrower, and **(ii)** if a loan is granted, on the compensation the two types of borrower obtain from undertaking the project. **(10% of the marks)**

(d) Suppose now that the entrepreneur already owns a project that, without further investment, will succeed with either probability p (if "good") or probability q (if "bad"). In case of success, the project yields a return R. The project yields a zero return otherwise. Lenders believe the project is "good" with probability α, and "bad" with probability $1 - \alpha$. We define $m = \alpha p + (1 - \alpha)q$.

We assume the entrepreneur owns all shares. If the entrepreneur were to put some of the shares on the market and if the true probability of success is q, are the assets in place over-valued or under-valued? Explain your answer. **(10% of the marks)**

(e) Let us continue with the framework in part **(d)**. At a cost J, the entrepreneuer can finance a new project which increases the overall probability of success by an amount $\tau > 0$. More specifically, if the new project is financed, the probability of success is either $p + \tau$ (if the initial project was "good") or $q + \tau$ (if the initial project was "bad"). If the new project is not financed, the probability of success is either p (if the initial project was "good") or q (if the initial project was "bad").

We assume:

$$\tau R > J.$$

The entrepreneur has no cash-on-hand; thus, the new investment must be financed by issuing new shares.

Write down the lenders' break-even constraint in a *separating* equilibrium in which only the entrepreneur with a "bad" project issue shares. **(10% of the marks)**

(f) What is the "good" entrepreneur's utility from issuing shares in this separating equilibrium? What is her utility from not issuing shares? **(20% of the marks)**

(g) In this separating equilibrium, does the value of shares vary as the entrepreneur announces the issue of new equity? Explain your answer. **(30% of the marks)**

Question 4

Over the last decades, group lending has had a significant impact on poor communities' access to sources of finance in many developing countries.

(a) Describe the main characteristics of group lending as compared to standard lending to individuals. **(20% of the marks)**

(b) Describe and explain the main rationales that make group lending more effective than "individual" lending at securing access to finance to borrowers with weak balance sheets. **(80% of the marks)**