ECON 4245 Economics of the Firm – Spring 2009

Seminar IV

Notes to solving the problems.

Problem 1 (a) (Exam 2005)

Discuss whether asymmetric information in the capital market may induce a firm *not* to make investments that would have been made if information were symmetrically distributed.

- Specify what the *asymmetric information* problem is.
  - Private information about firm's values or prospects.
  - Moral hazard?

- Respond to the specifics of the question: a no-investment decision caused by asymmetric information
  - underinvestment

- Set up a model where we have underinvestment because of asymmetric information – such as Tirole Sec. 6.2.1.2.

- Is this result robust?
  - Bad type not creditworthy. What if it is?
  - Being bad type sufficiently likely. What if most firms are good?
  - Dissipative signalling
    - collateral, dividend, short-term debt etc

Problem 1 (b)

An often used argument for government support to business start-ups – in Norway mainly through *Innovation Norway* ("Innovasjon Norge" in Norwegian) – is that private information about entrepreneurs' business ideas makes a private capital market perform poorly. Set up a simple model of corporate finance under asymmetric information to discuss the merit of this claim.

- Major overlap with part (a)
- Interesting issue: Is the government agency also without knowledge about entrepreneur's quality? If so, what does this imply for the rationale for government support to business start-ups?

Problem 2

Review Problem 9 in Tirole, p. 632.

Part (i): Single research strategy. This assumption makes the analysis identical to the fixed-investment model (Tirole, sec. 3.2). Breakeven constraint:

$$\mathcal{P}_1 = p_H[R - \frac{B}{\Delta p}] \geq I - A$$

Part (ii): The new thing here is that the two projects are statistically independent, but at the same time perfect substitutes in outcome, so that return is R whether one or two projects succeed. The inequality implies that the projects are profitable, absent agency problems, even if only one of them succeeds:

$$2p_H(1 - p_H)R > 2I.$$

Incentive constraint – working on both rather than on only one:

$$[1-(1-p_H)^2]R_b \geq [p_H + (1-p_H)p_L]R_b + B$$

Incentive constraint – working on both rather than on none:

$$[1-(1-p_H)^2]R_b \geq [1-(1-p_L)^2]R_b + 2B$$

New thing: it is the first constraint that is the binding one here. Rewrite:

$$R_b \geq \frac{B}{(1-p_H)\Delta p}$$

Nonpledgeable income: $[1-(1-p_H)^2]\dfrac{B}{(1-p_H)\Delta p}$

Breakeven constraint:

$$\mathcal{P}_2 = [1-(1-p_H)^2]\left[R - \frac{B}{(1-p_H)\Delta p}\right] \geq 2I - A$$

Is this stricter than with a single-strategy policy? Yes, might be. (This question is not asked explicitly in the text.)

Part (iii): Each entrepreneur has an incentive constraint:

$$p_H[(1-p_H) + \tfrac{1}{2}p_H]R_b \geq p_L[(1-p_H) + \tfrac{1}{2}p_H]R_b + B$$

$$\Leftrightarrow \Delta p(1 - \tfrac{1}{2}p_H)R_b \geq B$$

Nonpledgeable income per agent: $p_H(1-\tfrac{1}{2}p_H)\dfrac{B}{\left(1-\frac{1}{2}p_H\right)\Delta p} = p_H\dfrac{B}{\Delta p}$

Breakeven constraint:

$$\mathcal{P}_2^* = [1-(1-p_H)^2]R - 2\,p_H\frac{B}{\Delta p} \geq 2I - 2A$$

We need to show whether $\mathcal{P}_2^* - (2I - 2A) > \mathcal{P}_2 - 2I - A$