Written Exam Economics Winter 2020-2021

Corporate Finance Theory

Date: from 14 December 2020 at 10 AM to 11 January 2021 at 10 AM

This exam question consists of 5 pages in total, including this page.

Answers only in English.

A take-home exam paper cannot exceed 10 pages – and one page is defined as 2400 keystrokes

The paper must be uploaded as <u>one PDF document</u>. The PDF document must be named with exam number only (e.g. '1234.pdf') and uploaded to Digital Exam.

Please answer all questions. Answers must be submitted in English.

You may discuss the questions with your fellow students, but you must write up your own individual answers to all questions.

Exam scripts may be checked for plagiarism. Note, in particular, that copy paste of each others' answers, or changing only a few words in sentences, etc. constitutes plagiarism.

Problem 1

Write 1 to 2 paragraphs for each of the following subquestions. You are welcome to use a limited number of mathematical symbols in your answers, but please do not include any explicit calculations. Focus on providing intuition.

a. Explain why debt levels affect firm value in Fahn et. al (2019), commenting on the firm's relationship both with workers and creditors.

b. Discuss what the analysis of Bayar and Chemmanuar (2013) suggests about the relationship between the proportion of high-quality firms in the economy and the amount of IPO activity.

c. Describe how the conflict of interest between the activist investor and the Board affects the quality of communication in Levit (2019). Briefly comment on whether results in this article would change, if we instead assumed that interests were fully aligned.

Problem 2

In this question, you are asked to work with the model of Banal-Estañol et al. (2013) with independent, binary returns. In this model, a firm has two identical projects, i and j. To carry out each project, the firm must pay an investment cost of 1. Each project then succeeds with probability p and fails with probability $1 - p$. Success yields a cash flow of r_H whereas failure

yields a cash flow of r_L, where $r_H > 1 > r_L$ and $pr_H + (1 - p)r_L > 1$. Cash flow realizations are independent across the two projects.

The firm must raise the investment costs of 1 per project by borrowing from risk-neutral creditors. The risk free rate is normalized to zero. Creditors are willing to lend at an interest rate that allows them to break even on average. The firm also chooses between separate and joint financing, which differ in the following way.

Under separate financing, creditors who finance a project only have a claim on the cash flows of that particular project. If these cash flows are too low to repay them in full, then these creditors receive a fraction γ of these cash flows; the remaining fraction $1 - \gamma$ of the project's cash flow is lost to default costs. Under joint financing, all creditors have a claim on the cash flows of both projects. If the total cash flow from both projects is too low to repay all creditors in full, then creditors receive a fraction $1 - \gamma$ of the total cash flow, and the remaining fraction $1 - \gamma$ is lost to default costs.

Please attempt all subparts of this problem, even if there are some subparts that you are unable to answer.

a. Show when it is feasible for the firm to use separate financing. That is, derive a condition such that the firm is able to carry out the projects using separate financing if and only if this condition holds.

b. For the rest of this problem, you can assume that the condition you derived in part a is violated, so that separate financing is not feasible. Show that the firm will carry out the projects using joint financing if and only if the following condition holds

$$\left[\frac{1 - (1 - p)^2 \gamma r_L}{1 - (1 - p)^2} \right] \leq \frac{r_H + r_L}{2}. \tag{1}$$

For the rest of this problem, you can assume that condition (1) holds. We also adjust the model of Banal-Estañol et al. (2013) by assuming that the firm has two workers: worker i for project i and worker j for project j. The probability of success of a particular project depends on

whether the worker in question exerts effort. Specifically, if worker i exerts effort, then project i succeeds with probability p and and fails with probability $1 - p$. If worker i does not exert effort, then project i fails for sure. The same applies for worker j and project j. Any worker who exerts effort incurs a private cost of $B > 0$.

Suppose furthermore that the firm signs a contract with each worker, specifying a payment $r \geq 0$ to the worker if that worker's project succeeds, and zero if it fails. The firm can commit ex ante to the value of r, and chooses r optimally so as to maximize expected profits.

c. What is the worker incentive constraint in this setting? That is, write down a condition such that a worker has an incentive to exert effort if and only if this condition holds.

d. Using your answer in part c, show that the firm can only carry out the projects using joint financing if the following conditions holds:

$$\left[\frac{1 - (1-p)^2 \gamma r_L}{1 - (1-p)^2} \right] \leq \frac{r_H + r_L - B/p}{2}. \tag{2}$$

Briefly comment on why this condition depends on B.

e. Suppose that condition (2) is violated. Discuss informally whether or not the firm might nevertheless be able to carry out the projects using joint financing if it used relative performance evaluation: where a worker whose project succeeds is paid more if the other worker's project fails. *Extra:* if you would like, you can also consider joint performance evaluation, where a worker whose project succeeds is paid more if the other worker's project also succeeds. *Note: you are encouraged to refer to condition (2) in your discussion, but you are not expected to derive an explicit expression for the optimal contract.*

Problem 3

Please seek out and find a news story, describing a case that relates to some of the ideas from the course.

Discuss to what extent the main points from the news story relate to the different academic articles we have seen throughout the semester (approximately 2-3 pages). In particular, comment on both of the following:

- Which theoretical results from the articles can (or cannot) shed light on the news story?

- Which of the key modelling assumptions behind these theoretical results are realistic, when applied to this real-life situation?

Note: you are not expected to relate the news story to every single academic article we have seen. Rather, you should select a few articles from the course which you believe are most relevant for the news story you have chosen. Moreover, your answer should include a link to, or a copy of, the news story in question.