**Review Questions, Lecture 6: Liquidity and Risk Management**

**Problem 1:** The following diagram shows refinancing needs  and the probabilities with which they materialize, f(). Conditional on meeting the refinancing need, the final income of 50 is obtained with a probability of pH=0.8.



a) What is the NPV-maximizing cut-off point for reinvestments?

b) Assume that the undiscounted agency rent is B/p = 8. Which is the cut-off point which maximizes pledgeable income?

c) What is expected pledgeable income (and, hence, the maximum amount that can be externally financed).

d) Assume that of the amount in c) you need only 8 immediately and that you can keep the remainder as liquidity. What do you do when the actual refinancing need turns out to be 36?

e) Assume that all parameters are as in d) but that instead of keeping the remainder as liquidity you agree with your bank on an overdraft of the same amount. Also, the bank has written a covenant into the original loan contract which says that you must not get a loan elsewhere before you pay back this loan in full. What do you do when the actual refinancing need turns out to be 36 (and what will the bank say)?

**Problem 2:** A project with I=$500 promises a return of $1,000 with pH=1 at stage 2 (we assume a private benefit from shirking of B=0, so we effectively ignore moral hazard).

At the intermediate stage 1, the project is in need of an uncertain amount to be reinvested. We know that the probability that the reinvestment need is $1,000 or less is F(≤1,000) = 2/3. Expected reinvestment need conditional on reinvestment falling short of 1,000 is E|≤1,000 = 100. The investor chooses a cut-off point of \*=1,000 such that she does not reinvest if the reinvestment need exceeds $1,000.

a) What is net present value of the project?

b) By how much would E|≤1,000 need to increase to render the project unprofitable?

c) By how much would initial investment I need to increase to render the project unprofitable?

d) Demonstrate that it maximizes NPV to choose a cut-off point for reinvestments of \*=$1,000: Why can’t it be, for example, \*=998? (To keep matters simple we assume that all full-cent reinvestment needs – such as $998.01 – occur with positive probability).

**Question 1:** Within the framework of an incentive contract under moral hazard with an intermediate income and intermediate and uncertain refinancing requirement:

When is a firm cash-rich, when is the firm cash-poor?

**Question 2:** Within the framework of an incentive contract under moral hazard with an intermediate income and intermediate and uncertain refinancing requirement:

Why would a cash-rich firm want to issue short term debt?

**Question 3:** Assume that a firm does not receive any intermediate income but faces a positive refinancing need at the intermediate stage. How are the chances of the firm of securing reinvestment if the reinvestment need is less than the point of maximum pledgeable income? What are the chances if the refinancing need exceeds this point (but does not contradict NPV maximization)?

**Question 4:** Sketch the argument that full hedging is desirable if the firm faces the prospect of receiving an income at the intermediate stage which may turn it into a cash-rich or cash-poor firm! Which income intermediate income level would the firm want to realize as a consequence of the hedging strategy?

**Question 7:** Under which conditions may the full hedging strategy in question 4 not be optimal?