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

**Problem 1:**



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

The entrepreneur wants to reinvest up to the point where the cost of reinvestment equals the expected revenue from undertaking the reinvestment, i.e. N = 0.8 \* 50 = 40 **2 marks**

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

Pledgeable income is maximized at the point where the cost of reinvestment equals the discounted pledgeable income that it secures, i.e. P = 0.8 \* (50 – 8) = 33.6 **2 marks**

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

F(P) = the probability that the cost is below 33.6, i.e. 50%.

Expected reinvestment cost = (0) \* 0 + (20) \* 20 = 5

Pledgeable income = 0.5 \* 0.8 \* (50 – 8) – 5 = 11.8

**3 marks**

*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?*

Of the 11.8 that you can pledge, you need to invest 8, so you can keep liquidity of 3.8. So if the financing need turns out to be 36, you try to get a loan of 32.2 which is less than the 33.6 that you can pledge!

**2 marks**

*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 paid back its loan in full. What do you do when the actual refinancing need turns out to be 36?*

The bank would maximally want to give you a loan of 33.6, so normally they would be willing to pay you 32.2 as a new loan. But if they can get a hold of your 3.8 this is better to let you go bust than giving you a loan of 33.6 from which they keep 32.2 which only gives the bank a net profit of 1.6.

**1 mark**

**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 the event that reinvestment need falls 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?*

NPV = – 500 + 2/3 \* (1,000 – 100).

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

If the term in brackets is less than 750 NPV turns negative.

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

If investment I exceeds 600, NPV turns negative.

*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).*

Assume that  =998. If an actual =999 comes up (which according to our assumption occurs with positive probability) you give up $1,000 although you could have secured $1,000 by investing another $999. So increasing  to $999 increases net present-value! You can continue with this argument until you reach \*= $999.99 (raising it further to =$1,000 neither increases nor decreases NPV). If you reinvest $1,000.01 you would add a negative expected payment to NPV.