**Theory of Corporate Finance, ECN 5355**

**Assignment 2, due 26 October (before class)**

***Problem 2:*** *Assume that a project has a probability of success of pH=0.8 if the borrower behaves and pL=0.3 if the borrower misbehaves. The size of the necessary investment is I = $800. If successful, the project earns R=$1,200. If she misbehaves, the borrower can secure a private benefit B=$150. The risk-free interest rate is zero.*

1. *How much income can the borrower maximally pledge if the project is successful? How much is the expected pledgeable income? How much is the agency rent?*

The borrower can pledge 1,200 – 150/0.5 = 900 in the case of success. Expected pledgeable income is

pH (R – B/p) =0.8(1,200-150/0.5) = $720   
Agency rent = pH B/p =0.8 \* 150/0.5) = $240 (or, if you prefer, B/p = 300) **4 marks**

1. *How much of her own wealth does the borrower need to invest?*

Amin = I – pHR +pHB/p= 800-(0.8\*1,200) + (0.8\*150/0.5) = $80         **3 marks**

*c)* *What is the net present value of the project, what is the surplus of the borrower if she invests the minimum amount of her own wealth?*

NPV = pH R – I = 0.8 \* 1,200 – 800 = 160

Ub = pH Rb – A = 08 (150/0.5) – Amin = 240 – 80 – 160

*d) How small would the private benefit B need to be to allow for a contract where no own wealth of the borrower is invested?*

For I = pledge = pH (R – B/p) no own money needs to be invested. The critical private benefit B\* is:

So, I = pH (R – B\*/p) = 800= 0.8 (1,200 – B\*/0.5) 🡺 1000 = 1,200 - B\*/0.5 🡺 B\* = 100.

**3 marks**