

Problem 1 (Exercise 10.4). Mike's initial wealth is \$6,400 and he faces a potential loss with probability $1/4$. If he chooses Effort, then the loss is $\ell_E = \$471$; whereas if he chooses No-effort, then the loss is $\ell_N = \$1,216$. Mike's vNM utility-of-money function is

$$U(\$m) = \begin{cases} \sqrt{m} & \text{if he chooses No-effort,} \\ \sqrt{m} - 1 & \text{if he chooses Effort.} \end{cases}$$

- (a) If Mike is uninsured, will he choose Effort or No-effort? What about full insurance?
- (b) Suppose Mike is offered insurance with $h = \$80$ and $d = \$471$. Will he purchase it?

Problem 2 (Exercise 11.2). Mister O owns a firm. He can run the firm himself for zero utility, or hire Miss M to run it for him. If he hires Miss M, then he will not be able to check whether she works hard or not. Let e_L denote low effort and e_H high effort. Under the management of Miss M, the firm's profit levels and corresponding probabilities are:

profit	\$0	\$100	\$800
probability if $e = e_L$	1/2	1/4	1/4
probability if $e = e_H$	1/4	1/4	1/2

Miss M is currently unemployed and her current utility is zero. Her utility function is

$$U_A(m, e) = \begin{cases} m - 8 & \text{if } e = e_L, \\ m - 10 & \text{if } e = e_H. \end{cases}$$

Mister O is risk neutral. Consider the following contracts.

- *Contract A*: Mister O hires Miss M and pays her a fixed wage of \$10.
 - *Contract B*: Mister O hires Miss M on the following terms: if profit is less than \$800, then Miss M will get nothing; if profit is \$800, then Miss M will get \$24.
- (a) Which of the two contracts would Miss M find acceptable?
 - (b) How does Miss M rank: (1) sign contract A; (2) sign contract B; (3) unemployment?
 - (c) How does Mister O rank the two contracts?

Problem 3 (Exercise 11.8). There are two outcomes, $X_1 = \$1000$ and $X_2 = \$1500$; levels of effort, low e_L and high e_H . The Principal is risk neutral. The Agent's utility function is

$$U_A(m, e) = \begin{cases} \sqrt{m} & \text{if } e = e_L, \\ \sqrt{m} - 1 & \text{if } e = e_H. \end{cases}$$

The probability of X_1 is $1/2$ if the Agent chooses e_L , $2/5$ otherwise.

- (a) Find the fixed-wage contract, call it D , that gives the Agent a utility equal to 24.
- (b) Find the contract, call it C , that (1) makes the Agent indifferent between choosing e_L and choosing e_H and (2) gives the Agent an expected utility of 24.
- (c) Are contracts C and D Pareto efficient?