## SPRING 2024

ECN/ARE 200C : MICRO THEORY

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## HOMEWORK 5 (for due date see the web page)

There are two types of individuals. They have identical initial wealth of \$4,900, they face a potential loss of \$2,400 and they have a utility-of-money function  $U(m) = \sqrt{m}$ . For individuals of type H the probability of loss is  $p_H = 25\%$  while for individuals of type L the probability of loss is  $p_L = 10\%$ . Let  $N_H \ge 1$  be the number of H types and  $N_L \ge 1$  the number of L types. The insurance market is a monopoly. The monopolist knows all of the above data but cannot tell whether any particular customer is of type H or type L. The monopolist is considering several options (refer to the following figure). Assume that (1) if indifferent between insuring and not insuring, a consumer would choose to insure and (2) if indifferent between two contracts, then the consumer would choose the one with lower deductible.



- (a) Option 1: offer only contract A. Calculate the monopolist's profits in this case as a function of  $N_H$  and  $N_I$ .
- (**b**) Option 2: offer only contract *B*. Calculate the monopolist's profits in this case as a function of  $N_H$  and  $N_r$ .
- (c) Option 3: Offer contracts *C* and *D* and let consumer choose. The deductible for contract *C* is \$2,073.60 and the premium for contract *D* is \$615. Write an equation whose solution gives the premium of contract *D* and verify that the solution is h = 42.83. Calculate the monopolist's profits in this case as a function of  $N_H$  and  $N_L$ .
- (d) If  $N_H = 100$  and  $N_L = 1,000$ , which of the three options would the monopolist prefer?
- (e) If  $N_H = 50$  and  $N_L = 100$ , which of the three options would the monopolist prefer?