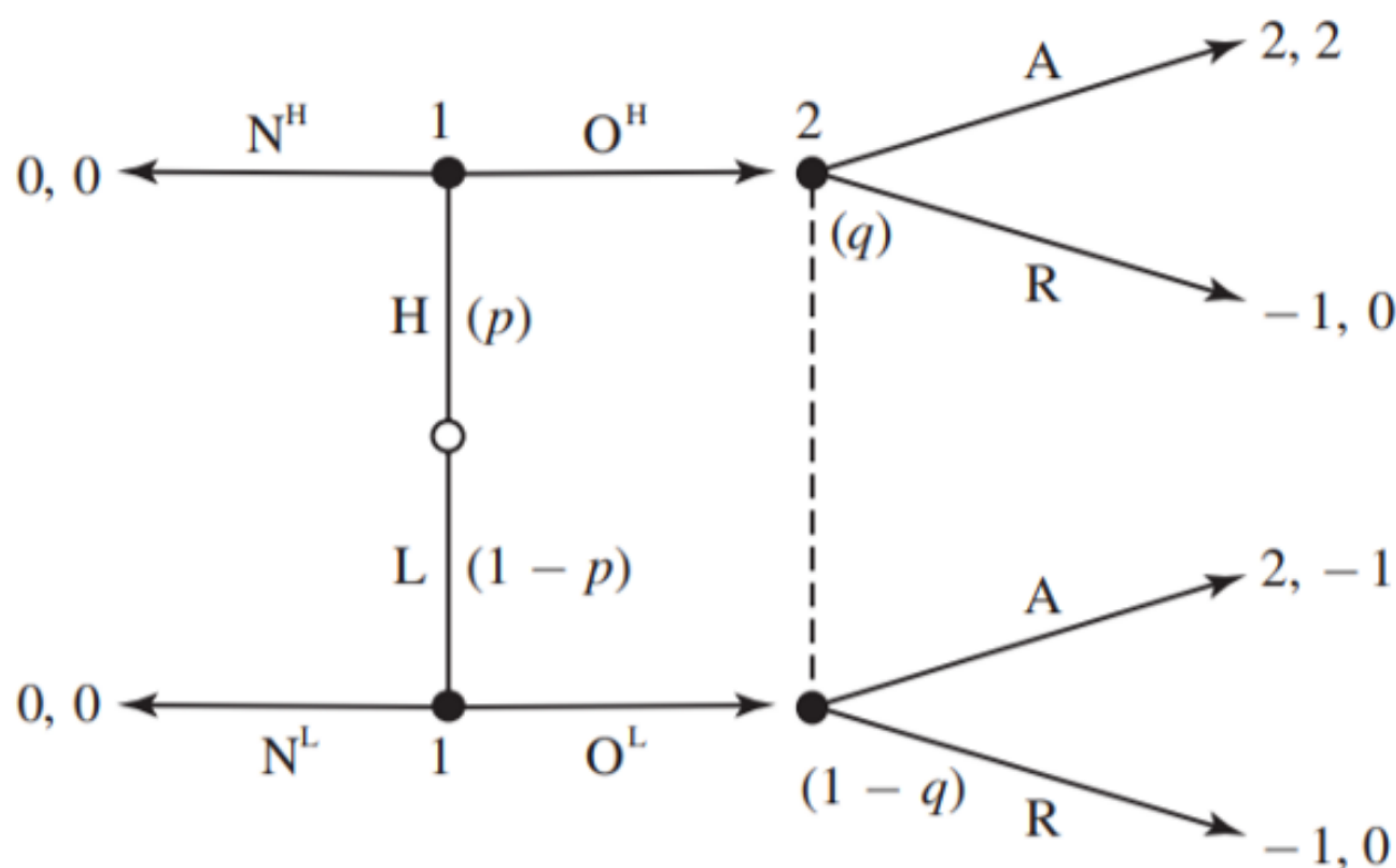


3. Consider the extensive-form game of incomplete information in the diagram that follows. There is a firm and a worker. In this game, nature first chooses the “type” of the firm (player 1). With probability  $p$ , the firm is of high

quality (H) and, with probability  $1 - p$ , the firm is of low quality (L). The firm chooses either to offer a job to the worker (O) or not to offer a job (N). If no job is offered, the game ends and both parties receive 0. If the firm offers a job, then the worker either accepts (A) or rejects (R) the offer. The worker's effort on the job brings the firm a profit of 2. If the worker rejects an offer of employment, then the firm gets a payoff of  $-1$  (associated with being jilted). Rejecting an offer yields a payoff of 0 to the worker. Accepting an offer yields the worker a payoff of 2 if the firm is of high quality and  $-1$  if the firm is of low quality. The worker does not observe the quality of the firm directly.



(a) Is there a separating PBE in this game? If so, specify the equilibrium and explain under what conditions it exists. If not, briefly demonstrate why.

$Q^H N^L$ :  $P_2$  plays A,  $P_1$  deviates = no PBE  
 $N^H Q^L$ :  $P_2$  plays R,  $P_1$  deviates = no PBE

(b) Is there a pooling PBE in which both types of firms offer a job? If so, specify the equilibrium and explain under what conditions it exists. If not, briefly demonstrate why.

$Q^H Q^L$ :  $P_2$  plays A if  $2q - 1(1-q) > 0 \Rightarrow q > 1/3 \Rightarrow P_1$  doesn't deviate  
 $(Q^H Q^L, A)$  is PBE when  $q > 1/3$  and  $q > p$

(c) Is there a pooling PBE in which neither type of firm offers a job? If so, specify the equilibrium and explain under what conditions it exists. If not, briefly demonstrate why.

$N^H N^L$  is Bk to R. R is also Bk to  $N^H$  and  $N^L$ . Thus, if  $p \leq 1/3$   
 $N^H N^L, R$   $p=q$  is pooling SPE