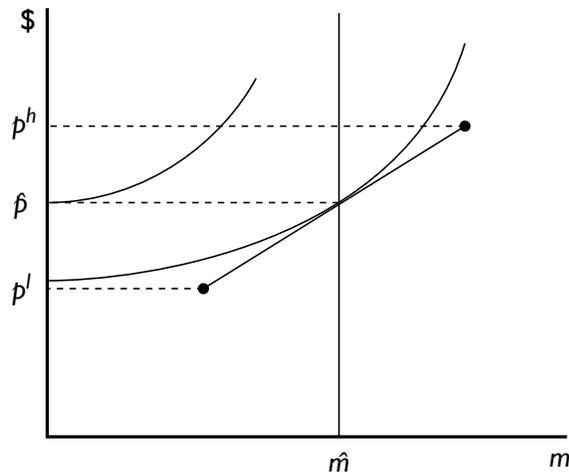


## First Quiz Answers

1. *NWDelta\_a.*

- (a) The isoprofit curve shows how much Delta can get by doing  $m = 0$ , i.e. its *outside option*. Thus, to get delta to do  $\hat{m}$ , Northwest has to pay them  $\hat{p}$  just to make them equally well off. The payment covers Delta's additional costs from doing the work.

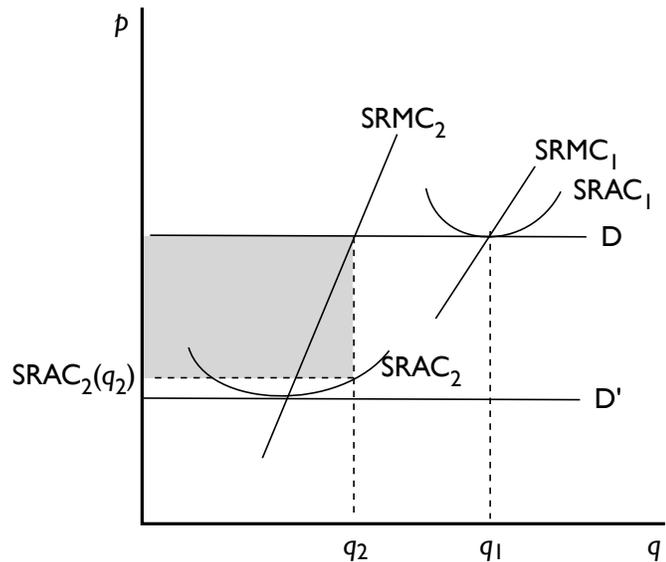


- (b) Since Northwest cannot observe Delta's  $m$ , and since  $m$  is costly to Delta, Delta can just shirk by setting  $m = 0$  but collect the  $\hat{p}$  anyway. This will give Delta an even higher payoff, shown by the higher isoprofit curve in the diagram.
- (c) Suppose Northwest pays Delta  $p^h$  if Northwest does well and  $p^l$  if Northwest does poorly. Further, suppose that Northwest's outcomes can be measured on the same axis as Delta's  $m$  and are correlated with Delta's  $m$  as shows in the diagram. Then on average, Delta expects to receive  $\hat{p}$  and this is enough to justify effort level  $\hat{m}$ . If Delta shirked by doing  $m < \hat{m}$ , then it would

increase the probability of receiving  $p^l$ , moving down along the tangent line, and thus moving *below* the isoprofit curve. Thus, this is not in Delta's interest.

Note that since Delta's initial isoprofit curve is risk free, while the high-powered incentive is risky, the diagram above is only correct if Delta is risk-neutral. Assuming Delta is risk averse, it would need somewhat higher payments  $p^l$  and  $p^h$  to compensate for the added risk.

2. *OilWells\_a.*



- (a) A type-2 firm produces quantity  $q_2$ , determined from setting its marginal cost equal to its price. Its profits are

$$(p - SRAC_2(q_2))q_2$$

which is shaded on the graph.

- (b) Since the rents are Ricardian, they cannot be reproduced. No other oil wells can become type-2 wells. Therefore, the type-2 wells will continue to earn these rents in the long run, and the

type 1 rents will remain in business and continue to earn zero economic profit.

- (c) Since there are large rents to using the type-2 technology, the type 1 wells and/or new entrant wells will want to adopt it. As they do adopt it, this will push the industry supply curve to the right, lowering the price. Eventually, the price will fall to  $D'$ , at which point there will be many more type-2 wells, all earning zero economic profit. No type-1 wells will be able to remain in business.