UNILATERAL

After class yesterday, I was asked a question about our screening analysis that I want to address.

First, some context: A Nash equilibrium is a strategy profile such that no player has a positive incentive to unilaterally change their strategy - so everyone else keeps their strategy unchanged. But in showing that, for example, there is no Nash equilibrium with pooling, where we looked at a diagram like this:

![Diagram showing Nash equilibrium]

we said we couldn’t be at the pooling outcome \((w^0, t^0)\) and still be at a Nash equilibrium, because (1) at that point each firm has 0 profit [everyone chooses the same contract and the wage = \(E[\theta]\)], (2) If one of the firms, say Firm #2, stops offering \((w^0, t^0)\) and instead offers \((\tilde{w}, \tilde{t})\), then Firm #2 will be strictly better off; their profit will become strictly positive. Why? Because in response to those new contract possibilities, H-type workers will choose \((\tilde{w}, \tilde{t})\) over \((w^0, t^0)\) and L-type workers will continue to choose \((w^0, t^0)\). This results in positive profits for Firm #2 since they now attract only H-types and make a positive profit on each H-type (who are being paid less than their productivity).

Since the firm’s strategy change makes them strictly better off, we must NOT have been at a Nash equilibrium.
So now to the question: It appears as if we’ve built an example in which we don’t have a simple unilateral strategy change by Firm #2. It looks like H-type workers are also changing their strategy (changing from “Accept ($w^0, t^0$)” to “Accept ($w, t$)”). Since we’ve had to have strategy changes by two players, doesn’t that ruin the argument that we weren’t at a Nash equilibrium?

**Answer:** NO! We are not changing the strategy of an H-type worker, we are only changing their action. To make the point in a simpler situation, consider the following game tree:

![Game Tree Diagram]

where Macrosoft’s payoffs are shown first and Microcorp second. Consider the strategy pair (Simple, (in if simple, out if Slick)). The result of this is 400,000 to Macrosoft and 100,000 to Microcorp. This strategy pair is NOT a Nash equilibrium. Macrosoft has a positive incentive to unilaterally change to Slick, so causing (Slick, (in if simple, out if Slick)) to be the new strategy pair. The result of this to Macrosoft is a payoff of 430,000, making them strictly better off. Notice - the is the whole point of this message - that while Microcorp’s STRATEGY hasn’t changed, they are choosing a different ACTION. At the first strategy pair, Microcorp chooses In; at the second strategy pair, Microcorp chooses Out. Microcorp’s decision changed not because their strategy changes but because when it’s their turn they are at a different node.

In the same way, in our screening example, the H-type worker’s strategy stays the same but the changed contract offer puts them at a different node and they choose a different action.