

Quiz No. 3: Microeconomics of Development

Name: ANSWER KEY

Thanks to your Purdue education, you have been hired by Monsanto, the biochemical company in St. Louis, to help predict demand for various new corn seeds they might sell around the world.

One team of corn breeders at Monsanto have developed a seed type they call “**TurboCharge**” (TC), selected to produce even higher yields than what farmers now get. Meanwhile, another team has developed a very different kind of seed, which they call “**EcoSave**” (ES), selected to grow with lower levels of fertilizer than farmers now use.

The top executives of the company are divided. Some want to focus their marketing effort on **TurboCharge** (TC), while others want to focus on **EcoSave** (ES). Which is right? Who will want to buy these seeds?

To help them decide, they ask you to analyze the market prospects for each type of seed. Luckily, from AGECE 340 you remember some simple diagrams that will help you explain and predict peoples’ response to innovation.

First, you go to the crop-breeding teams, and ask for their data on how the quantity of corn responds to the level of fertilizer use, under each kind of seed. The input-response curves are shown below, with each point labeled by a letter for existing seeds (points A-E), the TurboCharge seeds (points A*-E*) and the EcoSave seeds (A’-E’). Then, to predict which point farmers will choose, you collect market price data on the relative value of corn and fertilizer. You use these prices to draw the four thick gray lines (1-4), and analyze the result as follows:

The four thick gray lines (1-4) represent the farmer’s level of profit.

- (1) What is the formula for the slope of these profit lines, in terms of prices? $\frac{P_{fert}}{P_{corn}}$
- (2) Which line would a profit-maximizing farmer prefer (1-4 or can’t tell)? 4

At these prices,

- (3) Which point yields maximum profit, with existing seeds (A-E or can’t tell)? D
- (4) Which point yields maximum profit, using TC seeds (A*-E* or can’t tell)? D*
- (5) Which point yields maximum profit using ES seeds (A’-E’ or can’t tell)? D’
- (6) Which seed gives a bigger increase in corn production (TC, ES or about the same)? TC
- (7) Which seed gives a bigger increase in farmer’s profit (TC, ES or about the same)? Same

