Student Performance Q&A:

2013 AP® Microeconomics Free-Response Questions

The following comments on the 2013 free-response questions for AP® Microeconomics were written by the Chief Reader, David Anderson of Centre College, Danville, Kentucky, and Question Leaders Mary Kohelis, Woodrow Hughes, and Michael Brody. They give an overview of each free-response question and of how students performed on the question, including typical student errors. General comments regarding the skills and content that students frequently have the most problems with are included. Some suggestions for improving student performance in these areas are also provided. Teachers are encouraged to attend a College Board workshop to learn strategies for improving student performance in specific areas.

Question 1

What was the intent of this question?

This question determined students' ability to work with the monopoly model. It tested for an understanding of how price and quantity are determined, how profits are calculated, and how deadweight loss is identified for an unregulated monopolist. The question then examined students' knowledge of the price, quantity, and total revenue under conditions of perfect price discrimination. The question also determined whether students could identify the quantity produced and the profit received by a regulated monopolist. Lastly, the question tested students' understanding of the relationship between revenue and the elasticity of demand.

How well did students perform on this question?

The mean score was 5.55, which is 56 percent of the maximum possible score of 10 points. Students performed well in identifying the profit-maximizing price and quantity and a majority were able to indicate the areas on the graph that represented profit and deadweight loss.

What were common student errors or omissions?

The hardest part of this problem was part (b), which asked students to determine the quantity of output and the total revenue for a monopolist practicing perfect price discrimination. In the first part of (b), less than half of the students correctly determined the quantity a monopolist would produce, and in the second part, approximately one-fifth of the students correctly determined the total revenue received. Other common stumbling blocks for students were part (e), which asked the student to explain whether a point was in the elastic, unit elastic, or inelastic portion of the demand curve, and part (d), which asked if the regulated monopolist was earning positive, negative, or zero economic profit.

Based on your experience of student responses at the AP® Reading, what message would you like to send to teachers that might help them to improve the performance of their students on the exam?

Parts (d) and (e) required students to explain their assertions. It takes a greater depth of understanding to explain concepts well than to simply make an assertion or reading a diagram. Asking "Why?" or "What causes this to happen?" can encourage students to think more conceptually and better understand the relationships between variables and events. Have students explain the process behind changes and the rationale that underlies answers. If students know they will need to explain their answers in class, they will have a greater incentive to develop a firm understanding and not just memorize formulas or phrases. The difference between memorization and understanding was particularly important in part (b), which asked students to determine the total revenue of the perfect price discriminating monopolist. Students who memorized that total revenue is generally *price times quantity* missed this point. That formula does not apply in the case of perfect price discrimination, because each unit is sold at a different price. Classroom discussions of price discrimination, regulation, and other variations on the standard monopoly model will give students practice in manipulating the model and help them grasp its versatility and importance.

Question 2

What was the intent of this question?

This question determined students' understanding of some aspects of game theory. Part (a) tested students' ability to use a payoff matrix to determine the best decision for one player on the basis of another player's decision. Part (b) determined whether students understand the concept of a dominant strategy. Students illustrate their understanding by indicating dollar values in the payoff matrix. Part (c) tested whether students could identify a Nash equilibrium. Part (d) determined whether students can redraw a payoff matrix to show the effect of changes in some of the payoffs.

How well did students perform on this question?

The mean score was 2.54, which is 51 percent of the maximum possible score of 5 points. Students performed well on part (a)(i), which had them explain one player's case-specific optimal strategy using values in the payoff matrix. A small majority of students were also able to redraw the payoff matrix in part (d) to reflect changes in the cost of advertising.

What were common student errors or omissions?

Students had a particularly hard time determining the Nash equilibrium in part (c). Students also had difficulty with part (b), which required the use of dollar values in the payoff matrix to explain the lack of a dominant strategy. Instead of comparing the profit options for the firm in question, many students compared the profits between the companies. In part (d), which required a few calculations, students often added when they were supposed to subtract, or performed the calculation using numbers in the wrong cells of the matrix.

Based on your experience of student responses at the AP® Reading, what message would you like to send to teachers that might help them to improve the performance of their students on the exam?

Game theory provides valuable ways to analyze decisions made by interdependent individuals, firms, and policymakers. To garner the meaningful benefits of economic analysis using game theory matrices, students should develop skills beyond the ability to read each player's payoffs. Be sure to show students the simple strategies for finding dominant strategies and Nash equilibria. Students should also practice with payoff matrices from a variety of classic games beyond the prisoner's dilemma. Exposure to games such as chicken, matching pennies, and the battle of the sexes will help students broaden their

understanding of game theory. Explanations are available, for example, on YouTube under Game Theory 101. Additionally, teachers should emphasize the importance of careful calculations in this and every context.

Question 3

What was the intent of this question?

This question tested students' ability to work with a model of perfect competition in the presence of negative and positive externalities. Successful students showed that negative externalities raise the marginal social costs curve above the supply curve and that positive externalities raise the marginal social benefit curve above the demand curve. The question also tested for students' understanding that deadweight loss exists when markets fail to produce the allocatively efficient quantity of a good.

How well did students perform on this question?

The mean score was 2.81, which is 47 percent of the maximum possible score of 6 points. Students performed well on part (a), which had them draw the market for fireworks and show the equilibrium price and quantity. Students also did well on part (c)(ii), which asked them what would happen to deadweight loss if the government banned fireworks.

What were common student errors or omissions?

Students had the most difficulty with part (b). In part (b)(iii), most students could not correctly shade the area of deadweight loss for a market facing negative externalities. Students also struggled to equate demand with marginal social benefit in the absence of positive externalities. In part (c)(i), most students knew that the market equilibrium quantity would be less than the socially optimal quantity in the presence of a positive externality, but could not sufficiently explain that this resulted from benefits that spilled over to third parties.

Based on your experience of student responses at the AP® Reading, what message would you like to send to teachers that might help them to improve the performance of their students on the exam?

When asked to draw a market graph, students should show clearly labeled supply and demand curves.

Deadweight loss can result from either the overproduction of a good or the underproduction of a good, so students should practice shading deadweight loss for a variety of scenarios.

For part (c), some students seemed to have added lines to their graphs drawn for part (b), even though they weren't supposed to. This is a dangerous practice because the lines might be interpreted as part of the answer for the earlier part.

Many students might have understood the answer to part (c)(i), but had trouble getting their thinking onto the page. When planning assessments, ask students to explain their logic in writing. Finding the answer to a question is one thing, but being able to clearly articulate the logic behind it is another—and students need practice.