

Microeconomics, supply and demand curves, final exam practice problems

(The attached PDF file has better formatting.)

*Question 1.1: Price Elasticity of Supply

The supply curve of a competitive firm is $Q = P - 100$. Let η_{100} be the price elasticity of supply at $Q = 100$ and let η_{120} be the price elasticity of supply at $Q = 120$. Which of the following is true?

- A. $0 < \eta_{100} < \eta_{120}$
- B. $0 < \eta_{120} < \eta_{100}$
- C. $\eta_{100} < \eta_{120} < 0$
- D. $\eta_{120} < \eta_{100} < 0$
- E. $\eta_{100} < 0 < \eta_{120}$

Answer 1.1: B

The slope $\partial Q / \partial P = \beta = 1$. The elasticity is $\eta = \frac{\partial Q / Y}{\partial P / X} = \frac{\partial Q}{\partial P} \times \frac{P}{Q} = \beta P / Q$

- ~ When $Q = 100$, $P = 200$, and the elasticity is 2.
- ~ When $Q = 120$, $P = 220$, and the elasticity is $22 / 12 < 2$.

Jacob: Does the answer depend on the coefficients of the supply curve?

Rachel: If the supply curve is linear, it does not depend on the coefficients. The supply curve is $Q = \alpha + \beta P$. In practice, α must be negative. If α were positive, the firm would produce some quantity even if the price were zero or negative. But the marginal cost is always positive, so the firm would not do this. β must be positive, since a higher price induces a greater quantity. The slope $\partial Q / \partial P$ is constant for a linear supply curve.

The ratio $P / Q = P / (\alpha + \beta P)$. When $P = 0$, this ratio is zero. As P increases, this ratio increases, to a maximum of $1/\beta$ as $P \rightarrow \infty$.

Jacob: Can we show that this ratio is monotonically increasing?

Rachel: The derivative of this ratio with respect to P is positive. Taking the derivative requires the quotient rule, which some candidates have forgotten. It is easier to examine the reciprocal of this ratio, which is $\beta + \alpha/P$. The derivative with respect to P is $-\alpha/P^2$, which is negative. The reciprocal decreases as P increases, the ratio itself increases as P increases.

*Question 1.2: Price Elasticity of Supply

The price elasticity of supply is positive for most goods. For which good *might* the price elasticity of supply be negative?

- A. Labor
- B. Water
- C. Food
- D. Commodities
- E. Financial assets

Answer 1.2: A

Labor is the inverse of leisure: labor time + leisure time = 24 hours a day. As labor increases, the worker's leisure decreases.

A backward bending supply curve is caused by *wealth effects* that offset the substitution effect and make the consumer desire more leisure time.

A negative price elasticity of supply means that producers supply less of the good as the price increases. This occurs when a higher price for the good makes the producers richer and *raises the relative cost* of producing the good.

- Low paid persons may work 12 hours a day to provide food, clothing, and shelter.
- Average paid persons may work 8 hours day, since they desire more leisure time.
- Highly paid persons may work 4 hours a day, since they have no use for more pay.

In practice, a higher real wage rate usually increases the labor supply. A person may work on week-ends mowing lawns for \$25 an hour but not for \$5 an hour.

Labor is different from other goods because it is inversely correlated with leisure.

- Other goods have no adverse effect on the supplier when they increase. They increase the supplier's income when they are sold, but their production causes no loss to the supplier.
- Labor adverse affects the supplier. As labor increases, the supplier's leisure decreases.

*Question 1.3: Supply and Demand of Bread

If the demand for bread *decreases* (because consumers' tastes change and they want less bread) and the supply of bread *decreases* (because a drought ruined the wheat harvest)

- A. The quantity of bread traded increases; the price may increase or decrease.

- B. The quantity of bread traded decreases; the price may increase or decrease
- C. The price of bread decreases; the quantity may increase or decrease.
- D. The price of bread decreases and quantity increases.
- E. By definition, a rise in demand can not occur along with a fall in supply.

Answer 1.3: B

Know the four scenarios:

- If demand rises and supply rises, quantity increases but price may rise or fall.
- If demand falls and supply falls, quantity decreases but price may rise or fall.
- If demand rises and supply falls, price increases but quantity may rise or fall.
- If demand falls and supply rises, price decreases but quantity may rise or fall.

We put these scenarios into a two by two matrix:

	<i>Demand Rises</i>	<i>Demand Falls</i>
<i>Supply Rises</i>	Quantity Increases	Price Decreases
<i>Supply Falls</i>	Price Increases	Quantity Decreases

*Question 1.4: Supply and Demand of Wine

If the demand for wine *increases* (because consumers' taste for wine changes and they want more wine) and the supply of wine *increases* (because the grape harvest is good)

- A. The quantity of wine traded decreases; the price may increase or decrease.
- B. The quantity of wine traded increases; the price may increase or decrease
- C. The price of wine increases; the quantity may increase or decrease.
- D. The price of wine increases and quantity decreases.
- E. By definition, a rise in demand can not occur along with a fall in supply.

Answer 1.4: B

Know the four scenarios:

- If demand rises and supply rises, quantity increases but price may rise or fall.
- If demand falls and supply falls, quantity decreases but price may rise or fall.
- If demand rises and supply falls, price increases but quantity may rise or fall.
- If demand falls and supply rises, price decreases but quantity may rise or fall.

We put these scenarios into a two by two matrix:

	<i>Demand Rises</i>	<i>Demand Falls</i>
<i>Supply Rises</i>	Quantity Increases	Price Decreases
<i>Supply Falls</i>	Price Increases	Quantity Decreases

*Question 1.5: Supply Curve

The supply curve equals which of the following for competitive firms and monopolists?

	<u>Competitive Firm</u>	<u>Monopolist</u>
A	marginal revenue curve	marginal revenue curve
B	marginal cost curve	marginal cost curve
C	average cost curve	marginal revenue curve
D	marginal cost curve	does not have a supply curve
E	marginal cost curve	marginal revenue curve

Answer 1.5: D

A competitive firm faces a horizontal (flat, perfectly elastic) demand curve. Its supply depends on the price.

A monopoly faces a sloping demand curve. Its supply depends on the marginal revenue, which depends on the price and the slope of the demand curve.

*Question 1.6: Indifference Curves and Demand Curves

Which of the following is not held constant when we use indifference curves to derive the demand curve for good X? Assume that good Y represents all other goods.

- A. The price of good X
- B. The price of good Y
- C. The consumer's income
- D. The consumer's tastes
- E. The value to the consumer of good X

Answer 1.6: A