

MOT1421  
Economic Foundations  
Week One

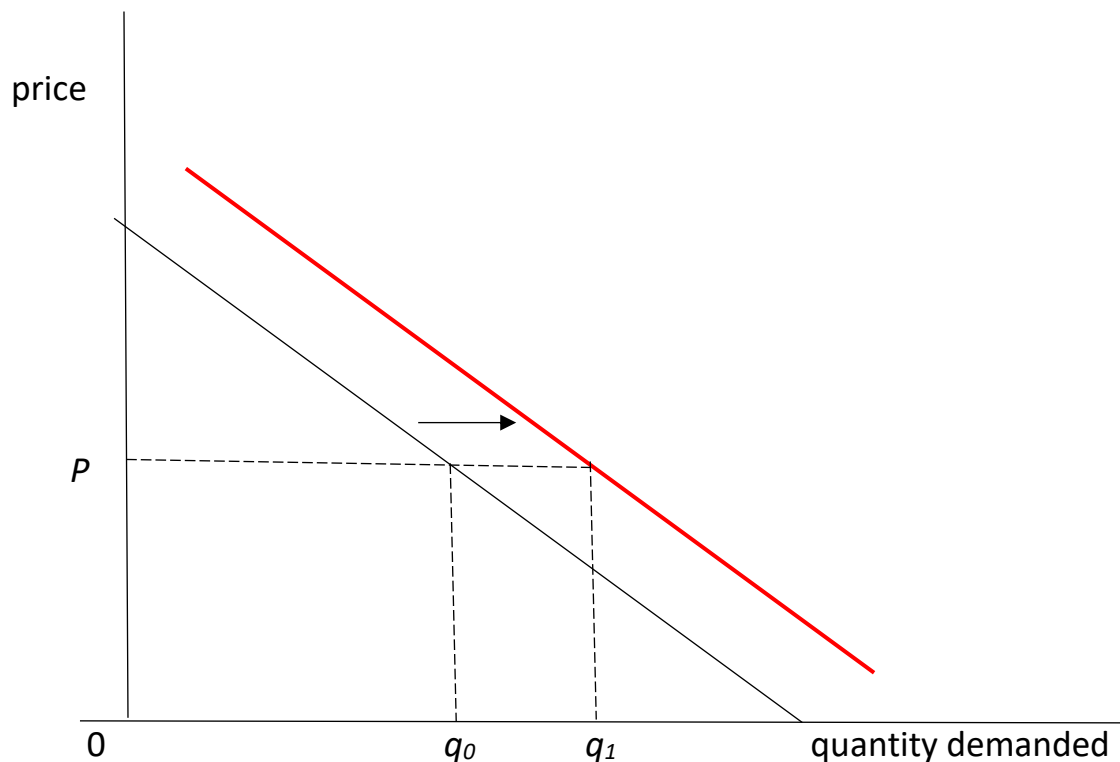
INTRODUCTION & THEORIES OF CONSUMER DEMAND  
SELF-TEST: ANSWERS

The self-assessment consists of 10 Questions.  
Each Question has a weight of 1. Your maximum score therefore is 10.  
A score of 6 means that you have successfully passed the test.  
This self-assessment is self-scoring.

**Question 1**

Consider the following consumer demand curve for good A. Good A is a normal good. The above consumer-demand curve has been drawn under the ceteris-paribus assumption. Explain what happens to this graph when consumer income rises.

Because good A is a normal good, a higher income will increase the demand for good A, at an unchanged price-level  $P$ . This is shown in the graph by a shift of the demand curve to the right (the red demand curve is the new curve).



## Question 2

The representative consumer has the following utility function:  $U = X \cdot \sqrt{Z}$ ; where  $X$  = the quantity of good  $X$ , and  $Z$  = the quantity of good  $Z$ . The prices of these goods are exogenously given:  $P_Z = 2$  and  $P_X = \text{Euro } 4$ . The consumer budget is exogenously given and equals Euro 36. The consumption budget is completely used up. Identify the utility maximising consumption bundle of this consumer.

The condition for utility maximisation is  $\frac{P_X}{P_Z} = MRS = \frac{MU_X}{MU_Z}$ .

$$MU_X = \frac{dU}{dX} = \sqrt{Z} \text{ and } MU_Z = \frac{dU}{dZ} = \frac{X}{2\sqrt{Z}}. \text{ Hence, } \frac{MU_X}{MU_Z} = \frac{\sqrt{Z}}{\frac{X}{2\sqrt{Z}}} = \frac{2Z}{X}$$

$$\frac{P_X}{P_Z} = \frac{4}{2} = 2. \text{ This gives: } \frac{MU_X}{MU_Z} = \frac{2Z}{X} = 2 \rightarrow X = Z$$

We know that the budget restriction is as follows:  $36 = 4X + 2Z$ . Substituting  $X = Z$  into the budget restriction gives:  $36 = 6X \rightarrow X = 6$  and  $Z = 6$ .

We can check our result in two ways. First:  $4X + 2Z = 4 \times 6 + 2 \times 6 = 36$ , which means that this combination does indeed exhaust the consumer budget.

Second:  $MU_X = \sqrt{Z} = \sqrt{6}$  and  $MU_Z = \frac{X}{2\sqrt{Z}} = \frac{6}{2\sqrt{6}} = \frac{1}{2}\sqrt{6}$ . This means that

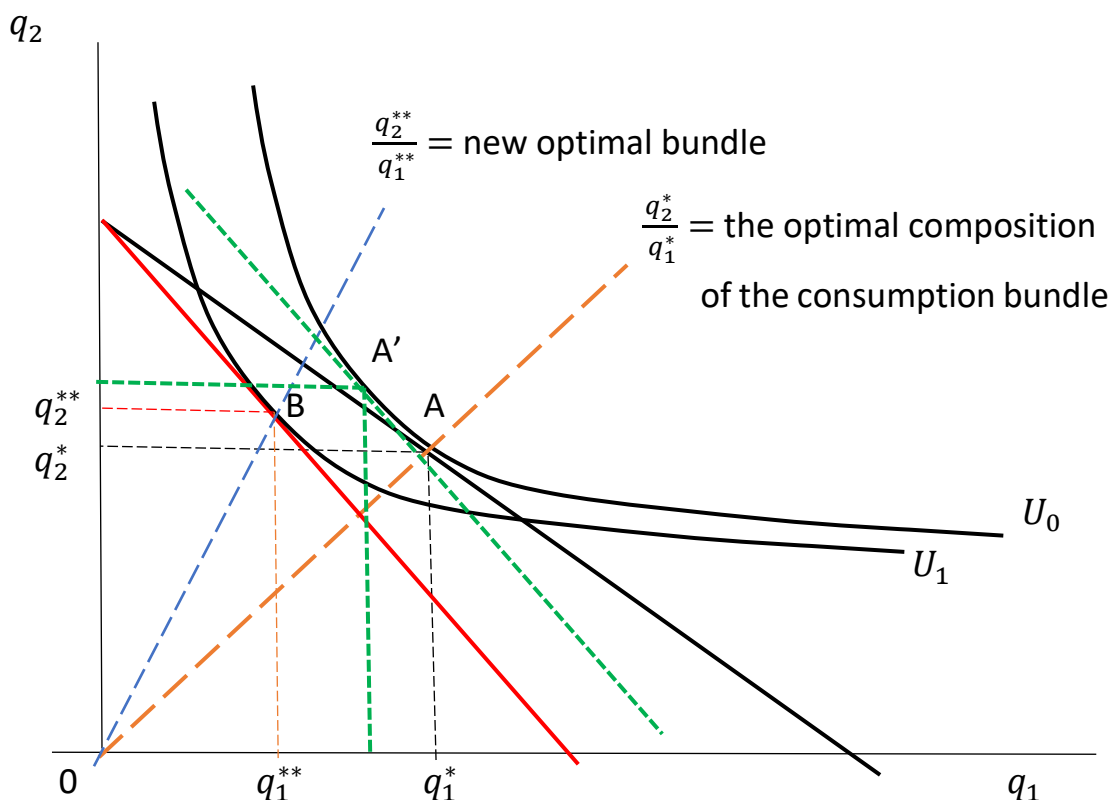
$$\frac{MU_X}{MU_Z} = \frac{\sqrt{6}}{\frac{1}{2}\sqrt{6}} = 2 = \frac{P_X}{P_Z}.$$

Conclusion: the utility-maximising consumption bundle consists of 6 units of  $X$  and 6 units of  $Z$ .

### Question 3

Consider Figure A (below). Assume that the price of good 1 increases.

Figure A  
Utility maximisation by the representative consumer



The original equilibrium position is given by point A: the point of tangency between the original indifference curve  $U_0$  and the original budget line (in black). The original optimal consumption bundle is  $(q_1^*, q_2^*)$ .

Due to the price increase for good 1, the area of affordable consumption bundles become smaller. The slope of the budget line becomes steeper (in absolute terms). The new budget line is given by the red linear curve. The original consumption bundle is  $(q_1^*, q_2^*)$  falls outside the area of affordable consumption options. The consumer cannot maintain utility at its original level  $U_0$  and is, hence, forced to move down to a lower indifference curve. Following the price increase for good 1, the consumer will maximise utility by choosing  $(q_1^{**}, q_2^{**})$ . This is the combination given by the point of tangency between the lower indifference curve  $U_1$  and the changed budget line (in red) – see point B in the

graph. The shift from point A ( $q_1^*, q_2^*$ ) to point B ( $q_1^{**}, q_2^{**}$ ) constitutes the **total effect**. What is the substitution effect caused by the higher price for good 1?

In response to the higher price for good 1, the optimising consumer will reduce consumption of good 1 and increase consumption of good 2; the consumer will move up along the original indifference curve  $U_0$ . The **substitution effect** caused by the higher price for good 1 is given by the change from point A ( $q_1^*, q_2^*$ ) to point **A'** ( $q_1^{*'}, q_2^{*'}$ ) in the graph. Point A' is found by finding the point of tangency between the original indifference curve and the slope of the new budget line; in the graph, the slope of the new budget line is given by the dashed green line. The substitution effect is negative for the (higher-priced) good 1 and positive for good 2 (which has become relatively cheaper).

The shift from point **A'** ( $q_1^{*'}, q_2^{*'}$ ) to point B ( $q_1^{**}, q_2^{**}$ ) is the **income effect** of the higher price for good 1. The income effect is negative for both goods, because the consumer suffers a loss of purchasing power (or real income) due to the price increase for good 1.

In sum, we find for commodity 1:

- total price effect on consumer demand for good 1:  $q_1^{**} - q_1^* < 0$
- which consists of a substitution effect:  $q_1^{*'} - q_1^* < 0$
- and an income effect:  $q_1^{**} - q_1^{*' < 0$

and for commodity 2:

- total price effect on consumer demand for good 2:  $q_2^{**} - q_2^* > 0$
- which consists of a substitution effect:  $q_2^{*' - q_2^* > 0$
- and an income effect:  $q_2^{**} - q_2^{*' < 0$

#### Question 4

The 'bandwagon effect' in consumer demand theory concerns the extent to which the demand for a commodity is increased due to the fact that others are also consuming the same commodity. It represents the desire of people to purchase a commodity in order to get into "the swim of things"; in order to conform with the people, they wish to be associated with; in order to be fashionable or stylish; or, in order to appear to be "one of the boys."

**Question 5**

- a. If  $e_Y = 0.75$  and consumer income falls by 3%, consumer demand declines by 2.25% percent.
- b. If  $e_P = -0.9$  and the price of the service increases by 5%, consumer demand declines by 4.5% percent.

**Question 6**

Consider the following consumer demand function (which is part of a complete Linear Expenditure System):

$$q_i = \gamma_i + \mu_i \times \left( \frac{Y}{P_i} - \sum_{i=1}^n P_i \times \gamma_i \right)$$

where  $q_i$  = the quantity demanded of good  $i$ ;  $\gamma_i$  = fixed quantity demanded of good  $i$ ;  $\mu_i$  = the marginal budget share of good  $i$ ;  $Y$  = the income of the consumers; and  $P_i$  = the price of good  $i$ . Note that the average budget share of good  $i$  is defined as:  $\alpha_i = \frac{(P_i \times q_i)}{Y}$ .

Derive the income elasticity of demand for good  $i$ .

The **income elasticity of demand for good  $i$**  is defined as:

$$e_{Yi} = \frac{dq_i}{dY} \times \frac{Y}{q_i} = \frac{\mu_i}{P_i} \times \frac{Y}{q_i} = \frac{\mu_i}{\alpha_i} = \frac{\text{marginal budget share of good } i}{\text{average budget share of good } i}$$

**Question 7**

A good is labelled a necessary good if it has an income elasticity of demand  $0 < e_Y < 1$ . A good is called a luxury good if it has an income elasticity of demand  $e_Y > 1$ .

### Question 8

A good is called an **inferior good** when it has a negative income elasticity of demand; this means that the demand for this good will decline, if consumer income rises.

A good is called a **Giffen good** when it has a positive own-price elasticity of demand; this means that the demand for this good will increase, if the price of this good increases. This effect constitutes the total effect of a higher price. We know that the substitution effect caused by a higher price, is to reduce the demand for this good. We further know that the higher price for this good reduces the purchasing power of the (given) income of the consumer. We can say that the real income of the consumer declines. In response to the loss in purchasing power, the consumer increases demand for the (higher-priced) good – which suggests that the income elasticity of demand for this good is negative. It follows that a Giffen good is also an inferior good.

### Question 9

Explain why consumers are not sovereign according to:

- a. Thorstein Veblen.

In Veblen's view, consumer preferences are socially determined. The super-rich use consumption to show off their wealth (conspicuous consumption) and the rest of society (the middle and lower-income classes) try to imitate the leisure class by consuming – as far as is possible given their lower incomes – luxury status goods. This may result in the fact that the price elasticity of demand for these status goods is positive. A higher price makes the good more attractive to consumers; preferences thus depend on the price.

- b. John Kenneth Galbraith.

Galbraith argues that consumer preferences are not exogenous, but can be influenced and manipulated by firms. He calls this want creation. By means of advertising, marketing and psychological tricks, firms create “wants” for their

(often new) goods and services. Firms are sovereign, consumers are dependent in his view. [This is what a dependent consumer looks like.](#)

### **Question 10**

Consider the following proposition: “In neoclassical theory, consumers are not sovereign in a market of a monopoly.”

This proposition is wrong, because consumer preferences are assumed to be exogenous and, hence, cannot be influenced or manipulated by the monopolist. Consumer preferences get expressed in the consumer demand curve, which the monopolistic firm has to accept. What it means is that the monopolist cannot sell a large quantity against a high price – because consumers will only be willing to purchase the large quantity at a lower price. This way, because consumer preferences are deemed exogenous, consumers remain sovereign: the customer is King, in other words.

*End of self-test Week 1*