



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2018

Economics

Assessment Unit AS 1
assessing
Markets and Market Failure



SEC11

[SEC11]
MONDAY 14 MAY, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number on the Answer Booklet provided.
Answer **all** questions in section **A** and **B** and **one** question in section **C**.
You are permitted to use a calculator in this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.

- Section A: 25 Marks
- Section B: 35 Marks
- Section C: 20 Marks

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

ADVICE TO CANDIDATES

You are advised to take account of the marks for each part question in allocating the available examination time. In questions involving calculations, you are advised to show your workings. Quality of written communication will be assessed in Questions **5**, **6 (b)**, **(c)** and **(d)**, **7** and **8**. Quantitative skills will be assessed where appropriate.

Section A

Answer all questions (25 marks)

- 1 The table below depicts the total level of utility (or satisfaction) a consumer receives from consuming various quantities of a healthy breakfast bar.

Quantity consumed	Total utility received (utils)
0	0
1	65
2	110
3	135

With reference to the consumption of **the second** breakfast bar, explain the meaning of the term marginal utility. [4]

- 2 Global steel prices fell from around \$400 per tonne in April 2015 to \$170 per tonne in April 2016. This rapid decline has been caused in no small part by a fall in demand for steel in oil-producing countries and government subsidies to steel producers in China.

With the aid of an appropriate diagram, explain the fall in steel prices between April 2015 and April 2016. [5]

- 3 Data published recently on the impact of income growth on the demand for luxury goods has suggested that an increase in average incomes in Estonia from €12,600 to €15,300 per year led to a 10% rise in the quantity of red meat demanded.

(a) Using the information above, calculate the income elasticity of demand for red meat. [3]

(b) Does the data support the view that red meat is a luxury good? Explain your answer. [3]

- 4** In 2015 median household disposable income in the UK was £25,600, up £1,500 from the previous year. Over the same period the number of households living below the poverty line (defined as 60% of median household disposable income) remained relatively unchanged.

(a) Using the information above, calculate the poverty line for the UK in **2015**. [2]

(b) Explain **one reason** why median income is generally accepted to be a more accurate indicator than mean income when calculating relative poverty rates. [2]

- 5** Research has shown that crop yields on farms located close to hobby and commercial bee-keeping are up to 35% higher than the national average.

With the aid of an appropriate diagram, explain why free markets are likely to lead to a less than optimal level of bee-keeping. [6]

Section B: Data response

Answer all questions (35 marks)

- 6 The following passage was written in April 2016. Read it carefully and answer the questions which follow.

Obesity: a growing problem!

A report published recently in *The Lancet* medical journal has claimed that the UK has one of the highest rates of obese and overweight people in the EU. This has caused concern that the NHS will be unable to cope with the increased health problems, such as diabetes, heart disease and cancer, which are associated with obesity. Indeed, research suggests that by 2020 obesity will cost the UK economy £6bn each year in lost output and health costs, and will lead to 70 000 premature deaths.

While obesity is a growing problem across the socioeconomic spectrum, there are some who believe it is directly correlated with poverty and deprivation, with a government health minister stating “not everyone who is obese is from a deprived background; but that is where the propensity lies”.

The chart below illustrates the relationship between obesity levels and deprivation (as measured by the index of social deprivation).

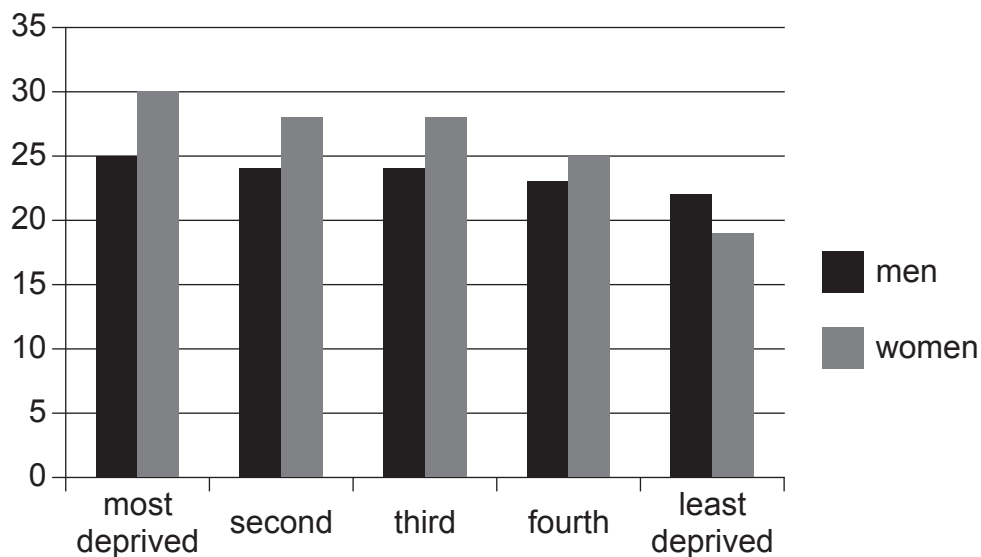


Fig. 1: Percentage of people classified as obese per quintile group

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The government is clearly worried about the cost to the economy of rising obesity levels and in his 2015 budget, Chancellor George Osborne laid out plans to introduce a tax on sugary drinks in an attempt to tackle the problem. The tax, which will equate to 18p per litre for sugary drinks containing more than 5g of sugar per 100 ml and 24p per litre for drinks with over 8g of sugar per 100 ml, is expected to raise around £500 million per year in additional tax revenue. This additional tax revenue has been earmarked for schools sports and breakfast clubs.

Supporters of the plan point to the experience of Mexico where a tax on sugary drinks led to a 12% drop in sales in the first year, with sales of bottled water increasing by 4% over the same period.

Kate Smith of the Institute of Fiscal Studies (IFS) stated, “Sugary drinks have wider costs to society that the consumer does not pay for, and one effective way to make up for this market failure is to impose a tax that internalises the external costs of consumption.”

Not everyone is in favour of the sugar tax, however, and not surprisingly the big soft drinks manufacturers have called on the Chancellor to reconsider the plan. The boss of Coca-Cola UK stated, “We don’t believe the sugar tax is the right thing to do... there is no evidence to suggest that it will reduce obesity, not least because only a very small proportion of an individual’s calorie intake comes from sugary drinks.” The eminent free market economist AJ McCann was even more scathing of the plan. He stated, “The demand for sugary drinks in the UK is relatively price inelastic and so this tax will do nothing but transfer more money from the pockets of hard-working citizens to government ministers who will then waste it on harebrained schemes designed to make themselves look good. Obesity has many separate causes and as a result there is a range of alternative policy measures that, if used together, would be more effective than taxation in changing consumer behaviour and reducing the obesity epidemic.”

- (a) Using the information in **Fig. 1**, compare the relationship between social deprivation and obesity in men with that of women. [5]
- (b) With the aid of an appropriate diagram, analyse the likely impact on community surplus of the imposition of a specific tax on sugary drinks. [6]
- (c) Analyse why free markets often lead to the over-consumption of goods such as sugary drinks. [9]
- (d) Critically examine the view that “there is a range of alternative policy measures that would be more effective than taxation in reducing obesity”. [15]

Section C: Essay section

Answer one question (20 marks)

- 7 In April 2016, the government introduced a National Living Wage of £7.20 per hour for workers over 25. This will be gradually increased to reach £9.00 per hour by 2020. Supporters of the scheme argue that it will reduce relative poverty and save the government millions of pounds each year. However, opponents argue that it might increase relative poverty as it is likely to lead to job losses.

Critically examine the government's decision to introduce a National Living Wage of £9.00 per hour by 2020. [20]

- 8 In his 2015 Budget, Chancellor George Osborne announced that from 2017 high-performing UK universities could increase the fees they charge students above the £9,000 limit that was set in 2012. Universities have welcomed the change and claim that this will allow them to invest in new facilities and attract the best staff.

Critically examine the view that UK universities should be free to set their own level of fees. [20]

THIS IS THE END OF THE QUESTION PAPER

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Surname *StemUp Model Solution*

Answer booklet

Write the question number in the left-hand margin at the start of each answer.

Question
number

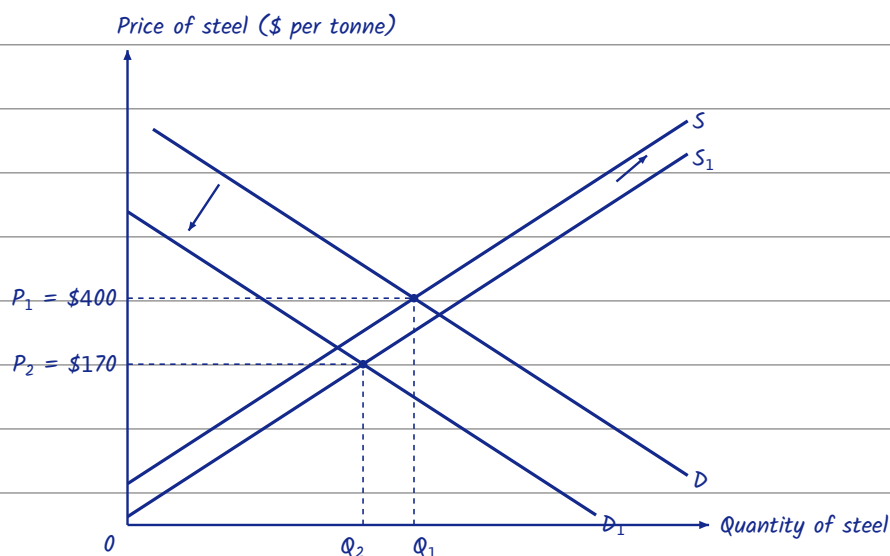
1

Marginal utility is the additional (extra) utility or satisfaction a consumer gains from consuming one more unit of a good or service.

Marginal utility of the 2nd breakfast bar = TU of 2 bars - TU of 1 bar = 110 - 65 = 45 utils. This is less than the 65 utils from the first bar, showing diminishing marginal utility.

2

Steel prices fell by $(400 - 170) \div 400 \times 100 = 57.5\%$ because demand for steel fell and supply increased at the same time.



As the diagram shows, steel is used in oil drilling, pipelines and refineries, so its demand is a derived demand. The fall in demand for steel in oil-producing countries (as oil prices fell) shifted the demand curve to the left from D to D_1 . At the same time, Chinese government subsidies lowered steel producers' costs of production, so supply increased and the supply curve shifted to the right from S to S_1 .

At the original price of \$400 there is now excess supply, so producers cut prices until a new equilibrium is reached at $P_2 = \$170$ per tonne. Both shifts push the

price down, which is why the fall was so rapid. The effect on quantity depends on the relative size of the shifts: here the fall in demand is larger, so quantity falls slightly from Q_1 to Q_2 .

3(a)
$$\% \text{ change in income} = (15,300 - 12,600) \div 12,600 \times 100 = 2,700 \div 12,600 \times 100 = 21.43\%$$

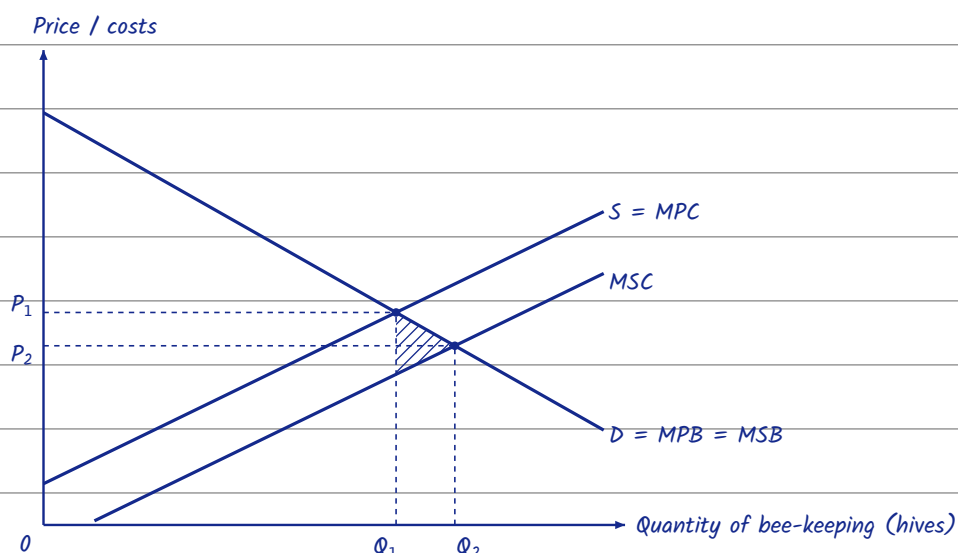
$$YED = \% \text{ change in quantity demanded} \div \% \text{ change in income} = 10\% \div 21.43\% = +0.47$$

3(b) No, the data does not support the view. A luxury good has a YED greater than +1, so demand rises more than proportionately as income rises. The YED of +0.47 is positive, so red meat is a normal good, but it is less than 1 (income inelastic): a 21.43% rise in income led to only a 10% rise in quantity demanded. So red meat is a normal necessity, not a luxury.

4(a)
$$\text{Poverty line} = 60\% \text{ of median income} = 0.6 \times \pounds 25,600 = \pounds 15,360 \text{ per year.}$$

4(b) The mean (total income $\div$ number of households) is skewed upwards by a small number of households with extremely high incomes, as incomes are not symmetrically distributed. The median is the income of the middle household when all are ranked in order, so it is not distorted by these extremes and better reflects typical income.

5 Bee-keeping generates a positive production externality: bees pollinate crops on surrounding farms, raising crop yields by up to 35% above the national average. This is an external benefit to third parties (farmers) who do not pay the bee-keeper for it.



 = welfare loss from under-provision (Q_1 to Q_2)

Rational bee-keepers only consider their own private costs and benefits when deciding how many hives to keep, and ignore the external benefit. So the marginal social cost of bee-keeping is below the marginal private cost ($MSC = MPC$ minus the external benefit to farmers). As the diagram shows, the free market equilibrium is where $D = MPC$, at P_1 and Q_1 , but the socially optimal level is where $MSB = MSC$, at P_2 and Q_2 . Since Q_1 is less than Q_2 , the free market leads to under-provision of bee-keeping: the hives between Q_1 and Q_2 , whose social benefit exceeds their social cost, are not kept, giving the shaded welfare loss.

This is market failure, as resources are misallocated and allocative efficiency is not achieved. Bee-keepers cannot charge farmers for pollination, since bees cannot be stopped from visiting nearby fields, so farmers free ride and the potential gain in crop output and farm incomes is lost. A subsidy to bee-keepers equal to the external benefit could move output to Q_2 .

6(a)

For both men and women there is a positive correlation between social deprivation and obesity: the more deprived the quintile group, the higher the percentage classified as obese. However, the relationship is much stronger for women than for men.

For men obesity rises only gradually, from 22% in the least deprived group to

23%, 24%, 24% and 25% in the most deprived group, a difference of just 3 percentage points (about 14% higher).

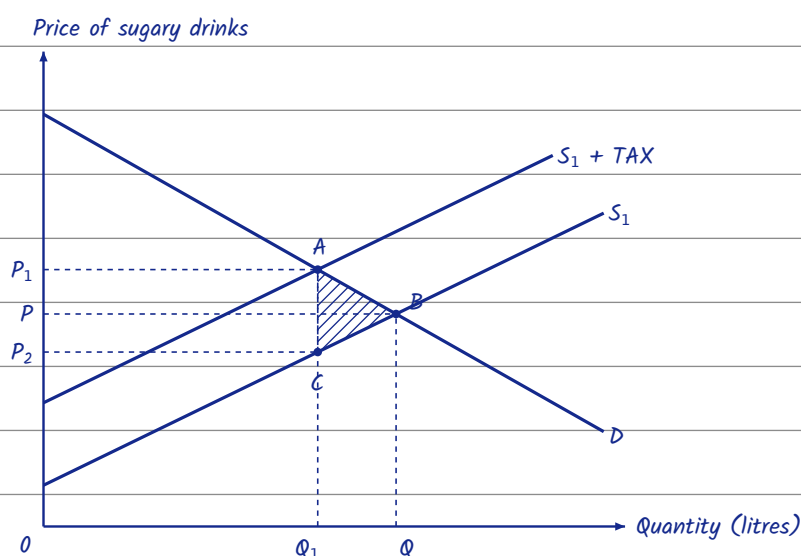
For women obesity rises from 19% in the least deprived group to 25% in the fourth, 28% in the third and second and 30% in the most deprived group, a difference of 11 percentage points, so the most deprived women are about 58% more likely to be obese than the least deprived.

Women have higher obesity rates than men in every group except the least deprived (19% compared with 22%), and the gap is widest in the most deprived group (30% v 25%, 5 percentage points). This supports the minister's view, especially for women.

6(b)

Community surplus is the total benefit or welfare to society from an economic transaction, equal to consumer surplus (the difference between what consumers are willing to pay and what they actually pay) plus producer surplus (the difference between the price received and the minimum price producers would accept).

The sugar tax is a specific indirect tax (18p or 24p per litre), so it adds a fixed amount to costs per litre and causes a parallel leftward shift of supply from S_1 to $S_1 + \text{TAX}$, the vertical distance being the tax.



 = deadweight welfare loss (triangle ABC)

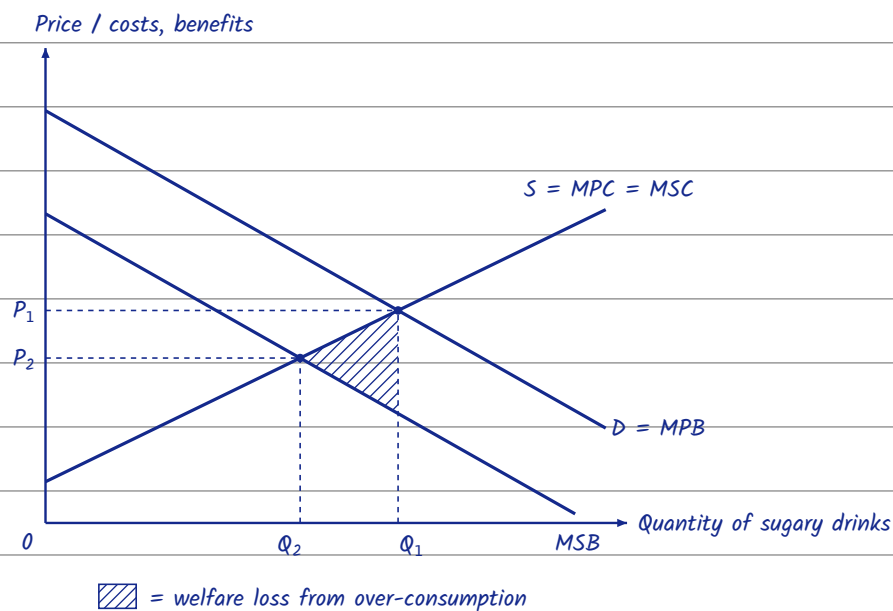
As the diagram shows, the price consumers pay rises from P to P_1 and quantity

falls from Q to Q_1 , while the price producers keep after paying the tax falls from P to P_2 . Consumer surplus falls by the area PP_1AB and producer surplus falls by P_2PBC , as firms must transfer the tax to the government. Part of this lost surplus, the rectangle P_2P_1AC (tax per litre $\times Q_1$), becomes tax revenue (about £500 million a year, to be spent on school sports and breakfast clubs), so it is not lost to society. However, the triangle ABC is a deadweight welfare loss (Harberger's triangle): the litres between Q_1 and Q are no longer traded, so community surplus falls by ABC .

The incidence and size of the loss depend on the price elasticities of demand and supply. McCann says demand is price inelastic, so most of the tax is passed on to consumers, quantity falls little and ABC is small. However, sugary drinks create negative consumption externalities (NHS costs, lost output), so if the tax moves consumption towards the social optimum, society may in fact gain welfare overall.

6(c)

Sugary drinks are a demerit good: a good that is over-consumed in a free market because consumers underestimate its harm to themselves and its consumption harms others. They are over-consumed for two main reasons, negative consumption externalities and information failure, both causes of market failure. First, consuming sugary drinks creates negative externalities: costs to third parties not reflected in the price. High sugar intake contributes to obesity, which the passage links to diabetes, heart disease and cancer. This raises costs for the NHS, paid by taxpayers, and reduces labour productivity through illness, with obesity expected to cost the UK economy £6bn a year by 2020 and cause 70 000 premature deaths. As Kate Smith of the IFS says, these are "wider costs to society that the consumer does not pay for". So the marginal social benefit (MSB) of consumption is less than the marginal private benefit (MPB): $MSB = MPB$ minus the marginal external cost.



Rational consumers only consider their own private benefit and the price they pay. As the diagram shows, the free market equilibrium is where $D = MPB$ meets supply, at P_1 and Q_1 , but the socially optimal output is where $MSB = MSC$, at Q_2 . Since Q_1 is greater than Q_2 , sugary drinks are over-consumed: each litre between Q_2 and Q_1 has a social cost greater than its social benefit, giving the shaded welfare loss. Resources are misallocated and allocative efficiency is not achieved.

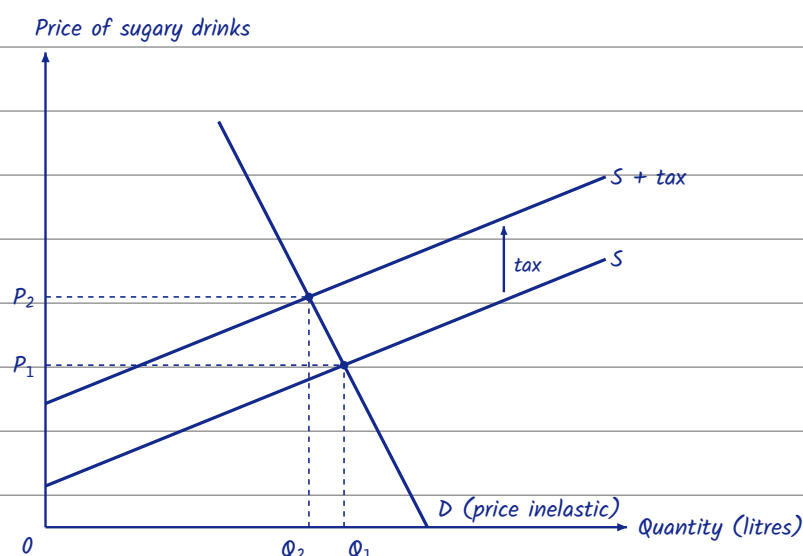
Second, there is information failure. Consumers may not be fully aware of the private costs of sugary drinks, such as their high sugar content (over 8 g per 100 ml in many drinks) and the higher risk of obesity and illness. Even if they know, many discount these costs because they occur in the future, while the benefits (taste, an energy boost) are immediate. Habit, addiction to sugar and persuasive advertising by soft drinks firms raise perceived MPB further, so demand is higher than it would be with perfect information. Fig. 1 suggests the problem is greatest in deprived groups, who may have less access to information about healthy diets.

So without intervention consumption is above the socially optimal level, which is why the government wants a tax that internalises the external cost.

6(d)

Taxation here means the sugary drinks levy of 18p to 24p per litre. AJ McCann argues that a range of alternative policies, used together, would be more effective in reducing obesity.

There are reasons to doubt the tax. McCann says demand for sugary drinks is relatively price inelastic, as they are habit forming and have few close substitutes for many consumers. As the diagram shows, with inelastic demand the tax raises the price from P_1 to P_2 by almost the full tax, but quantity falls only slightly, from Q_1 to Q_2 , so the tax mainly raises revenue (£500 million) rather than changing behaviour.



Coca-Cola also argues that sugary drinks are only a small proportion (about 5%) of an individual's calorie intake, so even a large fall in consumption may do little to reduce obesity, and consumers may switch to other, less healthy products such as sweets to get their sugar fix. The tax is also regressive: low income households spend a larger proportion of their income on sugary drinks, so it widens inequality, and it may add slightly to inflation.

On the other hand, there is evidence that the tax works. In Mexico sales of sugary drinks fell by 12% in the first year and sales of bottled water rose by 4%, suggesting demand is more elastic than McCann claims, especially among poorer households who are most price sensitive and, as Fig. 1 shows, most likely to be obese. The tax internalises the external cost, encourages firms to

reformulate drinks below the 5 g and 8 g thresholds, is cheap to administer as it is collected from a few producers, and its revenue is earmarked for school sports and breakfast clubs, which directly tackle obesity and offset its regressive effect.

The alternatives have strengths and weaknesses. Education campaigns on healthy diet and exercise tackle information failure at its root and change preferences in the long run, shifting demand for unhealthy food to the left, but they are costly, take years to work and may be ignored. Subsidising healthy food such as fruit and vegetables, or gym membership and sports clubs, lowers their price and encourages substitution, but has a large opportunity cost (the money could fund the NHS), high administration costs, and much goes to people who would have bought them anyway. Providing healthy meals in schools targets children early but is expensive. Regulation, such as restrictions on the sale of fatty, salty or sugary foods, portion limits, or bans on advertising unhealthy food to children, can change behaviour directly, but brings policing costs for the government, compliance costs for firms, the risk of regulatory capture by large food companies, and less consumer choice.

In conclusion, McCann is right that obesity has many causes (diet, lack of exercise, poverty), so no single policy will solve it. But he is wrong to dismiss taxation: its effectiveness depends on the price elasticity of demand, the size of the tax and the time scale, as demand becomes more elastic over time as habits change and firms reformulate. All the alternatives cost the government money, while the tax raises it. The most effective approach is therefore a combination, with the sugar tax funding education, school sport and healthy food subsidies, alongside advertising restrictions. The other measures are more effective with taxation than instead of it.

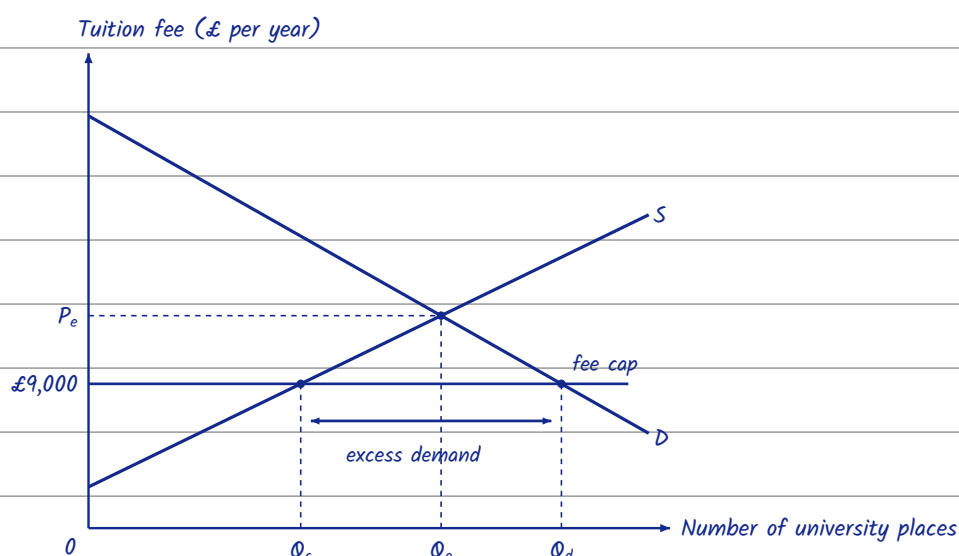
8

I have answered question 8.

At present tuition fees in the UK are capped at £9,000 per year, which acts as a maximum price set below the market equilibrium for many universities. Allowing

universities to set their own fees means removing the cap and letting the price mechanism determine fees for each course.

As the diagram shows, if the equilibrium fee P_e is above the £9,000 cap, the demand for places Q_d is greater than the number of places universities are willing to supply Q_s , so there is excess demand and places are rationed by entry grades. If universities are free to set fees, the fee rises to P_e and the number of places increases from Q_s to Q_e , clearing the market.



There are strong arguments for this. The people who gain most from university are the students themselves, who are likely to secure highly paid jobs: a typical graduate is estimated to earn over £200,000 more over their lifetime than a non-graduate (the graduate premium). On the benefit principle, they should contribute most to the cost. Even at higher fees, the fee often covers only part of the full cost of a place (especially for science and medicine), so education will still be subsidised by the state. As student numbers have increased dramatically, it would be almost impossible for the government to fully fund universities adequately, and every pound spent has an opportunity cost in health or schools.

Higher fees give universities the revenue to invest in new facilities and research and to attract the best staff, as they claim, raising the quality of teaching.

Introducing a market in higher education creates competition: universities must offer value for money to attract students, and price signals reward successful

courses, increasing productive and allocative efficiency. Students paying more may also value their course more and work harder, reducing drop-out rates.

However, there are strong arguments against. Higher education is a merit good which confers positive externalities on society: a more skilled and productive workforce, higher tax revenue, research and innovation, and better health and lower crime. As the marginal social benefit exceeds the marginal private benefit, leaving fees to the market would lead to under-consumption, so others in society should pay something towards the cost. There is also information failure:

17-year-olds may underestimate the long-term benefits of a degree.

Fees above £9,000 and the debt that follows, which could exceed £30,000, may deter students from low-income families, who are more debt averse. This would reduce social mobility and widen the gap between rich and poor. Students may be forced into low paid part-time jobs to fund their studies, leading to under-achievement and lower future earnings, and drop-out rates could rise as students struggle to cope. The graduate premium is also overstated, as it varies widely by subject and university, and many graduates earn less than non-graduates. If fees reflect expected earnings, fewer students may choose arts degrees or courses leading to lower paid but socially valuable jobs such as teaching and nursing, causing skills shortages.

Furthermore, top universities have significant market power, as demand for places at them is price inelastic, so they could raise fees well above cost and earn high revenues without improving quality, creating a two-tier system in which the best universities are only affordable to the rich. Finally, the total cost to the government of paying fees is relatively small compared with spending on health, welfare or pensions, and because student loans are only repaid above an income threshold, much unpaid debt is eventually written off by the taxpayer anyway.

In conclusion, whether universities should be free to set their own fees depends on several factors: the price elasticity of demand for each course and university, the student finance system (income contingent loans and generous bursaries reduce the deterrent effect on poorer students), the size of the positive

externalities, and the time scale, as the effects on access and skills only appear in the long run. On balance, complete freedom is not desirable, because of the merit good nature of education, the risk to equality of opportunity and the market power of top universities. A better approach is the one proposed: allowing high-performing universities to raise fees above £9,000 within a limit linked to teaching quality, with a requirement to spend part of the extra revenue on bursaries and widening access. This raises funding and quality while protecting access for poorer students.