



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Economics

Assessment Unit AS 1
assessing
Markets and Market Failure



SEC11

[SEC11]
TUESDAY 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 Sections **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 shows the weekly production possibilities for a firm which produces just two products: washing machines and dishwashers. The firm currently has 22 employees, each of whom assembles the products from components purchased from a range of suppliers.

Washing machines	Dishwashers
245	0
210	75
185	130
150	170
100	200
50	225
0	235

- (a) With reference to the table above, calculate the opportunity cost to the firm of increasing the production of dishwashers from 130 per week to 170 per week. [2]
- (b) With the aid of an appropriate diagram, explain the likely impact on these production possibilities if the firm implemented a system of specialisation and the division of labour. [4]

- 2 A Belfast restaurant has seen its trade double since the introduction of an “all you can eat buffet”, where customers can refill their plates as often as they like for a fixed price of £7.99.

With reference to the example above, explain the term diminishing marginal utility. [3]

- 3 The table below shows the estimated ticket sales for a music concert at a range of ticket prices. The concert is scheduled to take place in the Waterfront Hall, which has a maximum capacity of 2250.

Ticket price (£)	Estimated sales
85	895
80	1260
75	1980
70	2250
65	2890
60	3450

(a) Calculate the total revenue the concert promoter will earn at the equilibrium price. [2]

(b) Calculate the price elasticity of demand for this concert when the price increases from £60 to £65. [4]

- 4 Figures published by the Institute of Public Policy Research show the impact of obtaining residential planning permission on land prices. Agricultural land in the UK sells for an average price of £20,000 per hectare, whereas land with residential planning permission sells for £1.87 million per hectare.

With reference to the statement above, explain the terms economic rent and transfer earnings. [4]

- 5 High street sandwich chain Subway has announced that it is to start charging customers more for toasting their sandwiches to reflect the fact that hot food attracts 20% VAT while cold food does not.

With the aid of an appropriate diagram, analyse the likely impact on consumer surplus of the imposition of VAT on toasted sandwiches. [6]

Section B: Data response

Answer all questions (35 marks)

The following passage was written in August 2017. Read it carefully and answer the questions which follow.

6 Demand for electric cars soars

Demand for electric and plug-in hybrid cars is growing at an exponential rate according to the Society of Motor Manufacturers and Traders (SMMT). Figures released by the SMMT today (August 2017) show that, while the UK auto market as a whole has grown by 6.3% over the last 12 months, demand for pure electric vehicles rose by 48%, while the demand for plug-in hybrids rose by a staggering 133%! 1

These impressive growth figures are not confined to the UK; the global trend shows a very similar story. Sales of electric vehicles are booming right across the EU and are really beginning to take off in the US and China, with Morgan Stanley predicting that electric vehicles will make up around 60% of all vehicles sold around the world by 2040. 2

This increased demand for electric vehicles is having significant impacts on a wide range of other markets, not least on the market for commodities used in the production of electric batteries such as lithium. **Fig. 1** below shows the trend in lithium prices since 2002, with some predicting that lithium prices could double over the next five years. 3

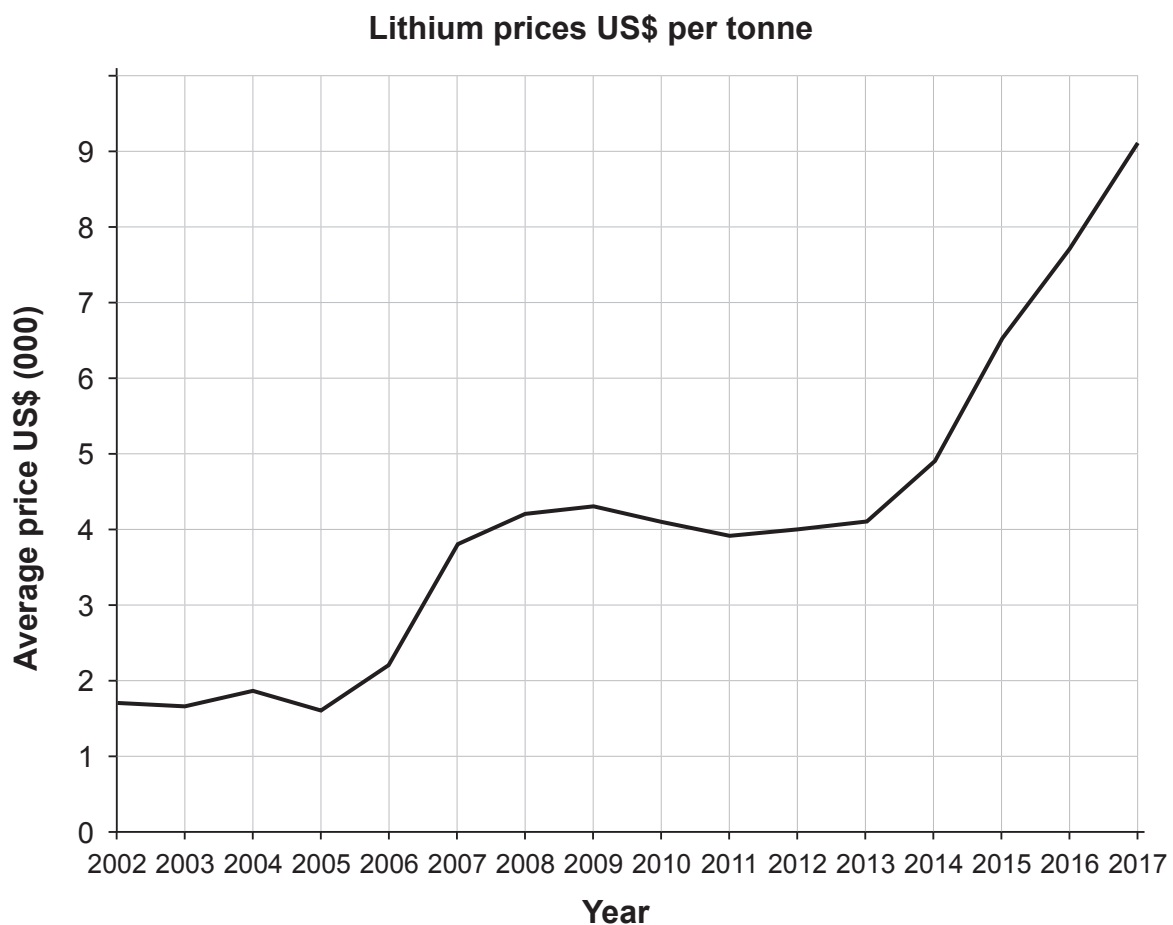


Fig. 1

Not everyone is convinced, however, that lithium prices will reach such dizzy heights. Commodity trader Leo Toner claims that lithium prices are nearing their peak. "Lithium prices have really taken off in the last five years as demand has outstripped supply," he said. "However, recent investment in infrastructure and capacity by the world's biggest mining corporations means that supply will be much more elastic in the long-run. As a result I expect prices to peak around the middle of 2018 before falling back to more normal levels as supply catches up with demand."

4

While the move towards electric and plug-in hybrid vehicles is widely considered to be a positive move from an environmental perspective, concerns have been raised that the environmental benefits have been overstated. Free market commentator Steven Huston stated, "Governments around the world have been providing incentives, both financial and otherwise, to encourage drivers to dump their combustion engines in favour of electric cars in the mistaken belief that they are better for the environment. What these interfering politicians fail to realise is that these cars run on electricity generated by burning fossil fuels, while their batteries contain huge amounts of lithium, cobalt and copper which must be mined from the earth's surface. Surely most people accept now that government intervention in markets causes greater problems than it solves. Remember it was only 10 years ago that the government were providing incentives to get us to switch to diesel cars as they were supposed to be cleaner than petrol cars. Now they are deemed so environmentally damaging that they plan to ban them completely by 2040!"

5

- (a) Using the information in **Fig. 1**, describe the trend in lithium prices between 2002 and 2017. [4]
- (b) Explain why lithium supply is likely to be more price elastic in the long-run than in the short-run (paragraph 4). [6]
- (c) With the aid of diagrams where appropriate, analyse the likely impact of the increased demand for electric vehicles on other markets. [10]
- (d) Critically examine the view expressed in paragraph 5 that government intervention in markets causes greater problems than it solves. [15]

Section C: Essay section

Answer one question (20 marks)

- 7 In 2017, the UK was one of the most unequal economies in the EU in terms of both income and wealth distribution according to a report by an EU think tank. The report stated that the UK had the highest income inequality in the EU and was fifth highest in terms of wealth inequality. Trade unionists used the report to call on the government to take decisive action to reduce both income and wealth inequality.

Critically examine some of the policies the UK government could implement to reduce both income and wealth inequality. [20]

- 8 German supermarket Lidl has announced a new plan for sales growth. The company plans to redesign its stores and raise prices. Retail analysts have backed the plan and claim that the higher prices are likely to lead to an increase in sales rather than a fall. They argue that the higher prices will change the negative perception some people have of the brand and hence will attract consumers who would not previously have shopped there.

Critically examine the view that the demand curve for some products is just as likely to slope upwards as downwards. [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

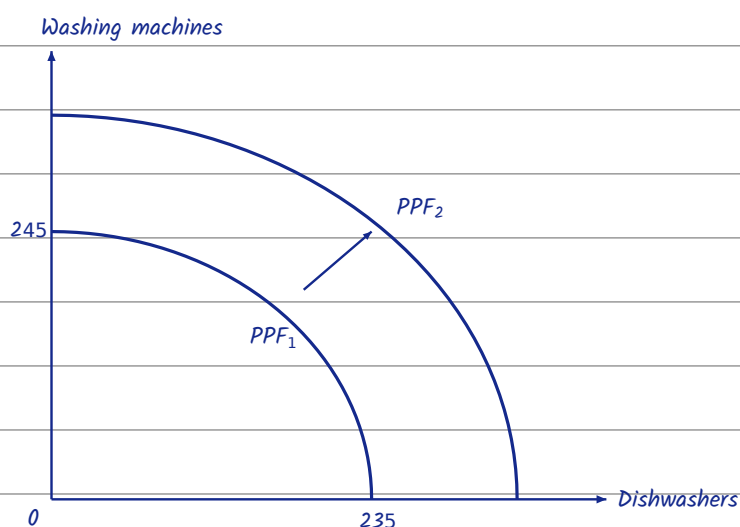
1(a)

Increasing dishwashers from 130 to 170 (+40) means washing machine output falls from 185 to 150.

Opportunity cost = $185 - 150 = 35$ washing machines per week (0.875 washing machines per extra dishwasher).

1(b)

Specialisation and the division of labour occur when the production process is broken down into a number of separate tasks and each of the 22 workers is assigned to one specific task, e.g. fitting drums or wiring control panels, rather than assembling a whole machine.



Workers become more skilled through repetition, no time is lost moving between tasks and tools can be specialised, so labour productivity rises. With the same 22 employees the firm can now produce more of both products, e.g. more than 245 washing machines or 235 dishwashers per week, so the PPF shifts outwards to the right from PPF_1 to PPF_2 , as shown in the diagram.

2

Marginal utility is the additional satisfaction a consumer gains from consuming one more unit of a good. The law of diminishing marginal utility states that, as successive units of a good are consumed, the marginal utility from each extra unit will eventually fall.

At the £7.99 buffet a hungry customer gains a lot of satisfaction from the first plate, less from the second and even less from the third, as they become full.

They stop refilling when the marginal utility of another plate falls to zero, since the extra plate costs them nothing.

3(a)

Equilibrium price = £70, where estimated sales equal the hall capacity of 2250 (quantity demanded = quantity supplied).

$$TR = P \times Q = £70 \times 2250 = £157,500.$$

3(b)

$$\% \text{ change in } Q_d = (2890 - 3450) \div 3450 \times 100 = -560 \div 3450 \times 100 = -16.23\%$$

$$\% \text{ change in } P = (65 - 60) \div 60 \times 100 = 5 \div 60 \times 100 = +8.33\%$$

$$PED = \% \text{ change in } Q_d \div \% \text{ change in } P = -16.23 \div 8.33 = -1.95$$

Demand is price elastic, since the PED is greater than 1 (ignoring the sign).

4

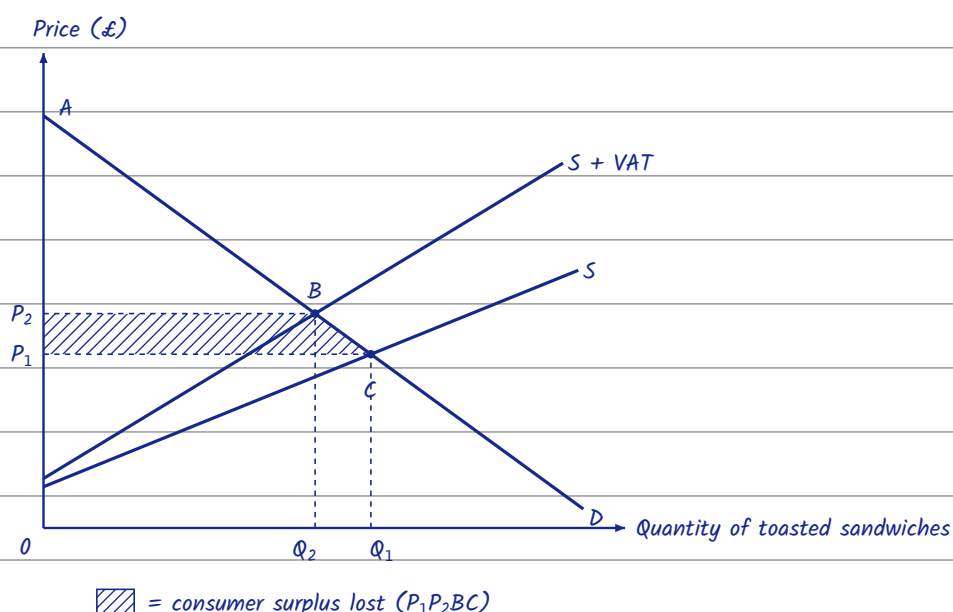
Transfer earnings are the minimum payment needed to keep a factor of production in its current use, i.e. what it could earn in its next best alternative use. Economic rent is any payment to a factor over and above its transfer earnings.

A hectare of land with residential planning permission could earn £20,000 in its next best use as agricultural land, so its transfer earnings are £20,000. Economic rent = £1,870,000 - £20,000 = £1,850,000 (£1.85 million) per hectare.

5

Consumer surplus is the difference between the maximum price a consumer is willing to pay for a good and the price they actually pay. It is the area below

the demand curve and above the market price.



As the diagram shows, before VAT the market for toasted sandwiches is in equilibrium at price P_1 and quantity Q_1 , and consumer surplus is the triangle ACP_1 . VAT at 20% is an ad valorem indirect tax, which increases Subway's costs per sandwich, so the supply curve shifts to the left from S to $S + VAT$. Because the tax is a percentage of the price, the gap between the curves widens at higher prices, so the new supply curve is steeper.

At the old price there is now excess demand, so the price rises to P_2 and quantity demanded contracts to Q_2 . Consumer surplus falls from ACP_1 to ABP_2 , a loss of the shaded area P_1P_2BC . Part of this loss (the rectangle P_1P_2B up to Q_2) is paid on the sandwiches still bought, partly as tax revenue to the government, while the triangle between Q_2 and Q_1 is lost entirely because some customers no longer buy toasted sandwiches, a deadweight loss.

The size of the fall depends on the price elasticity of demand. Cold sandwiches are a close substitute, so demand for toasting is fairly price elastic: Subway cannot pass on much of the tax, the price rises only a little and many customers switch to cold sandwiches. The consumers who keep buying toasted sandwiches, who value them most, bear most of the loss of surplus.

6(a)

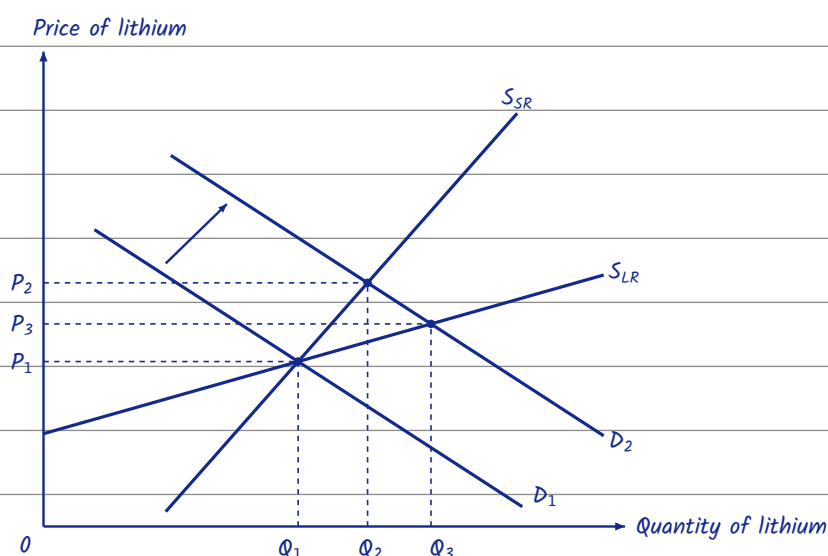
Overall lithium prices rose sharply, from about \$1,700 per tonne in 2002 to about \$9,100 per tonne in 2017, an increase of $(9,100 - 1,700) \div 1,700 \times 100 = 435\%$.

Prices were fairly stable from 2002 to 2005 at between \$1,600 and \$1,850 per tonne. They then rose quickly to about \$4,300 in 2009 (2.7 times the 2005 price), fell slightly in 2010 and 2011 to about \$3,900, and were stable to 2013. From 2014 they rose rapidly, by about 122% from \$4,100 in 2013 to \$9,100 in 2017.

6(b)

Price elasticity of supply (PES) measures the responsiveness of quantity supplied to a change in price: $PES = \% \text{ change in quantity supplied} \div \% \text{ change in price}$. Supply is price elastic if $PES > 1$ and inelastic if $PES < 1$.

In the short run lithium supply is price inelastic. Extracting lithium needs specialised and expensive machinery, mines and processing plants, and at least one factor of production is fixed. Mines may already be working close to full capacity with few stocks, so when demand from battery makers rises, miners can only increase output a little, for example by extra shifts. Firms are also unwilling to invest heavily on the basis of a price rise that may only be temporary.



In the long run all factors are variable. If prices stay high, as they have since 2005, firms expect them to remain high and invest in new mines, machinery and

infrastructure, and new firms enter the market attracted by higher profits.

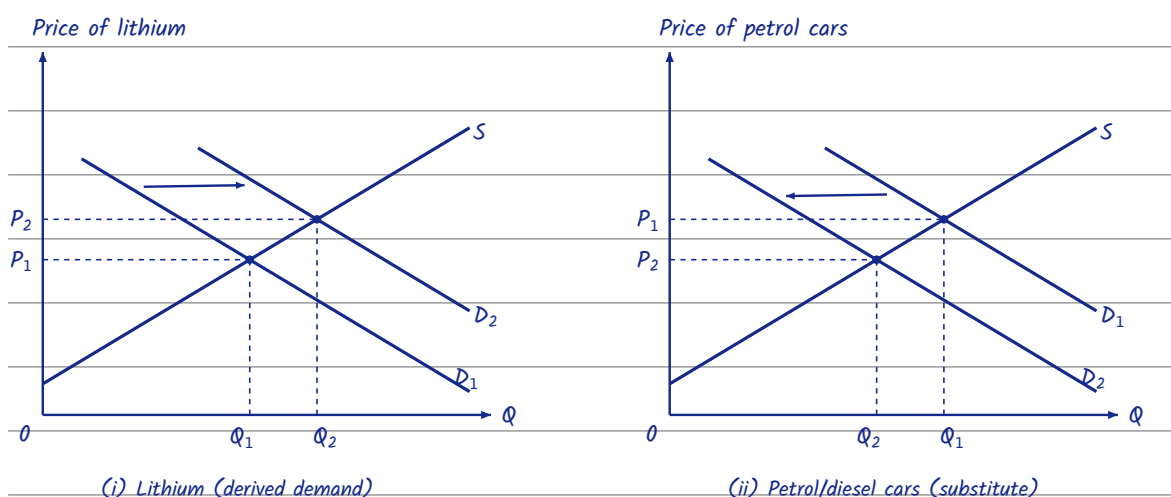
Paragraph 4 says the world's biggest mining corporations have recently invested in capacity. This investment takes several years to become fully operational, but once it does, quantity supplied can rise by much more for any price rise. As the diagram shows, an increase in demand from D_1 to D_2 raises the price to P_2 along the steep short-run supply curve S_{SR} , but along the flatter long-run curve S_{LR} output rises to Q_3 and the price only rises to P_3 . This is why Leo Toner expects prices to peak in 2018 and then fall back as supply catches up with demand.

6(c)

Markets are interrelated, so an increase in demand for electric vehicles (EVs), up 48% for pure electric cars in the UK (paragraph 1), affects several other markets, depending on whether the goods are substitutes, complements or factor inputs.

First, the demand for factors of production used to make EVs is a derived demand. Each battery contains large amounts of lithium, cobalt and copper, so as EV output rises, demand for lithium increases from D_1 to D_2 in diagram (i). At P_1 there is now excess demand, so the price is bid up to P_2 and quantity rises from Q_1 to Q_2 . Fig. 1 shows the lithium price rising from about \$4,100 in 2013 to \$9,100 per tonne in 2017, and some predict it could double again in five years. Because short-run supply is inelastic, most of the effect is on price. The higher price signals miners to expand output, so resources are reallocated to mining.

The rising lithium price then affects other markets that use lithium, cobalt and copper, such as mobile phone and laptop batteries and electricity cables. Their costs of production rise, so their supply curves shift left, raising their prices and reducing their output.



Second, petrol and diesel cars are substitutes for EVs, with a positive cross price elasticity of demand (XED). As EVs become cheaper, more attractive and supported by government incentives, demand for petrol and diesel cars falls from D_1 to D_2 in diagram (ii), so their price falls from P_1 to P_2 and quantity from Q_1 to Q_2 . This also lowers demand for petrol and diesel fuel, which is a complement to these cars, so oil companies and filling stations lose revenue.

Third, electricity and charging points are complements to EVs, with a negative XED. As more EVs are bought, demand for electricity and for home and public charging points increases, raising prices and encouraging investment in charging infrastructure and generating capacity. This could put strain on the electricity market and, if more fossil fuels are burned to meet demand, increase pollution. The size of these effects depends on how strong the XED is, the elasticity of supply in each market and how fast EV demand grows: Morgan Stanley predicts 60% of global car sales by 2040, so the long-run effects are likely to be large.

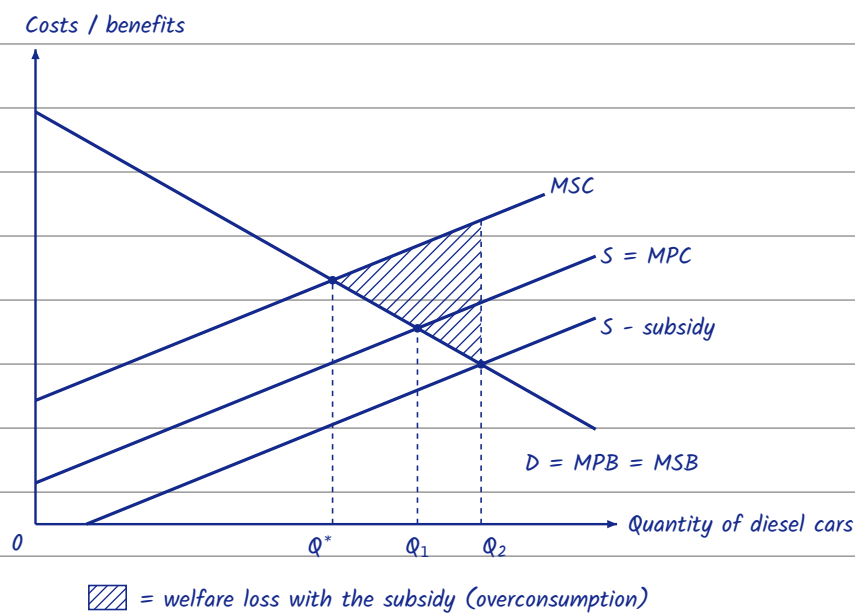
6(d)

Governments intervene in markets to correct market failure, such as the negative externalities of pollution from cars, using taxes, subsidies, regulation and bans.

Government failure occurs when such intervention leads to a less efficient allocation of resources, i.e. a net loss of economic welfare, compared with the free market. Steven Huston argues that this is usually the case.

There is evidence to support his view. The main cause is information failure: governments rarely have accurate information about the size of external costs and

benefits. Paragraph 5 says that ten years ago the government gave incentives, such as lower vehicle excise duty, to switch to diesel cars because they emit less CO_2 , but diesel cars emit harmful nitrogen oxides and particulates. As the diagram shows, the true MSC of diesel cars lay above MPC, so the free market quantity Q_1 was already above the optimum Q^* . The subsidy shifted supply to $S - \text{subsidy}$ and raised output to Q_2 , increasing the welfare loss (shaded) instead of reducing it. Now diesel cars are to be banned completely by 2040.



Intervention can also cause unintended consequences and distort other markets. Subsidies for EVs may simply shift pollution to power stations if the electricity is generated by burning fossil fuels, and increase environmental damage from mining lithium, cobalt and copper, while driving up their prices for other users. EV incentives also mainly benefit better-off households who can afford new cars, which is inequitable, and they have an opportunity cost: the money could be spent on health or education. Other causes of government failure include high administration and enforcement costs, which may exceed the benefits gained, conflicting objectives, and political self-interest, where politicians choose popular short-term policies to win votes rather than the efficient ones. However, there are strong arguments against Huston's view. Without intervention the market would fail, because drivers ignore the external costs of their exhaust emissions, so petrol and diesel cars are overconsumed and air pollution and

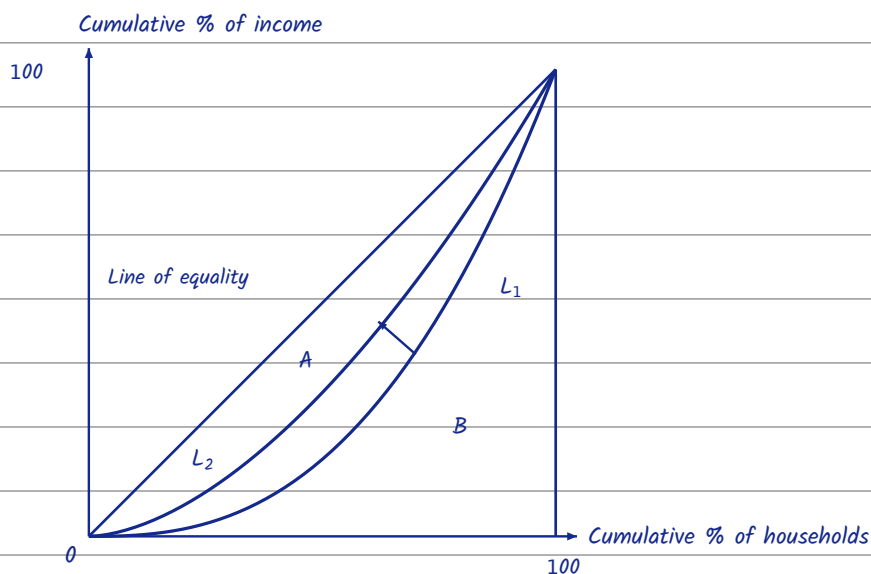
climate change worsen. Incentives for EVs correct this by internalising the externality and helping to overcome information failure, as consumers may not realise the long-run running cost savings. There are many successful examples of intervention: the ban on leaded petrol, the 5p plastic bag charge, which cut bag use by over 80%, and taxes on tobacco have all improved welfare. Although EVs use electricity, the share generated from renewables is rising, so their lifetime emissions are generally lower than combustion cars. The diesel example also shows that governments learn and change policy when new information emerges, as with the planned 2040 ban.

In conclusion, the view that intervention causes greater problems than it solves is too strong. Whether it does depends on the quality of the government's information, the type of policy used (a tax set at the size of the externality is better targeted than a subsidy for a particular technology), the administration costs, and the time scale, since benefits such as lower carbon emissions may only appear in the long run. The diesel example is a clear case of government failure, but the market failure from car pollution is large, so the answer is not to abandon intervention but to base it on better evidence, keep it under review and target the externality itself. Huston is a free market commentator, so his view may be biased. On balance, well designed intervention usually solves more problems than it creates.

7

Income is a flow of money received over a period of time, such as wages, interest, rent, profit and state benefits. Wealth is a stock of assets owned at a point in time, such as property, shares, savings and pension funds. Wealth inequality is usually much greater than income inequality, since wealth generates income (rent, dividends) and can be passed on through inheritance. Inequality can be shown by a Lorenz curve: the further the curve is from the line of equality, the greater the inequality, and the Gini coefficient measures it as $\text{area } A \div (A + B)$, from 0 (perfect equality) to 1. According to the report the UK had the highest income inequality in the EU and the fifth highest wealth inequality, so

its Lorenz curve is far from the line of equality, like L_1 . Effective policies would shift it towards L_2 .



First, the government could make the tax system more progressive, so higher earners pay a larger proportion of their income in tax. Raising the higher (40%) and additional (45%) rates of income tax reduces the post-tax income of top earners, and the revenue can be redistributed to the poorest through benefits and public services, narrowing the gap. However, high marginal tax rates reduce the incentive to work, take risks and invest, and lead to tax avoidance and evasion, or skilled workers and firms moving abroad, so the extra revenue may be smaller than expected (Laffer curve). Alternatively the tax-free personal allowance could be raised, taking low earners out of income tax and reducing the poverty trap, encouraging people into work. But this is expensive and also benefits high earners, so it is poorly targeted.

Second, the benefit system can be changed. Switching from universal benefits towards more means-tested benefits targets the money at those who need it most and saves the government money. However, means testing has high administration costs, low take-up because of stigma, and creates a poverty trap, since benefits are withdrawn as income rises, giving very high effective marginal tax rates. Linking benefits to average earnings rather than prices would stop benefit claimants falling further behind those in work, but would add significantly

to government spending and the opportunity cost is large.

Third, the government can raise the incomes of the lowest paid directly.

Increasing the National Minimum Wage, or encouraging firms to pay the real living wage, raises the incomes of the low paid and improves the incentive to find work. However, if it is set above the equilibrium wage, firms may demand less labour, so unemployment rises among the low skilled and young, who then have no earned income, making inequality worse. It may also raise costs and prices, adding to inflation. Its impact depends on how high it is set and on the elasticity of demand for labour. Expanding employment schemes such as Steps to Work in NI and regional policy to attract firms to areas of high unemployment would increase incomes of the unemployed, but do little for those already in low paid jobs, and firms may only "brass plate" to collect grants. In the long run, spending on education and training raises the skills and productivity of the poor, increasing their earning power, but this takes many years.

Wealth inequality needs different policies. The government could introduce an annual wealth tax on the total value of individuals' assets above a threshold. This directly reduces the stock of wealth of the richest. However, assets such as property, art and businesses are hard to value every year, so it is costly to administer and easy to avoid by moving wealth abroad. It also hits the asset rich but income poor, such as pensioners in valuable homes. Similarly, making council tax (domestic rates in NI) more progressive with extra bands for high value homes, or lowering the £325,000 nil rate band of inheritance tax and adding higher bands, would reduce the passing on of wealth between generations. But inheritance tax is very unpopular and easily avoided with good tax planning, so it raises little revenue.

The government can also help the poor build wealth. Compulsory pension savings, such as auto-enrolment, help low earners build a stock of wealth, although it may increase relative poverty in the short run as they give up current income.

Expanding shared ownership schemes helps poorer households buy property, the main form of wealth. However, the right to buy scheme reduced the stock of

social housing and pushed up private rents, which actually increased inequality.

In conclusion, no single policy is enough, because income and wealth inequality

have different causes. The most effective approach is likely to be a combination:

a more progressive income tax with targeted means-tested benefits and a higher

minimum wage for income inequality, and reform of property and inheritance

taxes together with pension and home ownership schemes for wealth inequality.

The success of each depends on its effect on incentives, the cost and ease of

administration, political acceptability and the time scale: tax and benefit changes

work quickly, while education and asset building only reduce inequality in the long

run. A degree of inequality also provides incentives to work and invest, so the aim

should be to reduce rather than eliminate it, without harming economic growth.