



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education

Economics

Assessment Unit AS 1
assessing
Markets and Market Failure



SEC11

[SEC11] Assessment

TIME

1 hour 30 minutes.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 **4(b)**, **5(b)**, **(c)** and **(d)**, **6** and **7**. Quantitative skills will be assessed where appropriate.

Section A (25 marks)

Answer all questions

- 1 In August 2017, car giant Skoda announced that it had manufactured and sold six million Octavia models in the 20 years since the car was launched. The Octavia model has long been a favourite of the nation's taxi drivers as well as being popular with families because of its space and reliability.

With reference to the passage above, explain how a Skoda Octavia could be described as both a consumer good and a capital good. [4]

- 2 The table below shows estimates for the share of total income and wealth by quintile group in the UK in 2017.

Quintile group	Percentage share of income	Percentage share of wealth
1	5	0
2	11	4
3	16	12
4	22	22
5	46	62

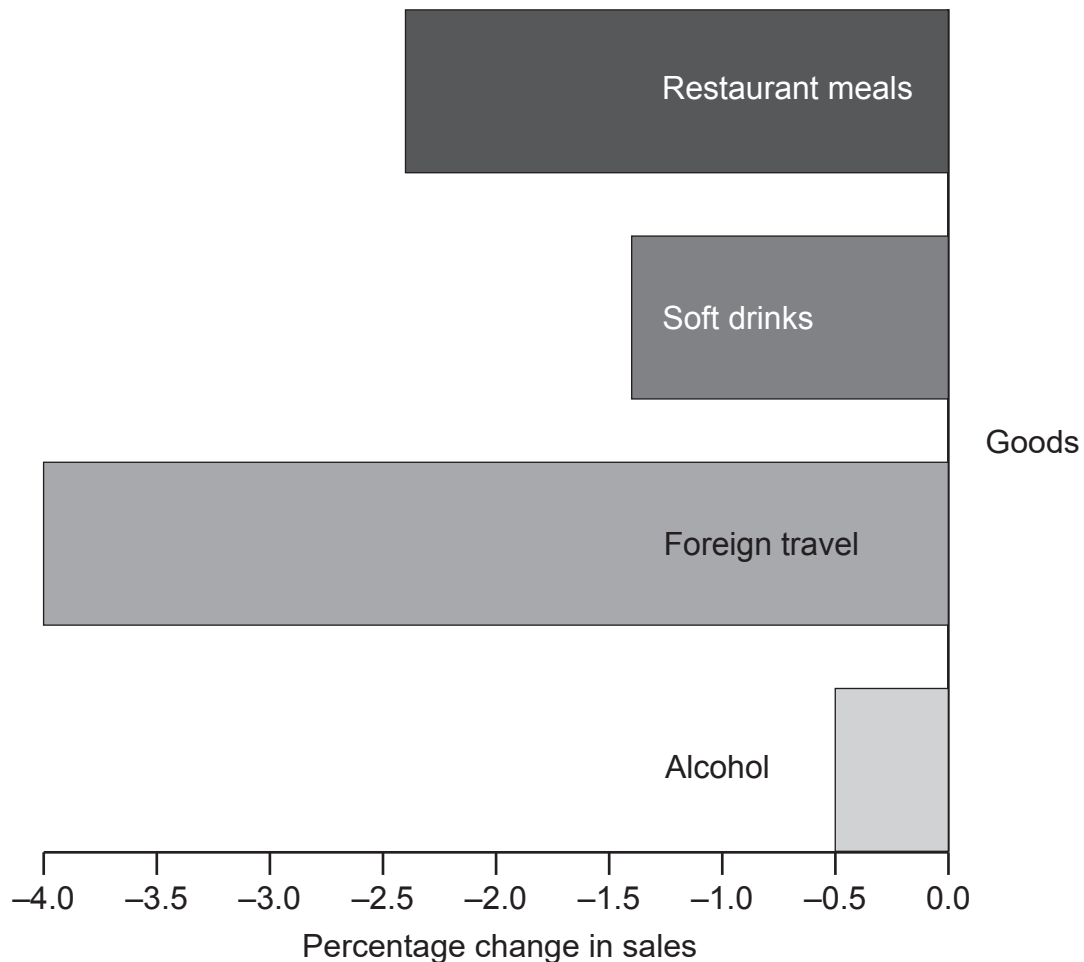
- (a) With the aid of appropriate examples, explain the difference between income and wealth. [4]
- (b) Using the information in the table above, compare the distribution of income with the distribution of wealth in the UK in 2017. [4]

- 3 Economists have discovered that consumers often take more time and trouble trying to save £5 on a £25 jumper than they take trying to save £5 on a £500 leather jacket.

With reference to the passage above, explain why consumers can sometimes act irrationally.

[4]

- 4 The chart below shows the estimated change in sales associated with a 5% increase in price for selected categories of goods.



- (a) Using the information in the chart above, calculate the price elasticity of demand for restaurant meals. [3]
- (b) With the aid of an appropriate diagram, analyse how, all other things being equal, the burden of a specific tax on alcohol is likely to be split between the producer and the consumer. [6]

Section B (35 marks)

Answer all questions

The following passage was written in August 2018. Read it carefully and answer the questions which follow.

5 “Fat-cat” pay on the rise

A report published by the High Pay Centre has noted that pay for chief executive officers (CEOs) at Britain’s biggest listed companies rose more than six times faster than wages in the wider workforce last year, as the average boss’s pay packet hit a staggering £3.9 million!

The average pay of chief executive officers in UK companies surged 11% on a median basis in 2017, while average worker earnings failed to keep pace with inflation, rising just 1.7% over the course of the year. This means that a worker on a median salary of £23,474 would have to work 167 years to earn the median annual pay of the average CEO.

The chart below shows how the pay of CEOs has soared since 2000 compared to the average pay of a full-time worker.

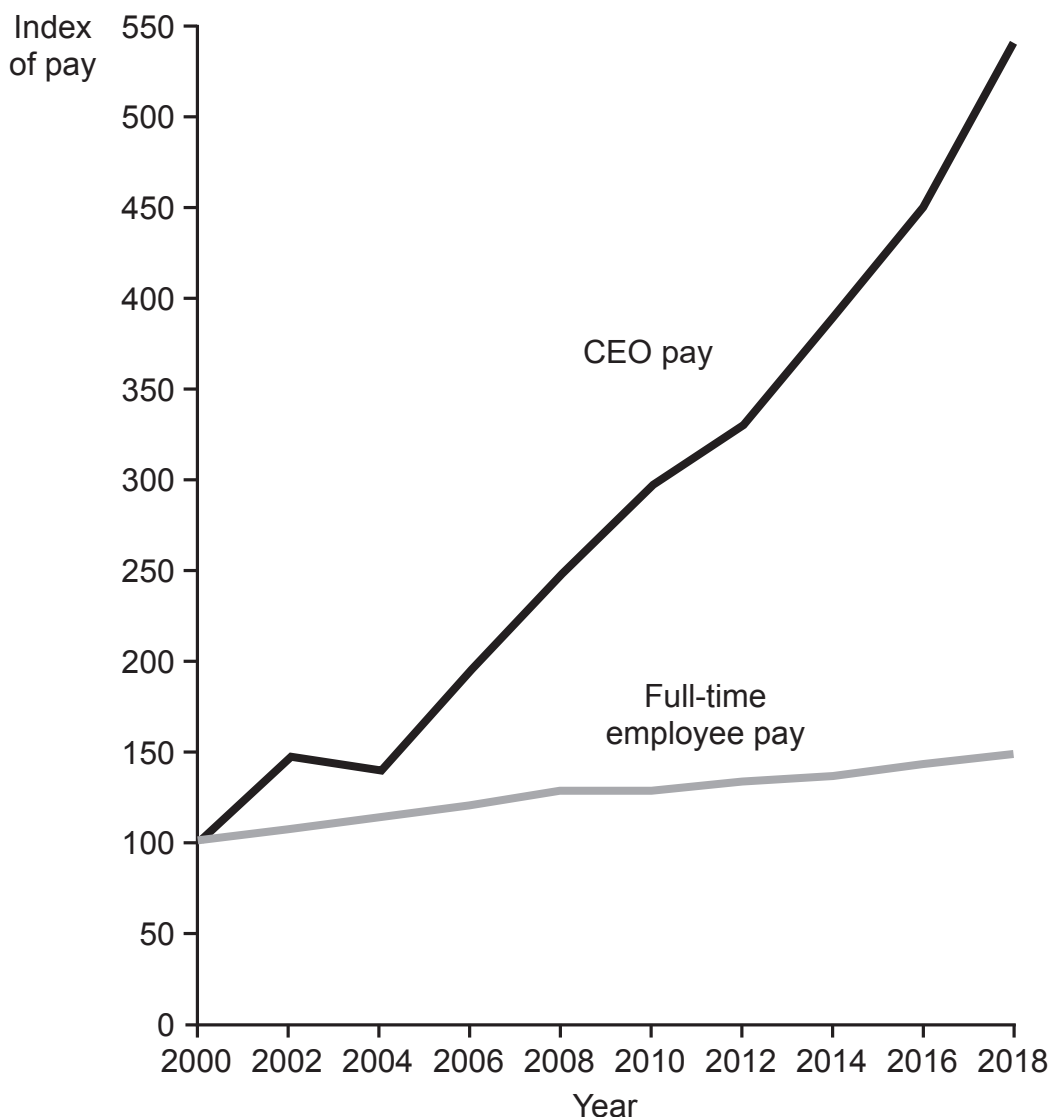


Fig. 1: Chief executive officer pay and full-time employee pay UK 2000–2018 (2000 = 100)

Responding to the report, Damien Savage, employment expert, stated that “it is right that those who work hard, generate wealth and create jobs are rewarded appropriately. Having a skill that is in short supply but in high demand has always been well rewarded in the marketplace. In recent years this marketplace has become genuinely global, so it is not surprising that the rewards to those at the top have increased”.

However, not everyone sees this widening pay gap as either inevitable or beneficial. Prime Minister Theresa May stated that “there is an irrational, unhealthy and growing gap between what these companies pay their workers and what they pay their bosses”.

The widening gap in pay has prompted some to call for the introduction of maximum pay legislation which would limit the pay of CEOs to some multiple of average pay. Michael Williams, of the Fair Pay Institute, stated that “20 years ago we introduced a National Minimum Wage, and contrary to the predictions of those on the political right, it has proven to be a huge success. Surely now is the time to introduce a National Maximum Wage”.

Damien Savage, however, has cautioned against any moves to regulate executive pay, claiming that maximum wages are the least effective policy for reducing pay inequality. “Introducing executive pay restrictions in the UK that are not matched by other countries will simply drive the best talent out of the UK in search of greater returns elsewhere. If the Prime Minister is so concerned about the pay gap, she would be better focusing on alternative policies such as increasing the pay of those at the bottom rather than penalising those who generate huge profits for shareholders, not to mention tax revenues for governments.”

- (a) Using the information in **Fig. 1**, compare the growth in CEO pay with that of the average full-time employee between 2000 and 2018. [5]
- (b) With the aid of an appropriate diagram, analyse how free market economists would explain the wage differentials between company bosses and the average full-time employee. [6]
- (c) Analyse the likely impact of a maximum wage on the economic rent of CEOs. [9]
- (d) Critically examine the view that a maximum wage is the least effective policy that the government could introduce to reduce pay inequality in the UK. [15]

Section C (20 marks)

Answer one question

- 6** Dalradian Resources (a Canadian mining company) has plans to invest £750 million into a gold mine in County Tyrone. If approved, the mine would create up to 800 full-time jobs. However, local residents are concerned about the negative externalities associated with the use of cyanide to remove the gold from the ore.

Critically examine the range of policies the government could use to reduce the negative externalities associated with gold mining. [20]

- 7** Recent studies in Europe have attempted to measure the price elasticity of demand for cigarettes. The studies have estimated that it lies somewhere between -0.27 and -0.89 . Critics have questioned the figures and pointed out that they are so far apart as to make the estimates ineffective for any practical use.

Critically examine the view that attempts to estimate price elasticity of demand are a waste of time and effort. [20]

THIS IS THE END OF THE QUESTION PAPER

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Surname	<i>StemUp Model Solution</i>
Answer booklet	Write the question number in the left-hand margin at the start of each answer.

Question number	
1	<i>A consumer good is a good bought by households to satisfy their wants directly, for its own sake. A capital good is a man-made aid to production: a good used to produce other goods and services.</i> <i>When a family buys a Skoda Octavia for its space and reliability, to take the children to school or go on holiday, it satisfies their wants directly, so it is a consumer good. When a taxi driver buys an Octavia and uses it to provide journeys to paying passengers, it is being used to produce a service, so it is a capital good. The same car can be either, depending on how it is used.</i>
2(a)	<i>Income is a flow concept: the amount of money received by an individual or household over a period of time, for example wages and salaries from work (such as £25,000 a year), interest on savings, dividends from shares, rent from property and state benefits such as the state pension.</i> <i>Wealth is a stock concept: the value of the assets owned at a particular point in time, for example a house, shares, money in savings accounts, works of art and private pensions. Wealth can generate income (shares pay dividends, property pays rent) and income that is saved adds to wealth.</i>
2(b)	<i>Both income and wealth are unequally distributed in the UK, but wealth is far more unequally distributed than income.</i> <i>The top quintile (quintile 5) receives 46% of income, more than the bottom three quintiles combined ($5 + 11 + 16 = 32\%$), and over 9 times the share of the bottom quintile ($46 \div 5 = 9.2$).</i> <i>However, the top quintile owns 62% of wealth, more than the other four quintiles added together ($0 + 4 + 12 + 22 = 38\%$) and over 15 times the</i>

wealth of the bottom two quintiles combined ($62 \div 4 = 15.5$), while the bottom 20% own no wealth at all (0%) but still receive 5% of income.

3

Traditional theory assumes consumers are rational, weighing up marginal costs and benefits to maximise their utility. A rational consumer would see that a £5 saving is worth exactly the same in both cases, so would spend the same time and effort trying to obtain it.

Behavioural economists argue that rationality is bounded: limited information, limited cognitive ability to process it and limited time mean consumers use mental shortcuts (heuristics), which lead to cognitive biases. Here consumers judge the saving relative to the price (relative price bias): £5 is 20% off the £25 jumper ($5 \div 25 \times 100$) but only 1% off the £500 jacket ($5 \div 500 \times 100$), so the saving on the jacket seems not worth the effort, even though the absolute gain is identical.

4(a)

$PED = \% \text{ change in quantity demanded} \div \% \text{ change in price}$.

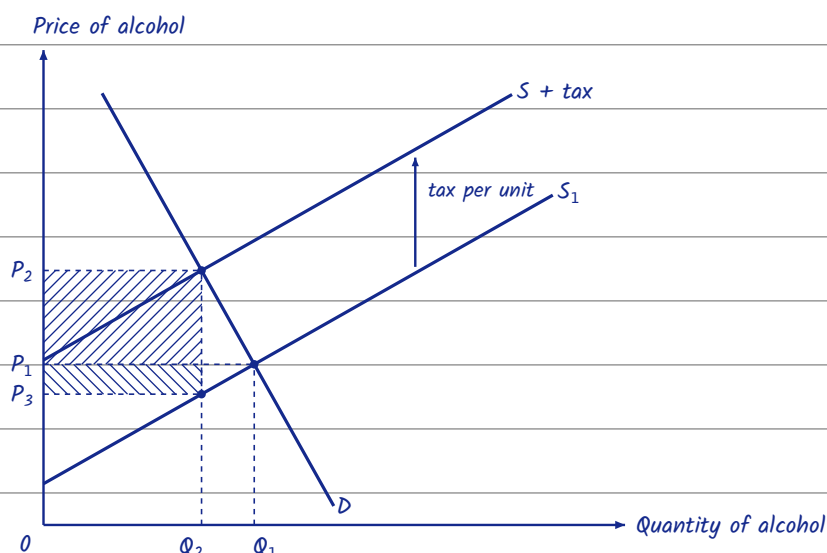
From the chart, a 5% rise in price leads to a 2.4% fall in sales of restaurant meals.

$PED = -2.4\% \div +5\% = -0.48$ (price inelastic).

4(b)

A specific tax is a fixed amount of tax per unit sold (e.g. £1 per litre), unlike an ad valorem tax, which is a percentage of the price. It is paid by producers, so it raises their costs by the amount of the tax at every output, shifting the supply curve vertically upwards (to the left) by the tax per unit, parallel to the original, from S_1 to $S + \text{tax}$.

From the chart, a 5% rise in price cuts alcohol sales by only 0.5%, so $PED = -0.5\% \div 5\% = -0.1$: demand is highly price inelastic, because alcohol is habit forming, even addictive, and has few close substitutes, so the demand curve is steep.



 = burden on consumer ($(P_2 - P_1) \times Q_2$)

 = burden on producer ($(P_1 - P_3) \times Q_2$)

As the diagram shows, before the tax the equilibrium is P_1, Q_1 . After the tax the price rises to P_2 and quantity falls only slightly, to Q_2 . The tax per unit is $P_2 - P_3$ and total tax revenue is $P_3 P_2 \times Q_2$. Consumers now pay P_2 instead of P_1 , so the consumer burden is $(P_2 - P_1) \times Q_2$. Producers receive P_2 but pass the tax to the government, keeping only P_3 , so the producer burden is $(P_1 - P_3) \times Q_2$. Because demand is so inelastic (-0.1), producers can pass most of the tax on in a higher price without losing many sales, as drinkers keep buying, so the consumer bears most of the burden and the producer only a small part. The more price elastic supply is relative to demand, the greater the share borne by the consumer.

5(a)

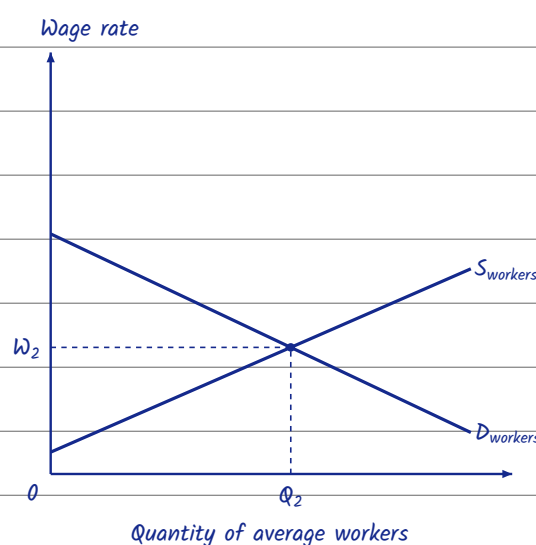
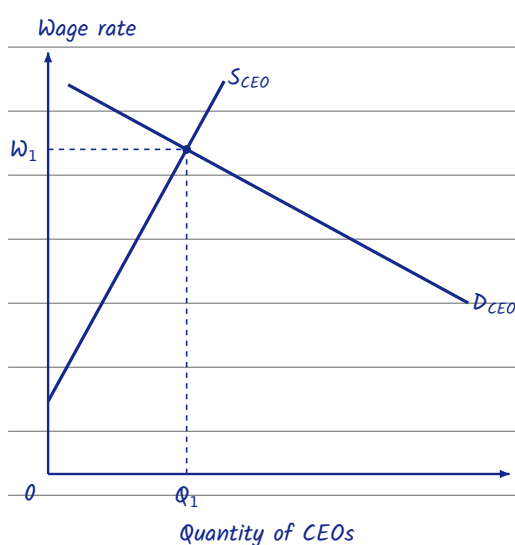
CEO pay grew much faster than the pay of the average full-time employee. The CEO pay index rose from 100 in 2000 to about 534 in 2018, an increase of about 434%, whereas full-time employee pay rose from 100 to about 148, an increase of only 48%. CEO pay therefore grew about 9 times faster ($434 \div 48 = 9.0$).

Employee pay grew at a slow, steady rate of roughly 2 to 3% a year, while CEO pay was far more volatile: it jumped about 47% between 2000 and 2002, then fell by around 5% (147 to 140) between 2002 and 2004, before rising rapidly

again, for example by about 19% (450 to 534) between 2016 and 2018. As a result the gap between the two indices widened from 0 in 2000 to about 386 points in 2018.

5(b)

Free market economists argue that wages are determined by the demand for and supply of labour in each occupation, so wage differentials arise because these conditions differ. The demand for labour is a derived demand, based on the marginal revenue product (MRP) of the worker. A FTSE 100 CEO makes decisions affecting billions of pounds of revenue and profit, so their MRP, and therefore the demand for CEOs (D_{CEO}), is very high. The supply of people with the rare talent and experience to run a large company is very limited, as it requires many years of education, training and experience (human capital), so S_{CEO} lies far to the left and is wage inelastic: even a big rise in pay brings few extra suitable candidates.

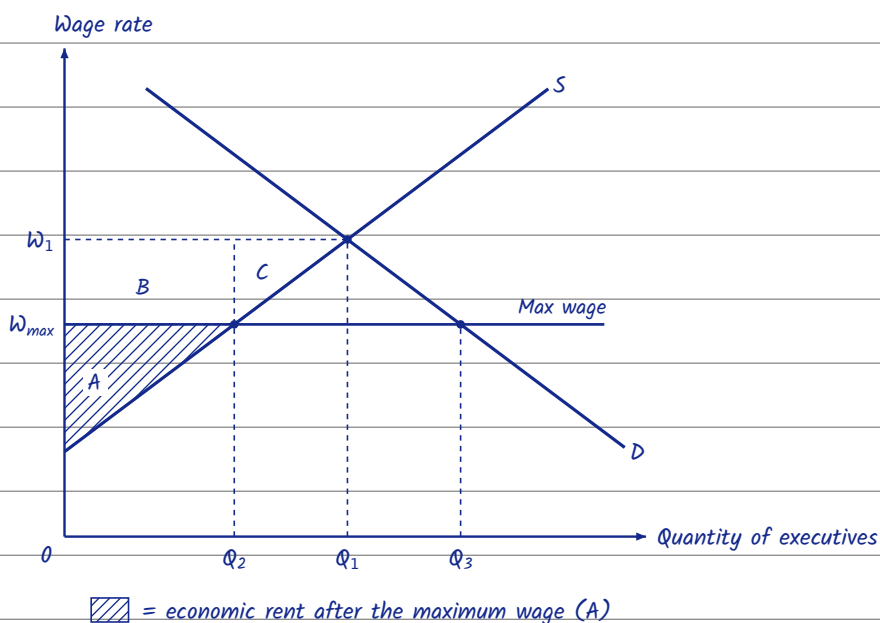


As the diagrams show, the CEO market clears at a very high wage W_1 with a small number employed, Q_1 . For the average full-time employee, whose skills are widely available and need little training, supply is large and wage elastic and MRP is lower, so the equilibrium wage W_2 is much lower and the number employed, Q_2 , much larger. The differential $W_1 - W_2$ is the market outcome. As Damien Savage says, "a skill that is in short supply but in high demand" is well rewarded, and as the market for CEOs has become global, UK firms compete with

US firms for the same talent, shifting D_{CEO} to the right. This explains why CEO pay rose by about 434% since 2000 while employee pay rose by only 48%. Free market economists see high pay as an efficient reward for scarce skills and an incentive to acquire them.

5(c)

Economic rent is any payment to a factor of production over and above its transfer earnings, the minimum payment needed to keep it in its present use. On a labour supply diagram, transfer earnings are the area under the supply curve and economic rent is the area above the supply curve and below the wage. A maximum wage is a legal ceiling on pay, set below the equilibrium wage, above which wages cannot rise.



As the diagram shows, in the free market the CEO wage is w_1 , Q_1 executives are employed and economic rent is area $A + B + C$. When a maximum wage is set at w_{max} , the wage falls and only Q_2 executives are willing to work in UK firms, as some move abroad or retire, while firms demand Q_3 , a shortage of Q_2Q_3 . Economic rent falls to area A only: area B is transferred from CEOs to shareholders as lower wage costs, and area C is lost altogether as executives Q_2Q_1 leave the market.

The size of the fall depends on the wage elasticity of supply of CEOs. If supply is very inelastic, because their skills are specific and they have few alternative

uses, most of the £3.9 million average pay is economic rent, so a maximum wage removes a large amount of rent with little fall in the number of CEOs. If supply is elastic, because CEOs are internationally mobile in the global market Damien Savage describes, transfer earnings are high (they can earn similar pay abroad), so many leave and the shortage is large. It also depends on how far below the equilibrium the maximum wage is set: the lower it is, the bigger the fall in rent, while a maximum above w_1 has no effect at all. Rising demand for CEOs would widen the shortage. Finally, firms may get round the limit by paying in shares, pensions and perks, so effective rent may fall less than the diagram suggests.

5(d)

Pay inequality is the gap between the pay of the highest and lowest paid workers. A maximum wage would cap CEO pay at a multiple of average pay, e.g. 20 times. The case for it is that it attacks inequality directly at the top. In 2017 a median worker would need 167 years to earn the average CEO's annual pay, and a cap would cut this ratio immediately and with certainty, unlike indirect policies. Research suggests motivation depends on relative pay, so workers who see the gap as "irrational" and "unhealthy" (Theresa May) may be demotivated; narrowing it may raise morale and productivity. It may improve firms' reputations with consumers, and much CEO pay is economic rent, so a cap could transfer it to shareholders or workers without reducing the number of CEOs, if supply is inelastic. Michael Williams also points out that the National Minimum Wage proved a success despite warnings.

However, there are strong arguments that it is the least effective policy. First, the labour market for CEOs is global, so if other countries do not follow, the best talent will leave the UK (a brain drain), and firms may move their headquarters abroad, reducing output, jobs and investment. Second, it is hard to enforce: much CEO remuneration is in long-term incentive plans, shares, pension contributions and perks such as accommodation, travel and school fees, so firms would shift pay into these forms. Third, it would reduce tax revenue, since top

earners pay a large share of income tax, and could weaken the incentive to work hard and take risks. Fourth, it only affects a few thousand people and does nothing to raise the pay of the lowest paid, so it narrows the gap at the very top but not across the distribution. There is also a risk of government failure, as setting the right multiple is difficult and lobbying could lead to regulatory capture.

Alternative policies may be more effective. Raising the National Minimum Wage (National Living Wage) increases pay at the bottom, as Damien Savage suggests, helping millions of workers; however, if set too far above the equilibrium wage it may cause unemployment, depending on the wage elasticity of demand for labour. A more progressive tax and benefit system, such as higher top rates of income tax and in-work benefits, reduces inequality in final (disposable) income without capping gross pay and raises revenue to spend on the poor, although it may cause tax avoidance and disincentives. Lower cost measures include forcing companies to publish pay ratios ("name and shame"), giving shareholders binding votes on pay, government oversight of remuneration committees and putting ordinary employees on them. In the long run, investment in education and training increases the supply of skilled workers, tackling the cause of the differentials.

In conclusion, a maximum wage is probably the least effective policy on its own, as it is easily avoided, risks losing talent and tax revenue, and helps no low paid worker. Its effectiveness depends on the level of the cap, on international coordination (a cap matched by other countries would stop the brain drain) and on the time period, since in the short run executives may not move. A combination of a higher minimum wage, progressive taxation and greater transparency is likely to reduce pay inequality more effectively and at lower cost.

7

Price elasticity of demand (PED) measures the responsiveness of quantity demanded to a change in price: $PED = \% \text{ change in quantity demanded} \div \% \text{ change in price}$. The estimates for cigarettes, from -0.27 to -0.89, suggest a

10% rise in price would cut consumption by anywhere between 2.7% and 8.9%.

Supporters argue that estimates are very useful. Firms use PED in pricing: if demand is inelastic, raising price increases total revenue, while if it is elastic, cutting price raises revenue. The government uses PED when setting indirect taxes, subsidies and price controls. If demand for cigarettes is inelastic, a higher tax will raise a lot of revenue and its burden will fall mainly on consumers, but it will not cut smoking much, so it is a weak way of reducing the external costs of smoking; if PED is nearer -0.89, the tax is more effective at reducing consumption. Knowing PED therefore helps governments choose between policies and forecast their effects.

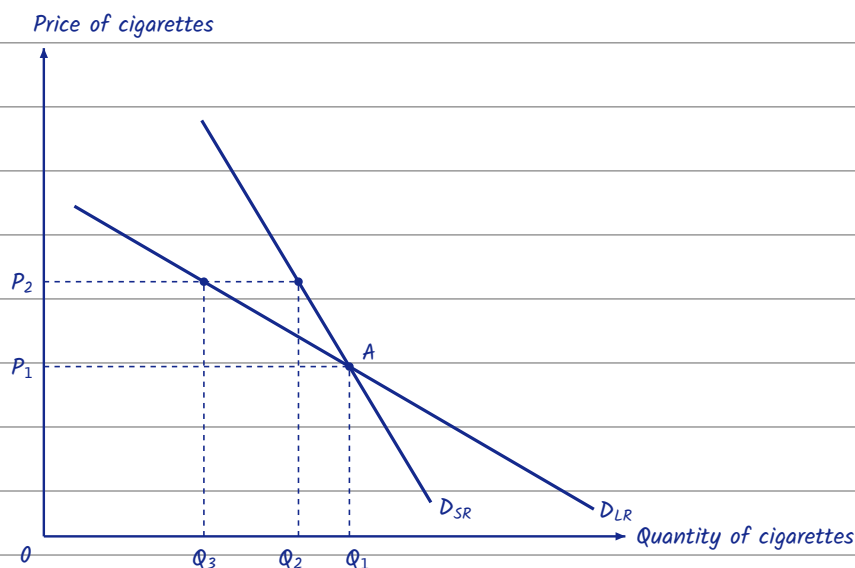
However, critics argue the estimates are unreliable for several reasons. First, PED is calculated using past data, and a 10% price fall that raised quantity demanded by 20% in the past need not do so again, as tastes and incomes change. This is valid, but using past data to predict the future is far better than random guesses based on hunches.

Second, many goods are sold at different prices in different outlets, so the government must use an average price, reducing accuracy. Yet each outlet could calculate its own PED from its own price changes, and the average figure is still useful at the macro level, for example for tax policy.

Third, PED calculated as a percentage change gives an average value over a price range, but PED varies along a demand curve: on a straight line demand curve it is elastic at high prices and inelastic at low prices, so if the price falls from £3 to £2.50, PED may differ at £3, £2.75 and £2.50. However, point elasticity can be calculated at each point on the curve using a slightly different formula.

Fourth, PED varies with the time period. As the diagram below shows, when the price rises from P_1 to P_2 , in the short run smokers are addicted and slow to change habits, so quantity falls only from Q_1 to Q_2 along D_{SR} . In the long run they find substitutes (e-cigarettes), quit or young people never start, so quantity falls to Q_3 along the flatter D_{LR} . This may explain the range from -0.27 to -0.89. Economists argue that as long as the time frame of each estimate is

clearly defined, knowing that PED changes over time is an advantage, not a weakness.



Finally, PED estimates rely on *ceteris paribus*. If a 10% price rise is followed by a 40% fall in quantity, giving a PED of -4.0, some of the fall may be due to other factors, such as lower real incomes, a smoking ban or a cheaper substitute. However, regression analysis allows economists to hold other variables constant and isolate the effect of price on quantity demanded.

The estimates also differ because they come from different countries, years and groups of consumers, such as young people, whose demand is more elastic, so the range itself is useful information about who will respond to a tax. Most importantly, even at both extremes the estimates are less than 1, so demand for cigarettes is price inelastic. The practical conclusion is the same in every case: a rise in tobacco duty will increase tax revenue, the burden will fall mostly on smokers and consumption will fall by less than the price rises. Cigarettes may also be an exception, as addiction and smuggling make demand hard to measure, so a wide range for one product does not mean all PED estimates are as imprecise; many goods have much tighter estimates.

In conclusion, PED estimates have real weaknesses and should not be treated as precise forecasts, so the critics are right that a single figure can mislead.

However, they are not a waste of time and effort. Their usefulness depends on

the purpose: a firm or government needing to know only whether demand is elastic or inelastic gets clear guidance even from a wide range, whereas exact revenue forecasts need more precise figures. If estimates are used with caution, for a defined time period, and together with a range of other data, they provide far better guidance for firms and governments than guesswork, at relatively little cost.