



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

Centre Number

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Candidate Number

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Economics

StemUp Model Solution

Assessment Unit AS 1

assessing

Markets and Market Failure



[SEC11]

SEC11

MONDAY 13 MAY, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page. Answer **all** questions in Sections **A** and **B**, and **one** question in Section **C**.

You are permitted to use a calculator in this paper.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

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. This paper is accompanied by a Case Study Booklet.

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.

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Section A

Answer all questions

- 1 The table below shows the monthly production possibilities for a small-scale carpentry firm which produces just two products: garden sheds and garden benches.

Garden sheds	Garden benches
0	500
10	450
20	382
30	271
40	140
50	0

- (a) With reference to the table above, calculate the opportunity cost to the firm of increasing the production of garden sheds from 20 per month to 40 per month.

[2]

Opportunity cost = garden benches given up

= 382 - 140 = 242 garden benches per month.

[Turn over]

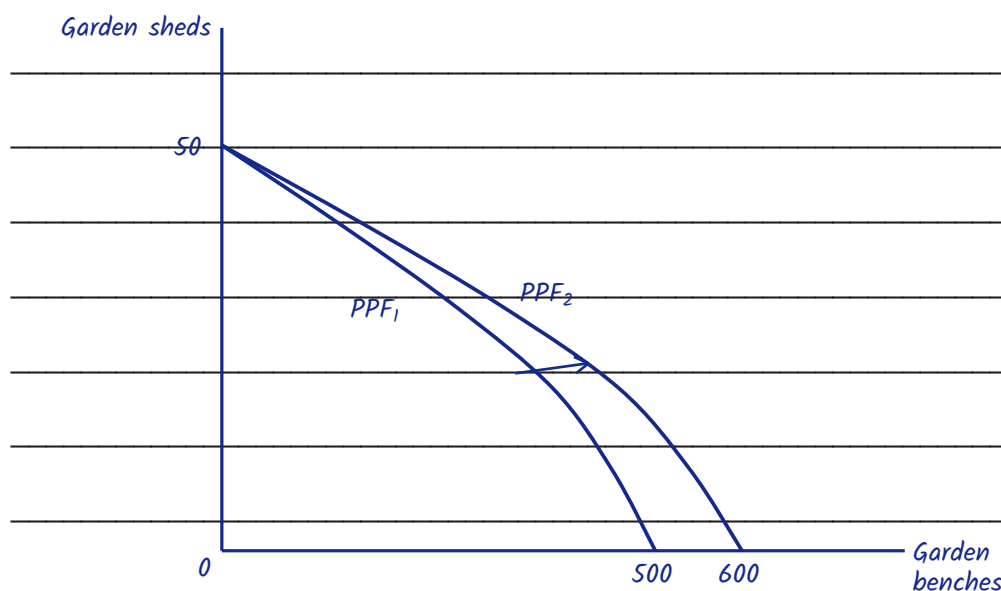


- (b) The firm is considering purchasing a piece of capital equipment that can be used in the production of garden benches. The firm estimates that productivity in garden benches will increase by 20% if it purchases the new equipment.

With the aid of a diagram, explain the likely impact on these production possibilities if the firm purchased this new piece of machinery and used it to produce garden benches. [4]

The machinery raises productivity in benches by 20%, so the maximum output of benches rises from 500 to 600 per month (500×1.2) and at every output of sheds 20% more benches can be made (e.g. at 20 sheds, $382 \times 1.2 \approx 458$ benches). The maximum output of sheds stays at 50, as the machine cannot be used to make sheds.

So the PPF pivots outwards from PPF_1 to PPF_2 , from the sheds intercept, as shown in the diagram below. The firm's production possibilities increase, and the opportunity cost of each shed (benches forgone) rises.



- 2 Kim's Kebabs is a fast-food business operating in a small town. Kim has been advised that the income elasticity of demand for her kebabs is 1.3.

With reference to the information above, calculate the likely percentage change in sales if the income of Kim's customers increased by 8%. [3]

$$YED = \% \Delta Qd \div \% \Delta Y, \text{ so } \% \Delta Qd = YED \times \% \Delta Y$$

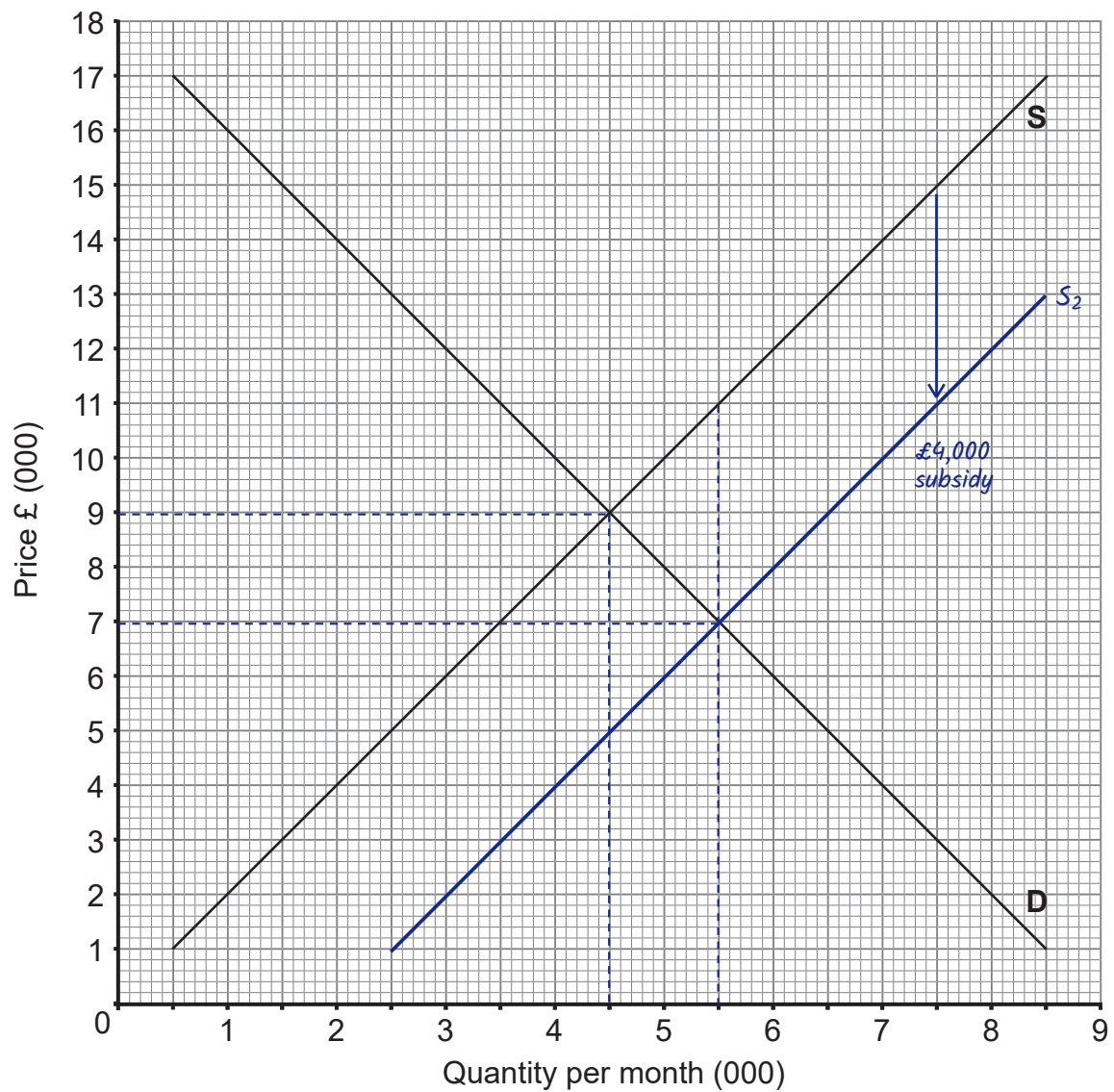
$$= 1.3 \times 8\% = +10.4\%$$

Sales of kebabs are likely to increase by 10.4%. As $YED > 1$, kebabs are an income elastic (luxury) normal good.

[Turn over]



- 3 The chart below shows the monthly demand and supply schedules for a particular brand of electric car.



- (a) Using the information in the diagram opposite, calculate the total monthly revenue the firm will make at the equilibrium price.

[2]

Equilibrium where $D = S$: price = £9,000 and quantity = 4,500 cars per month.

Total revenue = $P \times Q = £9,000 \times 4,500 = £40,500,000$ (£40.5 million) per month.

- (b) In an attempt to increase the sales of electric cars, the government offers a £4,000 production subsidy for each car produced.

Using the information in the diagram opposite, calculate the monthly cost to the government of introducing this subsidy.

[4]

A £4,000 subsidy per car shifts the supply curve vertically down by £4,000 to S_2 (drawn on the chart).

New equilibrium: price = £7,000, quantity = 5,500 cars per month.

Cost to government = subsidy per unit $\times$ quantity

= $£4,000 \times 5,500 = £22,000,000$ (£22 million) per month.

[Turn over]



- 4 According to the Joseph Rowntree Foundation, over 13 million people in the UK are living on incomes that are less than 60% of the median UK income, and at the same time almost 2.5 million people could not afford adequate food or shelter.

Using the information above, explain the difference between absolute and relative poverty.

[4]

Absolute poverty is when people do not have enough income to afford the basic necessities needed to survive, such as food, clothing and shelter. The almost 2.5 million people in the UK who could not afford adequate food or shelter are in absolute poverty.

Relative poverty is when people's income is low compared with the average income of the society they live in, so they cannot afford the standard of living that is normal in that society. It is usually measured as income below 60% of median income, so the over 13 million people living on less than 60% of median UK income are in relative poverty.

So a person can be in relative poverty without being in absolute poverty, as relative poverty depends on inequality.



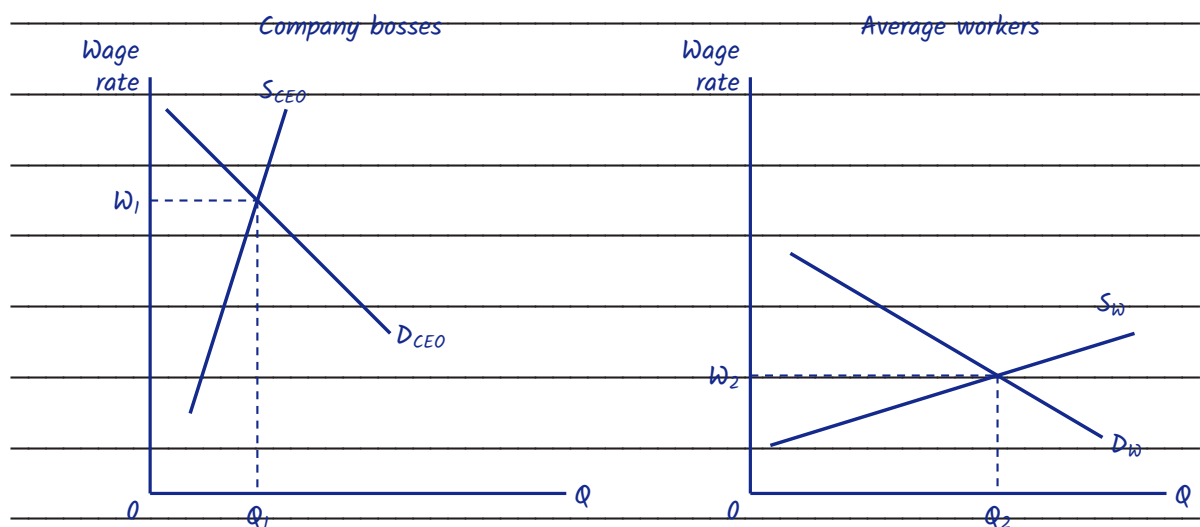
- 5 In the UK in 2021, the company boss-to-worker pay ratio stood at a staggering 167 to one. In other words, the average company boss will earn more in three months than the average person will earn over a lifetime.

With the aid of an appropriate diagram, explain how free market economists would explain the wage differential between company bosses and the average full-time employee.

[6]

Quality of written communication will be assessed in this question.

Free market economists argue that wages are a price set by the demand for and supply of labour in each occupation, so wage differentials reflect different market conditions. Demand for labour is a derived demand: a skilled company boss has a very high marginal revenue product, as good decisions can add millions to profits, so demand for CEOs is high and relatively inelastic. The supply of people with the rare skills, experience and human capital needed to run a large company is very limited and inelastic, as these take years of education and training to acquire. As the diagrams show, this gives a very high equilibrium wage W_1 at a low quantity Q_1 . For the average full-time employee, supply is large and elastic as many workers have the skills, so the wage W_2 is far lower. This explains the 167 to one pay ratio.



[Turn over]

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Section B (Case Study)

Answer all questions

Read the information in the Case Study Booklet and answer the questions below.

- 6 (a) Using the information in **Fig. 1**, describe the trend in oil prices between May 2021 and May 2022. [5]

Overall, crude oil prices followed an upward trend, rising from about \$68.50 per barrel in May 2021 to \$98.30 in May 2022, an increase of approximately 43.5% $((98.30 - 68.50) \div 68.50 \times 100)$.

From May to Dec 2021 the price rose gradually with fluctuations, reaching about \$86 in Oct 2021 before falling back to around \$71 in early Dec 2021.

The sharpest rise was from Dec 2021 to March 2022, with the price peaking at \$123.20 per barrel in early March 2022, about 79.9% higher than in May 2021 $((123.20 - 68.50) \div 68.50 \times 100)$.

After the peak, prices fell but were very volatile, ending at \$98.30 in May 2022, a fall of approximately 20.2% from the peak $((123.20 - 98.30) \div 123.20 \times 100)$.

So the trend was upward overall, with significant fluctuations, especially between March and May 2022.

[Turn over]



- (b) With the aid of appropriate diagrams, explain the basis for Steven Stewart's belief that the "best cure for high oil prices is high oil prices" (Paragraph 2). [6]

Quality of written communication will be assessed in this question.

Steven Stewart means that a high oil price sets off changes in both the demand for and the supply of oil which push the price back down. The price mechanism acts as a signal and an incentive (Paragraph 2).

Demand: oil products such as petrol, diesel and heating oil take a large share of household spending, so high oil prices reduce real disposable incomes. As oil is a normal good, lower incomes reduce demand for oil at every price. High energy prices also raise firms' costs, so economic activity falls and the derived demand for oil falls further.

Diagram 1: fall in demand

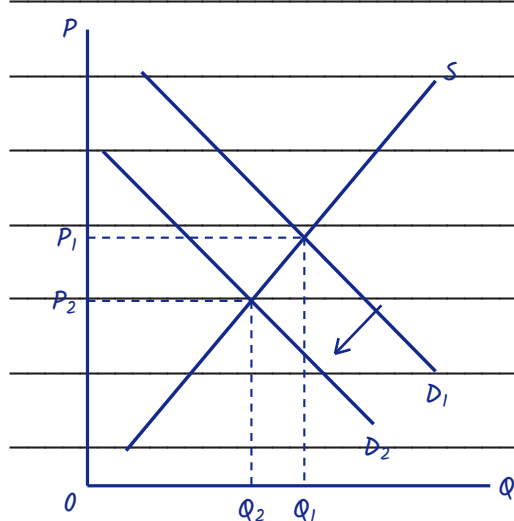
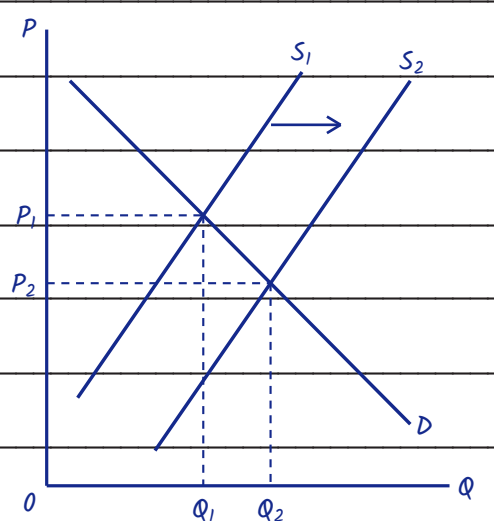


Diagram 2: rise in supply



In Diagram 1 demand shifts left from D_1 to D_2 , so the price falls from P_1 to P_2 and quantity falls from Q_1 to Q_2 .

Supply: at \$123 a barrel (Paragraph 1) oil producers earn huge supernormal profits. This profit signal encourages existing producers to invest in new capacity and attracts investment in production outside Russia, including fields that were unprofitable at lower prices. In Diagram 2 supply shifts right from S_1 to S_2 , creating excess supply at P_1 , so the price falls to P_2 while quantity rises to Q_2 .

Together, the fall in demand and the rise in supply both put downward pressure on price, which is why oil fell back below \$100 a barrel (\$98.30 in May 2022, Fig. 1). However, the supply response takes time, as new oil fields can take years to develop, so the "cure" works mainly in the long run and high prices can persist in the short run.

[Turn over



- (c) With reference to price elasticities of demand and supply, and with the aid of appropriate diagrams, explain why small changes in demand and supply can lead to large fluctuations in the price of oil (Paragraph 3). [9]

Quality of written communication will be assessed in this question.

Price elasticity of demand (PED) measures the responsiveness of quantity

demanded to a change in price: $PED = \% \Delta Q_d \div \% \Delta P$. Price elasticity of

supply (PES) measures the responsiveness of quantity supplied to a change

in price: $PES = \% \Delta Q_s \div \% \Delta P$. If the value is less than 1 (ignoring the sign for PED), demand or supply is price inelastic.

Demand for oil is price inelastic, especially in the short run, as there are few close substitutes for petrol, diesel and jet fuel, oil is a necessity for transport, heating and industry, and switching to electric cars takes time.

Diagram 1: inelastic demand

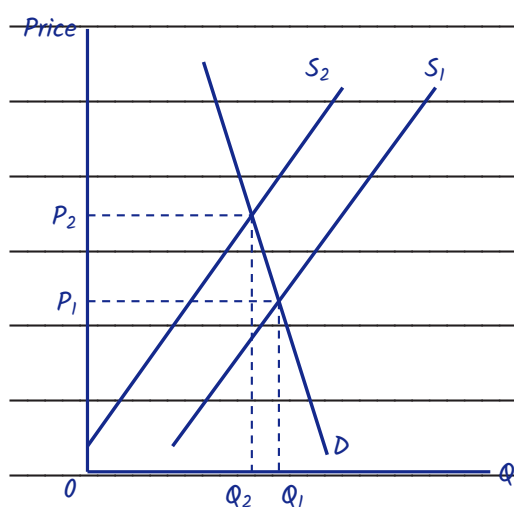
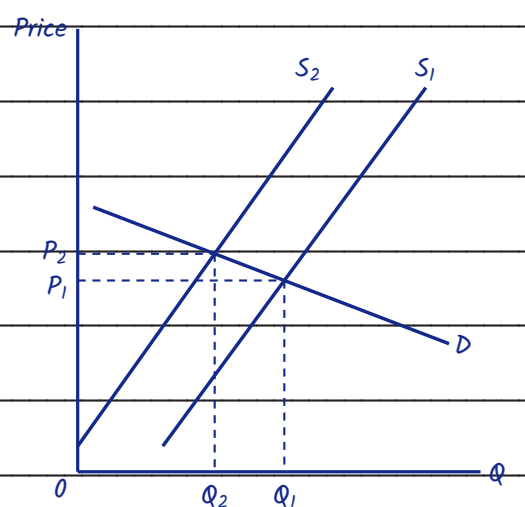


Diagram 2: elastic demand



Diagrams 1 and 2 show the same small decrease in supply, for example the supply disruption caused by the Russian invasion of Ukraine (Paragraph 1), shifting S_1 to S_2 . With inelastic demand (Diagram 1) consumers keep buying almost the same quantity, so the price must rise a long way, from P_1 to P_2 , to remove the excess demand, while quantity falls only slightly. With elastic demand (Diagram 2) the same shift causes only a small rise in price and a larger fall in quantity. So because PED for oil is low, even small changes to supply cause large price variations (Paragraph 3).

Supply of oil is also price inelastic in the short run, as it takes years to explore, drill and bring new oil fields into production and spare capacity is limited, so producers face long time lags.

Diagram 3: inelastic supply

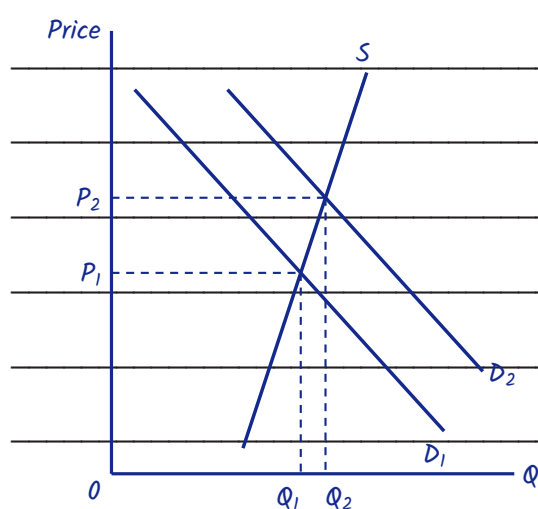
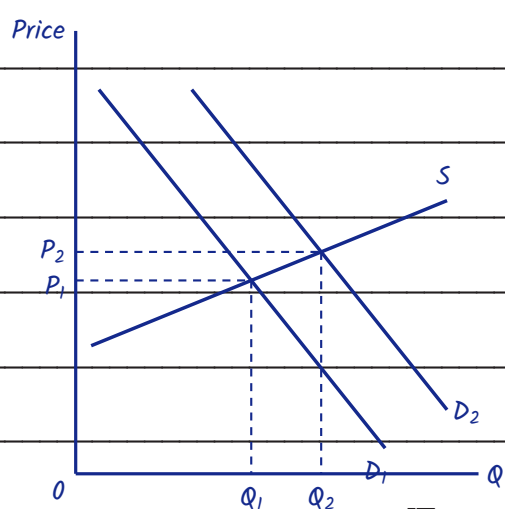


Diagram 4: elastic supply



[Turn over]



Diagrams 3 and 4 show the same small increase in demand, for example

from growth in global demand as economies recovered from Covid-19

(Paragraph 1), shifting D_1 to D_2 . With inelastic supply (Diagram 3)

producers cannot raise output much, so the excess demand is removed

mainly by a large rise in price from P_1 to P_2 . With elastic supply (Diagram

4) output rises easily and price rises only a little.

Therefore, because both the demand for and the supply of oil are price

inelastic, any small shift in either curve is absorbed mostly by a change in

price rather than quantity. This explains the large fluctuations in Fig. 1: the

price rose by about 80%, from \$68.50 to \$123.20, between May 2021 and

March 2022 and then fell by about 20% within two months. As PED and

PES are higher in the long run, when consumers and producers have time

to adjust, volatility is greatest in the short run.

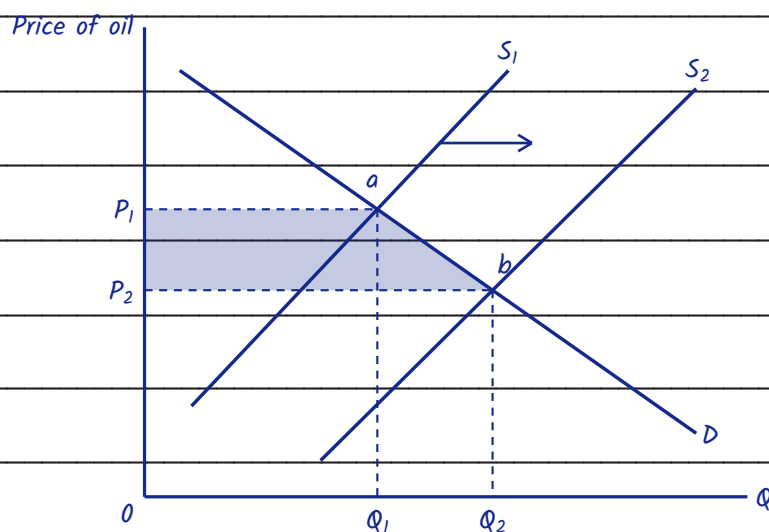


- (d) Critically examine the impact of **falling** oil prices on consumers, producers and the wider economy. [15]

Quality of written communication will be assessed in this question.

A fall in oil prices, such as the drop below \$100 a barrel to \$98.30 in May 2022 (Fig. 1), is caused by lower demand or increased supply (Paragraph 2). Its impact differs between consumers, producers and the wider economy, and between the short and long run.

Consumers: as the diagram shows, when supply increases from S_1 to S_2 and the price falls from P_1 to P_2 , consumer surplus increases by the shaded area P_1abP_2 , so consumer welfare rises.



[Turn over]



Lower oil prices also feed through to lower prices of goods that use oil in production, such as petrol, plastics, transport and food, raising real disposable incomes. This gives "some comfort to hard-pressed families" struggling with the cost-of-living crisis (Paragraph 4), and helps low-income households most, as fuel and heating take a larger share of their spending. Demand for complements such as cars and flights rises.

However, the benefit depends on how far and how quickly lower crude prices are passed on: retailers may be slow to cut pump prices, and a large part of the pump price is fuel duty, a fixed amount per litre, so a fall in crude prices causes a much smaller percentage fall in petrol prices. Also, at \$98.30 the price is still well above the \$68.50 of May 2021.

Producers: firms that use oil as an input, such as airlines, hauliers and manufacturers, benefit from lower costs of production, so their supply curves shift right and they can cut prices or earn higher profits, helping businesses recover from Covid-19 (Paragraph 4). In contrast, oil producers lose: because demand is price inelastic, a fall in price causes total revenue ($P \times Q$) to fall, so profits fall. This reduces investment in new production, may lead to job losses in the oil industry, and firms under pressure may cut costs by neglecting environmental and health and safety standards. Producers of substitutes such as renewable energy and electric cars may also see demand fall.



Wider economy: lower oil prices reduce cost-push inflation, a key cause of the cost-of-living crisis, and higher real incomes raise consumption and aggregate demand, supporting economic growth and employment. For an oil-importing country like the UK, the import bill falls. However, government tax revenue may fall, as VAT on fuel is ad valorem.

The biggest drawback, as Linda Doyle argues (Paragraph 5), is that cheaper oil encourages greater consumption of a fossil fuel that creates negative externalities such as carbon emissions and air pollution, which are not reflected in the price. As $MSC > MPC$, oil is overconsumed and there is a welfare loss, which grows as consumption rises. Low prices also reduce the incentive to invest in renewable energy and electric vehicles, delaying the move away from oil. On the other hand, lower prices make expensive, hard-to-reach oil projects unprofitable, which could reduce environmental damage from extraction.

[Turn over



Overall, falling oil prices benefit consumers, most firms and the wider economy in the short run, as they reduce inflation and raise real incomes during a cost-of-living crisis. However, the size of the impact depends on how large and how long-lasting the fall is: because PED and PES are low, prices are volatile and the fall may soon be reversed. It also depends on whether price cuts are passed on to consumers. In the long run, the environmental costs mean the overall effect on economic welfare may be negative unless the government corrects the externality, for example with a carbon tax that keeps prices closer to the true social cost, as Linda Doyle suggests. On balance, the short-term gains are significant, but the long-term welfare gain is smaller than it first appears.



Section C

Answer **either** question 7 **or** question 8

Quality of written communication will be assessed in these questions.

- 7 A recently published report suggests that government spending on free nursery places for three-year-olds has not produced any educational or economic benefits despite having cost more than £7 bn. At the same time a report into the government's scheme to build 300 000 new starter homes has found that not one single home was built despite the scheme costing almost £200 million. This has led to some suggesting that government intervention in markets is a complete waste of time, effort and money.

Critically examine the view that government intervention in markets often does little to improve economic welfare. [20]

or

- 8 Since 2016, the Northern Ireland Department for the Environment has issued sixteen licences which allow companies to mine for gold. These new licences have been issued despite concerns about potential environmental and health impacts such projects could have on local communities.

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

[Turn over]



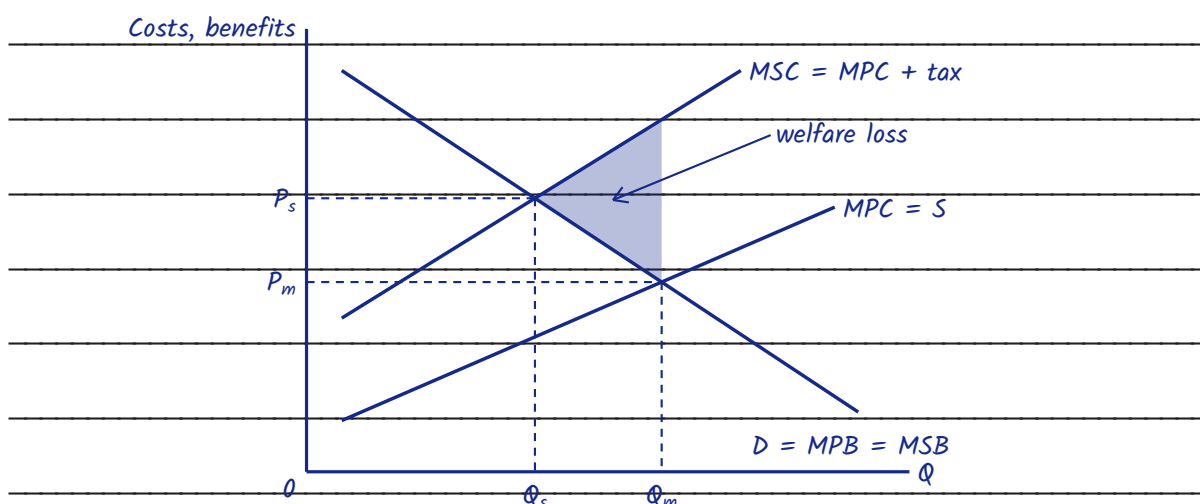
Write the number of the question you have chosen in the box below:

8

A negative externality is a cost imposed on third parties that is not reflected in the market price, so marginal social cost (MSC) exceeds marginal private cost (MPC). Gold mining creates significant negative externalities: cyanide used to extract gold from the ore can leak into rivers and groundwater, and mining causes noise, dust, traffic, landscape damage and possible health impacts on local communities, as the concerns about the sixteen licences show. Because mining firms do not pay these external costs, the free market leads to market failure.

As Diagram 1 shows, the market equilibrium is where $MPC = MPB$, at output Q_m and price P_m , but the socially optimal output is where $MSC = MSB$, at Q_s and P_s . Gold is overproduced ($Q_m > Q_s$) and underpriced, creating a deadweight welfare loss shown by the shaded triangle. Government policy should aim to reduce output to Q_s and internalise the externality so that the polluter pays.

Diagram 1: negative externality in gold mining



1. Environmental taxes. A tax on each tonne of ore processed, or on each unit of pollution, equal to the marginal external cost shifts MPC up to $MPC + tax = MSC$, so output falls to the socially optimal Q_s , price rises to P_s and the welfare loss is removed. It applies the polluter pays principle, gives firms a continuing incentive to adopt cleaner technology, such as cyanide-free extraction, and raises revenue that could fund environmental clean-up in local communities.

However, it is very hard to value the external cost in money terms, especially health effects, so the tax may be set too high or too low, leading to government failure. If it is too low, firms may simply pay the tax and continue to pollute.

Firms may try to avoid the tax by under-reporting output, or relocate to countries with weaker rules, and very high tax rates could reduce revenue (Laffer curve effects).

2. Regulation. The government could set strict limits on cyanide use, require safe storage of waste, set water quality standards, ban mining near homes and water sources or refuse licences altogether, backed up by fines for polluting firms.

Regulation is simple to understand, gives certainty and is effective for highly toxic pollutants like cyanide, where a strict limit is safer than relying on a price.

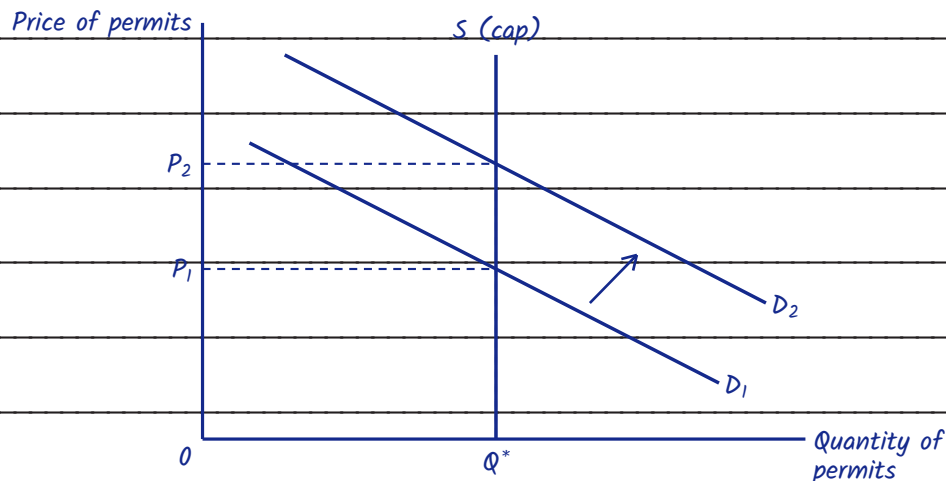
However, regulations give no incentive to cut pollution below the legal limit, they are costly to monitor and enforce for both the firm and the government, fines may be too small to deter, and there is a risk of regulatory capture, where the regulator acts in the interests of the mining companies rather than local communities.

[Turn over



3. Tradable pollution permits. The government sets a cap on total pollution from mining and issues permits that firms can buy and sell.

Diagram 2: tradable pollution permits



As Diagram 2 shows, the supply of permits is fixed (perfectly inelastic) at the cap Q^* ; if demand for permits rises from D_1 to D_2 , the permit price rises from P_1 to P_2 while total pollution stays at the cap. Firms that can cut pollution cheaply sell their spare permits, so pollution is reduced at the lowest total cost, and the cap can be reduced over time. However, with only sixteen licences there are too few firms for an effective trading market, the administration cost is high, and it is difficult to set the appropriate level of pollution; if too many permits are issued the price will be too low to change behaviour.

4. Subsidies. The government could subsidise cleaner extraction technology or the clean-up of old mine sites. This encourages environmentally friendly production without raising prices. However, subsidies have an opportunity cost, as the money



could be spent on health or education, they worsen government finances, and they reward the polluter rather than making the polluter pay.

5. Extending property rights. If local residents had clear legal rights over clean water and land, they could sue or negotiate compensation from mining firms, internalising the externality. However, legal action is costly and slow, and those affected are many and dispersed, so this is unlikely to work on its own.

Overall, no single policy is perfect, and the best choice depends on the type of externality, the information available and the cost of administration. Most economists prefer market-based policies such as taxes, which internalise the externality and make the polluter pay the full social cost of production, as they are efficient and give a long-term incentive to innovate.

However, for gold mining the main risk is highly toxic cyanide pollution, which can cause irreversible harm to health and the environment, so the damage is hard to value and a price-based policy alone is risky. With so few firms, tradable permits are impractical. I therefore conclude that the most effective approach is strict regulation of cyanide use and site safety, enforced through licence conditions and large fines, combined with an environmental tax on remaining pollution. The success of any policy depends on effective monitoring and avoiding government failure, as poorly designed intervention could cost more than the welfare it gains.

[Turn over



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Question Number	Marks
Section A	
1	
2	
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Total Marks	

Examiner Number

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Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

Economics

Assessment Unit AS 1
assessing
Markets and Market Failure

[SEC11]

MONDAY 13 MAY, MORNING

CASE STUDY BOOKLET

**For use with
Section B**

The following article was written in May 2022.

Oil price volatility

In a turnaround so sharp that it could cause whiplash, oil dropped below the \$100 a barrel benchmark only weeks after analysts had suggested it could reach \$200 a barrel. Oil prices were on an upward trajectory over most of the period illustrated in **Fig. 1** below, with prices peaking at \$123 a barrel in March 2022. This increase was driven by growth in global demand and by supply disruptions caused by the Russian invasion of Ukraine.

1

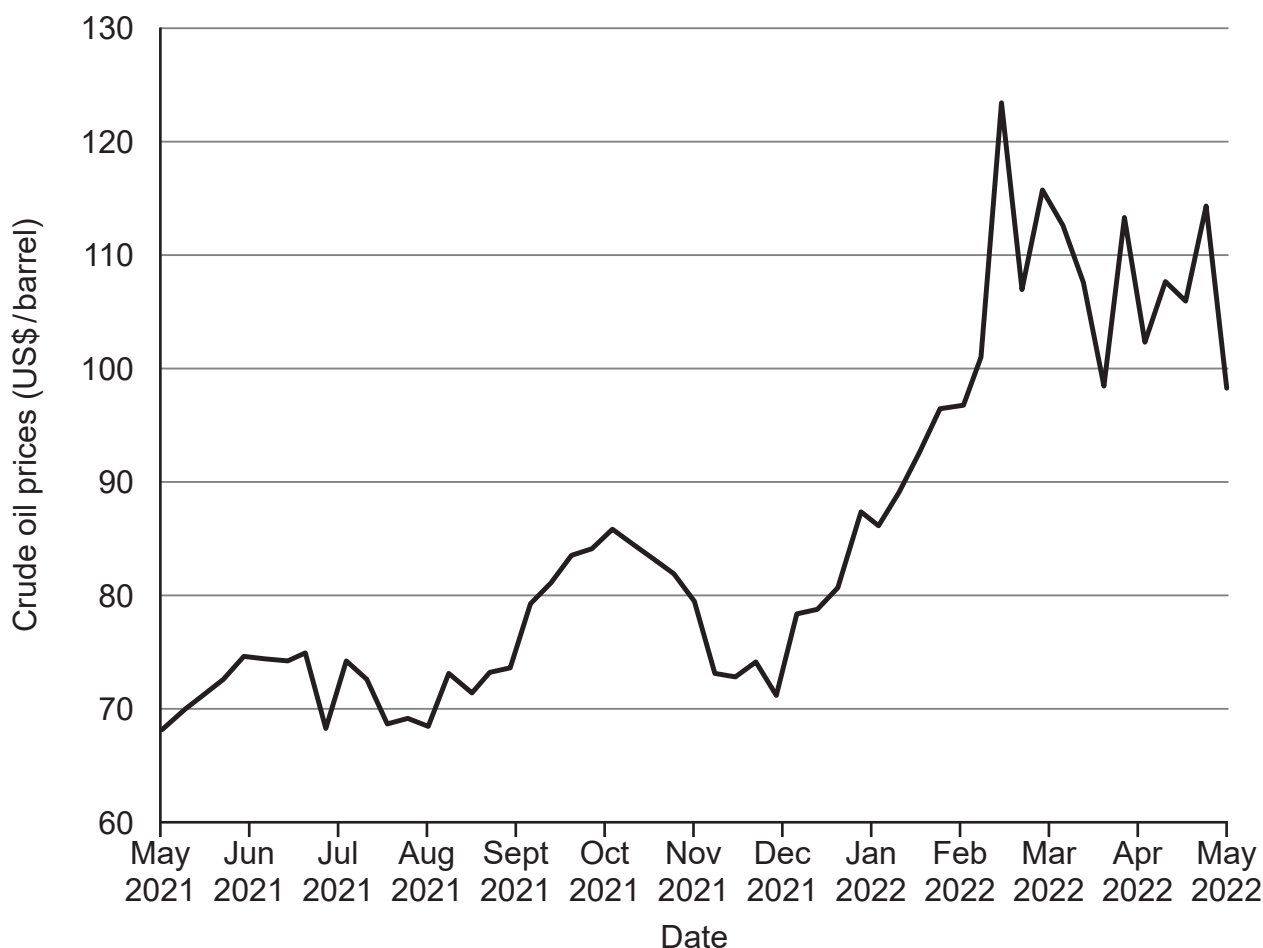


Fig.1 Crude oil prices (US\$) 24th May 2021 to 23rd May 2022

However, concerns about the prospects for the world economy and increased investment in oil production conspired to push oil prices lower. Oil market analyst Steven Stewart stated: "There is an old saying in commodity markets that the best cure for high oil prices is high oil prices! High energy prices are reducing disposable incomes and hence reducing the demand for oil, while at the same time the huge profits available to oil producers have encouraged new investment in production outside of Russia."

2

Oil price volatility is nothing new, as the price elasticities of demand and supply of oil make large fluctuations in oil prices more likely. As Steven Stewart stated, “the fact that demand is price inelastic means even small changes to supply can cause significant price variations. Likewise, the relatively low price elasticity of supply means that small changes in demand will have similar effects”.

3

Falling oil prices were welcomed by consumers, businesses and governments in the UK, the USA and the EU, who had been hit with a cost-of-living crisis, just as they had started to recover from the Covid-19 pandemic. Consumer advocate Mike Dean stated: “The rapid rise in oil prices since the beginning of last year has had a devastating impact on consumers and businesses. Just when we thought things were finally getting better after Covid-19, we have been hit with another economic shock in the form of soaring prices. The recent news that oil prices have started to fall back to more normal levels will provide some comfort to hard-pressed families and businesses who are struggling to heat their homes and fill their cars with fuel.”

4

However, not everyone sees falling oil prices as a good thing. Environmental campaigner Linda Doyle claimed that, “whilst falling oil prices may provide some short-term benefit to consumers’ pockets, they are bad for the economy, the environment and society as a whole since they encourage consumption of possibly the dirtiest form of energy known to mankind. Oil production and consumption have significant environmental impacts that are not reflected in the price. Rather than celebrating falling oil prices, the UK government needs to use the tax system to ensure that prices remain high so that we can finally wean ourselves off these damaging forms of energy”.

5

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