

Please write clearly in block capitals.

Centre number

Candidate number

Surname StemUp Model Solution

Forename(s) _____

Candidate signature _____

I declare this is my own work.

INTERNATIONAL AS ECONOMICS

Unit 1 The Operation of Markets, Market Failure and the Role of Government

Monday 6 January 2025 07:00 GMT Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:

- the Source Booklet, provided as an insert (enclosed)
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do **not** write outside the box around each page or on blank pages.
- Do **not** write in the Source Booklet.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may use a bilingual dictionary for this exam.
- You may **not** use an English dictionary.

For Examiner's Use	
Question	Mark
1–15	
16	
17	
18	
19	
20	
21	
TOTAL	



Section A

Answer **all** questions in the spaces provided.

Only **one** answer per question is allowed.

For each question completely fill in the circle alongside the appropriate answer.

CORRECT METHOD



WRONG METHODS



If you want to change your answer you must cross out your original answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.



0 1

Which one of the following is the best example of economic activity?

[1 mark]

A Consumption of goods



B Factors of production



C Inequality of income



D Maximisation of profit



0 2**Table 1** shows the market demand for and supply of bananas.**Table 1**

Price (\$)	Demand for bananas (kg)	Supply of bananas (kg)
12	1050	950
13	1000	1000
14	950	1050
15	900	1100

Bad weather leads to a fall in the supply of bananas of 100 kg at each price.

At which one of the following prices is there now excess supply of 100 kg?

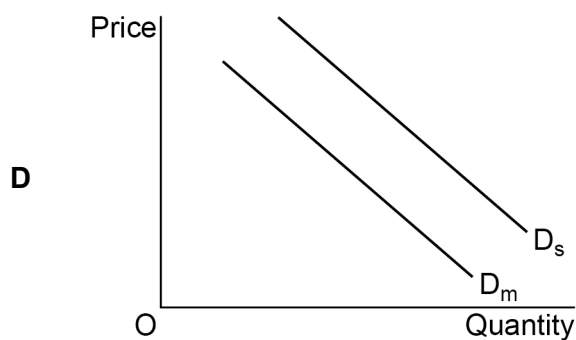
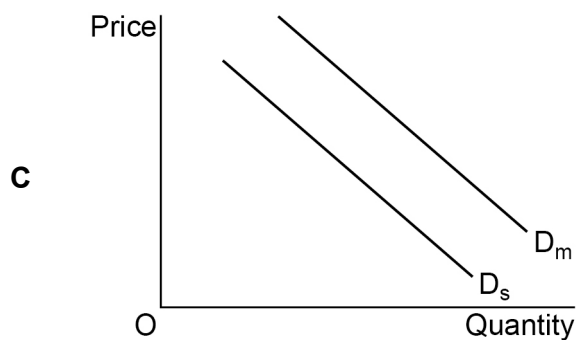
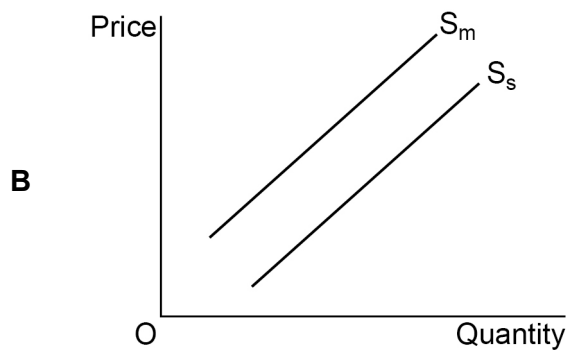
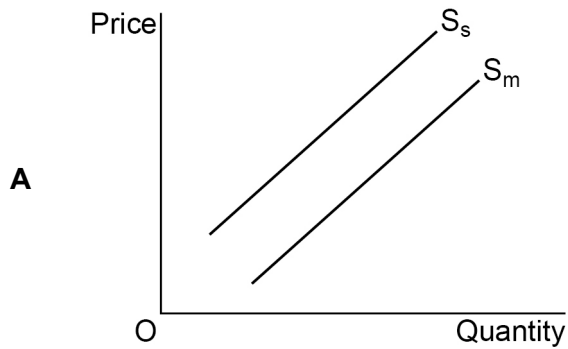
[1 mark]**A** \$12
☐
B \$13
☐
C \$14
☐
D \$15
☒
Turn over for the next question**Turn over ►**

0 3

The diagrams below show the demand or supply curves for a product.

The curve D_m shows the demand when consumers only consider the private benefits of the product and D_s shows the demand when consumers consider the social benefits. The curve S_m shows the supply when firms only consider the private costs of the product and S_s shows the supply when they consider the social costs.

Which one of the following diagrams shows positive externalities in production?

[1 mark]

0 4

Which one of the following combinations of characteristics applies to perfect competition?

[1 mark]

	Number of buyers and sellers	Profits	
A	High	High	☐
B	High	Low	☒
C	Low	High	☐
D	Low	Low	☐

0 5Kasem owns a firm that makes bicycles. **Table 2** shows the sales, total cost and profit for the firm in two different years.**Table 2**

	Sales of bicycles	Total cost (\$)	Profit (\$)
Year 1	1200	180 000	48 000
Year 2	1500	210 000	90 000

By how much did Kasem increase the price of a bicycle between Year 1 and Year 2?

[1 mark]

- A** \$7.50 ☐
- B** \$10.00 ☒
- C** \$17.50 ☐
- D** \$20.00 ☐

Turn over for the next question**Turn over ►**

0 6

Which one of the following explains the characteristic of excludability?

[1 mark]**A** Consumption by one person does not reduce the amount available to others.☐**B** Consumption by one person reduces the amount available to others.☐**C** Non-payers can be prevented from using the product.☒**D** Non-payers cannot be prevented from using the product.☐**0 7**When the price of coal is €30 a tonne, the quantity demanded is 400 000 tonnes a week. The price rises to €33 a tonne and the price elasticity of demand is -0.8 .

What is the new quantity demanded?

[1 mark]**A** 350 000 tonnes☐**B** 368 000 tonnes☒**C** 432 000 tonnes☐**D** 450 000 tonnes☐**0 8**

A government introduces a maximum rent for houses, to reduce the amount paid by families on low incomes. This leads to fewer houses being available for rent.

This is an example of which one of the following economic concepts?

[1 mark]**A** Cross elasticity of demand☐**B** Extension of property rights☐**C** Income elasticity of demand☐**D** Unintended consequences☒

0 9

Table 3 shows the long-run total cost of production of a firm for different units of output.

Table 3

Output	Total cost (£)
50	4300
51	4284
52	4316
53	4452
54	4590

At which output does the firm first experience diseconomies of scale?

[1 mark]

- A** 51 ☐
- B** 52 ☐
- C** 53 ☒
- D** 54 ☐

Turn over for the next question

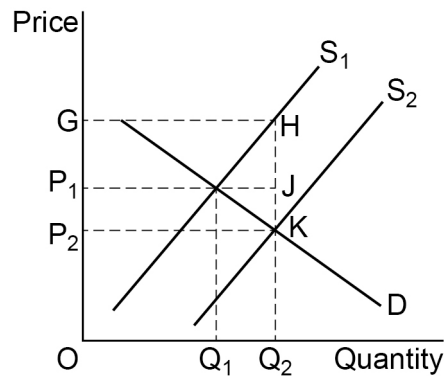
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1 0

Figure 1 shows the initial demand (D) and supply (S_1) curves for solar panels. The government then provides a subsidy to firms in the industry.

Figure 1



After the subsidy is provided, what is the total amount of revenue received by the producers from the consumers and the government?

[1 mark]

- A** OGHQ₂ ☒
- B** OP₁JQ₂ ☐
- C** OP₂KQ₂ ☐
- D** P₂GHK ☐

1 1

Which one of the following suggests that Economics is a social science?

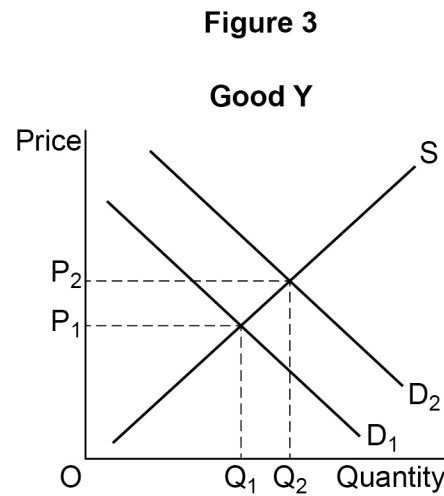
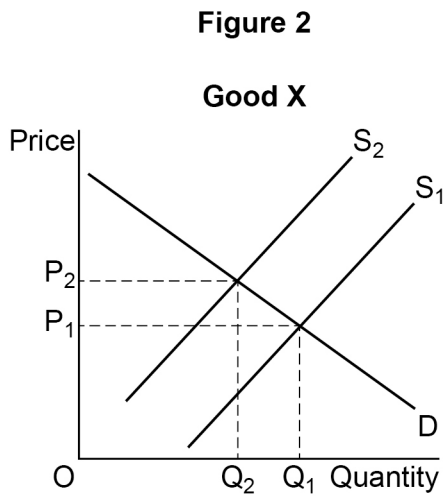
[1 mark]

- A** Economists apply existing principles to understand the world. ☐
- B** Economists conduct laboratory experiments to produce evidence. ☐
- C** Economists consider human behaviour to explain how society works. ☒
- D** Economists use value judgements to test known theories. ☐



1 2

Figure 2 and **Figure 3** show a change in the supply (S_1 to S_2) of **Good X** and the resulting change in the demand (D_1 to D_2) for **Good Y**.



Which one of the following relationships is illustrated by the diagrams?

[1 mark]

- A** Competitive demand ☒
- B** Composite demand ☐
- C** Derived demand ☐
- D** Joint demand ☐

1 3

Which one of the following is a correct combination of a benefit and cost of division of labour to firms?

[1 mark]

	Benefit	Cost	
A	Greater variety of products	Productivity is lower	☐
B	Production is quicker	Average cost is higher	☐
C	Resources are used efficiently	Workers are less flexible	☒
D	Workers require more training	Workers may become bored	☐

Turn over ►



1 4

The options below list four possible objectives of a firm and factors that may help the firm achieve these objectives.

Which one of the following combinations shows a factor that is most likely to help the firm achieve the associated objective?

[1 mark]

	Objective	Factor	
A	Growth	Recent profit levels have been high	☒
B	Increasing market share	There are low barriers to entry	☐
C	Profit maximisation	Other firms have improved their products	☐
D	Survival	The firm's costs are increasing	☐

1 5

In 2023, a delivery firm with 80 workers transported 480 000 packages. In 2024, the firm employed 90 workers and transported 648 000 packages.

All other things being equal, what was the percentage increase in labour productivity between 2023 and 2024?

[1 mark]

- A** 12.5% ☐
- B** 16.7% ☐
- C** 20.0% ☒
- D** 35.0% ☐

15

Section B

Look at the Source Booklet and answer **all** questions in the spaces provided.

Do **not** write in the Source Booklet.

1 6 . 1 Define 'scarce resource' (**Extract B**, line 12).

[3 marks]

A scarce resource is a factor of production (land, labour, capital or enterprise), such as natural gas or oil, which is finite or limited in supply relative to the unlimited wants it could be used to satisfy, so there are not enough of these inputs to satisfy all wants and choices must be made about how to use them.

1 6 . 2 Define 'demand' (**Extract C**, line 1).

[3 marks]

Demand is the quantity of a good or service that consumers are willing and able to buy at a given price in a given period of time.

Turn over for the next question

Turn over ►



1 7

The extracts provide information on natural gas production and prices.

You are advised to show your working for the calculations below.

1 7 . 1

Use **Extract A (ii)** to calculate how many billion cubic metres of natural gas were produced in Russia for each billion cubic metre of natural gas produced in Canada in 2022.

Give your answer as a ratio to **two** decimal places.

[3 marks]

$$\text{Russia : Canada} = 699 \text{ billion m}^3 : 205 \text{ billion m}^3$$

$$699 \div 205 = 3.40976...$$

$$\text{Ratio} = 3.41 : 1 \text{ (to two decimal places)}$$

1 7 . 2

Extract C (lines 4–5) states: 'In the UK, natural gas prices rose from \$0.03 per kilowatt hour in 2021 to \$0.07 in 2022. Over the same period, UK gas production rose from 32 to 38 billion cubic metres.'

Calculate the price elasticity of supply for natural gas in the UK between 2021 and 2022.

Give your answer to **one** decimal place.

[3 marks]

$$\% \text{ change in quantity supplied} = (38 - 32) \div 32 \times 100 = 18.75\%$$

$$\% \text{ change in price} = (0.07 - 0.03) \div 0.03 \times 100 = 133.33\%$$

$$PES = \% \text{ change in QS} \div \% \text{ change in P} = 18.75 \div 133.33 = 0.140625$$

$$PES = 0.1 \text{ (to one decimal place)}$$



1 8

Extract A shows natural gas prices for households and natural gas production in selected countries in 2022.

1 8 . 1

Explain how the amount of natural gas production in a country might affect natural gas prices for households in that country.

[6 marks]

The price of natural gas for households is determined by the interaction of demand and supply in the market. The amount of natural gas produced in a country affects the supply of gas that is available for sale to households in that country.

If a country produces a large amount of natural gas, such as Russia, the supply available for domestic households is high, so the supply curve is further to the right. At the old equilibrium price there would be excess supply, as quantity supplied exceeds quantity demanded. To sell the surplus, producers lower the price; as the price falls there is an extension of demand and a contraction of supply until a new equilibrium is reached where demand equals supply. Therefore higher production is likely to lead to lower natural gas prices for households.

In contrast, if a country produces little or no natural gas, the domestic supply is low and the supply curve is further to the left. At the old price there would be excess demand, so consumers compete for the limited gas and the price is bid up, causing a contraction of demand and an extension of supply (for example, imports) until equilibrium is restored at a higher price. A country that produces little gas must also import it, which adds transport costs, such as pipelines or shipping

Extra space *liquefied gas, raising household prices further.*

The size of the effect on price depends on the price elasticity of demand.

Households need gas for heating and cooking and there are few close substitutes in the short run, so demand is price inelastic. This means that a change in supply leads to a relatively large change in price, so differences in production between countries can cause large differences in household gas prices.

Turn over ►

1 8 . 2

To what extent do the data suggest that the amount of natural gas production in a country affects natural gas prices for households in that country?

Use the data in **Extract A** to support your answer.

[6 marks]

The data in Extract A largely support the view that higher natural gas production is associated with lower prices for households. Russia has the highest production, 699 billion cubic metres, and the lowest price, \$0.01 per kilowatt hour. Canada has the second highest production, 205 billion cubic metres, and the second lowest price, \$0.05. Germany has the second lowest production, only 5 billion cubic metres, and the highest price, \$0.24 per kilowatt hour.

However, the relationship is not perfect. Brazil has the third highest production, 23 billion cubic metres, yet the second highest price, \$0.23, almost as high as Germany. South Korea produces no natural gas (0 billion cubic metres) but has the third highest price of only \$0.06, very similar to Canada's \$0.05 even though Canada produces 205 billion cubic metres. So, although the rank order mainly supports the inverse relationship, some of the differences in the values are significant.

The data are also limited: they cover only five countries and a single year, 2022, so it is difficult to make a firm judgement. Other factors also affect household prices, such as the volume and cost of imports of natural gas, the price of other fuels, the level of demand, government subsidies and the level of indirect taxes, which may explain why South Korea's price is low and Brazil's is high.

Overall, the data suggest that, to a large extent, the amount of natural gas production affects household prices, as higher production is generally associated with lower prices, but the Brazil and South Korea figures show that production is not the only factor.

12



1 9

Extract B (line 22) states: 'Production may also be too low to take full advantage of economies of scale'.

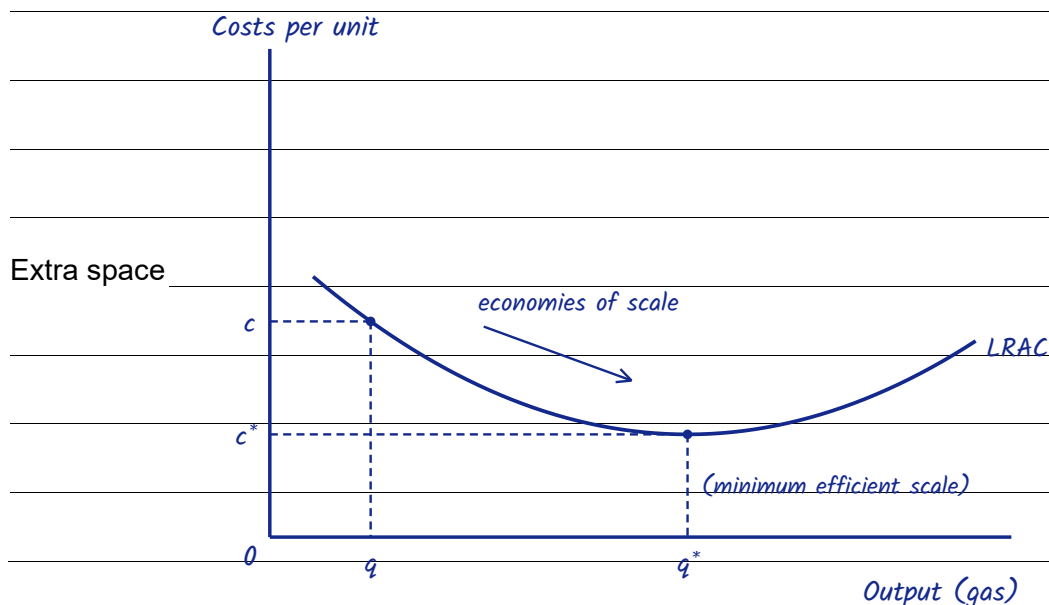
With the help of a diagram, explain why producing a low amount of natural gas may result in a high long-run average cost.

[9 marks]

The long run is the period in which all factors of production are variable, so a firm can change its scale of production. Long-run average cost (LRAC) is total cost divided by output when all factors are variable, ie the cost per cubic metre of gas. Long-run costs of gas production include drilling, pipelines, storage and skilled labour.

Economies of scale are the fall in long-run average cost that results from an increase in the scale of production. Gas production has very high fixed costs: a drilling rig, a pipeline network or a processing plant costs the same whether it handles a small or a large amount of gas. At a low output q , shown in the diagram below, these indivisible fixed costs are spread over only a few units, so LRAC is high at c . As output increases towards q^* , the fixed costs are spread over many more units and LRAC falls to its minimum at c^* , the minimum efficient scale.

There are other internal economies of scale that a small producer cannot take advantage of. Technical economies: larger pipelines and storage tanks have a lower cost per unit of capacity, since capacity rises faster than the cost of materials (the



Turn over ►



container principle). Purchasing economies: large producers bulk-buy pipes and equipment at a discount. Financial economies: large firms borrow at lower interest rates as they are seen as less risky. A small gas industry also misses external economies, such as specialist suppliers and trained workers.

Therefore a country or firm producing a low amount of natural gas, such as Germany with only 5 billion cubic metres in 2022 (Extract A), is likely to be operating at q on the falling part of the LRAC curve, too low to take full advantage of economies of scale, so its long-run average cost is high.

9

2 0

Extract C (lines 6–7) states: ‘the price of gas fluctuates, as it does for many commodities including foods such as wheat.’

Analyse the likely causes of fluctuations in commodity prices.

[12 marks]

Commodities are raw materials or primary products, such as natural gas, oil, copper or wheat, which are largely homogeneous and are traded in large quantities on world markets. Price fluctuations are large and frequent rises and falls in price over time. In a free market, price is determined by demand and supply, so commodity prices fluctuate because demand and/or supply change frequently and by large amounts: prices rise when supply falls or demand rises, and fall when supply rises or demand falls.

On the supply side, agricultural commodities such as wheat are very dependent on the weather. A drought, flood or disease can destroy a large part of a harvest, so the supply curve shifts to the left from S_1 to S_2 , creating excess demand at P_1 and pushing the price up to P_2 , as shown in the diagram. A good harvest has the opposite effect.

Supply of gas can also be disrupted by problems affecting delivery, such as a damaged pipeline, a war or sanctions affecting a major producer like Russia, the world's largest producer in Extract A with 699 billion cubic metres. Changes in costs of production, such as energy and fertiliser prices, also shift supply.

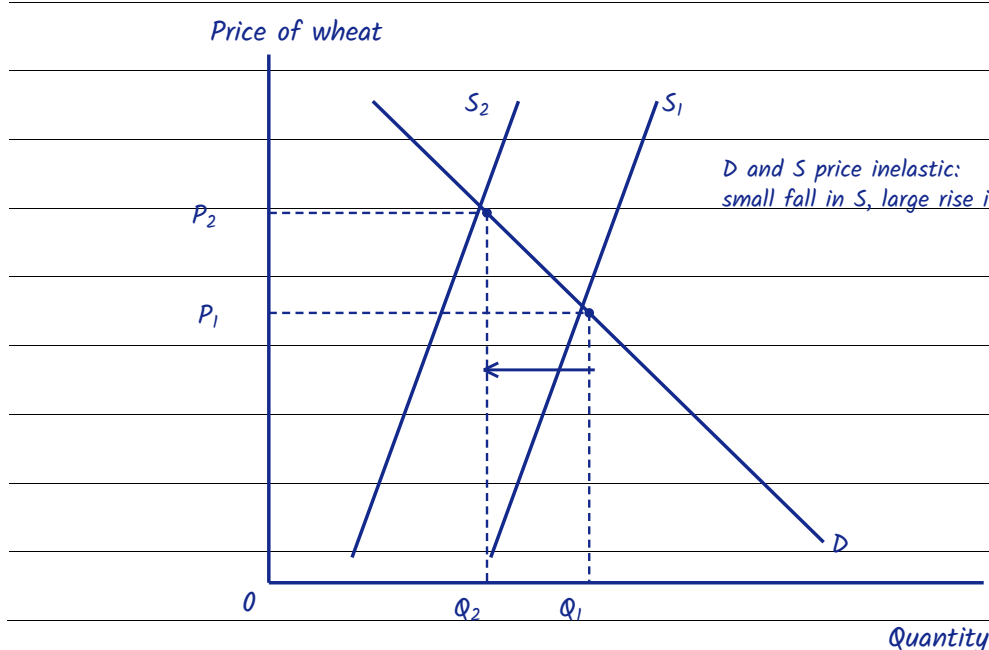
These supply shifts cause large price changes because both demand and supply are price



inelastic. Supply is inelastic in the short run because of the time taken to increase output: wheat takes months to grow and new gas fields take years to develop; the UK's PES for gas of only 0.1 shows that output barely responds even when price more than doubles. Demand is also inelastic because commodities are necessities with few substitutes: households must heat their homes and people must eat. With steep curves, even a small shift in supply leads to a large change in price, as from P_1 to P_2 .

On the demand side, rising incomes in fast-growing economies such as China and India increase the demand for energy and food, shifting demand to the right and raising prices, while a global recession reduces demand and causes prices to fall sharply. Cold winters increase demand for gas. Uncertainty about the future and speculation also matter: if traders expect prices to rise, they buy commodities now, which increases demand and makes the price rise, so expectations become self-fulfilling and fluctuations are exaggerated.

Finally, government intervention, such as export bans, taxes, stockpiling or subsidies, can suddenly change demand or supply. Overall, commodity prices fluctuate mainly because frequent shifts in supply and demand occur in markets where both curves are price inelastic.



2 1

Extract B (lines 9–10) states: 'In Brazil, some regions encourage fracking, but others do not.'

Use the extracts and your knowledge of economics to assess whether governments should encourage fracking or not.

[20 marks]

Fracking (hydraulic fracturing) is a method of extracting natural gas by pumping water, sand and chemicals at high pressure into shale rock to release the gas. Natural gas is a scarce, non-renewable resource, and demand for energy is growing in most countries (Extract B). In a free market, the price mechanism allocates resources: high gas prices signal scarcity and give firms an incentive to use fracking to increase supply. The question is whether governments should go further and encourage fracking, for example through subsidies, tax breaks, granting licences or removing bans.

There are strong arguments for encouraging fracking. First, it increases the domestic supply of natural gas. As shown in Extract A, countries with high production tend to have lower household prices: Russia produced 699 billion cubic metres and households paid only \$0.01 per kilowatt hour, whereas Germany produced 5 billion cubic metres and paid \$0.24. More supply shifts the supply curve to the right, lowering prices for households and firms, which raises real incomes and reduces costs of production, making firms more competitive. Extract C shows that UK prices rose from \$0.03 to \$0.07 per kilowatt hour between 2021 and 2022, so more domestic supply could reduce such price rises and the fluctuations that hurt consumers.

Second, fracking creates jobs and incomes, directly in drilling and indirectly in supplying industries, and generates tax revenue for governments that can be spent on public services. Extract B refers to the success of fracking in the US, where it helped make the country one of the world's largest gas producers, bringing lower energy prices and many new jobs. Third, higher production allows producers to take advantage of economies of scale: Extract B notes that production may be too low to take full advantage of economies of scale, so encouraging fracking could lower long-run average



costs. Fourth, domestic production reduces dependence on imports, improving energy security, and gas produces less carbon dioxide than coal, so it may act as a bridge in the move away from coal.

However, there are strong arguments against. Fracking creates negative externalities: costs suffered by third parties that are not taken into account by producers. These include the risk of polluting groundwater with chemicals, small earthquakes, noise and heavy traffic for local residents, leaks of methane, and the carbon emissions when gas is burnt, adding to climate change. As shown in the diagram at the end of this answer, firms produce where marginal private cost (MPC) equals marginal private benefit at Q_1 , but the marginal social cost (MSC) is higher, so the socially optimal output is Q^* . The market already overproduces, and there is a welfare loss shown by the shaded triangle. If the government encourages fracking with a subsidy, output would rise even further beyond Q^* , increasing the misallocation of resources.

There is also information failure: the long-term effects of fracking on health and the environment are uncertain, and residents and firms may not have full information about the risks. This is probably why, as Extract B states, in Brazil some regions encourage fracking but others do not, as the costs and benefits differ between areas depending on population density, geology and water supplies.

Furthermore, encouragement has costs. Subsidies and tax breaks have an opportunity cost, as the money could be spent on healthcare, education or on renewable energy.

Extract C suggests that governments could focus more on renewable energy such as wind and solar, which is sustainable and does not create the same negative externalities. Encouraging fracking may lock a country into fossil fuels for decades. In addition, it takes a long time for fracking to increase production, since sites must be explored and wells drilled, so it may do little to reduce prices in the short run when they are highest.

Fracking is also not possible everywhere, as it depends on the presence of suitable shale

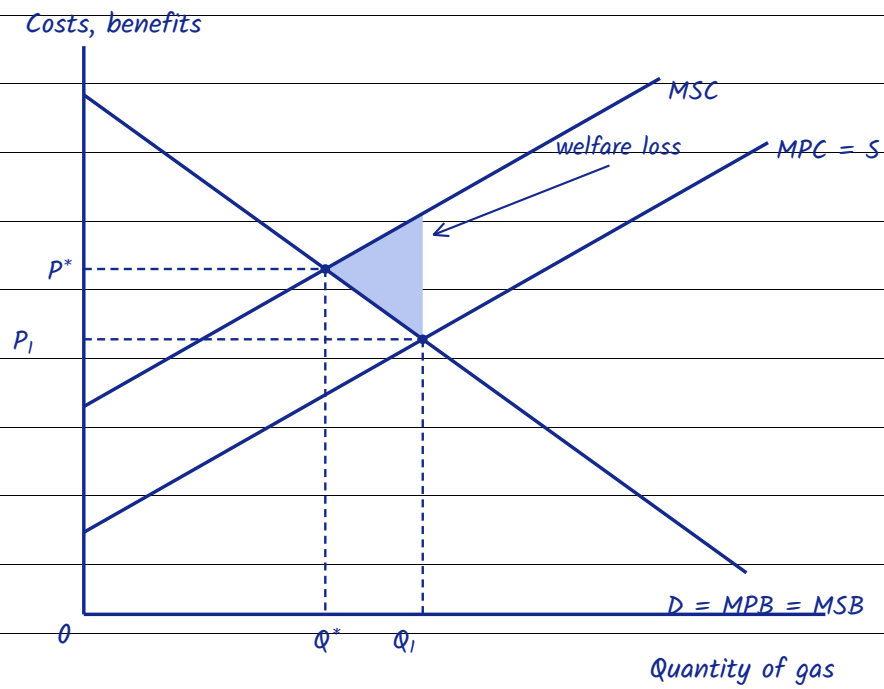
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Extra space rock, so it is not an option for some countries. Where it is possible, it may not make a significant difference: natural gas is traded internationally, so the extra output of one country may have only a small effect on world prices, especially with growing energy needs in most countries. There is also the risk of government failure: governments may lack the information to know the right level of support, or be influenced by lobbying from energy firms, leading to a misallocation of resources. Whether governments should encourage fracking therefore depends on several factors. First, it depends on the size of the external costs compared with the benefits; in remote, sparsely populated areas with suitable geology the external costs may be small, whereas in densely populated areas they may be large. Second, it depends on whether governments can regulate effectively, for example by using taxes, fines or strict environmental standards so that firms pay the full social cost and output moves towards Q^* . Third, it depends on the country's energy needs and alternatives: a country that imports most of its gas and has few renewable resources has more to gain, while a country with good wind and solar resources may be better investing in those. Finally, the experience of different countries matters, as the US success may not be repeated elsewhere if costs or geology differ.

In conclusion, I do not think governments should actively encourage fracking with subsidies, as the market already produces too much because of the negative externalities, and the money has a high opportunity cost compared with investment in renewables. However, they should not necessarily ban it either. The best approach is to allow fracking only in suitable areas, as some regions of Brazil do, with strong regulation and taxes that make firms pay for the external costs, so that countries can gain the benefits of lower prices, jobs and energy security shown in the US while moving towards renewable energy in the long run.





END OF QUESTIONS



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