

Answer **all** questions.

Question 1

The UK Telecommunications Industry

Telecommunications companies compete by offering more attractive terms to their customers. Table 1 compares the features and prices of mobile plans offered by different companies within the UK.

Table 1: Mobile plans by UK telecommunications companies

Company		Giffgaff	O2	Three Mobile	Tesco Mobile
Mobile plan features	Minutes of talk time	250	250	200	250
	Number of SMS	Unlimited	Unlimited	Unlimited	5000
	Data allowance	500 MB	250 MB	500 MB	500 MB
Price per month		£7.50	£10.00	£11.00	£7.50

Source: USwitch.com

Table 2: Selected statistics for Giffgaff, 2012-2014

Year	2012	2013	2014
Profit (£ millions)	– 29	2	8
Customers (thousands)	795	1200	1594

Source: Giffgaff, 2015

Extract 1: Giffgaff proves your customers can run your business for you

In 2014, Giffgaff, the mobile phone network run by its customers, acquired another 400,000 members last year. Giffgaff is a 'virtual' operator: it operates online only.

Giffgaff is a telecommunications company built by its parent company, O2, another telecommunications company, despite the saturated nature of the UK telecommunications industry. It runs on O2's existing network infrastructure, but is operated by a different management team. Unlike Giffgaff, O2 primarily operates through physical stores, and charges higher for similar mobile phone plans. The last of the 'virtual' operators to come to market, Giffgaff – launched as an experiment in 2009 by O2 – has overtaken almost 160 others by promising low prices, no contracts, and fair treatment of customers.

Giffgaff incentivises its members to provide customer service to other customers by paying them: the more value you bring to the business, the more money you will make. Existing Giffgaff members are paid for introducing new users to Giffgaff, or for helping to answer queries on Giffgaff's online forums. To date, Giffgaff has paid out £11 million to members for their services, and does not operate a customer service hotline, unlike its parent company, O2. This system seems to work: Giffgaff says that the average response time for questions is just three minutes, day or night.

Source: Telegraph UK, 2015

Extract 2: Quality of mobile coverage poor in rural UK despite saturated industry

Some 78% of people in urban areas were satisfied with their mobile network, compared with 67% in rural parts of UK, says Ofcom, the regulatory authority in the UK for the telecommunications industry. Partial 'not-spots', where there is coverage from some but not all of the mobile networks, affected a fifth of the UK, leaving people unable to make calls or send text messages when they are not on the right network. Because of such problems, people in rural areas of UK frequently stick to alternatives such as fixed line phone services (delivered through wires connected to homes).

Masts in urban areas cannot serve rural areas due to the large distances involved. To be covered effectively by mobile networks, investment in infrastructure must be undertaken in rural areas. Masts, which are tall and large fixed structures designed to support antennas for telecommunications, must be constructed near the region that is served by the mobile networks for mobile phone users to make calls or send text messages.

Source: BBC, 2014

Extract 3: UK Government announces deal to improve mobile coverage across rural UK

The UK Government has secured a deal with four leading mobile networks to improve mobile coverage across the UK, partially for greater fairness. The terms of the agreement include:

- Embarking on a £5 billion investment programme to improve mobile infrastructure by 2017;
- Guaranteed voice and text coverage from each operator across 90 per cent of the UK geographic area by 2017, halving the areas currently suffering from patchy coverage as a result of partial mobile coverage in certain rural areas;
- Provide reliable signal strength for all mobile services – this will enable consumers to receive mobile signals long enough to complete a mobile phone call; and
- Make the deal legally binding – it will be enforceable by Ofcom.

No direct cash payments will be made by the UK Government to the mobile networks as part of this agreement. To tackle 'not-spots', the UK Government has provided £150 million to develop infrastructure to increase mobile coverage in rural areas. This decreases the expenses incurred by firms operating in rural areas. An executive of O2 commented, "A partnership between government and the mobile operators is required to maximise coverage across the UK, so this agreement is a good outcome for our customers. It will support investment in our network, while ensuring that strong competition remains between the different networks."

Source: UK Government, 2014

Extract 4: Three promises mobile coverage to rural areas if merger with O2 approved

Three has promised to get mobile coverage into rural areas with no reception and reach 99 per cent of customers if its £10.5 billion merger with O2 gets the thumbs-up. Its Chief Executive said that by sharing masts, Three and O2 will reach areas known as not-spots, where mobile and internet signals are poor. The suggestion is the latest by Three as it tries to secure approval Ofcom, which has spoken out against the deal because it will reduce competition. If the deal goes ahead, Three has also pledged cheap mobile plans for pensioners, offering calls and text bundles for £5 a month.

Ofcom has set a target for mobile operators to reach 90 per cent of geographical coverage of the UK by 2017 – which Three says it will surpass if it merges with O2. The Chief Executive of Three says: 'There are some really exciting things for UK consumers that stand to come out of this. Coverage is a fairly regular topic of conversation, in terms of not being able to get signal at home, or in a field when you're walking the dog. Coverage of 99 per cent is a very significant number. It's in excess of what O2 has today. Putting the two companies together will definitely surpass the target of 90 per cent geographic coverage the Government has set.'

O2 and Three are the second and the fourth largest mobile network operators in the UK respectively, but combined they would become the biggest in the market, with 31 million customers. A takeover would reduce the number of large mobile network providers in the UK from four to three. The deadline for the decision on the merger is soon. Three's Chief Executive commented: 'We are getting towards the end of the process; I'm excited that we will be hearing the decision quite soon.'

Source: The Daily Mail, March 2016

Extract 5: Merger between Three and O2 blocked

Three was a magic number. At least, that was what mobile-phone operators and regulators in believed a few years ago. Letting just three dominant rival companies compete inside each national market would supposedly produce decent outcomes. Customers would benefit from enough competition; firms, despite mature markets with already high penetration rates, would get profits plump enough to allow them to invest in infrastructure, such as for rolling out better quality 4G and 5G services.

However, such conventional wisdom is being questioned. Last week, the merger of British telecommunication companies Three Mobile and O2 was blocked. Ofcom, Britain's communications regulator, was anxious that a lack of competition would hurt consumers and businesses.

Ofcom's own research in 25 countries shows that average prices were up to one-fifth lower in markets with four network operators than in those with three. As for spending on networks, analysis from Ofcom has also found "no link between a higher concentration in mobile markets and an increase in investment".

Some in the industry are dismayed. "Both EU and UK regulators seem only concerned with pricing and don't think of the bigger picture," complains the head of a telecommunications consultancy firm. He believes that mergers of mobile companies will offer lots of efficiencies that create win-win situations for both consumers and mobile companies.

Source: Telegraph UK and The Economist, May 2016

Questions

- (a) Based on Table 1, which is the most competitive telecommunications company in the UK? Justify your answer. [2]
- (b) Why might a telecommunications company such as O2 want to set up a second telecommunications company such as Giffgaff? [4]
- (c) Explain how the difficulty in deploying masts in urban areas to serve rural areas (Extract 2) is a case of factor immobility. [2]
- (d) Assess the impact of developments in Extract 3 on the extent of change in sales volume of mobile plans in rural UK. [8]
- (e) Explain **two** reasons a lack of competition in the UK telecommunications industry will 'hurt consumers' (Extract 5). [4]
- (f) Evaluate the factors that likely determined why the UK Government blocked the merger between Three and O2. [10]

[Total: 30]

Suggested Answers and Mark Scheme

- (a) Based on Table 1, which is the most competitive telecommunications company in the UK? Justify your answer. [2]**

1m for identifying company and 1m for reason.

Giffgaff. [1] Among the four providers in Table 1, Giffgaff's mobile plan provides the best features (in terms of talktime, SMS, mobile data) at the lowest price. [1]

Examiners' overall comments:

- Most candidates received the full 2 marks; only a handful of candidates did not manage to identify Giffgaff as the most competitive telecommunications company.
- Some candidates did not attain the 2nd mark because they did not compare Giffgaff with all telecommunications companies (e.g. only compared with Tesco Mobile). Others did not attain the 2nd mark because they did not compare on both the basis of price as well mobile plan features.

- (b) Why might a telecommunications company such as O2 want to set up a second telecommunications company such as Giffgaff? [4]**

Up to 2m for each of the two best reasons explained. 1m for reason, and 1m for link towards total revenue/total cost and therefore profits. Cap at 3m if 2 revenue advantages OR 2 cost advantages explained.

Possible reasons:

- **Revenue advantages**
 - As a way of discriminating between individuals whose demand for mobile services is more price inelastic (served by O2; possibly groups with higher income) and those whose demand is more price elastic (served by lower priced Giffgaff; possibly groups with lower income and therefore may search extensively for bargains) to increase revenue and, therefore, profits.
 - As a method of non-price competition: Giffgaff promises no contracts and fair treatment of its customers, and a quick response time to questions posed online. This may increase the demand for telecommunications services, increasing revenue and, therefore, profits, ceteris paribus.
 - To diversify its product offering and increase market share: Giffgaff is aimed at tech-savvy customers who may want prompt customer service online. This can increase the firm's demand, and, therefore, profits.
- **Cost advantages**
 - Giffgaff runs on O2's existing network infrastructure and such infrastructure can be better utilised with more customers on a network. As output increases, AFC falls. This increases the profitability of O2.
 - To reap internal (marketing) economies of scale. Due to the increased scale of production, Giffgaff and O2 may purchase mobile phones from mobile phone companies at lower cost; as output increases, LRAC falls. This increases the profitability of O2.

Do not accept managerial economies of scale because Giffgaff is a separate firm.

Accept answers that understand that O2 is still the parent company of Giffgaff – definition of 'firm' up to students to define.

For an answer that only provides multiple explained examples of internal EOS, cap at 3m (no revenue advantages).

Examiners' overall comments:

- Most candidates understood that this question required them to consider the firm's point-of-view.

Skills related issues:

- No introduction is required for short questions – avoid wasting precious time.
- Since firms can be assumed to be profit-maximising, and $\text{profits} = \text{TR} - \text{TC}$, it is a useful approach to consider both revenue and cost side factors separately. This will ensure sufficient breadth of your answer.
- When referencing costs of a firm, please be specific – you should clearly identify whether you are referring to total costs or average costs, and fixed costs or variable costs.

Content related issues:

- Usage of existing network infrastructure owned by O2 is not an example of internal (technical) economies of scale because the scale of production is not increased. This advantage can be explained in terms of a fall in AFC.
- There was some confusion between prices and cost. Price refers to the dollar value of the transaction in the goods market. Cost refers to the dollar value of what a firm pays for factors of production used in the production of the good.

(c) Explain how the difficulty in deploying masts in urban areas to serve rural areas (Extract 2) is a case of factor immobility. [2]

1m for identifying this as a case of geographical immobility OR defining factor immobility, and 1m for elaboration. No credit for explaining how factor immobility leads to market failure.

Factor immobility occurs when it is difficult to employ factors of production for other uses. The difficulty in employing masts in urban areas to serve rural areas is a case of geographical immobility [1] because masts are tall and large fixed structures (Extract 2) that are unable to be easily moved to a different location [1].

Examiners' overall comments:

- For full marks, candidates had to demonstrate understanding of the concept of factor immobility.
- The issue is not about the inability of masts situated in urban areas in serving rural areas; the issue in question is about the movement of such masts.
- Answers referencing the building of masts were also not accepted because this was not asked about in the question.
- A good answer would ideally show some understanding of the definition of factor immobility.

(d) Analyse the impact of developments in Extract 3 on the extent of change of sales volume of mobile plans in rural UK. [8]

Suggested approach: Consider which direction equilibrium quantity of mobile plans changes in via demand/supply analysis. Extent/magnitude of change may be discussed via PED/PES values.

Direction of change:

- DD factor:
 - Reliable signal strength (Extract 3) leads to an increase in DD because of changes in tastes and preferences/improvement in quality of services.
- SS factor:

- UK Government providing £150 million to develop infrastructure (Extract 3) decreases COP of firms operating in rural UK, increasing SS.
- Overall: Since DD increases and SS increases, equilibrium quantity (sales volume) of mobile plans rises unambiguously.

Magnitude of change:

- $|PED|$ likely > 1
 - Substitutes available to mobile phone usage such as fixed line phone services (Extract 2). When SS increases, there will be a small decrease in price and large increase in equilibrium quantity.
 - There is likely to be a **large** increase in equilibrium quantity.
- PES likely < 1
 - Factor immobility in the telecommunications industry (from **(c)**).
 - Impossible to divert FOP such as masts from one location to another to increase output in rural UK. Price changes will lead to less than proportionate changes in quantity supplied.
 - There is likely to be a **small** increase in equilibrium quantity.

Possible evaluative comments:

- Combination of both demand and supply changes will lead to a large change in equilibrium quantity.
 - Even though PES < 1 , limiting the extent of increase in equilibrium quantity due to demand increases, there exists a simultaneous increase in supply, and $|PED|$ likely to be > 1 .
- PED and PES likely to change in long-run.
 - Government may build new infrastructure in rural areas, increasing PES.
 - Spending habits may change in the long-run when consumers start realising the changes in the quality of mobile services, increasing magnitude of PED.
 - More likely that there are larger increases in equilibrium quantity in the LR.
- Overall increase in sales volume also depends on how much DD and SS increase by.
 - Substantial reduction in COP by the UK Government, which is likely to lead to a large increase in SS.
 - Increase in DD may take time, because tastes and preferences do not change overnight. Information about mobile service quality is not obtained immediately.

Level	Knowledge, Understanding, Application and Analysis
L3 (5 – 6)	For an answer that provides a detailed and analytic explanation of the impact of the developments on sales volume. Answer should contain considerations of elasticities.
L2 (3 – 4)	For an underdeveloped explanation about the impact of the developments on sales volume. If the extent of increase of sales volume is not considered, max L2.

L1 (1 – 2)	For an answer that shows some knowledge of demand and supply factors based on the developments in Extract 3, and/or for an answer that does not use the developments in Extract 3 at all.
E2 (2)	For an answer that uses analysis to support a judgement about the impact of the developments on the extent of change of sales volume. Judgement must directly address the 'extent' of change.
E1 (1)	For an unsupported judgement about the impact of the developments on the extent of change in sales volume. Judgement must directly address the 'extent' of change.

Examiners' overall comments:

- There was a wide range of responses to this question. Most often, what determined whether candidates were able to do well was if candidates were able to identify a suitable economic model to use (in this case, the demand/supply model).
- The question clearly referenced the 'extent of change', suggesting considerations of price elasticities of demand and supply were necessary.
- Sales volume is quantity, not total revenue. This was a very common misinterpretation of the question.

Skills related issues:

- Since the question referenced the 'extent of change', a good answer should reference both the direction and magnitude of changes in quantity.
- Use contextual material to substantiate changes in demand and supply, and PED and PES values. Sometimes, earlier questions can provide hints for subsequent questions. In this CSQ, part (c) suggested that there was factor immobility present, and therefore PES may be < 1 .

Content related issues:

- Many candidates were unable to relate a fall in cost of production to a rise in supply. These candidates immediately linked a fall in cost of production to a fall in price. This reduced the level of analysis.
- XED cannot be used in this case because there are no changes in the prices of related goods.
- This question focused on mobile plans in the entire market; not just that of one firm. It is inappropriate to justify the PED value as > 1 based on the 'availability of substitutes' due to the existence of more than 1 firm.

(e) Explain two reasons a lack of competition in the UK telecommunications industry will 'hurt consumers' (Extract 5). [4]

Up to 2m for each way consumers may be affected, up to a maximum of 4m.

Impact on consumers should be explained in terms of price (linked to consumer surplus), choice or quality. **Positive impacts will not be accepted.**

Possible impacts:

- Three and O2 will become the largest firm in the market after merger. (Extract 4) This raises their market power, enabling them to raise prices to increase profits in future. This will reduce consumer surplus.
- With fewer firms in the market, the choice of mobile plans may be reduced (i.e. will not see the variety of combinations of different features seen in Table 1). Therefore, consumers may be negatively affected.

- With an even larger market share, the merged company may not see a need to continually innovate to provide better quality services to its customers. This reduces any potential improvement in quality that firms may undertake to provide as a form of non-price competition.

Examiners' overall comments:

- Most candidates were able to identify areas of concern to consumers (price, choice, quality) when there was a lack of competition. However, the quality of these explanations differed greatly.
- Candidates should consider more than one way that consumers are affected. For example, if both points raised were related to prices, then this was only considered one aspect and therefore one way consumers were negatively affected.
- Answers should clearly distinguish whether consumers are hurt because quality and choice worsens, or whether they are hurt because of no improvement in quality and choice.

Skills related issues:

- Again, no introduction is required for short questions.
- Do not explain how competition benefits consumers when the question asks you to consider how a lack of competition hurts consumers.
- Apply the context given. For example, when considering choice, explain precisely what lower choice means in the context given.

Content related issues:

- X-inefficiency is a different issue to innovation and dynamic efficiency. X-inefficiency is about complacency about costs, not about whether they will innovate or not.
- This question focuses on consumers; if candidates offered how areas of performance of the firms and society were affected, these were not accepted.
- Quality is not the same as choice. Do not mix them up.

(f) Evaluate the factors that likely determined why the UK Government blocked the merger between Three and O2. [10]

Suggested approach: Identify factors that are relevant for government decision making, and elaborate/provide examples of how it may choose between blocking the merger or not. An assessment can then be made about the importance of the factors.

Possible factors, and why they are important:

- **Relative extent of market failure** from inequity (unfairness of poor mobile coverage in rural UK referenced in Extract 3) and inefficiency due to market dominance – affects choice between allowing Three and O2 to merge, and to block the merger. Important because the government has to decide which market failure to prioritise – competing objectives of efficiency and equity. If the UK Government decides that guaranteed coverage of 90% of UK is a fair enough level, compared to the 99% offered by Three and O2, then they may block the merger. Otherwise, they may approve the merger.
 - This point may instead be expressed in terms of the relative extent of market failure arising from factor immobility and market dominance. From the government's response of blocking the merger, it seems to have judged that the additional social benefit of raising mobile phone coverage from 90% to 99% of UK is less than the additional opportunity cost to society – that there will be increased market dominance and therefore a larger deadweight loss in the telecommunications industry.

- **Feasibility** – affects choice between the government undertaking infrastructure development, or the private sector undertaking such development. Important because if the government's budget balance is in a persistent deficit, undertaking large government expenditure may not be an option and the UK Government may thus choose to approve the merger between Three and O2 instead. However, if the UK Government deems that its budget position is healthy, it may choose to block the merger and undertake the infrastructure development via government expenditure.
- **Side-effects/trade-offs** – allowing or disallowing firms to merge depends on the efficiencies they generate too. If a firm is not allowed to merge, efficiencies that may be generated (e.g. productive efficiency due to increased internal EOS reaped and dynamic efficiency due to product/process innovation that may be carried out due to increased supernormal profits) when firms are large may not be reaped. If the government deems that allowing firms to merge may lead to improvements in productive and dynamic efficiency, then it may choose instead to approve the merger between Three and O2. If these positive side-effects the merger generates are limited, then they may choose not to approve the merger between Three and O2. The UK Government may have considered that the latter is likely to be the case because investment in infrastructure was limited, and less competition is likely to reduce the incentive for such investment.
- **Time period** – The government may consider both the short-term and long-term impact of a merger between Three and O2. Although it has been promised that the geographical coverage of mobile services will increase, and cheap mobile phone plans for pensioners, these benefits (from society's point of view) may be more than costs in the short-term. In the long-term, Three and O2 may exploit their increased market power to raise prices to increase profits. This will increase deadweight loss due to market dominance in the long-term.
- Etc... Accept any reasonable factor.

Possible overall evaluation:

(Make a judgement about what factors are likely to be more important than others and why, and link it towards the choice of government intervention within the data.)

- E.g. Relative extent of market failure is the most important factor because the aim of the government's intervention is to correct market failure. Since the government has chosen to block the merger, it likely deems that the possible deadweight loss that arises from market dominance is greater than that from factor immobility.
 - Feasibility is not likely to an important factor in this case because the UK Government has already decided to embark on the mobile network infrastructure investment programme (Extract 3).
 - It is likely that the UK Government deemed that the possible efficiencies arising from the merger are likely to bring about less benefits to society than the possible costs as a result of increased market dominance.
 - Etc.

Level	Knowledge, Understanding, Application and Analysis
L3 (7 – 8)	For a well-developed and well-contextualised answer. The importance of each factor is well-elaborated on, with appropriate examples of policy choices used to illustrate the argument. Factors discussed are important to the context provided.

L2 (4 – 6)	For a contextualised but underdeveloped discussion about the factors affecting the UK Government's decision making with a focus on achieving allocative efficiency. Factors chosen for discussion may not be of critical importance.
L1 (1 – 3)	Answers at this level may not answer the question (e.g. a full-fledged discussion about possible policies to undertake without a focus on factors affecting decision-making). They may also undertake a superficial, list-like approach of factors that the government should consider.
E2 (2)	For an answer that <u>uses analysis to support a judgement</u> about what the key factors that determine the UK government's interventions are. Judgement should be about 'factors', not just the method of government intervention. Judgement should not be about whether the UK Government's move to block the merger was justified or not.
E1 (1)	For an <u>unsupported</u> judgement about factors determining the UK Government's choice of intervention. Judgement should be about 'factors', not just the method of government intervention. Judgement should not be about whether the UK Government's move to block the merger was justified or not.

Examiners' overall comments:

- The gist of this question is that the government has many considerations when making a policy choice. When faced with different considerations, and with each consideration suggesting a different policy option, the government has to weigh its costs and benefits and consider the opportunity cost of its policy choice. This CSQ considered market failure arising from market dominance, and also consider issues of market failure arising from factor immobility and inequity. The best answers recognised the context provided well.
- There was a large variation in the quality of responses to this question. The most common pitfall was thinking that the government solely considered consumers' welfare when determining whether to block the merger – the social perspective of the government was largely absent. This showed a lack of understanding of the big picture view (e.g. micro and macro goals) that the government takes.
- Also, it was common to misinterpret the question as one asking about whether the move to block the merger was justifiable or not. This question is about the factors that the government considered – consider instead which factors are likely to be the most important in influencing its decision.
- A common (valid) approach was to consider the different areas of performance from the point-of-view of society (e.g. productive efficiency, allocative efficiency, dynamic efficiency and equity). However, the quality of such explanations, and their application to the context given, differed.

Skills related issues:

- Clearly answer each question within the topic sentence of each paragraph to avoid going out of point. For example, candidates should clearly state what factor the government considers at the start of each point.
- The merger does not create a monopoly. Consider the context as given.

Content related issues:

- It was common to argue that the merger will lead to market dominance, leading to market failure due to allocative inefficiency. However, it is more accurate to say that the merger will worsen market failure. Even better answers drew diagrams to show

how deadweight loss increased when mergers occurred. However, such diagrams should ensure that their demand curves do not cross.

- Many points raised were not substantiated well. For example, if candidates wish to argue for the possibility of predatory pricing or price wars occurring after the merger, they should clearly explain why this is so (e.g. higher supernormal profits or cost advantages suggest the merged firm is better able to withstand the price war and thus capture market share etc.).
- Quite a number of students referenced LRAS when they actually meant LRAC.