



Assessment of Competition Models for Heathrow Expansion

Lessons from telecommunications and implications for the CAA's proposed regulatory approaches

Prepared for Heathrow Airport Limited

Martin Duckworth
Berkeley Research Group, LLC
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I Executive Summary

I.A Scope of this report

1. The CAA is consulting on potential future regulatory models to support expansion at Heathrow. In November 2025 the CAA produced a ‘long list’ of regulatory models. In the current consultation, the CAA has proposed a short list of 5 potential regulatory approaches (which are not mutually exclusive):
 - A package of improvements in HAL’s governance of large-scale projects; (Models 1,2 and 4a)
 - Adjustments to the form of the regulation, such as lengthening the charge control period or restrictions on returns; (Model 3)
 - Three competition-based models:
 - A competitive tender approach for design and build of separable assets (4b);
 - A ‘competition for the market’ model where bidders compete for the opportunity to design, build and operate separable assets for a payment stream from HAL (5b); and
 - A ‘competition within the market’ model where an entrant designs, builds and operates a terminal and competes with the incumbent, HAL, in the provision of Airport Operation services (AOS) (7b).
2. The CAA considers that models which introduce competition could, in principle, increase efficiency both in terms of overall cost of the scheme, and the cost of finance, compared to the current model where HAL continues to be the single owner/ operator at Heathrow. The CAA outline that this could “provide incentives for parties to achieve efficient costs and service levels”.
3. We have been asked to assess these competitive models against their likelihood of delivering the desired outcomes stated by the CAA, and in particular, seen against the backdrop of the introduction of more competition in other sectors, such as telecoms. The experience of introducing competition in the UK telecoms market is particularly interesting because there are similarities between Heathrow airport and the UK telecom market (at the time when it was liberalised): (i) entrants will be competing with a vertically integrated incumbent with market power, with which they will need to interact to deliver services; (ii) competition will be based on investment rather than the ‘asset light’ service-based competition introduced in some regulated sectors such as retail energy supply; and there is a significant degree of uncertainty about future costs and revenues due to cyclical effects and technological innovation.
4. The telecoms experience provides insights into two interrelated questions:
 - i. What are the conditions that need to be put in place to ensure investors are willing to commit funds to build and operate competitive assets at Heathrow; and

- ii. What are the conditions that are required for competitive entry to deliver benefits to end users, compared to the counterfactual of an evolution of the current regulatory framework.

I.B Lessons from telecoms

5. Key messages from the experience of facilitating infrastructure-based market entry in the telecoms sector are:
 - A duopoly, which is the likely result of the model which aims to deliver competition for AOS (Model 7b), did not prove sufficient to deliver effective competition in telecoms, with a need for continued retail price regulation to protect end users from excessive prices;
 - Before committing significant expenditure on operating assets (i.e. Model 5b/7b), investors will require clarity on the regulatory framework, its effect on revenues and cost and the interaction with incumbent. Depending on the operational complexity of the interfaces between the incumbent and entrant, this framework can take a number of years to put in place. In telecoms markets, entrants have been able to initially limit investment, for example rolling out at a small scale whilst the framework is being developed to maintain optionality. At Heathrow, investors may simply defer committing expenditure until the framework is in place;
 - Given the downside risks faced by entrants seeking to compete with the incumbent in downstream markets (i.e. Model 7b), investors want the possibility of returns above the cost of capital leading to a trade-off between providing investment incentives to entrants and constraining end user prices through regulation of the incumbent. Ofcom has, in recent years, allowed prices to rise to provide a 'fair bet', assessing that the long-term benefits of investment by BT and competitors outweigh the short-term costs of higher prices.

I.C Implementation issues

6. At this stage, the competition models being consulted on by the CAA are described only at a very high level. To assess their relative strengths and weaknesses, we also consider and suggest the additional contractual and regulatory arrangements that would need to be in place to make each model workable and attractive to investors, drawing on experience from telecommunications.
7. An approach based on tendering for design and build does not raise significant issues (4b), given that this is a well-established commercial model that we understand Heathrow currently utilises for some procurement. The approach does not introduce a need for long-term third party investment and the investment will be included in HAL's RAB and so will not require significant adjustment to the regulatory framework for pricing.
8. A tender for design, build and operate (5b) may work well for assets where the ongoing costs of operating and maintaining the asset are relatively small and certain, and hence returns are predictable. However, if ongoing expenditure is limited, any additional efficiency benefits compared to a design and build model would in turn be relatively small. Applying Model 5b to more complex assets where ongoing expenditure would be relatively high, there would be uncertainties over future revenues or ongoing dependences on HAL, leading to trade-offs. Investors would want a high degree

of certainty on future cash flows, which would mean setting out the future regulatory framework in advance, delaying the bid process. If they do not have this certainty, investors would seek higher potential returns to offset any downside risks increasing the hurdle rate they require to commit. This would offset any efficiency gains resulting from the minimisation build and operating expenditure

9. The model based on competition in AOS raises a large number of implementation issues, without a clear model that could deliver an efficient outcome. Even if a single entrant could be incentivised to enter, a duopoly would be unlikely to deliver effective competition. The clear asymmetries between any entrant and HAL means that end user outcomes would be more likely to be driven by regulation and cost asymmetries than by relative efficiency. A particular issue would be the need for detailed regulation of the relationship between HAL and the entrant, given that HAL would have a dual role as both a supplier to, and a competitor with, the entrant. In telecoms significant time and resources have been required to ensure that there is a level playing field between entrants and the incumbent's own business, with the framework in the UK evolving over decades.

I.D Our assessment

10. We have assessed the three models against the criteria set out by the CAA. Our assessment takes account of our analysis of the practical challenges in adopting the models and the need to incentivise investment and hence the likely outcome. This particularly impacts model 7b, where the CAA considers the benefits in principle of effective competition in AOS but recognises that this model may not deliver effective competition. In our view, entry of a third-party operator would not result in effective competition for AOS at Heathrow and would likely result in higher prices overall, even if HAL continued to be subject to regulation.
11. We summarise our assessment below:

Table 1: Our assessment of the competition models short listed. we have used the same 1 to 4 scoring used by the CAA, with 4 being the best score, and 2 representing the scope of the status quo. We present the CAA score in brackets

Criterion	4b	5b	7B	Comments
Avoiding disruption	2 (2)	2 (2)	1 (2)	We consider models 4b and 5b are unlikely to add significant disruption to the implementation. Model 7b is likely to require significantly more time, due to the need to develop a new regulatory framework setting out post-entry regulation of AOS and regulated access to HAL facilities. The CAA appears to have not fully considered the complexity of model 7b.
Efficient cost	3 (3)	3 (4)	2 (3)	We consider both models 4b and 5b could deliver incentives to reduce design and build costs. In practice the incremental benefits under model 5b due to the incentive to reduce ongoing costs will be limited by the challenges in getting bidders to commit into the future. Under model 7b the absence of effective competition means that any cost efficiencies would not necessarily be passed through to end users and the greater fragmentation resulting from having two operators in a single airport would offset any efficiency gains. We

Criterion	4b	5b	7B	Comments
				consider the CAA is likely to be optimistic on the efficiency incentives under models 5b and 7b by not fully considering the implications of long term operating models.
Cost of Finance	2 (2)	2 (2)	1 (2)	We consider that models 4b and 5b do not materially affect the cost of financing, albeit challenges arise for more complex assets where the 5b model is applied. Under model 7b both the entrant and HAL would face an increased cost of capital due to uncertainty on the regulatory regime. It does not seem that the CAA has captured this risk premium in its assessment.
Practical implementation	2 (1)	1 (1)	1 (1)	We consider that the complexity of the implementation of 5b and 7b would be significantly higher than under the current model. Model 4b would increase the regulatory overhead during the procurement compared to the status quo, but this would be a one-time cost.
Competition	3 (3)	3 (4)	2 (3)	We consider that the level of competition would increase under models 4b and 5b, to the extent that a number of credible bidders could be found. As noted above we do not consider that in practice the benefits of 5b over 4b would be significant. Under model 7b, the creation of a duopoly, with significant asymmetry between HAL and an entrant, would mean that customer outcomes would remain a function of regulation rather than competition. We believe that the CAA have overstated the level of competition that could be achieved in practice under models 5b and 7b.
Quality of service	2 (2)	2 (2)	3 (2)	We consider that Model 7B, has the potential of achieving an increase in the level of service, if competing terminal operators are incentivised to compete and differentiate on the basis of quality. However, the full impact of this model on wider airport operations and delivery would need to be considered. This aspect was not captured by the CAA in its rating.

Source: Our analysis presented in this report.

12. In terms of **avoiding delay and disruption**, 4b may not significantly delay the process, as it is based on a well-established procurement model, although there would be additional overhead from a mandated process. Similarly, 5b for relatively straightforward assets (which would need to be defined clearly), may not lead to significant delays. However, assets that have significant ongoing expenditure and involve complex interaction with HAL will require significant upfront work to define the future regulation of these assets and the relationship with HAL. In order to have an effective tender delivering efficiency, the CAA would need to determine the approach *ex ante*, which would delay the bidding process. For 7b, working through the practical requirements for regulation post-entry would significantly delay the process and may not deliver a viable bidder.

13. Options 4b and 5b could explicitly target **efficient costs** by determining the provider based on the lower cost offer. In theory, option 5b could provide lower overall costs because the bidder would seek to minimise lifetime costs including ongoing operating expenditure, not just build costs. In practice, under option 5b it may be difficult to require bidders to commit to a fixed level of payments far into the future, which would limit the additional efficiency benefits. While effective competition can in theory deliver strong efficiency incentives, in practice Option 7b would be unlikely to result in prices that reflect efficient costs, as competition would not be effective but could be driven by ‘cherry picking’ of high-margin customers or by cost asymmetries.
14. Option 4b would have little impact on **the cost of finance** as in the long-term HAL would continue to finance the assets. For relatively simple assets, option 5b could marginally reduce the overall cost of capital by attracting infrastructure investors looking for predictable returns. However, if the complexity and uncertainty on future returns is higher for a given asset, this effect would be likely to be outweighed by investors requiring a higher risk premium to compensate for downside risks. For model 7b, bidders would face a wider range of risks, including demand and regulatory risk, likely increasing the overall cost of capital above that of the existing RAB based framework.
15. As noted above, the **practical implementation** for 4b is relatively straightforward. The other models require the CAA to determine the operating model for assets operated by third parties and how they will interwork with HAL’s operations. In addition, for 7b, the CAA would need to develop a regulatory framework for the price regulation of AOS in a competitive market and regulation of potential anti-competitive behaviour by either HAL or the entrant.
16. In theory, the effect of **competition** increases as more of the value chain is subject to competitive pressures. However, in practice this requires multiple credible bidders in the case of Models 4b and 5b and effective competition for AOS in the case of Models 7b. Our analysis suggests that a competitive outcome is more likely for Model 4b than Model 5b and competition is unlikely to be effective under Model 7b. Even if successful, competition is not an end in itself and the degree to which this benefits end user depends on a number of additional factors. These would include the need to offer investors sufficient returns to enter, and the ongoing costs related to the additional operational complexity of having two providers on a single site. These factors could offset any efficiency benefits resulting from increased competition.
17. Models 4b and 5b would not directly incentivise high **quality of service** if bids are based solely on cost minimisation. To the extent that reducing quality can lower costs, each model would require explicit quality controls to maintain appropriate standards. In principle, effective competition for AOS creates incentives to improve the quality of service to attract customers who value higher quality. Even if competition was not fully effective under Model 7b, an entrant could be incentivised to compete on quality and adopt a differentiated approach, offering a higher quality of service as a strategy to attract higher margin customers.
18. Overall, model 4b may provide some benefits, albeit limited. Similarly, for some specific assets model 5b may be effective at increasing operational efficiency. Both model 5b applied to complex assets such as a terminal and model 7b are unlikely to provide benefits overall, given the difficulty in putting in place a long-term framework which leads to operational efficiency in the case of Model 5b and effective competition in the case of Model 7b.

II Practical implications of the CAA's models of competition

19. The three competition models set out by the CAA can be seen as a progression, with successive models building on the previous one:
 - i. Regulatory model 4b: competitive tendering by HAL for the design and build of assets. A selection procedure is put in place which selects the efficient bidder (e.g. the lowest cost bidder for a defined specification of the assets required) to design and build an asset and the build cost is then rolled into the HAL RAB;
 - ii. Regulatory model 5b: competitive tendering by HAL to design, build and operate. A selection procedure is put in place which selects the efficient bidder to design, build and operate the asset. Once built, the asset value could be transferred to HAL and included in the RAB (potentially as a separate item), with HAL recovering its capital costs and the operating costs charged by the bidder, through airport charges. Alternatively, the asset could be owned and operated by a bidder who would recover both capital and operating costs from HAL through a series of payments;
 - iii. Regulatory model 7b: direct competition for AOS. A selection procedure is put in place which selects an entrant, who would build, own and operate the new assets. A regulatory framework then needs to be put in place that both allows the entrant to generate a reasonable return on its regulatory asset (RAB) and that constrains this return so that the benefits of the reduced cost are passed through to end users. Access charges would also need to be established to provide the entrant with access to the airport activities provided by HAL (e.g. access to runways).
20. Below we consider, in turn, the practical implications of implementing each of these models, where appropriate drawing on the experience in telecoms. In particular, we focus on two inter-related questions:
 - i. What conditions are required to create the right incentives for potential alternative investors to commit to investing, or to compete for the opportunity to invest, under each of these models; and
 - ii. Whether these conditions would result in competition that benefits end users, compared to the counterfactual of the existing regulatory arrangements.

II.A Regulatory model 4b: competitive tendering by HAL for the design and build of assets

21. The RPI-X approach to charge controls was designed to incentivise efficiency, as fixing prices means the profitability of the regulated firm during the charge control period is dependent on the level of operational expenditure and so there is a strong incentive to minimise operational expenditure. Future charge controls will then be set on the resulting operational expenditure include any efficiency gains, passing on the benefits to end users. However, the incentive to reduce capital

expenditure on long lived assets in an RPI-X charge control is limited. The majority of any capital expenditure will be recovered in future charge control period through depreciation charges and a return on the net value of the asset. Regulators provide scrutiny to attempt to ensure that only efficient capital expenditure is included in the RAB and, if the WACC reflects the actual cost of capital, the company should be indifferent to the size of the RAB. However, due to the information limiting the visibility of what is spent to end users, the optimal regulatory outcome has a bias to more investment.

22. One suggested solution to the problem has been for regulators to introduce greater competition for the construction of specified assets.¹ If the specifications of the assets can be contractually defined by the regulator ex ante, then awarding the contract to the lowest offer from a number of credible bidders will provide strong efficiency incentives. An alternative approach would be to loosely define the required outputs and then allow each bidder to develop a different solution to deliver these output and cost their particular solution. While allowing more flexibility could lead to greater efficiency by allowing bidders to come up with creative solutions, the selection would typically require assessing both the quality of the bid and the price. Such comparative assessments, based on multiple parameters, were common in many jurisdictions when issuing entrant mobile licences but were difficult to administer and in almost all jurisdictions have been replaced by simple auctions.
23. Once constructed the assets would be handed over to HAL in return for the price bid, and the amount paid to the bidder by HAL would be included in HAL's RAB.
24. For a tendering process to be effective, certain conditions need to be met:
 - i. Multiple credible bidders need to exist to ensure sufficient competitive pressure to incentivise efficient bids;
 - ii. Adequate and symmetric information needs to be provided to all bidders to limit uncertainty, as high uncertainty will lead to bidders 'shading' their bids to avoid winner's curse where the competition is won not by the most efficient bidder but the most optimistic bidder;
 - iii. Transparent rules need to be established for the bid with clear commitments to enforce these rules and clear selection criteria aligned with efficiency to prevent bidders gaming the rules.
25. As noted above the simplest criterion to select the bidder would be a fixed price so that the selection process is an auction. This would then place any cost risk, e.g. cost overruns, on the bidder.
26. The contractual relationship between the successful bidder and HAL will be important as the assets will need to be constructed on a site owned and operated by HAL. If assets are broadly separable, then the number of touchpoints may be limited during the construction phase, but effective governance of the relationship may still be necessary to ensure the asset can be delivered efficiently. Bidders will want reassurance that the nature of the relationship with HAL is established

¹ For example: <https://dieterhelm.co.uk/regulation-utilities-infrastructure/regulation/regulatory-reform-and-the-system-operator-model/>

before the tender process, to minimise the risks they bear, which will allow them to offer a more competitive price.

27. The asset to be delivered also needs to be clearly defined in terms of quality to ensure that the lowest-cost bidder is the most efficient bidder rather than simply a bidder offering a lower quality than others.
28. These issues are similar to those in other infrastructure construction projects and they are well understood, so should not create significant practical difficulties. However, the CAA mandating competitive bidding would require additional time and resources to put the regulatory regime in place. The CAA would also need to assess, and if necessary, determine: (i) the scope and specification of the assets to be included; (ii) the bidding process and; and (iii) the contractual arrangements between HAL and the bidder. Given the specialist nature of such a procurement, currently the CAA is unlikely to have the necessary skills and resources in place to lead the process but could oversee a process led by HAL.

II.B Regulatory model 5b: design, build and operate

29. Under model 5B, the assets once constructed would be operated by the bidder, rather than handed over to HAL to operate as in model 4b.
30. In the November 2025 Working Paper, the CAA indicated that following construction, HAL would be the owner of assets in this model². This implies the construction payment made to the bidder would then be included in HAL's RAB and operating payments included in allowable revenues to be recovered from end users. However, the Consultation Document states³ that this model would be attractive to infrastructure investors, implying some longer term financing of the asset (as these investors would likely not be interested in shorter term construction loans).
31. Extending the competitive model to include the operational period after the build has been completed has, in principle, some advantages over design and build alone:
 - i. To the extent that there are trade-offs between build costs and operating costs, a competitive bidding process which aims to minimise overall costs may result in a more efficient outcome than one which seeks to minimise build costs alone;
 - ii. Third parties may have some competitive advantage in operating non-core assets, such as carparks, compared to Heathrow;
 - iii. the CAA may be able to benchmark the costs of operating similar assets across third-parties and against HAL's own costs providing an incentive for HAL to reduce its costs; and
 - iv. If cash flows from operating the asset were long-term and predictable, this would be attractive to infrastructure funds/investors, allowing competition for financing.

² November 2025 Working Paper para 4.62

³ Consultation para 6.107

32. However, extending the model over a much longer operating period, inevitably increases uncertainty for bidders who will be committing upfront expenditure in exchange for cash flows generated from operating an asset long term. Bidders will want compensation for bearing the resulting risks, which could offset any benefits from competition, reducing the level of expenditure.

II.B.1 Structure of payments

33. Infrastructure investors would prefer greater certainty over the cash flow generated by the asset once constructed. For example, revenue certainty could be achieved by using an availability-based fee structure, as suggested by the CAA, where the asset operator is paid a fixed fee by HAL, regardless of the level of demand. This would create a debt-like obligation for HAL to cover the fixed payments, with HAL bearing all risks related to demand uncertainty. If a pure availability fee was used for an asset such as a terminal, where HAL also operated equivalent assets, then HAL could have the incentive to direct demand⁴ to the third-party asset if it could avoid operating/expansion costs in its own assets. This would distort competition and could result in a misallocation of demand resulting in higher costs overall for Heathrow.
34. Even under an availability fee structure, the third-party operator would bear additional non-controllable risks above the build cost risks. These risks could be associated with the future expenditure for operating the asset. For example, in the case of a terminal, there will be significant ongoing expenditure for operating the terminal and upgrading the terminal during its lifetime. This expenditure will be to some degree dependent on the volume of traffic/passengers using the terminal, with the additional risk the HAL would seek to push demand to the terminal to avoid their own operating expenditure. This could make the cash flow generated by the asset volatile, even if revenues are fixed. HAL may also seek to deliver future capital expenditure, for example for upgrades, in a way which ignores the implications for operational expenditure, which would be the responsibility of the third-party operator, reducing overall efficiency.
35. An alternative approach could be a model variant where the payments from HAL take into account the level of ongoing costs and/or the level of demand, along with expected commercial revenues. This would be closer to the current regulatory model for HAL where allowable revenues are determined for each charge control period. Compared to an availability payment, such variation of model 5B could either reduce the level of risk borne by investors (to the extent that variation in operating costs and/or commercial revenues would be passed on to HAL and hence end users) or increase the risk (to the extent that the investors would be exposed to demand risk). In either case the productive efficiency incentives would likely be reduced compared to a pure availability payment model where bidders' future revenues would be fixed, giving a strong incentive to reduce expenditure. The regulatory mechanism through which payments would be set would also need to be set out as part of the tender process, introducing a greater level of complexity in setting up the process and assessing the bids than a simple availability payment.

⁴ On the assumption that Heathrow was the overall 'system operator' and so was able to influence the usage of different assets. If the third-party had some ability to influence the split of demand between HAL's and their assets then which would introduce the potential for competition for demand, as in model 7b.

II.B.2 Financing

36. As noted above, it is unclear from the consultation what investors would be financing under this option, given the assumption that the assets would be transferred to HAL once constructed.⁵ If the bidder was only financing the cost of construction prior to the transfer to HAL, it is not clear why this would result in a lower overall cost of capital
37. If third-party finance was also required in the operating phase of the assets, the structure of the payment from HAL to the owner of the asset would have an impact on both the cost of capital for bidders and for Heathrow as a whole. A fixed availability payment would remove any demand uncertainty, reducing the cost of capital for the bidders, but at a Heathrow level this would be offset by the obligation for HAL to make debt like fixed payments increasing HAL's cost of capital. Conversely passing through some of the impact of demand volatility to the third-party would increase their cost of capital, while decreasing HAL's cost of capital.

II.B.3 Conclusion

38. In principle, a model where bidders commit to operating the assets has advantages over a design and build model both in terms of overall expenditure minimization and financing. However, implementing such models requires putting in place a long-term contractual framework, compared to a 'one shot' bidding process for design and build. This will increase complexity, and would represent a significant barrier for assets, such as terminals, where there is uncertainty over future expenditure and demand and where the operator would need to interact with HAL. This complexity would lead to delay, because, in order to have an effective bidding process, the CAA would need to set out the future contractual framework before bids were made. In any case, there is likely to be a limit on the degree to which efficiency benefits are likely to be realized if there is future uncertainty which cannot be managed contractually. If bidders are required to bear additional risks, they will bid more conservatively. Alternatively, if risks are passed on to HAL and hence end users by updating the level of payments when new information becomes available, this will inevitably reduce efficiency incentives as it would require the regulator determining whether any future increases in costs are due to exogenous factors or inefficiency.
39. This suggests that this model is most suitable for assets which are both separable and where ongoing expenditure is relatively predictable and is not highly dependent on factors outside the control of the bidder. For example, the Thames Tideway Tunnel is largely independent of the Thames Water network and, once built, is expected to have very low operational expenditure, with limited dependency on what volume it receives from Thames Water. In Heathrow, suitable assets would include terminal car parks, which have predictable costs (there are many potential operators with significant experience of running carparks) and have limited operational links with the terminals. Under any circumstance, as we explained in paragraph 28 above in relation to Model 4b, if the CAA mandated competitive bidding, this may cause an additional delay as additional time and resources would be required to define the scope and specification of the assets to be tendered out and the structure of the bidding process.

II.C Regulatory model 7b: direct competition for AOS

⁵ The CAA has not shortlisted Model 7, where the bidder would retain full ownership of the assets.

40. The third competition model is direct competition for AOS, i.e. managing passengers' journeys and flights.
41. In order to offer AOS, a third-party would presumably operate a terminal as this is the main point of contact between airlines and the airport. The models of competition in other jurisdictions set out by the CAA focus on competition between terminals. It is not clear if the CAA would consider extending this model to a third runway or how competition based on competing runways could operate.
42. Competition can bring a number of benefits in principle:
 - i. Incentivising all players to deliver services efficiently (productive efficiency);
 - ii. Driving down prices towards the cost of production (allocative efficiency); and
 - iii. Encouraging companies to invest and innovate in the delivery and specification of services (dynamic efficiency).
43. However, these benefits can only be achieved if entry fosters effective competition. Even in this case overall efficiency will depend on the costs of introducing competition. For example, allowing regulated prices to rise can act as a form of entry assistance, but in this case the long run benefits of the resulting entry must be weighed against the short run costs of higher prices.
44. The CAA highlights that it is not clear whether the model could lead to effective competition. There is also limited discussion in the consultation of the mechanics of a model based on a third-party terminal operator competing with HAL. In order to answer these two questions we:
 - i. Assess the likely competitive landscape⁶ post-entry; and
 - ii. Analyse what this would mean for the necessary regulatory framework.

II.C.1 Competitive landscape under model 7b

45. The CAA has not set out in detail the expected competitive landscape under model 7b. However, we can infer the following elements based on Heathrow's current structure and the plans for its expansion:
 - i. The number of competitors;
 - ii. The degree of vertical integration;
 - iii. The level of switching costs; and
 - iv. The potential for cost differences between providers.
46. These factors then feed into our assessment of the likely effectiveness of competition, absent regulation and hence the necessity for regulation post-entry.

⁶ We use 'competitive landscape' in place of market structure as we have not carried out a market definition

II.C.1.a Number of competitors

47. It appears reasonable to assume there will be only be one new terminal built in the foreseeable future.⁷ This reflects the significant economies of scale in constructing new terminals which means that it would not be efficient to have two new terminals as part of the current Heathrow expansion plan. This is reflected in the plans put forward by both HAL and Heathrow re-imagined. This also means that there is little scope for further entry in the medium term, i.e. there is a significant barrier to entry.
48. The CAA has rejected the possibility of forced divestment of assets by HAL (i.e. Model 8), and so HAL will continue to own and operate the majority of the assets in the airport.
49. This means that there would be a duopoly, consisting of HAL operating the existing terminals, with their extensions, and the entrant operating the single new terminal, with little threat of future competitive entry.

II.C.1.b Vertical integration

50. As the CAA is not proposing that HAL divests assets or structurally separates, HAL will also remain vertically integrated, operating both the existing runways, transport links and the existing terminals. An entrant terminal operator would be reliant on HAL for access to the existing runways, transport links and terminals. In theory the entrant could also operate other infrastructure in addition to the new terminal such as the 3rd runway, which would then require HAL and the entrant to provide reciprocal access. Having separate, competing, owners of runways would be likely to significantly increase the complexity of the commercial arrangements due to the need to maintain safety and to efficiently allocate the available capacity across runways.
51. The entrant could also be associated with a particular airline or group of airlines, either through ownership or as an anchor client, leading to a degree of vertical integration with the downstream airline market.

II.C.1.c Switching costs

52. High barriers to switching will also act as a constraint on the effectiveness of competition, for example the barriers to switching between airports is one reason why the CAA has determined HAL to have SMP. Within an airport, large airlines and alliances will wish to have all their demand in a single terminal to enable easy connections between flights. This will make it difficult to switch all of their demand to another terminal, because they will have sunk significant costs in their current terminal and there may not be sufficient capacity for all of their traffic at another terminal. They will also not wish to switch part of their demand to another terminal as this will result in the inefficiency of having to connect customers across two terminals. This means that the benefits larger airlines may get from terminal competition would be concentrated when a new terminal is first constructed,

⁷ We note that HAL has outlined a plan to extend T5 and replace T3 with an extension to T2 in addition to the construction of a new terminal.

where the large airline groups may have some countervailing buyer power and so ability to lock in long-term benefits.

53. Smaller independent airlines may have the ability to switch terminals on an ongoing basis and would provide some competitive pressure, but this is unlikely to be effective at driving prices overall down to cost as terminal operators would be able to discriminate easily between smaller airlines with lower barriers to switching and those larger airlines who face higher barriers to switching.
54. Overall, the nature of switching contrasts with competition in telecommunications where the customer base is atomised and all customers make purchasing decisions on a regular basis.⁸ Ofcom has also intervened to reduce barriers to switching, for example mandating number portability. However, a combination of the countervailing power of larger airlines and the lower barriers to switching of smaller airlines may mean that barriers to switching are not a key determinant of competition.

II.C.1.d Cost differences between providers

55. In markets with lower barriers to entry and exit, prices will be driven down towards the incremental cost of the most efficient providers, as these providers compete for market share and inefficient providers exit the market. Given airports are a capital-intensive industry, the situation is more complex as providers will seek to recover sunk costs as well as forward looking costs but will not exit the market if they are unable to recover these sunk costs.
56. In terms of forward-looking costs, HAL will have an inherent advantage over an entrant having already significant sunk assets while the entrant will have to invest in constructing equivalent assets. HAL will also have the incumbency advantage of starting with all of the demand and hence revenue while an entrant will have no revenues during the construction phase. The entrant may be able to rapidly increase demand once construction is completed if it can offer airlines an attractive offer in terms of price and quality. The entrant may also have some advantages in being able to build a state of the art terminal while HAL, even with a programme of modernisation, may be constrained by the underlying legacy terminal infrastructure. Overall, HAL is likely to have lower forward-looking costs.
57. A further relevant question is whether the efficient forward-looking costs of an entrant will be lower than the costs of HAL taking into account both its forward-looking costs and the value of its sunk assets that are deemed not to have yet been recovered, i.e. the RAB value. The costs of building a new terminal are likely to be significantly higher than the equivalent RAB value, given the RAB is reduced by the accumulated depreciation to date. This means it is likely that the entrant would have higher forward looking unit costs than HAL's costs on a RAB basis and so would not be able to compete if HAL's prices were set at a level consistent with the current regulatory approach, which allow HAL to recover the RAB and any future expenditure. Only if there are very significant economies of scale or cost efficiencies from operating a brand new terminal would an entrant have lower unit costs allowing them to undercut HAL, if HAL were to set prices to recover the RAB.

58. In many markets with high capital intensity, incumbents typically have a cost advantage. In the periods where large-scale entry has occurred in the UK telecoms market, this has generally occurred at points in time where the cost advantages of incumbency has been reduced:
- i. Where the incumbent operators also need to invest during a technology transition, for example the transition from dial up to broadband networks, the current roll out of full fibre networks or in the transition from first generation to 2G networks and 2G to 3G in mobile; or
 - ii. Where the entrant has a potential source of efficiency that the incumbent cannot match, for example scope efficiencies from the roll out of cable TV networks offering telephony and later broadband services.
59. Where telecoms entrants do not have equal or lower costs than incumbents, they have only been able to enter either by targeting higher margin customers, the approach adopted by Mercury Communications during the duopoly period, or by focussing on niches such as serving large corporations in the City of London. This limits the benefits of competition to these customers.

II.C.1.e External constraints

60. As well as the constraints arising from competition between HAL and entrants, the competitive landscape will also be subject to external constraints, but the CAA's decision to impose price control on HAL suggests that competition from other airports is insufficient to limit pricing at Heathrow.
61. Currently there are also binding capacity constraints in Heathrow due to limited slot capacity and environmental limits leading to scarcity rents. If capacity constraints continue to be binding after entry and capacity expansion, then this could distort competition. In the absence of regulation HAL and the entrant would have an incentive to set prices above a cost-oriented level, in order to capture part of these scarcity rents.

II.C.2 Implications for regulation

62. In this section we first set out, based on the above analysis, the likely market failures under this model, and then outline the regulatory framework that would be necessary to remedy these market failures, both at the level of AOS and the interaction between HAL and the entrant.

II.C.2.a Potential market failure

63. The competitive landscape post entry does not appear to be such there will necessarily be effective competition for the supply of AOS at Heathrow:
- i. There will be a duopoly of providers AOS with little prospect of further entry;
 - ii. The entrant may well have a structurally higher cost base;
 - iii. The entrant will be reliant on HAL for access to existing infrastructure; and

iv. There may be capacity constraints on Heathrow overall.

64. As a result, HAL and/or the entrant unilaterally or jointly may have market power for AOS, because they would be able to increase prices above a competitive level.
65. Moreover, given vertical integration, there are also potential issues relating to leveraging market power into downstream markets:
- i. HAL's control of upstream infrastructure such as the existing runways or transport links could result in market power upstream, and HAL could seek to leverage into the downstream provision of AOS, by favouring its own business over that of the entrant; and
 - ii. If one or more airlines had a degree of management control or influence over the entrant, and the entrant had market power in AOS (which appears possible given the competitive landscape), the entrant could seek to favour these airlines over competitors.
66. This suggests that there is a likelihood for ongoing regulation at Heathrow both for the provision of AOS and the contractual relationships between HAL as an operator of upstream infrastructure and a new entrant terminal operator.

II.C.2.b The CAA would need to determine the price regime for AOS

67. A significant area of uncertainty for any entrant would be the price it is able to charge and hence its expected revenues. This may be affected by regulation, either directly if the entrant's prices are regulated or indirectly, through price regulation on HAL which will impact on the profit maximising price the entrant can charge. The CAA is not clear in the Consultation on what price regime would be expected under this model, but there are several potential outcomes:
- i. Full de-regulation of prices following entry with a commitment to not introduce regulation in the future;
 - ii. Partial de-regulation, e.g. safeguard caps on HAL, with the possibility of re-introduction of price regulation subject to 'fair bet' provisions;
 - iii. Continued price regulation of HAL, until effective competition is established; and
 - iv. Regulation of both HAL and the entrant.
68. The CAA may not be able to definitively state the approach it will take to the future regulation of AOS, as this may depend on outcomes and future analysis such as SMP determinations. However, potential entrants will wish to see clear signalling of the likely approach before they commit significant investment. For example, in 2021 Ofcom signalled the likely long-term approach to regulation (suggested it would probably be limited to safeguard regulation) so that both Openreach and entrants building fibre networks had greater clarity on the profile of future pricing.

II.C.2.b.i Full deregulation does not appear to be a credible option

69. While Heathrow expansion can be seen as a unique opportunity in a generation to introduce competition in AOS, this uniqueness also demonstrates the very high barriers to entry in general. The nature of terminals where capacity can only be added efficiently in large increments (i.e. a single large terminal is more efficient than smaller terminals) means that there is only the prospect of a single entrant.⁹ This contrasts with the current competition for fibre roll out in the telecommunications market. The transition from copper technology to fibre technology has provided an opportunity for competition to be established, this has allowed multiple 'altnets' to enter competing against both BT and VMO2 with the possibility of effective competition with 3 or more players being established in at least some areas of the UK.¹⁰
70. There would seem to be a significant risk of a lack of effective competition in the long run, even if there was successful entry by an additional provider to create a duopoly. Absent regulation, this could lead to higher prices and return which would be contrary to the CAA's rationale for introducing competition, which is to put downward pressure on prices. It is therefore unlikely that the CAA would commit to deregulate the AOS market post-entry or signal it was minded to do so.

II.C.2.b.ii Partial deregulation

71. In telecoms, Ofcom has adopted an approach of partial de-regulation, e.g. only regulating an 'anchor product' for fibre services provided by Openreach and Ofcom has signalled that it will only introduce regulation in the future under certain conditions¹¹:
 - i. Competition is not effective in a given geographic area;
 - ii. There is evidence that consumers in that area have worse outcomes than in areas where competition is effective; and
 - iii. Openreach's returns on investment are significantly above the cost of capital, to ensure BT's investors a 'fair bet' on their investments.
72. Ofcom's approach was the result of the existing regulatory and market structure leading to an outcome where investment in new technology was much slower than in other jurisdictions. Ofcom had limited ability to directly incentivise investment by Openreach, as new technology investments were not included in a RAB¹². Instead, Ofcom relied on encouraging Openreach indirectly to invest by a combination of allowing higher returns if it did invest and by making the market for fibre networks contestable by new entrants, meaning lower returns if it did not. While this approach has delivered high levels of investment, it has resulted in higher prices and returns than cost-based regulation of prices. However, Ofcom considers that where effective competition is established,

⁹ The CAA has rejected model 8, where HAL would be required to divest assets and only one organisation has indicated an interest to build another terminal.

¹⁰ Ofcom has defined a separate geographic market for 'Area 1' - areas where 3 or more operators compete - where it has signalled it would deregulate in future market reviews

¹¹ <https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/185028-promoting-investment-and-competition-in-fibre-networks--wholesale-fixed-telecoms-market-review-2021-26/letters/dame-melanie-dawes-to-philip-jansen-response.pdf?v=327087>

this will provide further benefits due to the innovation and efficiency incentives that competition can bring when markets are fully deregulated, which will offset the increased prices in the short run.

73. The CAA's objectives differ significantly from Ofcom's, given that the view is that investment in expansion would be made by HAL in the absence of competition. For the CAA the objective is ensuring that prices post investment are set at an efficient level, consistent with this investment being made in a timely manner. An outcome under competition which results in higher prices than if HAL made the investment under the current regulatory framework would not appear to meet CAA's objectives. As there is no realistic prospect of effective competition in the long run, there are also no corresponding benefits from future de-regulation.
74. In addition, the characteristics of the telecoms markets which mean that Ofcom can de-regulate but provide a backstop to mitigate the risk of permanently higher prices where effective competition is not established. In particular, in the fixed telecoms market the outcome is expected to vary geographically with competition likely to be effective in at least some parts of the country. The market outcome in areas where effective competition is established can be used as a benchmark for those areas where Openreach maintains SMP. If Openreach prices in areas where it has SMP are at or below the prices in effectively competitive areas Ofcom has signalled it will not intervene.

II.C.2.b.iii Regulation of HAL alone could distort investment incentives

75. An alternative would be to continue to regulate HAL's AOS under the existing RAB approach and use accounting separation to set wholesale prices for access to the common airport infrastructure.
76. Under such an approach, the competitive provider would be free to set prices but would be constrained to some degree by the availability of HAL's regulated AOS prices. It would be able to compete by setting prices below HAL's regulated prices or offering higher quality services and would still be able to profitably deliver services if it had a lower average unit cost than the terminals business of HAL.
77. However, even with structurally higher costs, given the overall capacity constraints on Heathrow and the limited capacity in HAL's legacy terminal, the entrant could potentially generate returns above their cost of capital following a number of strategies:
 - i. A cost minimisation strategy, reducing build and operating costs by offering a lower quality of service than HAL;
 - ii. Pricing above HAL, on the basis that the entrant will have market power due to airlines having a higher willingness to pay than HAL's regulated prices and not all demand being met by HAL's terminals;
 - iii. If margins vary across customers, e.g. between long haul and short haul flights, cherry picking higher margin customers by offering a discount to HAL's prices to these customers.
78. These strategies do not rely on the entrant being more efficient than HAL at constructing and operating the terminal. They could distort investment incentives, for example with the entrant

building low cost/low quality infrastructure at Heathrow to undercut HAL or lead to prices overall being higher than if HAL was a single regulated operator, as the entrant would have market power.

II.C.2.b.iv Regulating both HAL and the entrant would not be a competitive outcome

79. An outcome where both HAL and the entrant had their prices regulated would appear not to be genuine competition for AOS, as competition on prices is an essential element of effective competition. Instead, such an outcome would appear to be more akin to model 7a which has been rejected by the CAA, even if the revenues for the new entrant were in the form of payments for AOS directly from airlines instead of through an availability payment. Any regulation would also need to deal with the cost asymmetry between HAL and the entrant set out above.

II.C.2.c The relationship between an entrant and HAL would need to be regulated

80. The fact that an entrant would compete with HAL while still relying on HAL for some inputs and coordination would itself create substantial uncertainty, absent regulation. HAL would have incentives to increase the entrant's costs, reduce quality, or discourage switching in order to maximise demand in its own terminals and increase its profitability. Its ability to do so would be material because of the wide range of touchpoints between a competing terminal operator and HAL as owner of the airport infrastructure and of competing terminals. This type of relationship—where the entrant depends on a vertically integrated incumbent that is both competitor and supplier—is common in telecommunications. Over more than 40 years of liberalisation, a wide range of mechanisms has been introduced to limit such anti-competitive behaviour:
- i. Detailed contracts setting out the terms and conditions of the wholesale and peer to peer relationships between the entrant and incumbent;
 - ii. Service costing to ensure that wholesale inputs are provided on a cost-oriented basis;
 - iii. Accounting separation to monitor price discrimination between wholesale services provided to competitors and internal consumption by the downstream arm of the incumbent;
 - iv. Equivalence of inputs and monitoring of quality of service to prevent non-price discrimination between wholesale services provided to competitors and internal consumption by the downstream arm of the incumbent;
 - v. Contractual dispute resolution with the regulator as a back stop; and
 - vi. Intervention on corporate governance, including structural separation of the upstream business to try and limit the incentive for anti-competitive conduct.
81. The variety of measures that have been put in place in the telecoms sector over time show how challenging it is to ensure a level playing field as competition evolves. This has required significant investment in time and resources by Ofcom as the regulator. While not all of these measures may be required to enable a third party operator to run a terminal, complex regulation to incentivise both HAL and the terminal operator to operate efficiently will need to be put in place.

82. Given the multi-billion-pound investment that would need to be made by an entrant terminal operator, the entrant would expect a high degree of certainty in order to commit to entering at a price that was close to costs. This contrasts with telecommunications competition where entrants have been able to invest relatively small amounts initially, while the regulation of competition is developing, only fully investing where there is clarity that there is a profitable business opportunity.

III Assessment of options for competition

III.A Assessment criteria

83. In this section we provide a high-level assessment of the three competition models short-listed by the CAA. Given the limited detail presented in the CAA's consultation and the complexity of the issues, the impact of implementing each model would very much depend on the details of each implementation. We have focussed on a qualitative assessment providing details of factors which may make each factor more positive or negative and drawing on the experience of telecoms liberalisation but for comparison have provided an assessment for each of the criteria in line with the CAA's rating.
84. We adopt the same criteria as used by the CAA in its assessment of the long list of regulatory models:
- i. Avoid delay and disruption
 - ii. Promote efficient costs;
 - iii. Raise sufficient finance;
 - iv. Be practical to implement;
 - v. Promote competition;
 - vi. Promote service quality.
85. We consider these criteria for each of the models in turn and then summarise the results.

III.B Regulatory model 4b: competitive tendering by HAL for the design and build of assets

III.B.1.a Avoid delay and disruption

86. The need to specify a competitive tendering process which covers a large separable asset within the expansion may require more time compared to the counterfactual where HAL contracts for individual components due to the complexity of specifying and contracting for a complex asset overall. However, given this is a commonly used framework, the delay may be limited.

III.B.1.b IV.B.1.b Promotes efficient costs

87. This option could provide greater downward pressure on costs than HAL having control of design and build if the conditions for an efficient award process were met, i.e. there are multiple bidders, clarity on the specification and the contract is awarded to the lowest price bidder with a high degree of commitment on the price paid.

88. As the resulting cost would be included in HAL's RAB there would be no or little effect on HAL's regulatory cost of capital.¹²

89. The ongoing operating costs would be borne by HAL and included in HAL's allowable revenues. The bidder would have no direct incentive to minimise these costs, which would mainly depend on the specifications of the tender.

III.B.1.c Raises sufficient finance

90. The long run impact on financing will be minimal as HAL will have to fund the assets once it is delivered. Any bidder will need to raise working capital during the construction phase which may be more expensive than HAL's equivalent cost of capital, but the impact is likely to be small.

III.B.1.d Practical to implement

91. This is an established model in other sectors so there is significant cross sectoral experience in implementing similar projects.

III.B.1.e Promotes competition

92. This model does not promote competition for AOS but does provide for competition in design and build costs.

III.B.1.f Promotes service quality

93. The impact on service quality, both in the short and long term, will be dependent on how tightly the tender can be specified to deliver the appropriate level of quality, as the incentive for bidders will be to reduce costs as much as possible while still being compliant with the contract.

III.C Regulatory model 5b: design, build and operate

III.C.1.a Avoid delay and disruption

94. A robust and efficient tender process which covers both the design and build of a core asset such as a terminal but also the long-term operation of this asset will be far more complex than both the existing arrangements and model 4b. Bidders would need visibility of both the revenue stream they would enjoy but also details of the interactions with HAL during the operations of the terminal.

95. Putting in place the operating framework and then running the tender would inevitably delay the process materially for more complex assets such as terminals.

96. Experience in telecommunications of similar design, build and operate tenders, for example tenders for the roll out of broadband networks in underserved rural areas, is that the process can be extremely protracted. For example, in Ireland the National Broadband Plan took 7 years from the

¹² To the extent that a greater proportion of the construction risks were passed on to the contractor, it could lower HAL's costs of capital marginally but the bidders would seek to be compensated for these risks through the price paid so the overall impact on costs would likely be immaterial.

publication of the original plan to contract award¹³, in part because of the need to set out the commercial relationship between the winning bidder and the incumbent, eircom. Similar commercial agreements would need to be put in place under this model.

III.C.1.b Promotes efficient costs

97. In principle a tender process which assigned the rights to build and operate the asset on the basis of the lowest overall lifetime cost should provide good incentives to reduce costs. However, a tender process which required the bidders to commit to a fixed revenue stream for the life of the asset is likely to be considered too risky for complex assets with high ongoing expenditure, such as a terminal, given the uncertainty on the required expenditure post-build. For these assets, bidders would likely need assurance that they could pass on variations in ongoing expenditure to HAL, limiting the efficiency incentive for operating costs.
98. The efficiency benefits also depend on the award process being well designed and competitive. It is not clear whether there would be multiple bidders for the opportunity to design, build and operate complex assets under an untested model where the airport would remain owned by a commercial operator competing with the bidder. If there were only one or two credible bidders, then the bids may not reflect efficient costs.
99. As a result, the cost minimisation benefits may be relatively small compared to Model 4b.

III.C.1.c Raises sufficient finance

100. If the asset resulted in a very certain cash flow, e.g. a fixed availability payment and low and predictable operations and maintenance costs, this could result in a low cost of capital for the asset. This would be offset by the higher operational gearing for HAL due to the fixed payments, which would increase HAL's cost of capital. The net effect may be broadly neutral. Depending on market circumstances, this could lower the cost of capital if there was relatively high demand for infrastructure assets – for example, some telecoms operators carved out and sold infrastructure assets such as towers and duct networks to take advantage of high demand for infrastructure assets when interest rates were historically low.
101. However, any marginal reduction in the cost of capital from tapping into demand for infrastructure assets would be critically dependent on upfront clarity on future cash flows. If future revenues or expenditure were perceived to be uncertain because they were to a material degree dependent on future demand and/or the conduct of HAL, then bidders in a tender would seek higher returns to compensate for this risk. This would likely be the case for complex assets such as a terminal, where there would be a significant number of touchpoints with HAL and uncertainty on both ongoing operating costs and capital expenditure for maintenance and upgrades over the lifetime of the asset.
102. In summary, for some assets where cash flows are highly certain the impact of allowing infrastructure investors to compete for financing could marginally reduce the overall cost of capital.

¹³ <https://www.gov.ie/en/department-of-culture-communications-and-sport/publications/national-broadband-plan/>

However, for more complex assets, the additional risk premium due to the increase in uncertainty is likely to dominate, increasing the overall cost of capital.

III.C.1.d Practical to implement

103. The practicalities of implementation would depend on the complexity of operating the asset. Implementation would be straightforward for clearly separable, non-core assets with predictable operating costs such as car parks but would be very difficult for a complex asset such as a terminal.

III.C.1.e Promotes competition

104. This model does not promote competition for AOS but does in principle provide for competition over a greater part of the value chain than option 4b.

III.C.1.f Promotes service quality

105. If the tender process was based on bidding for a fixed availability payment, then the incentive would be to minimise service quality while remaining compliant with the tender. The ability to maintain and promote service quality will then depend on how easily it would be to specify quality of service in a meaningful way over the lifetime of the asset and enforce this. This would be challenging for a more complex asset such as a terminal where quality of service is difficult to measure and expectations may change over time.
106. Overall, this approach may reduce the quality of service.

III.D Regulatory model 7b: direct competition for AOS

III.D.1.a Avoid delay and disruption

107. Any potential bidder would want to have clarity on the regulatory framework before committing to the expenditure required to construct a terminal. There are no existing models for an entrant passenger terminal competing with a vertically integrated airport operator so the CAA would have to create this framework covering the award process, the framework for regulation of AOS post-entry and the regulation of the contractual arrangements between the entrant and HAL.
108. The experience of telecoms shows that it is possible to introduce competition in markets even where entrants are reliant on the incumbent to provide access and interconnection to existing infrastructure. However, the framework has developed over the last 4 decades, allowing Ofcom (and previously Oftel) to iterate the framework based on experience up to that point. The nature of entry in telecoms has facilitated this process, with entrants being able to test the effectiveness of the current framework through small scale entry, e.g. in a limited geographic area, only committing to larger investments when the framework is fit for purpose. As example of this is Duct and Pole Access (DPA) to the Openreach network, which underlies much of the current competitive roll out for fibre networks by altnets. DPA was first introduced in 2010 but widescale take up did not occur until after 2021. This delay was in part due to operational and pricing issues with the DPA product which were ironed out as the service was tested but also because the framework for downstream

regulation of the fibre networks only became clear in 2021, allowing investors greater certainty over potential revenues.

109. The entry in the AOS market, requiring a single multi-billion pound commitment to invest, is significantly different from the telecoms investments, where investors retain the optionality to defer or accelerate investment as more information becomes available. As a result, the success obtained in telecoms is unlikely to be replicated in the AOS market. Potential bidders would want clarity on the revenue expectations, including the price regulation of AOS and costs, including any access payments to HAL, before committing to this investment. Absent this clarity, investors would either require a regulatory risk premium or would not commit but use the option to delay investment as a negotiating tool to improve terms.
110. This indicates that the introduction of competition in AOS would be likely to delay investment for a number of years while the overall regulatory framework was developed.

III.D.1.b Promotes efficient costs

111. In principle, effective competition will provide strong incentives for all market participants to minimise costs in order to continue operating and to compete on price to increase returns. However, competition in the AOS market would not be effective post-entry with a duopoly, with no threat of further entry and with likely significant asymmetry of costs due to exogenous factors, rather than relative efficiency.
112. In telecoms the initial period after liberalisation, where a duopoly was created in fixed telecoms, did not result in effective competition, but only limited competition for high-margin customers. There has only been the prospect of effective competition where both the incumbent, BT, and entrants have a broadly level playing field, for example when both BT and entrants need to invest in new technology and entrants are granted access to BT's infrastructure on an equivalent basis.
113. Under this model, HAL would likely still be subject to price regulation as removing price regulation would lead to prices increasing above a competitive level. Continued regulation would mean that HAL would not be subject to the same incentives to reduce cost as it would be in an effectively competitive market. An entrant without market power would only choose to enter if they had with lower average costs than HAL, but this could be due to exogenous factors rather than greater efficiency. In this case the entrant could set prices above costs under the 'umbrella' of HAL's regulated prices, increasing the overall level of prices compared to the current approach where the regulated prices are averages across the whole of Heathrow.
114. Given the capacity constraints on HAL and for Heathrow overall, the new entrant may have a degree of market power and could potentially enter even if inefficient, relying on this market power to either increase prices above HAL's regulated prices or by reducing quality of service below a competitive level.
115. A new entrant facing an established incumbent would also have an incentive to cherry pick high margin customers. This could increase prices both reducing allocative efficiency by distorting the distribution of demand over Heathrow as a whole and requiring an increase in HAL's regulated prices to offset the loss of high margin customers.

116. In practice this model would be unlikely to promote greater efficiency than models which introduce competition in the construction of assets.

III.D.1.c Raises sufficient finance

117. Overall, the cost of capital for Heathrow as a whole is likely to be higher under this model than under the current RAB framework. The RAB framework provides a high degree of certainty to investors, lowering the cost of capital. Under a model of competition for AOS:
- i. Investors in a terminal competing with HAL for AOS would face many of the same systematic risks as HAL, e.g. the impact of macro-economic shocks on demand for AOS;
 - ii. A novel regulatory framework with two competing operators would likely result in higher perceived regulatory risk than the established RAB framework and hence a premium; and
 - iii. The impact of additional liquidity through introducing additional investors to HAL is likely to be more than offset by any new investors wanting an expected return significant above their cost of capital before committing investment, i.e. the 'hurdle rate' for new investments being greater than HAL's regulated WACC.
118. This is consistent with the experience in telecoms, where investors in new entrants have faced the risk of not recovering their investments. In response, Ofcom has explicitly allowed regulated prices to rise above a cost based level, and hence allowed expected returns to rise, in order to stimulate investment.
119. Ofcom also recognises that the cost of capital for the parts of BT that face competition is higher than the cost of capital for those assets which are regulated on a RAB approach.

III.D.1.d Practical to implement

120. Introducing a new regulatory framework to enable competition in a former monopoly environment has proven to be challenging in any sector. The complexity of managing competition for a new entrant on a site operated by HAL which is a competitor would make this particularly challenging, requiring a detailed contract covering all possible eventualities.
121. This is similar to the experience in telecoms, where entrants have been dependent on interconnection with the BT network, to allow communication with BT's customer base or access to non-replicable infrastructure, such as ducts and poles, to allow competitive roll out. The development of the regulatory framework that led to the development of competition in telecoms has evolved over decades, with entrants testing new opportunities by investing a limited amount, engaging with Ofcom to further develop regulatory frameworks and only committing fully when the framework is fit for purpose. However, this approach would not work for a large indivisible investment such as a new terminal.

III.D.1.e Promotes competition

122. While this option in principle will deliver more direct competition for AOS, the resulting competition will not be effective and the costs of enabling competition, both in terms of implementation delay and additional expenditure, are likely to outweigh the benefits of competition.

III.D.1.f Promotes service quality

123. Under effective competition, competitors have an incentive to increase, innovate and differentiate the quality they offer in order to win market share and increase returns. However, competition will not be effective but will be heavily influenced by regulation and the entrant may have market power so the incentives to increase quality may be dampened. The full impact of this model on wider airport operations and delivery would need to be considered to understand whether this model could enhance service quality.

III.E Summary

124. We summarise our assessment below:

Table 2: Our assessment of the competition models short listed. we have used the same 1 to 4 scoring used by the CAA, with 4 being the best score, and 2 representing the scope of the status quo. We present the CAA score in brackets

Criterion	4b	5b	7B	Comments
Avoiding disruption	2 (2)	2 (2)	1 (2)	We consider models 4b and 5b are unlikely to add significant disruption to the implementation. Model 7b is likely to require significantly more time, due to the need to develop a new regulatory framework setting out post-entry regulation of AOS and regulated access to HAL facilities. The CAA appears to have not fully considered the complexity of model 7b.
Efficient cost	3 (3)	3 (4)	2 (3)	We consider both models 4b and 5b could deliver incentives to reduce design and build costs. In practice the incremental benefits under model 5b due to the incentive to reduce ongoing costs will be limited by the challenges in getting bidders to commit into the future. Under model 7b the absence of effective competition means that any cost efficiencies would not necessarily be passed through to end users and the greater fragmentation resulting from having two operators in a single airport would offset any efficiency gains. We consider the CAA is likely to be optimistic on the efficiency incentives under models 5b and 7b by not fully considering the implications of long term operating models.
Cost of Finance	2 (2)	2 (2)	1 (2)	We consider that models 4b and 5b do not materially affect the cost of financing, albeit challenges arise for more complex assets where the 5b model is applied. Under model 7b both the entrant and HAL would face an increased cost of

Criterion	4b	5b	7B	Comments
				capital due to uncertainty on the regulatory regime. It does not seem that the CAA has captured this risk premium in its assessment.
Practical implementation	2 (1)	1 (1)	1 (1)	We consider that the complexity of the implementation of 5b and 7b would be significantly higher than under the current model. Model 4b would increase the regulatory overhead during the procurement compared to the status quo, but this would be a one-time cost.
Competition	3 (3)	3 (4)	2 (3)	We consider that the level of competition would increase under models 4b and 5b, to the extent that a number of credible bidders could be found. As noted above we do not consider that in practice the benefits of 5b over 4b would be significant. Under model 7b, the creation of a duopoly, with significant asymmetry between HAL and an entrant, would mean that customer outcomes would remain a function of regulation rather than competition. We believe that the CAA have overstated the level of competition that could be achieved in practice under models 5b and 7b.
Quality of service	2 (2)	2 (2)	3 (2)	We consider that Model 7B, has the potential of achieving an increase in the level of service, if competing terminal operators are incentivised to compete and differentiate on the basis of quality. However, the full impact of this model on wider airport operations and delivery would need to be considered. This aspect was not captured by the CAA in its rating.

Source: Our analysis presented in this report.

IV Annex: Telecoms Case Studies

IV.A Competitive entry in telecoms

125. Competition in the UK telecoms industry has evolved over the last 40 years, since the initial introduction of competition when BT was (partially) privatised in the mid-1980s. Over time, competition has increased following further entry and this has been matched by de-regulation in parts of the value chain ('relevant markets'), as these have been determined to be effectively competitive by Ofcom. The telecoms sector therefore offers useful lessons on the challenges of introducing investment based competition¹⁴ into a previously single provider environment.
126. The development of competition has been different in the fixed and mobile sectors:
 - i. In fixed, liberalisation occurred by allowing entry alongside an existing incumbent monopoly operator, BT;
 - ii. In mobile, the market had a degree of competition from the introduction of cellular technology with further competition introduced as new technology, and the scarce resources needed to deploy this technology, was introduced.
127. Both have some lessons for the models proposed by the CAA.
128. In fixed networks, the introduction of competition resulted in de jure or de facto duopolies initially. More recent waves of entry have been critically dependent on access to BT's infrastructure. The CAA's competition models implicitly assume the entry of a single additional provider at Heathrow in addition to HAL, i.e. a duopoly. Given that the CAA has rejected requiring HAL to divest assets, a new entrant will be dependent on HAL's infrastructure, such as the existing runways, while under Model 7b competing with HAL in downstream markets. Similarly, while Oftel/Ofcom have at times studied requiring BT to divest assets, to date BT has remained vertically integrated, being both a supplier and competitor to entrants.
129. In mobile networks, further competition has been introduced by the allocation of scarce spectrum resources to new entrants in addition to the existing operators when additional spectrum has been released. Similarly, Heathrow expansion results in the availability of a new scarce resources: a quota of noise, aircraft movements, physical space.
130. In this section we first present case studies on market entry in the fixed sector. We then provide an overview of entry into the mobile sector through the allocation of resources.

IV.B Case studies of fixed network entry

131. We consider four case studies of entry into the fixed sector.
 - i. The entry of Mercury Communications as part of duopoly set up in the initial liberalisation in the UK;

¹⁴ Rather than the asset light service competition introduced in some regulated sectors.

- ii. The entry of the cable TV operators in the 1990s;
 - iii. The entry of operators using Local Loop Unbundling (LLU) in the 2000s; and
 - iv. The current wave of investment in full fibre access networks by alternative network operators ('altnets') competing with BT.
132. The first two case studies illustrate the impact of a single entrant in the sector, resulting in a duopoly, on the development of competition. The latter two studies, at a point where the market was fully liberalised and there were no restrictions on entry, illustrate the importance of defining the regulatory framework to encourage competitive entry.

IV.B.1 The entry of Mercury Communications

133. Prior to the 1980s, fixed telephony networks were considered a natural monopoly. The focus was on increasing availability of telephony services, i.e. universal service. In the 1980s, the introduction of new technology in long distance transmission of calls, initially microwave transmission and then fibre optics, significantly reduced the cost of carrying long distance calls. This reduced the barrier to entry, leading to the introduction of competition in several jurisdictions including the US and UK.
134. In the UK, in 1983 Mercury, a subsidiary of Cable and Wireless, was licensed as a fixed competitor to BT¹⁵, focusing on parts of the network considered contestable (long-distance networks and the City of London). The Minister for Information Technology announced the no further licences would be issued for long distance networks for at least seven years.¹⁶
135. The aim of competition in the fixed market was to provide some discipline on BT in contestable parts of the market, to increase BT's efficiency and limit returns post-privatisation. There was widespread recognition that BT had not been efficient under public ownership when compared to incumbent operators in other jurisdictions. Large parts of the market, in particular local access, were considered to remain non-contestable. There was an expectation that regulation would need to be maintained, with an RPI-X charge control being imposed on BT as part of the privatisation. BT was also obliged to allow Mercury to interconnect its network with the BT network, allowing it to offer calls to and from BT subscribers.

IV.B.1.a Duopoly outcomes

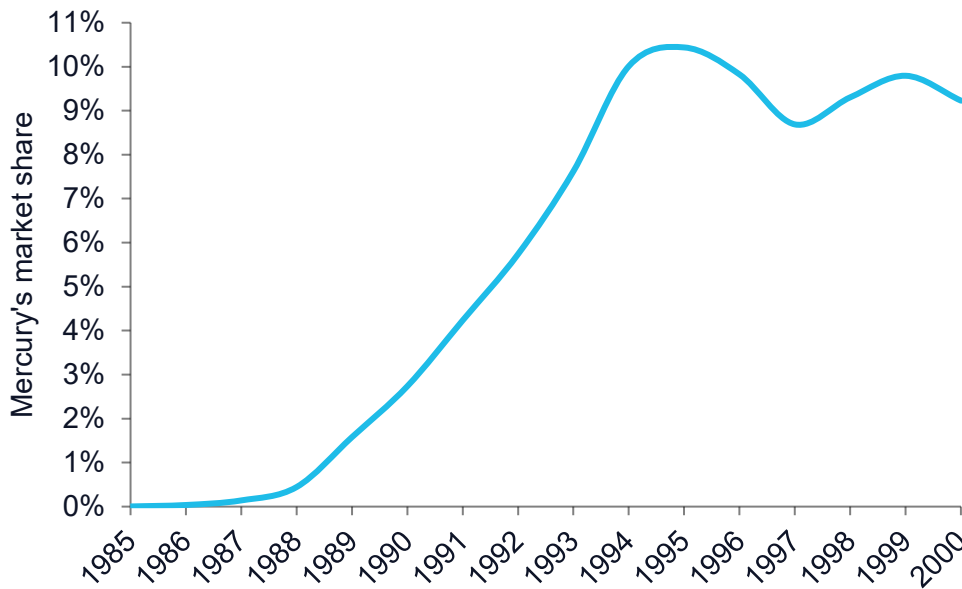
136. The effect of competition in fixed was limited, with Mercury focusing initially on 'cherry-picking' high-margin parts of the market, such as serving customers in the City of London and competing on international calls. This competition brought benefits in terms of lower prices to this subset of customers but did not increase the overall competitive pressure for most customers. Mercury's share of the fixed market only reached 10.6% after 10 years of operations and remained at that level or lower in the following years, as shown in the Figure below.

¹⁵ Source: A brief history of recent UK telecoms and Ofcom

<https://webarchive.nationalarchives.gov.uk/ukgwa/20080712180121/http://www.ofcom.org.uk/static/archive/ofcom/about/history.htm>

¹⁶ Ibid

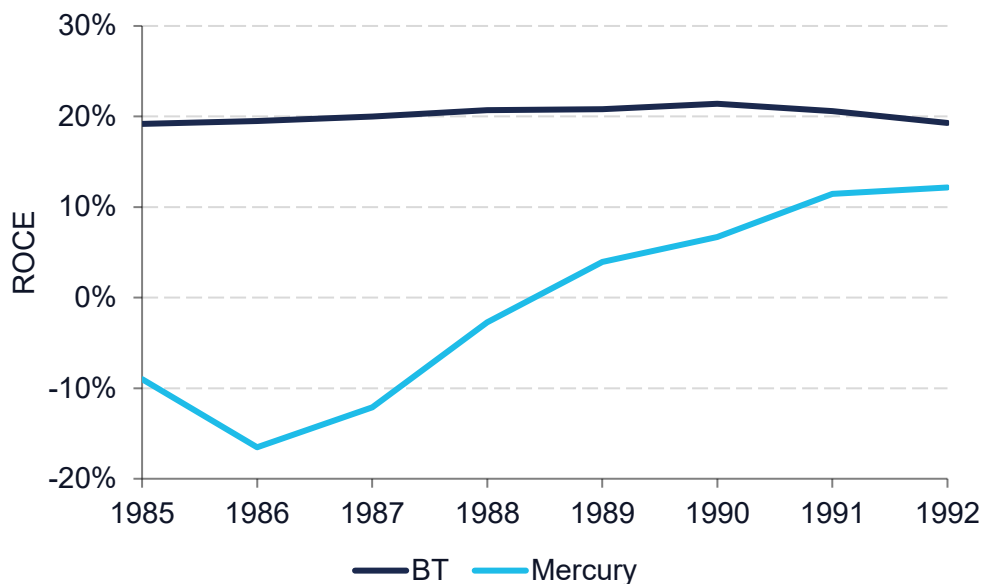
Figure 1: Revenue share of Mercury in the fixed telephony market (BT + Mercury)



Source: BT and Mercury annual reports.

137. The narrow addressable market also meant that Mercury did not have the same economies of scope and scale as BT (for example, not having the benefit of call volumes from residential customers in the evenings and at weekends to better utilise capacity). As a result, Mercury's returns were below BT's, as it is shown in the figure below.

Figure 2: Return on Capital Employed (ROCE) for BT and Mercury



Source: BT and Mercury annual reports.

138. This limited competition did not place a significant constraint on BT's costs. For example, the total number of employees at the end of 1990 was 248 thousand, 7 thousand higher than in 1984 when competition was introduced.¹⁷

¹⁷ Source. BT Annual Reports

139. In 1990 the Government conducted the ‘Duopoly review’, reflecting the 1983 undertaking not to issue further licences for 7 years. Given the limited benefits from the duopoly, the review recommended issuing further fixed licences to deliver telephony services.
140. This introduced further competition to Mercury in long distance and international calls and for corporate connectivity in areas such as the City of London. There was concern that further competition to BT for high-margin customers and services would mean that BT would not be able to generate a reasonable return overall. A large proportion of residential customers were unprofitable and were effectively cross-subsidised by profits from business customers. This was because of the combination of the universal service obligation imposed on BT and regulation, which held ‘access’ prices (line connection and rental charges) below cost to ensure affordability. To level the playing field (and to ease the sale of the State’s remaining shares in BT), a system of ‘access deficit contributions’ (ADCs) was set up whereby competitors would make payments to BT to compensate it for the profits lost as BT’s market share was eroded, albeit with waivers of these payments when operators were small.

IV.B.2 Entry of cable television operators

141. One of the major beneficiaries to the further liberalisation following the duopoly review were cable television operators, who were building out local access networks to deliver multi-channel television. The cable operators were granted local monopolies (franchises) in the delivery of television over cable networks, with BT prevented from using its existing fixed network to compete (known as the ‘broadcast ban’) until 2001.¹⁸ By combining two products, television and telephony, it was believed that these operators could overcome the natural monopoly enjoyed by BT as the incumbent operator of the local access networks.
142. The regulatory framework was also adjusted to benefit the cable operators:
- i. Number portability was introduced allowing customers to retain their existing numbers when switching from BT to the cable operators (and vice versa);
 - ii. Waivers were granted so the cable operators did not have to pay ADCs initially; and
 - iii. Oftel did not require BT to offer access to its own local network to competitors (e.g. local loop unbundling), meaning the competition for residential lines was largely a duopoly.
143. The granting of local cable monopolies with dual revenue streams of television and telephony encouraged significant investment in cable access networks, with approximately 50% of households covered by 2000. These operators were funded by a number of overseas investors, with fragmentation as local franchises were issued to different operator.

IV.B.2.a Outcomes

144. Despite the increase in competition across the value chain in the 1990s, Oftel maintained retail price regulation on the basis that competition was not effective. Retail price regulation became

¹⁸ <http://news.bbc.co.uk/1/hi/business/1354686.stm>

more focussed on constraining the cost of typical residential usage, given the greater competition for high margin business customers, despite the roll out of cable networks serving residential customers.

145. The ADC regime, which was designed to incentivise efficient entry rather than cherry picking, proved to be unworkable and unnecessary:
- i. The requirement that competitors made balancing payments to the incumbent distorted competition and led to disputes and uncertainty;
 - ii. A combination of BT's advantages as an incumbent and Ofcom granting increased flexibility to increase access prices for residential services meant that BT was able to remain profitable even as competitors increased market share.
146. The introduction of further competition post-duopoly review appeared to be effective in incentivising BT to reduce costs. For example, by 1999 the workforce had almost halved to 125 thousand, compared to the 247 thousand employees at the time of the duopoly review.¹⁹ This greater efficiency fed into charge controls, resulting in significant real terms reductions in prices. At the same time the introduction of new digital technology led to increased quality of service.
147. After 2000, build of cable networks largely stopped as cable operators were unable to finance their existing debt and the industry went through a process of restructuring and consolidation, eventually resulting in a single UK cable operator, now VMO2. While some of the original investors did not make a return on their investments, the (sunk) assets eventually generated significant cash flows particularly once they were upgraded to offer broadband internet access and so a 'triple play' for television, telephony and internet access.

IV.B.3 Entry based on LLU access to BT's network

148. Prior to 2000, the main service by provided by telecoms operators in terms of revenue was voice telephony. From 2000, as Internet adoption increased rapidly and became central to business and social life, users increasingly wanted 'always on' broadband connections. Telephony operators could offer broadband over existing copper cables using ADSL technology and cable television operators could offer broadband over their existing coaxial copper cables using DOCSIS technology.
149. From 1998, the EC introduced a package of legislation which liberalised the telecoms sector across the EU. The UK had adopted a model based on competition between vertically integrated infrastructure operators, for example between BT and the cable television operators. Other jurisdictions focused on 'access-based' competition where competitors were able to use the incumbents' local access networks to deliver services. The most common form was 'local loop unbundling' (LLU), which allowed competitors to gain access to the incumbent's copper access network to deliver services directly to end users. LLU was introduced in other jurisdictions in the 1990s to allow competition in telephony services, but it could also be used to deliver ADSL services.

¹⁹ Source: BT Annual Reports

In 2000 the EC mandated the introduction of LLU across the EU, overruling the UK's concerns that this would undermine infrastructure-based competition.

150. LLU was launched in the UK in 2001. LLU required competitors to be able to access BT buildings to connect to the copper pairs used to serve individual customers, which required processes to be put in place to ensure network security. Initial roll-out was slow and limited to a small number of exchanges due to operational issues, with BT constructing separate rooms for each competitor. Wholesale LLU prices were set at a high level compared to line rental services based on BT's network equipment, meaning that competitors had limited incentive to invest in their own equipment.
151. In 2004 Ofcom conducted a Strategic Review of Telecoms²⁰ (the TSR) which was intended to set out a new regulatory framework to address the future challenges for the industry, particular related to the roll out of new technologies. In 2005, facing a potential Enterprise Act reference which could have resulted in structural separation, BT agreed to²¹:
 - i. Separate out the local access network into a separate 'access services division', Openreach;
 - ii. Introduce 'equivalence of inputs', where the downstream business of BT would use the same processes and products when purchasing services from Openreach as those used by competitors; and
 - iii. Reduce the price of local loop unbundling services, introducing a regulatory asset base for copper cable and infrastructure assets.

IV.B.3.a Outcomes

152. Prior to 2005, take-up of fixed broadband services in the UK was relatively slow, with both BT and the cable operators suffering financial problems due to excessive borrowing. Prior to the TSR, competitors could not offer mass market broadband services using LLU at competitive prices. However, following functional separation and the reduction in the wholesale prices for LLU, roll-out of LLU across most BT exchanges by competitors such as TalkTalk and Sky drove rapid growth in broadband.
153. There were significant benefits to consumers, with entrants innovating in terms of products, for example offering higher speeds, unlimited usage and products which bundled together voice and broadband services. There was also significant competition on retail prices.
154. The availability of multiple providers, BT, the cable network and entrants relying on LLU, allowed Ofcom to remove price regulation of BT's retail services as the relevant market was determined to be effectively competitive. Remaining regulation focussing on the terms and conditions, including prices, of the Openreach wholesale access services.

²⁰ Ofcom Strategic Review of Telecommunications - Phase 1 Published: 28 April 2004

²¹ Final statements on the Strategic Review of Telecommunications, and undertakings in lieu of a reference under the Enterprise Act 2002 Published: 22 September 2005

IV.B.4 Infrastructure-based competition

155. By 2010, the limitations of the existing copper local access infrastructure were becoming a constraint on the quality of broadband access. While operators in a number of other jurisdictions began a full replacement of copper cables by fibre to the customers, from 2010 onwards BT rolled out fibre-to-the-cabinet technology, where fibre replaced copper for most of the connection to the customer, but retained copper for the final connection. BT Retail and existing ISPs migrated their customers to the new technology. Virgin Media also upgraded its network to offer higher speeds.
156. However, by 2015 there was concern that the UK was falling behind peers in the roll-out of full-fibre networks which offered higher speeds and reliability than BT's fibre to the cabinet network. The DCMS conducted the Future Telecoms Infrastructure Review in 2018²², which set out a programme for accelerating the roll-out of full-fibre networks:
- i. Encouraging infrastructure-based competition in urban areas;
 - ii. In less dense areas, relying on regulation in the long run;
 - iii. Using public subsidies in very rural areas;
 - iv. Providing long-run clarity on regulation, with relaxation of price regulation in the medium term;
 - v. Allowing competitors to BT to access BT's network of ducts and poles on a non-discriminatory basis.
157. Ofcom implemented this approach through the 2021 WFTMR decision, which:
- i. Signalled a long-term regulatory approach where strict price regulation would not be imposed for 10 years and even after this would only be imposed if competition was not effective and returns were well above the cost of capital (a 'fair bet' had been met);
 - ii. Reduced the prices of Duct and Pole Access.

IV.B.4.a Outcomes

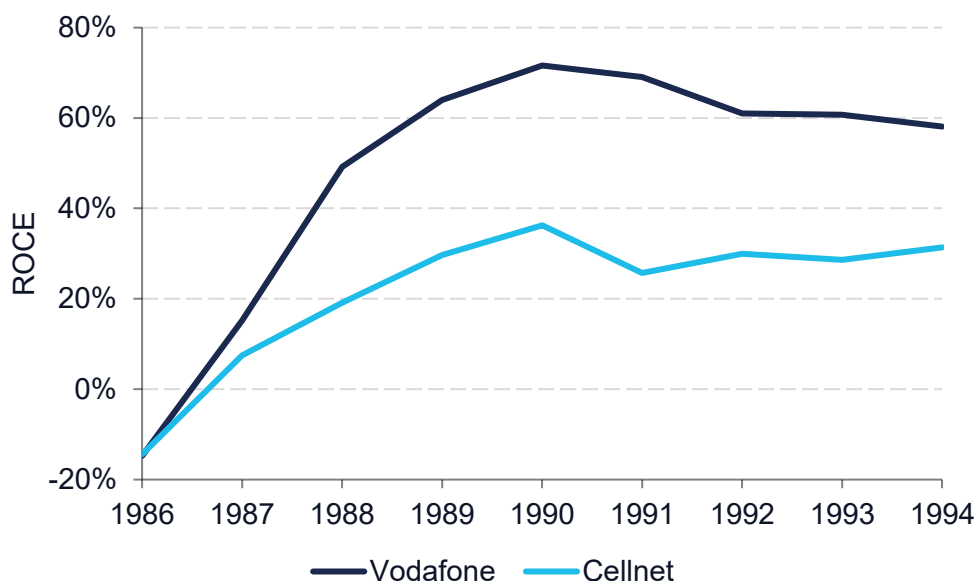
158. Ofcom's implementation of the policy has been successful in incentivising investment in full fibre networks both by competitors and by Openreach, with rapid increases in availability and take-up, although take-up is much higher for Openreach than for its competitors. While users have seen increases in bills, the offer of 'more for more', i.e. higher speeds and a more reliable service, means that there has been little customer dissatisfaction. While Openreach continues to roll out its fibre network to cover the majority of homes in the UK, altnet roll-out has begun to slow, with an expectation that the fragmented industry will start to consolidate.

IV.C Entry in mobile

²² Department for Digital, Culture, Media & Sport Future Telecoms Infrastructure Review Published 23 July 2018

159. Cellular mobile technology was developed in the 1980s. The lack of incumbency advantage and relatively low fixed costs also meant that barriers to entry were lower than in the fixed network. In 1983²³, as the competition in the fixed market was being introduced through the entry of Mercury, two national licences for cellular technology were granted to Cellnet (a j.v. owned 60% by BT and 40% by Securicor) and Racal (later becoming Vodafone).
160. Competition in the mobile market resulted in significant benefits, with take up of mobile services being faster than in many comparable markets. While the mobile operators were incentivised to innovate and to minimise costs, competition was not sufficient to drive prices down to costs and the mobile operators were still able to generate very high returns in a duopoly, as shown in the figure below.

Figure 3: ROCE for the first two mobile operators in the UK



Source: Vodafone and Cellnet annual reports.

161. 2nd-generation mobile technology became available in the early 1990s. Given the success of competition in the mobile sector in delivering good consumer outcomes, albeit without fully constraining returns, the UK government took this opportunity to introduce further competition issuing 2G licences both to the existing two operators and to three new entrants. Following a merger two new entrants entered the market, resulting in a four-player market in mobile services.
162. In mobile the entry of two further operators at a time where a new generation of technology was being introduced resulted in significant price reductions, increases in penetration and product innovation (e.g. bundled services and SMS). While barriers to entry were significant, with entrants having to roll out a national network to effectively compete, the high growth in the market and the fact that the existing operators also had to upgrade their networks made entry attractive.

²³ Ibid

163. In mobile, spectrum supporting the third generation of mobile technology, offering broadband capabilities, was made available in 2000. Five 3G licences were auctioned in 2000, allowing for one entrant in addition to the four existing operators. The rapid growth and profitability of mobile operators, as well as the 'dotcom' bubble, led to operators bidding up the price of the licences, driven by a number of potential new entrants. While the entrant, Three, launched in 2003, its limited network coverage and the immaturity of the technology meant that take-up of mobile broadband was limited until 2007, when the launch of the original iPhone created demand.
164. Since the entry of Three in 2000, regulators have allowed consolidation both at the network level and the retail level:
 - i. T-Mobile and Three agreeing a network sharing arrangement for most of the country in 2008;
 - ii. T-Mobile and Orange merging in 2010 to form EE;
 - iii. Vodafone and O2 entering into a network sharing arrangement in 2012
 - iv. BT buying EE in 2016;
 - v. Virgin Media buying O2 in 2021; and
165. This trend to a reduced number of players reflects a recognition that in industries with significant economies of scale, there is a trade-off between the number of providers and investment incentives, particularly when there is a regular cycle of investment required. For example, there was a concern that the UK was falling behind in the roll-out of 5G services. Government intervention in easing planning restrictions on mobile masts, encouraging sharing of infrastructure in rural areas and reducing landlords' ability to increase rents had little impact. In this context, the CMA, supported by Ofcom, allowed further consolidation in mobile networks with Vodafone and Three merging, with the parties giving commitments to deliver their plans to significantly increase 5G roll-out across the UK. This was despite an expectation that the increase in concentration will increase upward pricing pressure.

IV.D Lessons

IV.D.1 Duopoly is not sufficient for effective competition

166. Economic theory suggests that outcomes in oligopolies will differ depending on a range of factors. However, in markets where there are high barriers to entry and expansion and high switching costs, oligopolies tend to result in high returns.
167. This has particularly been the case where competition has been introduced with a single operator competing against an established and vertically integrated operator:
 - i. Mercury made limited inroads into BT's market share in the duopoly period and struggled to make a reasonable return while BT made good returns which were only constrained by retail price regulation;

- ii. The cable operators also had financial difficulties, despite economies of scope compared to BT and BT being prevented from offering competing services (the broadcast ban).

168. Competition has been much more successful when there have been relatively low barriers to entry and expansion, for example in mobile, the roll out of broadband access based on LLU, and the recent roll out of full fibre networks, based on access to passive infrastructure, such as ducts and poles.
169. The nature of fixed networks has allowed competitors to BT to enter with relatively low investment, with efficient competitors being able to scale up.

IV.D.2 Effective competition may be slow to develop

170. After 40 years of competition, BT remains dominant (Ofcom continues to determine BT to have significant market power, ‘SMP’) in most of the UK for key fixed wholesale markets and so continues to be regulated in these markets. This is despite significant investment by vertically integrated competitors including the cable operators in the 1990s, by internet providers in the 2000s and 2010s, and by altnets in the 2020s. Competition has mostly developed as a result of significant demand and technological changes (such as the demand for cable TV, broadband and TV streaming) and regulator interventions, which aimed at finding the appropriate trade-off between price competition and maintaining incentives for investing in new technologies.
171. Conversely, effective competition has been a feature of the mobile market throughout much of the period, with a move in later years to allow consolidation in order to boost investment incentives.

IV.D.3 Greater number of ‘touch points’ between competitors and the incumbent increases complexity

172. Initially, competition in telephony services required interconnection between BT as the incumbent network and competitor networks. Initial negotiations to establish interconnection agreements were protracted, in part due to concerns about network security but also because BT, as the incumbent, did not have an incentive to make interconnection straightforward or set fair and reasonable terms. This required significant ongoing intervention from Oftel in the initial years of liberalisation to ensure that the terms and conditions were fair and reasonable.
173. While interconnection can be delivered by connecting the two networks at a neutral point between networks (‘in span’ interconnection), local loop access required competitors to be able to access BT (Openreach) exchange buildings to install equipment and for BT engineers to connect this equipment to the BT local access network. The initial roll-out was based on separating out competitors’ equipment in newly built rooms, but the space limitations and the time to build rooms meant that roll-out was slow. Moving to co-mingling, where CPs’ equipment was placed in the same space as BT equipment, meant that LLU could be rolled out to more exchanges but required more complex contractual arrangements. While LLU was launched on 1 January 2001, four years later there were only 31 thousand unbundled loops. However, the 2005 TSR led to significant changes in both pricing and terms and conditions, with Openreach reporting 1 million unbundled lines by mid-2006 and the total number reaching 7 million by mid-2010.

174. Duct and pole access (DPA), used by competitors to roll out competing fibre networks, requires competing providers to access Openreach's network of ducts and poles spread across the UK (around 4 million poles, 500 thousand kilometres of duct and around 4 million manholes). While DPA was mandated in 2010 and launched in 2011, high prices, restrictions on its use and a cumbersome process meant that take-up was low. Further work on processes and removal of some restrictions on use meant that usage increased from 2018 onwards, but large-scale roll-out of fibre networks using DPA only began in 2021.

IV.D.4 Entry does not always deliver lower consumer prices than regulation

175. Since liberalisation began in the mid-1980s, regulation has been withdrawn from large parts of the value chain. The process of market analysis has been designed to address market failures by introducing remedies as far upstream as possible to address bottlenecks.
176. While there is acceptance that competition has led to significant consumer benefits in telecoms, particularly in terms of increased quality of service, such as faster download speeds and unlimited usage packages, entry has not always led to lower prices for legacy services:
- i. In the initial phases of competition for telephony services, entry was concentrated on long-distance and international calls where usage was concentrated on a small number of customers. Despite retail prices being regulated overall, many residential customers faced above-inflation price increases as prices were 'rebalanced' to reduce long-distance call charges while increasing line-rental charges;
 - ii. When retail prices were de-regulated, those customers buying voice services separately (rather than bundles of voice and broadband) faced significant price increases as barriers to switch meant that competition for these customers was limited. Ofcom later intervened to protect these customers from price increases;
 - iii. Ofcom's current policy to encourage fibre roll-out is based on explicitly allowing prices for legacy broadband services to be set above a cost-based level to provide entrants with sufficient margin to compete.

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