Appendix E: Profitability analysis

Introduction

E.1 In this appendix we set out our assessment of the profitability of providers of public cloud infrastructure services.

E.2 We examined profitability to inform our understanding of competition in the cloud services markets. The outcomes of the competitive process in their different forms in a market, including prices and profitability, product quality and range and levels of innovation, can provide evidence about its functioning.[1]

E.3 We discuss the approach we have taken to assessing the profitability of cloud services markets and the analysis done to support our assessment, having considered responses to our working paper[2] and the PDR,[3] together with Ofcom's and our financial information requests and publicly available financial information. We have assessed return on capital employed for AWS and Microsoft's cloud businesses. We have also analysed the margins for identified relevant cloud providers.

Our approach to profitability analysis

E.4 This section sets out the approach we have taken to our profitability analysis, including the scope of the analysis and our overarching conceptual approach for measuring profitability. Stakeholder submissions on our overall approach to assessing profitability are set out in chapter 3 of this report.

Scope of our analysis

E.5 This section sets out the scope of our profitability assessment, highlighting which business activities we considered to be relevant, which firms we analysed and the time periods over which we assessed profitability.

Business activities and relevant firms

E.6 We examine the global profitability of cloud services for the largest providers of public cloud infrastructure services in the UK. Where possible, we assess the profitability of public cloud services specifically. Where this is not possible, for

---

[1] CC3 (Revised), Guidelines for market investigations: Their role, procedures, assessment and remedies, paragraph 103.
[2] See chapter 6 of Competitive landscape working paper.
[3] See chapter 3, paragraphs 3.218 to 3.276 of Provisional decision report and appendix E: Profitability analysis.

example where a provider is unable to provide data on its public cloud services separately to its private or hybrid cloud services, we have assessed the narrowest relevant business units which include public cloud services for which it has been possible to undertake the analysis.

E.7 We have included AWS, Microsoft, Google, Oracle, IBM and OVHcloud in our analysis as we have identified these firms as relevant providers of public cloud infrastructure services in the UK.

E.8 The two largest suppliers of cloud services in the UK are AWS and Microsoft. They are present at all levels of the cloud stack and provide a wide range of cloud services across multiple product categories at scale. As set out in the market shares section of this report, these two cloud providers collectively account for [60-80]% of IaaS and PaaS cloud services revenues in the UK in 2024. We consider these two providers to represent a substantial part of the markets.[4]

E.9 Google is the third largest provider of cloud services in the UK markets and has a significantly lower share of cloud services revenues, accounting for [5-10]% of IaaS and PaaS revenues in the UK in 2024.[5]

E.10 We also present financial information on smaller cloud providers who have been identified as global and UK competitors to AWS, Microsoft and Google and for which we have been able to obtain cloud services profit margin figures. These include IBM, Oracle and OVHcloud. IBM and Oracle are the next largest providers in the UK in our analysis of cloud services revenues.[6] We include OVHcloud in our analysis as it publicly reports its cloud services performance and is Europe-focused.

E.11 We assess return on capital employed for AWS and Microsoft's cloud businesses as we are primarily interested in assessing the profitability of the largest incumbent providers in the public cloud infrastructure services markets,[7] and due to limitations on data available for other providers.

E.12 While Google is the third largest provider in the markets, we note that Google's cloud business has only recently (in 2023) reported profits[8] and its market share in the UK is substantially less than AWS and Microsoft.[9] We include Google's cloud business in our margin benchmarking, but we do not calculate its return on capital employed, as its returns would historically be negative and it could at most have achieved returns in excess of the cost of capital for 18 months only and we do not

[4] CC3 (Revised), paragraph 116.
[5] See appendix D of this report.
[6] See appendix D of this report.
[7] CC3 (Revised), paragraph 114.
[8] Alphabet 2023 Form 10-K, page 87.
[9] See appendix D of this report.

have enough information to determine if Google's profitability improvement will persist in the future.

E.13 We discuss some of the data challenges for the other smaller cloud providers below.

E.14 We examine profitability at a global level for the providers due to (i) the global nature of the cloud services they provide and (ii) the global nature of their financial reporting, asset base and capital investment.

Time period under consideration

E.15 We seek to examine profitability over a time period that is sufficiently long to provide a representative picture of profitability and that is not unduly distorted by unusual macroeconomic conditions or one-off events. We recognise that the appropriate time period may vary depending on the specific market and that the pattern of investment and nature of sources of competitive advantage may affect the CMA's view of the relevant timescales over which it would expect to see competition playing out in the market.[10]

E.16 Where large and risky investments have been made, we would expect to see a normal level of profitability restored over a relatively long timescale.[11] Our guidelines note that:

> 'Where investment is characterized by large one-off expenditure, or the industry has experienced a period of growth, it may be desirable to consider profitability over a relatively long period of time or on a project appraisal basis.'[12]

E.17 We seek to balance this aim with the constraints faced by the cloud providers in providing us with reliable and consistent financial information, which may be challenging given past acquisitions and divestments, as well as changes in financial reporting systems and cost allocation approaches, for example.

E.18 Of the cloud providers included in our profitability assessment, AWS was the first provider to start providing cloud services in 2006. Microsoft, Google and IBM all started providing cloud services in 2008, whilst OVHcloud entered the markets in 2010 and Oracle entered the markets in 2016.[13] These cloud providers all started by offering one element of the cloud stack and gradually expanded their cloud services offerings over time.

---

[10] CC3 (Revised), paragraph 121.
[11] CC3 (Revised), paragraph 121.
[12] CC3 (Revised), Annex A, paragraph 10.
[13] See chapter 2; OVHcloud Corporate - History & Facts.

E.19 To take a view on current market trends in profitability we have generally focused on the last five years (financial years covering the years from 2019 to 2023/24). Where data allows, we have also considered a longer (up to 10 years) period from 2013 to 2023/24, including for our return on capital employed (ROCE) analysis. We also consider the profitability of cloud providers beyond 2023/24, to the extent that our review of internal documents suggests that this may be meaningful.

Overarching conceptual approach

Return on capital employed versus cost of capital

E.20 The analysis of profitability as a means of understanding competitive conditions in a market is based on the premise that in a competitive market firms would generally earn no more than a 'normal' rate of profit. Our guidelines define a 'normal' level of profit as:[14]

> 'the minimum level of profits required to keep the factors of production in their current use in the long run, ie the rate of return on capital employed for a particular business activity would be equal to the opportunity cost of capital for that activity.'

E.21 The rationale for benchmarking return on capital with the opportunity cost of capital is that, in a competitive market, if firms persistently earned in excess of the return required to compensate investors for the risks taken, we would expect these profits to attract entry and/or expansion.[15] This entry/expansion would serve to compete away profits in excess of the cost of capital up until the point where firms cover their total costs, including a market-based cost of capital and no more. Where firms persistently earn in excess of a normal return, this signals that there may be limitations in the competitive process.

E.22 Our guidelines, therefore, refer to the rate of return on capital as a means of measuring profitability. Return on capital can be based on cash flows (internal rate of return (IRR)) or profits (ROCE). These approaches are very similar in substance, with the choice between them determined in part by industry characteristics and in part by data availability.

E.23 We have considered different approaches to assessing cloud providers' profitability and have taken the approach of comparing cloud providers' ROCE with the cost of capital. Use of ROCE allows us to calculate annual profitability and thus provides insights into trends over time and the drivers of profits which may exist above the 'normal' level.

---

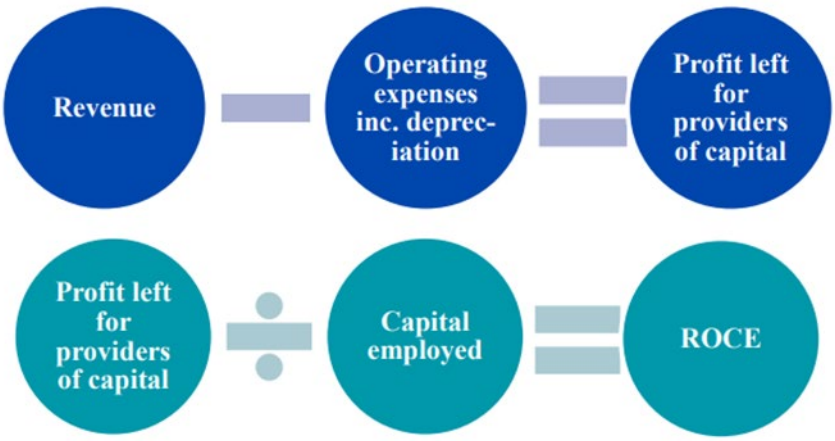
[14] CC3 (Revised), paragraph 116.
[15] The time period over which this process may take place may differ between different sectors due to the time taken for entry and/or expansion of capacity.

E.24 We observe that cloud services are business segments within most of the cloud providers'[16] overall operations for which reliable profitability data is more readily available than cash flow data,[17] making these segments better suited to the ROCE approach.[18]

E.25 We also consider that the pattern of ongoing variable capital investments in the market (as opposed to large one-off investments) and the lack of any obvious time period to use as investment entry and exit assumptions means that ROCE is more suitable than IRR for measuring profitability. We would not expect an IRR assessment to produce materially different results to a ROCE assessment.[19]

E.26 The figure below illustrates how ROCE is calculated.

Figure E.1: The components of ROCE



Source: CMA analysis. Note, profit left for providers of capital can be distributed or reinvested in the business.

E.27 The ROCE is benchmarked against the opportunity cost of capital, which is the weighted average cost of capital (WACC), over the relevant period(s) of analysis. The WACC is the return on investment that providers of capital – both debt and equity – expect, given the risks associated with the relevant activity.[20]

[16] AWS, Microsoft, Google, Oracle and IBM.
[17] [✂]. Microsoft was not able to provide balance sheet accounts or cash flow data for its for Cloud & Enterprise or Azure business units. Our understanding is that Microsoft; [✂]. [✂] response to the CMA's information request [✂]; Responses to Ofcom's information requests [✂].
[18] Where the market of interest is a division or segment of a company it may not be possible to obtain reliable cash flow data at this level and we may therefore adopt a return on capital approach for this reason. CC3 (Revised), Annex A, paragraph 11.
[19] Provided that analysis is undertaken carefully, with various adjustments made, ROCE assessment is equivalent to an IRR assessment and is also, therefore, conceptually robust. See The Economic Analysis of Accounting Profitability (1987), Jeremy Edwards, J A Kay, Colin P Mayer, for a fuller discussion of the conditions under which the ROCE and IRR approaches are equivalent.
[20] WACC is therefore expected return on equity and expected return on debt, weighted by gearing – the relevant proportions of debt and equity.

Economic versus accounting profitability

E.28 When estimating ROCE, our approach is to start with accounting figures from the income statement and balance sheet of the relevant activities and then make adjustments to arrive at an economically meaningful measure of profitability.

E.29 An important factor to consider when selecting an appropriate measure is the availability of good quality data. Where possible, the CMA will base its calculations on financial data that can be reconciled to audited financial statements, albeit with appropriate adjustments.[21]

E.30 There is also the need to obtain an appropriate value for capital employed. Obtaining a value for capital employed can present difficulties irrespective of the choice of profitability measurement method; a return on capital approach requires an economically meaningful value for the capital base, which may not necessarily accord with the value ascribed in the financial records.[22]

E.31 We may consider adjustments to accounting data produced in line with standard accounting practices relating to the difference between historical cost and replacement cost and relating to the inclusion of certain intangible assets where certain criteria are met.[23] We may also consider adjustments to cost or asset allocations on a case-specific basis[24] to account for the activities which are the subject of the investigation, where a firm undertakes other business activities and/or where there are material intercompany transactions.

Additional analysis

E.32 We recognise that profitability analysis, based on a ROCE versus WACC framework, requires certain assumptions to be made. The results from profitability analysis can be sensitive to ranges around these assumptions, particularly with regard to asset valuations. Where appropriate, therefore, we have undertaken sensitivity analysis.

E.33 We also critically review both the historical financial information and the forecasts provided by cloud providers and the assumptions underlying them.

E.34 As described below, we undertake additional analysis into margin benchmarking to further inform our economic profitability assessment.

---

[21] CC3 (Revised), annex A, paragraph 11.
[22] CC3 (Revised), annex A, paragraph 13.
[23] CC3 (Revised), annex A, paragraph 14.
[24] CC3 (Revised), annex A, paragraph 14.

Margin benchmarking

E.35 We consider that margin benchmarking provides useful context and insight into the comparative profitability of cloud providers, as well as trends in profitability over time. Margin benchmarking can also be less impacted by issues of data availability.

E.36 However, we do not typically consider margins by themselves to be a suitable benchmark for determining if profitability exceeds a 'normal' level, if we can determine other measures such as ROCE. Margin benchmarking may also have some limitations, where the firms included may provide different services, have different cost bases, face different risks and have differing reporting requirements and/or accounting policies.

Determining profits and capital base

E.37 In this section, we summarise how cloud providers track and assess the profitability of their cloud businesses. We then set out how we have determined the relevant segmental earnings and capital base to use for the purposes of our margin and ROCE analysis. We also comment on any issues we noted when determining these inputs.

The cloud providers' approaches to assessing the profitability of cloud services

E.38 As noted in the guidelines, we consider that the manner in which firms assess profitability for the purposes of monitoring and reporting performance may inform our view as to what is an appropriate measure for the markets under consideration.[25]

E.39 Ideally, we would assess the profitability of cloud providers' public cloud infrastructure services business specifically, taking into account all relevant costs and an appropriate capital base. In assessing the viability of doing this, it is important to consider how the firms are organised and how the firms monitor and report performance, both externally and internally.

E.40 Most of the cloud providers that we identify for profitability analysis are integrated global firms, providing a range of services in addition to cloud services. Only Amazon is structured to have a separate corporate entity providing cloud services (AWS) with full income statement reporting and reporting of balance sheet items.

[25] CC3 (Revised), annex A, paragraph 9.

Even so, AWS is still part of the wider Amazon group and some balance sheet items are not allocated to AWS (eg corporate assets).[26]

E.41 In general, other cloud providers (Microsoft, Google, Oracle, IBM and OVHcloud) track the revenue generated by their cloud businesses (though not always specifically public cloud).[27] In some cases (as discussed below) they track margin data.

E.42 However, in some cases, cloud providers' businesses are structured so that cloud infrastructure services form part of broader 'cloud' or 'infrastructure' reporting segments, which may also include: private or hybrid cloud services, cloud SaaS products, on-premises infrastructure licences and/or support services and other ancillary cloud services.

E.43 We asked cloud providers how they track financial performance and profitability for their cloud service business.[28] We summarise their responses below:

(a) Amazon reports global profitability for AWS in its public accounts. AWS said that it also [✂] as well as various other reports for its cloud infrastructure services business and that it monitors performance [✂].[29] AWS said it measures profitability for AWS using profit margins [✂].[30]

(b) Microsoft said that its Azure Standalone Services (Azure) reporting unit is the business that offers public cloud infrastructure services, but that [✂] so does not have operating profit data for Azure.[31]

(c) Microsoft said that it does not in the ordinary course measure profitability at the Azure level or [✂] Cloud & Enterprise (which is part of Microsoft's publicly reported Intelligent Cloud segment).[32] Microsoft noted that Cloud & Enterprise includes Azure but also other businesses, including GitHub, Nuance, Intune, Power BI, Active Directory and some on-premises products such as Windows Server and SQL Server.[33]

[26] Amazon public accounts report AWS total assets excluding corporate assets, such as cash and cash equivalents, marketable securities, other long-term investments, corporate facilities, goodwill and other acquired intangible assets and tax assets (see for example, Amazon 2023 10-K page 70).
[27] CMA analysis of Form 10-Ks for Amazon, Microsoft, Alphabet, Oracle and IBM and OVHcloud Consolidated Accounts.
[28] We note that OVHcloud publicly reports its 'Public Cloud' business segment, along with its other business segments of 'Private Cloud' and 'Web Cloud and Other', to an earnings before interest, tax, depreciation and amortisation (EBITDA) level, as well as reporting segment capex. OVHcloud consolidated financial statements, eg Consolidated financial statements FY2023.
[29] AWS' response to the CMA's information request [✂].
[30] AWS' response to the CMA's information request [✂].
[31] Microsoft's response to the CMA's information request [✂].
[32] Microsoft's response to the CMA's information request [✂].
[33] Microsoft's response to the CMA's information request [✂].

(d) Microsoft said the financial performance of its global cloud business is reported in quarterly management reports and that it tracks Azure revenue performance [✂].[34]

(e) Google said it monitors profitability of cloud products on a global basis, with both operating profit and gross profit used to assess profitability.[35] Google Cloud includes Google Cloud Platform (GCP) as well as Google Workspace (a SaaS product) and other enterprise services.[36]

(f) Google said that it does not track and manage operating profits by geographic region [✂].[37]

(g) IBM said its IaaS and PaaS businesses are included as part of its 'Infrastructure' segment and 'Software' segment respectively. As such, the performance of IBM's IaaS and PaaS businesses is a subset of those segments and gets reviewed within those segments [✂].[38]

(h) IBM [✂].[39] IBM was able to provide some [✂] management reporting for [✂] and gross margins for [✂].[40]

(i) Oracle said it is currently piloting new methods to measure profitability at a service level and/or data centre level. Oracle said it could only provide financial data from [✂] using this new method of reporting.[41] Oracle's publicly reported segment which includes its cloud business, 'Cloud and license', includes cloud services and on-premises licences together.[42]

Inputs in assessing the profitability of cloud services

Identifying the relevant segments

E.44 The cloud providers that we have identified for profitability analysis are mostly global firms which offer cloud infrastructure services (both public and private) as well as providing other services and products. To assess the profitability of their public cloud infrastructure services businesses, it is necessary to identify the relevant reporting segment within each firm (or the closest relevant segment).

[34] Microsoft's response to the CMA's information request [✂].
[35] Google's response to the CMA's information request [✂].
[36] Alphabet Form 10-K 2023, page 87
[37] Google's response to the CMA's information request [✂].
[38] IBM's response to the CMA's information request [✂].
[39] IBM's response to the CMA's information request [✂].
[40] IBM's response to the CMA's information requests [✂].
[41] Oracle's response to the CMA's information request [✂].
[42] Oracle FY23 10-K, page 101.

AWS

E.45 We consider AWS' public cloud reporting segment to be the most relevant to public cloud infrastructure services.[43]

Microsoft

E.46 As noted above, we asked the cloud providers how they monitor and assess the profitability of their public cloud businesses. Based on Microsoft's response and our review of Microsoft's financial statements and internal management accounts, we have identified the two most relevant segments for our profitability analysis to be:

(a) Microsoft's Azure product business, which offers its main public cloud infrastructure services. However, Microsoft reports more limited financial information for this segment ([✂]); and

(b) Microsoft's wider Cloud & Enterprise segment, which includes Azure[44] as well as other products and services, for which the company reports revenue, gross margin and operating income.

E.47 We recognise that the Cloud & Enterprise segment includes other products, such as Cloud & Enterprise licensing and Cloud & Enterprise SaaS, which could impact the profitability of the segment. However, we consider it to be a relevant segment as these products are similar and complementary to Azure services and may be purchased as part of multiple licences that include cloud-based services, for which judgement is exercised by Microsoft in determining revenue recognition.[45]

E.48 Therefore, we consider Cloud & Enterprise to provide a relevant view of cloud profitability for Microsoft as Azure is a substantial and growing proportion of the segment ([✂] of Cloud & Enterprise revenues in financial year 2023);[46] it is the closest level to Azure at which operating income is tracked; and it may potentially capture some revenues (and associated costs) for products and services that are related to cloud services, but potentially are not included in Azure due to the nature of customer agreements and Microsoft's accounting practices.

E.49 We also include the Microsoft Cloud segment in our gross margins analysis as it represents a collection of cloud-focused services from across Microsoft's reported

[43] AWS submissions indicate it does not provide private cloud services. AWS' response to the CMA's information request response to the CMA's information request.
[44] As noted in Ofcom Final report – Annexes, paragraph A2.33.
[45] Microsoft's public accounts also note that Microsoft offers customers the ability to acquire multiple licences of software products and services, including cloud-based services, in its customer agreements and that significant judgement is exercised by Microsoft in determining revenue recognition for these customer agreements (including determining standalone selling prices and whether products and services are considered distinct performance obligations that should be accounted for separately versus together, such as software licences and related services that are sold with cloud-based services). Microsoft FY23 10-K page 97.
[46] CMA analysis of Microsoft's response to the CMA's information request [✂].

operating segments.[47] However, we consider it less relevant as it is a collection of services from across Microsoft's segment reporting, some of which do not appear as relevant to public cloud infrastructure services eg the commercial portion of LinkedIn and Dynamics 365 and as only revenues and gross profit are tracked for Microsoft Cloud, it does not provide a greater level of financial reporting than Azure or Cloud & Enterprise.

Google

E.50 We have identified two relevant segments for our profitability analysis:

(a) Google Cloud Platform appears to be Google's most relevant reporting segment for public cloud infrastructure services. However, Google reports revenues and gross margins for Google Cloud Platform but does not report operating margins.[48]

(b) Google Cloud has operating margin data available but includes some other services (such as Google Workspace) that we do not consider relevant to assessing the profitability of Google's cloud services.

E.51 Google Cloud Platform contributes [✂] Google Cloud revenues and gross profits. We include both Google Cloud and Google Cloud Platform in our assessment of gross margins and Google Cloud in our assessment of operating margins.

IBM

E.52 We consider IBM's [✂] to be more relevant to include in our assessment of gross and operating margins than IBM's publicly reported Hybrid Cloud. Our reasoning for this is that Hybrid Cloud includes private and hybrid cloud/on-premises services, which are [✂].[49]

Oracle

E.53 We consider Oracle's publicly reported cloud and license segment to be of limited relevance as it is likely to include a substantial portion of on-premises services, which may have substantially different margins to cloud services.[50] We consider the 'Cloud services' portion of Oracle's reported cloud and license segment and, more recently, Oracle's reporting for its cloud infrastructure business to be most relevant. However, Oracle only has data available for its cloud infrastructure business from [✂]. Oracle reports revenues for the 'Cloud services' portion of its

[47] Microsoft 10-K reports.
[48] As noted in Ofcom Final report – Annexes, Table A2.2.
[49] Based on our analysis of IBM UK cloud revenue breakdown. IBM's response to the CMA's information request [✂].
[50] CMA analysis of Oracle public accounts indicates that cloud services have comprised between 25% to 40% of Oracle's Cloud and License segment revenues for financial years 2021 to 2023.

cloud and license segment and has been able to provide a breakdown of cloud services and license support costs, but does not track the profitability of the 'Cloud services' portion of the reported cloud and license segment.

OVHcloud

E.54 We consider OVHcloud's public cloud reporting segment to be the most relevant to public cloud infrastructure services because this reporting segment is focused on these services.

Cost allocation

E.55 We note that none of the cloud providers included in our profitability assessment only offer public cloud services and all except OVHcloud provide a much broader range of products and services beyond cloud services.

E.56 As a consequence, there are costs which are directly incurred by the relevant cloud businesses and also shared common costs incurred by the firm.

E.57 Our understanding is that the operating profit (also known as earnings before interest and tax (EBIT)) figures used in our margins and ROCE analysis include allocations for shared and common costs such as sales and marketing costs, as well as internal recharges for the use of cloud services by other businesses within the wider firm.

E.58 We acknowledge that there is potentially a proportion of cloud providers' costs which are allocated or recharged from shared and common usage and that there are challenges in accurately allocating and recharging these costs on a meaningful basis. As the cloud providers included in our EBIT margins and ROCE analysis have allocated and recharged costs in the ordinary course of business and use this financial data to track and assess performance, we consider it reasonable to use this EBIT data in our profitability analysis.

Capital base

E.59 We considered the capital bases for AWS' and Microsoft's cloud businesses, because a measure of capital employed is required for our ROCE analysis and received some submissions from cloud providers on the assets to be included in capital employed and their measurement.

Balance sheet as a starting point

E.60 Amazon and Microsoft publicly report consolidated balance sheets. Amazon's public accounts also include reporting of AWS' asset balances for total assets excluding corporate assets, net property and equipment and goodwill. Microsoft's

public accounts do not include balances for Azure or Cloud & Enterprise but include unearned revenue balances for the Intelligent Cloud segment (which Azure and Cloud & Enterprise are part of).[51]

E.61 In addition, AWS provided accounts payable and accounts receivable balances from their internal management accounts for 2018 to 2023.[52]

E.62 Microsoft does not prepare separate balance sheets for Azure, Cloud & Enterprise or Intelligent Cloud in the ordinary course of business.[53] However Microsoft provided the carrying values for what it identified as 'all-cloud related assets' used in its public cloud infrastructure business. Microsoft noted that these assets are not exclusively Azure assets and also [✂]. Microsoft also said that these fixed assets do not include [✂].[54]

E.63 We consider it reasonable to use the balance sheet data that is available for AWS and Microsoft in our profitability analysis.

E.64 In the following section we consider issues raised by the cloud providers relating to relevant assets to include in working capital, valuation of tangible assets and inclusion and valuation of intangible assets. This is to determine what is included in our measure of capital employed for AWS' and Microsoft's cloud businesses, based on the balance sheet data available and cloud provider's submissions.

Working capital and tangible assets

Cloud providers views

E.65 AWS submitted that we should account for liquid assets like cash holdings and marketable securities when computing capital employed.[55]

E.66 AWS submitted that the analysis in the PDR deducts a share of Amazon's unearned revenue from AWS' total assets, which increases AWS' ROCE.[56]

Our assessment

E.67 We would expect the capital employed for cloud businesses to include working capital and tangible assets such as buildings, servers and network equipment.

E.68 Our analysis seeks to reflect the operational capital employed by the businesses. We would generally consider relevant tangible and intangible assets, including

[51] As noted in Ofcom Final report – Annexes, paragraph A2.33.
[52] AWS' responses to the CMA's information requests [✂].
[53] Microsoft's response to Ofcom's information request [✂].
[54] Microsoft's response to the CMA's information request [✂].
[55] AWS' submission to the CMA [✂].
[56] AWS' submission to the CMA [✂].

working capital (which we consider in our estimates of capital employed for our ROCE analysis) to determine this. However, any cash balances or marketable securities represent means of funding the capital employed by the business, rather than an operational balance. We note we are not aware of any legal or regulatory requirements for cloud businesses to hold amounts of cash or marketable securities.

E.69 We therefore do not consider cash holdings and marketable securities to be relevant assets to include when estimating capital employed for businesses in the public cloud infrastructure services markets.

E.70 We would generally expect working capital for a business to include unearned revenue, as this is typically a current (or non-current) liability arising from a business' derivation of revenue. We note that AWS did not provide any rationale or evidence supporting its indication that unearned revenue should not be included in capital employed.

E.71 Amazon's accounts indicate that prepayments of AWS services comprise a substantial portion of Amazon's unearned revenue balances.[57] Therefore we consider it appropriate to include an estimate of AWS unearned revenue.

E.72 Microsoft publicly reports an unearned revenue balance specifically for its Intelligent Cloud segment (which Azure and Cloud & Enterprise are part of). We consider it likely that a substantial portion of this balance will relate to Azure and Cloud & Enterprise.[58] We therefore consider it to be appropriate to include an estimate of unearned revenue for Azure and Cloud & Enterprise.

Tangible asset measurement

Cloud provider views

E.73 Microsoft submitted that the profitability analysis does not adjust for accounting-driven increases in EBIT and ROCE arising from AWS' and Microsoft's changes in asset useful life policies, which can partly explain the upward trend in EBIT and ROCE. Microsoft submitted that this means that the PDR's ROCE analysis overstates how sustainable Microsoft's profitability is and attributes accounting-driven gains to market power rather than financial reporting changes.[59]

[57] For example, AWS 2023 Form 10-K page 51.
[58] The Cloud & Enterprise segment has comprised between [✂] of Intelligent Cloud's net revenue between FY20 to FY24; Azure has comprised [✂] of Intelligent Cloud's net revenue between FY20 to FY24. Additionally, Microsoft's public accounts note that certain cloud services depend on a significant level of integration, interdependency and interrelation between the desktop applications and cloud services and are accounted for together as one performance obligation. The revenue that Microsoft allocates to remaining performance obligations includes unearned revenue and future obligations which Microsoft does not recognise on its balance sheet. See for example Microsoft FY23 Form 10-K, pages 64 and 86.
[59] Microsoft's response to the CMA's PDR dated 28 January 2025, paragraph 74(i).

E.74 Microsoft submitted that the profitability analysis overstates Microsoft's ROCE by not taking into account the full historical cost of building Azure, noting that many of the assets Microsoft has invested in reached the end of their useful life before 2018 and no longer appear on Microsoft's balance sheet and are therefore not included in the CMA's capital employed estimates.[60]

Our assessment

E.75 We asked AWS and Microsoft to provide information on the impact of their changes to asset useful life policies on the depreciation costs and asset carrying values for their cloud businesses, but we did not receive sufficient information in order for us to test the impact of its changes over the period of our ROCE analysis.[61]

E.76 We consider the changes to asset useful life policies applied over time are unlikely to have a material impact on ROCE, as the lengthening of asset useful lives results in a lower annual depreciation cost (positively impacting EBIT and ROCE) but also an offsetting increase in capital employed (negatively impacting ROCE) and vice versa. We also note there may be offsetting costs and benefits over time. For example, lengthening an asset's useful life from three to four years may also result in somewhat higher EBIT and capital employed in years two and three, but would mean there is a higher depreciation cost in year four. This is consistent with our sensitivity testing for AWS' ROCE.[62]

E.77 We therefore consider the changes to asset useful life policies to be unlikely to have a material impact on our ROCE analysis.

E.78 As set out in chapter 3 of this report, AWS' and Microsoft's continuous investments in the cloud market will continually be adding to capital employed and hence reflected in our ROCE figures. However, assets that have reached the end of their useful life will not be included in our measure of capital employed, as noted by Microsoft.

E.79 We do not accept that the full historical cost of the assets used by the Azure business should be included in the measure of capital employed, except to the extent that they are recognised on Microsoft's balance sheet due to their use in the

[60] Microsoft's response to the CMA's PDR dated 28 January 2025, paragraph 74(iii).
[61] Microsoft submitted that the gross margins and asset values it provided were based on the useful life of the fixed assets that was effective in each year, but did not provide us with data in order to test the impact of the changes to asset useful life policies. Microsoft's response to the CMA's information request [✂]. AWS provided data on the impact of its changes to asset useful life policies in the years the changes occurred but was not able to provide information on the impact on depreciation and asset carrying values over time. AWS' response to the CMA's information requests [✂].
[62] We tested the sensitivity of our baseline ROCE for AWS to the changes in its asset useful life policies in the year the changes occurred, using the data AWS provided. We found that, for those years, AWS' ROCE would have been lower by [✂] to [✂] basis points if AWS had not changed its useful life policy, but that AWS ROCE was still [✂] to [✂]. We would also expect AWS' ROCE to be higher in subsequent years if AWS had not changed its useful life policy, as assets would be fully depreciated sooner (meaning less depreciation cost over subsequent years). CMA analysis of Amazon Form 10-Ks; AWS' responses to the CMA's information requests [✂];

business for the period of our analysis. Whilst past investments may have enabled the Azure business, they will also have generated returns during this past period which are also excluded from the ROCE analysis. These past investments also may no longer be contributing to returns. As Microsoft notes, the assets relating to this historical investment have reached the end of their useful life before 2018 and Microsoft did not submit they continue to be used in its business to generate returns.[63] We therefore do not consider them to be 'operating assets' for the business for the period of our analysis and are not relevant to include in capital employed. We note also that, of the historical investment cited by Microsoft (data centres, networking equipment and foundational cloud infrastructure),[64] much of this will also have had shared use across other Microsoft businesses.

Intangible assets

Cloud provider views

E.80 AWS submitted that there are relevant intangible assets which we should include in our estimate of AWS' capital employed.[65] AWS submitted that estimates for AWS' goodwill, brand value and other intangible assets (including both finite-lived and indefinite-lived intangible assets) should be included as these contribute to AWS' revenues and profits.[66]

E.81 AWS submitted that an estimate of goodwill between [✂] and [✂] and an estimate of brand value between [✂] and [✂] should be included in AWS' capital employed between 2020 and 2023.[67]

E.82 AWS submitted that the PDR underestimates AWS' capital employed by excluding all intangible assets and the sensitivity analyses conducted in the PDR's profitability assessment did not account for intangible assets. AWS submitted that, by focusing on the total assets reported for AWS in Amazon's public accounts, the PDR ignores goodwill, cash, marketable securities, acquired intangibles and other long-term assets that are attributable to AWS but are recorded only at a more aggregate level (for Amazon as a whole) in Amazon's financial books.[68]

E.83 AWS also submitted that it is not credible for the PDR analysis to assume that there are no relevant intangible assets. AWS submitted that internal evidence on brand value, goodwill, IP and in progress R&D shows that there are relevant intangible assets that should be accounted for in AWS' capital employed. AWS

[63] We also note that Microsoft submitted that it has procedures in place to ensure that the costs and the underlying assumptions used to estimate the carrying value, of fixed assets are reasonable, giving as examples that Microsoft [✂] and that its accounting policy requires [✂]. Microsoft's response to the CMA's information request [✂].
[64] Microsoft's response to the CMA's PDR dated 28 January 2025, paragraph 74(iii).
[65] AWS' submissions to the CMA [✂].
[66] AWS submission to the CMA [✂].
[67] AWS' submission to the CMA [✂].
[68] AWS' submission to the CMA [✂].

submitted an additional estimate for its intangible assets based on the [✂] to show the relevance of AWS' intangible assets in the AWS' business and their impact on the AWS profitability estimates. AWS said these AWS EMEA intangible assets reflect the value that AWS EMEA attributes to AWS IP for being able to offer its services and, when scaled to obtain a global intangible assets estimate, equated to about [✂] in 2024.[69]

Our assessment

E.84 We have considered whether we should include intangible assets in our estimate of the capital base. Intangible assets are assets such as goodwill, brand value and in-process research and development assets.

E.85 Our guidelines set out criteria that intangible assets should meet to be considered for inclusion in capital employed:

(a) it must comprise a cost that has been incurred primarily to obtain earnings in the future;

(b) this cost must be additional to costs necessarily incurred at the time in running the business; and

(c) it must be identifiable as creating such an asset separate from any arising from the general running of the business.[70]

E.86 We have considered below whether AWS and/or Microsoft have relevant intangible assets which should be included in capital employed, based on these criteria.

E.87 In relation to AWS' submission that it is not credible for the PDR analysis to assume that there are no relevant intangible assets, we note that our starting assumption is not that AWS has no relevant intangible assets; it is that if AWS has relevant intangible assets they would be included in its reported total assets. To the extent there may be Amazon corporate assets which are not attributed to AWS, or off-balance sheet assets, that may be relevant intangible assets, we would expect AWS to be able to provide evidence of these and how they meet the criteria set out above.

E.88 We note that AWS submitted that its [✂]. However, AWS did provide any such internal evidence in support of this statement.

E.89 AWS also submitted a new estimate for [✂]. AWS did not provide evidence to show that this [✂] and did not explain why the intangible assets that this measure

[69] AWS' submission to the CMA on [✂].
[70] CC3 (Revised), annex A, paragraph 14.

is intended to reflect would not be included in the reported balance for AWS total assets (given that the only exclusions from AWS total assets are corporate assets, such as cash and cash equivalents, marketable securities, other long-term investments, corporate facilities, goodwill and other acquired intangible assets and tax assets).[71] AWS also did not explain if and/or why this new measure should be used instead of the estimates for goodwill and brand value that AWS previously submitted, or how it meets the criteria set out above.[72]

E.90 We consider an [✂] to be unlikely to meet the criteria of a cost additional to costs necessarily incurred at the time in running the business, or be identifiable as creating such an asset separate from any arising from the general running of the business.

E.91 We also assessed the specific intangible asset categories of goodwill, brand value and other intangible assets, which we cover in the following paragraphs.

Goodwill

E.92 Goodwill can be acquired in a business combination. Acquired goodwill is not a separately identified asset but rather is a balancing figure. It is the remaining, unallocated element of an acquisition price once all tangible assets and certain (although not necessarily all) intangible assts have been fair-valued and set against the price paid.

E.93 In principle, we agree that, when purchasing a business, goodwill may represent the value of intangible assets not capitalised on the businesses' balance sheets. The approach that we have taken is to recognise those intangible assets that meet our criteria for recognition, regardless of whether they have been separately identified in the companies' balance sheets or are included in a balancing goodwill figure, but to exclude any remaining goodwill, in line with the criteria set out in our guidelines. This approach ensures that only intangible assets that meet our criteria for recognition are included in the estimate of the capital employed by AWS and Microsoft. It also avoids the risk of capitalising any economic profit.

E.94 Microsoft's Cloud & Enterprise business includes GitHub and Nuance (separate to Azure).[73] Microsoft recorded acquired intangible assets and goodwill (along with other assets and liabilities) for GitHub and Nuance when they were acquired in 2018 and 2022 respectively.[74] We do not consider the recorded goodwill for GitHub and Nuance to meet the criteria of creating a separately identifiable asset, given that it represents the balancing figure between price paid and assets

[71] Amazon FY24 10-K, page 68.
[72] We note that in AWS' submission [✂], the ROCE sensitivity analysis submitted only includes this estimate of AWS total global intangible assets, it does not include the goodwill or brand value estimates previously submitted. AWS' submission to the CMA [✂].
[73] Microsoft's response to the CMA's information request [✂].
[74] Microsoft FY22 Form 10-K and FY19 Form 10-K.

acquired. It is also unlikely to meet the criteria of cost additional to costs necessarily incurred at the time in running the business. We therefore have not included this in our estimate of capital employed.[75]

E.95 AWS [✂] proposed that we should allocate a share of Amazon's intangible assets to AWS.[76]

E.96 AWS submitted an estimate of AWS goodwill that was calculated by allocating a share of Amazon's goodwill. For goodwill, we note that Amazon reports its goodwill assets by segment, so an AWS goodwill balance is available. As such, we do not consider it suitable to use AWS' submitted approach of allocating AWS a share of Amazon's goodwill proportional to AWS' share of Amazon's revenues.[77] Also, we consider it highly unlikely that AWS' goodwill would meet the criteria for inclusion in capital employed. Whether AWS' goodwill represents capitalised future economic profit (in the form of the balancing figure between price paid and assets acquired for acquisitions) or reflects [✂] as submitted by AWS,[78] this does not create a separately identifiable asset (separate from any arising from the general running of the business). The goodwill is also unlikely to meet the criteria of a cost additional to costs necessarily incurred at the time in running the business.

Brand value

E.97 Microsoft did not submit and we did not identify, any brand value asset for its cloud businesses.

E.98 AWS submitted an estimate of brand value that was [✂].[79] Amazon does not record an intangible asset that relates to AWS' brand value in public accounts, presumably on the basis that any potential asset relating to brand value does not meet the recognition criteria for an intangible asset under applicable accounting standards.[80]

E.99 We recognise that brand value, whether acquired or developed in house, could meet the criteria of comprising a cost that has been incurred primarily to obtain earnings in the future. An acquired brand appears more likely to meet the criteria of being additional to costs necessarily incurred at the time in running the business, whereas operating costs that contribute to developing brand value would

[75] Microsoft's Form 10-Ks note that the Nuance goodwill was primarily attributed to increased synergies that are expected to be achieved from the integration of Nuance and the GitHub goodwill was primarily attributable to anticipated synergies from future growth. FY23 Form 10-K, page 70; FY19 Form 10-K, page 73.
[76] AWS' submission to the CMA [✂].
[77] AWS' submission to the CMA [✂]. We note that under AWS' submitted approach, estimated goodwill for AWS is between [✂] whereas Amazon's reported accounts have had a goodwill balance for AWS of between $1.2 billion-$1.3 billion for the last five years. Amazon Form 10-Ks.
[78] AWS' submission to the CMA [✂].
[79] AWS' submission to the CMA [✂].
[80] We also note that if Amazon did record a separate identifiable brand value asset relating to AWS, we would expect it to be included in the AWS total assets balance, which we use to calculate AWS' capital employed.

be less likely to meet these criteria. We therefore considered whether there is evidence of an AWS brand value asset and how that may have arisen.

E.100 Given that (i) Amazon does not record an intangible asset relating to brand value in its public accounts; (ii) the cloud-related acquisitions data provided by AWS does not include an identifiable brand asset; and (iii) AWS did not provide any evidence of costs incurred relating to brand value and/or acquired brand value, we do not consider there to be sufficient evidence of AWS acquired brand value or an AWS brand value asset in general. Our view is that this fails both the criteria of being costs in addition to the costs it has necessarily incurred in running its business and of creating a separately identifiable asset.

E.101 We therefore did not include any estimates of brand value assets in our measure of capital employed for either AWS or Microsoft's cloud business.

Other intangible assets

E.102 In response to our request for information on its investments, Microsoft noted its investment in research and development (R&D).[81] Microsoft capitalises relevant R&D costs once technological feasibility has been established for a product,[82] so we consider any assets related to R&D to already be accounted for on Microsoft's balance sheet.

E.103 We have limited information on Microsoft's GitHub and Nuance acquired intangible assets (exclusive of goodwill), but were able to identify that the majority of the recorded intangible assets for each were allocated to customer-related assets and the rest mostly allocated to technology-based assets.[83] The primarily customer-related nature of the assets suggests they are likely to have been incurred primarily to obtain earnings in the future. As these are separately recorded intangible assets from acquisitions which are directly identifiable as having become part of the Cloud & Enterprise business, we also consider them to be assets separate from any arising from the general running of the Cloud & Enterprise business. We do not have enough information to determine whether the GitHub and Nuance intangible assets were costs additional to costs necessarily incurred at the time in running the business. However, given that GitHub and Nuance have remained as separate specialised services within Coud & Enterprise,[84] it is possible that their costs reflect investment outside of Cloud & Enterprise's normal business operations.

---

[81] Microsoft's response to the CMA's information request [✂].
[82] Microsoft FY23 Form 10-K, page 54.
[83] Customer-related assets comprise 51% and 60% of the recorded intangible assets for GitHub and Nuance respectively. CMA analysis of FY23 Form 10-K, page 71; FY19 Form 10-K, page 73.
[84] Nuance provides healthcare and enterprise AI solutions. GitHub provides a collaboration platform and code hosting service for developers. FY23 Form 10-K, page 11.

E.104 Therefore, we conservatively included estimates for the acquired intangible asset values for GitHub and Nuance[85] over the period of our ROCE analysis, but also performed sensitivity testing that excludes these intangible asset values.

E.105 Our review of Microsoft's public accounts indicated that a large proportion of Microsoft's intangible assets appear to relate to other acquired intangible assets (ie relating to acquisitions that are not GitHub or Nuance).[86] We assessed the information that Microsoft submitted on its cloud-related acquisitions.[87] We note that we did not have sufficient information on Microsoft's other acquisitions to ascertain if they meet the intangible asset criteria above. Therefore, we did not include these other acquired intangible assets in our 'base' calculation of Microsoft's capital employed. However, we performed sensitivity testing that includes these other acquired intangible assets and we present our base calculations and sensitivity analysis in our profitability analysis.

E.106 AWS [✂] but proposed that we should include an allocation of Amazon's finite-lived and infinite-lived intangible assets in the estimate of AWS' capital employed.[88] However, our understanding is that an allocation of some of these intangible assets may already be included in AWS' total assets balance that we use to calculate AWS' capital employed.[89]

E.107 Given the lack of specificity in AWS' submission, we reviewed Amazon's and AWS' intangible assets to understand if there are any identifiable other intangible assets that meet the criteria set out above.

E.108 Amazon's public accounts indicate that its main intangible assets categorised as 'Other assets' are acquired intangible assets relating to video and music content.[90] We do not consider video and music content to be relevant to assessing the profitability of AWS.

E.109 We consider it highly unlikely that AWS has incurred costs relating to other intangible assets (such as in-process research and development) that are in addition to the costs it has necessarily incurred in running its business.

E.110 Similar to Microsoft, we assessed the information that AWS submitted on its cloud-related acquisitions[91] but we did not have sufficient information on AWS' acquisitions to ascertain if they meet the intangible asset criteria above. Therefore,

---

[85] Note, we have not included goodwill in our estimate of acquired intangible asset values.
[86] For example, Microsoft recognised $4.4 billion of acquired intangible assets for Nuance in financial year 2022 and had net intangible assets of $11.3 billion as at 30 June 2022. Microsoft FY23 Form 10-K.
[87] Submitted to Ofcom, see Cloud services market study - Final report – Annexes, page 40.
[88] AWS' submission to the CMA [✂]; AWS' response to the CMA's information request [✂].
[89] AWS Form 10-Ks note 'goodwill and other acquired intangible assets' as the only intangible assets excluded from total segment assets and that Technology infrastructure assets (which could include intangible assets) are allocated among Amazon's segments based on usage, with the majority allocated to the AWS segment.
[90] Amazon FY23 Form 10-K, page 49.
[91] Submitted to Ofcom, see Cloud services market study - Final report – Annexes, page 36.

we did not include AWS' acquisitions in our 'base' calculation of AWS' capital employed. However, we performed sensitivity testing that includes these acquired intangible assets and we present our base calculations and our sensitivity analysis in our profitability analysis.

Summary

E.111 We considered whether it is relevant to include estimates for goodwill, brand value and other intangible assets (finite-lived and indefinite-lived intangible assets) in Microsoft's and AWS' capital employed for their cloud businesses. Apart from Microsoft Cloud & Enterprise's acquired intangible assets (excluding goodwill) for GitHub and Nuance, we consider it highly unlikely that Microsoft's and AWS' cloud businesses have goodwill, brand value or other intangible assets that meet the intangible asset criteria set out above. We also considered the estimate of total global intangible assets that AWS submitted in response to the PDR and consider this unlikely to meet the intangible asset criteria set out above.

E.112 As noted above we have performed sensitivity testing for acquired intangible assets. Our findings from this sensitivity testing are set out in the ROCE analysis section of this appendix.

Cost of capital

E.113 This section sets out how we estimated WACC for AWS and Microsoft's cloud business for the purposes of this market investigation and cloud provider views on our approach. We made our own estimations of WACC which we cross-checked against internal WACC estimates provided by cloud providers.

E.114 All WACC figures presented in this appendix are nominal except where indicated.

E.115 The approach taken reflects the circumstances of this case – it should not be taken as an illustration of how the CMA might consider the cost of capital in other cases.

Our approach to estimating the WACC

E.116 There are several factors we have considered in estimating an appropriate benchmark cost of capital for large cloud providers. These included:

(a) How to estimate the cost of capital;

(b) Specification of the cost of capital; and

(c) The time period over which the cost of capital should be measured.

How to estimate the cost of capital

E.117 As set out in our guidelines, we generally look to the Capital Asset Pricing Model (CAPM) when calculating the cost of capital since this is a widely understood technique with strong theoretical foundations.[92] We adopted the CAPM approach in estimating the cost of capital for large cloud providers.

E.118 The CAPM relates the cost of equity (Ke) to the risk-free rate (Rf), the expected return on the market portfolio overall (total market return or Rm) and a firm-specific measure of investors' exposure to systematic risk (beta or β) as follows:

$$Ke = Rf + \beta(Rm - Rf)$$

E.119 The difference between the total market return (Rm) and the risk-free rate (Rf) is the equity risk premium (ERP), which captures the additional returns investors require for investing in the stock market overall.

E.120 If a business was entirely funded by equity, the expected return on equity could be considered to be its 'cost of capital'. For the purposes of this analysis, we treat WACC as equal to cost of equity for AWS and Microsoft's cloud business due to both businesses' low levels of long-term debt financing. [93]

E.121 The cost of capital must reflect the effects of tax on returns to capital providers. We have measured profitability on an operating basis (ie using EBIT), thereby excluding the impact of interest and tax. As a result, profitability was assessed independently of the choice of capital structure of individual firms and pre-tax.

E.122 The returns to equity holders are made after corporation tax has been deducted. Hence, the cost of equity reflects the fact that the actual return to shareholders has been reduced by the rate of tax. To ensure comparability between our cost of capital and profitability measure we have therefore estimated the cost of capital (which we treat as equivalent to cost of equity for large cloud providers) on a nominal pre-tax basis, by making this adjustment:[94]

$$\text{Pre-tax WACC} = (1/(1-t)) \times Ke$$

Specification of the basis of the cost of capital

E.123 In keeping with the theoretical basis of the CAPM, our approach seeks to estimate the WACC of the large cloud providers themselves. To calculate this we used market data, such as inflation, the risk-free rate, the tax rate and the total market

---

[92] CC3 (Revised), paragraph 116 and annex A, paragraph 16.
[93] Long-term debt financing for Amazon and Microsoft is 3% or less of capital and we consider the applicable debt levels for their cloud businesses may be even lower. We note that Microsoft's internal WACC for the Cloud and Enterprise segment, produced for annual goodwill impairment testing, shows that Microsoft [✂]. Source: Microsoft's response to the CMA's information request [✂].
[94] This avoids the need to adjust nominal financial information to remove the effects of inflation.

return. We also estimate beta using market data for the large cloud providers and their competitors. We note that this data is only available for the cloud providers at the total company (ie group) level rather than at the cloud segment level. We cross-check our WACC estimate against cloud provider internal estimates (in particular, AWS' and Microsoft's cloud-related WACC estimates), as a way of considering any cloud segment-specific WACC variances.

Relevant time period

E.124 We have generally focused on the last 5 years (2020 to 2024) for our analysis of the profitability of large cloud providers, with an extended ROCE analysis over a seven to ten-year historical period (covering 2014/15 to 2024) for AWS and Microsoft's cloud business where data allowed it. We have estimated the WACC in line with this.

E.125 We note that some inputs into the CAPM calculation, notably the risk-free rate and inflation, have increased substantially during the last 10 years. In this context, we have considered data for the last 10 years, but give somewhat more weight to more recent data.

Our estimate of the cost of capital

E.126 This section sets out the analysis that we undertook to estimate the components of the WACC calculation, which includes both generic and industry-specific components. The former comprises the real risk-free rate (RFR), inflation and the total market return (TMR); the latter comprises beta and the tax rate.

Risk-free rate

E.127 In order to estimate the RFR applicable over the period considered, we analysed the yields on inflation-linked US government bonds of 10-year maturity.[95] We consider these securities to have negligible default risk and to be a reasonable proxy for the RFR.

E.128 We have calculated the average Daily Treasury Par Real Yield curve rates for 10-year securities over the last 5 years (2019 to 2023) and 10 years (2014 to 2023) to estimate a range of 0.20% to 0.34% for the RFR. We note real yields have increased substantially since late 2022 (average yields in 2023 were 1.68%), however we consider it appropriate to use the average rates over the period of our analysis to approximate the prevailing rate on average over this period. Based on our analysis, using more recent real yield curve rates also has minimal impact on the WACC estimate.

[95] Daily Treasury Par Real Yield curve rates, Resource Centre - US Department of the Treasury.

E.129 We also test the sensitivity of our WACC estimate to updated RFR inputs for 2024 further below.

TMR and ERP

E.130 The ERP is the additional return that investors require to compensate them for assuming the risk associated with investing in equities rather than in risk-free assets. One approach to estimate the ERP is to first estimate the returns which investors expected to make on the market (the TMR) and then deduct the relevant RFR (as estimated above).

E.131 AWS submitted that the TMR estimate for its WACC should be based on a global or US index rather than UK, to more accurately reflect the return that investors expect from an investment in AWS and for better comparison against AWS' global ROCE. AWS submitted that US real equity returns should be used as an upper bound and UK real equity returns as a lower bound, both over the period 1900-2023 from the Global Investment Returns Yearbook 2024.[96]

E.132 There are two types of approaches that can be used to estimate the TMR. Historical methods seek to derive the TMR from a long run of data on realised returns on equities. Forward-looking approaches seek to estimate the expected TMR based on either the reported expectations of market participants or the TMR implied in asset prices at the start of the period.

E.133 There is no universally accepted method for deriving the TMR or the ERP. Both concepts are concerned with investors' ex-ante expectations of returns, which are largely unobservable. The academic literature on the subject is large and can be categorised into three types:[97]

(a) Studies that assume that historical realised returns are equal to investors' expectations ('historical ex-post approaches').

(b) Studies that fit models of stock returns to historical data to separate out ex-ante expectations from ex-post good or bad fortune ('historical ex-ante approaches').

(c) Studies that use current market prices and surveys of market participants to derive current forward-looking expectations ('forward-looking approaches').

E.134 Each of the above methods have a large degree of uncertainty associated with them and any results from these analyses require a large number of assumptions and significant amounts of judgement.

[96] AWS' submission to the CMA on [✂].
[97] Housebuilding market study final report - appendix B: Cost of capital dated 26 February 2024, paragraphs B24-B25.

E.135 The CMA assessed the evidence on TMR in detail in its Ofwat PR19 price redeterminations,[98] and placed limited weight on the forward-looking approaches. It concluded that a real TMR range of 6.2% to 7.5% for the UK market was appropriate, with a midpoint of 6.8%. In that decision, the CMA considered in detail whether an assumption of a broadly constant TMR in the long run was appropriate and concluded that it was.

E.136 In the PDR we noted that we considered this TMR range of 6.2% to 7.5% for the UK market to be a reasonable proxy for a global TMR. We have also reviewed the latest estimates for market returns in the Global Investment Returns Yearbook 2025, based on the long-run DMS database.[99] Whilst calculated on a slightly different basis to the PR19 approach, the latest DMS estimate of long-run real equity returns for the UK market is 7.1%, which is slightly higher than for the world market overall (6.7%) and higher than the world market excluding the US (6.0%).[100] We consider this to be consistent with our PDR range of 6.2% to 7.5%.

E.137 The latest DMS estimate of long-run real equity returns for the US market is higher in comparison (8.5%).[101] However, the US market was the most successful economy in the 20th century. We note that DMS in the Global Investment Returns Yearbook 2025 caution against relying on US performance as a guide for returns in other markets or for future returns (both for international and US investors).[102]

E.138 Over the period of our analysis, interest rates were relatively low (see our estimated range above). While we adopt a stable TMR approach for our WACC estimate, this approach tends to overestimate returns when the RFR is low.[103] For example, our range of 0.20% to 0.34% for the RFR means that our implied ERP is 6.0% to 7.2%. This is significantly higher than the long-run historical ERPs for most markets.[104]

E.139 We therefore consider our estimated range of 6.2% to 7.5% to be a reasonable and potentially conservative, estimate of the TMR.

---

[98] CMA PR19 Redetermination - Final Report 17 March 2021, pages 796 to 838. While this analysis was in the context of estimating a cost of capital for UK companies, we consider it to be broadly applicable here.
[99] The DMS database (Dimson, Marsh, and Staunton, 2025) provides annual returns on stocks, bonds, bills, inflation and currencies for 35 markets Global Investment Returns Yearbook 2025 | UBS Global
[100] Real inflation-adjusted equity returns for 1900-2024, using arithmetic mean. UBS Global Investment Returns Yearbook 2025: Elroy Dimson, Paul Marsh, Mike Staunton, Table 1, page 25.
[101] Real inflation-adjusted equity returns for 1900-2024, using arithmetic mean. UBS Global Investment Returns Yearbook 2025: Elroy Dimson, Paul Marsh, Mike Staunton, Table 1, page 25.
[102] UBS Global Investment Returns Yearbook 2025: Elroy Dimson, Paul Marsh, Mike Staunton, page 23.
[103] While the TMR is generally more stable than the ERP, there is some positive correlation between interest rates and required returns. For example, an earlier edition of Dimson, Marsh, and Staunton Yearbook examined the empirical relationship between real interest rates and subsequent real returns for equities and concluded that when real interest rates are low, expected future returns on all risky assets are also lower. Credit Suisse Global Investment Returns Yearbook 2019, page 21.
[104] Equity risk premiums relative to bonds for 1900 to 2024, using arithmetic mean, have been 7.0%, 5.3%, 4.6% and 3.9% for the US, UK, world and world excluding US respectively. UBS Global Investment Returns Yearbook 2025: Elroy Dimson, Paul Marsh, Mike Staunton, Table 12, page 70.

Inflation

E.140 AWS submitted that the inflation data used in the WACC estimate should be updated to include data through to December 2024, which results in higher estimate of 2.9% rather than 2.7%. AWS also submitted that forward-looking consumer expectations for inflation are more suitable than central bank inflation targets as inflation has persistently exceeded inflation targets not only in the US, but also in the UK and other countries, citing a House of Commons Library article that it said shows that the UK has far exceeded its inflation target of 2% in the past years and the median five-year-ahead US consumer inflation expectation, which stands at 3.0% as of January 2025, from the Federal Reserve Bank of New York's Survey of Consumer Expectations. AWS submitted that an updated inflation range of 2.9-3.0% should be used.[105]

E.141 We note that, in principle, if the inflation data used in the WACC estimate is updated to December 2024 then other data inputs should be updated for consistency. We test the sensitivity of our WACC estimate to updated inputs further below.

E.142 Since the RFR and TMR are expressed in real terms, we needed an estimate of inflation to convert our estimated real cost of equity into a nominal cost of equity. We analysed Consumer Price Index (CPI) data from the US Bureau of Labor Statistics. Average annual CPI over the last 10 years (2014 to 2023) has been 2.7%.[106] This 10-year average includes a relatively atypical period when inflation has risen significantly above the long-term target (annual inflation of 4.7%, 8.0% and 4.1% in 2021, 2022 and 2023 respectively).[107] We assumed that equities have long investment horizons, as reflected in our estimates of the TMR and the RFR. Therefore, we also consider the Federal Reserve's longer-term inflation target of 2%. The Federal Reserve targets inflation that averages 2% over time and for many years inflation in the United States has run below this target.[108]

E.143 We are estimating a WACC that investors could have reasonably expected to earn on their investments in the cloud market historically. We do not consider recent forward-looking estimates of inflation to be relevant to this assessment, as it is not clear why these would be reflective of long-term inflation expectations that would have been reasonable over the past five to ten years. In any event, the top end of our range allows for the possibility of inflation persistently turning out above the official inflation target.[109]

---

[105] AWS' submission to the CMA on [✂].
[106] Consumer Price Index for All Urban Consumers (CPI-U) Bureau of Labor Statistics Data.
[107] Consumer Price Index for All Urban Consumers (CPI-U), Annual CPI-U data Bureau of Labor Statistics Data.
[108] The Fed - Why does the Federal Reserve aim for inflation of 2 percent over the longer run?
[109] The relevance of UK inflation data is also not clear given that AWS' and Microsoft's cloud business' largest geographic markets are the US and we have determined an inflation range based on US inflation.

E.144 For the above reasons, we consider an inflation range of 2.0% to 2.7% to be appropriate for the five to ten year period of our ROCE analysis.

Tax rate

E.145 AWS submitted that the PDR underestimates AWS WACC because it averages the effective tax rates of Amazon and Microsoft rather than using the Amazon-specific rates.[110]

E.146 The tax rates for Amazon and Microsoft overall will reflect the full range of activities undertaken by their businesses, rather than being specific to their cloud businesses. Similar to our approach to the beta estimate, we therefore consider it reasonable to average the tax rates of Amazon and Microsoft to estimate the rates likely to apply to a cloud business of their scale. We also cross-check our estimated range against the tax rate used in Microsoft's internal cloud-related WACC estimates.

E.147 We also considered whether additional company comparators should be used to estimate an average tax rate range for the WACC. Our review of the effective tax rates for Alphabet, Oracle and IBM for the last two to three years indicates that their inclusion would reduce our tax rate estimate (thereby reducing the WACC).

E.148 We therefore consider it reasonable to retain our approach of calculating the effective tax rates for Amazon and Microsoft over the last ten years from their public accounts, resulting in a tax rate range of 15% to 20% for the purposes of our WACC calculation. The average effective tax rate for Amazon and Microsoft over the last 5 financial years (FY19 to FY23) was 15.1% and 14.5% respectively and over the last ten financial years (FY14 to FY23) was 23.5% and 20.5% respectively.[111]

E.149 We also test the sensitivity of our WACC estimate to updated tax rate inputs for 2024 further below.

Equity betas

E.150 The beta of an asset measures the correlation between the volatility of the returns on the asset and the returns on the market as a whole, or the exposure of the firm to systematic or 'non-diversifiable' risk. It is in return for assuming this (market) risk that investors require an (equity risk) premium over the risk-free return.

E.151 Microsoft submitted that the profitability analysis underestimates WACC by using company-level regressions. Microsoft submitted that as beta is calculated based on the correlation of stock price movements with the broader market, Amazon and

[110] AWS' submission to the CMA on [✂].
[111] CMA analysis of Amazon and Microsoft 10-K filings.

Microsoft's significant presence within the S&P 500 (collectively accounting for approximately 10% of the index) distorts their beta estimates. Microsoft submitted that as a result, the beta estimates used in the WACC calculations may be biased downward, underestimating the true systematic risk of AWS' and Microsoft's cloud businesses.[112]

E.152 AWS submitted that the PDR underestimates AWS WACC because it averages estimates of the equity beta of Amazon and Microsoft rather than using the Amazon-specific beta.[113]

E.153 The beta value of a listed firm can be directly estimated as the covariance between the stock's returns and the market's returns, divided by the variance of market returns. However, when estimated in this way, the beta value reflects the full range of activities undertaken by a listed business and, as a result, may differ from the beta of the relevant activities for the purposes of our investigation.

E.154 We consider the betas for Amazon and Microsoft to be relevant to use, but that cross-checks are also necessary given the above. We compared our WACC estimate to AWS' and Microsoft's internal cloud-related WACC estimates as well as cross-checking cross- against the betas used in the internal WACC calculations provided by Microsoft and Google.[114] We also took into account the betas for Alphabet, Oracle and IBM, as comparator companies that also have cloud services contributing a substantial portion of their business.

E.155 We acknowledge that when a single stock comprises a large proportion of the market index, this may affect the estimated beta. This is because company-specific stock movements may have a disproportionate impact on the market index, making it less representative of a fully diversified market index. While taken together Microsoft and Amazon may account for approximately 10% of S&P 500 by market value,[115] individually each of Microsoft and Amazon are a smaller proportion,[116] which suggests the individual betas we use are less likely to be affected. In any case, we also use the cross-checks as described in the preceding paragraph.

E.156 We have calculated the betas for Amazon, Microsoft, Alphabet, Oracle and IBM on a monthly basis over the last 5 years and 10 years.[117] The average equity beta for this sample of firms is 0.96 for the last 5 years and 1.03 for the last 10 years. The

[112] Microsoft's response to the CMA's PDR dated 28 January 2025, paragraph 74(ii).
[113] AWS' submission to the CMA on [✂].
[114] Microsoft's response to the CMA's information request [✂]; Microsoft's response to Ofcom's information request [✂]; Google's response to the CMA's information request [✂].
[115] Microsoft's response to the CMA's PDR dated 28 January 2025, paragraph 74(ii).
[116] With each individually accounting for less than 6.8%. S&P 500® | S&P Dow Jones Indices [accessed 22 May 2025].
[117] Calculated using data from Bloomberg and S&P 500 as reference market.

average for Microsoft and Amazon is 1.00 and 1.11 for the last 5 and 10 years respectively.[118]

E.157 Based on our analysis, we consider a beta range of 1.0 to 1.1 to be appropriate over the period covered in our analysis.

E.158 We also test the sensitivity of our WACC estimate to updated beta inputs for 2024 further below.

Our WACC estimates

E.159 Table E.1 below shows the WACC calculations using the approach and inputs set out above:

Table E.1: CMA estimates of WACC

	Low	*High*
RFR	0.2%	0.3%
TMR	6.2%	7.5%
ERP	6.0%	7.2%
Equity beta	1.0	1.1
Real CoE (post-tax)	6.2%	8.1%
CPI	2.0%	2.7%
Effective tax rate	15.0%	20.0%
Cost of equity (nominal, pre-tax)	**9.8%**	**13.9%**

Source: CMA analysis

E.160 We tested the sensitivity of our WACC estimate to use of input data updated to December 2024. We found this to increase our upper range WACC estimate to 14.2%, with no impact on our lower range WACC estimate.[119] We therefore do not consider this to have a material impact on our WACC estimate.

E.161 Given AWS' submissions on the use of company-specific data, we also tested the sensitivity of our WACC estimate to having AWS- and Microsoft-specific WACC estimates, with use of input data updated to December 2024. We found this to result in a calculated WACC range of 9.7% to 14.6% for AWS and 9.9% to 14.2% for Microsoft's cloud business, which we do not consider to be materially different to our estimate of WACC set out in the table above.

E.162 We therefore do not consider the impact of updated data to December 2024 or use of company-specific WACC estimates to be sufficiently material to justify updating the WACC range, particularly as this would not impact the findings of our analysis when compared to the levels of ROCE found in the next section of this appendix. Similarly, even if AWS' proposed range of [✂]% for AWS' WACC was used, as set

[118] For Microsoft the average beta for the last 5 and 10 years is 0.86 and 0.96 respectively; for Amazon it is 1.14 and 1.26 respectively.
[119] Based on updated data to December 2024, we increased the RFR range to 0.4% to 0.5% and used an inflation rate of 2.9% for our upper range estimate. We found that our estimated ranges for beta and effective tax rate did not change with updated data to December 2024.

out in the next section AWS' ROCE would still be consistently in excess of WACC for the last ten years.

E.163 We have also compared our WACC estimates against internal WACC estimates provided by AWS, Microsoft, Google and [✂]:

(a) Microsoft's internal documents indicate that they have used a WACC of [✂] on a real, pre-tax basis ([✂] using our estimates for inflation set out above) for their goodwill impairment testing for the Cloud and Enterprise segment over the last 6 financial years.[120]

(b) The quarterly WACC calculations for Alphabet group, which were provided by Google indicate that the Alphabet group's pre-tax nominal WACC has ranged from [✂] over the period Q4 2018 to Q4 2023.[121]

(c) [✂].[122] AWS submitted that this internal [✂] WACC estimate relates to its nominal post-tax WACC.[123] This would equate to a pre-tax WACC of [✂] using our estimates for the tax rate set out above.

(d) [✂] provided its internal annual WACC estimate for [✂].[124] [✂].

E.164 On this basis, we consider a WACC range of 10% to 14% to be a reasonable benchmark for comparing to ROCE (pre-tax, as calculated) for AWS and Microsoft's cloud business over the period covered in our analysis.

Our profitability analysis

Margins analysis

Gross margins

E.165 We considered gross profit expressed as a percentage of revenue (ie gross margin),[125] as a potentially relevant measure of financial performance for cloud providers, as set out in paragraph E.35.[126]

[120] CMA analysis of Microsoft's response to the CMA's information request [✂] and Microsoft's response to Ofcom's information request [✂].
[121] CMA analysis of Google's response to the CMA's information request [✂].
[122] AWS' response to the CMA's information request [✂].
[123] AWS' submission to the CMA on [✂].
[124] [✂] response to the CMA's information request [✂].
[125] Gross profit is typically calculated as revenue less cost of goods sold (COGS). Gross profit is most commonly defined by the cloud providers in our analysis as revenue less direct costs, including infrastructure costs and excluding sales and marketing costs, research and development costs, general and administrative costs, non-infrastructure depreciation and amortisation and interest and tax. Where cloud providers' gross profit measures have varied from this definition we have sought to make adjustments to analyse gross margins on a comparable basis.
[126] See also chapter 3, market outcomes section of this report..

E.166 Gross margin is publicly reported for Microsoft Cloud. We estimated OVHcloud Public Cloud gross margin on a comparable basis using public accounts.[127] In addition, the evidence that we gathered includes gross margins for Microsoft Cloud & Enterprise, Microsoft Azure, Google Cloud, Google Cloud Platform and IBM's [✂].[128] We also estimated AWS' gross margins for financial years 2020 to 2023 using cost breakdowns in AWS' internal management accounts,[129] and Oracle's Cloud services gross margin using reported revenues and [✂].[130]

E.167 Table E.2 below shows the gross margins for the relevant business segments of AWS, Microsoft, Google, IBM and OVHcloud for the last five financial years.

Table E.2: Gross margins by cloud provider segment, financial years (FY) 2020 to 2024[131]

	FY20	*FY21*	*FY22*	*FY23*	*FY24*	*YTD FY25*
AWS (estimated)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Microsoft Cloud	67%	71%	70%	72%	71%	n/a
Microsoft Cloud & Enterprise	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Microsoft Azure	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Google Cloud	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Google Cloud Platform	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Oracle Cloud services (estimated)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
IBM [✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
IBM [✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
OVHcloud Public Cloud (estimated)	25%	31%	52%	48%	40%	n/a

Note: We have indicated n/a where we did not have data available to calculate gross margin. Google Cloud Platform and AWS FY23 data is for January to September 2023. Oracle Cloud services YTD FY25 data is for June to November 2024. Microsoft Cloud & Enterprise and Azure YTD FY25 data is for July to December 2024. The Microsoft Cloud segment was previously reported as 'commercial cloud' in financial years 2020 and 2021 and has not been updated for YTD FY25 as at the start of financial year 2025 Microsoft changed the composition of its reported segments, The IBM margins are for the [✂] geographic regions; all other margin data is on a global basis.
Source: CMA analysis of Microsoft Form 10-Ks and 10-Qs; Oracle Form 10-Ks and 10-Qs; OVHcloud Consolidated Financial Statements; Responses to the CMA's information requests [✂].

E.168 Table E.2 shows:

(a) AWS and Microsoft's broader cloud businesses (Microsoft Cloud and Cloud & Enterprise) have consistently achieved the highest gross margins, in excess of [✂] for AWS and of [✂] for both Microsoft segments over the last five years.

(b) The gross margins for Google Cloud, Google Cloud Platform and Microsoft Azure have increased over time.

---

[127] OVHcloud publicly reports gross margin for its Public Cloud segment exclusive of depreciation and amortisation related to its cloud infrastructure. We have estimated OVHcloud Public Cloud gross margin inclusive of infrastructure depreciation and amortisation using OVHcloud's total annual depreciation and impairment expense for property, plant and equipment, allocated based on the Public Cloud segment's proportion of annual capex. Note, OVHcloud may include some R&D expenses in its reported gross profit which other cloud providers do not include in gross profit.
[128] We sought to update IBM's UK and EMEA public cloud gross margins for 2023/2024 however only data for UK public cloud was provided. [✂].
[129] We estimate gross margin for AWS on a comparable basis to other cloud providers by including AWS cost reporting categories of [✂]. We sought to update AWS' gross margin data for October to December 2023 and the 2024 financial year, however AWS said it [✂] and as a result it could not provide its management accounts in the same format as needed to calculate comparable gross margins. [✂].
[130] [✂].
[131] Financial years vary between cloud providers. AWS, Google and IBM have financial years ending in December; Microsoft's financial year end is June; Oracle's financial year end is May; and OVHcloud's financial year end is August.

(c) AWS, Microsoft, Google and Oracle[132] have generated gross margins for their cloud businesses which are higher than other providers.

EBIT and EBIT margins

E.169 We considered earnings before interest and taxation (EBIT),[133] expressed both in US dollar (USD) value and as a percentage of revenue, as a potentially relevant measure of financial performance for cloud providers, as set out in paragraph E.357.

E.170 AWS and Google Cloud have publicly reported operating profit (equivalent to EBIT). We were provided with internal management accounts that included operating profit for Microsoft's Cloud & Enterprise reporting segment and we estimated the operating profit for Azure from gross profit (see the previous section for an explanation of our approach). We also estimated the operating profit for Oracle cloud services using our estimated gross profit (see the previous section for an explanation of our approach) and an estimated allocation of Oracle group opex.[134]

E.171 Table E.3 below sets out the EBIT for the cloud segments of AWS, Microsoft and Google for the last five financial years.

Table E.3: EBIT (USD billions) for financial years (FY) 2020 to 2024

	FY20	*FY21*	*FY22*	*FY23*	*FY24*
AWS	14	19	23	25	40
Microsoft Cloud & Enterprise	[✂]	[✂]	[✂]	[✂]	[✂]
Microsoft Azure (estimated)	[✂]	[✂]	[✂]	[✂]	[✂]
Google Cloud (restated for 2023 useful life change)	[✂]	(2)	(2)	2	6
Google Cloud (pre 2023 useful life change)	(6)	(3)	(3)	n/a	n/a
Oracle Cloud services (estimated)	[✂]	[✂]	[✂]	[✂]	[✂]

Note: In January 2023 Google changed the estimated useful life of its servers from four to six years and the estimated useful life of certain network equipment from five to six years.[135] We show Google Cloud EBIT both on the current reporting basis (restated for 2023 useful life change) and on a pre-2023 useful life change basis due to the impact of this change on profitability. We note that AWS and Microsoft have also made changes to their useful life policies for servers and network equipment: AWS in financial years 2020 and 2022[136]; Microsoft in financial years 2020 and 2023.[137]

Source: CMA analysis of AWS Form 10-Ks; Microsoft Form 10-Ks; Alphabet Form 10-Ks; Oracle Form 10-Ks; Responses to the CMA's information requests [✂].

E.172 Table E.3 shows:

---

[132] This is also consistent with Oracle's new financial tracking, which indicates its global Cloud Infrastructure business had a gross margin of [✂] for FY24 and its UK gross margins [✂] for FY24 [✂]. [✂].
[133] EBIT is calculated as gross profit less indirect costs such as sales and marketing costs, research and development costs and general and administrative costs. It excludes interest and tax.
[134] We estimate sales and marketing opex by allocating a portion of Oracle's Cloud and license sales and marketing costs, using Oracle Cloud services' proportional share of total Cloud and license revenue and estimate research & development, general & administrative and intangible asset amortisation opex using Oracle Cloud services' proportional share of total Oracle revenue.
[135] Alphabet Q3 2023 earnings release, 24 October 2023, page 3.
[136] Amazon 2022 From 10-K, page 41; Amazon 2020 Form 10-K, page 43.
[137] Microsoft FY23 Form 10-K, page 63; Microsoft FY20 Form 10-K, page 52.

(a) AWS and Microsoft have reported higher EBIT for their cloud businesses than Google Cloud and other cloud providers.

(b) Google Cloud EBIT is positive in FY23. Prior to FY23 Google Cloud was loss-making.

(c) [✂].

E.173 Table E.4 below sets out the EBIT margins for the cloud segments of AWS, Microsoft and Google, over a longer eight-year period.

Table E.4: EBIT margins for financial years 2017 to 2024

	FY17	*FY18*	*FY19*	*FY20*	*FY21*	*FY22*	*FY23*	*FY24*	*YTD FY25**
AWS	25%	28%	26%	30%	30%	29%	27%	37%	39%
Microsoft Cloud & Enterprise	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Microsoft Azure (estimated)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Google Cloud (restated for 2023 useful life change)				[✂]	(12)%	(7)%	5%	14%	18%
Google Cloud (pre 2023 useful life change)		(74)%	(52)%	(43)%	(16)%	(11)%			
Oracle Cloud services (estimated)				[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

**FY25 margins are for the year to date for each provider: AWS and Google Cloud are for January to March 2025; Microsoft Cloud & Enterprise and Microsoft Azure are for July 2024 to December 2024; Oracle Cloud services is for June 2024 to November 2024.*
Source: CMA analysis of AWS Form 10-Ks and 10Qs; Microsoft Form 10-Ks; Alphabet Form 10-Ks and 10-Qs; Oracle Form 10-Ks and 10-Qs; Responses to the CMA's information requests [✂].

E.174 Table E.4 shows:

(a) The EBIT margins for AWS have consistently been between 25% and 30% for 2017 to 2023 and increased to 37% in 2024.

(b) The EBIT margins for Microsoft's Cloud & Enterprise business segment have consistently been between [40-50]% and [50-60]% for the last eight financial years.

(c) We estimate that Microsoft Azure [✂] and has consistently had EBIT margins between [20-30%] and [30-40%] for the last four years, with margins on an upward trajectory.

(d) Google Cloud became profitable in FY23 and is reporting growing EBIT margin, albeit the EBIT margins for Google Cloud are currently significantly lower than AWS and Azure and Microsoft's Cloud & Enterprise business segment.

(e) Our estimated EBIT margins for Oracle's Cloud services have consistently been between [10-20]% and [20-30]%.

E.175 [✂].[138]

ROCE analysis

E.176 We calculated ROCE for AWS and Microsoft's Cloud & Enterprise and Azure businesses. The basis for doing this analysis for AWS and Microsoft's cloud businesses is set out earlier in the 'Scope of our analysis' section. As set out in that section, we were primarily interested in assessing the profitability of AWS and Microsoft's cloud businesses as they are the two largest providers in the UK markets with [60%-80%] share of combined IaaS and PaaS revenues. The third largest provider in the UK, Google's cloud business, only became profitable in 2023 as well as having a substantially smaller share of the UK markets. We set out our ROCE analysis and compare it to our estimated WACC in the section below.

E.177 We estimated a WACC in the range of 10% to 14% to be appropriate for our profitability assessment for AWS and Microsoft's Cloud & Enterprise and Azure businesses (as set out earlier in this appendix).

E.178 We also tested the sensitivity of our ROCE analysis using different measures of capital employed for AWS and Microsoft's Cloud & Enterprise and Azure businesses.

AWS

E.179 We considered AWS' ROCE, measured as EBIT divided by capital employed. Our baseline estimate of capital employed is calculated as AWS total assets[139] (from public accounts) less AWS accounts payable (from AWS internal accounts)[140] and an estimate of AWS unearned revenue.

E.180 As set out earlier in this appendix, we consider it appropriate to include an estimate of AWS unearned revenue. We estimated AWS unearned revenue for each year by allocating a portion of Amazon's total unearned revenue balance, using AWS' proportional share of Amazon total revenue. We consider revenue-based allocation to be reasonable in the context of the limitations on available data, particularly as unearned revenue balances are likely to be closely linked to revenue generation.

---

[138] [✂] response to the CMA's information request issued [✂].
[139] AWS accounts state that AWS total assets exclude corporate assets (such as cash and cash equivalents, marketable securities, other long-term investments, corporate facilities, goodwill and other acquired intangible assets and tax assets) and primarily consist of property and equipment, accounts receivable and operating leases. AWS 2023 Form 10-K page 70.
[140] AWS' response to the CMA's information request issued [✂].

E.181 We also tested the sensitivity of our AWS ROCE analysis using different measures of capital employed:

(a) Sensitivity 1: AWS total assets less an estimate of AWS current liabilities. This sensitivity takes into account that there may be additional AWS current liabilities not captured in our baseline estimate, such as accrued expenses. We estimated AWS current liabilities for each year by allocating a portion of Amazon's total current liabilities balance, using AWS' proportional share of Amazon total operating expenses.[141]

(b) Sensitivity 2: AWS total assets less AWS accounts payable. We consider this sensitivity to overstate AWS capital employed as it does not include AWS unearned revenue. However, we include this sensitivity as a cross-check as it does not rely on estimates for account balances.

(c) Sensitivity 3: AWS total assets only. We consider this sensitivity to overstate AWS capital employed as it does not include any current liabilities. We include it as a conservative lower bound for the ROCE figure, but do not consider it to be an appropriate measure of ROCE, compared to the measures set out above.

E.182 We also tested the sensitivity of our AWS ROCE analysis to the inclusion of estimates for acquired intangible assets.[142] We found that the inclusion of acquired intangible asset estimates resulted in no material changes to our ROCE analysis for AWS (less than 10 basis points difference in ROCE in all scenarios with acquired intangible assets) and so omitted these from our ROCE analysis below.

E.183 Table E.5 sets out the results of our ROCE analysis for AWS for the last five years.

Table E.5: AWS ROCE under baseline and sensitivity scenarios for capital employed

	FY20	*FY21*	*FY22*	*FY23*	*FY24*
Baseline ROCE	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE sensitivity 1 (using total assets less estimated current liabilities)	37%	37%	32%	28%	30%
ROCE sensitivity 2 (using total assets less accounts payable)	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE sensitivity 3 (using total assets)	28%	29%	26%	23%	26%

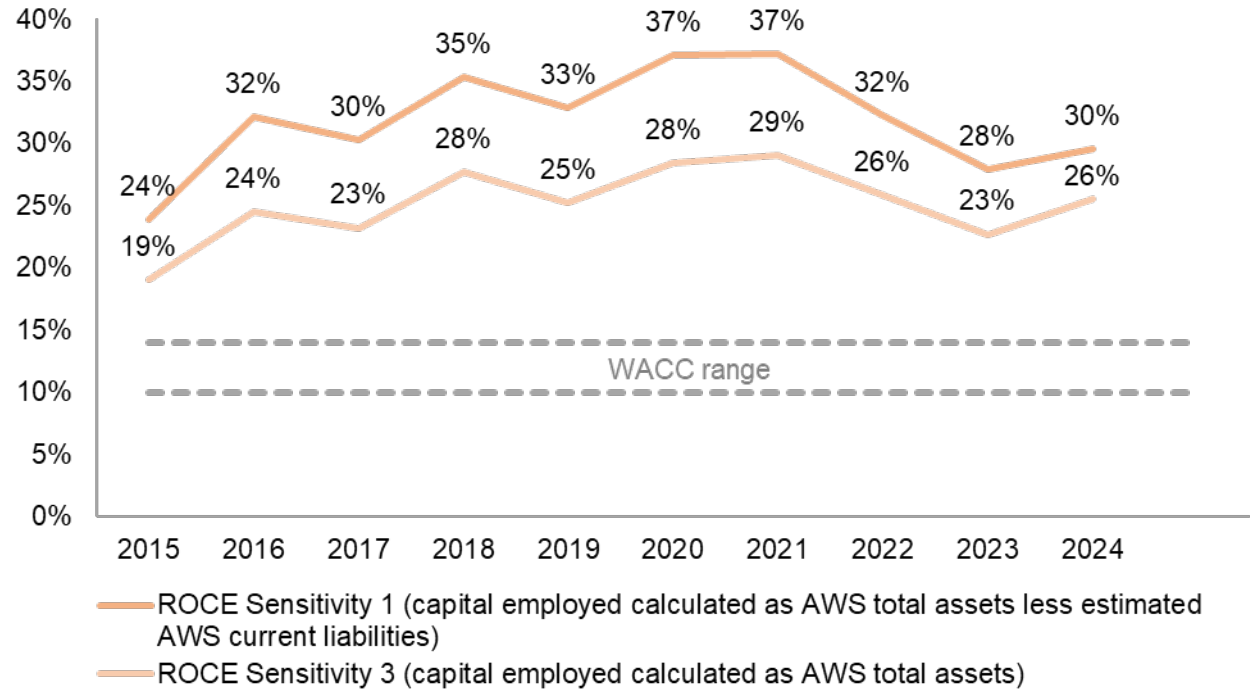
Source: CMA analysis of Amazon Form 10-Ks; AWS' response to the CMA's information requests [✂].

[141] Given Amazon's largest current liability account has consistently been accounts payable over the last 10 years and we would expect accounts payable to be closely linked with the level of operating expenditure, we consider this to be a reasonable allocation approach.
[142] We used internal data on [✂] and reviewed Amazon's public accounts for 2022-2024 for any intangible assets from acquisitions noted that appeared to relate to AWS.

E.184 The table above shows that our baseline ROCE and all ROCE sensitivities for AWS have been above our range for WACC of 10% to 14% over the last five years and consistently in excess of 20%.

E.185 We also considered AWS ROCE over a longer time period of 10 years. Although we only have data available to calculate baseline ROCE for 2018 to 2024 (which shows that baseline ROCE has consistently been in excess of 20% for the last seven years), we were able to extend our analysis to a 10-year period using the data from ROCE sensitivity 1 (which we consider to be the next best approximation for capital employed) and sensitivity 3. This is shown in Figure E.2 below.

Figure E.2: AWS ROCE under sensitivity 1 and 3, financial years 2014 to 2023



Source: CMA analysis of Amazon Form 10-Ks.

E.186 Figure E.2 shows that since 2015 AWS' ROCE has consistently been above WACC and since 2016 has been in excess of 20%.

E.187 We also considered AWS future ROCE using AWS' internal forecasts. We used AWS' internal forecasts for operating income and capex to calculate forecast ROCE under sensitivity 3 for financial years 2025 and 2026.[143] Our calculation indicates that AWS' ROCE is forecast to [✂] in 2025 and 2026 under sensitivity 3 but remain [✂] WACC.[144] However, we give less weight to forecasts prepared

[143] We are able to estimate forecast ROCE under sensitivity 3 by estimating AWS total assets for 2024 using AWS' total assets as at 31 December 2023, forecast capex for the year and an estimate of annual depreciation based on prior year depreciation expenses.
[144] CMA analysis of Amazon Form 10-Ks and AWS' response to the CMA's information request [✂].

during the course of the investigation and also note that sensitivity 3 is consistently our lowest and least appropriate, ROCE measure per our analysis above.

Impact of AI investment on ROCE

E.188 We also considered the impact of AWS' investment in AI cloud services on AWS' ROCE. Whilst the data that we had available did not contain a detailed breakdown of financial data available that would allow us to calculate AWS ROCE excluding AI, our analysis found that:

(a) AWS' main AI cloud services ('Gen AI' and 'AI/ML') have [✂] in each year from 2021 to 2024;[145] and

(b) AWS' external server capex on Gen AI has [✂].[146] AWS' external server capex on Gen AI [✂].[147]

E.189 An AWS internal document stated that [✂].[148] In an internal document from 2024, AWS noted [✂] margins associated with its services categorised as machine learning infrastructure ('ML Infra') and generative AI ('Gen AI'), partly due [✂].[149]

E.190 Our analysis indicates that [✂], thereby having a positive impact on ROCE in the period from 2021 to 2024. However, we did not have sufficient data to calculate AWS' ROCE excluding the impact of AI.

Microsoft Cloud & Enterprise and Azure

E.191 As explained above, we consider it relevant to assess the profitability of both Azure and Microsoft's Cloud & Enterprise reporting segment, as reflected in internal financial reports. We set out our approach to calculating ROCE for each below.

Microsoft Azure

E.192 Azure is one of the products included in Microsoft's Cloud & Enterprise business unit. Azure is reported to [✂] while the broader Cloud & Enterprise business is reported to [✂]. We therefore calculated an estimate of Azure EBIT as an input to our analysis of EBIT margins and ROCE.

E.193 To estimate Azure EBIT, we allocated a portion of the non-infrastructure operating costs[150] which are attributed to Cloud & Enterprise. We considered whether to

[145] Note, this does not cover all of AWS' AI-related services. AWS' responses to the CMA's information requests [✂].
[146] AWS' response to the CMA's information request [✂].
[147] AWS' response to the CMA's information request [✂].
[148] AWS' response to the CMA's information request [✂].
[149] AWS' response to the CMA's information request [✂].
[150] This includes expenses related to sales and marketing, research and development and general and administrative expenses. Microsoft's response to the CMA's information request [✂].

allocate non-infrastructure operating costs to Azure based on Azure's proportion of Cloud & Enterprise revenue or based on Azure's proportion of Cloud & Enterprise cost of goods sold (COGS). We consider revenue-based allocation to be more appropriate, as we consider that the level of expenditure on sales and marketing, research and development and/or general and administrative expenses will be more closely linked to revenue generation and growth than COGS expenditure.

E.194 We considered Microsoft Azure's ROCE, measured as estimated EBIT divided by capital employed. Our baseline estimate of capital employed is calculated as Microsoft public cloud fixed assets (provided to us by Microsoft)[151] plus estimated Azure current assets, less estimated Azure unearned revenue. We note that this only includes unearned revenue as a current liability for Azure, however it is likely that Azure incurs other current liabilities such as accounts payable. As a result, this estimate may overstate capital employed (and understate ROCE) and we consider a broader estimate of current liabilities in our sensitivity testing.

E.195 As noted earlier in this appendix, the public cloud fixed assets balances provided to us by Microsoft reflects assets which are not exclusively Azure assets but also [✂].[152] We use the public cloud fixed assets in our baseline estimate of capital employed as well as in all sensitivities tested (detailed below), as this was the only cloud-specific data on fixed assets available. However, this may mean that Azure capital employed is overstated (and hence ROCE understated) in all scenarios due to the lack of adjustment for [✂].

E.196 We estimated Azure current assets for each year by allocating a portion of Microsoft's total current assets balance excluding cash and cash equivalents, using Azure's proportional share of Microsoft total revenue. We consider revenue-based allocation to be appropriate as accounts receivable (which are closely linked to revenue generation) have consistently comprised the majority of Microsoft's current assets excluding cash and cash equivalents.[153]

E.197 As set out earlier in this appendix, we consider it to be appropriate to include an estimate of unearned revenue for Azure and Cloud & Enterprise. The value of Microsoft's Intelligent Cloud unearned revenue liability as of 30 June for the last five financial years has ranged between $16.6 billion and $23.1 billion.[154] We estimated Azure unearned revenue for each year by allocating a portion of the Intelligent Cloud unearned revenue balance, using Azure's proportional share of Intelligent Cloud revenue. As above, we consider revenue-based allocation to be

[151] Microsoft's response to the CMA's information [✂].
[152] Microsoft's response to the CMA's information request [✂].
[153] For example, as at 30 June 2023 accounts receivable comprised 67% of Microsoft's current assets excluding cash, cash equivalents and short-term investments. Microsoft FY23 Form 10-K, page 60.
[154] Microsoft 10-K reports.

appropriate as unearned revenue balances are closely linked to revenue generation.

E.198 We note that Microsoft's reported Intelligent Cloud unearned revenue balance does not split out the current and non-current portions of this balance. We would not typically include non-current unearned revenue in our calculation of unearned revenue. Our estimate of baseline capital employed could be somewhat understated by inclusion of non-current unearned revenue in our estimate, however we note that the non-current portion of Microsoft's total unearned revenue balance has been consistently low.[155] Given this, we consider the inclusion of any non-current unearned revenue in our capital employed estimate likely to have a minimal impact.

E.199 We also tested the sensitivity of our Azure ROCE analysis using different measures of capital employed:

(a) Sensitivity 1: Microsoft public cloud fixed assets plus an estimate of Azure net working capital. This sensitivity takes into account that there may be additional Azure current liabilities not captured in our baseline estimate, such as accounts payable. We estimated Azure net working capital for each year by allocating a portion of Microsoft total net working capital (current assets less current liabilities excluding cash, cash equivalents and current debt), using Azure's proportional share of Microsoft total revenue. We consider revenue-based allocation to be appropriate as accounts receivable and unearned revenue are the two largest balances in Microsoft's net working capital.

(b) Sensitivity 2: Microsoft public cloud fixed assets only. This sensitivity may overstate or understate capital employed as it does not include any current assets or liabilities and [✂] may also mean the asset values are overstated for Azure. However, we included this sensitivity as a cross-check as it does not rely on estimates for account balances.

E.200 We also tested the sensitivity of our Azure ROCE analysis to the inclusion of estimates for acquired intangible assets. We found the inclusion of acquired intangible asset estimates resulted in no material changes to our ROCE analysis for Azure (less than 30 basis points difference in all scenarios) and omitted these from our ROCE analysis below.

E.201 Figure E.3 sets out the results of our ROCE analysis for Azure for the last five years.

[155] Microsoft's 10-K reports show long-term (non-current) unearned revenue was 12% of Microsoft's total unearned revenue balance as at 30 June 2019 and the proportion as at 30 June for financial years 2020 to 2024 has ranged between 4% to 8%.

Figure E.3: [✂]

[✂]

Source: CMA analysis of Microsoft Form 10-Ks; [✂].

E.202 Figure E.3 shows our baseline Azure ROCE has ranged from [✂] over the last five financial years, whilst ROCE Sensitivity 1 has ranged between [✂] and Sensitivity 2 has ranged between [✂].

E.203 It also shows that our baseline ROCE and all ROCE sensitivities for Azure have been above our estimated WACC since financial year 2021 and are stable. Microsoft Azure ROCE has been in excess of 20% under all sensitivities used in our analysis for the last three years.

E.204 We also considered Azure projected ROCE for 2025 based on Azure's half-year 2025 financial performance. We projected Azure's full year 2025 EBIT using its half-year gross profit data, asset and liability balances as at 31 December 2024 and the EBIT and baseline capital employed estimation method set out above. Our calculation indicates that baseline Azure ROCE is projected to increase slightly in financial year 2025 to [✂].[156]

E.205 We also considered Azure ROCE over a longer time period. Microsoft was only able to provide public cloud fixed asset balances as far back as financial year 2018,[157] so we were not able to analyse Azure ROCE over a 10-year period. However, our analysis of Azure ROCE over the seven-year period of financial years 2018 to 2024 shows that Azure ROCE was [✂], under baseline ROCE and all ROCE sensitivities.

Microsoft Cloud & Enterprise

E.206 We considered Microsoft Cloud & Enterprise's ROCE, measured as estimated EBIT divided by capital employed. Our baseline estimate of capital employed is calculated as Microsoft public cloud fixed assets (submitted by Microsoft) plus estimated Cloud & Enterprise current assets and estimated acquired intangible assets for GitHub and Nuance, less estimated Cloud & Enterprise unearned revenue. We note that this only includes unearned revenue as a current liability for Cloud & Enterprise, however it is likely that Cloud & Enterprise incurs other current liabilities such as accounts payable. As such, this estimate may overstate capital employed and we consider a broader estimate of current liabilities in our sensitivity testing.

[156] CMA analysis of Microsoft Form 10-Ks, Microsoft's response to the CMA's information request [✂].
[157] Microsoft's response to the CMA's information request [✂].

E.207 Consistent with our calculations for Azure, we estimated Cloud & Enterprise current assets by allocating a portion of Microsoft's total current assets balance excluding cash and cash equivalents, using Cloud & Enterprise's proportional share of Microsoft total revenue.

E.208 Also consistent with our calculations for Azure, we estimated Cloud & Enterprise unearned revenue for each year by allocating a portion of the Intelligent Cloud unearned revenue balance, using Cloud & Enterprise's proportional share of Intelligent Cloud revenue.

E.209 Microsoft's Cloud & Enterprise business includes GitHub and Nuance (separately to Azure, hence we did not include in our Azure ROCE analysis). As discussed in the 'Intangible assets' section, we consider it relevant to include an estimate of GitHub and Nuance acquired intangible assets for Cloud & Enterprise.

E.210 We note however, that while we have conservatively included an estimate in initial analysis as they may meet the criteria set out in the 'Intangible assets' section, our estimates may overstate capital employed and hence artificially understate ROCE. The Nuance business provides professional services which are reported in [✂] (in 'Enterprise Services' within the Intelligent Cloud segment).[158] The acquired intangible assets for GitHub and Nuance also include a substantial proportion of customer- and marketing-related assets, which are less clearly relevant assets for the provision of cloud services. We used the total acquired intangible assets in our estimate of Cloud & Enterprise capital employed, however given these factors, this is likely to overstate capital employed to some degree which again would result in an understatement of ROCE.

E.211 We estimated the carrying value of GitHub and Nuance acquired intangible assets over the period of our ROCE analysis using Microsoft's reported total acquired intangible assets in the year of acquisition and weighted average useful life for these assets.[159]

E.212 We also tested the sensitivity of our Cloud & Enterprise ROCE analysis using different measures of capital employed:

(a) Sensitivity 1: Microsoft public cloud fixed assets plus an estimate of Cloud & Enterprise net working capital and estimated acquired intangible assets for GitHub and Nuance. This sensitivity takes into account that there may be additional Cloud & Enterprise current liabilities not captured in our baseline estimate, such as accounts payable. As for Azure, we estimated Cloud & Enterprise net working capital by allocating a portion of Microsoft total net working capital (current assets less current liabilities excluding cash, cash

[158] Microsoft FY23 Form 10-K, page 93; Microsoft's response to the CMA's information request [✂].
[159] Microsoft FY23 Form 10-K, page 78; Microsoft FY19 Form 10-K, page 73.

equivalents and current debt), using Cloud & Enterprise's proportional share of Microsoft total revenue.

(b) Sensitivity 2: Microsoft public cloud fixed assets plus estimated acquired intangible assets for GitHub and Nuance. This sensitivity may overstate or understate capital employed as it does not include any current assets or liabilities. However, we included this sensitivity as a cross-check as it does not rely on estimates for account balances.

(c) Sensitivity 3: Microsoft public cloud fixed assets plus estimated Cloud & Enterprise current assets, less estimated Cloud & Enterprise unearned revenue (ie excluding GitHub and Nuance acquired intangible assets). This sensitivity takes into account that the intangible asset balances for GitHub and Nuance may potentially fail to meet the criteria in paragraph E.68, which means their inclusion could overstate capital employed.

E.213 Figure E.4 sets out the results of our ROCE analysis for Cloud & Enterprise for the last five years.

Figure E.4: [✂]

[✂]

Note: The baseline estimate here is also the lower bound for our ROCE analysis.
Source: CMA analysis of Microsoft Form 10-Ks [✂].

E.214 Figure E.4 shows that our baseline ROCE and all ROCE sensitivities for Microsoft Cloud & Enterprise have been above WACC for the last five years and consistently in excess of 45%.

E.215 We also tested the sensitivity of our Cloud & Enterprise ROCE analysis to the inclusion of estimates for acquired intangible assets for other cloud-related acquisitions that we assessed as relevant to Cloud & Enterprise.[160]

E.216 We found the inclusion of estimates for acquired intangible assets for other cloud-related acquisitions (in addition to GitHub and Nuance which have been included in baseline) had a limited impact on Cloud & Enterprise ROCE, which remains in excess of 50% in all years. We found the difference to be less than 150 basis points in all scenarios and omitted these from our ROCE analysis above.

E.217 We also considered Cloud & Enterprise projected ROCE for 2025 based on Cloud & Enterprise's half-year 2025 financial performance. We projected Cloud & Enterprise's full year 2025 EBIT using its half-year EBIT data, asset and liability

[160] [✂]. We assume a weighted average life of 7 years and that 20% of acquisition deal value will be recognised as acquired intangible assets (excluding goodwill) based on GitHub and Nuance accounts, in order to estimate the carrying value of acquired intangible assets for other relevant cloud-related acquisitions. Source: Microsoft FY22 Form 10-K, pages 77-78 ; Microsoft FY19 Form 10-K, page 73; Microsoft's response to the CMA's information request [✂]; Microsoft's response to Ofcom's information request [✂].

balances as at 31 December 2024 and the baseline capital employed estimation method set out above. Our calculation indicates that baseline Cloud & Enterprise ROCE is projected to remain stable in financial year 2025 at [✂].[161]

E.218 We also considered Cloud & Enterprise ROCE over a longer time period. Microsoft was only able to provide public cloud fixed asset balances as far back as financial year 2018, so we were not able to analyse Cloud & Enterprise ROCE over a 10 year period. However, our analysis of Cloud & Enterprise ROCE over the seven year period of financial years 2018 to 2024 shows that Cloud & Enterprise ROCE was consistently in excess of 45% in all years over this longer time period.

Impact of AI investment on ROCE

E.219 We also considered the impact of Microsoft's investment in AI cloud services on Azure and Cloud & Enterprise ROCE. Whilst the data that we had available did not contain a detailed breakdown of financial data to allow us to calculate Azure or Cloud & Enterprise ROCE excluding AI, our analysis found that Microsoft's AI-related cloud capex on Server GPUs is increasing significantly, at a [✂] CAGR[162] from [✂] in financial year 2023 to forecast [✂] in financial year 2027.[163]

E.220 Microsoft also provided the following data on Azure AI:[164]

(a) Estimated Azure AI revenue as a proportion of total Azure revenue is [✂] for FY24 and [✂] for FY25; and

(b) Forecast gross margins for AI-related cloud services for FY24 and FY25 are [✂] and [✂], respectively.

E.221 Given that the total Azure gross margin for FY24 was [✂] (and previous years have been [✂], as shown in Table E.2), this indicated that Azure's gross margin (and potentially EBIT margin) excluding AI would be higher. Given that Azure is a substantial portion of the Cloud & Enterprise segment, this could also apply to Cloud & Enterprise.

E.222 An internal document dated September 2024 stated that [✂].[165]

E.223 These margins and Microsoft's increasing AI-related cloud capex suggest that if cloud AI services were removed from Microsoft data for financial years 2023 and 2024, we would expect ROCE to be higher.

[161] CMA analysis of Microsoft Form 10-Ks, Microsoft's response to the CMA's information request [✂].
[162] Compound Annual Growth Rate.
[163] Microsoft's responses to the CMA's information requests [✂].
[164] Microsoft's response to the CMA's information request [✂].
[165] Microsoft's response to the CMA's information request [✂].