Ofcom's future approach to mobile markets and spectrum

Annex 4 – Pricing

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Contents

1. Overview

This annex contains an analysis of mobile pricing data over the period 2019-2022. This pricing annex supplements Ofcom's recently published Pricing Trends in Communications services report 2022.[1]

Ofcom's latest Pricing Trends in Communications services report ('Pricing Trends report') presents prices over the period 2016 – 2022. It focuses on prices for new and upgrading customers ('front-book pricing'), mainly examines movements in annual average offered prices, calculates average prices at the industry level (as opposed to mobile provider level), typically presents prices adjusted for inflation, and assesses prices at a reasonably aggregated level.

In relation to mobile, the Pricing Trends report found that:

- there are still good value deals available for those who shop around, although some services have become more expensive;
- for new customers, prices excluding handsets declined from 2016-2022 in both real and nominal terms, despite increasing data use, based on comparisons of prices for a basket of mobile services;[2] and
- Ofcom research shows that about a third of UK households (over 9 million in total) were struggling to afford their communications services in October 2022 with 9% stating they have experienced difficulty affording their mobile phone service.[3]

In this annex we complement the analysis in the Pricing Trends report by analysing recent pricing trends in mobile for both new/upgrading customers and existing customers (i.e. both the front-book and the back-book), at a monthly average level, by provider, in nominal terms (i.e. not adjusted for inflation), and at a more disaggregated level.

We also present an initial analysis of prices using customer-level data obtained from providers. This data enables us to assess prices taking into account the actual tariffs that customers have chosen, giving us a better understanding of pricing outcomes and the functioning of the market. As a result, this customer-level data allows us to present prices weighted according to take-up, which provides a more informative (weighted) average estimate of the prices customers are paying.

We focus on recent pricing trends and use several different data sources to build a fuller picture of prices. In particular, we have used three types of data:

- Front-book prices: we assess monthly advertised prices for new/upgrading customers over the 2020-2022 period.[4]
- Back-book prices: we examine changes in prices for existing customers over the 2021-2022 period, following the widespread implementation of in-contract inflation-plus price rises, as per the terms and conditions set out in contracts.[5]

[1] Pricing trends for communications services - Ofcom.
[2] This basket changes from year-to-year to reflect changing average usage.
[3] Ofcom Communication Affordability Tracker research, October 2022.
[4] This source was also used in the Pricing Trends report but this annex analyses prices in a more granular fashion.
[5] This source was also used in the Pricing Trends report.

- Customer-level prices: we examine changes in prices for customers over the 2019-2021 period based on their actual contract choices.[6]

We have also examined third-party analysis of mobile provider pricing and assessed MNOs' own statements on their pricing and profitability.

Our key findings are set out in brief in the box below.

What we have found – in brief

- The majority of existing contract customers faced large price increases this year, driven by most of the major mobile providers implementing in-contract price rises that were either inflation or inflation-plus indexed, against a backdrop of high inflation in the UK. These annual price rises will have affected most existing customers that had taken out a contract with providers before April 2022, the most common month when annual price rises were implemented.
- Customers unaffected by in-contract price rises in 2022 would broadly speaking have fallen into one of the following categories: (a) a customer with a contract with Sky Mobile or Tesco Mobile i.e. providers who did not apply contractual price rises, (b) a customer on a pay-as-you-go (PAYG) tariff or a customer with a contract on a rolling monthly SIM-only deal who could have switched ahead of (or after) these rises, or (c) a new (post implementation date) customer who contracted with their provider after the 2022 price rise came into effect.[7]
- For those customers unaffected by the in-contract price rises, we find that average pricing trends have been generally stable through 2022. This finding is based on an analysis of front-book prices using the same unweighted (offered price) data source used in the Pricing Trends in Communications services 2022 report.
- We have also found that while average pay monthly SIM-only (SIMO) and traditional PAYG pricing trends have been broadly flat during 2022, there have been some price increases for the lowest data allowance SIMO packages, and some cheap low-data 1-month tariffs have been removed by the main providers.
- Because the majority of contracted customers faced contractual price rises in 2022, on average back-book mobile prices increased. This also suggests that mobile prices overall rose during 2022 up to October. This is in line with third-party analysis of mobile providers' recent pricing, as well as with MNOs' own statements on their pricing and profitability during 2022.
- Consumers will face further high in-contract price rises in 2023 if providers exercise their in-contract price rise clauses given the current and forecasted high levels of inflation.
- From a high-level analysis of the customer-level data, we found for SIM-only and PAYG prices: (a) prices broadly increase with the data allowance, (b) prices on average have reduced between 2019 – 2021, and (c) there is price dispersion between providers, which increases with the data allowances. We also found that further in-depth analysis is needed to understand pricing patterns in the data, which we plan to publish in 2023.

[6] The dataset includes additional information and we plan to publish further analysis on this in 2023.
[7] Out-of-contract customers could have avoided an in-contract price rise if they chose to switch ahead of the implementation date as specified in the terms & conditions of their tariff, or could have reduced the impact of the price rise by switching (penalty free) after the implementation date.

The above findings were reached by triangulating across different data sources.[8] To understand the overall picture fully, we need to look at the actual prices paid by customers (both new/upgrading and existing) using customer-level data obtained from mobile providers. We have collected such data for the calendar years 2019 to 2021 and present an initial analysis of average contracted prices in this annex. We intend to produce a more comprehensive analysis of this data next year.[9]

The remainder of this annex is set out as follows:

- Section 2 sets out the data and methodology we have used in this pricing annex.
- Section 3 contains an analysis of back-book pricing.
- Section 4 assesses front-book pricing.
- Section 5 discusses our analysis of customer-level pricing.

[8] Neither the front-book pricing (i.e. prices for new/upgrading customers) nor back-book pricing (i.e. prices for existing customers) data sources we have used contain customer level information, and so the average prices that we have analysed will not reflect the actual choices – and in turn expenditure – of consumers over the period we have analysed. As a result, the average prices we calculate are not weighted according to tariff popularity or actual expenditure.

[9] We expect to analyse how market outcomes vary across different consumer groups (e.g., low- versus higher-income customers) and whether there are potential gains from switching that consumers are not utilizing. Given that tariffs tend to differ in multiple aspects (e.g., price, data allowance, and service quality), we also aim to analyse how consumers value these different tariff characteristics.

2. Data and methodology

Back-book pricing data

We define back-book pricing here as the unweighted front-book prices from previous months and/or years uplifted for periodic price increases set out in the terms & conditions of contracts taken out with providers. Our focus in this annex is on the pricing uplift to this back-book due to in-contract pricing clauses, as per the terms and conditions set out in the contract between customers and their provider.

Data source

Data on back-book pricing is sourced from Pure Pricing[10], using its UK Mobile Monthly Mobile Pricing Databases.[11] We have supplemented this data with information from mobile providers' websites, in particular on terms & conditions for annual price variations, as well as Money Saving Expert[12] for information on historical terms & conditions for annual price variations.

The providers covered by Pure Pricing are O2, EE, Three, Vodafone, Virgin Mobile, Sky, Tesco Mobile, iD Mobile, BT Mobile, and Plusnet. We have also included giffgaff and VOXI in our back-book pricing analysis, sourcing information from providers' websites and Money Saving Expert.

The information from Pure Pricing sets out for each of the providers covered the following information:

- The annual price increase policy.
- Whether the policy applies to handset tariff, airtime only within a handset tariff, SIMO tariffs, or a combination of these.
- The price increase implementation date, and the month to which inflation-indexed annual policies are indexed.

We have supplemented the above with information on new contract qualifying dates for the various annual pricing policies used by mobile providers, sourced from mobile providers' websites for 2022 policies and Money Saving Expert for 2021 policies. This provides information on which type of annual pricing policy a customer would have faced in 2021 and 2022 for a given provider, with policies typically varying depending on when a customer signed their contract.

[10] Mobile & Broadband Pricing Consultants | Pure Pricing.
[11] Pure Pricing sources information from mobile providers' publicly facing pricing touchpoints, including website published pricing, price guides, legal terms and conditions, online sales customer journeys and discussions with customer support teams.
[12] Money Saving Expert is a consumer finance information and discussion website, founded by financial journalist Martin Lewis. The website's focus is to provide people with information on saving money. Money Saving Expert: Energy Help, Credit Cards, Flight Delays, Shopping and more.

The back-book pricing data therefore only provides information on price changes for existing customers. It does not contain information on individual customers, nor does it contain any information on pricing levels.

Methodology

We use this back-book pricing data to understand how prices for back-book customers are changing over time.

Front-book pricing data

Data source

Data on front-book pricing is sourced from Pure Pricing[13], using its UK Mobile Pricing Database. This is the same source Ofcom used in the Pricing Trends report.

The database contains tariff prices for new/upgrading customers offered by mobile providers in the UK. Pricing information covers the core tariff, as well as add-ons, proposition descriptions, and international and roaming information. The database captures promotional activities of providers over time, and the prices we have used in our analysis account for these pricing promotions.

Pure Pricing sources this information from mobile providers' publicly facing pricing touchpoints, including website published pricing, price guides, legal terms and conditions, online sales customer journeys, and discussions with customer support teams. Pricing information on tariffs is sourced from websites each month.

The months covered for the front-book pricing analysis in this annex are August 2020 – October 2022.

The providers covered by the database are as follows: EE, giffgaff, iD Mobile, O2, Plusnet, Sky, SMARTY, Tesco Mobile, Three, Virgin Media ('Virgin Mobile'), Vodafone, VOXI, and BT Mobile.

For each of these providers the Pure Pricing mobile pricing database provides information on the tariff types shown in Table 1. We have assessed pricing for four of these tariff types: PM Handset, PM SIMO, PAYG bundle SIMO, and PAYG Top-Up SIMO.

[13] Mobile & Broadband Pricing Consultants | Pure Pricing.

Table 1: Summary of tariff types in Pure Pricing's mobile pricing database

Tariff name (in database)	Description (in database)
PM Handset	Pay monthly handset tariffs for four devices.[14]
PM MBB SIMO	Pay monthly mobile broadband, sim-only, 30-day and 12-month contracts.
PM MBB WiFi	Pay monthly mobile broadband with WiFi device[15], 30-day, 12-month and 24-month offers.
PM SIMO	Pay monthly sim-only, 30-day, 12-month, 18-month and 24-month contracts.
PAYG bundle SIMO	Pre-pay sim-only 30-day bundles.
PAYG MBB WIFI	Pre-pay mobile broadband with WiFi device, 30-day, 3-month, 6-month and 12-month validity.
PAYG MBB SIMO	Pre-pay mobile broadband sim-only, 30-day, 3-month, 6-month and 12-month validity, includes Starter kits.
PAYG Top-Up SIMO	Pre-pay Top-Up sim-only, standard pre-pay top-up tariffs, includes rewards where given.

Source: Pure Pricing

The database contains variables for provider, contract length, device, tariff name, tariff details (e.g. included minutes/texts/data/roaming charges), and pricing.

Tariff prices are updated each month for tariffs in the database, and each month represents a snapshot picture for the day that tariff data was collected by Pure Pricing.[16]

For each month a tariff is available, the database has a variable for: monthly tariff price, device price (if applicable), out-of-bundle charges, and the length and discount of any promotions available if you purchase the tariff that month.

Pure Pricing collects tariff data from provider websites and other customer-facing pricing touchpoints, and so the data source will not show any tariffs that are exclusively offered by providers' retail partners, such as Dixons Carphone selling Vodafone contracts. Therefore, the Pure Pricing dataset covers a wide selection of providers and tariffs but does not contain the full range of tariffs available on the market.

We note below some important points of detail regarding Pure Pricing's categorisation of certain tariffs in their database:

- The Pure Pricing database distinguishes between 1-month pay-monthly SIM-only tariffs, and 1-month PAYG Bundle SIM-only tariffs. On the Pure Pricing Database spreadsheets, it defines 30-day pay monthly SIM-only tariffs as "Pay monthly sim-only, 30-day contracts", and PAYG bundle SIM-only tariffs as "Pre-pay sim-only 30-day bundles". The key distinction between PAYM 30-day contracts and PAYG SIMO tariffs is whether the tariff requires a customer to enter a contract and

[14] Each month Pure Pricing captures pricing for four of the most popular handsets in the market. Pure Pricing chooses handsets to reflect the most popular manufacturers (e.g. Apple and Samsung), and then the models these manufactures use to address the broadest segment of the market. For example in November 2022, Pure Pricing's handset data selected iPhone 14 and iPhone SE from Apple, and Samsung Galaxy S21 FE and Samsung Galaxy S22 from Samsung. Pure Pricing's handset selection methodology means that the handset tariff data will not capture the full market tariffs which include a mobile or portable WiFi device.
[15] Tariffs which include a mobile or portable WiFi device.
[16] International and Roaming information is updated on a quarterly basis in March, June, September and December.

pass an associated credit-check or not. PAYM 30-day contracts require a credit check and will bill the customer in advance each month for recurring monthly charges and in arrears each month for out-of-bundle charges such as International Direct Dial (IDD) calls or premium call charges. PAYG 30-day bundles require no credit check, require the customer to pre-purchase their bundle in advance each month, and require any out-of-bundle service charges to be paid via pre-loaded top-up credit, or via a pre-purchased add-on such as a bundle of IDD minutes.

- For providers such as giffgaff, VOXI and SMARTY, the Pure Pricing database only shows tariffs that fall within the 'PAYG Bundle SIM-only' tariff category. The 30-day SIM-only tariffs on these providers' websites give a price for one month, state that it is possible to cancel any time, and specify that there is no contract: these tariffs are defined as "*a simple monthly subscription that you can cancel anytime. You will be charged every 30 days, starting the day you start using your SIM."* Pure Pricing stated that giffgaff, VOXI and SMARTY tariffs are PAYG billed, with no credit check, and the bundle is pre-purchased in advance each month. Any out-of-bundle services must be purchased via top-up credit or pre-purchased add-on bundles such as a bundle of IDD minutes if offered by operator. Pure Pricing therefore records these tariff types as PAYG Bundle tariffs, rather than 1-month pay-monthly SIM-only contracts.
- Pure Pricing dataset only includes pay monthly SIM-only tariffs for Sky. Although it is possible to purchase handsets[17] from Sky and then add pay-monthly SIM-only tariffs to this purchase, Pure Pricing categorises these tariffs as pay monthly SIM-only, rather than pay monthly handset tariffs.

We have not made any adjustments to the way in which Pure Pricing categorises tariffs in its database.

Methodology

We created an average monthly price variable for each tariff in the Pure Pricing database. This allows us to compare tariff prices across time, as well as across and within providers.

This average monthly price variable takes the monthly average of all prices across the length of the contract, includes the upfront device cost, and reflects any promotional pricing discounts at the beginning of the contract. We do not take account of annual price increase policies in calculating this monthly price variable. Therefore, the price calculated is the average monthly price before (i.e. excluding) the effect of any annual pricing policies are implemented by the provider in question.[18]

[17] Buy Samsung Galaxy S22 5G Mobile Phones, Tablets & SIM Only Deals | Sky Mobile.

[18] If prices were calculated to include the effect of in-contract price rises (i.e. an approximation of a customer's billed amount each month) then pay monthly handset tariff prices would need to be treated differently depending on the provider. This is because some providers bundle the airtime and handset into one monthly price, while others split airtime and handset contracts. For bundled contracts in-contract price rises are applied to this monthly price, and therefore apply to both the airtime and the handset. By contrast, split contract providers apply in-contract price rises for handset tariffs only to the airtime contract. Therefore, the price calculation to account for these contractual differences would not only be different, but for identical handset tariffs and in-contract price rises would show that prices increased by a greater £ amount for bundled tariffs. Since we examine front-book pricing before any in-contract price rises apply – and separately examine back-book pricing changes (see Section 3) – we do not perform the calculations described above.

This monthly average price variable does not include usage-driven add-ons such as international calling and roaming charges, or surcharges on additional data purchased once tariff data allowances have been used up. This is because the Pure Pricing dataset does not contain usage data.

Table 2 presents an example calculation of the average monthly price for a pay monthly handset tariff available from Three in February 2022. For PAYG Top-Up SIM-only tariff tariffs the average monthly price cannot be calculated in this way, because the monthly price is usage based, and we do not have access to usage data from the Pure Pricing dataset. We therefore present information on the rates per text, minute, and data in the relevant analysis section later in this annex. Roaming charges are discussed in Ofcom's Pricing Trends in Communications services report 2022.[19]

Table 2: Example average monthly price calculation for a tariff in the Pure Pricing database

Date	Provider	Tariff Type	Contract Length	Device name	Tariff name	Device charge (upfront cost)	Monthly charge	Promotional Monthly charge	Promotion duration (month)	**Average Monthly Price**
02/2022	Three	PM Handset	24 months	iPhone 13 5G 128GB	Advanced 1GB Unltd	£49	£47	£23.50	6	**£43.17**

Source: Pure Pricing, Ofcom analysis

The Pure Pricing mobile pricing database contains a large number of tariffs, handsets and non-handset (i.e. SIMO) combinations. This reflects the large choice of tariffs available in the UK marketplace. For example, in October 2022 there were 674 tariffs available across all providers and the 8 tariff types shown in the Pure Pricing dataset.

The large number of tariffs and substantial differences in tariff types means that it can be challenging to draw inferences from a single average price trend for the market, because it may mask important nuances that are relevant to understanding price movements. Put differently, this is because a single average price calculation may be subject to product mix effects.

Product mix effects can occur when an average product price moves over time not because the prices of the individual products have changed, but because of a change in the mix of those products over time. For example, if a greater number of expensive products (or tariffs in the case of this annex) become available over time, but the individual prices of all products remained constant, a simple average calculation would misleadingly show the average price increasing over time, when in fact it is constant. This demonstrates the need to control for product mix effects as well as examine a range of sources on pricing.[20]

To address the risk of product mix effects we created separate time series graphs for each of the following tariff types:

[19] Pricing trends for communications services in the UK, Ofcom, 01 December 2022

[20] In addition to a product mix effect, a value mix effect can also exist. Operators use a range of levers beyond price and data allowance to differentiate value in their tariffs, such as 5G availability, data speed cap, inclusive EU roaming, or inclusive EU+USA+AUS/NZ roaming, inclusive streaming services, such as Netflix.

- SIM-only tariffs, by contract duration.
- PAYG tariffs, by top-up tariffs and by bundled tariffs.
- Handset tariffs, by contract duration.

To control for tariffs having different data allowances (and associated prices), we created three different hypothetical customer profiles for high/medium/low data usage customers. These customer profiles were constructed based on the most popular tariffs taken up by consumers for monthly SIM-only and monthly handset-airtime tariffs, using the 'ECN data set' for the month of November 2020[21]. The three customer profiles are as follows:

- High: unlimited data allowances.
- Medium: up to 5GB for pay monthly handset tariffs, and 4/5/6GB data allowance for pay monthly SIM-only tariffs.
- Low: up to and including 3GB data allowance for pay monthly SIM-only tariffs. We did not construct a low profile for pay monthly handset tariffs.

For SIM-only tariff pricing graphs we present average prices across providers while controlling for data allowances by presenting three charts, one for each of the three 'customer profile' data allowances.

For handset tariff graphs we created additional time series graphs for each of the three customer profiles. For example, for a 24-month handset-tariff graph, we would also create two versions, one showing unlimited data allowances tariffs, and one showing tariffs with up to 5GB data allowances.

The average price presented in the above time series graphs is calculated by taking a simple average across all tariffs fitting the graph description in question, for each provider (where individual providers are shown in a graph), in a given month.

As an example, for a graph showing prices for pay monthly SIM-only 12-month tariffs, by provider, the average price is calculated as follows: for each provider shown in the graph, we identify all of that provider's tariffs that are pay monthly SIM-only with a 12-month contract. We then calculate a simple average (i.e. not weighted by customer numbers or revenues because this information does not exist in the Pure Pricing dataset) across all of these tariffs, for a given month. This gives us – for a given month – the average price for relevant tariffs for each provider. The calculation is then repeated for each of the remaining months covered by the graph, and a time series is then presented in the graph.

We present these time series graphs in Section 4. This allows us to assess how front-book pricing has changed on a monthly basis over the August 2020 – October 2022 periods.

[21] See Ofcom publication Helping customers get better deals - A review of the impact of end-of-contract notifications and pricing commitments by broadband and mobile providers (ofcom.org.uk), paragraph 4.2, for details on the data used.

Customer-level data

Data source

We collected anonymised customer-level data on contract choices and mobile services used from mobile providers to better understand consumer experiences in the UK mobile sector.[22] This data provides evidence on the actual prices paid by customers and therefore on pricing outcomes for consumers. While the Pure Pricing data show the tariffs and prices that are offered by mobile providers, the customer-level data complement this with information on which tariffs are chosen by consumers. This allows us to understand which tariffs are chosen by many or few consumers and whether some tariffs are chosen by certain consumer groups more than others. The customer-level data also provide information on the mobile services used and any additional charges incurred. This is important to understand whether usage behaviour and total monthly bills deviate substantially from the contracted services allowances and the monthly recurring charge. Taken together, the customer-level data, therefore, allow us to obtain a considerably more detailed picture of consumer experiences in mobile sector.

We obtained the customer-level data for residential customers covering the period from 2019 to 2021 from the following mobile providers: BT/EE/Plusnet, Sky, Tesco Mobile, Three/SMARTY, Virgin Media O2, and Vodafone/VOXI. Due to the granular nature of the data and correspondingly large volume, we obtained information for a five-percent random sample of active customers for each of the three calendar years. Customers were defined as individual subscribers (according to SIMs) and considered active in accordance with a provider's standard definition of the term.[23] For each customer, we then obtained information for the entire three-year period (to the extent available), irrespective of the year in which the customer was sampled. If a customer was in the 2020 sample, for instance, we still obtained information for the calendar years 2019 to 2021. If the customer had left the provider before the end of 2021 or started their first contract with the provider after January 2019, we obtained the information for the whole period available.

The data requested broadly cover the following three areas:[24]

- Contract history: The data include general information about a customer's contracts or PAYG bundles, including the start and end dates, contract type (e.g. SIM-only, airtime + handset, PAYG), minimum contract period, allowance of data/texts/voice minutes, and the monthly price.[25] The data we requested also include information on mobile handsets received as part of airtime and handset bundled or split contracts, such as the make and model of the handset.

[22] The data provided to Ofcom were anonymized and did not include information (such as names or addresses) that would enable individuals to be identified. While certain information was collected about the demographics and location of consumers, this information is sufficiently broad to not identify individuals. In particular, the customer location was collected at a sufficiently wide geographic area (i.e., Lower-Layer Super Output Area) that it would not be possible to identify individuals from it.
[23] The definition notably differs between customers with post-pay monthly contracts and pay-as-you-go agreements.
[24] The description of the data is not exhaustive and therefore only covers a subset of the variables, for which we received information.
[25] Not all of these characteristics are relevant for all types of contracts. There is, for example, no minimum contract period for PAYG contracts.

- Usage and billing information: The data include information about the mobile services used and the charges incurred at a monthly level. The usage of data, texts, and voice minutes is split between within-allowance and out-of-allowance usage, as are the associated charges.
- Customer demographics: The data include information on the approximate location of a customer, according to Lower-Layer Super Output Area (LSOA), their age, and whether the provider classifies them as vulnerable.[26] This information is only available for customers with post-pay contracts and not those with PAYG agreements.

The analysis of the customer-level data in this report is narrow in scope and we will publish further analysis based on this data next year. Specifically, we focus in this report on information from customers' contract history for SIM-only contracts and PAYG agreements to present some descriptive statistics and insights the customer-level data can offer. We plan to extend the analysis, drawing on the full dataset and studying further key aspects of market outcomes and consumer experiences in the sector and publish our findings in 2023.[27]

Methodology

We analyse the differences in contracted monthly SIM-only and PAYG bundle prices between providers and data allowances and changes thereof over time. The main variable of interest for the analysis of customer-level data presented in this annex is the average price, weighted according to the number of customers that purchased a given tariff or PAYG bundle. This differs from the simple average price computed based on the Pure Pricing data in the front-book analysis.

As discussed in the context of the front-book pricing methodology above, we also need to account for 'product-mix' effects when conducting the price analysis, as the customer-level data consists of a large number of different tariffs. In this annex, we do this by computing the average prices separately for each type of contract and focusing on two relatively narrowly defined tariff groups: post-pay SIM-only contracts and pre-pay PAYG bundles according to monthly data allowances bands.[28]

We focus on post-pay SIM-only contracts and PAYG bundles for two main reasons. First, these contract types are offered by either all providers (in the case of SIM-only) or a relatively broad range of providers (in the case of PAYG). Second, these contract types are similar to each other in terms of the services involved (i.e. mainly voice minutes, texts, and data) and are therefore more comparable between providers than other types of contracts, which include a handset.[29] The data allowance bands we distinguish are up to 1 GB, 1-3 GB, 3-6 GB, 6-10 GB, 10-30 GB, 30-100 GB, more than 100

[26] LSOAs are geographic divisions of the UK used for the UK Census and which are sufficiently broad to guarantee customers' anonymity for data protection purposes. The data do not include any personally identifiable information of individual customers. See footnote 22 for details.
[27] We discuss potential areas of analysis in Section 4.
[28] The customer-level data notably cover PAYG bundles by Three and O2 that are not captured by the Pure Pricing data.
[29] For example, monthly airtime + handset split contracts are only offered by three providers in our data. In addition, some providers can only provide the total prices for monthly handset and airtime contracts, while others provide separate prices for the handset and airtime services.

GB (but not unlimited), and unlimited data.[30] We present graphs of the distributions of customers by different data bands in the Section 4.

We then compute the average monthly contracted prices (excluding any add-ons or discounts) by provider, contract type, and data allowance bucket.[31] In this calculation, to ensure broad coverage of the tariffs offered by different providers, we do not account for other contract characteristics like the minimum contract period or extras beyond voice minutes, texts, and data allowances. We recognize that the precise monthly prices differ between tariffs according to these characteristics and we plan to address this point in the follow up analysis.

[30] Any given data allowance band includes the upper bound. For example, the 1-3 GB band includes tariffs/bundles with more than 1 GB and up to 3 GB data allowance.

[31] Although we do not incorporate any discounts in the present analysis, we recognize that these are important and will take them into account in future research.

3. Analysis of back-book pricing

Introduction

This section presents our analysis of back-book pricing over the 2021-2022 period. As discussed above, we use information on providers' in-contract price rise policies to provide insights into the changes in prices faced by existing customers of mobile providers over this period. This data does not contain information on individual customers, nor does it contain any information on pricing levels.

In-contract price rises at the point they are implemented by a mobile provider will not necessarily apply to all of the back-book i.e. all existing customers. Many mobile providers have changed their annual price rise clauses in the terms & conditions of mobile contracts since 2020, and therefore the price rise faced by existing customers of a given provider will depend on the date when each customer signed a contract with their provider.

We note that contract customers affected by price rise policies will be those that took out a contract containing a price rise clause with their provider prior to the price rise implementation date, as specified in the T&Cs of the provider in question.

Summary of recent in-contract price rise policies

In 2020 and 2021 some, but not all, of the main mobile providers announced they would be using inflation-plus formulas to set annual price increases for many existing customers. This marked a clear shift from providers using simple inflation-indexed annual price rises (with some using the Consumer Prices Index (CPI) as the inflation measure for annual price rise calculations, and others using the Retail Prices Index (RPI)). The first inflation-plus rises were implemented in March or April 2021.[32]

In November 2022, Three announced that it would also use an inflation-plus formula to set annual price rises. As of the time of writing the only mobile providers offering tariff contracts that do not apply in-built annual price rise clauses are Tesco Mobile and Sky Mobile.

PAYG tariffs do not face in-built annual price rises. This reflects a payment structure in which the consumer pays up front for a given package and so there is no scope for further charges by the mobile provider unless consumers opt to buy additional services.

In-built price rise mechanisms apply to both in-contract and out-of-contract customers. However, customers that are out-of-contract are free to move to a different provider without penalty, whereas in-contract customers have less flexibility to do so and are likely to have to pay a penalty if

[32] Prior to this, fixed broadband and landline service contracts did not usually have annual price rises built in while mobile services and a small number of fixed services had annual price rises that were linked to inflation measures (and no more). It is also the case that prior to the widespread implementation of in-contract inflation-plus price rises by providers, the majority of consumers purchased both their handset and airtime bundled together in a single contract, with contract prices not reducing once the minimum contract term is reached. Since then, more customers have turned to split contracts - with separate contracts for the handset and airtime – and more customers are using SIM-only tariffs.

they leave their contract to find a better deal. In the remainder of this section we refer to these clauses as 'in-contract' price rise policies, noting that they can also apply to out-of-contract customers.

In the tables below we summarise the in-contract price rises mobile providers implemented in 2021 and 2022. These tables show the annual price rise that existing customers would have faced if they were subject to an in-contract price rise. For example, for annual price rises implemented in April 2021, a customer taking out a contract in May 2021 would not have been affected by the 2021 annual price rise. But a customer taking out a contract in March 2021 would have faced the 2021 annual price rise.

Table 3 shows the annual price rise that existing customers would have faced in 2021 if they were subjected to an in-contract price.[33] The table shows that customers subjected to an inflation-plus in-contract price rise in 2021 were in the minority: only two of the MNOs implemented this type of annual price rise (Vodafone and EE), and these only applied to customers that had relatively recently signed a new/upgraded contract. In the case of Vodafone only customers that signed a contract from 9 December 2020 were affected, and in the case of EE only customers that signed a contract from 1 September 2020 were affected. Three did not implement an inflation-plus price rise in 2021 and instead raised prices by a fixed 4.5% to customers that signed a new/upgraded contract from 29 October 2020.[34]

The table shows that even for those customers captured by these newer price rise clauses in 2021, the price rises they faced were moderated by low inflation rates at the time the price rises were calculated. This meant that the actual annual price rises faced by existing customers at the time of providers' implementation dates in 2021 were much lower than they otherwise would have been, because the low inflation rates affected not only the newer inflation-plus clauses but also affected inflation indexed clauses, and their respective qualifying customers. As a result, annual price rises in 2021 ranged from 0%[35] to 4.6%[36].

[33] The table shows, for each mobile provider the type of increase that existing customers faced, which depended on when their customers had signed contracts. The table also shows the magnitude of price rise, and the implementation date.
[34] O2 (the remaining MNO) announced a move to an inflation-plus pricing policy but stated that these would only be implemented in April 2022 (and only for customers signing new/upgraded contracts from 25 March 2021), a year after the other MNOs.
[35] Some O2, some Virgin Mobile, some iD Mobile, and some Plusnet customers.
[36] Some Plusnet customers: customers taking out contracts from 7 October 2020.

Table 3: Back-book customers on mobile contracted tariffs: 2021 annual in-contract price rises

Provider	New contract start date	Increase type	Annual price rise implementation date	Increase in 2021
Vodafone [37]	Before 9 December 2020	RPI	April 2021	1.4%
Vodafone [38]	From 9 December 2020	CPI + 3.9%	April 2021	4.5%
EE [39]	Before 1 September 2020	RPI	April 2021	1.2%
EE [40]	From 1 September 2020	CPI + 3.9%	April 2021	4.5%
O2 [41]	Before 25 March 2021	RPI	April 2021	1.4%
O2 [42]	From 25 March 2021	RPI + 3.9%	April 2022	N/A
Three [43]	Before 29 October 2020	RPI	May 2021	1.4%
Three [44]	From 29 October 2020	Fixed rate	April 2021	4.5%
BT Mobile [45]	Before 1 September 2020	CPI	April 2021	0.6%
BT Mobile [46]	From 1 September 2020	CPI + 3.9%	April 2021	4.5%
Virgin Mobile [47]	Before 5 May 2021	RPI	July 2021	1.5%
Virgin Mobile [48]	From 5 May 2021	None	N/A	N/A
iD Mobile [49]	From 1 March 2018 to 29 February 2020	RPI	April 2021	1.4%
iD Mobile [50]	From 1 March 2020	RPI	April 2021	1.4%
Plusnet [51]	Before 7 October 2020	Mixture [52]	June 2021	0-4.6%
Plusnet [53]	From 7 October 2020	CPI + 3.9%	June 2021	4.6%

Source: Mobile providers' websites, Money Saving Expert, Ofcom analysis. The term 'tariff' refers to a mobile contract signed when joining or upgrading with a provider. All price increases are included in contract T&Cs,

[37] See Three and Vodafone customers to be hit with up to 4.5% price hikes (moneysavingexpert.com).
[38] See Three and Vodafone customers to be hit with up to 4.5% price hikes (moneysavingexpert.com).
[39] See BT and EE to hit millions with up to 4.5% price hikes - what you can do about it (moneysavingexpert.com).
[40] See BT and EE to hit millions with up to 4.5% price hikes - what you can do about it (moneysavingexpert.com).
[41] See O2 to increase pay-monthly bills by 1.4% from April - what you need to know (moneysavingexpert.com).
[42] See Millions of O2, Three and Virgin Mobile customers to be hit with price hikes of up to 11.7% from April - here's what you need to know (moneysavingexpert.com).
[43] See Three and Vodafone customers to be hit with up to 4.5% price hikes (moneysavingexpert.com).
[44] See Three and Vodafone customers to be hit with up to 4.5% price hikes (moneysavingexpert.com).
[45] See BT and EE to hit millions with up to 4.5% price hikes - what you can do about it (moneysavingexpert.com).
[46] See BT and EE to hit millions with up to 4.5% price hikes - what you can do about it (moneysavingexpert.com).
[47] See Virgin Mobile to increase prices for millions from July (moneysavingexpert.com).
[48] See Virgin Mobile to increase prices for millions from July (moneysavingexpert.com).
[49] See price change summary: Retail Price Index | What is the RPI? | iD Mobile Network.
[50] See price change summary: Retail Price Index | What is the RPI? | iD Mobile Network.
[51] See price change summary: Plusnet to hike prices for 100,000s of customers next month (moneysavingexpert.com).
[52] Money Saving Expert states that out of contract customers were moved onto the CPI+3.9% terms in March 2021. For customers who signed up before 7 October 2020 but who were still in contract in March 2021, Money Savings expert states that these customers won't see prices rise while they're still in contract. When their contract ends, they'll be moved

and customers are unable to cancel without penalty while in the minimum commitment period. Price increases apply to pay monthly contracts only, and do not apply to PAYG.

Table 4 shows the equivalent information for the 2022 in-contract price rises across providers. The key differences between 2021 and 2022 in terms of provider policies were the following:

- O2's announced move to an RPI+3.9% clause was implemented for the first time in 2022.
- Virgin Mobile changed all tariffs to an RPI+3.9% clause in 2022, but because this was a change to existing contracts (as opposed to new contracts going forward), Virgin Mobile customers were allowed to leave penalty free.
- BT Mobile changed the terms for older contracts (contracts which started before 1 September 2020) from CPI to CPI+3.9% for 2022 but this also meant that customers could cancel their contract without paying an early termination charge.
- Plusnet moved legacy customers onto the new CPI+3.9% clause over 2021-2022, meaning more customers were captured by the new pricing mechanism. Price rises for 2022 were also implemented in March, when they were in June for 2021.

onto the new in-contract price rise terms. They'll then see annual prices rise at the next scheduled date. Plusnet to hike prices for 100,000s of customers next month (moneysavingexpert.com).

[53] See Plusnet to hike prices for 100,000s of customers next month (moneysavingexpert.com).

Table 4: Back-book customers on mobile contracted tariffs: 2022 annual in-contract price rises

Provider	New contract start date	Increase type	Annual price rise implementation date	Increase in 2022
Vodafone[54]	Before 9 December 2020	RPI	April 2022	8.2%
Vodafone[55]	From 9 December 2020	CPI + 3.9%	April 2022	9.3%
EE[56]	Before 1 September 2020	RPI	April 2022	7.5%
EE[57]	From 1 September 2020[58]	CPI + 3.9%	April 2022	9.3%
O2[59]	Before 25 March 2021	RPI	April 2022	7.8%
O2[60]	From 25 March 2021	RPI + 3.9%	April 2022	11.7%
Three[61]	Before 29 October 2020	RPI	May 2022	7.8%
Three[62]	From 29 October 2020	Fixed rate	April 2022	4.5%
BT Mobile[63]	Before 1 September 2020	CPI + 3.9%	April 2022[64]	9.3%
BT Mobile[65]	From 1 September 2020	CPI + 3.9%	April 2022	9.3%
Virgin Mobile[66]	All tariffs irrespective of start date	RPI + 3.9%	April 2022[67]	11.7%
iD Mobile[68]	From 1 March 2018 to 29 February 2020	None	N/A	N/A
iD Mobile[69]	From 1 March 2020 to 1 February 2022	RPI	April 2022	7.8%
Plusnet[70]	Before 7 October 2020	CPI + 3.9%	March 2022	9.3%
Plusnet[71]	From 7 October 2020[72]	CPI + 3.9%	March 2022	9.3%

Source: Mobile providers' websites, Ofcom analysis. The term 'tariff' refers to a mobile contract signed when joining or upgrading with a provider. All price increases are included in contract T&Cs, and customers are

[54] See price change summary: Consumer Price Index (CPI) annual price adjustment, Vodafone.
[55] See price change summary: Consumer Price Index (CPI) annual price adjustment, Vodafone.
[56] See price change summary: Mobile RPI price changes | Help | EE.
[57] See price change summary: Mobile CPI+ price changes | Help | EE.
[58] Also applies to those whose contract started before 1 September 2020 and will come to an end by April 2022. EE states that it is "moving some of our existing customers across to the latest version of our terms to create consistency for our customers", meaning that the number of legacy contracts with RPI annual prices is declining.
[59] See price change summary: Prices | O2.
[60] See price change summary: Prices | O2.
[61] See price change summary: Changes to your Monthly Charge – Customers who joined before 29 October 2020 - Changes to your Monthly Charge – Customers who joined before 29 October 2020 - - Support - Three.
[62] See price change summary: Changes to your Monthly Charge – Customers joining or upgrading on or after 29 October 2020 - Changes to your Monthly Charge – Customers joining or upgrading on or after 29 October 2020 - - Support - Three
[63] See price change summary: Annual price change and CPI | BT.
[64] With right to cancel without incurring exit fee.
[65] See price change summary: Annual price change and CPI | BT.
[66] See price change summary: Annual RPI Increase | Virgin Media.
[67] Virgin Mobile's in-contract price clause change to RPI+3.9% was a change to existing contracts and therefore customers were allowed to leave penalty free. See Millions of O2, Three and Virgin Mobile customers to be hit with price hikes of up to 11.7% from April - here's what you need to know (moneysavingexpert.com).

unable to cancel without penalty while in the minimum contract period. Price increases apply to pay monthly contracts only, and do not apply to PAYG.

Table 5 presents a summary of in-contract price rise changes over 2021-2022. The table makes it easy to compare the difference in annual price rises implemented across providers in each of these years.

The table shows a marked increase in the magnitude of annual price rises applied to existing customers with contracts from 2021 to 2022. The simple average annual price increase rose from less than 3% in 2021 to 9% in 2022. This was driven by a high inflationary environment in the UK, but also reflected changes made by providers over 2021-2022 such as O2, Virgin Mobile, BT Mobile and Plusnet, as discussed earlier.

Not only were the implemented price rises higher in 2022, but a far greater proportion of existing customers would have faced the higher rates, as more customers would have signed new or upgraded contracts which included inflation-plus clauses.

Table 5 also shows that the large annual price rises faced by existing customers also applied to customers on older inflation-only price rise contracts. The high inflationary environment meant that even customers on these older contracts experienced high annual price rises.

The information included in the table on contract start dates also shows that the vast majority of existing customers – who were existing contract customers at the point in time when their provider implemented the 2022 price rise – would have faced the large annual 2022 price rises.

Customers that were not affected by these in-contract price rises in 2022 would broadly speaking have fallen into one of the following categories:

- A customer with a contract with Sky Mobile or Tesco Mobile, i.e. providers who did not use contractual price rises.[73]
- A customer on a pay-as-you-go (PAYG) tariff, or a customer with a contract on a rolling monthly SIM-only deal who could have switched ahead of (or after) these rises.
- A new (post implementation date) customer with a contract who did not have a contract with a provider at the time the 2022 price rises were implemented.[74]

[68] See price change summary: Retail Price Index | What is the RPI? | iD Mobile Network.
[69] See price change summary: Retail Price Index | What is the RPI? | iD Mobile Network.
[70] See price change summary: CPI Plus 3.9% Guide | Help | Plusnet.
[71] See price change summary: CPI Plus 3.9% Guide | Help | Plusnet.
[72] See Millions of BT, EE, Plusnet, Shell, TalkTalk and Vodafone customers to be hit with price hikes of up to 9.3% - here's all you need to know (moneysavingexpert.com).
[73] Sky and Tesco Mobile do not have in-built annual price rises in their contracts. Tesco commits to no in-contract price rises (Fixed prices | Supermarket Value | Why Tesco Mobile | Tesco Mobile). Sky Mobile did not implement an annual price increase for its mobile customers in 2022.
[74] Out-of-contract customers could have avoided an in-contract price rise if they chose to switch ahead of the implementation date as specified in the terms & conditions of their tariff, or could have reduced the impact of the price rise by switching (penalty free) after the implementation date.

Table 5: Summary of in-built in-contract price rises: 2021-2022

Provider	New contract start date	Increase in 2021*	Increase in 2022**
Vodafone	Before 9 December 2020	1.4%	8.2%
Vodafone	From 9 December 2020	4.5%	9.3%
EE	Before 1 September 2020	1.2%	7.5%
EE	From 1 September 2020	4.5%	9.3%
O2	Before 25 March 2021	1.4%	7.8%
O2	From 25 March 2021	N/A	11.7%
Three	Before 29 October 2020	1.4%	7.8%
Three	From 29 October 2020	4.5%	4.5%
BT Mobile	Before 1 September 2020	0.6%	9.3%
BT Mobile	From 1 September 2020	4.5%	9.3%
Virgin Mobile	Before 5 May 2021	1.5%	11.7%
Virgin Mobile	From 5 May 2021	N/A	11.7%
iD Mobile	From 1 March 2018 to 29 February 2020	1.4%	N/A
iD Mobile	From 1 March 2020 to 1 February 2022	1.4%	7.8%
Plusnet	Before 7 October 2020	0-4.6%	9.3%
Plusnet	From 7 October 2020	4.6%	9.3%
SIMPLE AVERAGE	**N/A**	**2.5%**	**9.0%**

Source: Pure Pricing, Money Saving Expert, Ofcom analysis. We exclude Sky and Tesco from this table on the basis that they do not have in-contract price rise mechanisms and therefore compared to the providers above. Price increases apply to pay monthly contracts only, and do not apply to PAYG.

** Applies to existing customers that signed a contract prior to the day of the implementation date in 2021 for the provider in question.*

*** Applies to existing customers that signed a contract prior to the day of the implementation date in 2022 for the provider in question.*

While Table 5 shows that annual price rises were large across providers and across contract start dates in 2022, it does not show the substantial variation in terms of the extent of tariff pricing that is covered. Table 6 shows that there are important differences across the providers in terms of the scope of the in-contract price rise clauses. These differences reflect the setup of the contract that providers sell to customers. EE, BT Mobile, iD Mobile, and Three bundle the airtime and handset into one monthly price. In-contract price rises are applied to this monthly price, and therefore apply to both the airtime and the handset. Other providers shown in Table 6 have split airtime and handset contracts, and in-contract price rises apply differently to these split contracts. In the case of Vodafone, O2, and Virgin Mobile in-contract price rises for handset tariffs apply only to the airtime contract and so do not apply to the handset.

Therefore, even if the magnitude of the in-contract price rises were identical across all of the providers shown in the table, the £ increase in monthly bill (other things equal) for a handset tariff following an in-contract price rise would be greater for EE, Three, BT Mobile, and iD Mobile, than it would be for an identical handset tariff with Vodafone, O2, or Virgin Mobile.

Table 6: In-contract price rise mechanisms in 2022: applicable tariff elements

Provider	Handset tariffs		SIM-only tariffs
	Device	Airtime	Airtime
EE	Yes	Yes	Yes
Three	Yes	Yes	Yes
BT Mobile	Yes	Yes	Yes
iD Mobile	Yes	Yes	No
Vodafone	No	Yes	Yes
O2	No	Yes	Yes
Virgin Mobile	No	Yes	Yes
Plusnet	N/A	N/A	Yes

Source: Pure Pricing.

Looking forward, we note that in November 2022 Three announced that future new contracts would be subjected to a CPI+3.9% pricing mechanism, applying each April and using the published-in-January CPI inflation rate.[75] This now means that Three has the same in-contract pricing policy as Vodafone and EE.

[75] Three's new T&Cs apply to customers who joined or upgraded on or after 1st November 2022.

4. Analysis of front-book pricing

We have undertaken a time series analysis of tariff prices over the past two years to assess how front-book mobile prices have changed. We have carried out this analysis because front-book pricing represents an opportunity for out-of-contract customers to select a cheaper tariff than their existing contract, noting our finding in Section 3 that back-book prices have risen in 2022.

As discussed in Section 1, we created an average monthly price variable to compare tariff prices over time. This price takes into account promotional price discounts at the beginning of the contract and excludes out-of-bundle charges and add-ons.[76]

We do not take account of annual price increase clauses in calculating this monthly price variable.[77] This is because for the Pure Pricing data we do not have customer-level information on the start date of contracts with mobile providers. This is relevant because the date on which a contract was signed determines not only the type of annual price increase policy that a provider will apply to the customer but will also determine after how many months the customer will face their first[78] annual price increase. This in turn would determine the actual billed price faced by the customer. Since we do not have data at this level from Pure Pricing, in this section we focus on the average monthly price that customers would face for the period between taking out the contract and the implementation of any annual pricing policy by the provider in question.

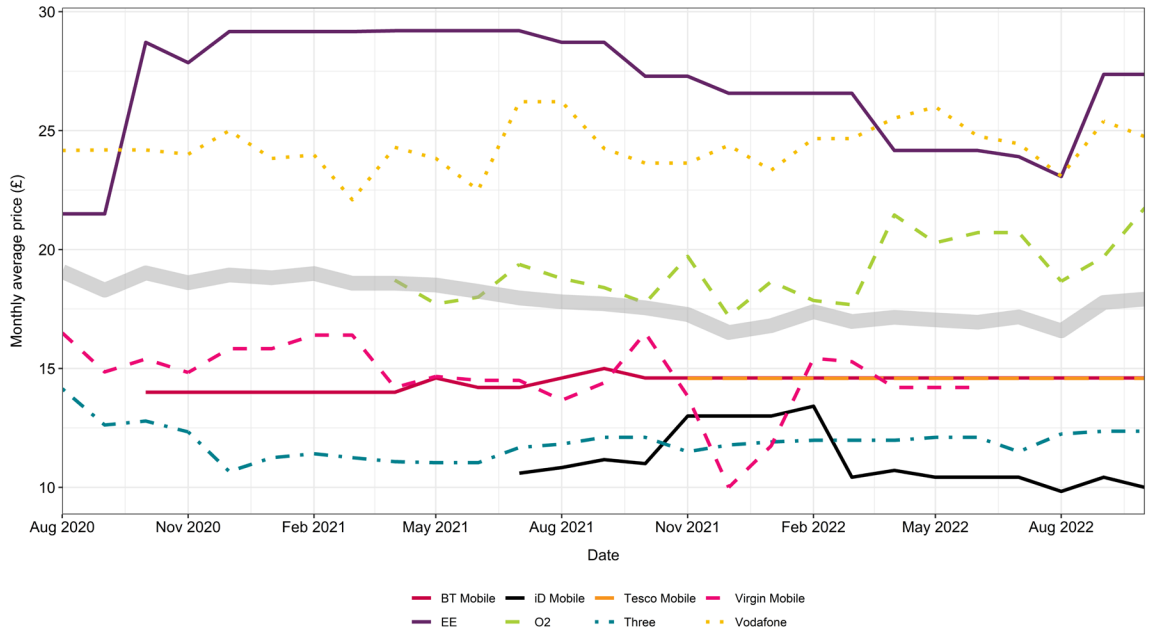
As discussed in Section 2 we have analysed a wide range of tariff types, contract durations, and data allowances, to account for potential product (and value) mix effects.

Our pricing analysis for the front-book is presented in the remainder of this section.

[76] We have not been able to take into account out-of-bundle charges and add-ons because we do not have access to usage data as part of the Pure Pricing dataset.
[77] As discussed above, were we to do so then we would need to take into account the differences between bundled and split contracts for handset tariffs. Bundled tariffs have in-contract price rises applied to both the handset and tariff, while split contracts have in-contract price rises applied only to the airtime tariff.
[78] This information, combined with details on the tariff the customer is on and contract exit date, would allow one to determine if any subsequent annual price rises would apply to the customer.

Pay monthly SIM-only contract prices

Figure 1: Pay-monthly SIM-only, 24-month contract

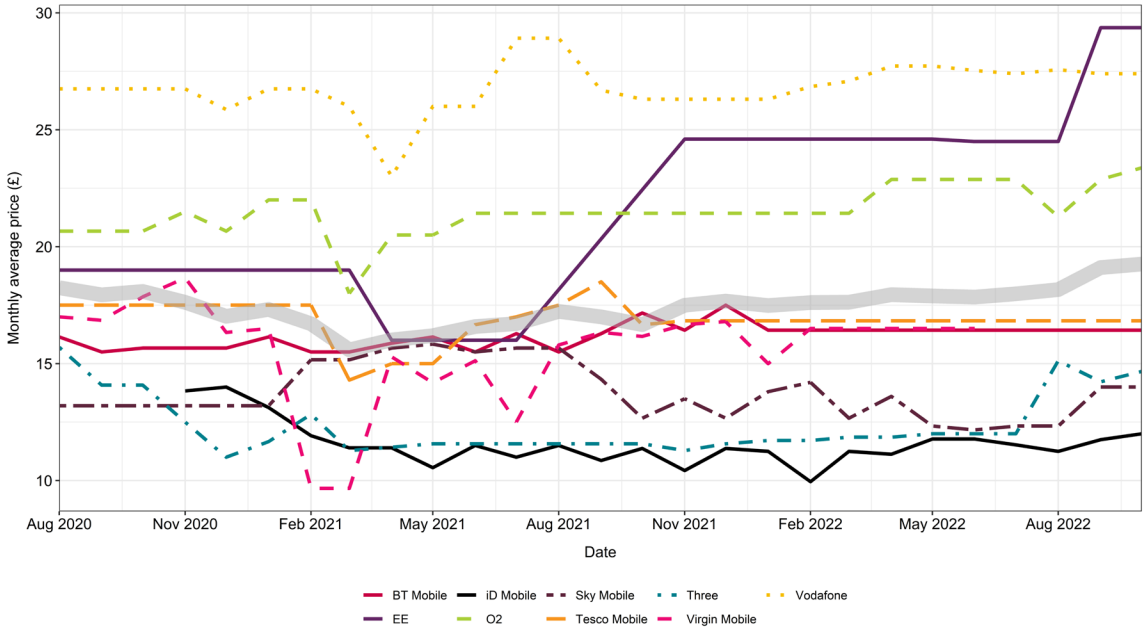


Source: Pure Pricing, Ofcom analysis

Figure 1 shows average offered prices, by provider, for pay-monthly SIM-only tariffs with a 24-month contract. This chart shows tariffs across all levels of usage; we control for this in later charts. The thick grey line shows the average price across all providers, and therefore represents a simple average (i.e. not weighted by tariffs actually taken up by consumers) industry price in each month. Because we are examining SIM-only tariffs we do not need to control for handset types, and therefore pricing trends are less likely to be subject to mix effects than for handset tariffs. Nonetheless, the chart above does not control for potential changes in the mix of data packages available over the period in question or 'value' differences in terms of low/medium/high end tariffs offered by providers. We address this later in this section.

Figure 1 shows that the price trend has been largely constant for all providers except EE (where prices have increased between the start and the end of the period), and O2 (where prices have trended upwards over the period). The chart also shows substantial month-to-month variation in price for operators, which may mean, among other possible interpretations, that promotional activities are an important feature of the marketplace. This is particularly the case with Vodafone, O2, and Virgin Media, with other providers showing much less month-on-month price fluctuations. For the industry as a whole, the thick grey line shows that average offered prices gradually declined from August 2020 to the end of 2021. Industry average prices have been broadly stable over 2022, with an uptick in pricing in September and October.

Figure 2: Pay-monthly SIM-only, 12-month contract



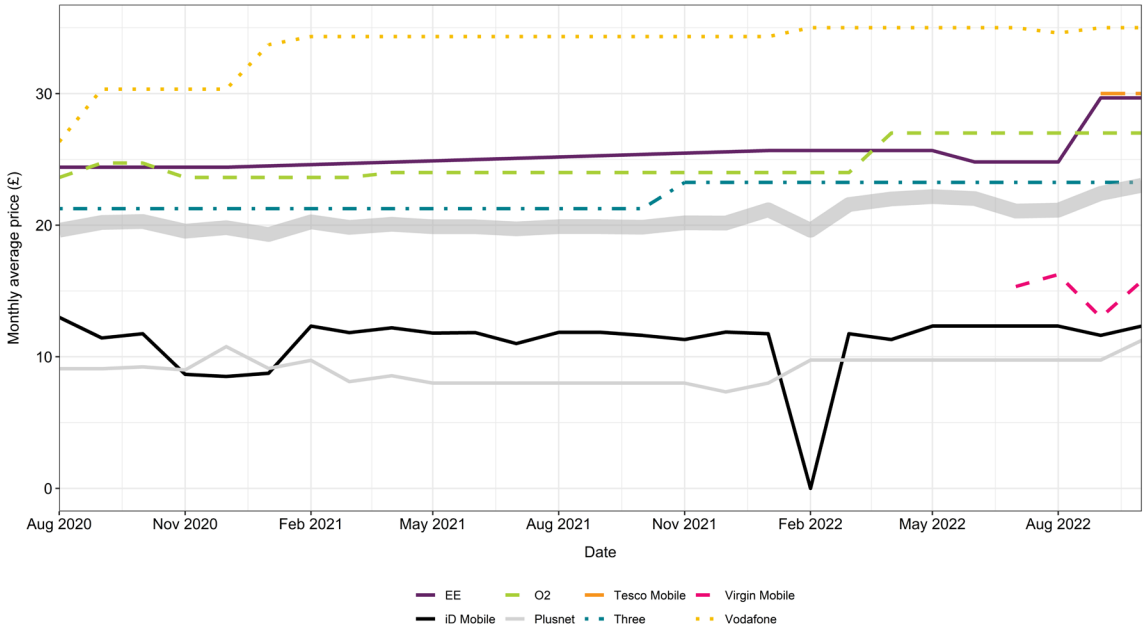
Source: Pure Pricing, Ofcom analysis

Figure 2 shows that the average offered pricing trend for pay-monthly SIM-only 12-month contracts stayed broadly flat for most providers over 2022. This chart shows tariffs across all levels of usage; we control for this in later charts. The thick grey line shows the average price across all providers, and therefore represents a simple average (i.e. not weighted by tariffs actually taken up by consumers) industry price in each month. We note that EE's prices have increased by around £10 since August 2020[79], and there has also been a slight trend increase in prices for Vodafone and O2.

For the industry as a whole, the thick grey line shows that average offered prices gradually decline from August 2020 to the beginning of 2021. Since then industry average prices have been on a gradually increasing trend through to October 2022.

[79] Albeit that there was a substantial drop in prices during 2021.

Figure 3: Pay-monthly SIM-only, 1-month contract



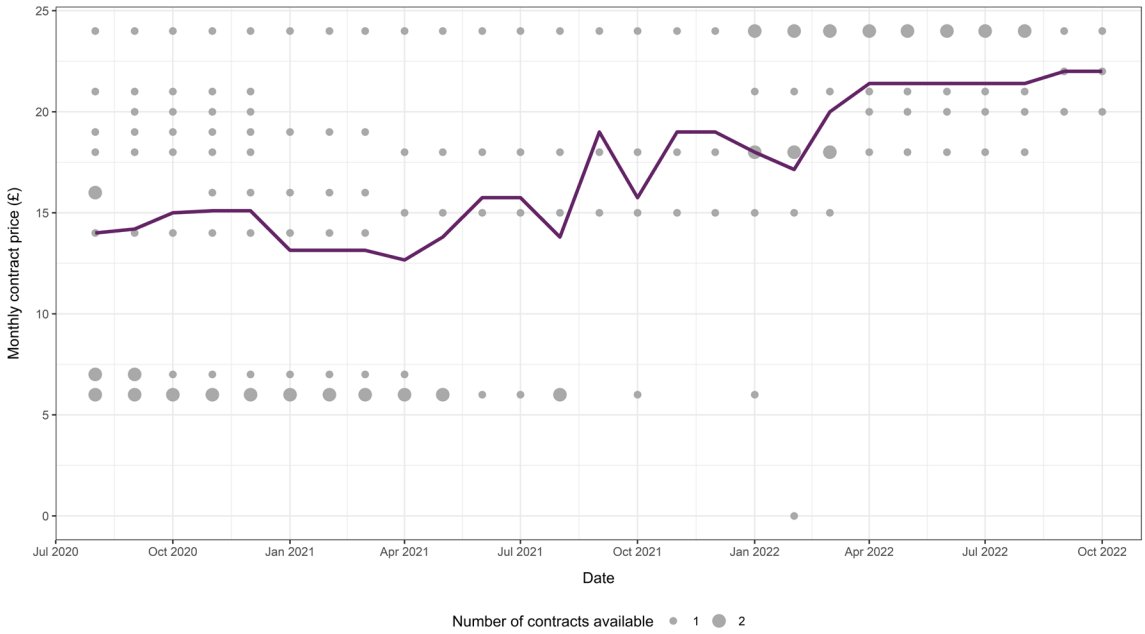
Source: Pure Pricing, Ofcom analysis

Figure 3 shows that the average offered pricing trend for pay-monthly SIM-only 1-month contracts stayed broadly flat for most providers over the period.[80] This chart shows tariffs across all levels of usage; we control for this in later charts. As above, the thick grey line shows the average price across all providers, and therefore represents a simple average (i.e. not weighted by tariffs actually taken up by consumers) industry price in each month. There has been a slight increase in pricing for O2 and Three, with a much more substantial price rise for Vodafone. For the industry as a whole, the thick grey line shows that average offered prices have been on a gradually increasing trend over the period.

The charts below present average prices across all providers, for SIM-only tariffs, and control for data allowances. The purple line in each chart represents the average monthly price across all providers, for the tariffs described in the title of each chart.

[80] The £0 price shown for iD Mobile reflects a £0 promotion for the month of February 2022, lasting one month. Since the chart presents prices for 1-month tariff contracts this is treated as a zero price for that one month.

Figure 4: Monthly average price for 1-month SIM-only tariffs, up to 3 GB data allowance

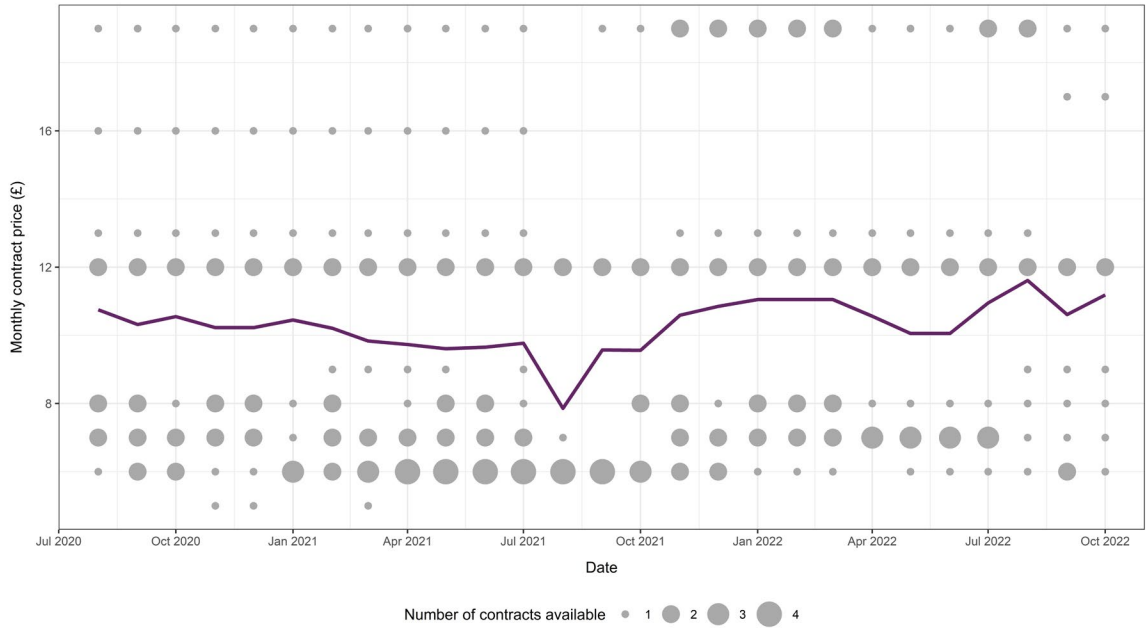


Source: Pure Pricing, Ofcom analysis

Figure 4 shows that there has been a trend increase in average prices for 1-month SIMO tariffs with <=3GB data allowance since August 2020. This trend is shown by the solid line in the chart above.

The individual dots in the chart represent the number of tariffs available at each price point, across providers, for each month over this period. The chart shows that the number of lower-priced tariffs has reduced over this period, and that there has also been an increasing number of higher priced tariffs. These changes have driven the trend increase in pricing.

Figure 5: Monthly price for 12-month SIM-only tariffs, up to 3 GB data allowance

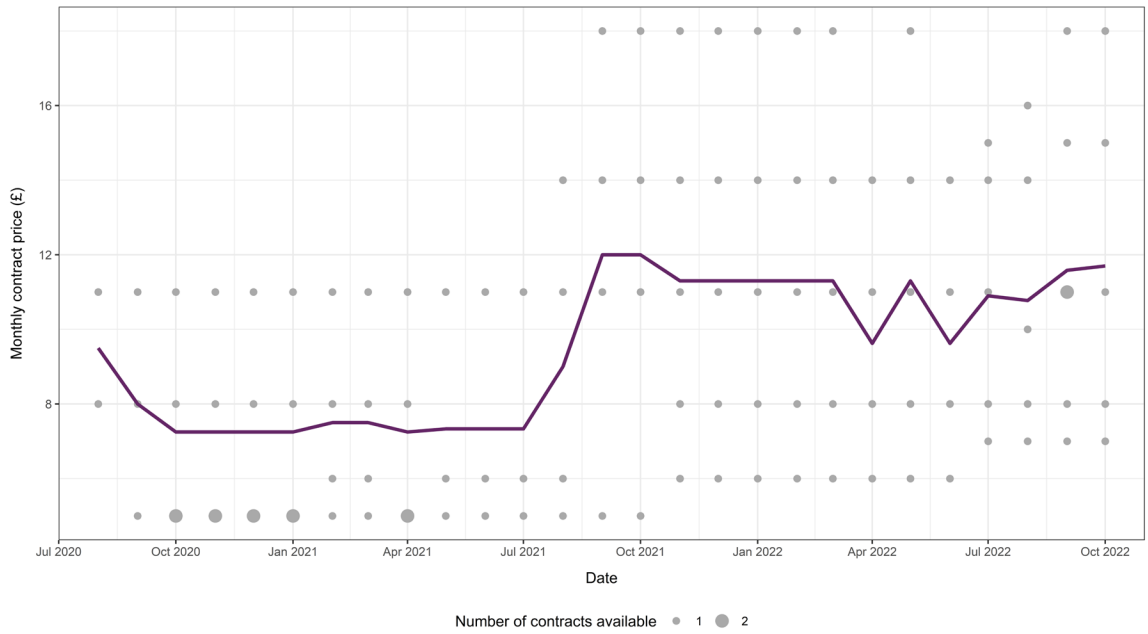


Source: Pure Pricing, Ofcom analysis

By contrast, Figure 5 shows that there has been broadly flat pricing trend across providers for average prices for 12-month SIMO tariffs with <=3GB data allowance since August 2020, albeit with some increases in the most recent months. This trend is shown by the solid line in the chart above.

As above, the individual dots in the chart represent the number of tariffs available at each price point across providers, for each month over this period. The chart shows that during 2021 there was an increase in the number of lower-priced tariffs, which drove the downward trend in average prices over the first nine months of 2021, which has subsequently reversed as the number of these lower-priced tariffs has reduced and there has also been an increase in the number of higher-priced tariffs during 2022.

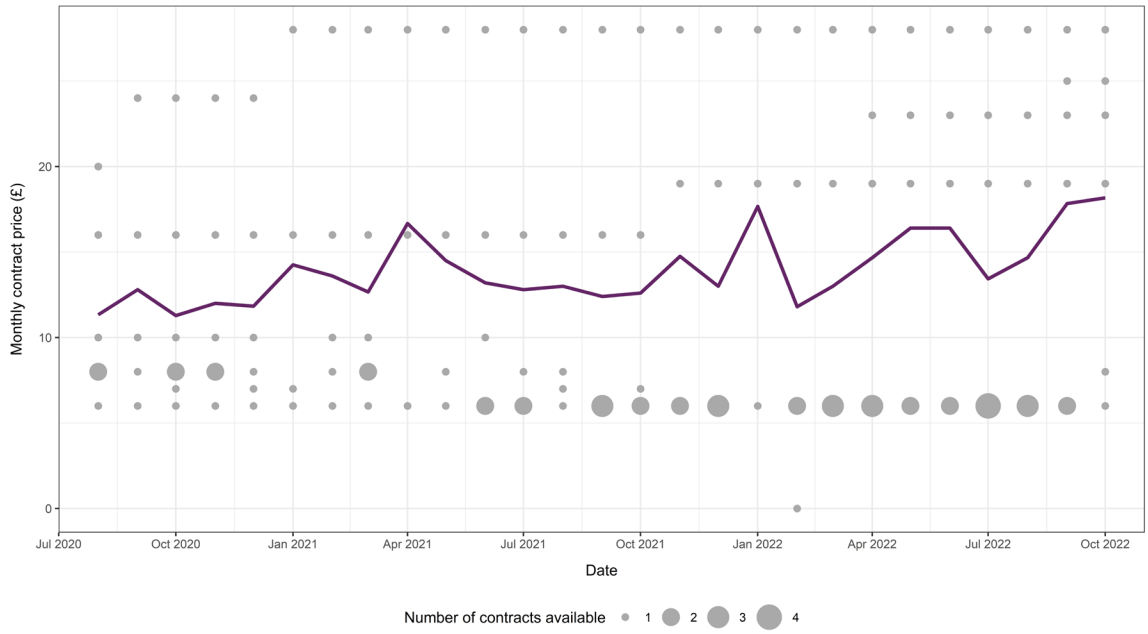
Figure 6: Monthly price for 24-month SIM-only tariffs, up to 3 GB data allowance



Source: Pure Pricing, Ofcom analysis

Average prices for 24-month SIMO tariffs with <=3GB data allowance have trended upwards since August 2020 (see Figure 6), driven by the introduction of higher priced tariffs in the second half of 2021, as well as a gradual reduction in the number of lower-priced tariffs.

Figure 7: Monthly price for 1-month SIM-only tariffs, 4/5/6 GB data allowance

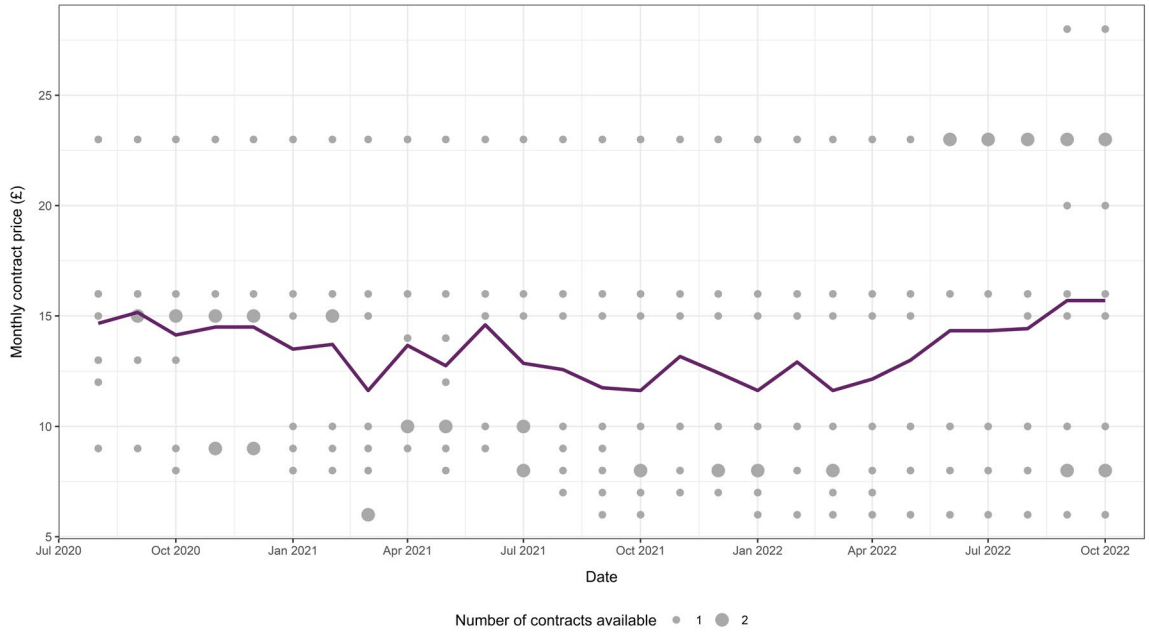


Source: Pure Pricing, Ofcom analysis

Figure 7 shows average prices for 1-month SIMO tariffs with a higher 4/5/6GB data allowance since August 2020. For these higher data allowance tariffs there has been a trend increase in pricing,

albeit with substantial month-on-month fluctuations. This is the net effect of a greater number of higher-priced tariffs being offered over this period (driving higher average prices) offsetting an increased concentration of lower-priced tariffs (driving lower average prices, shown by the growing number of larger circles appearing in the bottom of the chart over the period).

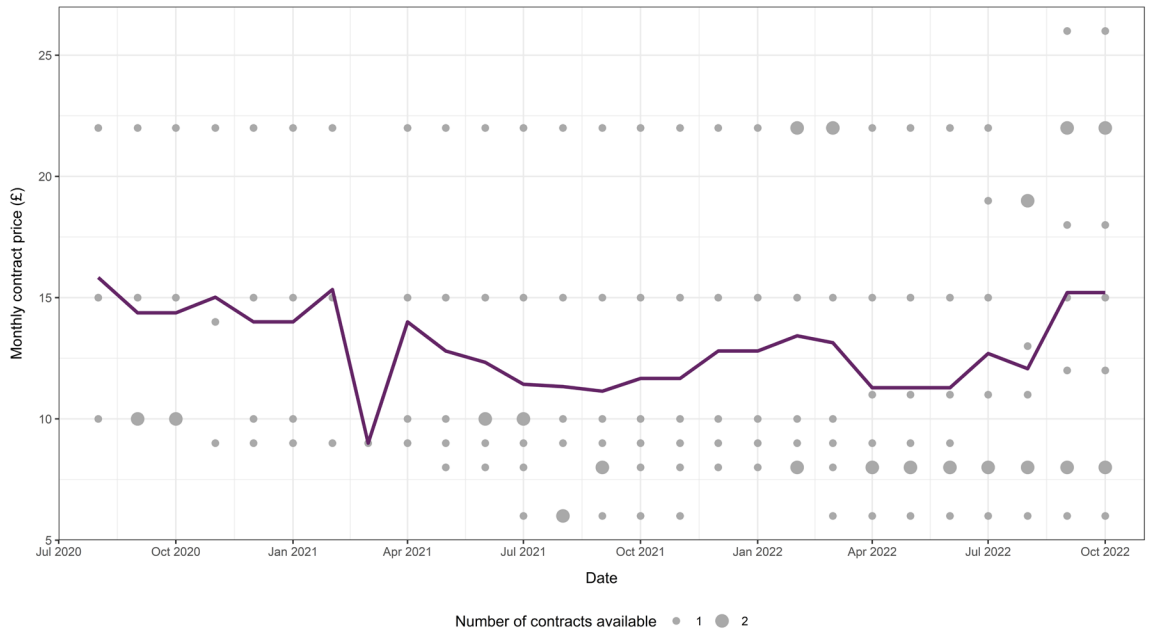
Figure 8: Monthly price for 12-month SIM-only tariffs, 4/5/6 GB data allowance



Source: Pure Pricing, Ofcom analysis

Figure 8 shows average prices for 12-month SIMO tariffs with a higher 4/5/6GB data allowance since August 2020. The chart shows a broadly flat average pricing trend, with a trend decline through to October 2021, followed by a trend increase through to October 2022.

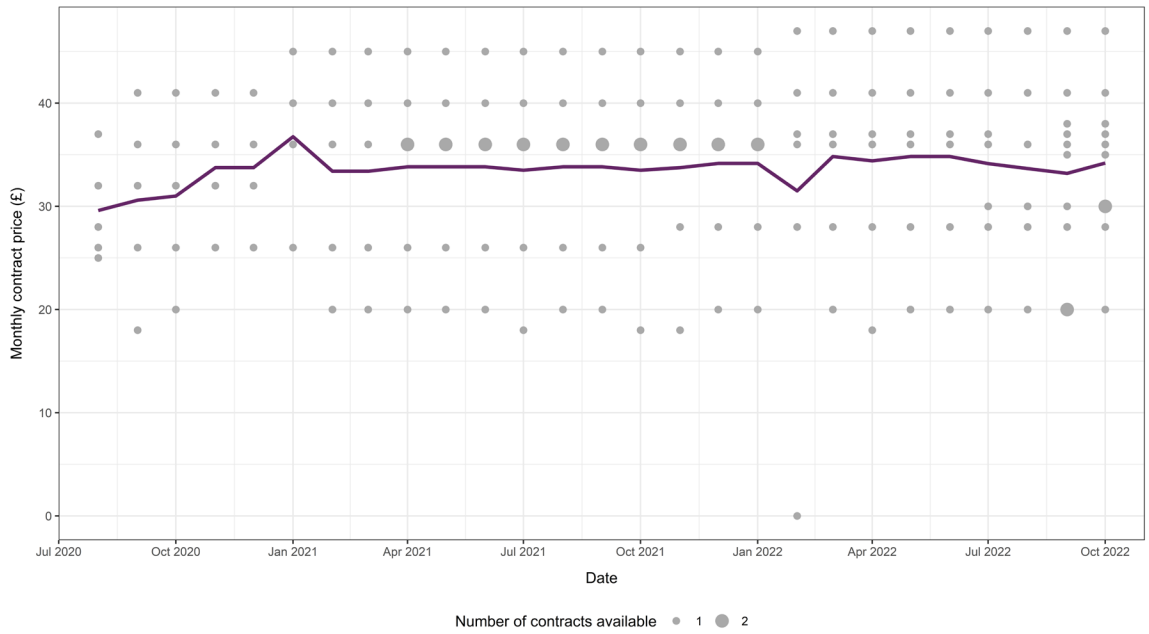
Figure 9: Average monthly price for 24-month SIM-only tariffs, 4/5/6 GB data allowance



Source: Pure Pricing, Ofcom analysis

Figure 9 shows average prices for 24-month SIMO tariffs with a higher 4/5/6GB data allowance since August 2020. The chart shows a trend decline in average prices from the start of the period through to mid-2022, driven by a larger number of lower-priced tariffs being available on the marketplace. Since then average prices have started to increase through to October 2022.

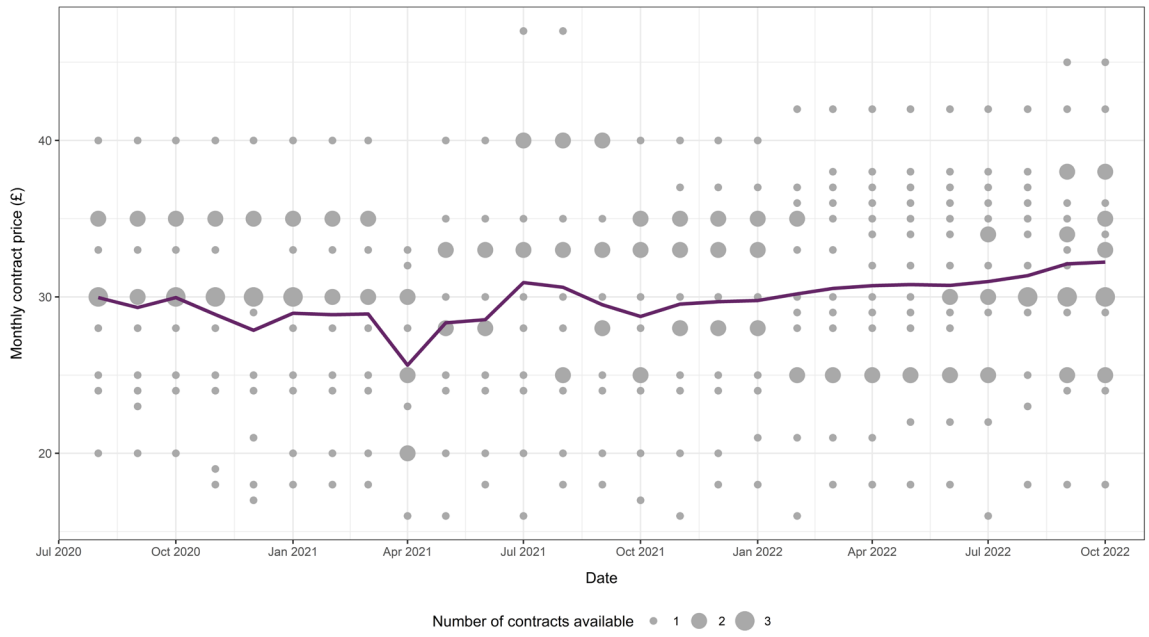
Figure 10: Monthly price for 1-month SIM-only tariffs, unlimited data allowance



Source: Pure Pricing, Ofcom analysis

Figure 10 shows average prices for 1-month SIMO tariffs with unlimited data allowances since August 2020. The chart shows a slight upward trend in average prices through to October 2022, driven by an increase in the number of higher-priced tariffs.

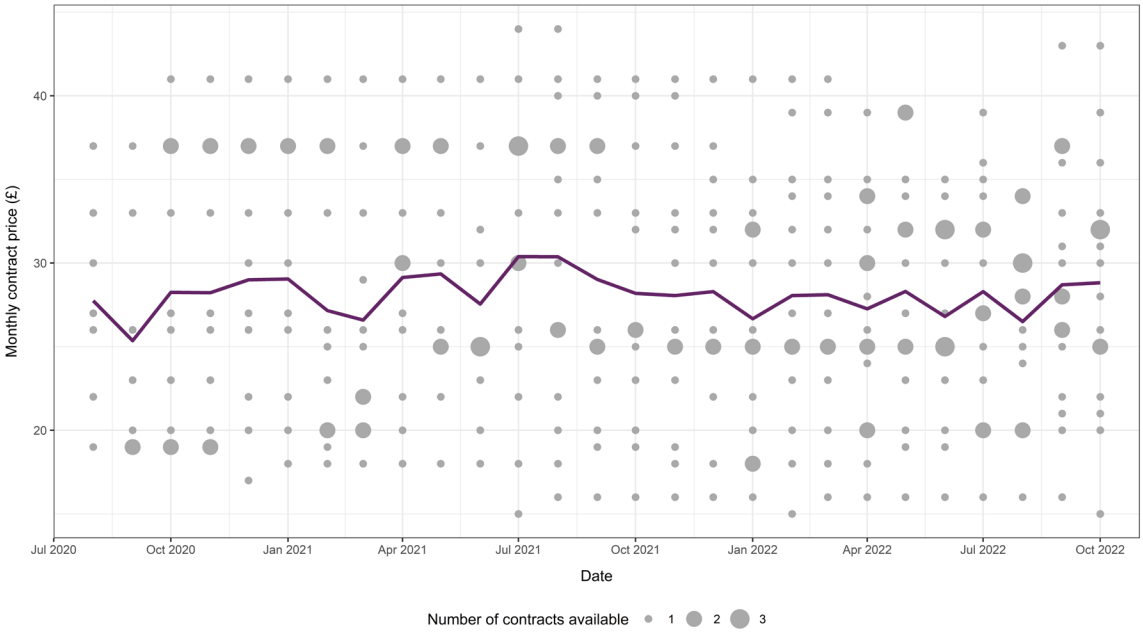
Figure 11: Monthly price for 12-month SIM-only tariffs, unlimited data allowance



Source: Pure Pricing, Ofcom analysis

Figure 11 shows average prices for 12-month SIMO tariffs with unlimited data allowances since August 2020. The trend for average prices has been slightly upward sloping, with a gentle and steady increase since October 2021 through to October 2022.

Figure 12: Monthly price for 24-month SIM-only tariffs, unlimited data allowance

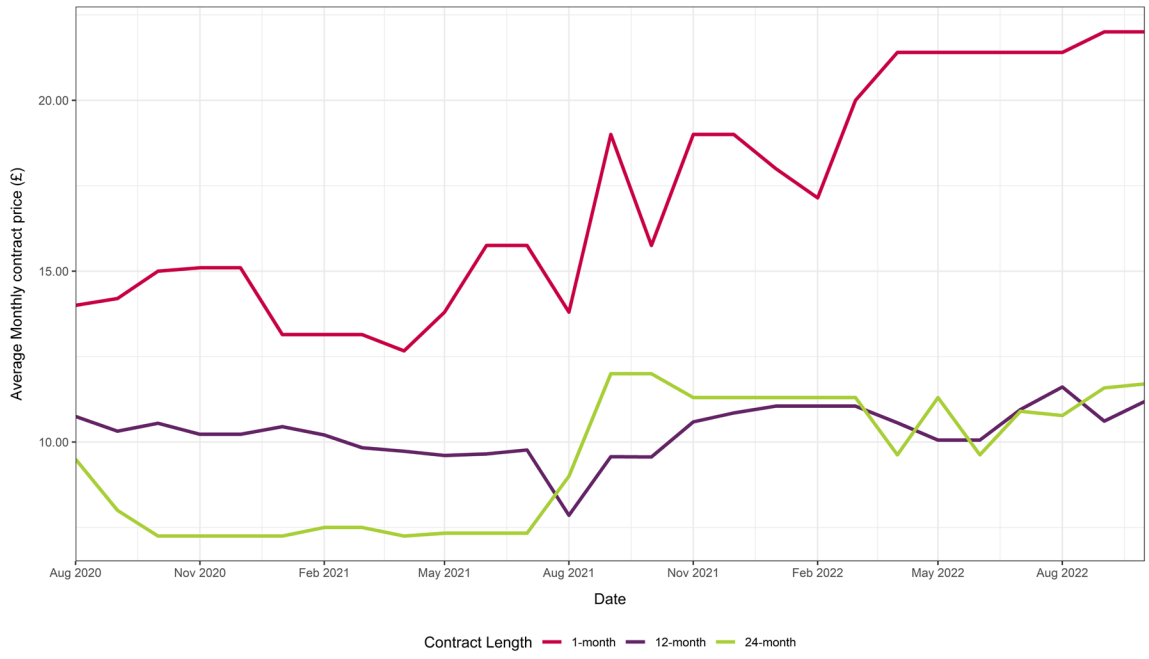


Source: Pure Pricing, Ofcom analysis

Figure 12 shows average prices for 24-month SIMO tariffs with unlimited data allowances since August 2020. The trend for average prices has been broadly flat, but with substantial month-on-month fluctuations over the period.

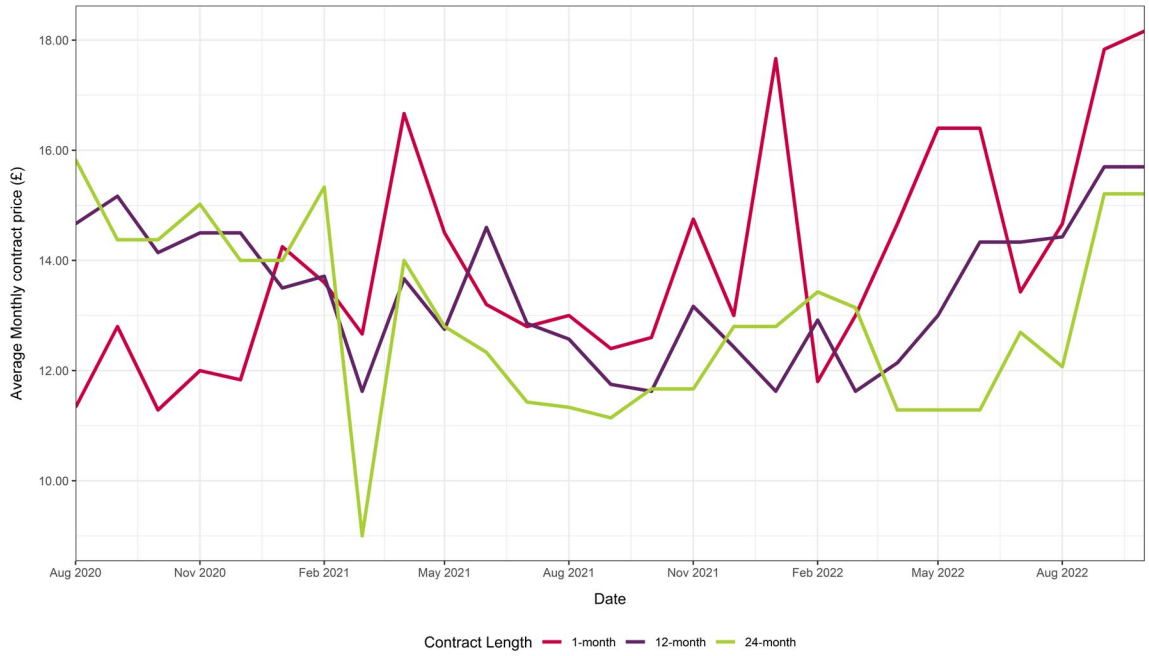
The charts below summarise the above charts by comparing average prices across providers for each of the three 'customer profile' data allowances, showing average prices for 1-month, 12-month, and 24-month tariffs on a single chart. We have summarised the charts in this way to make it easier to identify level differences in pricing by contract length. The charts (Figure 12 - Figure 14) show that 1-month tariffs are typically substantially more expensive than 12-month and 24-month contracts, with 24-month on average being the cheapest across providers.

Figure 13: Average monthly price for SIM-only tariffs, up to 3 GB data allowance



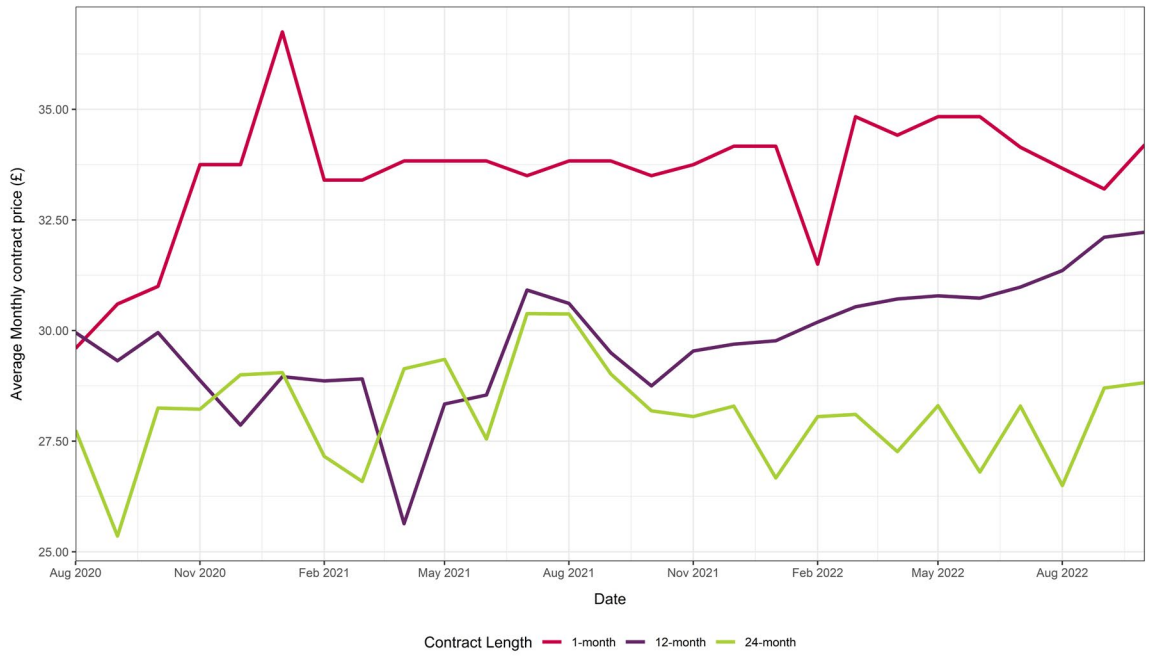
Source: Pure Pricing, Ofcom analysis

Figure 14: Average monthly price for SIM-only tariffs, 4/5/6 GB data allowance



Source: Pure Pricing, Ofcom analysis

Figure 15: Average monthly price for SIM-only tariffs, unlimited GB data allowance



Source: Pure Pricing, Ofcom analysis

PAYG prices

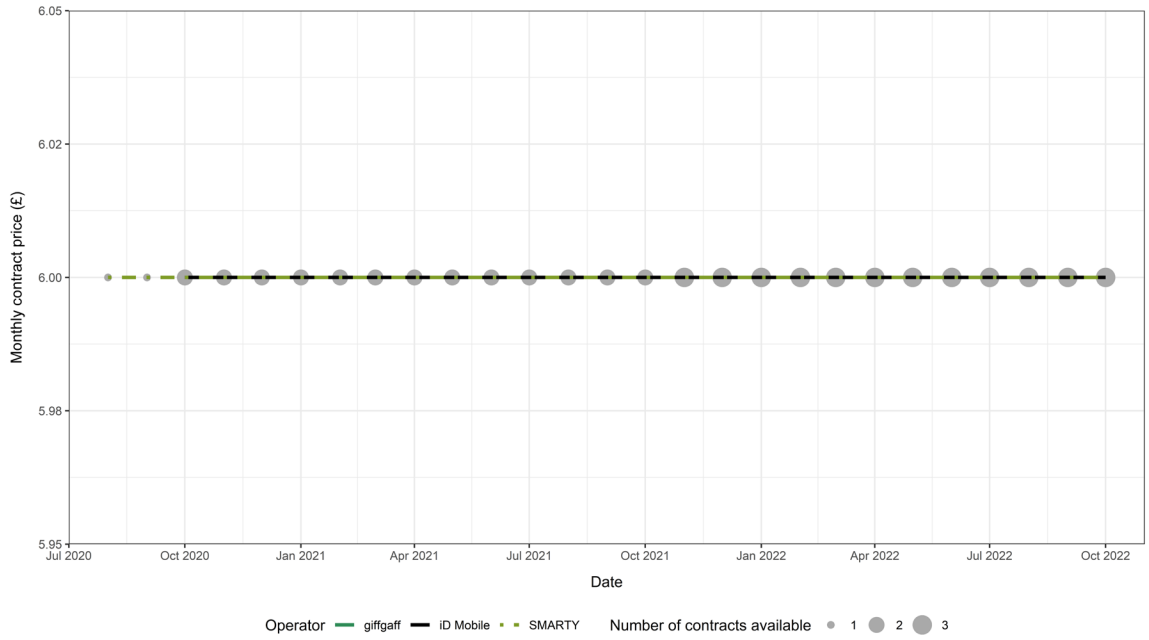
In this section we present prices for PAYG tariffs. These are split into 'PAYG Bundle' tariffs and 'PAYG top-up' tariffs, with the latter sometimes referred to by commentators as 'traditional PAYG'.

PAYG Bundle SIM only tariff, 1-month tariff

The charts below show monthly prices for 1-month PAYG bundle tariffs for 1GB, and 2GB data allowances, over the August 2020 – October 2022 period.

The 1GB data allowance chart (Figure 15) shows that tariff prices over the period in question have been unchanged. The three operators in the Pure Pricing data set that offer these tariffs price at the same level. However, there has been an increase in the number of tariffs available at this price point.

Figure 16: PAYG bundle price for 1-month SIM-only tariff, 1 GB data allowance

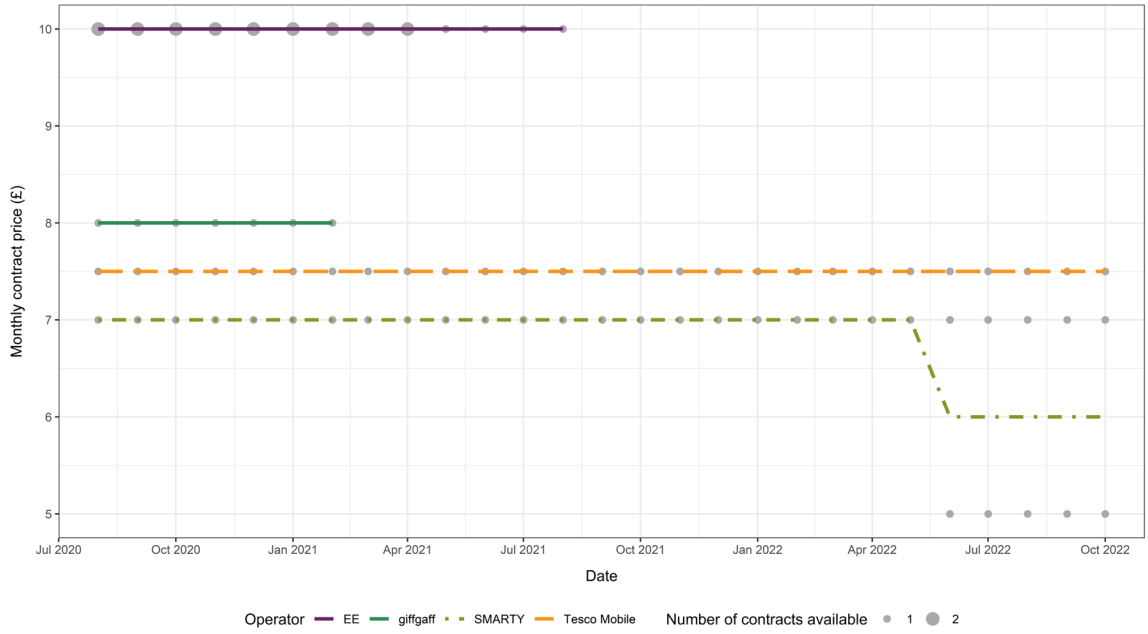


Source: Pure Pricing, Ofcom analysis.[81]

The 2GB data allowance chart (Figure 16) shows that – for the four operators offering these tariffs – average monthly prices over the period in question have been mainly unchanged, with the exception of SMARTY which introduced a lower-priced tariff in 2022. EE and giffgaff also stopped providing these tariff types over the period, resulting in just two active operators at the end of the analysed period.

[81] The listed providers – i.e., giffgaff, iD, and SMARTY – all charge the same monthly bundle price, so that their respective lines for the average bundle charge are overlaid and only one is visible.

Figure 17: PAYG bundle price for 1-month SIM-only tariff, 2 GB data allowance



Source: Pure Pricing, Ofcom analysis

PAYG Top-up SIM-only tariff prices

We find that between August 2020 – October 2022 period, and in contrast to other tariff types, there was a very limited number of tariffs available for 'traditional PAYG'. Data from Pure Pricing indicates that there was only one tariff available by the end of the period in their data set. For this reason, we have not analysed pricing due to the very small sample.

Pay monthly handset tariffs

In this section we assess pricing for pay monthly handset tariffs. As discussed in Section 2, Pure Pricing each month collects handset tariff pricing data for four of the most popular handsets in the market.[82] This means that the Pure Pricing handset tariff data will not represent the full availability of handset tariffs on the market.

Notwithstanding the above sampling point, a challenge with analysing pricing for handset tariffs is the complexity and variety of bundles and tariff combinations available on the marketplace. This means that for an analysis of prices to compare tariffs on a like-for-like basis, the complexity and variety would need to be controlled for. Otherwise, there is a risk that pricing trends could be driven by product mix effects, linked to differences in data allowances, contract lengths, and in this case handset types. This risk is heightened for pay monthly handset tariffs given the large number of handsets available in the marketplace, and which have wide-ranging prices and quality.

[82] For example, in November 2022, Pure Pricing's handset data selected iPhone 14 and iPhone SE from Apple, and Samsung Galaxy S21 FE and Samsung Galaxy S22 from Samsung. It is possible this skews the pricing sample towards higher-price devices.

To illustrate the challenge, if the mix of handset types changed over a time period (for example becoming more or less expensive), and/or if the mix of data allowances available changed over this period, a simple average price for handset tariffs chart may not capture these dynamics. This demonstrates the value in controlling for handset types when analysing these tariff types.

Even if handset types are controlled for, it is important to recognise that it is normal industry practice for a given handset device to be progressively discounted over its marketed life. This reflects the gradual obsolescence of existing devices as newer devices are brought onto the market, and which can command a higher price.[83] As a result, charts presenting pricing for a given handset's tariffs might be expected to show a downward pricing trend over time. This feature complicates interpretations of pricing trends. We have not addressed this effect in our analysis for handset tariffs.

A similar challenge to the one discussed above is where one (or more) provider(s) tends to offer tariffs with better (or worse) handset devices compared to its rivals, this will incorrectly show up as being a more expensive (or cheaper) provider. This risk can be mitigated by indexing average prices to 100 at the start of the period for each provider, such that level differences between providers are eradicated at the start of the period.

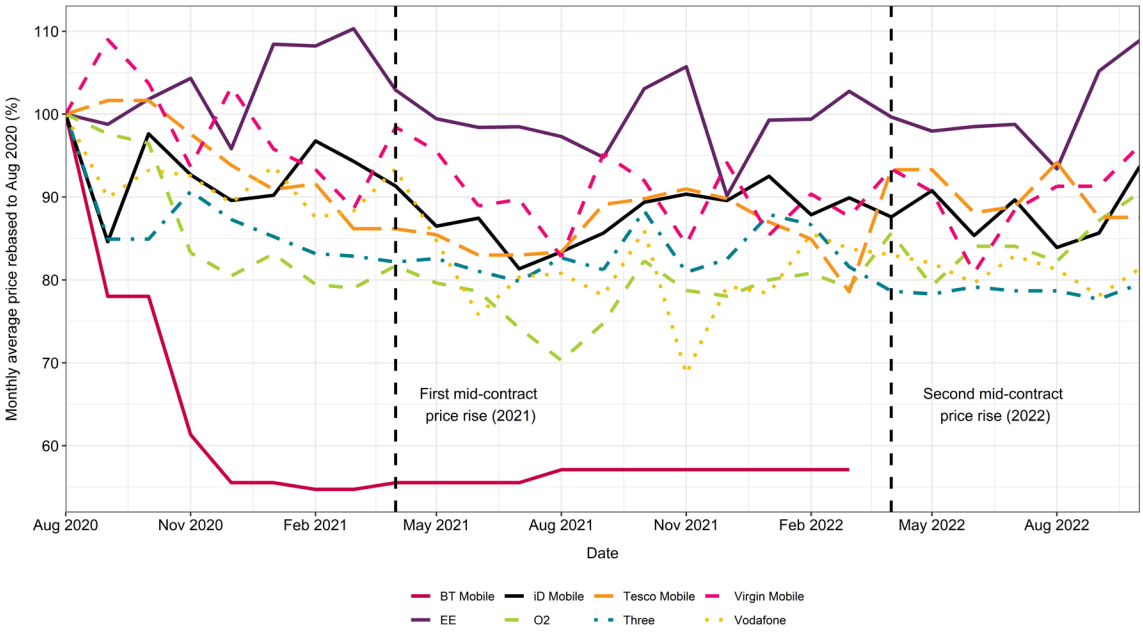
Given the challenges of analysing pricing for handset tariffs, we have undertaken a limited analysis of handset tariffs, set out below.

[83] This feature is often more pronounced at certain times of year when providers clear stock in the months ahead of the launch of a new handset model.

Average monthly price by provider

Pay-monthly handset, 24-month contract

Figure 18: Monthly average price by provider, Pay-monthly Handset, 24-month contract



Source: Pure Pricing, Ofcom analysis

Figure 17 shows average indexed prices, by provider, for pay-monthly handset tariffs with a 24-month contract.[84] Prices are indexed to 100 for the first observation in the period, August 2020, for each provider. We took this step to address the risk that one or more providers offer tariffs with better (or worse) handset devices compared to rivals; if this was the case then this would incorrectly show up as being a more expensive (or cheaper) provider. By indexing to 100 at the start of the period for each provider we eradicate level differences between providers. The chart also controls for contract length by only examining 24-month long tariffs.

Nonetheless, the chart does not control for the possibility that the mix of handsets or data allowances changed over the period.[85] Consequently, if the mix of handset types changed over this period (for example becoming more or less expensive), and/or if the mix of data allowances

[84] The steep decline in price for BT Mobile from August 2020 reflects a substantial change in value mix for the provider. August 2020 was the last month BT Mobile sold 5G handset tariffs from the BT website. From September 2020, customers on the BT site seeking 5G phone and tariff bundles were directed to EE. BT continued to sell 4G phone and tariff bundles from its site. The time series for BT Mobile stops before the end of the period because May 2022 was the last month that BT Mobile sold 4G handsets from the BT website. From this date potential customers seeking any handset and tariff bundle were directed to EE. The last monthly data captured by Pure Pricing for BT for 4G handsets was March 2022. BT Mobile continued to sell pay monthly sim-only tariffs over this period. October 2022 was the last month that BT Mobile sold sim-only tariffs from its site, and customers were referred from the BT site to the EE site for all consumer mobile services from November 2022.

[85] And as discussed earlier the Pure Pricing data does not cover the full market.

available changed over this period, this chart will not capture these dynamics. Therefore, caution needs to be applied when drawing any inferences from this chart.

To better understand how average prices have moved over time for handset tariffs, we additionally examined average pricing trends controlling for data allowance and for two handset types, an Apple handset and a Samsung handset.[86] We find that once data allowance, handset type, and contract length are controlled for, average prices typically followed a broadly flat trend over the October 2021-October 2022 period. As noted above, these trends describe pricing before any in-contract price rises apply i.e. they represent the upfront prices of new contracts.

Conclusion

The analysis in this section has shown that pricing outcomes have been less positive for consumers in 2022. Average pricing trends have been generally stable in 2022, but with many tariff types, contract durations, and data allowances showing price increases in the most recent months we have analysed. We have also found price increases in 2022 for the lowest data allowance SIMO packages, and some cheap low-data 1-month tariffs have been removed by the main providers. The prices we have analysed are upfront 'offered' prices by providers, and so will not take into account the effect of in-contract price rises.

In relation to in-contract price rises, the analysis in Section 3 found that many existing customers experienced large in-contract price rises in 2022, driven by high inflation combined with the use of inflation and inflation-plus in-contract price rise clauses by providers. Because the majority of contracted customers faced contractual price rises in 2022, on average back-book mobile prices increased.

These findings also suggest that mobile prices overall rose during 2022 up to October. This is in line with third-party analysis of mobile providers' recent pricing, as well as with MNOs' own statements on their pricing and profitability during 2022.

Analysts and the MNOs have commented on the impact of in-contract price rises on the financial performance of mobile operators. All MNOs reported growth in mobile service revenues in their most recent results (against a backdrop of declining revenues historically).[87] Analysts have also said that revenues have likely been boosted by mid-contract price rises and increased roaming.[88] These statements indicate that the in-contract price rises in 2022 have boosted revenues with a resultant

[86] The handset types we analysed were the newest iPhone and Samsung Galaxy as of August 2022: the iPhone 13, and Samsung Galaxy S22 (both at 128GB with 5G). An examination of pay-monthly mobile tariffs on price comparison websites (such as Money Supermarket) list the newest iPhone and Samsung Galaxies under their "Popular Phone Contracts" section, which provided a further motivation for selecting these two handsets.

[87] Vodafone H1 FY23 Results Presentation: page 10, BT Group - Results for the half year to 30 September 2022 : Page 8, Q3 2022 Earnings Release (virginmediao2.co.uk) & Quarterly trading update for CK Hutchison Group Telecom Holdings Limited, 9 November 2022

[88] For example, Enders Analysis, in its report (Varied price rise impacts - UK mobile market in Q2 2022, 19 August 2022) said 'Mobile service revenue growth improved by 4.4ppts to +4.5%—the highest level of growth the sector has seen since 2010. This was entirely down to the higher-than-inflation [in-contract] price increases that the providers put through in April, which we estimate boosted growth by 4.6ppts (implying—at best—flat underlying growth).' Citi also said 'With over 85% of revenues concentrated in just four providers, the market has been benign and somewhat inflationary even on front book this year. Against this backdrop, providers so far seem to have retained the benefits of price increases with mobile ARPU trend improve[d] across the boa[r]d.' TeleQ – will UK price hike repeat in 2023, 26 September 2022.

improvement in profitability in some cases but it is unclear whether this increase in profitability will be enduring.

5. Analysis of customer-level data

This section presents our initial analysis of mobile prices using customer-level contract data. As mentioned in Section 1, the main objective of this analysis is to illustrate how the customer-level data may improve our understanding of market outcomes through the example of average prices and their dispersion. The analysis also provides an initial view on potential questions that could be addressed in future research.

For context and to aid the interpretation of the average prices, we begin by presenting graphs of tariffs chosen by consumers over the different data-allowance bands among SIM-only and PAYG tariffs, separately for the three years from 2019 to 2021. These graphs show the relative popularity of different data allowance bands and thereby provide an indication of which tariff changes affect many versus few consumers. In addition, changes in the distribution over time can provide evidence which is indicative of consumers' switching between data allowance bands.[89] We also present graphs that illustrate the proportion of monthly SIM-only customers according to different minimum contract periods. These graphs provide insights into the relative popularity of contract lengths and changes in the popularity over time.

Second, we discuss our analysis of the average monthly prices by provider and data allowance bands, separately for SIM-only and PAYG. This analysis provides insights on the relationship between the monthly price and the data allowance, the dispersion of prices between different mobile providers, and the evolution of prices over time. In addition, we compare the average monthly contracted prices for SIM-only tariffs and PAYG bundles among providers that offer both. This allows us to compare mobile services with very similar characteristics and raise questions for future work on the reasons underlying observed price differences, including potential barriers to switching and how consumers value the flexibility embedded in PAYG agreements.

Finally, and given the limited initial scope of our analysis of the customer-level data, we present a non-exhaustive list of further research that we look to conduct in the future.

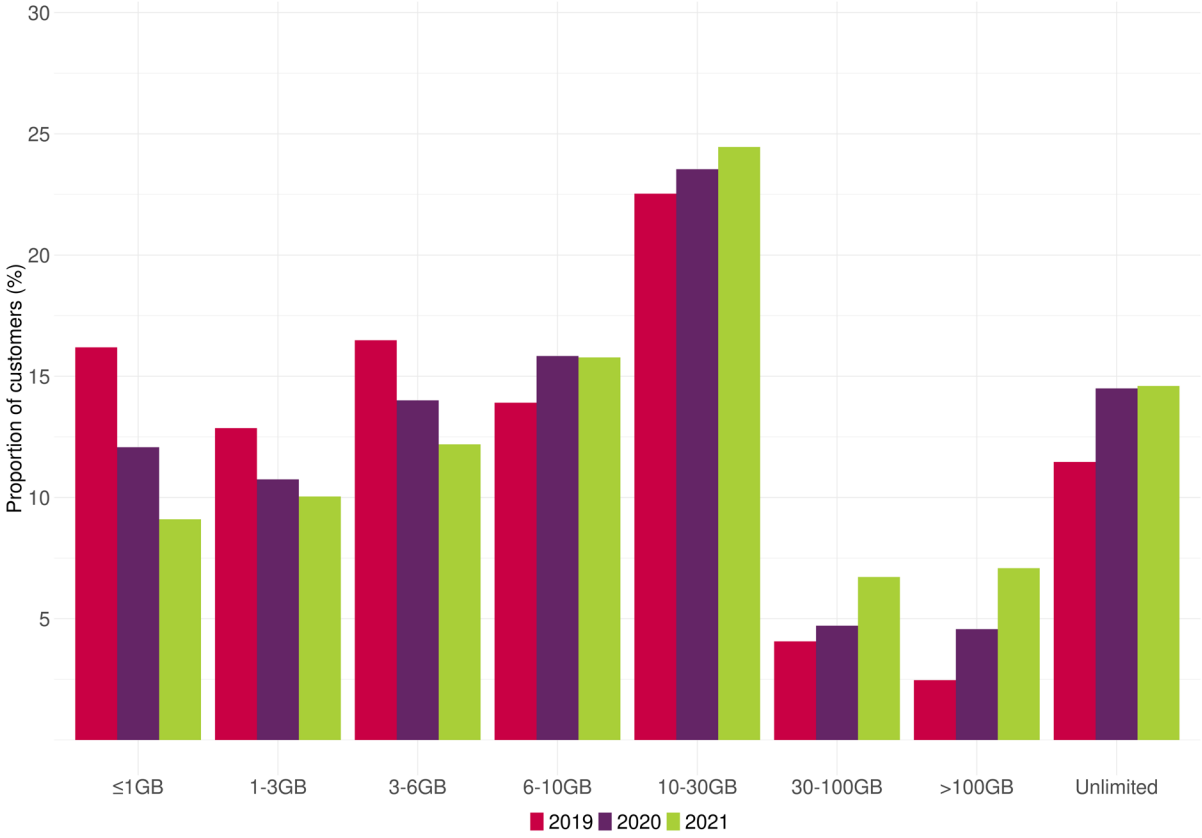
Distribution of customers by data allowance and minimum contract period

Figure 18 shows the proportion of SIM-only customers according to the data allowance bands of their contracts in the years 2019 to 2021. Across the three years, most SIM-only customers (up to around 70%) chose a mobile contract with data allowance under 30 GB.[90] The figure also suggests that there has been a shift towards higher data allowance contracts over time. The proportion of customers choosing an unlimited data tariff, for instance, has increased from 11% in 2019 to nearly 15% in 2021; the proportion of customers choosing tariffs with 30-100 GB data allowance has increased from around 4% to 7% and those with a data allowance of over 100 GB (but not unlimited)

[89] Consumers may, of course, also switch to SIM-only or PAYG contracts from other types of contracts (or vice-versa), so that changes in the distribution need not necessarily reflect consumer switching between data-allowance bands.
[90] The proportion of customers by data allowance band and the corresponding prices reflect the customer-level data, for which tariff characteristics were available. As this is a subset of all sampled customers, there may be some differences in the distribution shown relative to the actual distribution in the population.

has increased from around 2.5% to 7%. There could be several underlying reasons for this trend, including SIM-only customers increasingly purchasing tariffs with higher data allowance but also substitution from other contract types (e.g., airtime + handset) to SIM-only and those customers' disproportionately selecting tariffs with higher data allowance. Overall, these changes may also be related to the downward trend in the mobile prices of high data allowance, as mentioned in the Ofcom report (2021) "Pricing trends for communication services in the UK".

Figure 19: Proportion of monthly SIM-only customers with different data allowances in 2019-2021



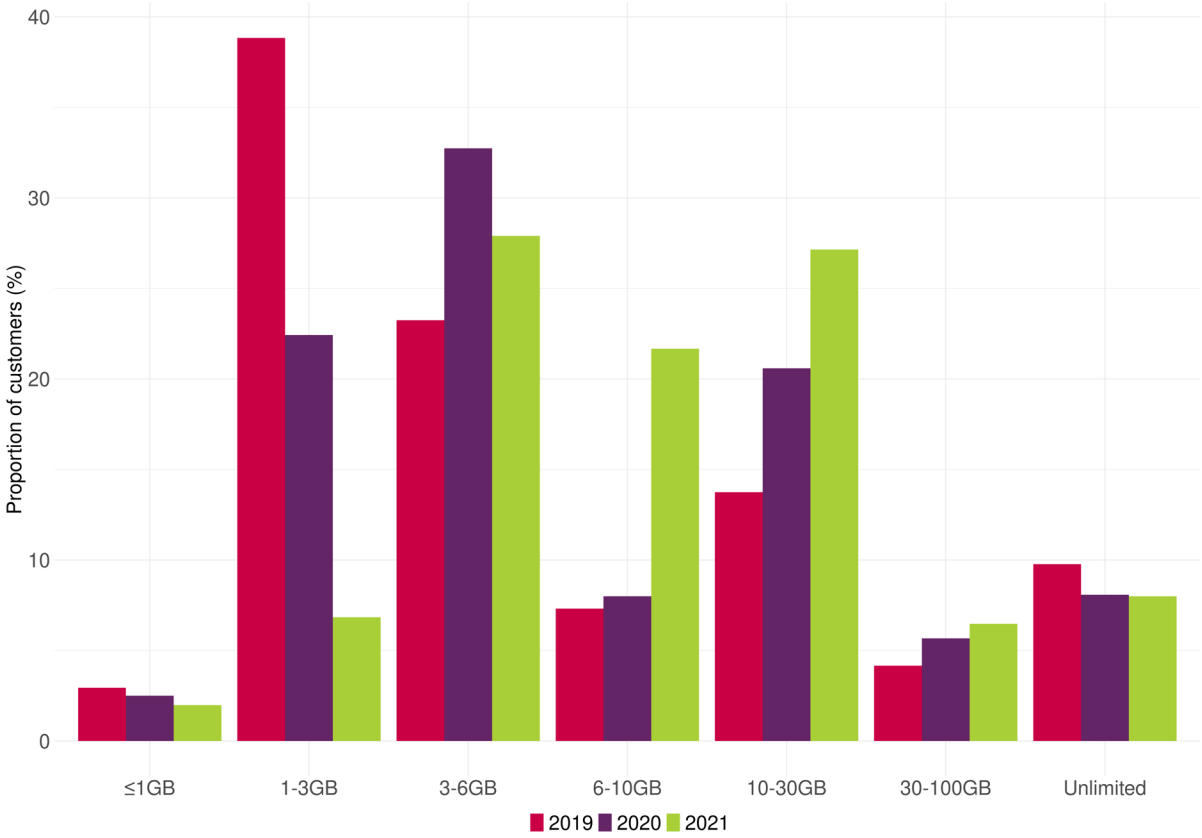
Source: Customer-level data from EE, BT, Plusnet, O2, Virgin Media, Vodafone, Three, Tesco, and Sky; Ofcom analysis.[91]

Figure 19 shows the proportion of PAYG customers according to the data allowance of their purchased bundles during the years 2019 to 2021. Most of the customers (over 80%) choose bundles with a data allowance between 1 GB and 30 GB in all three years. Over time, there appears to be a shift from the lower-allowance bundles in this range towards higher-allowance bundles. Customers purchasing bundles with 1 GB to 6 GB data allowance, for instance, make up over 60% in 2019 and those with 6 GB to 30 GB allowance under 25%. By 2021, these lower-allowance bands account for roughly 35% and the higher-allowance buckets about 50%. Similar to the dynamics observed for SIM-only customers in Figure 18, these changes might reflect PAYG customers switching to higher-allowance buckets or substitution between PAYG and other types of contracts. Lower-allowance

[91] The distribution shown in this figure may deviate from the actual distribution of UK mobile customers of the named providers given that the customer-level data are a randomly drawn 5% sample.

customers might, for instance, substitute to SIM-only contracts so that there are fewer of them in the distribution of PAYG customers.

Figure 20: Proportion of PAYG customers with different data allowances in 2019-2021



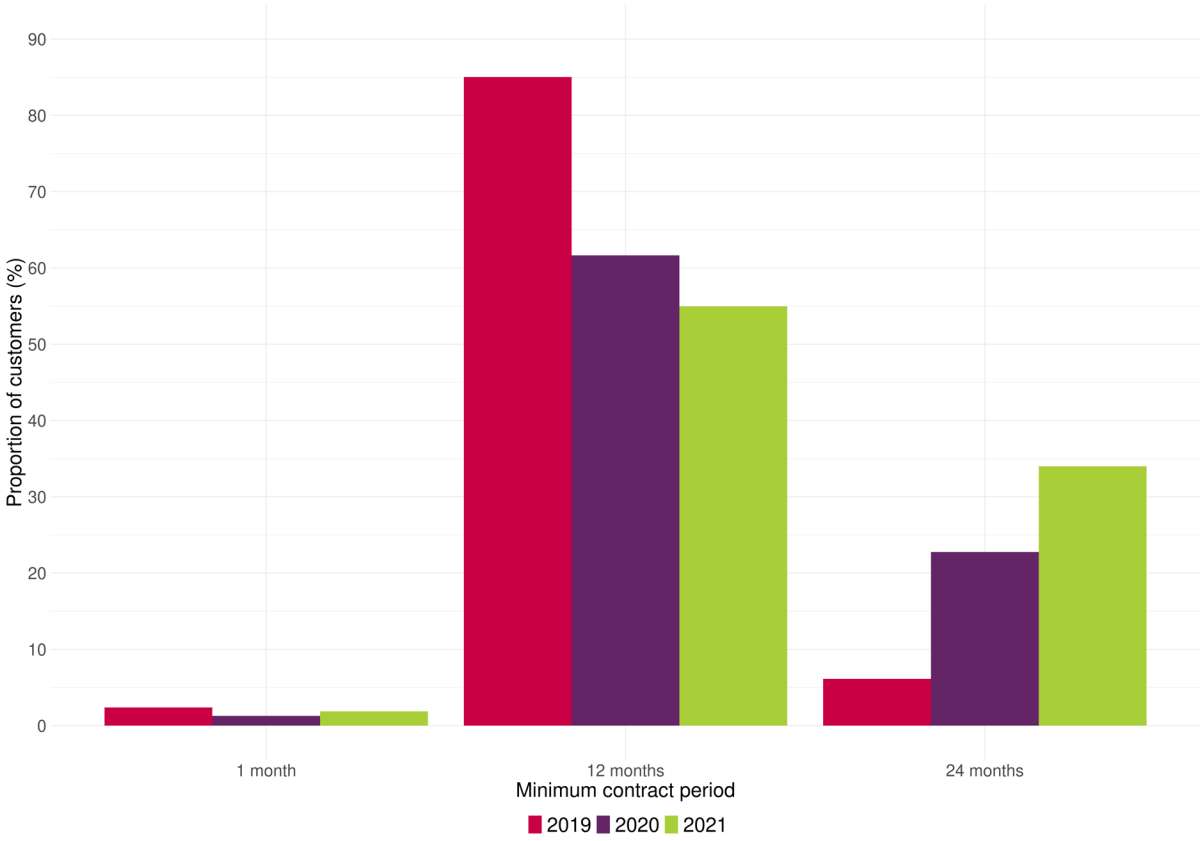
Source: Customer-level data from O2, Vodafone, Three, Tesco, SMARTY and VOXI; Ofcom analysis.[92, 93]

Figure 20 shows the proportion of monthly SIM-only customers with different minimum contract periods, over the calendar years 2019 to 2021. The chart shows that the majority of SIM-only tariffs chosen by customers have a 12-month or 24-month minimum contract period; only a small share of customers chose 1-month SIM-only tariffs. The chart also shows a decline in the proportion of customers on 12-month contracts and an increase in the proportion of customers on 24-month contracts over the 2019 to 2021 period. This shift towards contracts with longer minimum contract period suggests that an increasing share of customers will have been subjected to the mid-contract price rises highlighted in Section 2 due to the longer minimum contract length.

[92] We exclude EE from the analysis for PAYG customers as the prices of EE PAYG customers were not available.

[93] The distribution shown in this figure may deviate from the actual distribution of UK mobile customers of the named providers given that the customer-level data are a randomly drawn 5% sample.

Figure 21: Proportion of monthly SIM-only customers with different minimum contract periods in 2019-2021



Source: Customer-level data from BT, EE, O2, Plusnet, Sky Mobile, Tesco, Three, Virgin Media, Vodafone; Ofcom analysis. [94]

Average contracted monthly SIM-only and PAYG bundle prices by data allowance

Our analysis of the average contracted SIM-only and PAYG bundle prices focuses on four areas: (a) the relationship between prices and the inclusive data allowance; (b) the evolution of prices over time; (c) the dispersion of average prices between providers; and (d) the difference between SIM-only and PAYG prices for comparable data allowances.

Our analysis shows that average prices are broadly increasing with the data allowance. However, there are some exceptions. For example, there is a sharp price drop between the 3-6 GB and the 6-10 GB data band for SIM-only tariffs of one provider in 2020. Another provider's average price for SIM-only tariffs with unlimited data allowance is cheaper than its tariffs in the more than 100 GB data band in 2019 and 2020. In addition, the PAYG bundles of some providers with up to 3 GB data allowances are also less expensive on average than their bundles with 3-6 GB data allowance. Some of these may be due to unobserved characteristics that we did not take into account in our current

[94] The distribution shown in this figure may deviate from the actual distribution of UK mobile customers of the named providers given that the customer-level data are a randomly drawn 5% sample.

analysis. For instance, in the case of the first-mentioned provider in 2020, most customers in the 3-6 GB data allowance group chose plans with additional benefits, which are significantly more expensive compared to plans without them. In contrast, we do not find this to be the case for customers of this provider in 6-10 GB data allowance group in the data. This difference in plans between the two data bands may in part explain why the average prices of 3-6 GB data allowance tariff plans for that provider are higher than 6-10 GB data allowance plans, highlighting the importance of carrying out further analysis to understand the different factors that can drive choice of tariff.[95]

Secondly, our analysis shows that, for most providers, average prices overall have gradually declined between 2019 to 2021.[96] This could be explained by a variety of factors, for example, customers' switching from higher data allowances to lower data allowances within the same data bands or the drop in the price of a certain data allowance tariff. However, we will need further analysis to fully explain this pattern in the data.

Third, our analysis shows significant price differences between providers for the same data allowance bands. These could be explained by a variety of factors, for example differences in perceptions of quality (including for example network quality and customer service), and more analysis is needed to understand these differences. In addition, while the average prices paid by customers of different providers in lower data allowance bands (up to 30 GB for monthly SIM only and up to 10 GB for PAYG) are closer to each other, the average prices paid by customers in higher data allowance bands differ considerably by provider. Whether this is a result of the intensity of competition for different groups of customers is something we also intend to explore in the next phase of our work.

Finally, we compare the monthly prices of SIM-only tariffs and those of PAYG bundles for mobile providers offering both. This comparison reveals that that the average prices paid by monthly SIM-only customers are generally lower than those paid by PAYG customers for the same data allowance, except for the case of one provider.[97] Thus, customers would generally pay higher prices when switching from monthly SIM-only to PAYG with the same provider.[98]

Potential future market-monitoring research

We intend to draw increasingly on the customer-level data underlying the analysis presented in this section and similar information, as part of our ongoing work to monitor market outcomes. This will enable us to monitor market outcomes and assess how well the UK mobile sector is working for

[95] Some unlimited data tariffs also come at a lower speed, which may explain the lower price of these for these tariffs relative to those with limited data allowance.
[96] We note that this data pre-dates the 2022 price rises, and we are therefore not able to assess the impact of those on prices customers' pay.
[97] This again could be possibly driven by unobserved characteristics and further analysis will be required to examine this unusual pattern.

[98] Our findings here suggest a difference to the findings based on the Pure Pricing data in the Pricing Trend Report. However, there are two important differences. First, the analysis based on the Pure Pricing data is based on 2022, not 2021 as the analysis based on the customer-level data. Second, the Pricing Trends Report uses six service baskets and weights based on market shares. In contrast, the customer-level data use the underlying number of customers as weights. The latter point highlights the importance of using customer-level data in a pricing analysis.

consumers. We expect to carry out further analysis to address the questions set out below, with a view to publishing further results during the next year.

There are several questions that can be answered using customer-level data. The following provides a preliminary, non-exhaustive list of some these questions.

1. **How do the market outcomes vary between different consumer groups?** Different consumers purchase mobile services through different channels (e.g., directly from mobile providers or indirectly via third parties) and select different types of service agreements and tariffs (e.g., post-pay airtime + handset, post-pay SIM-only, and PAYG agreements). As market outcomes, such as the number of tariffs available and prices, may vary with these choices, there may be some consumer groups for whom the UK mobile market is working well and some for whom it is not. Vulnerable or low-income consumers, for instance, may be more likely to purchase certain tariffs. The customer-level data can provide some new insights into the market outcomes for these and other consumer groups.[99]

2. **Are there potential gains from switching?** Consumers may benefit from switching from their current tariff to more favourable tariffs (within or between providers) after their minimum contract period has expired. The gains from switching to be considered may include lower prices for comparable services but also higher quality services that are available for a comparable price.[100] Given that tariffs generally differ in several characteristics (e.g., prices and quality), we will consider the scope for analysis of the potential gains from switching that takes account of these and other differences between tariffs. Importantly, the potential gains from switching may also accrue disproportionately to some consumer groups rather than others and analysis using customer-level data can capture this.

3. **What trade-offs do consumers make when choosing between mobile services?** Consumer experiences in the UK mobile sector and potential gains from switching tariffs depend on how consumers value the characteristics of different mobile services, including different dimensions of price and quality. We intend to investigate to what extent we can take account of these different dimensions in our analysis.

[99] The customer-level data contains the approximate home location of customers with post-pay monthly contracts. We can use this location to assess how contract choices and usage behaviour vary by location and the corresponding differences in demographic characteristics of the population in different parts of the UK. This will allow us to make inferences about how consumer choices/behaviour differs according to demographic markers that are not directly available in the customer-level data but retrieved from third-party sources, like the ONS. Location information is not available for pre-pay PAYG customers, so that these customers would not be covered by this type of analysis.

[100] In addition, the gains from switching may also involve a consideration of the services used rather than those contracted. If some consumers only use a small share of their contracted data allowance, there might be potential gains from switching to a lower data allowance and paying a lower monthly price.