ADVISORY PANEL ON CONSUMER PRICES – STAKEHOLDER

Improving the quality of the energy component of ONS price indices

Status: Draft

Expected publication: Unknown

Purpose

1. This paper updates members of the Panel on the ONS proposal to directly account for fixed gas and electricity tariffs in our main measures of consumer price inflation from March 2025, and this paper also provides an update on longer-term plans for improving our measures of energy price inflation.

Actions

2. Members of the Panel are invited to comment on:
    a. The ONS proposal to introduce fixed tariff gas and electricity indices from March 2025, in the form of cohort-tracking indices calculated from manually-collected data
    b. ONS plans for the introduction of large data sources and multilateral index methods post-2025

Background

3. In 2023, ONS presented at both APCP Panels, describing how only variable tariff prices feed into the ONS measures of electricity and gas inflation. This approach has implicitly assumed that the price index for fixed tariffs equals that of variable tariffs.
4. To keep pace with shifting consumer behaviour, ONS should move away from this assumption to account for fixed tariffs directly, producing a fixed tariff price index which is calculated from fixed tariff prices.
5. The potential inclusion of fixed tariffs has become more relevant recently due to the historically rapid energy price inflation seen in recent years and an increasing proportion of all tariffs being fixed tariffs.
6. Specifically, expenditure shares calculated using Ofgem data (described below) suggests that in January 2019, fixed tariffs constituted around 46% of electricity expenditure (37% for gas), falling to around 13% (11% for gas) by late 2022, then to 8% each by summer 2023, but rising since then to 19% (20% for gas) by July 2024.
7. This provides a strong case for directly taking account of fixed tariffs in our measures of consumer price inflation.

Update on the introduction of Ofgem data

8. Much of the ONS work on this project last year focused on acquiring and attempting to use detailed tariff-level data collected by Ofgem. Ofgem request information from suppliers each time the energy price cap is updated. This source contains detailed tariff-level information and customer numbers. After its introduction in January 2019 the series was initially biannual (April and October), but has been quarterly since January 2023, in line with the frequency of the energy price cap. The Ofgem dataset only covers Great Britain. Last year, ONS considered a range of methodological options were considered, such as stratified unit value indices and different types of multilateral indices.
9. In August 2024, ONS decided that it did not have the risk appetite for introducing fixed tariff price indices based on the Ofgem data into the basket for March 2025, due to a number of outstanding risks, some of which were previously communicated to the Panels. This doesn't prevent the inclusion of the Ofgem data at a later date.
10. Some of these risks, to be addressed prior to any introduction of the Ofgem data, include:
    a. The risk that, in a given production round, there would be insufficient time between the arrival of Ofgem data, and the period at which figures are finalised, for ONS to check the data and resolve any queries with it.
    b. The risk that there is insufficient technical support on-hand when this data source is introduced, leaving ONS unable to adapt processes or systems in response to any data format changes or market developments. For March 2025, such ongoing support would very limited due to the introduction of grocery scanner data into our measures of consumer price inflation.
11. ONS intends to continue investigating options (such as the Ofgem data) for increasing our tariff coverage and introducing multilateral index methods for some year subsequent to 2025. ONS will continue to update the Panels on progress to achieve this.

Update on proposal to introduce fixed tariffs in March 2025

12. Following the above decision not to introduce a price index based on the Ofgem data in March 2025, ONS has investigated the possibility of introducing a lower-risk fixed tariff index for March 2025. This would allow ONS to reflect properly the recovery in the fixed tariff market share and move away from the implicit assumption that the fixed tariff index is equal to the variable tariff index. This would deliver an immediate quality improvement to the outputs ahead of the introduction of any large data sources into the energy basket. This proposal for March 2025 also has the practical advantage of being similar in operation to many current central collections (including the current electricity and gas collections which cover variable tariffs only).

<u>Manual collection</u>

13. For this March 2025 fixed tariff price index, ONS has investigated collecting the fixed tariff information manually from the energy supplier websites each month on index day (similar to what is currently done for the current variable tariff index).
14. Given the resource constraints, ONS has sought to measure a subset of the fixed tariff market that contains the most popular tariffs. This subset includes only 1-year tariffs paid by direct debit, which Ofgem data shows are by far the popular type of fixed tariff, and considers only the 'main' tariffs each provider offers (removing those which come with additional services such as boiler repair or are for loyal customers only). Additionally, such a collection would cover a sample of companies in each region within Great Britain, informed by customer numbers (see below for a comment on Northern Ireland).
15. ONS first conducted an experimental fixed tariff manual collection on index day in August 2024, which successfully proved that the data itself (standing charges and unit rates for each main tariff) can be collected. As in the current ONS variable tariff index, we can work out an average monthly bill for a customer on a tariff by first multiplying the standing charge by an average number of days in a month, and secondly by taking the unit rate and multiplying that by an estimate of average household energy consumption in kWh, before finally adding these two components together.
16. The manual collection cover *** electricity and *** gas fixed tariffs, with all 14 Great Britain regions covered and *** major suppliers covered (supplier-region pairs have been selected based on the proportion of fixed tariff customers in that region with that supplier). Research suggests that fixed tariffs have a low prevalence in Northern Ireland, we will continue to monitor this.
17. Using the Ofgem data, we estimate that these *** major suppliers cover around ***% of customers on fixed tariffs at the start of year. Also as of the start of this year, of the customers on fixed tariffs, around 95% were on direct debit tariffs, around 75% were on tariffs of 1-year duration, and around 94% were on single unit rate tariffs (i.e. not economy-7, which we have excluded from this manual collection sample).

<u>Index methods for manually collected data</u>

18. Turning to the question of index method choices, with manual collection there is no option to use some of the more dynamic index methods. This is due to there being no details about the changing numbers of customer numbers per tariff within a year (which are present in the Ofgem data).
19. Given this limitation, the ONS can use an index method similar to that used to calculate the price indices for 12-month and 24-month mobile phone charges contracts, henceforward known as the 'cohort-tracking' method. The idea of this method, considered in the context of 1-year fixed tariffs, is that the average bill used to calculate the index for a given supplier in a given region will be the mean of (a) the average bill for the main tariff available from that supplier in that region in that month and (b) the average bill for each of the main tariffs available from that supplier in that region in the 11 previous

months. Hence, the average bill used to calculate the index will resemble a 12-month rolling average.

20. Underlying this method is the same assumption underlying the mobile phone charges contract price indices – that customers do not exit from their contract early, and that every month, $1/12^{th}$ of the customers on fixed tariffs from that provider in that region will come off their contract and take up whatever the current main tariff is from that supplier in that region.
21. The price index for a given supplier in a given region for a given month is then the rolling average bill for that supplier in that region in that month, divided by the corresponding rolling average bill in January.
22. The main advantage of such a cohort-tracking method, over a method which simply takes the average bill for the main tariff in a given month and divides it by the average bill for the main tariff in January, is that the cohort-tracking method considers the price movements (or lack thereof) experienced both by customers newly signing onto fixed tariffs, and those on fixed tariffs from previous months. As well as this coverage advantage, there is also the practical advantage of reducing volatility.

Aggregating the indices

23. Once there are indices for each supplier-region pair in the sample (e.g. supplier A in region X), they are weighted together with expenditure weights calculated using customer number data, and these weights are updated annually. The below indicative indices use Ofgem data to provide the customer numbers out of convenience, it could prove a useful data source for when the weights are updated annually in live production (using a January or October vintage, for instance).

Indicative indices

24. While the manual collection itself only commenced in August 2024, for the purposes of this paper, we have created a pseudo-historical back series for the manually collected data from the Ofgem dataset. Using information such as the tariff name, fixed tariff length, and when the tariff became available to customers and when it ceased to be available, we have attempted to automatically select a subset of the Ofgem data to represent the 1-year main tariffs available from each major supplier in each region for each index day, from 2018 to present. Fixed tariffs will generally persist in the data for at least 12 months, hence even though the Ofgem data is quarterly, we can construct a monthly series. This provides a single tariff per month for each supplier and region in the sample, these supplier-region indices are then aggregated using expenditure weights as described above.
25. Using this subset of the Ofgem data as a pseudo-back series, we have produced a cohort-tracking fixed tariff price index from 2019 to present, to compare with both our traditional variable tariff index, and an estimate of a multilateral index produced from the whole Ofgem dataset. As in the actual manual collection, this is for 1-year tariffs paid by direct debit excluding tariffs with multiple unit rates (e.g. economy-7).

26. This constructed back-series comes with a few caveats:
    a. The Ofgem dataset contained certain blank columns for certain suppliers and periods, reducing the accuracy of the automatic identification of main fixed tariffs in certain periods.
    b. There has been reduced levels of quality assurance on this constructed back series due to the time and resource limitations, for instance there are some implausible movements for particular suppliers in particular periods whose causes we otherwise would have investigated.
    c. During the period of historically rapid energy price inflation experienced between mid-2021 and mid-2023, for some suppliers there were periods when they did not widely offer new main fixed tariffs, leading to a sharply reduced number of data points feeding into the constructed back series in this period and a very low degree of confidence in the figures over this period. If the actual manual collection had been ongoing during such a period, ONS would likely have investigated imputation, but there has been insufficient time for that in this project.
    d. Both during the turbulent period mentioned above, and to a lesser extent in other periods, it is not always the case that our code has been able to identify the main tariff in a given month for a given provider, hence a 12-month average is allowed to be calculated if at least 6 of the last 12 months had valid main tariff values. This leniency has been adopted as shortcut for the constructed back series alone - as with above, if there were to be unavailability during the actual manual collection, ONS would investigate imputation.

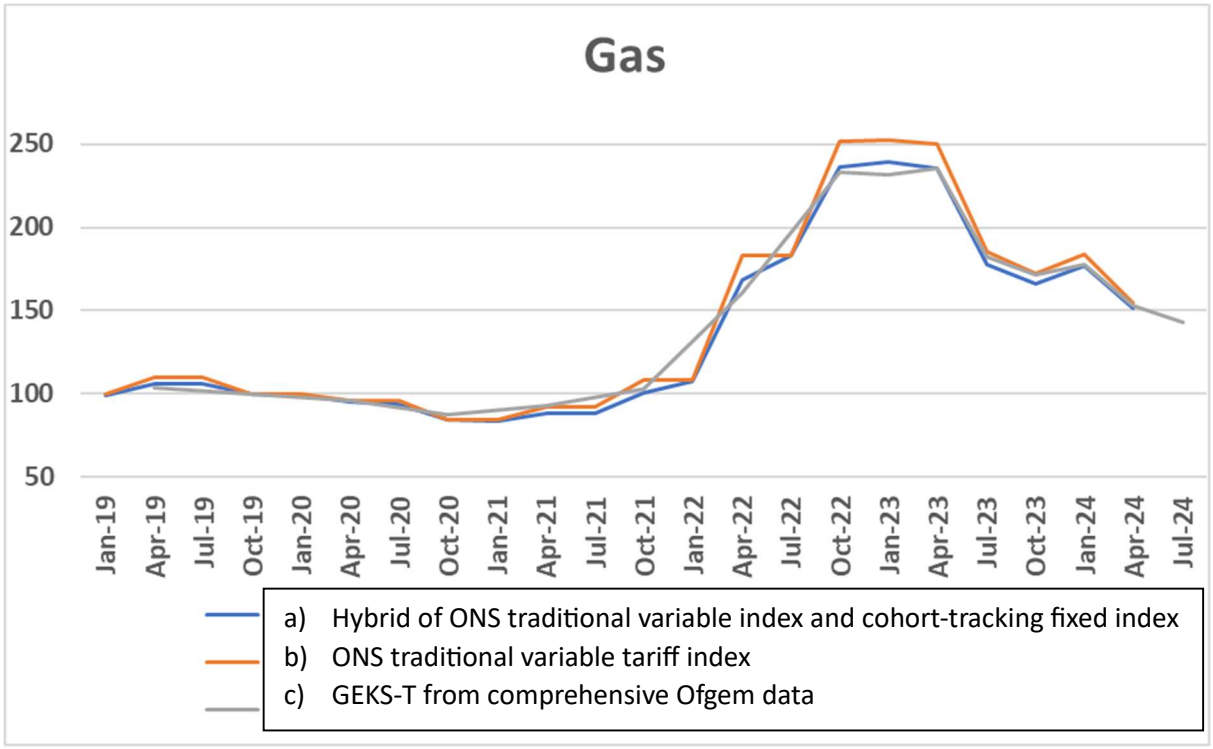
<u>Comparing indices</u>

27. The first pair of graphs compares different indices which represent both the fixed and variable tariffs:
    a. **Hybrid of traditional ONS variable index and cohort-tracking fixed index** (this is the option proposed for introduction in March 2025) - a weighted average of (i) the traditional ONS variable tariff index and (ii) the fixed tariff cohort-tracking index calculated from a constructed estimate of what the manually-collected data may have looked like had it been running in previous years
    b. **ONS traditional variable tariff index** - the scenario in which fixed tariffs are not directly accounted for and we continue using the traditional ONS matched-pairs variable tariff price index to represent both fixed and variable tariffs
    c. **GEKS-T from comprehensive Ofgem data** - an estimate of a multilateral index calculated from the comprehensive Ofgem data
28. Series (a) is described above, while series (c) is a GEKS-T multilateral index which uses an arithmetic mean to construct elementary prices at the lowest strata, calculated from the Ofgem data, which started in January 2019 and was biannual until January 2023, from which point it became quarterly, in line with the changes in the price cap frequency. Note that, in practice, only the first vintages of Ofgem data could be available for use in a given production

round, whereas this analysis uses final vintages for all periods except July 2024. A comparison of various estimates of multilateral indices is provided in the Appendix, along with commentary on outliers in the Ofgem data.

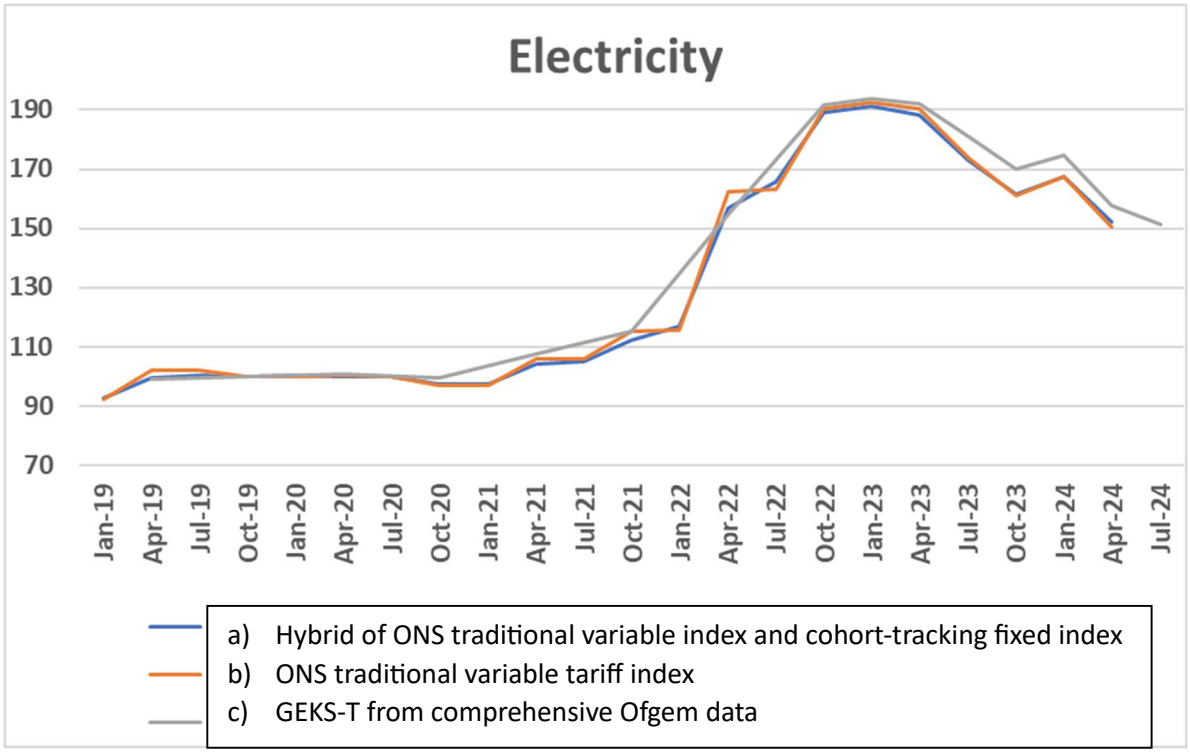
29. When considering these series, please bear in mind firstly the caveats relating to series (a) mentioned above, secondly fact that both series (a) and (c) shown below are produced from a specific configuration of options (e.g. the choice of variables in the aggregation structure), and thirdly that there are some differences in coverage between the three series.

30. Below, Figure 1 shows a comparison of the gas price indices for series (a), (b) and (c), equal to 100 in Jan-2020 (this base period has been chosen as there are known data issues near the start of the Ofgem series).



31. Generally, the hybrid index is closer to the multilateral index than the traditional variable tariff index is. The hybrid also appears somewhat smoothed compared to the traditional ONS variable tariff index.

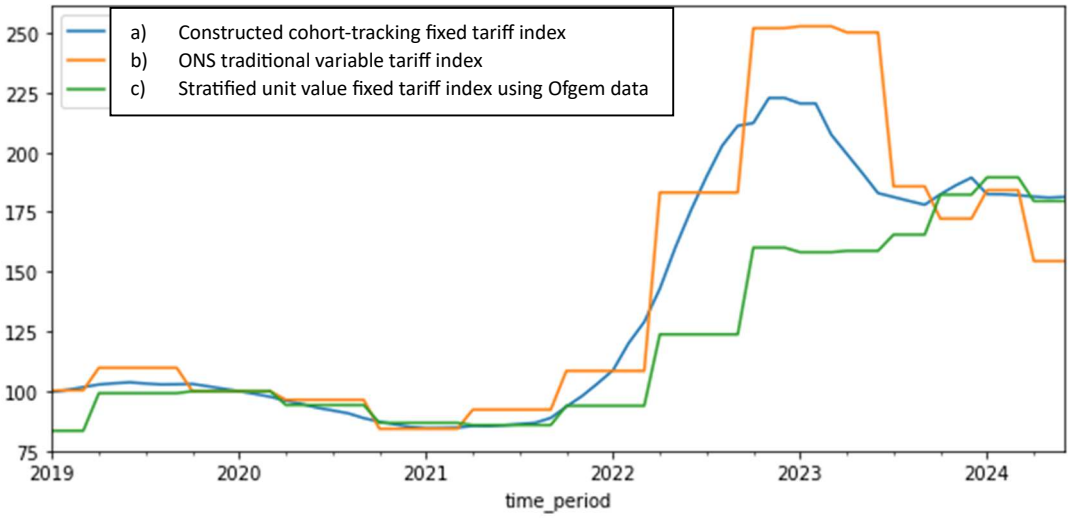
32. Figure 2 below shows series (a), (b) and (c) for electricity, equal to 100 in January 2020. Please note that the y-axis scale is different between figure 1 and figure 2.



33. There is greater difference in figure 2 between the multilateral index and either the traditional ONS index or the hybrid index.

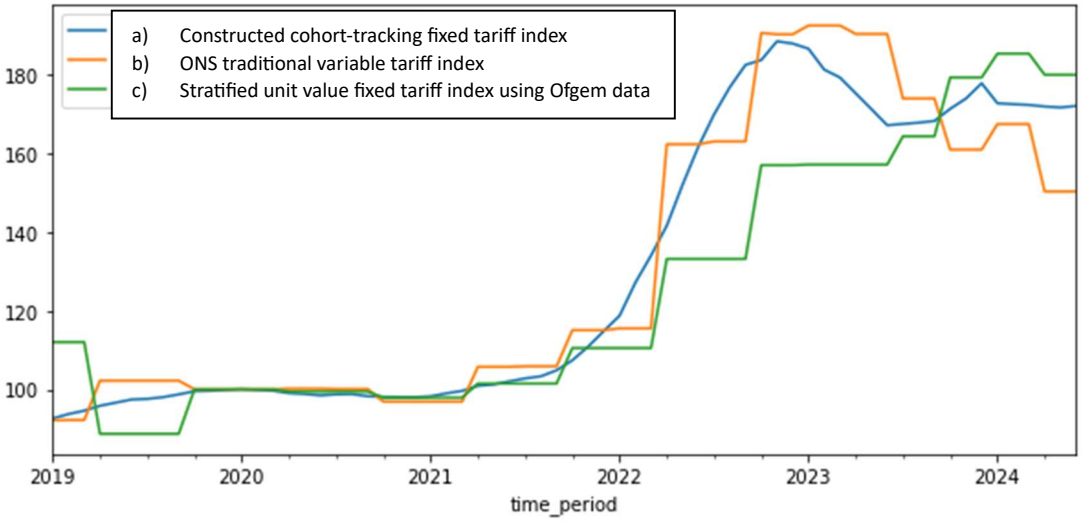
34. The second pair of graphs compares indices intended to represent just the fixed tariff component of the market, and show greater divergences than the indices presented in the first pair of graphs (which are indices covering both fixed and variable tariffs). These divergences will stem from differences in method and coverage, more work would be required to more fully understand these (the Ofgem data in particular is larger and more complex).
    a. **ONS traditional variable tariff index** – the scenario in which we continue to use the traditional variable tariff index to represent fixed tariffs
    b. **Constructed cohort-tracking index** – constructed from a subset of the Ofgem data designed to approximate what the manual collection may have looked like in previous years, as described and caveated above
    c. **Stratified unit value fixed tariff index** – this has previously been shown to the Panel in 2023 and is calculated from the comprehensive Ofgem dataset, the low-level indices track the weighted average bill for different groups of tariffs (e.g. direct debit fixed electricity tariffs in London), these are then weighted together

35. Figure 3 shows series (a), (b) and (c), for gas, equal to 100 in January 2020.



36. The constructed cohort-tracking series closely approximates the stratified unit value series until late 2021, at which point the energy market shocks reduce the prevalence of fixed tariff and hence the number of data points in the constructed series. Even in late 2023 and early 2024 there are periods in which the constructed series and the unit value series have different trends, however some lagged effects are to be expected with the 12-month rolling average. Overall, the constructed series is closer to the unit value series than the traditional series is.

37. Figure 4 repeats the comparison from Figure 3 but with electricity.



38. Similar patterns are present here as in the gas comparison.

Appendix

1. This Appendix compares different multilateral indices calculated using the Ofgem data, and comments on properties of the data (e.g. presence of outliers). At time of writing, research has not been completed to evaluate for unit value basis when defining the lowest level strata to determine grouped prices from the Ofgem data.
2. It is important to highlight that the current/presented Ofgem indices do not have any implemented methods at any stage of the aggregation for the targeted detection of outliers or for the application of imputation.

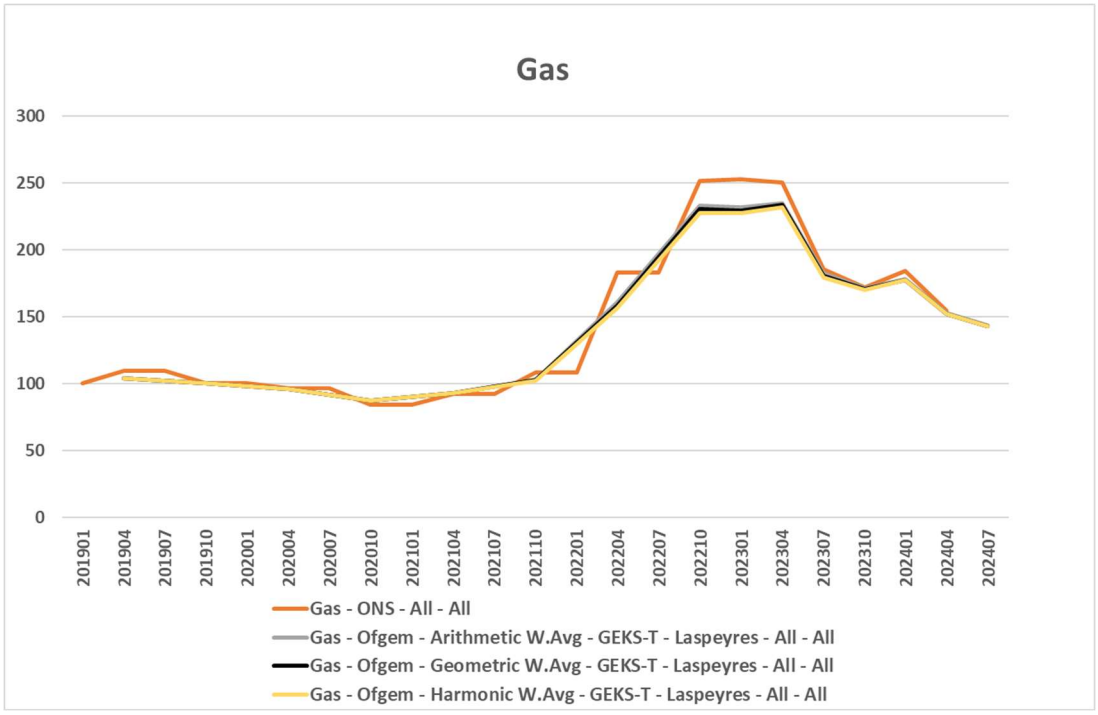
Ofgem outlier evaluation

3. The next pair of graphs compares different types of multilateral indices calculated from prices determined using either the weighted arithmetic mean, weighted geometric mean or weighted harmonic mean.
4. The use of weighted means to determine averaged prices prior to the calculation of indices is actioned to ensure one price is calculated for each of the lowest level strata definitions. Admin data often has multiple price observations for each low-level strata definition and the Ofgem data is not an exception.
5. Each of the discussed averages behaves differently when outlier observations are present in the data. The harmonic mean favours lower value outlier observations, the arithmetic mean favours high value outlier observations, and the geometric mean is influenced by both high and low value outliers. Hence, the following interval applies.

$$Harmonic\ Mean \leq Geometric\ Mean\ \leq Arithmetic\ Mean$$

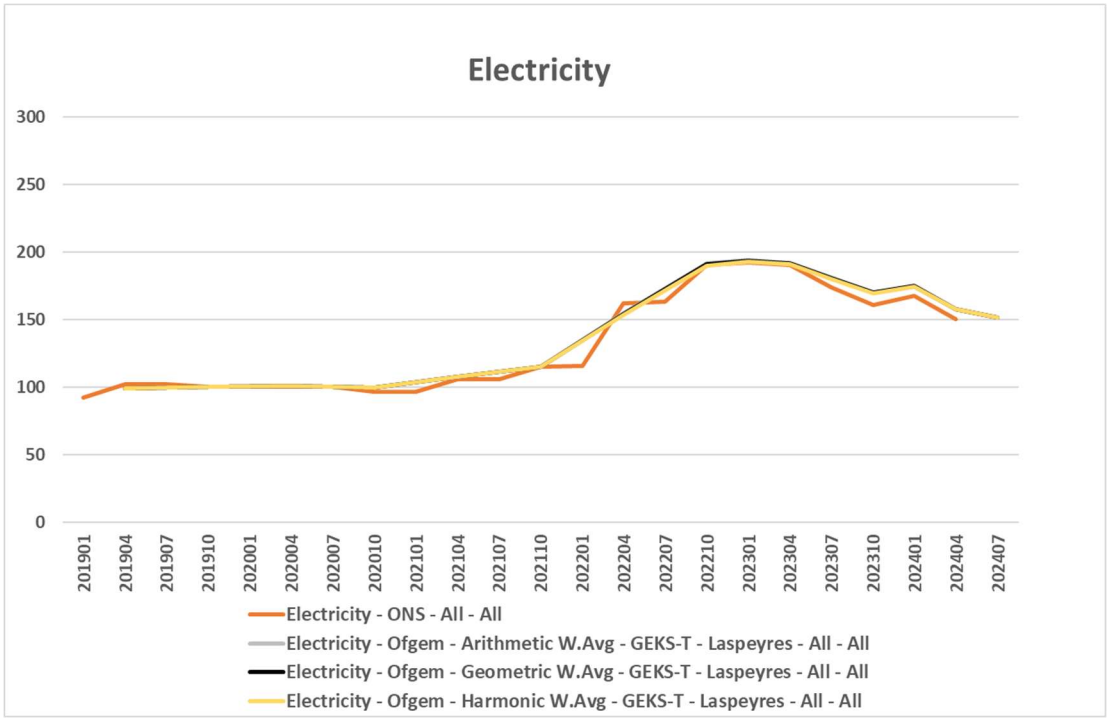
6. Therefore, by calculating the arithmetic and harmonic weighted means we can generate an interval to evaluate for the presence and degree of outliers in the Ofgem data over the course of the time series.

7. Figure 5 shows the index time series when using each of the weighted means to calculate lowest level strata prices for gas, equal to 100 in January 2020. The current ONS variable tariff index is added for comparison.



8. For the majority of the gas time series, there is little to no difference when using any of the three weighted averages, which implies negligible outlier activity. The exception is during 2022 when gas prices increased significantly, where small/mild differences (+/- 5 index points) can be found between indices calculated using the three weighted averages, suggesting the limited existence of outliers during this period of price volatility in the Ofgem data.

9. Figure 6 below repeats the comparison but for electricity, equal to 100 in January 2020.



10. Unlike the Ofgem data for gas, the Ofgem data for electricity shows almost no divergence for all observed periods between the index time series calculated using each of the three weighted averages to determine prices for the lowest level strata definitions. This can be considered as evidence for the absence of outliers in the observable data.

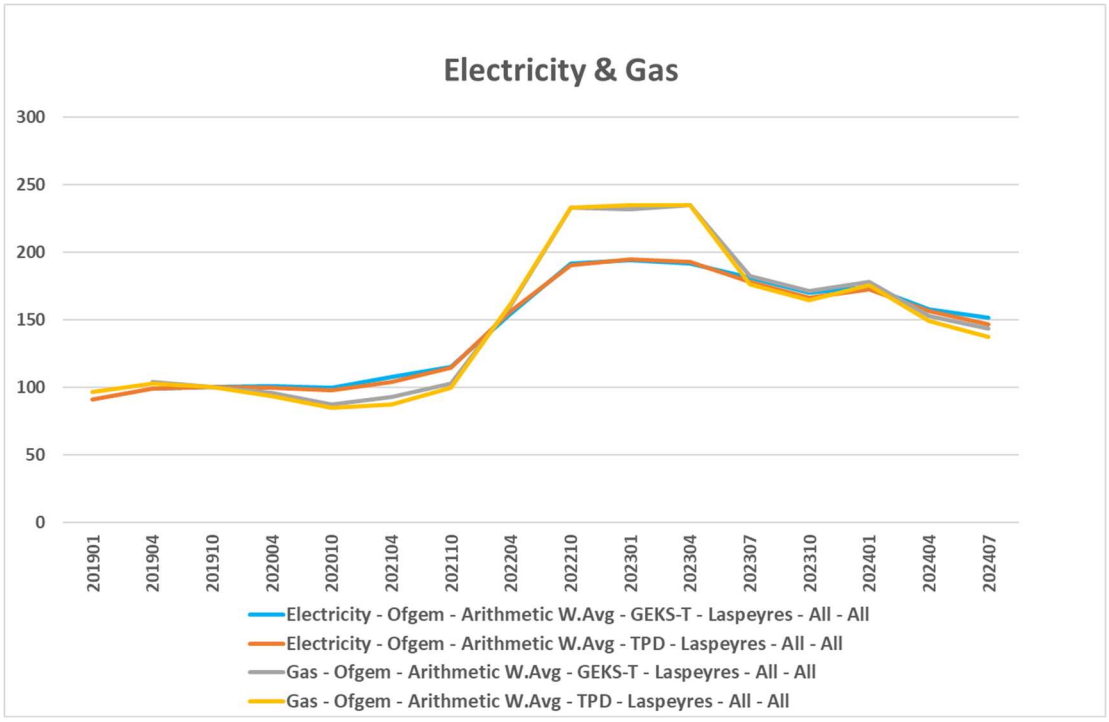
Ofgem data & multilateral methods

11. A comparison was actioned between the GEKS-T and TPD (Time Product Dummy) multilateral aggregation methods when applied to the Ofgem data and found minimal differences. Except for the most recent periods covered by the Ofgem data, which is likely due to these data points being incomplete or provisional and no steps are currently taken by the ONS to impute or otherwise resolve at the time of writing.
12. The GEKS-T method is based on the geometric mean of expenditure weighted Ofgem prices. The TPD method is the weighted ordinary least squares linear regression model of expenditure weighted Ofgem prices. All strata definitions, prices and quarterly weights used for the comparison are the same for both methods.

13. The advantages of multilateral price index methods include:
    a. The ability to aggregate incomplete price time series often provided by admin data sources.
    b. The ability to use prices weighted on a monthly/quarterly basis and frequently reclassified strata definitions without concerns relating to chain drift.

    Find below the link for published ONS details on multilateral methods and their applicability for generating CPI estimates from admin data.
    https://www.ons.gov.uk/economy/inflationandpriceindices/methodologies/introducingmultilateralindexmethodsintoconsumerpricestatistics

14. Figure 7 below shows the indexed price time series comparison between the GEKS-T and TPD (Time Product Dummy) multilateral aggregation methods for both gas and electricity.


Electricity & Gas
300
250
200
150
100
50
0
201901
201904
201910
202004
202010
202104
202110
202204
202210
202301
202304
202307
202310
202401
202404
202407
Electricity - Ofgem - Arithmetic W.Avg - GEKS-T - Laspeyres - All - All
Electricity - Ofgem - Arithmetic W.Avg - TPD - Laspeyres - All - All
Gas - Ofgem - Arithmetic W.Avg - GEKS-T - Laspeyres - All - All
Gas - Ofgem - Arithmetic W.Avg - TPD - Laspeyres - All - All