Price Index of Private Rents QMI

Quality and Methodology Information for the Price Index of Private Rents, detailing the strengths and limitations of the data, methods used, and data uses and users.

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Release date:
26 March 2025

Next release:
To be announced

Table of contents

1 . Output information

- Statistical designation: official statistics in development
- Data collection: administrative data from the Valuation Office Agency, Welsh Government, Scottish Government and Northern Ireland Housing Executive
- Frequency: monthly
- How compiled: hedonic double imputation index
- Geographic coverage: UK, countries, regions and local authorities or broad rental market areas
- Related publications: Private rent and house prices, UK: March 2025 bulletin

2 . About this Quality and Methodology Information report

This quality and methodology information (QMI) report contains information on the quality characteristics of the data (including the European Statistical System's five dimensions of quality) as well as the methods used to create it.

The information in this report will help you to:

- understand the strengths and limitations of the data
- learn about existing uses and users of the data
- understand the methods used to create the data
- help you to decide suitable uses for the data
- reduce the risk of misusing data

3 . Important points

- The Price Index of Private Rents (PIPR) uses a hedonic double imputation approach to measure the change in price of renting residential property from private landlords; this is an internationally recognised method, which is described in Chapter 5: Hedonic Regression Methods of the Eurostat Handbook on Residential Property Prices Indices (PDF, 8.1 MB).
- The PIPR reflects price changes for all privately rented UK properties, not only newly-advertised rental properties.
- The PIPR is calculated using rental data for the United Kingdom (UK), collected by Rent Officers operating for the Valuation Office Agency, Scottish Government, Welsh Government, and Northern Ireland Housing Executive (which includes data provided by propertynews.com).

4 . Quality summary

Overview of the PIPR

The Price Index of Private Rents (PIPR) measures the change in price of renting residential property from private landlords. The PIPR is published as a series of price indices and levels covering the United Kingdom (UK), its constituent countries, English regions, local authorities in England and Wales, and broad rental market areas in Scotland and Northern Ireland. All data presented are non-seasonally adjusted.

The PIPR aims to reflect price changes for all private rental properties (the stock, not only newly advertised properties) in the UK. England and Wales rents data is for achieved rents, but Scotland's source data is mainly for advertised new lets and data for Northern Ireland is entirely advertised new lets. PIPR uses these data to approximate the rental stock at a given point in time, to produce statistics aiming to reflect price changes for the average private rental property.

The PIPR uses administrative data. This means rental price statistics are produced using data that are already collected for other purposes. Private rental price data sources are Valuation Office Agency (VOA), Scottish Government (SG), Welsh Government (WG) and Northern Ireland Housing Executive (NIHE). These organisations deploy Rent Officers to collect the price paid for privately rented properties. Data for Northern Ireland also include data provided by propertynews.com.

The sources of annual expenditure weights include the VOA, SG, WG, NIHE, Office for National Statistics, the Department for Work and Pensions, and the Ministry of Housing, Communities and Local Government (MHCLG), formerly known as the Department for Levelling Up, Housing and Communities (DLUHC).

Uses and users

The production of private housing rental statistics is relevant for many purposes. This includes decisions relating to the provision of housing, mortgage lending, and the state of the rental market:

- the statistics contribute to the calculation of Consumer Prices Index (CPI), Retail Prices Index (RPI) and Consumer Prices Index including owner-occupier housing costs (CPIH)
- central government uses housing statistics to monitor economic performance and develop housing policies
- local government and devolved administrations use rental market statistics to monitor and develop housing policies in their local areas; these statistics are also used to understand how changes and policies at national level affect housing at the local authority or devolved level
- financial institutions use rental market statistics to inform decisions on setting interest rates
- landlords are interested in whether and where demand for new rental properties exist and the current state of the rental market, including average rental prices paid in their local area
- letting agencies are interested in the average rental price levels in their area, as well as the types of properties and their locations; they need to be able to advise potential landlords on the achievable letting price for their property but also require statistics in running their businesses

Strengths and limitations

Rich data sources

A strength of the PIPR is that it is constructed using large administrative data sources. Annually the Valuation Office Agency and the devolved administrations collect over 450,000 private rents prices in England, 30,000 in Wales, 40,000 in Scotland, and over 10,000 in Northern Ireland.

Data collection differences

Data collection differs across the UK. Data for England and Wales are achieved rents (for both new, renewal and existing tenancies), while Scotland rents data are mainly for advertised new lets, and Northern Ireland rents data are entirely for advertised new lets. Differences between new, renewal and existing tenancies, and how the Office for National Statistics (ONS) produces a stock measure of rental prices, are explained in our Measuring rents: stock vs flow blog.

The Cost of Living (Tenant Protection) Scotland Act capped in-tenancy rent price increases at 0% (and up to 3% in certain circumstances) until 31 March 2023. On 1 April 2023, this rent price increase cap was increased to 3% (and up to 6% in certain circumstances), as shown in the Scottish Government's news article, Scottish Parliament approves 3% rent cap. On 20 September 2023, the Scottish Government confirmed that this rent price cap would remain in place for up to six months from October 2023, as explained in their news article, Scottish Parliament approves final extension of tenant protections.

In Scotland, rents data are predominantly for advertised new lets (which are not subject to the price cap), with only a small proportion based on existing lets data. Data collection procedures do not involve actively seeking to re-collect data for previously collected properties. Therefore, price changes for existing tenancies are largely estimated for Scotland.

In PIPR, assumptions on average periods between rent price increases are used to measure price inflation for the stock of rents. We assume that rent price remains constant for up to 14 months if updated rents data for that property are not available. Records more than 14 months old are excluded from PIPR's model. This is a consistent methodology applied to rents data from England, Wales, Scotland and Northern Ireland, which aims to produce a stock-based measure, regardless of whether an advertised or achieved, or new, renewal or existing tenancy price is used.

Caution is advised when comparing estimates from both Scotland and Northern Ireland with estimates from other areas across the United Kingdom. This is because of differences in data collection and housing policy across the UK (in-tenancy rent price increases were capped in Scotland until 31 March 2024, with temporary changes to the rent adjudication system for existing tenants until 31 March 2025).

Estimates at local geographies

The newly developed methodology allows comparisons of rental price changes to be made at more detailed levels. However, while our average prices and growth rates at higher geographies are robust, low collection rates in some local authorities and broad rental market areas can lead to volatility at these levels. While efforts are made to account for this volatility, the change in price in these local levels can be influenced by the type and number of properties collected in any given period. Lower-level geographic breakdowns should be considered in the context of their longer-term trends rather than focusing on monthly movements.

Estimates for the City of London and the Isles of Scilly are not published because of low collection volumes.

Recent improvements

Our Private Rent and House Prices, UK bulletin, launched on 20 March 2024, using the Price Index of Private Rents methodology for Great Britain and the Index of Private Housing Rental Prices (PIPR) methodology for Northern Ireland. On 26 March 2025, we improved the PIPR methodology to additionally cover Northern Ireland. This means that from March 2025, PIPR methodology is used for all of the UK.

This follows work to improve and transform our private rental price statistics, as explained in our Redevelopment of private rental prices statistics, impact analysis, UK article, which includes making better use of existing data sources, improving methods, and developing systems. Prior to March 2024, the Index of Private Housing Rental Prices, UK bulletin was our lead measure of rental price changes.

Any future methodological changes made to the Price Index of Private Rents will be described in the Private rent and house prices, UK bulletin, and in this quality and methodology information report.

5 . Quality characteristics of the PIPR data

This section describes the quality characteristics of the data and identifies issues that should be considered when using the statistics.

Relevance

(The degree to which the statistical product meets users' needs for both coverage and content.)

The Price Index of Private Rents (PIPR) was developed in response to user feedback. In the Office for Statistics Regulation's (OSR's) Systemic review of Public Value: Statistics on Housing and Planning in the UK (PDF, 534KB), two main areas for development were identified:

- the publication of private rental price levels that are comparable over time, including a historical data time series
- the publication of increased geographic detail

The Price Index of Private Rents methodology replaces the Index of Private Housing Rental Prices methodology.

The same rental data used in the PIPR are also used to construct the owner-occupiers' housing costs component of the Consumer Prices Index including owner-occupiers' housing costs (CPIH) under the rental equivalence approach.

Accuracy and reliability

(The degree of closeness between an estimate and the true value.)

Estimates are based on a sample of private rents, rather than a census. Data underlying the Price Index of Private Rents (PIPR) are collected by Rent Officers from letting agents and landlords who are willing to provide data on their rental properties, as explained in our Price Index of Private Rents Quality assurance of administrative data methodology. The sample is purposive. To ensure a representative sample, Rent Officers in the Valuation Office Agency (VOA), and the devolved Scottish and Welsh Governments, and Northern Ireland Housing Executive, set targets to collect rental data in each area based on Census data.

PIPR uses expenditure weights to ensure that aggregated, headline data is representative of expenditure on rental properties in the UK. The expenditure weights represent the share of expenditure on rental properties at a granular level across the UK. By using expenditure weights, we are able to account for geographic differences in the rates of data collection and to mitigate the limitations of using a purposive sample.

Rents data for Northern Ireland are delivered with a two-month lag compared with our other sources of rents data. To publish timely estimates at a UK level, we impute the missing Northern Ireland data for the latest two months. More detail on our imputation methods is provided Section 6: Methods used to produce the PIPR data.

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain, for example, geographic level.)

Coherence

There are several approaches to measuring rental price changes over time, each measuring something different.

The PIPR aims to measure the "stock" of rents. This captures average rental price changes experienced by the entire private rental sector, using data for both new and existing tenancies in the reference period.

Another approach is to measure the "flow" of rents, which would capture the price of new tenancies starting in the reference period.

The flow of "achieved" rents would use rents for new tenancies and renewals that have successfully started in the reference period. The Office for National Statistics (ONS) is unable to create a flow of achieved rents measure, as the rents data sources do not include the start date of the tenancy or any other indicator to identify whether a tenancy is new, a renewal or an existing tenancy.

The flow of "advertised" rents is measured by private sector organisations (such as Homelet, Rightmove and Zoopla) using data for advertised new lets, this will include advertised lets that do not lead to a tenancy starting, and will not capture where the achieved rent price differs from the initially-advertised price.

Since measuring the "flow" of rents would only reflect the minority of tenancies (those that are just starting), measuring the "stock" of rents is necessary to understand average price changes experienced by all privately renting tenants.

Given the different dynamics that affect an advertised price compared with achieved rents, there can be expected differences in the measured inflation rates. In particular, advertised prices are generally much quicker to reflect changes in market dynamics because they immediately reflect what landlords and agents expect to achieve.

A comparison of advertised rents against our achieved stock based measure (PIPR) is published annually in our January PIPR statistical bulletin. A Measuring rents: stock vs flow blog explains the difference between a stock and flow measure.

Comparability

The Price Index of Private Rents statistics can be compared over time and across geographies. However, data collection practices differ across the devolved nations, which makes it difficult to compare trends between some UK countries. In England and Wales, data for achieved rents are collected for both new and existing tenancies, and Rent Officers attempt to collect updated data for properties within the following 12 months. In Scotland and Northern Ireland, rents data are predominantly for advertised new lets, and data collection procedures do not involve actively seeking to re-collect data for previously collected properties.

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.)

All the statistics published by the Office for National Statistics (ONS) are available under the Open Government Licence.

The ONS website aims to meet accessibility standards, as set out in our accessibility statement.

The Private rent and house prices, UK statistical bulletin (which includes the Price Index of Private Rents (PIPR) for the UK) can be accessed from 9.30am on the day of publication.

For general enquiries on the PIPR, please contact us via email at hpi@ons.gov.uk.

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

The Private rent and house prices, UK release is a monthly publication, launched on 20 March 2024. The statistical bulletin is published on the second or third Wednesday following the reference period, subject to receipt of data.

Details on upcoming releases can be found on our Release calendar web page, which provides six months' advance notice of release dates. Public attention will be drawn to any change to the pre-announced release schedule, and the reasons for the change will be explained fully, as set out in the Code of Practice for Statistics.

Concepts and definitions (including list of changes to definitions)

(Concepts and definitions describe the legislation governing the output and a description of the classifications used in the output.)

The Ministry of Housing, Communities and Local Government's (MHCLG's) Housing statistics and English Housing Survey glossary is available on GOV.UK.

Broad rental market area

There are various ways in which you can classify the different geographies of a country. Once such classification is the Broad Rental Market Area (BRMA). The definition for a BRMA is where a person could reasonably be expected to live, taking into account access to certain facilities and services.

We are unable to use local authority geographic classifications for Scotland and Northern Ireland and instead use use BRMA for these.

Monthly dataset

We measure how the prices of the stock of rental properties are changing each month, including both new and existing rental properties. To do this, we assume that the price of a property remains valid for up to 14 months from the point of data collection. Each month, we create a dataset that represents the stock of rental properties, which is used to measure how average rental prices have changed. This dataset is referred to as the "monthly dataset". Further information on how the monthly dataset is created can be found in Section 6: Methods used to produce the PIPR data.

Elementary aggregate

An elementary aggregate is the lowest-level aggregate for which expenditure data are available and used for index construction purposes.

Geography

The Price Index of Private Rents (PIPR) is used to produce private rental price statistics for the United Kingdom, its countries, English regions, local authorities in England and Wales, and Broad Rental Market Areas in Scotland and Northern Ireland.

Property postcodes are mapped to higher-level geographies using the National Statistics Postcode Lookup and the Postcode Directory, which can be accessed through our Open Geography portal.

Why you can trust our data

We commit to the pillars, principles and practices of the Code of Practice for Statistics in producing Price Index of Private Rents (PIPR). In 2024, we requested a quality-focused assessment of PIPR by the Office for Statistics Regulation (OSR). This was the first step towards achieving accredited official statistics status. The OSR published their Spotlight on Quality Assessment: Price Index of Private Rents (PIPR) report in October 2024, which included some requirements for the Office for National Statistics (ONS) to address before submitting PIPR for a full assessment. The ONS' intentions for addressing these requirements are outlined in our Private rental prices development plan, which we aim to update quarterly.

6 . Methods used to produce the PIPR data

The Price Index of Private Rents (PIPR) brings together several administrative data sources. More information on how we have assessed the quality of these can be found in our PIPR Quality assurance of administrative data methodology.

Main data sources

The data sources used to produce the PIPR fall into two distinct categories: price data, and property attributes data. The price data provide details on the price at which a residential property has been rented. This data source also includes limited information on property attributes. The price data are combined with other existing data sources to obtain further property attributes, such as the age of the property and floor area.

Private rents data for England and Wales are based on achieved rent, that is the actual price a tenant pays to rent the property; we are not able to distinguish within these data whether this represents a new let, a renewal or the price of an existing lease. Private rents data for Scotland are mainly based on advertised rents and some achieved rents, while data for Northern Ireland are based entirely on advertised rent only and we are unable to determine the achieved rent for these properties.

Private rents data are collected separately in England, Scotland, Northern Ireland and Wales by Rent Officers as part of their responsibilities to administer functions relating to Housing Benefit and Universal Credit. Rent Officers collect rental prices from letting agents and landlords who are willing to provide data. The sample is purposive, but Rent Officers use Census data to set collection aims that are representative of the private rental market.

Rents data is collected in all countries of the UK to support statutory work. To maintain a representative sample of private rents, data are collected voluntarily from the Private Rented Sector (PRS), including from private landlords, letting and managing agents, investors, tenants, administrative authorities and companies supporting the sector. The property sector comprises many independent agents and larger agency groups.

For England, about 37% of rents data are sourced from the larger companies with multiple branches. Data provided in 'bulk' is quality assessed and only accepted if the Rent Officer is satisfied it is valid. Collaboration with the MHCLG enables Valuation Office Agency (VOA) Rent Officers to also use data provided by the three Tenancy Deposit Protection (TDP) schemes to support data collection. This administrative TDP dataset is updated regularly and provides insight into potential rents data suppliers. VOA Rent Officers contact letting agents primarily, and the data provided are validated by sampling. Regular contact with the supplier is maintained where possible to ensure changes in rent are captured at future updates. Direct TDP-informed rents data collection comprises about 12% of VOA's lettings information collection.

For Wales, approximately 26% of rents data was sourced from 'bulk' data collection activities in 2024. TDP data is not utilised in Wales's data collection.

For Scotland, about 15% of rents data is obtained in 'bulk' from larger companies within multiple branches. TDP data is not utilised in Scotland's data collection.

For Northern Ireland, rents data collection relies entirely on advertised new lettings. TDP data is not utilised in Northern Ireland’s data collection.

We meet regularly with our main data providers to identify and resolve emerging collection or data issues, to query unusual trends and to discuss future data collection improvements. More information on our communication with data providers is provided in PIPR Quality assurance of administrative data methodology.

How we process the data

The new measures of rental prices are produced using a hedonic double imputation approach, which allows for mix-adjustment of the monthly price data to account for changing composition of collected rental properties. This ensures that when we analyse rental prices, we are comparing like with like. This is similar to the approach used to calculate the UK House Price Index, but tailored to suit the rental data. A fuller description of the hedonic double imputation approach and alternative methods for constructing house price and rental price indices can be found in the Eurostat Handbook on Residential Property Prices Indices (PDF, 8.1MB).

The most important stages in the PIPR data production process are:

1. Input rental price data are cleaned and linked to property attributes data.

2. On an annual basis, a "fixed basket" of properties is created (using the previous 12 months of collected data), and missing-property characteristics are imputed.

3. On a monthly basis, a monthly dataset is created, and missing-property characteristics are imputed.

4. Each month an ordinary least squares (OLS) regression model is fitted to the monthly dataset to derive imputed prices for properties within the fixed basket for the current month (hedonic regression model).

5. Elementary aggregates are produced at a stratum-level (local authority by property type by furnished status, or local authority by bedroom category) by taking an unweighted geometric average of price relative within a stratum.

6. Elementary aggregates are weighted together using expenditure weights into a Lowe index, and then chain-linked annually to produce a rental price index series to track prices over time.

7. The corresponding average rental price series is derived by applying the change in the index to a base set of rental prices from the reference period (currently January 2023).

We use the same statistical process for rents data from each data source. We do this to ensure a consistent approach in our processing, and because our analysis has not shown any evidence to use a different method between countries.

Input data cleaning and linking

We link rental price data to property attributes data using properties' Unique Property Reference Number (UPRN). Separately, we also link to a geo-demographic segmentation (ACORN) using property postcode, which allows us to control for differences between smaller areas.

The input data are quality assured and cleaned by the data providers, who check for implausible values (for example, high or low rents) and duplicates. They are then entered into the Office for National Statistics' (ONS') Address Index Matching Service (AIMS) tool to obtain a UPRN for each property, and derived variables (such as property type, bedroom category and furnished status) are created.

Table 1: Average linking rate from January 2015 to December 2024

	VOA Council Tax	Land and property services valuation list	Acorn
England rental data	91.0%	N/A	99.8%
Wales rental data	91.4%	N/A	99.9%
Scotland rental data	N/A	N/A	99.9%
Northern Ireland data	N/A	86.5%	99.1%

Source: Price Index of Private Rents from the Office for National Statistics

Notes

1. The linking rate to Valuation Office Agency (VOA) Council Tax has increased over time reaching on average 95.9% for England and 93.7% for Wales in 2024.

Creation of annual fixed basket and imputation of property characteristics

The PIPR methodology is mix-adjusted to control for different types of rental properties being collected in different months. The process of mix-adjustment (which ensures we are comparing like with like throughout the year) requires that, in each January, a fixed basket of properties is created using all the collected rental properties in the previous year. Within this process, duplicate records for the same property are removed so that only the most recent record collected is used. Prices to rent a single room in a house of multiple occupancy (HMO) are also removed.

A decision tree regressor (for continuous variables) and a decision tree classifier (for categorical variables) is used to impute any missing data in price-determining characteristics of rental properties. This uses the open source Decision Trees - scikit-learn python package.

Table 2: Average imputation rate from the fixed basket between January 2015 and December 2024

	England & Wales	Scotland	Northern Ireland
Property type	0.00%	0.17%	0.36%
Number of bedrooms	0.00%	0.00%	0.00%
Furnished status	0.00%	0.00%	N/A
Floor area	10.84%	N/A	13.53%
Property age	10.30%	0.24%	19.96%
Acorn category	0.05%	0.01%	1.09%

Source: Price Index of Private Rents from the Office for National Statistics

After imputing for missing characteristics, the fixed basket is used (as described in the Hedonic regression model section below) to produce imputed rental prices throughout the current year (and the subsequent January), before a new fixed basket is constructed in the subsequent January.

Creation of monthly dataset

The monthly dataset of properties used in the calculation of the Price Index of Private Rents (PIPR) uses a stock measure of rental prices; that is, both new and existing rentals are accounted for. This is in line with current international best practice, although the Office for Statistics Regulation's (OSR's) Systemic review of Public Value: Statistics on Housing and Planning in the UK (PDF, 534KB) points to recent research that suggests a flow measure may be worth considering; that is, only new lets. Currently it is not possible for us to distinguish between new lets and existing lets in our data collection.

Each month we receive new delivery of rents data collected by Rent Officers over the month. For the purposes of PIPR production, a month is defined as the 28th of the preceding month to the 27th of the named month. The newly collected data will include updated data for previously collected properties that were already in the monthly dataset, as well as data for properties not previously collected within the preceding 14 months. Following each monthly data delivery, the monthly dataset is updated as follows:

1. If the property was not in last month's monthly dataset, that property record is added to the current month's monthly dataset and the time in dataset set to one.

2. If the property was in last month's monthly dataset, then the property's price and other characteristics are updated, and the time in dataset reset to one.

3. For remaining properties in last month's monthly dataset for which there has not been a price update in the latest data delivery, the existing price is retained and the time in dataset increased by one.

4. Any properties that have not received a price update for over 14 months (and therefore with a time in dataset greater than 14) are removed from the current month's monthly dataset. We refer to this as the 14-month validity period.

A 14-month validity period is applied to balance typical fixed-term contract lengths (during which rent prices remain fixed, and which tend to be either 6, 12, 18 or 24 months) against operational practices (the typical time between updates for properties collected by Rent Officers is between 12 and 14 months for England). There are methodological benefits (in terms of substantially improving the number of property updates) to using a 14-month validity period over using a shorter period, which would only capture a small proportion of record updates.

The price of an existing property in the monthly dataset is only updated when a match is identified in the newly collected data and the price change is within the acceptable tolerance level. The price update is deemed valid if it meets both of the following constraints:

- the new price is less than the previous price multiplied by 1.49995

- the new price is more than the previous price multiplied by 0.6667

Prices to rent a single room in a house of multiple occupancy (HMO) are also removed.

As with the annual fixed basket, some properties in the monthly dataset may be missing one or more of their price-determining characteristics. Prior to running the hedonic regression model, a decision tree regressor is used to impute for missing floor area. Other (categorical) missing variables are set to a "missing" category.

Hedonic regression model

In a hedonic regression, properties are defined in terms of a set of characteristics, each of which contributes to the rental price of a property. For example, the number of bedrooms or the location of the property will influence the rent price, but no features can be priced in isolation - they are jointly determined in the ordinary least squares (OLS) regression.

Therefore, once the monthly dataset is created and property characteristics imputed, the monthly dataset is fitted to a regression model to estimate the contribution of each characteristic to the natural logarithm of the rental price of a property. The model of the price (in pounds) is therefore non-linear. A separate regression model is run for each month, and for each country.

The price-determining characteristics that we use in the regression are:

- number of bedrooms
- natural log of floor area in square meters (used only for properties in England, Wales and Northern Ireland)
- property type (detached, semi-detached, terraced, and flat or maisonette)
- furnished status (used only for properties in England, Wales and Scotland)
- geo-demographic segmentation (ACORN)
- local authority district in England and Wales, and broad rental market area in Scotland and Northern Ireland
- property age bracket

For Scotland, the floor area has been excluded from the regression model because the address information available in the rental data is not suitable for linking.

For Northern Ireland, furnished status has been excluded from the regression model because data on furnished status is not collected by our data supplier.

For our regression model, we use a semi-log ordinary least squares (OLS) model, with the mathematical formulation:

$$ln(p_i) = k + \sum_j \beta_j x_{ij} + e_i$$

Where:

- p_i is the rental price of property i
- k is a constant
- $_j$ is the coefficient associated with characteristic j
- x_{ij} indicates whether property i has the characteristic j (such as detached property); if so, it takes the value 1, otherwise it takes the value 0 (except for floor area where it takes the value of the natural logarithm of floor area)
- e_i is the statistical error term for property i

The OLS regression is run once, internally studentised residuals are calculated, and any properties with an absolute value of the studentised residual greater than or equal to four, are considered an outlier and are dropped from the sample. The regression is run again on the reduced dataset, and the coefficients' estimates obtained from this second regression are applied to the fixed basket.

Creation of elementary aggregates

The ordinary least squares model produces coefficients, which are used to calculate an imputed rental price for each property within the annual fixed basket for each month of the year. This allows calculation of a price relative of imputed rents for each property between every month and the base month, January.

From there, a Jevons index can be calculated for imputed rental prices within each stratum (local authority (LA) by property type by furnished status, or LA by bedroom category). This is the elementary aggregate. The Jevons is an unweighted geometric average of price relative within a stratum. The formula is:

$$A_{s,t} = \left(\prod_{i \in s} \frac{p_{i,t}}{p_{i,jan}} \right)^{\frac{1}{n}_s}$$

Where:

- $A_{s,t}$ is the elementary aggregate for stratum *s* at time *t*
- $p_{i,t}$ is the imputed rental price of property *i* at time *t*
- $p_{i,jan}$ is the imputed rental price of property *i* in base period for that year, the first January
- the ratio of $p_{i,t}$ to $p_{i,jan}$ is thus the price relative for property *i*
- the product is over all properties *i* within stratum *s*
- n_s is the number of properties in stratum *s*

Strata that have low property counts (less than five properties) in the fixed basket are imputed using the local-authority level aggregate as a donor, because we judge strata with low counts to have sample sizes too small to provide a reliable estimate for an index.

When calculating the statistics used for the Retail Prices Index (RPI), we use an arithmetic mean of the price relatives (Carli) between the current month and the base month, instead of a geometric mean of the price relatives (Jevons).

Expenditure weights

To ensure representativeness of the UK rental market expenditure weights are used when aggregating data. In particular these allow us to mitigate the impact of our rental price data being a purposive sample.

Expenditure weights are updated annually and are calculated at the strata level. We consider strata to be the most granular level of data produced by PIPR. Our expenditure weights are calculated for every local authority (England and Wales) or broad rental market area (Scotland and Northern Ireland), by property type, by furnished status and for every local authority or broad rental market area by bedroom category.

To calculate expenditure we multiply the latest estimate of the dwelling stock for each stratum with its average observed rental price. The distribution of expenditure across the UK as a proportion, is the expenditure weight. Dwelling stock data come from the Office for National Statistics, the Scottish Government, the Welsh Government and the Department of Finance (Northern Ireland).

Estimates for observed rental prices are produced using the rental price data supplied by the Valuation Office Agency (VOA), Scottish Government, Welsh Government and Northern Ireland Housing Executive.

Dwelling stock estimates for England, Scotland and Wales are broken down by local authority and tenure type; for PIPR we only use dwelling stock estimates for privately rented properties.

Dwelling stock estimates are split by the proportion of property types rented privately in Wales, Scotland and the nine regions of England using data from the English Housing Survey, Scottish Housing Conditions Survey, and Census (for properties in Wales). Dwelling stock estimates are also split by property furnished status using the national-level split estimated by the Living Costs and Food Survey.

For Northern Ireland, dwelling stock estimates are broken down by property type and data from the Northern Ireland House Conditions Survey are used to calculate the number of properties of that type that are privately rented.

To calculate estimates by bedroom category, the Family Resources Survey is used to split the dwelling stock volumes by bedroom category.

Our expenditure weights are calculated annually in February and an indicative weights summary is published alongside our bulletin. To ensure our weights are timely, we use the most recently published data from each source. We have chosen these data sources to calculate our expenditure as our analysis has shown these to be the most reliably official statistics available that meet the needs of PIPR.

PIPR uses the annual expenditure weights monthly to aggregate indices and price level data from our most granular levels up to headline statistics. By using expenditure weights, we ensure that aggregated data produced by PIPR are representative of expenditure on rental properties in the UK, and we are able to account for geographic differences in collection rates across the UK.

Aggregation of elementary aggregates

The within-year index at national level is calculated from the elementary aggregates and expenditure weights as follows:

$$index_{y,t} = 100 \sum_{s \in GB} (A_{s,t} \times w_{s,y})$$

Where $index_{y,t}$ is the index for United Kingdom (UK) in year *y*, month *t,* $A_{s,t}$ is the elementary aggregate (post low count imputation for strata with low counts) for stratum *s* in month *t* and $w_{s,y}$ is the expenditure weight for stratum *s* in year *y*. The summation is over all strata *s* within the country (UK).

The within-year index for each country, region and local authority is calculated in the same manner, where the sum is over all strata associated with the given geographical area for that index.

This within-year index starts at 100 for January and runs for 13 months to January of the following year.

Within-year indices are combined into a single continuous index using standard chain-linking methods, with the overlap period being in January. For an overview of chain-linking, see Section 12.4.2 in ONS' Consumer Prices Indices Technical Manual, 2019 article, which describes the standard chain-linking methodology used in ONS' price statistics (including in PIPR, UK House Price Index and Retail Prices Index).

A three-month moving average has been applied to estimates below the regional level to reduce volatility caused by low data collection. For example, at the local authority and broad rental market area level, the published estimate for March is a simple average of the raw estimates for January, February and March.

Creating a UK index and PIPR's two-month revision policy

Rental price data for Northern Ireland are delivered to us with a two-month lag, meaning that while data for Great Britain are available for the published month, Northern Ireland data are not available for the published and previous month. As Price Index of Private Rents (PIPR) statistics contribute to the calculation of the Consumer Prices Index (CPI), Retail Prices Index (RPI) and Consumer Prices Index including owner-occupier housing costs (CPIH), it is essential that we produce timely estimates.

To create an overall UK index of private rental prices, we impute the two most recent periods of the Northern Ireland index. We impute the two most recent periods for Northern Ireland by carrying forward the latest available two-month inflation rate (from the two previous periods) for Northern Ireland. From our analysis, we have found this method provides accurate forecasts and reduced bias. Each month, the latest rental price data delivery from Northern Ireland is used to revise imputed index values for Northern Ireland.

For example, when creating the PIPR index for June, data for Northern Ireland will only be available up to April. We will impute the June index for Northern Ireland, by taking the April index and inflating it by the growth rate between February and April for that index (see Table 3). Similarly, we will re-impute the May index by inflating the April index by the average growth rate between February and April.

Table 3: Example of imputing two most recent months data for Northern Ireland

Month	GB Index	NI Index	UK index
Weight	98%	2%	100%
Jan	100	100	100
Feb	101	100.6	100.99
Mar	101.5	101	101.5
Apr	102.6	101.8	102.58
May	102.9	102.41 (imputed & unpublished)	102.89 (imputed & published)
Jun	103.4	103.01 (imputed & unpublished)	103.39 (imputed & published)

Source: Office for National Statistics

Notes

1. These are not real data; they have been constructed for illustrative purposes only.

Every month we will revise the two most recent monthly estimates for the UK. This will include the delivery of previously unavailable data for Northern Ireland and allows us to replace previously imputed data with actual data. Only the UK series will be subject to this imputation and later revision. Our analysis has shown that revisions to the UK series is likely to be minor, with the annual percentage expected to be revised by no more than 0.02 percentage points under "typical" rental market behaviour.

This is the only regular revision of the PIPR series. We will notify users of PIPR statistics of any planned revisions within the Private rent and house prices bulletin.

Publication of estimated average prices

Alongside the PIPR index, we also publish a series of estimated average rental prices. The estimated average rental prices are based on the imputed prices, that is those predicted by the hedonic regression model.

To produce the time series of estimated average rental prices, a base set of imputed prices is uprated with the price index growth rate. The current base prices are weighted averages of the January 2023 imputed prices. By uprating reference-period prices using the index, we are able to create a series of rent price levels that are comparable over time.

To ensure the base set of rental properties remains representative, the base period for the price series will be updated every five years. When the series are re-based, the entire price level series will be recalculated using the new base period. Updating the base period regularly will ensure that our price levels are reflective of the current stock of rental properties. Note that, when we update the base period, the average rental price series will change but the inflation measure will not be revised, this is similar to the approach we use for our UK House Price Index.

For example, the initial base period for the PIPR is January 2023, and in five years we expect to change the base period to January 2028. This is illustrated, with mock data, in Table 3. For example, the 2028 base year price for 2018 of £967 is calculated by dividing the 2028 actual average imputed price (£1,405), by the price growth from 2018 to 2028 (which is £1,394 divided by £959).

Table 4: Example of re-referencing in the Price Index of Private Rents

Year	Price index (2023 = 100)	2023 base year price series (£)	Actual average imputed price (£)	2028 base year price series (£)
2018	86	959		967
2019	85	948		955
2020	85	948		955
2021	87	970		978
2022	94	1,048		1,057
2023	100	1,115	1,115	1,124
2024	107	1,193		1,203
2025	112	1,249		1,259
2026	115	1,282		1,293
2027	120	1,338		1,349
2028	125	1,394	1,405	1,405
2029	130	1,450		1,461

Source: Office for National Statistics

Notes

1. These are not real data; they have been constructed for illustrative purposes only.

Note that changing the reference period does not affect the previously published growth rate. This is shown in the example (which is based on mock annual data, rather than monthly, for ease of presentation). This approach ensures that a set of comparable average rental prices are published, and that these prices remain representative of the current market.

Creation of a historical series

There is a user need to understand the long-term inflation in private rents. Data from the PIPR are our best source of rents inflation data, but is only available from 2015. Our other main source of inflation data is the Index of Private Housing Rental Prices (IPHRP), which has a longer historic series.

The historic series from PIPR starts from January 2015. We are unable to extend the PIPR series further because there are lower data volumes and worse address quality in earlier periods for Great Britain. Also, the hedonic regression model used in PIPR will not provide robust estimates before 2015. Additionally, rents data for Northern Ireland (and therefore the UK) are unavailable before January 2015.

Our best source of rents data from before this point come from the IPHRP. IPHRP uses different methods to PIPR, but it does use the same source rental price data as PIPR.

We have compared these two indices for the period from 2015 to 2023 in our Redevelopment of private rental price statistics, December 2023 article. We have found that PIPR tends to be more responsive to changes, better representing the rental market and reports a slightly higher annual growth rate compared with IPHRP during periods of high growth. Meanwhile, during periods of slower growth, PIPR and IPHRP converge.

To produce this historical series, we have chain-linked IPHRP with PIPR at January 2015. This has involved re-referencing the IPHRP indices, so that the IPHRP index value matches the corresponding PIPR index value in January 2015. This results in a continuous series of indices for private rents.

This historical series has a methodology break between December 2014 and January 2015 as we change from the IPHRP to the PIPR methodology. The annual percentage change series has a period of transition during 2015 where the annual change has been calculated using both PIPR-derived current period values and IPHRP-derived base period values from the previous year. We advise users to bear in mind the differences between PIPR and IPHRP when interpreting trends during this transition period and comparing index values produced by PIPR with those produced by IPHRP.

In addition, we have produced estimates of rent price levels using a combination of PIPR and IPRHP data. To produce this, we have applied the chain-linked index to the PIPR-derived rent price in January 2023 (PIPR's reference period). Therefore, all rent price level series have a methodology break between December 2014 (IPHRP methodology) and January 2015 (PIPR methodology). We advise users to bear this in mind when interpreting trends during this transition period. Additionally, since methodology limitations prevented rent price levels from being produced using IPHRP, caution is advised to users when interpreting trends using rent price estimates before January 2015.

How we analyse and interpret the data

Once the data have been aggregated, we analyse the resulting series by various breakdowns, over time, and against other published sources of rental price growth. We explore any unexpected movements within the series through the record-level data. We hold monthly curiosity meetings to review the data and discuss any long-term trends and their causes.

How we quality assure and validate the data

Quality assurance of each of our data sources can be found in our Quality assurance of administrative data used in the Price Index of Private Rents methodology.

Each month, test statistics are analysed to ensure the hedonic regression model has run correctly and fit successfully. This includes analysing the R-squared of the model (model fit) and significance of the explanatory variables. Between January 2015 and December 2024, an average R-squared of 0.86 for England, 0.79 for Scotland, 0.67 for Wales and 0.66 for Northern Ireland is achieved.

We conduct a number of internal checks throughout the process, including checking:

- the linking rate between the rental information and property attributes data to ensure the linking has not failed
- the number of properties being added and dropped from the monthly dataset
- missingness rates and distributions for property characteristics before their values are imputed

How we disseminate the data

We publish the monthly Private Rent and House Prices, UK release every second or third Wednesday of the month. Data are made available through our:

- Private Rent and House Prices, UK statistical bulletin
- Price Index of Private Rents (PIPR), UK: Monthly price statistics downloadable data (XLSX, 13.5MB)
- Housing prices in your area tool to explore local statistics

A table of weights analysis providing information on the aggregate weights used for the index is published annually.

Most queries can be answered from the website datasets or supporting methods documents. Please email any additional queries regarding the PIPR to hpi@ons.gov.uk.

How we review and maintain the data processes

We continually review our methods to ensure they remain appropriate. We will announce any changes to methodology.

7 . Other information

In March 2024 we, at the Office for National Statistics, improved and transformed our private rental price statistics, which included making better use of existing data sources, improving our methods and developing our systems. Before the launch of the Private Rent and House Prices, UK publication (including the Price Index of Private Rents (PIPR) for Great Britain), we produced our Index of Private Housing Rental Prices (IPHRP) bulletins and our Private rental market statistics (PRMS) bulletins.

When the IPHRP was developed, the matched-pairs methodology used was the most suitable method available because of the unavailability of microdata to apply more sophisticated methods.

8 . Related links

Quality assurance of administrative data used in the Price Index of Private Rents
Methodology | Released 26 March 2025
Quality assurance of the administrative data used in the monthly production of the Price Index of Private Rents.

Private rent and house prices, UK
Bulletin | Released 26 March 2025
The Price Index of Private Rents (PIPR) produces rent price and inflation statistics for the UK, tracking prices paid for new and existing tenancies in the private rental sector. Includes headline UK House Price Index statistics.

Private rental prices development plan, UK: updated January 2025
Article | Released 23 January 2025
Overview of our plans for the statistical development of rental prices statistics, including a timeline for development.

9 . Cite this article

Office for National Statistics (ONS), released 26 March 2025, ONS website, article, Price Index of Private Rents QMI.