Office for National Statistics

Changing housing costs across England and Wales for affected households. Quality and Methodology Information

Quality and methodology information, strengths and limitations, methods, and data uses and users.

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1 . Output information

- National Statistic: no

- Frequency: one-off

- Geographic coverage: England and Wales, countries, regions and local authorities

- Related publications: Who is most exposed to rising housing costs in England and Wales?

2 . About this QMI report

This quality and methodology report contains information on the methods used to calculate the official statistics in development presented in the article: "Who is most exposed to rising housing costs in England and Wales?".

The statistics derived from these methods are labelled as "official statistics in development". Until September 2023, these were called "experimental statistics". Read more about the change in our guide to official statistics in development (opens in a new tab).

The statistics are based on information from the Valuation Office Agency, the Welsh Government, UK Finance, the Financial Conduct Authority and the Bank of England. We are developing how we collect and produce the data to improve the quality of these statistics.

Once the developments are complete, we will review the statistics with the Statistics Head of Profession. We will decide whether the statistics are of sufficient quality and value to be published as official statistics, or whether further development is needed. Production may be stopped if they are not of sufficient quality or value. Users will be informed of the outcome and any changes.

The information in this report will help you to:

- understand the strengths and limitations 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 the data

3 . Important points

- This analysis aims to provide timely estimates of changes in housing costs for the subpopulation of households affected by them.

- The mortgage analysis estimates the increase in monthly mortgage repayments for households who remortgaged in 2023.

- The private rents analysis estimates the increase in monthly rental payments for households who experienced an increase in rental costs in 2023.

- Estimates of average cost increases are combined with estimates of the share of households affected by cost increases to assign an overall "exposure" score from one (lowest) to seven (highest) for each local authority in England and Wales.

- This score captures the relative exposure to increasing housing costs for households in any given local authority relative to all other local authorities of England and Wales.

4 . Quality summary

Overview

The article "Who is most exposed to rising housing costs in England and Wales?" explores geographic patterns in relative exposure to housing cost increases for affected households in local authorities across England and Wales.

The analysis uses publicly available data from both administrative and survey sources to bring together estimates of changing private rental costs and changing mortgage repayments for affected households in 2023.

The private rental data sources are the Valuation Office Agency and the Welsh Government. These organisations deploy Rent Officers to collect the price paid for privately rented properties.

The mortgage repayment data sources are UK Finance, the Financial Conduct Authority, the Bank of England and the English Housing Survey.

Population estimates at the local-authority level, by household tenure, are sourced from the Census 2021.

Estimates of household disposable income at the local-authority level are aggregated from small area income estimates for the financial year ending 2020 (as shown in our Income estimates for small areas, England and Wales bulletin), and adjusted using survey data from the Family Resources Survey to give an estimate for the financial year ending 2022 (latest year of data available at time of analysis).

Uses and users

The public, local government and devolved administrations can use these estimates to understand how exposed their area was to changing housing costs in 2023, relative to other geographically, economically or demographically similar areas.

Users should note that the estimates of rent and mortgage payment cost increases and the share of households affected by them are subject to uncertainty related to both the underlying data sources and the assumptions made during the analysis. However, the underlying patterns in exposure scores and relative differences between local authorities are expected to be robust in relation to these.

5 . Quality characteristics of the data

Relevance

This analysis is relevant for understanding the important issue of how housing costs have changed in 2023. The geographic unit of analysis is the local authority, which is in line with housing policy often being devolved at the local-authority level.

This analysis focuses on the experience of households affected by housing cost increases, which is not captured when cost increases are averaged over all households. Importantly, this means the results are not generalisable to all households in an area.

Accuracy and reliability

As in any analysis, confidence in the results depends on the reliability of these assumptions. In many cases assumptions have been required because of data constraints. Though results, particularly point estimates, should be treated cautiously, the analysis represents our best estimate of changing housing costs for affected households in different local authorities of England and Wales in 2023.

This analysis uses a variety of publicly available data sources. This means that the accuracy of the estimates is dependent on the accuracy and reliability of each individual data source. Notably, several data sources are based on samples rather than censuses. Uncertainty measures related to survey data are not incorporated into this analysis.

As with other releases based on Rent Officer data, low collection rates in some local authorities means change in price in these local levels can be influenced by the type and number of properties collected in any given period. For this analysis, we take the latest available data point during the 2023 period, and statistics based on low counts have been excluded.

Coherence and comparability

The data sources for changes to private renting costs are the same as those used in our other private rental market releases. However, the use of a different subpopulation of makes it difficult to compare this to our other publications.

Comparable publicly available analysis to test the coherence of the analysis of changing mortgage repayments could not be found.

As one-off analyses, it is not currently possible to compare estimates over time beyond 2023.

Accessibility and clarity

The analysis combines readily available statistics in a novel way to build a picture of relative differences between local areas. The use of publicly available data sources throughout increases the transparency and replicability of the analysis. Assumptions made in the course of the analysis are detailed in the individual methodology subsections in the following sections.

Supporting information is available for some but not all these data sources. Our Changing housing costs across England and Wales for affected households dataset is available.

Timeliness and punctuality

This one-off publication reviews housing cost increases in 2023. Publishing in April 2024, there has been a lag of around four months between publication and the period to which the data refer.

6 . Methods used to produce the data

Main data sources for mortgages

The mortgages analysis for our article entitled "Who is most exposed to rising housing costs in England and Wales?" is based on the following data sources: UK Finance, the Financial Conduct Authority, the Bank of England (BoE) and the English Housing Survey.

Data processing for mortgages

Effective interest rates on new mortgages from January 2018 to December 2023 are sourced from the Bank of England. The average interest rate that a household remortgaging in 2023 is moving off, referred to as "old interest rate" (2018 to 2022) and the average interest rate that a household remortgaging in 2023 is moving onto, referred to as "new interest rate" (2023) are calculated using the total weighted average interest rate for each year.

UK Finance have published data on outstanding mortgage debt by postcode sector up to the end of 2021, including postcode sectors in all four UK nations. However, some data have been suppressed because of small counts and covers the subset of financial providers that are UK Finance members. The UK total outstanding mortgage debt for 2021 published by the Financial Conduct Authority is used to adjust UK Finance postcode sector totals upwards to account for this undercoverage.

The English Housing Survey (2021 to 2022) provides London and non-London estimates of average household expenditure on mortgage repayments per week in pounds. For Wales, the estimate is imputed assuming that expenditure in Wales is comparable with the average for England outside of London.

The average share of all mortgages that are on five years fixed, three or four years fixed, two years fixed, or variable rate, was calculated using the Bank of England's Distribution of balances within effective interest rates series, averaging across the years 2018 to 2022. The average across the period is used to balance out fluctuations that occur in any given year.

The share of mortgage-holding households that have remortgaged in 2023, and so have been affected by rising interest rates in 2023, is calculated as follows: of all mortgages on five years fixed rate as of 2022, 20% are assumed to come up for renewal in 2023. That probability is changed to 25% for four-year fixed-rate mortgages, 33% for three-year fixed, 50% for two -year fixed-rate mortgages and 100% for variable-rate mortgages. This approach is used consistently across all local authorities.

Data on the number of mortgage-holding households per local authority are sourced from the England and Wales Census 2021.

Methodology for mortgages

Estimating the average increase in monthly mortgage repayments

The foundation of the mortgages analysis is the mortgage repayment formula used by financial institutions to calculate monthly repayments. This formula calculates the monthly repayment (M) using the outstanding loan amount (O), the interest rate (i) and the number of monthly payments left to pay in the total loan term (n).

$$M = O \frac{[i(1+i)^n]}{[(1+i)^n - 1]}$$

The objective is to estimate the difference in monthly repayment for an average household remortgaging in 2023. To do this, we calculate the average M based on interest rates during the period 2018 to 2022, when households remortgaging in 2023 would have last agreed a mortgage, and the average M based on interest rates in 2023.

To understand the difference in payments relating to the change in interest rates, we need to estimate O, n and i.

To estimate the average outstanding loan amount (O), we aggregate the 2021 UK Finance data from postcode sector to local authority. Postcode sectors contain multiple individual postcodes. Where a postcode sector spans more than one local authority, the outstanding loan amount is shared equally between all eligible local authorities. The proportion of total outstanding mortgage debt represented by each local authority is calculated as the total of the local authority divided by the grand total for all local authorities.

These same proportions are then applied to the Financial Conduct Authority total outstanding mortgage to adjust for the fact that UK Finance data contains data from only a subset of providers. In doing this, we assume that the distribution of mortgage debt across geographies does not differ between financial providers who are members of UK Finance and those who are not.

After making the upwards adjustment to account for undercoverage of UK Finance data, we then adjust the estimate of total outstanding mortgage debt per local authority downwards to account for the share of this debt estimated to be represented by buy-to-let mortgages. This share comes from data published by the Financial Conduct Authority. We need to do this to estimate the average outstanding mortgage debt per mortgage-holding household, which involves dividing the total outstanding residential mortgage debt per local authority by the number of mortgage-holding households per local authority reported in Census 2021. The Census provides us with a reliable estimate of the number of mortgage-holding households in 2021. However, we do not have this estimate for the number of buy-to-let mortgage-holders. As such, buy-to-let mortgages have been excluded from the analysis.

The Financial Conduct Authority publishes the share of total outstanding residential mortgage debt that is buy-to-let at the UK level, and we therefore apply the downwards adjustment evenly across all local authorities. It is possible that this leads to an overestimate of O in local authorities where buy-to-let mortgages are more common than the UK average and an underestimate of O in local authorities where buy-to-let mortgages are less common than the UK average.

To estimate the average number of monthly payments left to pay (n) we first reorganise the mortgage repayment formula into a form that can be used to calculate n given estimates of M, O and i.

$$n = \frac{log(\frac{M}{M - i0})}{log(1 + i)}$$

We input the average O in 2021 calculated as described above and the average interest rate in 2021 published by the Bank of England. For M we input the estimate of average monthly household expenditure on mortgage repayments from the 2021 English Housing Survey.

Following this method we did two calculations of n, one for the average number of payments left on a mortgage in London and one for outside London. This decision was taken as O and M were both found to be systematically higher for London compared with outside London. This analysis estimated that mortgage-holding households in London had on average 24 years of payments left to make in 2021, whereas the average outside London was 17 years.

The average old interest rates for agreements made between 2018 and 2022 and the average new interest rate for agreements made in 2023 are calculated using published interest rates from the Bank of England.

Finally, the mortgage repayment formula is used with our estimates of the average outstanding loan amount (O) and the average number of monthly payments left to pay in the total loan term (n) to calculate an M for each year between 2018 and 2023. The average old monthly mortgage cost for households needing to remortgage in 2023 is calculated as the weighted average M taking into account the share of remortgaging households coming off a five-year fixed, three or four-year fixed, two-year fixed or variable-rate mortgage, respectively.

Lower and higher estimates of cost increase

We use the average interest rates on new mortgage agreements published monthly by the Bank of England to highlight examples of smaller and larger interest rate differences for households remortgaging in 2023.

The lower estimate example is a household coming off a five-year fixed-rate agreement made in January 2018 at 2.19% interest rate onto a five-year fixed-rate agreement in January 2023 at 3.72%.

The higher estimate example is a household coming off a two-year fixed-rate agreement made in November 2021 at 1.51% interest rate onto a two-year fixed-rate agreement in November 2023 at 5.51%.

Estimating the share of households that are affected

The share of households affected by increases in mortgage repayments in each local authority of England and Wales is calculated by multiplying the estimate of the share of outstanding mortgages coming up for renewal in 2023 with the estimated share of all households in the local authority that are mortgage-holders.

Assumptions

The analysis assumes that the average size of an outstanding mortgage in 2021 is a valid proxy for mortgages coming up for renewal in 2023. This is a necessary assumption because of data availability; 2021 is the only year for which we can estimate the average outstanding residential mortgage debt per mortgage-holding household, given that we can estimate both the total of all outstanding residential mortgages and the number of mortgage-holding households for this year. While it is unlikely that O has remained stable from 2018 to 2023, the change over time will be linked to changes in house prices. As this analysis focuses on changing mortgage costs related to interest rate rises, it was considered best to use the 2021 reference point and avoid compounding the results with the effect of house price rises.

The analysis assumes that the distribution of outstanding mortgage agreement length does not differ across geographies such that the UK averages are a reliable estimate for the distribution within each local authority.

Similarly, we assume that the average interest rate available on new mortgage agreements from 2018 to 2023 does not systematically differ by local area. This may not be the case as interest rates offered will depend on the loan to value ratio where an area with a higher loan to value ratio would be expected to be subject to higher interest rates. While we did vary the average size of remaining loan (O) by local area, we are not able to vary the average interest rate as this is not published at subnational levels.

We assume all mortgages coming up for renewal in 2023 set up their last mortgage agreement in the period between January 2018 and December 2022. This excludes the small number of fixed-term mortgages longer than five years.

We assume the number of mortgage-holding households can be used as a proxy for the number of outstanding residential mortgages in a local authority. Furthermore, it is assumed that the prevalence of owning with a mortgage has not changed substantially for any local authority since Census 2021.

Main data sources for private rents

The private rents analysis for the article "Who is most exposed to rising housing costs in England and Wales?" uses three main data sources:

- our [Price Index of Private Rents, UK dataset,](#) which uses private rents data collected by the Valuation Office Agency and Welsh Government to publish simple average rent prices

- our [Changes in private rental sector behaviour, England and Wales dataset,](#) which uses private rents data collected by the Valuation Office Agency and Welsh Government to measure changes in the abundance and magnitude of private rental price changes

- the number of private renting households and total number of households in each local authority in England and Wales as of Census 2021

Data processing for private rents

The share of private renting households experiencing an increase in rental costs in 2023 is estimated using the average monthly data for September 2023 (latest data available as of this analysis). This is available at country level for England and Wales and at regional level for English regions.

The average percentage cost increase for private rent is estimated using the average monthly data for September 2023 (latest data available as of this analysis). This is available at country level for England and Wales and at regional level for English regions.

The mean rent between January 2022 and December 2022 is used as an estimate of rental costs in 2022. This is available at local-authority level.

Methodology for private rents

Estimating the average increase in monthly private rent costs

The average rent cost increase is calculated by multiplying the average rent in 2022 by the average percentage cost increase for households who were visited by a rent officer in 2023, and who had experienced a cost increase since the previous visit.

The average percentage cost increase is published by country and region only. The average for Wales is used for all local authorities in Wales while the appropriate regional average is applied for all local authorities in England.

Estimating the share of households that are affected

The share of households affected by increases in private rents in each local authority of England and Wales is calculated by multiplying the estimate of the share of households that were visited by a rent officer in 2023, and who had experienced a cost increase since the previous visit, with the estimated share of all households in the local authority that are private renting.

The average share of households visited by a rent officer in 2023 who had experienced a cost increase since the previous visit is published by country and region only. The average for Wales is used for all local authorities in Wales while the appropriate regional average is applied for all local authorities in England.

The share of all households in the local authority that are private renting is estimated using Census 2021 data on the number of private renting households and the total number of households in each local authority.

Estimates for different property types

To estimate the average rent cost increase and share of households affected by increases for properties with one, two, three or four or more bedrooms, the same steps are repeated with disaggregated data sources.

Data on the following are published, disaggregated by housing type:

- the average share of households, that were visited by a rent officer in 2023, and that had experienced a cost increase since the previous visit

- the average percentage cost increase for households that experienced an increase

Housing type refers to whether a property is a detached house, semi-detached house, terraced house or flat. This analysis derives estimates for properties with one, two, three or four or more bedrooms by weighting the housing type data using data from Census 2021 on the share of privately rented one-, two-, three- or four or more-bedroom properties that are detached, semi-detached, terraced or flats.

Assumptions

This analysis is founded on the assumption that data collected by the Valuation Office Agency and Welsh Government and published by the Office for National Statistics (ONS) provides an indicative picture of the private rental market.

Furthermore, regional estimates are applied to all local authorities of a region. This is necessary because of the lack of data at lower geographies. Consequently, these estimates may be an overestimate or an underestimate, depending on the underlying distribution of data across local authorities within a region.

We assume that the prevalence of renting has not changed substantially for any local authority since Census 2021.

Affordability

We present the estimates of increasing costs for both mortgage repayments and rent as a percentage of household disposable income (HDI). This requires an estimate of HDI at the local-authority level.

Main data sources

To estimate the average monthly household disposable income before housing costs by local authority, three datasets are used:

- income estimates for net annual income before housing costs by MSOA (Middle-layer Super Output Area) for financial year ending (FYE) 2020 from our Income estimates for small areas dataset series

- the number of households in each MSOA from Census 2021

- UK average net weekly income before housing costs for FYE 2022 from the Department for Work and Pensions's (DWP's) Households Below Average Income (HBAI) series

The DWP's HBAI and our small area income estimates are based on data from the Family Resources Survey.

Methodology

The average weekly household disposable income before housing costs for FYE 2022 from the DWP's HBAI series is multiplied by 52 to give an annual estimate. This is then multiplied by the total number of Census 2021 households in all the local authorities of England and Wales, to give an estimate of total income FYE 2022.

The MSOA-level estimate of annual income before housing costs for FYE 2020 is multiplied by the number of households in each MSOA from Census 2021 to give an estimate of total income for each MSOA. This is aggregated from MSOA to local authority using a geography lookup. The proportion of the total income represented by each local authority is calculated as the total of the local authority divided by the grand total for all local authorities.

These proportions are then applied to the estimate of total income FYE 2022. The result is divided by the number of households in the local authority to estimate the average household net annual income before housing costs for each local authority.

Finally, we take the estimates of average increase in mortgage repayments and private rent costs for each local authority and calculate them as a proportion of the local-authority level estimate of HDI.

Assumptions

We assume that the overall local authority level estimate of HDI is representative of both the affected mortgage-holding and affected private renting populations.

We assume the share of total income represented by each local authority for FYE 2020 has not changed substantially over the following two years.

Exposure scores

Exposure scores are assigned for each of the following variables:

- the share of households in a local authority affected by increased private rent costs

- the average increase in private rent costs for affected households as a percentage of household disposable income

- the share of households in a local authority affected by increased mortgage costs

- the average increase in mortgage costs for affected households as a percentage of household disposable income

A score of 1 is assigned to local authorities falling in the first quarter of the data distribution (within the bottom 25% of local authorities across England and Wales when data are ordered from lowest to highest).

A score of 2 is assigned to local authorities falling in the second quarter of the data distribution (above the bottom 25% but within the bottom 50% of local authorities across England and Wales when data are ordered from lowest to highest).

A score of 3 is assigned to local authorities falling in the third quarter of the data distribution (within the top 50% but below the top 25% of local authorities across England and Wales when data are ordered from lowest to highest).

A score of 4 is assigned to local authorities falling in the fourth quarter of the data distribution (within the top 25% of local authorities across England and Wales when data is ordered from lowest to highest)

To create the overall private rents exposure score, the scores for the two rents variables are added together to give a value between 2 and 8. This is then adjusted by subtracting 1 to give a score between 1 and 7. The final adjustment was made for simplicity to have scores starting from 1.

The same process was followed to create the overall mortgage exposure score from the scores for the two mortgage variables.

This results in an overall private rent and mortgage exposure score for each local authority of England and Wales.

7 . Related links

[Who is most exposed to rising housing costs in England and Wales?](#)
Digital Content Article | Released 25 April 2024

8 . Cite this methodology

Office for National Statistics (ONS), released 25 April 2024, ONS website, quality and methodology information report, [Changing housing costs across England and Wales for affected households, Quality and Methodology Information (QMI)](#)