OXFORD ECONOMICS

RESILIENCE BAROMETER: METHODOLOGY DOCUMENT

SEPTEMBER 2025

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 OVERVIEW

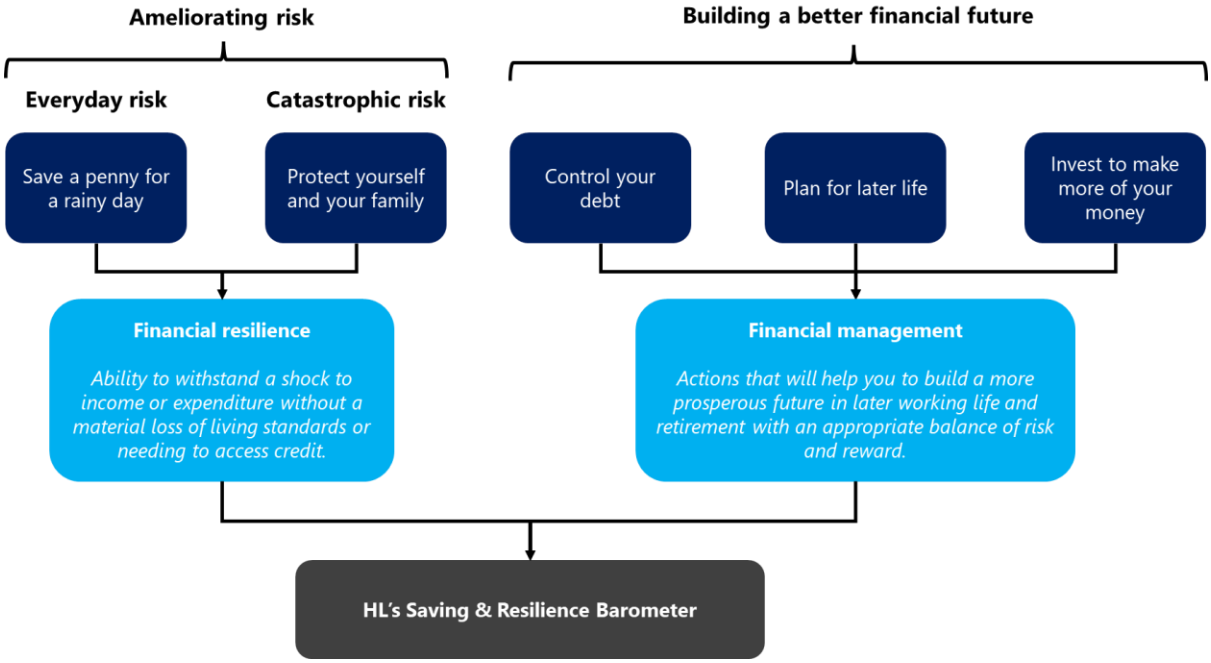
A barometer has been developed to measure the financial resilience of households within Britain. The following document sits alongside the barometer results report to provide a detailed explanation of the methodology underpinning them. This document outlines how the historical dataset has been constructed as well as the development of the barometer indicators. Furthermore, the forecast and scenario model methodology are described, highlighting how the barometer results have been projected in the short-run.

Financial resilience is conventionally defined as a household's ability to withstand an unexpected shock to their income or expenditure. Being able to cope with such everyday risk is undoubtedly of crucial importance. However, solely focusing on this aspect would neglect choices and behaviours that influence the financial wellbeing of households around the country. In shaping the barometer to Hargreaves Lansdown's 'five to thrive' model[1], we have sought to develop a holistic measure that can produce a comprehensive tool to monitor financial resilience. The barometer is structured around five pillars as illustrated in Fig. 1:

- **Control your debt**: it is not that debt is inherently a bad thing for consumers. Indeed, there are very sound reasons why households need and do take on debt, for example to finance educational courses or a house purchase. However, ensuring that debt repayments are sustainable is a crucial first step to successful financial management.
- **Protect yourself and your family**: once debt is under control, ensuring that there is an adequate safety net to guarantee the financial future of yourself and any dependants in the event of catastrophe should be a priority for households.
- **Save a penny for a rainy day**: having access to a pool of savings that can help to mitigate the consequences of an unexpected shock to income or spending is a prerequisite of sound financial planning.
- **Plan for later life**: planning for the associated drop in income during retirement is integral to preserving purchasing power during this period. Ensuring adequate pension contributions through the working life and more actively managing funds closer to retirement are important in this respect.
- **Invest to make more of your money**: finally, once households have accomplished the above, they have the freedom to invest any excess savings into assets that can help to build a better financial future.

[1] https://www.hl.co.uk/features/5-to-thrive

Fig. 1. Savings and Resilience Barometer: conceptual structure



1.2 MAPPING THESE TO INDIVIDUAL INDICATORS

In collaboration with Hargreaves Lansdown, Oxford Economics mapped each of these pillars to a set of concepts that could be measured by specific indicators. The data underpinning the indicators is a household panel dataset—effectively a database of households which provides a representative sample to derive conclusions about both the state of the nation and how conditions vary across households with different socioeconomic characteristics. The original source for our panel dataset is the Wealth and Assets Survey (WAS) conducted by the Office for National Statistics (ONS) on a biennial basis. The WAS is the most detailed financial survey run in the UK with information on all aspects of households' balance sheets together with demographic information such as the age of household members, whether residents own or rent their home, and the household's region.

Despite such exceptional detail, the WAS did not contain all the information we wished to use when constructing measures of financial resilience. We therefore imputed additional variables, exploiting the correlation between these indicators and household characteristics evident from other survey data. For example, we used the Financial Lives Survey (FLS) conducted by the Financial Conduct Authority to model the likelihood of households being covered by income protection policies dependent on key characteristics. This was then matched based on common characteristics to the households in the WAS dataset. Other sources used for imputation include the Living Costs and Food Survey (LCFS) and the Labour Force Survey (LFS).

The major downside of the WAS compared to other data sources is that it is published with a very long reporting lag meaning that the data are not timely. At the time of modelling, the latest WAS dataset was based on interviews conducted between 2020 and 2022. To bring this up to date, we have extrapolated it forward through to 2024 Q4 using a wide range of macroeconomic and survey data and different modelling techniques.

With the underlying data in place, the final step in our analysis was to transform these data into a barometer measure as structured in Fig. 1. A barometer is simply an analytical tool that allows indicators measured in different units to be combined. Therefore, it is often used to measure multi-faceted concepts, such as financial resilience, where it is advantageous to synthesise information from a wide range of variables.

To understand how household financial resilience is expected to change in the short run, baseline forecast for the following year will be presented, leveraging projections from Oxford's Global Economic Model (GEM). Furthermore, this method will also provide us with a platform to evaluate the consequences of salient risks for UK households via scenario analysis, using the barometer to develop more granular insights than afforded by macroeconomic indicators.

Since the publicly available WAS only provides data at the Government Offices for the Regions (GOR) level, additional analysis has been conducted to enable the barometer, pillar, and indicator-level results to be available at the local authority district level.

1.3 DEFINITION OF A HOUSEHOLD

The barometer describes financial conditions for households in Britain as defined by individuals that are living together and related or dependant[2]. As our measure of financial resilience is at the household level, individuals who are not related or dependant on each other cannot be assumed to financially support each other and therefore are be treated as a separate household in the barometer. Furthermore, the final dataset only includes households which have an average age below 68 and the main earner in the household is not retired.

The following sections in this document provide more in-depth detail on the following:

1. Variables selected and historical imputation
2. Extrapolation methodology
3. Indicator thresholds
4. Forecast and scenario methodology

[2] This differs from the WAS definition of a household as this is based on individuals living together. Where indicators are only available at the household level as defined by the WAS, they have been split between the new definition of households based on the number of adults. These variables include the value and debt of the property they live in.

2. VARIABLES SELECTED

In this section we describe the process used to identify concepts that were relevant to each of the five pillars we sought to capture using the barometer and how these were mapped to individual metrics. These indicators are calculated for each household enabling detailed analysis of the metrics by household type[3].

2.1 CONTROLLING YOUR DEBT

Controlling debt is about keeping debt repayments manageable and affordable. This involves distinguishing between productive debt and problematic debt as well as identifying the potential burden it can place on a household.

2.1.1 Affordability of future debt repayments

Liabilities obligate households to make a future stream of payments—how affordable these are in the near-term compared to current income will capture their affordability. This is measured by the following variable:

- Monthly debt repayments as a share of total monthly household income.

Monthly debt repayments including credit cards, store cards, overdrafts, and hire purchase are taken from the WAS. Households will also need to cover the mortgage repayments on their primary residence. Household income will be used to evaluate the affordability of these debt repayments. In this measure, household income excludes income from rental properties as monthly mortgage payments for these properties are not included in the debt repayment variable. The WAS only collects total debt for these properties and does not ask about the monthly repayments.

2.1.2 Uncertainty of future repayments

A household can better plan and is more financially secure if it is certain about the value of debt it will have to repay in the future. Therefore, taking on debt with a variable rate exposes a household to greater financial risk. The size of this risk is captured by the following variable:

- Share of household debt with a variable interest rate.

Within the WAS, respondents are asked whether their mortgage is on a variable rate. This is added to their credit card debt to identify the size of their liabilities that have a variable rate. Other types of loans are assumed to have fixed interest rates. Total liabilities are combined with mortgage on the main home to calculate the size of this debt as a proportion of the total.

[3] In the publicly available databases only the Government office regions are available. In order to calculate the indicators at a more granular regional level, the probability of each household being in these regions was estimated. See appendix for more details.

2.1.3 Use of debt

The type of debt taken out by a household is important when considering whether it strengthens or weakens its financial resilience. Debt can be used to acquire assets and build financial resilience in the future. Examples of this type of debt are mortgages or loans used to finance home upgrades which increase an individual's potential wealth. Debt can also be used to finance a household's consumption that it cannot afford, given current income. To measure the size of households' usage of 'good' debt we created the following variable:

- Share of debt that is used to finance capital consumption.

The WAS's section on debt has questions relating to reasons for taking out loans and hire purchase. Debt which has been taken out to cover home improvement, business, main residence, and second home purchases are classed as financing capital consumption. The size of this is used to calculate its proportion out of total debt.

2.1.4 Existence and severity of arrears

Existence of arrears is evidence that a household is behind on its debt repayments and severe arrears is a sign that a household's debt may be spiralling out of control. This concept is measured using the following variable:

- Whether a household is in arrears or not.

The WAS is used to identify the households that are in arrears. Arrears in the survey includes credit cards, loans, and bills.

2.1.5 Subjective evaluation of debt position

Personal evaluation of a household's debt can support the other variables collected in judging a household's control of debt. This concept is measured using the following variable:

- Whether a household has debt issues.

The two questions that have been identified in the WAS are shown in Fig. 2. These questions identify whether the household finds its bills and credit commitments a burden and whether it is keeping up with repayments. If the household find its bills and credit commitments to be a heavy burden or somewhat of a burden—as well as falling behind with some or many of its bills—it is identified as having debt issues.

Fig. 2. Variables chosen for the subjective evaluation of debt position

Concept	WAS Question	Problem debt response
Subjective evaluation of debt position	To what extent is keeping up with the repayment of your bills and credit commitments and any interest payments a financial burden to you?	A heavy burden and somewhat of a burden
	Which one of the following statements best describes how well you are keeping up with bills and credit commitments?	Falling behind with some of them and having real financial problems and have fallen behind with many of them

2.2 PROTECT YOURSELF AND YOUR FAMILY

The Protect yourself and your family section of the barometer assesses how well a household is prepared for the sudden and possibly long-term loss of earnings. A single person or a family can be protected from unexpected circumstances through insurance policies (life, critical illness, and income protection) and having a balanced split of income between earners within the household.

2.2.1 Adequacy of life insurance

Life insurance is an important part of protecting a family's financial strength and resilience in the event of a death. The rationale behind this is that the larger the insurance pay-out as well as assets accumulated by the household, the more comfortable and supported a family will be in the long-term. The variable is only calculated for households with dependants[4] and the concept is measured by this variable:

- Value of insurance and assets minus liabilities and child costs.

The WAS survey response detailing a household's life insurance value is combined with their financial assets to provide an understanding of a household's coverage in the event of a death. For this measure, household financial assets exclude primary residence and business value as these should not need to be sold in the event of death. Household liabilities need to be settled before dependants can benefit from the life insurance pay-out or assets. The liabilities included in the measure are highlighted in Fig. 3.

Households with younger families will need to have adequate protection to support them until there are 18. Child costs have been calculated by multiplying the number of years until the children are 18 by an average annual cost of a child. The average annual cost of a child has been calculated based on the 2019 basic cost of raising a child over 18 years as published by the Child Poverty Action Group[5]. The average cost per year of dependency has been estimated as £4,308 and is calculated using the weighted average costs of the couple and lone parent[6].

[4] Dependants include children or other adults in the household as they may be financially impacted.
[5] Child Poverty Action Group: The cost of a child in 2019
[6] Weights based on the proportion of lone and couple parents from the 2020 ONS Families and households in the UK data. Lone parents face a cost of £102,620 to raise their child until they are 18 and account for 14% of the of families in the UK. Families who are couple have costs of £74,333 to raise their child until they are 18.

Fig. 3. Liabilities included in the Wealth and Asset Survey

Measure	Liabilities included
Liabilities	Total outstanding credit/store/charge card balance
	Total outstanding on mail order
	Total outstanding on Hire Purchase accounts
	Total amount of formal and informal loans
	Total value of overdrawn current accounts
	Total value of arrears
	Total value of remaining mortgage on primary residence

2.2.2 Critical illness coverage

If a main earner loses their job or is unable to work due to a critical accident or sickness, critical illness coverage will provide a lump sum to their household. This is measured using the following variable and is calculated for all households:

- Whether a household has critical illness coverage or not.

The FCA's Financial Lives Survey (FLS) is used to determine whether a household has critical illness insurance. The FLS directly asks whether an interviewee has critical illness which is unavailable in the WAS. Correlations between the presence of cover and characteristics of households in the FLS—including whether there are multiple adults or children in the household, the work status of the main earner, the household's income, age, education, and whether the residents own their own home—are used to predict the likelihood of households in the WAS being protected. Critical illness coverage is then imputed by choosing the households which are most likely to be covered. Further information can be found in the appendix.

2.2.3 Sick pay and income protection coverage

Similarly, sick pay and income protection coverage will provide income support to a household in the event of an accident or sickness. This is measured using the following variable and is calculated for all households:

- The number of months of essential expenditure covered by the value of household sick pay and income protection.

In order to be eligible for Statutory Sick Pay (SSP), a person has to be employed and earning an average of £120 per week. For the eligible earner, they receive SSP for 28 weeks from their employer.

Many employers pay more than SSP, with studies highlighting length of service, occupation, contract type, and company size as important factors in determining who receives sick pay above SSP. Based on these factors, sick pay for the individuals who are working in the household are estimated using a combination of sources. The individual sick pay is then aggregated to provide a household measure of sick pay coverage. For more details, see appendix.

The FLS is also used to determine whether a household has income protection insurance. In the same way as critical illness coverage, the correlations between the presence of cover and characteristics of households in the FLS are used to predict the likelihood of households in the WAS being protected.

Critical illness cover is then imputed by choosing the households that are most likely to be covered. See appendix for more details. It has been assumed that a household will have 3 months of essential spending coverage if they have income protection.

2.2.4 Number of earners and balance of earnings

Having a balanced split of earnings in a household is conducive to building financial resilience. This is because such households are not solely reliant on a single income and are better prepared if the income of an earner is lost. To measure this concept, the following variable is used:

- Share of employment earnings generated by the primary earner.

Earnings data from employment information of the primary earner and their partner from the WAS are used to measure the share of their earnings out of the combined employment earnings. A single person household takes the value zero as they are solely reliant on their own income.

2.3 SAVE A PENNY FOR A RAINY DAY

The save a penny for a rainy day barometer category assesses the financial resilience of households in the short term and measures how well households have built a cash buffer for unexpected emergencies. Within this category, variables capturing the adequacy of liquid assets, the ability to save (in the form of surplus income), and support offered by an employer in the event of sickness or redundancy are constructed.

2.3.1 Surplus income

Households with a higher savings rate are better prepared to absorb a temporary financial shock. To measure this, the following variable is calculated:

- Total expenditure as a proportion of household income.

Total income is net of taxes and include income from all sources such as employment, investment, benefits, and other regular income.

Total expenditure captures all household outgoings such as rent and mortgage payments, council tax, debt repayments, and expenditure on all goods and services. Household expenditure is taken from the Living Costs and Food Survey (LCFS). The correlation between expenditure indicators and household characteristics are used to impute the house expenditure of the households in the WAS panel. The characteristics used to impute household expenditure include income decile, family size, number of children, vehicle ownership, and housing tenure. For more information, see appendix.

2.3.2 Adequacy of liquid assets

When experiencing a temporary financial shock, most households will immediately react by drawing upon their stock of liquid assets. Therefore, measuring the adequacy of this stock is an important aspect of the barometer category. To measure the adequacy of a household's stock, the following variable is calculated:

- The number of months of essential expenditure covered by drawing upon liquid assets.

The value of liquid assets held by a household is taken from the WAS and includes current accounts, joint accounts, cash ISAs, savings accounts and national savings products, see appendix for more details.

Essential household expenditure is under pinned by the LCFS. This uses non-discretionary spending classifications, based on those used by the Australian Bureau of Statistics (ABS)[7], to calculate a household's essential expenditure. The average household spending of the essential spending categories is calculated by income decile group and applied to the expenditure categories which have been imputed on to the WAS households. Further detail of the used classification has been provided in the appendix

2.3.3 Eligibility for and generosity of redundancy

Similar to SSP, employers are required to pay a minimum level of compensation when making an employee redundant. Furthermore, this may be above the minimum, providing further support to the employee. This only covers working households and is captured with the following variable:

- The number of months of essential expenditure covered by the value of household redundancy pay.

The minimum compensation is determined by several factors. If an employee has been working for an employer for more than two years, when made redundant, they will receive:

- half a week's pay for each full year they were aged under 22;
- a week's pay for each full year they were aged between 22 and 41; and
- a week and a half's pay for each full year they were older than 41.

Length of service is capped at 20 years. Using responses from the WAS, the statutory minimum amount of redundancy pay can be calculated using status of employment to exclude ineligible workers (self-employed and temporary workers), year started job, respondent age group, and gross annual income from main job.

2.4 PLAN FOR LATER LIFE

This section looks at whether a household is prepared for life after retirement and whether it can support itself financially. A large emphasis is placed upon the value of a household's pension as this is the primary source of income for retirees. Furthermore, home ownership gives a household the options of equity release and down-sizing as well lower housing costs as they are not renting in their retirement. This generates increased flexibility and financial resilience upon retirement. Beyond the stream of income provided by a pension, other financial assets and liabilities are valued to create a more complete representation of financial strength.

[7] https://www.abs.gov.au/articles/measuring-non-discretionary-and-discretionary-inflation

2.4.1 Value of pension

Pensions are the primary source of income for retirees. The size and type of the pension will determine their income once they retire. How this will cover living costs in retirement is evaluated with reference to the expected costs in retirement. The variable that captures this concept is:

- Value of total pension compared to retirement costs.

The WAS's pension survey responses are used to calculate a household's pension value. This includes: defined contribution schemes, defined benefit schemes, self-invested personal pensions, and retained rights pensions.

Retirement costs are based on the Target Replacement Rate (TRR) and Living Wage Pension (LWP) benchmark. The Pensions Commission's TRR is based on maintaining a similar standard of living before and after retirement, using a ratio of pre-retirement earnings. These ratios have been updated by the Resolution Foundation to reflect changes in the tax system[8] which are used in the modelling. To ensure a minimum standard, this approach is underpinned by a floor based on an adjusted version of the Living Wage pension, which reflects an income level sufficient to meet basic needs in retirement.[9] The extra costs required increase each year, reflecting wages, inflation, state pension and income tax changes. See the appendix for more details.

2.4.2 Home ownership in retirement

If a household owns a large amount of home equity, it will be able to release this via downsizing or selling part of their property. Furthermore, housing costs will be lower as they are not renting in retirement if a household owns its own home. The following variable measures this concept:

- Value of home equity

The value of the home equity owned by the household is captured by the value of the main residence minus the remaining mortgage on it from the WAS. To account for the strong correlation between home equity and age, the home equity threshold is based on the average home equity of households 5-years younger and 5-years older than that of the households average age[10]. The threshold increases with inflation each quarter to hold the purchasing power of the threshold constant. A households' home equity is divided by the threshold and those who have more home equity than it will have a value of 100, while household with less than the threshold will have a value smaller than 100. If a household does not own a home, it gets a value of 0.

2.4.3 Other financial assets and liabilities

Beyond the stream of income payments that are derived from a pension, retired households can also support their consumption from other financial assets that they have accrued during their working life.

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[8] Perfectly adequate?, Resolution Foundation, 2024

[9] The final Living Wage Pension used to calculate the required pension pot reflects housing subsidies, expected to be received by renters.

[10] Additionally, we have smoothed the threshold by age to remove volatility in the dataset and excluded the top 1% of home equity values by age to reduce the impact of outliers.

Conversely, they would also have their living standards compromised by any liabilities which require future payments. To measure this concept the following variable is used:

- Long-term assets minus all liabilities (excluding student loans).

Household estimates of long-term assets are available through the WAS and these are captured by financial assets that provide a return. Business assets and second homes are also included as they can provide revenue for later life.

Similar to home equity, there is a strong correlation between the value of long-term assets and age. Therefore, the threshold of household's long-term assets calculated by the average long-term assets of households 5-years younger and 5-years older than that of the households average age[11]. The threshold increases with inflation each quarter to hold the purchasing power of the threshold constant. A households' long-term assets is divided by the threshold and those have more long-term assets than the threshold will have a value of 100, while household with less will have a value smaller than 100. If a household does not own any long-term assets, it gets a value of 0.

2.5 INVEST TO MAKE MORE OF YOUR MONEY

A household can further improve its financial position by investing income to build wealth in the long term. This barometer category will capture this by investigating if a household has set aside income to invest.

2.5.1 Investment intensity

A household's appetite for investment can be measured by looking at how it allocates its surplus income between liquid and less liquid assets. Whilst liquid assets provide security in the short-term, the less liquid assets can improve wealth in the long term through investment. The investment intensity of the household will be measured only for those with more than 3months of essential spending as these households will be resilient in the adequacy of liquid assets indicator and any excess money can be invested. The variable used is:

- Share of less liquid assets from total investable assets for those with more than 3 months of essential spending. Investable assets are calculated as total assets minus 3 months of essential spending.

The value of less liquid assets is taken from the WAS, see appendix for the asset classification.

[11] Similar to the home equity indicator, we have smoothed the threshold by age to remove volatility in the dataset and excluded the top 1% of home equity values by age to reduce the impact of outliers.

3. EXTRAPOLATING AND FORECASTING THE DATASET

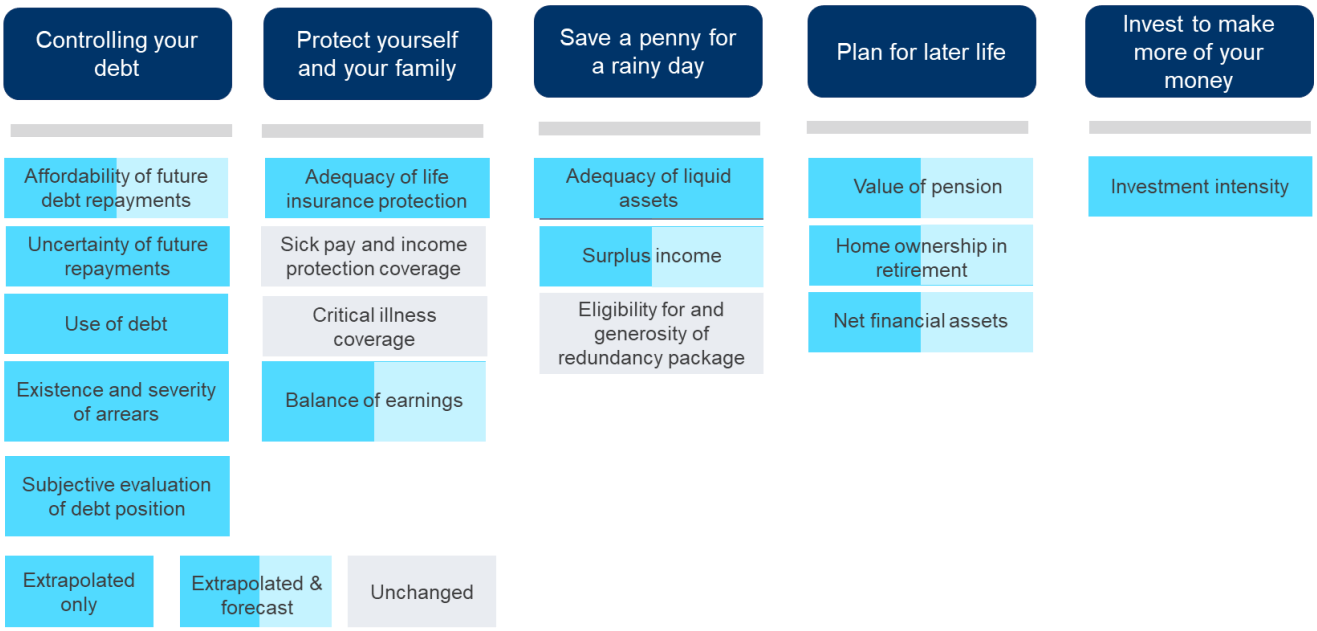
3.1 EXTRAPOLATION OVERVIEW

The Barometer incorporates information from both rounds 7 and 8 of the WAS. Round 7 underpins the pre-pandemic Barometer values covering the period 2018 Q2 to 2020 Q1, while Round 8 of the WAS dataset is used to extrapolate the Barometer between 2020 Q2 to 2022 Q1. After this, we have extrapolated the variables to 2024 Q4 using a wide range of macroeconomic and survey data and different modelling techniques.

Oxford Economics Global Economic Model (GEM) is then used to produce a baseline forecast of the Barometer. Furthermore, this method will also provide us with a platform to evaluate the consequences of salient risks for UK households via scenario analysis, using the barometer to develop more granular insights than afforded by macroeconomic indicators.

Not all indicators are extrapolated and forecast, and Fig. 4 summarises these.

Fig. 4. Extrapolated and forecast variables



Five key models were developed to extrapolate and forecast the dataset:

1. Asset model including cash, savings accounts, and investment assets.
2. Home equity and second homes.
3. Pension values.
4. Arrears and debt burden. (Extrapolation only)
5. Adequacy of life insurance protection. (Extrapolation only)

The following section provides more detail on the macroeconomic and survey data used to extrapolate the indicators.

3.2 ASSET MODEL

The asset model extrapolates and forecasts household income and consumption to estimate households' value of cash, savings, and investment assets. Households accumulate or draw down their savings each quarter depending on their household income and consumption. Furthermore, the modelling also factors in known changes in asset prices.

3.2.1 Household income

Household income has been extrapolated and forecast based on employee and self-employed earnings from work, benefits, investments, and other regular sources of income. Each component has been separately extrapolated and forecast while maintaining consistency with overall macroeconomic trends.

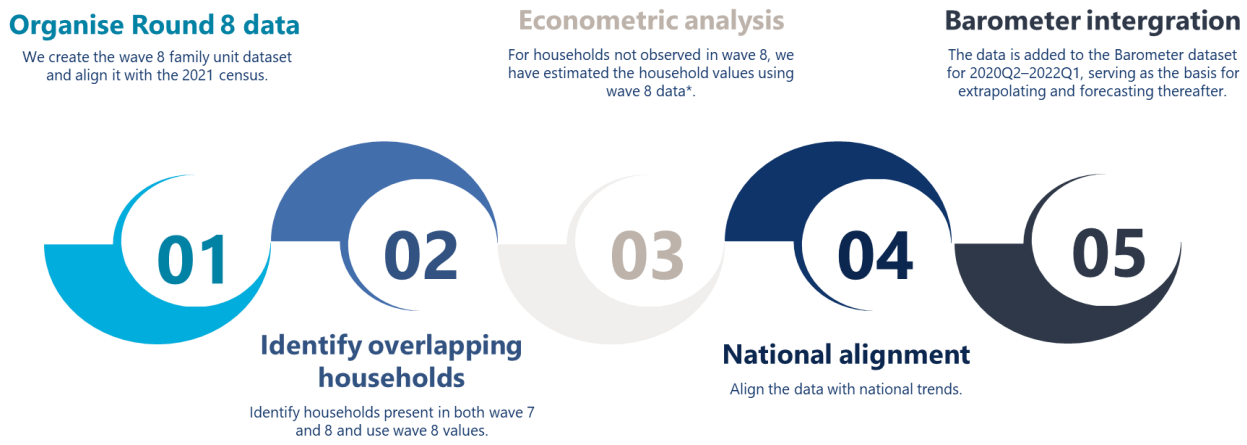
Extrapolation

Data from Round 8 of the WAS have been incorporated to extrapolate the variables to 2022 Q1. To do this, we first identified overlapping households that were present in both Round 7 and Round 8 of the survey. For these households—comprising approximately 50% of the Barometer dataset—we include the more recent Round 8 values wherever possible[12]. For the remaining households not observed in Round 8, we estimate missing values using key household characteristics such as income group, employment status, and family size[13]. Additionally, macroeconomic indicators were incorporated to generate quarterly patterns and align them with the overall change between the two rounds. This general approach is used when incorporating other Round 8 data into the Barometer dataset.

[12] Of the overlapping households, those that have retired or changed tenure use estimated values rather than actuals as the underlying household characteristics do not change in the Barometer dataset. Furthermore, actuals and predicted values are averaged to reduce the volatility seen in the actuals.

[13] Quantile regressions are used to estimate values for Round 7 and Round 8 using all the full sample. The change in the predicted values is applied to the actuals from Round 7 to generate predicted values covering the Round 8 period.

Fig. 5. General approach to incorporating Round 8 data



From 2022 Q2 onwards, earnings from work have been extrapolated based on the seasonally adjusted average weekly earnings (AWE) by industry published by the ONS[14]. The earnings of the primary earner and their partner have been individually extrapolated based on the industry they work in to capture any impact this may have on the balance of earnings in the household. Other household work-based earnings are extrapolated in line with the primary earner. Work-based household earnings will therefore differ depending on the industries in which the households are working.

Benefits, other regular household income,[15] and income from investment have been extrapolated from 2022 Q2 using the quarterly change of personal sector transfers from central government, personal sector dividend receipts, and total disposable income, respectively, from the GEM.

Forecast

In a similar approach to the extrapolation, household income has been forecast based on the individual sources of income using forecasts from the GEM. Earnings from work are underpinned by total wages and salaries, while benefits change in line with personal sector transfers from the central government. Investment and other regular sources of income are forecast using the quarterly change of personal sector dividend receipts and total personal disposable respectively.

3.2.2 Household expenditure

Multiple datasets are used to extrapolate and forecast households' consumption by COICOP[16] category.

Extrapolation

[14] Average weekly earnings (AWE) by 16 NACE industries published by the ONS and seasonally adjusted.
[15] Given that other regular income includes several sources not included in the GEM, such as income from royalties and educational grants, it changes in line with the total disposable income.
[16] The Classification of Individual Consumption According to Purpose (COICOP) is the international reference classification of household expenditure.

A top-down approach is used to estimate household consumption by COICOP category in the extrapolation period. Firstly, Bank of England data are used to model saving rates, which were combined with household income to estimate total household consumption. This is then constrained to match the national consumption trends from the GEM.

Household-specific trends in consumer spending by COICOP category are estimated and constrained to total household consumption. The extrapolation of detailed household spending by COICOP category is broadly split into two groups: mortgage and rental payments; and other household spending.

Mortgage and rental payments

Since the global financial crisis, interest rates and mortgage payments have been at historical lows. This has reversed during 2022, with the central bank increasing interest rates, causing mortgage costs to rise. With many households on fixed mortgages, the change in interest rates does not immediately impact them. The model accounts for the estimated number of households refinancing their mortgage each quarter and those on variable interest rates who will experience a change in their mortgage payment. Their mortgage payments will reflect the interest rate they face in the quarter they refinance their mortgage or the variable rate they need to pay. The model also captures the fall in the number of households on variable rate mortgages, which will increase the uncertainty of the future repayments indicator. More details are available in the appendix.

Changes in rental payments by Local Authority District (LAD), as reported by the ONS[17], are matched to the LAD where each household resides to extrapolate their rental payments.

Other household spending

Annual data from the LCFS are used to estimate household-specific spending by COICOP category between 2019 and 2022. For each year and COICOP category, separate models are estimated using key household characteristics such as income group, employment status, and family size. National quarterly COICOP data released by the ONS[18] are used to interpolate the annual series to quarterly before applying the trend to the households within the Barometer.

National COICOP data are used after this to estimate household consumption trends, with pandemic impacts modelled for transport services and tourism.[19][20]

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[17] Price Index of Private Rents

[18] The average of the national trends and LCFS trends are used to reduce the volatility in the household-specific COICOP spending.

[19] Transport spending is adjusted using Google mobility data and industry-specific homeworking patterns. Mobility data capture changes in commuting and general travel relative to pre-pandemic levels, while ONS surveys show that homeworking is more common in business services than in sectors such as manufacturing or hospitality. For working households, adjustments are based on the primary earner's industry; for non-working households, general travel trends are applied.

[20] Reduced international travel is reflected through net consumer tourism expenditure trends, while other tourism-related spending follows the household's estimated restaurants and hotels trend.

Forecast

The forecasts of consumption are underpinned by the forecast variables from the GEM. CPI trends in food, energy, fuel, and core inflation are combined with overall real consumption changes to provide specific consumption forecasts for all elements of housing costs (except for mortgage payments) for each household.

Consistent with the extrapolation model, mortgage payments are dependent on the refinancing period of the household and the repayment costs they are expected to face based on the GEM's forecast for interest rates.

3.2.3 Change in assets

Assets held by households are underpinned by their expected income and consumption during the extrapolation period and macroeconomic trends in the forecast.

Extrapolation

Data from Round 8 of the WAS are used to estimate the value of assets to 2022 Q1. After that point, trends in income, consumption, and savings are applied. The modelling accounts for both shifts in the types of assets held and changes in the amount of savings within each asset category.

When incorporating the Round 8 asset information, a top-down approach is used. The modelling starts with total household assets held by households and then splits these down into detailed asset categories. The method for incorporating total assets from Round 8 is consistent with the modelling approach outlined in the income section.

The estimated value of total assets are divided into different types of asset holdings. Round 8 data are used to examine the types of assets households hold, with a particular focus on investment and non-investment assets[21]. However, changes in these holdings shown by the WAS data were inconsistent with alternative sources. While the WAS suggests a decline in the proportion of investing households between Round 7 (April 2018–March 2020) and Round 8 (April 2020–March 2022), both the Financial Lives Survey (FLS) and Hargreaves Lansdown figures indicate a significant increase[22].

Given this discrepancy, the distribution of assets between investment and non-investment categories has been estimated using FLS results. Once the proportions for investment and non-investment assets are determined, savings within each detailed asset type are estimated based on historical proportions, aligned with the estimated totals for investment and non-investment assets. See the appendix for details.

From 2022 Q2 onwards, the composition of assets remains unchanged, while their value changes according to the accumulation or drawdown implied by extrapolated income and consumption trends.

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[21] Investment assets are defined as less-liquid assets; and non-investment assets as liquid assets in the Barometer. See the appendix for further details on the classification on each asset type.

[22] The FLS reports that the share of adults holding investments rose by 5 percentage points over this period, from 32% to 37%. Similarly, Hargreaves Lansdown added 483,000 new investment clients (excluding cash and pensions), expanding its client base to 1.9 million by March 2022.

The current stock of household assets will also change in value over the extrapolation period using observed financial data (Fig. 6).

Fig. 6. Financial indicators used

Asset	Linked financial variable
Household value of current accounts	Interest rate on bank deposit, GEM
Household value of savings accounts	Interest rate on bank deposit, GEM
Household value of cash ISAs	Interest rate on bank deposit, GEM
Household value of stocks, shares, lifetime and innovation ISAs	MSCI World TR
Household value of National Savings certificates and bonds	Direct Saver interest rate
Household value of UK shares	FTSE AJI-ShareIndexTR
Household value of insurance products	No change
Household value of fixed term bonds	10 year gilt, GEM
Household value of employee shares and share options	FTSE All-Share Index TR
Household value of Unit/investment trusts	MSCI World TR
Household value of Overseas shares	MSCI World ex UK TR
Household value of UK bonds/gilts	10 year gilt, GEM
Household value of overseas bonds or gilts	Barclays Aggregate Global Bond Index
Household value of informal financial assets	No Change

Forecast

Asset values are forecast according to the portfolio of assets held by individual households, with growth in each asset class underpinned by the relevant forecast in the GEM. The assets have been split into three groups: liquid assets; financial products; and bonds. While the GEM does not forecast the value of every asset that households might hold, it does forecast indicator that will capture the macroeconomic trends in these three groups.

Overall liquid assets have been constrained to match personal sector savings from the GEM. Similarly, savings of less liquid assets have been constrained to match personal sector savings of companies' securities and government debt from the GEM.

3.2.4 Change in liabilities

Extrapolation

Data on liabilities from Round 8 of the WAS have been incorporated to capture the change in debt repayments, liabilities, and "good" debt during the period between round 7 and 8 of the WAS. The debt modelling assesses both the value of debt that households have and identifies those that have paid off or taken on debt during the period. The approach used to incorporate Round 8 data is consistent with the modelling outlined in the income section.

From 2022 Q2, household-specific debt repayments and liabilities are extrapolated using Bank of England data, with overall changes aligned to credit growth trends from the GEM. Further details can be found in the appendix.

Forecast

Monthly debt repayments and liabilities are forecast using forecasts of personal sector debt interest payments and credit growth, respectively, from the GEM.

3.3 HOME EQUITY AND SECOND HOMES

Extrapolation

For homeowners, the value of their house is extrapolated based on the UK House Price Index published by the Land Registry[23] rather than using Round 8 WAS data[24]. The house price of the main residence is extrapolated based on the LAD and house type or flat[25]. There is less information regarding other properties that households own, so they have been extrapolated using the national overall average UK House Price Index. The extrapolated house price is based on the quarter in which the household answered the survey.

Household mortgages are extrapolated based on the average mortgage size during the extrapolation period[26]. Other property values and their associated debt such as land and business remain unchanged due to limited information. Home equity and net property have been estimated by calculating the difference between property values and property debt during the reporting quarter.

Forecast

LAD house price forecasts are based on Oxford Economics' regional forecasting models. The outstanding value of the mortgage held by each household is forecast based on the projected mortgage liabilities of the household sector. Equity in a household's main residence is calculated as the difference between these two metrics.

The value of other properties that households own and their other mortgage liabilities have been forecast using national forecasts of the relevant variables from the GEM. Home equity and net property have been calculated as the difference between property values and property debt.

3.4 PENSION WEALTH

Household pension values have been extrapolated and forecast based on the pension type. The analysis first incorporates the data from Round 8 of the WAS, with contribution rates and macro trends used thereafter. In addition, the updated measurement for defined benefit schemes has been incorporated into the pre-pandemic estimates, and the details can be found in the appendix.

Extrapolation

To incorporate the Round 8 data, a top-down approach is used, beginning with the modelling of total pension assets before breaking these down into detailed asset categories. The approach used to incorporate Round 8 data is consistent with the modelling outlined in the income section.

Defined contribution pensions are estimated using household contributions and asset growth. The percentage of earnings households who contribute to their pensions is taken from the WAS and

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[23] https://landregistry.data.gov.uk/app/ukhpi

[24] Households are unlikely to accurately report changes in their household prices, while the published data are expected to provide more accurate and reliable estimates.

[25] The WAS includes information on house type including detached, semi-detached, and terraced.

[26] The average has been calculated based on the total number of mortgages outstanding and the total mortgage liabilities from the GEM.

combined with earnings data to calculate the quarterly increase in pension values. Current pension values are adjusted each quarter based on global equity prices and UK long-run bond interest rates[27]. Households are assumed to hold 70% of assets as equity and 30% as bonds if the primary earner is under 60, shifting to a 50:50 split from age 60 onwards.

The total value of additional voluntary contribution (AVC) schemes is calculated using the same asset growth methodology, with equity–bond ratios determined by the primary earner's age; however, AVCs do not grow through additional contributions. CPI is applied to estimate the value of other pensions households may hold[28].

Retirement costs and state pension are extrapolated to update the pension value benchmark. Projections of retirement costs have been based on updated Living Wage Pension releases, along with wage growth thereafter. The state pension is extrapolated based on the published data and changes announced by the government. As households age in the extrapolation period, retirement costs are aligned to their age in each reported quarter.

Forecast

Defined contribution pensions are forecast using household contributions and asset growth data from the GEM. Earnings are forecast using the GEM, while the household contribution rate remains consistent with the extrapolation period. Assumptions about asset holdings are the same as the extrapolation period.

The forecast for AVC schemes and other household pensions is aligned with the extrapolation period, using the relevant GEM data.

The state pension is forecast under the "triple lock" policy, based on the highest of wage growth, CPI from the GEM, or 2.5%. As in the extrapolation period, retirement costs are linked to individuals' ages in each reported quarter.

3.5 ARREARS AND DEBT BURDEN

Round 8 data are first incorporated for both household debt burden and arrears before being extrapolated. Arrears and debt burden data from Round 8 have been incorporated to identify households that are currently in arrears or not, as well as whether they feel debt is a burden or not.

The type of arrears—loan or utility arrears—has also been included in the analysis to improve the extrapolation of arrears from 2022 Q2 onwards. The approach used to incorporate Round 8 data is consistent with the modelling outlined in the income section.

After this, arrears and household debt burden have been extrapolated based on combining relevant macroeconomic data and Bank of England survey data.

[27] Equity prices are measures using MSCI World TR and long run gilts are measured by 10 year government debt.

[28] Defined benefit schemes were extrapolated using CPI due the limited data available to evaluate the change in their value.

3.5.1 Arrears

From 2022 Q1, we have combined multiple sources to extrapolate household arrears. Utility arrears are underpinned by data from Ofgem and the Bank of England. The total number of households in utility arrears changes in line with the number of households in arrears or outstanding debt as published by Ofgem[29]. The Bank of England household survey is then used to calculate which households enter or exit utility arrears based on the likelihood of them reporting they are in utility arrears in the 2022 survey. This model is based on a logistic regression, and the variables used to model whether a household was likely to be in arrears included income, age, employment status, whether the respondent had a degree, region, whether the respondent owns their own home, the number of children, and the number of adults in the household. With the question only available in the 2022 survey, the logistical model was only estimated for this year. However, given that utility arrears saw the largest increase during this year, it should reflect those most likely to be in arrears during the extrapolation period.

Similarly, loan arrears are extrapolated using two datasets. The change in unsecured loan write-offs is used to predict the total change in the number of households with loan arrears. The Bank of England household survey is then used to calculate which households enter or exit loan arrears based on a logistical model with the same variables as the utility arrears model. More details are available in the appendix.

3.5.2 Debt burden

The WAS contains information on the debt burden of a household during the survey period. To extrapolate this variable we used Bank of England data to model the likelihood of individual households finding their debt a burden in any given year. Logistic regression was fitted for each year, with the same covariates as the arrears models, where the dependent variable was a variable describing whether debt was a heavy burden or not. These models were then used to predict the burden of debt for each household in the WAS in each year. More details are available in the appendix.

3.6 ADEQUACY OF LIFE INSURANCE

Life insurance coverage and child costs have been modelled to extrapolate the life insurance adequacy indicator. Using Round 8 data, life insurance has been modelled in three stages:

- identifying households with life insurance,
- estimating the value for existing policyholders, and
- estimating the value for new policyholders.

Round 8 of the WAS indicated that the proportion of households with life insurance increased by 2.0 percentage points, from 18.2% to 20.2%. Those who have cancelled or taken out life insurance, as seen in the Round 8 data, are the first change within the Barometer dataset. The remaining households with life insurance are selected based on a probability model using key characteristics such as income, age, employment status, tenure, and family size.

[29] https://www.ofgem.gov.uk/publications/debt-and-arrears-indicators.

The analysis revealed only limited differences in insurance values between Rounds 7 and 8. Consequently, the insurance value for households within the Barometer data remains unchanged between round 7 and round 8, while the value for new households is based on predicted life insurance values using household characteristics.[30]

Child costs are extrapolated using recent publications of child costs by the Child Poverty Action Group, along with the core CPI.[31]

The extrapolated life insurance and child costs are combined with projections for assets and liabilities to assess the change in the life insurance adequacy indicator.

3.7 LOCAL AUTHORITY DATA

In the publicly available dataset, the WAS reports the location of households at Government Office Region level (e.g., Scotland, Wales, North East of England, or South East of England), but does not provide more granular locational data. We have enhanced the framework to estimate financial resilience at the local authority level, which involves updating the data structure of the WAS and estimating LAD-specific household weights.

Our nationally representative financial resilience dataset therefore reflects the financial and demographic characteristics of each local authority in Great Britain. This is then used to estimate each local authority's financial resilience at the overall barometer, pillar, and indicator level; the findings are also available by income, age, tenure, and family type within each local authority. For more details, see the appendix.

[30] As life insurance values remain unchanged, Round 7 data were used to ensure consistency across households in the dataset.

[31] The 2024 child cost figures have been excluded as they indicate a significant increase in the cost of raising a child due to a methodical change. Core CPI is instead used during this period.

4. DATA NORMALISATION AND WEIGHTS

4.1 BAROMETER OVERVIEW

The purpose of this barometer is to measure financial resilience: a level of financial security and good management that ensures unexpected storms can be weathered and a comfortable retirement is within reach. As such we want to use the barometer as a tool to track and monitor what proportion of households are meeting acceptable standards in the various aspects of their financial management e.g., adequately saving for retirement, putting aside enough cash reserves for a rainy day etc.

In this context, we decided that it was most appropriate to normalise the data using a linear scaling approach but with maximum values defined, where appropriate, by a theoretical reference value that represented a point at which it was deemed resilience had been achieved.

For that reason, we applied thresholds to each of the indicators. The maximum possible score for each indicator is 100, and the value of the underlying measure that corresponds to 100 is set with reference to resilience rather than wealth. For example, a household scored full marks on the 'adequacy of liquid assets' indicator if they have enough liquid wealth to cover three months' essential expenditure. Households with higher rates of savings coverage did not receive a higher score on this indicator.

4.2 THRESHOLDS

There are a number of ways that thresholds have been chosen. In some cases, external sources of information and expertise have been used to set thresholds at an appropriate level. Sometimes, the underlying variable natural ranges between 0 and 100 so no transformation is needed. And in other cases, the threshold has been set with reference to the distribution of values in the household-level dataset that has been used to calculate scores. In these cases, often the 10^{th} or 90^{th} percentile has been chosen in order to allow for the range of situations that most households find themselves in while excluding outliers that might skew the results. See the appendix for a detailed description of the thresholds used and the rationale behind those choices.

4.3 WEIGHTS

Weights have been used for aggregating the factors into the final barometer. This includes a within pillar weight as well as across pillar weight. Subjective weights have been used as alternative methods will not find appropriate weights. These weights are based on Hargreaves Lansdown's view of importance in financial resilience. The invest pillar is half the weight of the other four pillars.

Fig. 7. Pillar weights

Pillar	Concept	Within-Pillar Weight	Pillar Weight
Control your debt	Affordability of future debt repayments	45%	22.22%
	Uncertainty of future debt repayments	22%	
	Use of debt	11%	
	Arrears	11%	
	Subjective evaluation of debt position	11%	
Protect yourself and your family	Life insurance	40%	22.22%
	Critical illness insurance	5%	
	Sick pay and income protection insurance	40%	
	Balance of earnings	15%	
Save a penny for a rainy day	Adequacy of liquid assets	50%	22.22%
	Surplus income	35%	
	Redundancy pay	15%	
Plan for later life	Value of pension	50%	22.22%
	Home ownership	25%	
	Other assets	25%	
Invest	Investment intensity	-	11.11%

4.4 HOUSEHOLD RESILIENCE GROUPS

To aid the communication of the barometer results, we have designed a method to allocate households between five bands according to their barometer scores. These bands are very poor, poor, fair, good and great. The share of households in each band will provide a reference point to communicate the changing state of financial resilience in the UK.

The bands are primarily based on the quintile distribution of pre-pandemic barometer scores. The pre-pandemic distribution of 'Control your debt', 'Invest to make more of your money' and to a lesser extent 'Protect yourself and your Family' have been adjusted to take account of the nonlinear distribution of scores. Threshold scores for each band are fixed to values observed in the pre-pandemic (2019) period so that changes in the shares can be used to trace developments over time.

Fig. 8. Score range and pre-pandemic (2018Q1-2020Q1) proportion of households

	Score range					
Band	Save a penny for a rainy day	Protect Your Family	Control Your Debt	Plan for Later Life	Invest	Overall Index
Very poor	0-20.7	0-45.0	0-52.2	0-9.7	0	0-41.6
Poor	20.7-47.4	45.0-66.6	52.2-66.1	9.7-37.3	1-16.5	41.6-52.8
Fair	47.4-65.0	66.6-78.1	66.1-77.9	37.3-51.4	16.5-49.8	52.8-61.3
Good	65.0-82.8	78.1-88.5	77.9-95	51.4-75.0	49.8-81.5	61.3-70.6
Great	82.8-100	88.5-100	95-100	75.0-100	81.5-100	70.6-100

	Pre-pandemic proportion of population					
Band	Save a penny for a rainy day	Protect Your Family	Control Your Debt	Plan for Later Life	Invest	Overall Index
Very poor	20	20	18	20	49	20
Poor	20	29	19	20	13	20
Fair	21	11	22	20	13	20
Good	19	20	17	19	13	20
Great	20	20	25	21	13	20

5. APPENDIX

ASSET OVERVIEW

The wealth and asset survey includes the household value of several assets. These have been categorised into two groups as shown in Fig. 8. The most liquid assets include cash held in current accounts, ISA's, savings accounts and national saving products. Assets that are deemed less liquid are held in financial products and accounts outside of these four cash-based accounts.

Fig. 9. Household assets groups[32]

Asset grouping	Asset type
Liquid assets	Household value of net current accounts
	Household value of cash ISA
	Household value of savings accounts
Less liquid assets	Household value of fixed term investment bonds
	Household value of unit investment trusts
	Household value of employee shares and options
	Household value of overseas bonds and gilts
	Household value of UK bonds and gilts
	Household value of informal financial assets
	Household value of tax-exempt savings plans
	Household value of national savings products
	Household value of investment and unknown ISA
	Household value of lifetime ISA
	Household value of Innovative finance ISA
	Household value of all other property, excluding main property
	Value of business assets, after deducting outstanding debts

CONSUMER SPENDING

Household expenditure is based on the Living Costs and Food Survey (LCFS). This survey is used to impute total household expenditure, COICOP based expenditure as well as essential expenditure for the households in the Wealth and Asset Survey (WAS). The 2018-2019 and 2019-2020 LCFS have been combined to provide a consistent estimate of expenditure with Round 7 of the WAS.

Expenditure models

We first imputed total consumer expenditure, excluding mortgage and rent payments, for WAS households using regressions estimated on LCFS data. In the model, total non-housing expenditure as a share of net income is regressed on household characteristics: number of adults and children, income decile[33], vehicle ownership, and employment status. Income quintile thresholds are taken from the WAS to ensure consistency when imputing expenditure estimates onto WAS households.

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[32] Value of business assets, after deducting outstanding debts is only include in the net financial asset indicator. It is excluded from the investment intensity indicator

[33] The first income decile was split to provide greater accuracy for those households who have zero or negative savings rates.

Predicted total non-housing expenditure is then obtained by multiplying the estimated share by net household income.

Total non-housing expenditure is combined with mortgage and rental payments[34] from the WAS to give total household expenditure. To align household saving with the national saving rate of 5.1%[35], we introduced an additional expenditure category. This was derived by comparing the household panel's weighted average saving rate with the national rate. The difference was used to calculate the extra expenditure required for each household to ensure the average saving rates matched, with the adjustment scaled according to each household's initial savings ratio.

[34] Rental payments have been adjusted to account for housing benefits. This has been estimated using the LCFS dataset.

[35] Based on the average saving ratio between 2018 Q2 and 2020 Q1 published by the ONS - United Kingdom Economic Accounts: Quarter 2 (Apr to June) 2021.

Fig. 10. Expenditure share model results

	Tenure			
Variable	**Owner outright**	**Owner with a mortgage**	**Private renter**	**Social renter**
Number of Adults	0.07***	0.035***	0.043***	0.077***
Number of Children over 5	0.067***	0.031***	0.041***	0.056***
Number of children under 5	0.016***	0.007***	-0.001***	0.012***
Age (base category 16-24)				
24-44	0.317***	-0.04***	0.004***	0.024***
44-64	0.32***	-0.02***	-0.011***	0.006***
Over 64	0.245***	0.004***	-0.094***	-0.042***
Vehicles	0.111***	0.053***	0.064***	0.122***
Employment status (Base category is self-employed)				
Employed	0.248***	-0.057***	-0.064***	-0.082***
Unemployed	-0.031***	-0.056***	-0.07***	-0.022***
Retired	0.03***	0.034***	-0.061***	-0.021***
Household decile				
Top half of first decile	-1.267***	-0.185***	-0.155***	-0.147***
2	-1.448***	-0.477***	-0.289***	-0.252***
3	-1.47***	-0.46***	-0.384***	-0.306***
4	-1.561***	-0.571***	-0.454***	-0.355***
5	-1.551***	-0.569***	-0.474***	-0.41***
6	-1.642***	-0.632***	-0.523***	-0.493***
7	-1.704***	-0.651***	-0.557***	-0.554***
8	-1.739***	-0.716***	-0.566***	-0.583***
9	-1.832***	-0.765***	-0.607***	-0.646***
10	-1.906***	-0.813***	-0.649***	-0.753***

Detailed expenditure

Detailed household expenditure broadly follows the 2-digit COICOP classification. However, additional detail was included for transport services and restaurants & hotels to capture the impact of the pandemic. In particular, commuting experienced a significant fall, which will be seen in the transport services data, while traveling abroad was limited which impacted spending on holidays abroad in accommodation services.

Fig. 11. Expenditure categories

Expenditure category
Food and non-alcoholic beverages
Alcohol and tobacco
Clothing and footwear
Housing *including: rent, mortgage repayments, council tax, fuel and power*
Household goods and services
Health
Purchase of vehicles and operation of personal transport equipment
Transport services
Communication
Recreation and culture
Education and child specific expenditure
Resturants & hotels domestic spending
Resturants & hotels spending abroad
Miscellaneous goods & services

Detailed non-housing expenditure estimation was carried out in two stages. The first stage focused on broad expenditure groups, summarised in Fig. 12, to address volatility in the underlying data and ensure greater stability in the estimates. These categories were modelled using key household characteristics, such as income, age, and tenure.[36] In the second stage, the general expenditure category was further disaggregated. This was done using average household expenditure by income decile, allowing spending differences across the income distribution to be captured more accurately.

[36] The COICOP expenditure categories from the LCFS have been aggregated into the general, vehicle, children specific, housing costs, and housing goods and services. Nursery, crèche, playschools, and childcare payments were removed from miscellaneous goods & services and combined with child specific expenditure. Furthermore, vehicle insurance and taxation were added to purchase and operation of vehicles. Lastly, housing expenditure was split between key housing costs such as council tax, fuel and power, and other housing costs which are based on furnishings, household equipment, and services. These housing costs are added to mortgage and rental payments from the WAS to calculate overall housing costs

Fig. 12. Expenditure groups

Expenditure group	LCFS Expenditure category
General expenditure	Food and non-alcoholic beverages
	Alcohol and tobacco
	Clothing and footwear
	Health
	Transport services
	Communication
	Recreation and culture
	Resturants & hotels
	Miscellaneous goods & services excluding nursery, crèche, playschools and childcare payments
Education and child specific expenditure	Education
	Nursery, crèche, playschools and childcare payments
Vehicle expenditure	Purchase of vehicles
	Operation of personal transport
	Vehicle insurance and taxation
Housing expenditure	Housing costs *including: rent, mortgage repayments, council tax, fuel and power*
	Household goods and services *including Furnishings, household equipment and services*

Essential expenditure

The essential expenditure classification is underpinned by an Australian Bureau of Statistics study into inflation of discretionary and non-discretionary spending. These categories are focused on key items that households need to consume and are summarised in Fig. 13.

Fig. 13. Essential spending classification

Expenditure group	Essential spending
Food and non-alcoholic beverages	Bread, rice and cereals, Pasta products, Beef (fresh, chilled or frozen), Pork (fresh, chilled or frozen), Lamb (fresh, chilled or frozen), Poultry (fresh, chilled or frozen), Bacon and ham, Other meat and meat preparations, Fish and fish products, Milk, Cheese and curd, Eggs, Other milk products, Butter, Margarine, other vegetable fats and peanut butter, Cooking oils and fats, Fresh fruit, Other fresh, chilled or frozen fruits, Dried fruit and nuts, Preserved fruit and fruit based products, Fresh vegetables, Dried vegetables, Other preserved or processed vegetables, Potatoes, Other tubers and products of tuber vegetables, Jams, marmalades, coffee, tea, cocoa and powdered chocolate
Housing	Rents, mortgage repayments, Maintenance and repair of the dwelling, Water supply and miscellaneous services relating to the dwelling, Electricity, Gas and other household fuels, Goods and services for routine household maintenance
Health	Medical products, appliances and equipment and Hospital services
Transport	Operation of personal transport and Transport services
Communication	Postal services, Telephone and telefax equipment, Telephone and telefax services, Internet subscription fees (ex. combined packages) and Combined telecom services
Recreation and culture	Pets & pet food and TV, video, satellite rental, cable subscriptions and TV licences
Education and child care expenditure	Education fees, Payments for school trips, other ad-hoc expenditure, Nursery, crèche, playschools and Child care payments
Miscellaneous goods & services	Personal care products, social protection (excl child care expendiure), insurance

All of health, communication, education, and child specific expenditure are included in a household's essential expenditure. Not all the expenditure items are included in the other categories. In these cases, the average share of essential items by decile is calculated and applied to the household's expenditure of that category.

MORTGAGE REPAYMENT MODEL

Households are expected see their mortgage repayments change depending on the type of mortgage they are on and the interest rate. The WAS has provided detailed information on mortgages including: whether a household is on a fixed or variable interest rate; the interest rate their current mortgage is based on; the number of years left on their mortgage; and their current monthly repayment. The WAS allows households to include up to three mortgages on the main residence and the sum of these has been used for the model. Where a household has multiple mortgages, the weighted average interest rate of these mortgages is calculated. Averages have been used where data are missing, and a household has a mortgage.

The change in household mortgage payments is calculated in three stages incorporating mortgage data from the Bank of England, Oxford Economics GEM, and the WAS. These stages estimate when fixed-term mortgage holders refinance, incorporates the trend in variable rate mortgages, and provides the latest interest rate expectations.

(1) **Fixed-term mortgage household refinancing:** The quarter in which a household needs to refinance its mortgage has been estimated using BoE data[37] as it is not included in the WAS. Based on an analysis from the Financial Lives Survey[38], no evidence was found that certain groups of households will refinance their mortgage in particular years. Therefore, we randomly estimate when a household on a fixed-term mortgage will need to refinance. To do this, we randomly assign it to a two, three, five, and 10 year fixed-term mortgage. Since 2020, the proportion of households taking out five-year fixed term mortgages has increased as households have taken advantage of the lower rates and reduced the number of times they are required to refinance their mortgage. As a result, the proportion of households on two, three, five, and 10 year fixed-term mortgages is based on the latest 2024 Q4 mortgage stock proportions to ensure the refinance rate is based on the latest information. With the households assigned a fixed mortgage length, they are assumed to refinance linearly based upon their fixed period length. For example, one-eighth of households on a two-year fixed mortgage will refinance each quarter while one twentieth of households on a five-year fixed mortgage will refinance each quarter. When a household refinances, it is assumed they refinance onto the same fixed-length contract.

(2) **Variable rate mortgage household:** By 2024 Q4, the proportion of variable rate mortgages has fallen to 10.6% from nearly 45% between 2018Q2 and 2020Q1[39], when the households were surveyed for the latest WAS. In order to capture this trend, we switch households from variable rate mortgages to fixed-term mortgages each quarter. The number of households that switch to a fixed mortgage is based on the quarterly change in households on variable rate mortgages. For example, between 2022Q1 and 2022Q2 the proportion of variable rate mortgage holders fell from 16.9% to 15.6%. Therefore, during this quarter, we ensure 1.3% of the households on a variable rate mortgage move to a fixed-term mortgage. We assume household characteristics have not played a role in their decision to switch to a fixed-term contract and household are randomly selected. These household are then assigned a two, three, five, and 10 year fixed-rate mortgage with the proportion of households assigned to each term length dependent on that observed in the new mortgage approvals data for that quarter.

(3) **Mortgage payments:** The interest rates households face when refinancing their mortgage or on a variable rate are underpinned by Oxford Economics GEM. Within this model, quoted mortgage rates for two, three, five, and 10 year mortgages are based on the equivalent swap rate for that length of contract and a margin assumption based on historical data. The interest rate on variable rate mortgages will be based on the central bank policy rate plus a margin assumption. The effective interest rate for households with variable rate mortgages is used rather than the quoted rate as those on variable rates typically have contracts with the spread included in it and, thus, they do not take out a new contract each quarter. The interest rate paid by the household also includes a household specific adjustment. This is calculated as the difference between the market interest rate for the assigned mortgage (by fixed term length if on a fixed-rate mortgage) and the interest rate it pays between 2018Q2 and 2020Q1. This will capture any household specific factors such as riskiness of the household and LTV of the mortgage. Based on the new interest rates, mortgage size, and mortgage years remaining the mortgage payment of the household is calculated. With differences between this estimate and the reported mortgage payments, the change in the estimated series is applied to the reported mortgage payment to provide a forecast.

SICK PAY

Eligibility and generosity of sick pay determines how well a household is supported by an employer in the event of sickness, preventing a household earner from working. While the government provides Statutory Sick Pay (SSP), many employers pay more than SSP. Studies have highlighted that length of service, occupation, contract type, and company size play a significant role in determining who receives sick pay above SSP.

Several sources of information have been combined to estimate the extra pay individuals may get on sick leave as well as their eligibility for SSP. For an eligible earner, they receive a minimum of £99.35/ week for 28 weeks from their employer as SSP. Where an individual may be entitled to more than the SSP, the value of sick pay is calculated as the weeks of coverage times their gross weekly employment earnings plus any remaining SSP entitlement. As the SSP covers 28 weeks, many individuals will first get their enhanced sick pay before getting only the SSP. The individual estimates have then been aggregated to provide a household measure of sick pay coverage.

The number of weeks an individual will have sick pay coverage has been calculated using company benchmark data which provides the median number of sick pay weeks by broad industry group and length of service[40]. This information has been enhanced by multiplying the median by the proportion of businesses that provide above sick pay by size and contract type to estimate the number of extra weeks sick pay an individual may get depending on their industry, length of service, size of company, and contract type[41]. The number of weeks covered in the public sector and higher & further education only differ based on industry and length of service.

Fig. 14. Estimated number of weeks sick pay above SSP

	Small Company			Medium Company			Large Company		
	1 year	2 years	5 years	1 year	2 years	5 years	1 year	2 years	5 years
Private production permanent	2.0	2.3	3.1	3.6	4.1	5.6	5.9	6.8	9.2
Private production temporary	1.3	1.5	2.0	2.4	2.7	3.7	3.9	4.5	6.1
Private production no contract	1.2	1.3	1.8	2.1	2.4	3.3	2.1	2.4	3.3
Private services permanent	2.0	4.7	5.1	3.6	8.6	9.2	5.9	14.1	15.1
Private services temporary	1.3	3.1	3.4	2.4	5.7	6.1	3.9	9.3	10.0
Private services no contract	1.2	2.8	3.0	2.1	5.0	5.4	3.5	8.2	8.8
Public sector	16	32	52	16	32	52	16	32	52
Higher and further education	21	32	52	21	32	52	21	32	52

[37] https://www.bankofengland.co.uk/statistics/tables

[38] The Financial Lives Survey asks when the fixed term ends on the interviewee's mortgage which was used to calculate which year they would refinance. In each year, the characteristics of the households who would refinance were similar to that of a mortgage holder.

[39] Based on the BoE mortgage data. https://www.bankofengland.co.uk/statistics/tables

[40] https://www.unison.org.uk/content/uploads/2017/03/Sickness-absence-benchmarks.pdf

[41] As published by the Department of Health & Social Care in their Health in the workplace and Sickness absence and health in the workplace studies.

PENSIONS

The following section provides information on the pensions data included in the Barometer. This includes:

- Pensions included in the WAS
- Changed to the Defined Benefit measurement
- Changes to the contribution rates
- Calculating the retirement costs

PENSIONS INCLUDED IN THE WAS

The WAS includes the following pensions:

Fig. 15. Pensions included

Variable label
Total value of defined benefit occupational scheme
Total value of current defined contribution pension wealth
Total value of AVCs scheme
Total value of current personal pension scheme
Value of total retained DB pension wealth'
Total value of retained rights in DC scheme
Total value of retained rights for drawdown
Value of pensions in payment
Value of pensions expected from former spouse/partner

As noted in their user guides, the wealth for each of these components was calculated as describe below.

Current defined benefit occupational pension scheme wealth

Individuals could report up to two current defined benefit pensions. The wealth in each of these schemes was calculated separately (as described below) and then summed to derive total wealth in current defined benefit (DB) occupational schemes[42].

Wealth in these schemes was defined as:

$$W_i = \frac{A_R Y_i^p + L_i}{(1+r)^{R-a}}$$

[42] Since these are individual, not household, pension wealth measures, and due to the complexity of the calculations and the information that would have been required from respondents, survivor benefits are not modelled. In practice, this would lead to an underreporting of pension wealth for women, since the expected future survivor's benefits that they will receive when they (on average) outlive their husbands will not be measured. To the extent these survivors' benefits will be sometime in the future for most women, their omission will have only a small effect on the calculations.

Where:

• A_R is the age- and sex-specific annuity factor at normal pension age, R, based on (single life) annuity rates quoted by the Financial Services Authority, assuming average age- and sex- specific life-expectancies (as estimated by the Government Actuary's Department) and a discount rate of 3 per cent.

• Y_i^p is annual pension income, defined as $Y_i^p = \alpha_i n_i s_i$

• α_i is the accrual fraction in the individual's scheme

• n_i is the individual's tenure in the scheme.

• s_i is the individual's gross pay at the time of interview.

• L_i is the lump sum that the individual expects to receive at retirement r is the real investment return (assumed to be 3 per cent per annum)

• R is the normal pension age in the pension scheme.

• a is the individual's age at interview.

Definition of wealth from Additional Voluntary Contributions (AVCs)

Individuals who reported being members of an occupational DB scheme were asked whether they had made any AVCs and, if so, what the value of their AVC fund was at the time of interview. Therefore, current AVC wealth is simply defined as the fund value reported by the respondent at the time of the interview.

Definition of current defined contribution occupational pension

Individuals could report up to two current defined contribution pensions. The wealth in each of these schemes was calculated separately (as described below) and then summed to derive total wealth in current defined contribution (DC) occupational schemes. This procedure was also followed for those who reported that their employer-provided scheme was a hybrid scheme or that they did not know the type of scheme.

Individuals were asked to report the value of their fund at the time of the interview and were encouraged to consult recent statements where available. Current occupational DC pension wealth is, therefore, simply defined as the fund value reported by the respondent at the time of the interview.

Definition of current personal pension wealth

Individuals could report up to two current personal pensions; current being defined as schemes to which the individual was (or could have been) contributing at the time of interview. The wealth in each of these schemes was calculated separately (as described below) and then summed to derive total wealth in personal pensions.

Individuals were asked to report the value of their fund at the time of the interview and were encouraged to consult recent statements where available. Current personal pension wealth is, therefore, simply defined as the fund value reported by the respondent at the time of the interview.

Retained rights in defined benefit occupational pension scheme

Individuals could report up to three pensions in which rights have been retained. These could be either DB of DC schemes. The wealth in each DB retained scheme was calculated separately (in much the same way as for current DB schemes described above) and then summed to derive total wealth held as retained rights in defined benefit (DB) occupational schemes.

Retained rights in defined contribution occupational pension

The wealth in each DC retained scheme was calculated separately as described in above and then summed to derive total wealth held as retained rights in DC schemes. Specifically, individuals were asked to report the value (at the time of interview) of their retained DC fund.

Rights retained in schemes which individuals are drawing down

Individuals could also report that they were already drawing down assets from a retained pension scheme. In these cases, individuals were asked to report what the remaining fund value for their scheme was at the time of interview. The wealth in each of these schemes was then summed to derive total wealth held in schemes of this type.

Pensions expected in future from former spouse/partner

Individuals were asked to report in total how much they expected to receive in the future from private pensions from a former spouse or partner. Respondents were given the choice to report this either as a lump sum wealth figure, or as an expected annual income. Two slightly different approaches were followed, depending on how the respondent answered.

For those who reported a total lump sum value, this figure was taken as the relevant wealth measure and discounted back to the time of the interview. For those who reported an expected future annual income, wealth was calculated in much the same way as for DB schemes described above:

$$W_i = \frac{A_R Y_i^p + L_i}{(1+r)^{R-a}}$$

Where:

• A_R is the age- and sex-specific annuity factor at retirement age, R (see above)

• Y_i^p is expected annual pension

• r is the real investment return (assumed to be 3 per cent a year)

• R is assumed to be 65, or the individual's current age if he/she was already aged over 65

• a is the individual's age at interview

Definition of wealth from pensions in payment

In order to calculate the value of the future stream of income provided by pensions from which the individual was already receiving an income, the lump sum which the individual would have needed at the time of interview to buy that future income stream from a pension provider was calculated. Wealth from pensions in payment was therefore defined as:

$$W_i = \frac{A_R Y_i^p}{(1+r)^{R-a}}$$

Where:

• A_R is the age- and sex-specific annuity factor based on respondent's current age, a

• Y_i^p is reported current annual private pension income

For those age groups for whom no market annuity factor was available (ages 75 and over), the ONS predicted a hypothetical annuity factor based on the information from those ages where annuity prices were available.

DEFINED BENEFIT PENSIONS

The Barometer has incorporated enhancements to the approach for valuing defined benefit (DB) pensions, which affect all periods of the Barometer.

A key methodological shift is that the WAS now uses the Superannuation Contributions Adjusted for Past Experience (SCAPE) discount rate to determine the present value of future pension promises, both pre- and post-retirement. This replaces the prior reliance on market-based discount rates and results in valuations that are more stable and relevant for policy purposes. As illustrated in Fig. 16, this has led to a fall in the median and mean pre-retirement DB pension wealth.

Fig. 16 Revisions to defined benefits in Great Britain, April 2018 to March 2020 (Round 7)[43]

Methodology	Median pre-retirement DB pension wealth (£)	Mean pre-retirement DB pension wealth (£)
Published methodology	£71,700	£194,600
Updated methodology	£65,100	£126,600
Percentage (%) difference between two methodologies	-9	-35

PENSION CONTRIBUTIONS

Each household participant in the Wealth and Assets Survey (WAS) provides data on the value of their pension contributions (from both employer and employee), and type of scheme. However, it has two deficiencies for our modelling. These are:

1. **Pensionable pay**: while the WAS identifies those on a defined contribution scheme, it does not include information on the pensionable salary their contributions are based on. An employee's pensionable salary could be basic earnings, qualifying earnings, or total earnings depending on the scheme they are on.
2. **Representativeness of the data**: the distribution of pension contributions does not match that of the more reliable, employer-provided, Annual Survey of Hours and Earnings (ASHE).

[43] ONS: Estimating defined benefit pension wealth in Great Britain: December 2024

Pensionable pay

Several steps were taken to identify the employee's pensionable earnings and hence an individual's method of auto-enrolment pension contributions. Employees are allocated to one of three schemes which have different pensionable pay and minimum contributions (Fig. 17).

Fig. 17. Pensionable pay and minimum contribution by defined contribution scheme

Type	Pensionable pay	Minimum employer contribution	Minimum employee contribution	Minimum total contribution
Total pay	Total pay	3.0%	4.0%	7.0%
Qualifying earnings	£6,240 and £50,270 of total pay	3.0%	5.0%	8.0%
Basic pay	Pay excl bonus, holiday pay etc	4.0%	5.0%	9.0%

In the WAS survey, no information is collected on the method of contributions. Pension contributions are expressed as either a reported percentage or a calculated percentage given the individual's pension contribution and their basic pay depending on the question answered by the interviewees. Furthermore, other household datasets do not include questions on the type of scheme households are on. While the ASHE includes information on each employee's pensionable pay, this may include earnings below the lower earnings limit or above the upper earnings limit as highlighted by the Department for Work & Pensions and, therefore, does not identify whether qualifying earnings should be used. To identify the employee's pensionable pay and type of scheme, we made the following assumptions:

Total pay

Total earnings schemes require employees to contribute only 4%, compared to 5% for those on either the basic or qualifying earnings schemes. As such, we assume that all those employees contributing exactly 4% were on a total earnings scheme. This is only identifiable for employees that provided percentage answers in the WAS as calculated pension percentages require an assumption on their pensionable pay.

Qualifying and basic earnings

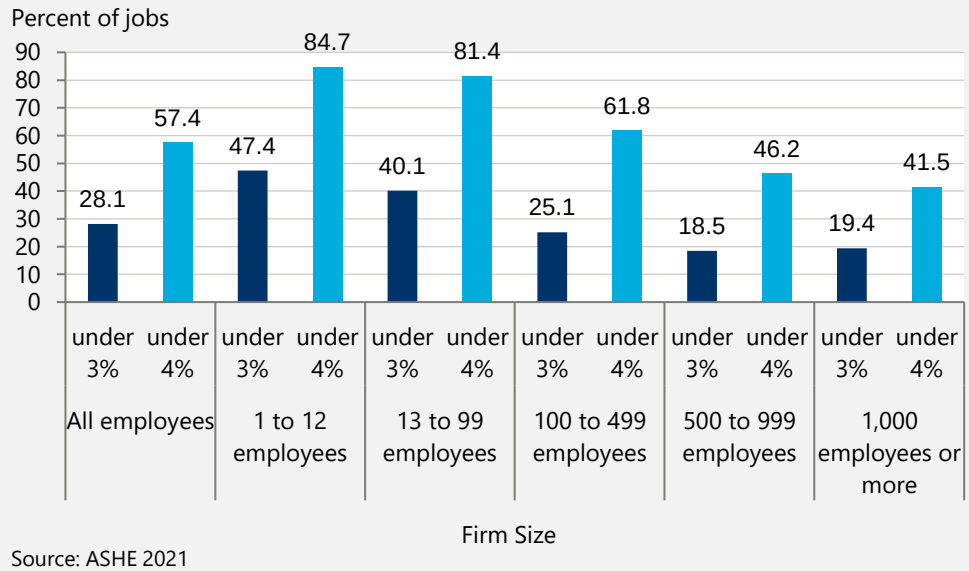
We use employer contributions to distinguish between those on basic earnings and qualifying earnings. Basic earnings schemes require that employers contribute 4%, while qualifying earnings schemes require that they contribute only 3%. As such, we assume that all those individuals whose employers are contributing less than 4% are on qualifying earnings, and hence the rest are on basic earnings. In the analysis, we are only able to identify those on minimum qualifying earnings.

When compared to ASHE, the distribution of employee contributions from the WAS suggests a higher proportion of employees on a basic earnings pension scheme. As data from ASHE are provided by employers rather than employees, it is believed to be more accurate. Within the ASHE data, 57.4 percent of employees have a pension contribution of under 4% and 21.2 percent of employees between 4% and 8%, while the WAS has 45.7 percent of employees under 4% and 34.8 percent of employees between 4% and 8% . Therefore, we adjust the employer contributions in the WAS data so that they are in line with the aggregated distributions from the ASHE dataset. In particular, we focus

the analysis on identifying those paying less than 4% which will enable the identification of those on minimum qualifying earnings.

At the firm size level, the published 2021 ASHE data identify clear trends in the proportion of employees where the employer contributes less than 4%. This data show that smaller firms were significantly more likely to contribute less than 4% when compared to larger firms. As employers contributing less than 4% could mean an employee is on either a total or qualifying earnings scheme, employer pension contributions under 3% were also assessed . Where an employer has provided total pay as their pensionable pay and their contributions are based on qualifying earnings, the calculated percentage will be less than 3% and below the minimum. As shown in Fig. 18, a higher proportion of individuals with employers contributing under 3% is found in smaller firms. While this trend is in line with industry expectations, a difference of 29.3% for all employees is larger than expected. Based Hargreaves Lansdown knowledge of pension schemes, the number of employees using qualifying earnings schemes is significantly larger than those on total salary schemes. The reason for this result could be due to some employers taking into account the fact that the employees are on qualifying earnings while others do not. As a result, an average of the proportions was calculated by firm size.

Fig. 18. Proportion of jobs by employer contribution share by firm size



Source: ASHE 2021

In order to match the proportion by firm size of those we believe to be on qualifying earnings, we adjust the pension contributions of individuals in the WAS. Individuals who had a pension contribution between 4% and 8% were shifted onto qualifying earnings based on their previously reported employer pension contribution, firm size, and sector of the economy they worked in. This will mean those individuals that reported lower pension employer contributions and worked in firms more likely to have employees on qualifying earnings were adjusted first until the proportion on qualifying earnings match the ASHE data.

Distribution of employee pension contribution

We adjust employee contributions to match the ASHE distribution of contributions for each band of employer contributions. This is done by ranking individuals by their reported employee contributions,

and then adjusting those marginal individuals across employee contribution bands to match the ASHE distribution while minimising the deviations from their reported contributions.

Having adjusted the distribution of contributions and mapped each individual to a scheme, we change the employee contributions of those individuals contributing less than the minimum required by their scheme. This ensures that total contributions are greater than 8% for those on qualifying earnings, 7% for those on total earnings, and greater than 9% for those on basic earnings.

RETIREMENT COSTS

The benchmark is underpinned by retirement costs based on an adjusted version[44] of the Pension Commission's Target Replacement Rate (TRR) with a floor derived from the Living Wage Pension. The income in retirement required is calculated for each measure, and where the TRR is below the Living Wage Pension, the Living Wage Pension is used.

Target replacement rate

The Pensions Commission's TRR is based on maintaining a similar standard of living before and after retirement, using a ratio of pre-retirement earnings. In 2004 the Pension Commission published a set of ratios that are before and after housing costs, we have used the before housing costs benchmark in this analysis. Since 2004, these ratios have been updated by the Resolution Foundation to reflect changes in the tax system[45] which uplift the ratio to maintain consistency in terms of net income with the original ratios.

To calculate a household-specific benchmark using the TRR, the rate is applied to the estimated pre-retirement earnings[46] of each individual within a household. This involves adjusting an individual's current earnings to reflect their expected income between ages 50 and retirement.[47] Once pre-retirement earnings are estimated, the relevant TRR rates are applied, and the individual earnings data are aggregated at the household level to determine the required benchmark income.

[44] The rates used have been estimated by the Resolution Foundation and have been adjusted to reflect changes in the tax system since the original rates were set by the Pension Commission.
[45] Perfectly adequate?, Resolution Foundation, 2024
[46] We assume that household benefits and/or investment income will remain at a similar level in retirement, considering only employee and self-employed earnings in our calculations. Consequently, households relying solely on benefits or investment income are expected to have adequate income coverage in retirement to maintain their current standard of living in retirement for this benchmark.
[47] For example, a 35-year-old is anticipated to see their earned income fall by 11% compared to the average income of those aged between 50–68. We, therefore, estimate their pre-retirement earnings as £35,720 (£40,000*89%). Average earnings by age based on the LFS.

Fig. 19 Original and updated target replacement rate[48]

Gross earnings band 2025	Original TRR	Updated TRR
Less than £18,900	80%	86%
£18,900 to £34,900	70%	76%
£34,900 to £49,700	67%	72%
£49,700 to £79,600	60%	62%
Over £79,600	50%	50%

Living wage pension

The Living Pension, published by the Living Wage Foundation, is designed to ensure retirees can meet their basic everyday needs. The measure particularly emphasises the financial burden of rental costs, as it differs by tenure as well as relationship status.[49] Housing expenses in the Living Pension benchmark vary depending on whether the individual is a homeowner, social renter, or private renter. Rental costs are based on gross rental payments.[50]

Since the Barometer dataset does not include the expected tenure status of households in retirement, this is modelled. Homeowners are assumed to remain homeowners in retirement, while renters are assessed for their likelihood of purchasing a home before retirement. The likelihood of purchasing a home before retirement is based on the proportion of anticipated homeowners in retirement across age groups and individual household characteristics such as income, current rental status (private or social renter), education and childhood housing status.

Recent research indicates that a growing number of younger households will remain renters into retirement. The Resolution Foundation[51] predict that 65% of those currently age 25 will be homeowners and 66% of those currently aged 35. This is far below the proportion for those who are currently aged 45, which is 74%. The proportion of homeownership is aligned to these proportions within the respective age groups[52], and individual households are identified as being homeowners in retirement . This modelling captures higher essential costs for those currently aged 16–64 in retirement due to the expectation that a higher proportion of these households will be renters in retirement.

As the relationship status of a household at retirement is not known, an average cost for an individual has been calculated based on a weighted average of these single and couple costs. The weighting used has been estimated based on the proportion of individuals who are single or in a couple for the

[48] Total wages and salaries are used to estimate 2025 figures bandings for the TRR.
[49] Building a Living Pension, Resolution Foundation, 2021
[50] The Living Pension assumes that single pensioner households have private rent that equals the average lower quintile rent for a one-bedroom property in England. For pensioner couples, it assumes the rent reflects the average lower quintile rent for a two-bedroom property in England. Social rental payments are based on the rents in the minimum income standards (MIS).
[51] Building a Living Pension, Resolution Foundation, 2021
[52] Age groups include: 16-34, 35-44, 45-54, 55-64.

age cohort 65-69[53]. This data shows there is a higher proportion of households that are living in a couple compared to being alone. Furthermore, there is a slightly higher probability of an individual being alone if they are currently single. This is due to some individuals not currently living in a couple in this age cohort and have never been in a couple which does not apply to an individual who is currently in a couple.

Fig. 20. Living wage pension required by tenure[54]

Living standard	Single		Couple	
	2019	2025	2019	2025
Homeowner	£10,470	£14,620	£16,160	£22,580
Social renter	£14,070	£19,76	£19,970	£28,030
Private renter	£16,000	£22,19	£22,450	£31,150

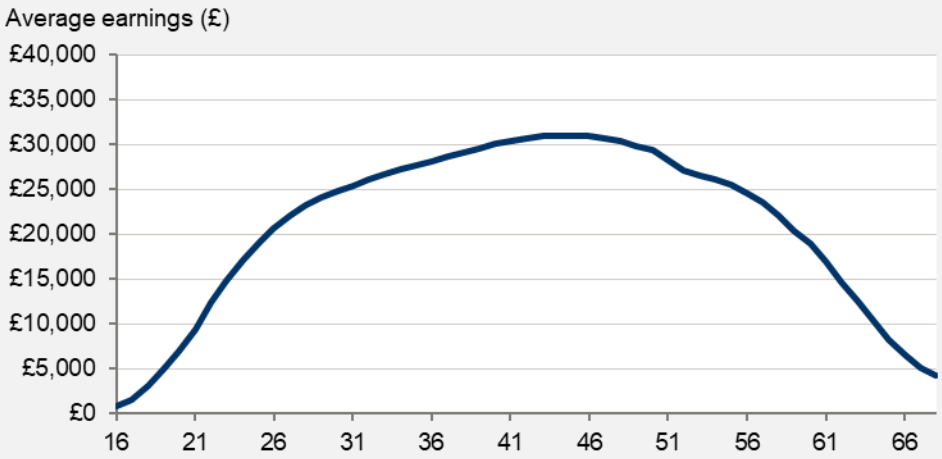
In addition to the income to support the retirees spending, households will also need to cover any income tax that must be paid. Individuals currently get £12,570 tax free allowance so an individual will need to pay tax on the income needed above this threshold. We assume households use the tax-free pension lump sum withdrawal. Therefore, 25% of their pension is tax-free and used to supplement their income over their retirement and the rest is subject to a 20% tax rate.

These costs will need to be met by the state pension and pension savings. It is assumed that the state pension is available to all individuals and equals £8,736 annually[55]. Individuals will need to cover the remaining expenses with pension savings, and a total required pension pot is estimated based on a 4% annual drawdown.

To evaluate how well households are doing in terms of their pension savings, this retirement cost has been distributed over the working life of the individuals within the household. Pre-pandemic data[56] shows that, in general, average earnings and employment rates peak for individual in their mid-40's, declining thereafter. Individual's pension savings should therefore follow a similar pattern and the savings needed to finance a moderate cost of living has been distributed based on the average lifetime earnings. Lifetime earnings has been calculated by multiplying the average earnings by the employment rate at each age. As shown below, average earnings and employment rates are expected to be lower for older individuals which will reduce their ability to save into their pension.

[53] 2019 marital status and living arrangements data published by the ONS.
[54] Total wages and salaries are used to estimate 2025 figures for the LW pension benchmarks.
[55] Based on the 2019 to 2020 full rate of the new State Pension of £168 per week.
[56] Based on 2019 labour force survey data interpolated by individual age.

Fig. 21. Average earnings by age (Retiring at 68)



Source: Oxford Economics

Once the required savings have been calculated by age, a discount rate of 3% per year until retirement has been applied to account for the real investment return. As the retirement age is increasing, separate costs by age have been calculated based on when an individual can access their state pension. Where an individual can retire earlier, they will need to have saved more money quicker as they are working for fewer years.

FORECAST RETIREMENT COSTS

The pension savings required are forecast based on the expected increase in retirement costs, state pension and tax free allowance. Each year between 2020 and 2024, updates to the Living Wage Pension are published and incorporated into the calculator while wage growth underpins the increase in the TRR retirement income. From 2024 onwards, wage growth is used to increase both income estimates. This will take into account the rising costs faced by households as well as the general improvement in living standards.

The state pension forecast is based on the "triple lock" policy. Each year, the state pension is increased based on the highest of these three measures: A flat 2.5% rise, average earnings growth in the second quarter of the previous year or inflation in the third quarter of the previous year. The forecasts of earnings and inflation are based on projections from Oxford's Global Economic Model (GEM).

The average quarterly increase in retirement costs has been calculated and the increase is applied to the initial retirement costs by age. Furthermore, the age of the individuals in the household increases each year to ensure the correct cost is used.

INCOME PROTECTION AND CRITICAL ILLNESS COVER

Income protection and critical illness cover are imputed from the 2020 Financial Lives Survey (FLS), conducted by the Financial Conduct Authority (FCA). For both types of cover, the survey reports whether the respondent does or does not have the cover. Other characteristics of the respondent and their household are used to model the likelihood of particular households having each type of cover.

Modelling income protection and critical illness cover

In both cases, the outcome variable modelled is binary (1 in the presence of cover, 0 otherwise) and as such logistic regressions were fitted on the FLS data. All covariates used were available in, or could be calculated from the WAS dataset. As with expenditure, the income decile thresholds are based on the WAS to ensure consistency when imputing cover for WAS households. Fig. 22 shows the results of these regressions, where the coefficients are interpreted as the effect on the log odds of the outcome variable, holding other covariates constant.

These models were then used to predict the probability of each household in the WAS having each type of cover. The households with the highest probability of having a given type of cover in the WAS were assigned that type of cover, such that the overall share of households with cover matched the share in the FLS.

Fig. 22. Critical illness cover and income protection model results

Variable	Critical illness cover	Income protection
Household type (base category single adult, no children)		
Single adult with children	0.57***	-0.01***
Multiple adults, no children	-0.09***	-0.64***
Multiple adults with children	0.26***	-0.49***
Work type (base category not employed)		
Employed full-time	0.92***	0.57***
Employed part-time	0.54***	0.05***
Self-employed full-time	0.29***	0.00
Self-employed part-time	0.76***	-0.01
Household income decile		
2	-0.17***	0.63***
3	0.15***	0.70***
5	0.39***	0.87***
6	-0.26***	0.18***
7	0.50***	1.15***
8	0.59***	1.50***
9	0.72***	1.51***
10	0.90***	1.79***
Age (base category 16-24)		
24-34	1.00***	0.55***
34-44	0.97***	0.68***
44-54	0.91***	0.33***
54-64	0.37***	-0.03***
64-70	-0.23***	-0.87***
70+	-1.17***	-3.68***
Degree	-0.04***	0.27***
Homeowner (base category own home outright)		
Own home with mortgage	0.91***	0.83***
Rent home	-0.69***	-0.62***
Constant	-3.93***	-4.58***

In the case of both types of cover, homeowners with a mortgage are more likely to be protected than those who own their homes outright, who are in turn likelier to be covered than renters. Those of prime working age, 24-54, are generally the likeliest to be covered in both cases. Both employees and self-employed workers are more likely to have critical illness cover than those who are not working, but only employees are more likely to have income protection than those who are not working. In both cases, broadly speaking, households with higher incomes are more likely to be covered. Single adult households are the most likely to have income protection policies, while households with children are the most likely to have critical illness cover. Having a degree makes income protection more likely, but critical illness cover slightly less likely.

ARREARS EXTRAPOLATION

Fig. 23. Bank of England arrears models

Variable	Utility arrears	Loan arrears
Household income decile		
2	0.04	-0.24
3	0.18	-0.46
4	-0.21	-0.77**
5	-0.66**	-0.55
6	-0.61*	-0.87**
7	-1.14***	-1.44***
8	-1.16***	-1.17***
9	-1.24***	-1.52***
10	-0.86***	-1.08***
Age (base category 16-24)		
24-34	-0.07	-0.26
34-44	-0.04	-0.41
44-54	-0.60**	-0.86**
54-64	-1.02***	-1.70***
64+	-1.72***	-2.29***
Main earner employment status (Base category private sector services)		
Employee (Private sector industry)	0.28	0.09
Employee (Public sector)	-0.65**	-0.71*
Self-employed	-0.30	-0.86
Non-working	0.15	-0.55*
Retired	-1.30**	-1.27***
Degree	-0.10	0.26
Region (base category North East & Yorkshire and the Humber)		
North West	-0.02	0.02
Midlands	-0.36	-0.08
South East	-0.31	-0.45
East of England	-0.17	-0.04
South West	-0.11	-0.06
Wales	0.06	-0.63
London	0.05	0.65**
Scotland	-0.22	-0.43
Homeowner (base category own home outright)		
Own home with mortgage	-0.48*	-0.29
Rent home	0.45**	-0.04
ln(Number of children)	0.82***	0.88***
ln(Number of adults)	0.40	0.36
Constant	-1.87***	-1.97***

Fig. 23 shows the results of the logistic regressions fitted on Bank of England household survey data to model whether households are in utility and loan arrears. Coefficients are interpreted as the effect on the log odds of being in arrears, holding other covariates constant. For both models, the likelihood of being in arrears broadly decreases as income and age increase. A greater number of children increases the likelihood of being in arrears.

These models were used to predict the likelihood of being in arrears for all households in the WAS. Once the predictions had been made, the total number of households who are classified as being in utility and loan arrears are based on the Ofgem arrears and unsecured loan write-off data. With quarterly volatility in both these datasets, the data is smoothed and the average the last 4 quarters is used. For each type of arrears, this is extrapolated in the following way:

• The percentage change π in the share of households that were in utility and loan arrears from one year to the next was calculated using the relevant Ofgem and unsecured loan write-off data.

• If the share increases from year t to year $t + 1$:

  • All those households which are in arrears in year t are assumed to continue to be in arrears in year $t + 1$

  • The households with the highest predicted probability of being in arrears from among those who were not in arrears in year t are assumed to be in arrears in year $t + 1$, such that the overall percentage change equals π

• If the share decreases from year t to year $t + 1$:

  • All those households which are not in arrears in year t are assumed to continue not to be in arrears in year $t + 1$

• The households with the lowest predicted probability of being in arrears from among those who were in arrears in year t are assumed not to be in arrears in year $t + 1$, such that the overall percentage change equals π

Households that are in arrears are then based on whether they have either loan or utility arrears (or both).

DEBT BURDEN

Fig. 24 Bank of England debt burden models

Variable	2022	2023	2024
Household income decile			
2	-0.30	-	-
3	-0.55*	-	-
4	-0.46*	-	-
5	-0.98***	-	-
6	-0.94***	-	-
7	-1.36***	-	-
8	-1.51***	-	-
9	-1.05***	-	-
10	-0.81***	-	-
Household income quintile			
2	-	-0.24	-0.69***
3	-	-0.65***	-1.04***
4	-	-0.78***	-1.06***
5	-	-0.82***	-1.37***
Age (base category 16-24)			
24-34	0.24	0.38	0.52**
34-44	0.19	0.32	0.07
44-54	0.05	0.03	-0.14
54-64	-0.09	-0.24	-0.23
64+	-0.78*	-0.30	-1.08***
Main earner employment status (Base category private sector services)			
Employee (Private sector industry)	-0.20	0.25	-0.15
Employee (Public sector)	-0.26	-0.43*	-0.23
Self-employed	-0.33	-0.01	0.04
Non-working	-0.37*	-0.04	-0.14
Retired	-0.79*	-1.15**	-0.79**
Degree	0.18	0.08	0.34**
Homeowner (base category own home outright)			
Own home with mortgage	-0.43**	0.18	-0.02
Rent home	0.28	0.65**	0.44**
ln(Number of children)	0.56***	0.63***	0.47***
ln(Number of adults)	0.47*	0.18	0.04
Constant	-1.57***	-2.21***	-1.41***

Fig. 24 shows the results of the logistic regressions fitted on Bank of England household survey data to model the burden of debt for each household. Coefficients are interpreted as the effect on the log odds of having debt as a burden, holding other covariates constant. For all models, debt burden broadly decreases as income and age increase. Fewer homeowners with a mortgage find debt less a greater burden than those who own their homes outright. Renters, however, find debt a greater burden. A greater number of children increases the debt burden[57].

These models were used to predict the burden of debt for all households from 2022 onwards after the integration of Round 8 of the WAS. Once the predictions had been made, households were classified as being burdened or not in the following way:

• The percentage change π in the share of households that felt debt was a burden from one year to the next was calculated from the Bank of England survey data

• If the share increases from year t to year $t+1$:

• All those households which find debt a burden in year t are assumed to continue to find debt a burden in year $t+1$

• The households with the highest predicted burden from among those who did not find debt a burden in year t are assumed to find debt a burden in year $t+1$, such that the overall percentage change equals π

• If the share decreases from year t to year $t+1$:

• All those households which did not find debt a burden in year t are assumed to continue not to find debt a burden in year $t+1$

• The households with the lowest predicted burden from among those who did find debt a burden in year t are assumed not to find debt a burden in year $t+1$, such that the overall percentage change equals π

[57] The debt question was changed in 2023 from: To what extent is the repayment of these loans and the interest a financial burden on your household? to How concerned are you about your current level of debt? To ensure consistency with the historical data only the overall proportional change is used with the variation by household characteristic based on the latest model.

MONTHLY DEBT REPAYMENTS

Fig. 25 Bank of England monthly debt repayment models

Variable	2022	2023	2024
Household income decile			
2	0.35	0.13	-0.21
3	0.74**	0.60**	0.28
4	1.02***	0.48*	0.35
5	1.16***	0.86***	0.49**
6	0.96***	0.81***	0.50**
7	1.32***	0.57*	0.51*
8	1.28***	0.65**	0.71**
9	1.37***	0.92***	0.99***
10	1.64***	1.12***	1.60***
Age (base category 16-24)			
24-34	0.36	0.06	-0.36
34-44	0.34	0.01	-0.37
44-54	0.58*	0.15	-0.56**
54-64	0.69*	0.15	-0.29
64+	0.93**	0.49	0.13
Main earner employment status (Base category private sector services)			
Employee (Private sector industry)	0.15	0.07	0.10
Employee (Public sector)	-0.42*	-0.60**	-0.15
Self-employed	0.33	0.03	-0.04
Non-working	-1.25***	-0.36	-1.14***
Retired	-0.48	0.13	0.29
Degree	-0.22*	-0.10	0.06
Homeowner (base category own home outright)			
Own home with mortgage	0.16	0.34*	0.14
Rent home	-0.06	-0.03	-0.09
ln(Number of children)	0.54***	0.46***	0.86***
ln(Number of adults)	-0.18	0.17	0.01
Constant	3.69***	3.88***	4.75***

Fig. 25 shows the results of weighted least squares regressions, fitted on Bank of England data where the dependent variable is the logarithm of monthly debt repayments. The process for using these project debt repayments forward after 2022 is as follows:

• The models are used to predict annual figures for monthly debt repayment.

• The annual predictions are linearly interpolated to a quarterly frequency, and predictions for quarterly repayment growth are derived from these.

• Quarterly repayment growth predictions are applied in a chained manner to monthly debt repayments from the WAS.

Aggregate repayment growth quarter-on-quarter is constrained to match total UK credit growth from Oxford Economics' Global Economic Model, by scaling all households' repayments up or down by the same factor.

MONTHLY SAVINGS

Fig. 26 Bank of England savings ratio models

Variable	2019	2020	2021	2022	2023	2024
Household income decile						
2	0.00	-0.01	-0.01*	0.00	-0.01	0.00
3	0.01	0.01	0.01	0.01	0.00	0.00
4	0.02***	0.03***	0.01	0.02**	0.02***	0.01*
5	0.03***	0.03***	0.03***	0.02**	0.01*	0.01*
6	0.04***	0.03**	0.02**	0.03***	0.02***	0.00
7	0.02***	0.04***	0.03***	0.02***	0.02***	0.01***
8	0.04***	0.04***	0.04***	0.01***	0.02**	0.01***
9	0.04***	0.05***	0.05***	0.03***	0.01*	0.01***
10	0.04***	0.06**	0.04**	0.04***	0.03***	0.02***
Age (base category 16-24)						
24-34	-0.01*	-0.04*	-0.01	-0.01	-0.01*	0.00
34-44	-0.02***	-0.05**	-0.01	-0.02	-0.01**	0.00*
44-54	-0.02***	-0.05***	-0.02***	-0.02**	-0.01*	-0.01*
54-64	-0.02***	-0.05***	-0.02**	-0.03***	-0.02***	0.00
64+	0.01	-0.03	-0.02	-0.01	0.00	0.00
Employment status (base category employed)						
Self-employed	-0.01	-0.01	-	-	-	-
Unemployed	-0.01***	-0.02***	-	-	-	-
Retired	0.00	-0.01	-	-	-	-
Main earner employment status (Base category private sector services)						
Employee (Private sector industry)	-	-	-0.01*	0.00	0.00	0.00
Employee (Public sector)	-	-	-0.01**	-0.01*	0.00	0.00
Self-employed	-	-	-0.01	-0.01	0.00	0.00
Non-working	-	-	-0.02***	-0.01***	-0.01**	-0.01***
Retired	-	-	0.01	-0.01	0.00	0.00
Degree	0.01***	0.03***	0.02***	0.01***	0.01***	0.00*
Homeowner (base category own home outright)						
Own home with mortgage	-0.05***	-0.07***	-0.06***	-0.06***	-0.05***	0.00
Rent home	-0.06***	-0.08***	-0.07***	-0.07***	-0.06***	0.00
ln(Number of children)	-0.01**	-0.02***	-0.02***	-0.02***	-0.01***	0.01***
ln(Number of adults)	-0.01***	-0.03***	-0.01	0.00	-0.01	0.03
Constant	0.10***	0.18***	0.13***	0.11***	0.09***	0.05***

Fig. 26 shows the results of weighted quantile regression, fitted on Bank of England data where the dependent variable is the saving ratio. The saving ratio has been calculated base on the monthly saving of households and their income. The process for predicting the saving ratio is as follows:

• The models are used to predict annual figures for savings ratios.

• The annual predictions are linearly interpolated to a quarterly frequency, and predictions for quarterly differences in savings ratios are derived from these.

• Quarterly savings ratio difference predictions are applied in a chained manner to the pre-pandemic savings ratios from the WAS.

PREDICTING WHICH HOUSEHOLDS START HOLDING INVESTMENT PRODUCTS

The FLS indicates that the share of adults holding an investment product increased from 32% to 37% between 2020 and 2022 and Oxford Economics have incorporated this increase in investors in the Barometer dataset. This has been estimated in three stages.

Firstly, we used a logistic regression to estimate the likelihood a respondent in the FLS was an investor in 2020 and 2022 using a model for each period. Characteristics used include personal income, age, tenure, household type and employment status. These models are then used to estimate the likelihood of an individual being an investor in the barometer dataset. These individual likelihoods are averaged to the household level based on the individuals' income as weights.

We then ranked non-investing households by the change in likelihood between 2022 and 2020, and assumed the households with the biggest increase in the likelihood were the ones that started investing. As there are differences between the proportion of investors in the FLS and WAS, we have assumed the same proportion of non-investors become investors and there are the same number of investors per household as seen in the WAS. This leads to 3.7% more households investing in the underlying dataset.

Finally, we extrapolate the increase in investing households between 2020Q2 and 2022Q1. We randomly select those households who have been identified as most likely to become an investor and equally distribute them as becoming an investor during one of these quarters. When a household becomes an investor, we redistribute their liquid assets to start investing in financial products. Based on the analysis of the FLS, we estimate that on average new investors have a smaller proportion of their assets in financial products. Reflecting this difference, the proportion of wealth held in each financial product is 80% less than the average seen in the underlying WAS dataset.

Fig. 27 New investor model (FLS)

Variables	2020	2022
Family type (base category single adult, no children)		
Single adult with children	-0.29*	-0.37***
Multiple adults, no children	0.12	0.18***
Multiple adults with children	-0.13	0.01
Employment (base category unemployed)		
Other	0.59**	-0.35
Employed full-time	0.52**	-0.31
Employed part-time	0.55**	-0.32
Self-employed full-time	1.04***	0.03
Self-employed part-time	0.97***	-0.07
Retired/ Semi-retired	1.16***	0.32
Household income decile		
2	0.15	0.11
3	0.23*	0.29**
4	0.49***	0.58***
5	0.64***	0.87***
6	0.96***	1.17***
7	1.55***	1.33***
8	1.42***	1.7***
9	1.75***	1.73***
10	1.25***	1.09***
Age group (base catergory 16-24)		
24-34	-0.28	-0.2*
34-44	-0.27	-0.36***
44-54	0.2	-0.11
54-64	0.35**	-0.19
64-70	0.2	-0.72***
70+	0.24	-0.52***
Has a degree	0.51***	0.6***
Property tenure (base category own outright)		
Own with mortgage	-0.7***	-0.79***
Rent	-1.25***	-1.21***
Female	-0.29***	-0.62***
Constant	-1.32***	-0.01

ESTIMATING THE CHANGE IN HOUSEHOLDS' ASSET ALLOCATION

We have also developed models to estimate the change in the amount of investment products households hold as a share of their total asset allocation. For this analysis we followed a similar approach to the new investors model. Using the FLS survey, we developed two OLS regression models to predict the share of assets held as investment products for 2020 and 2022. Characteristics used in the model include personal income, age, tenure, household type and employment status.
We then used these models to establish the predicted change in this share between 2020 and 2022 for those households who were investors in the WAS. We then applied this change to the asset allocations of those households equally between the periods 2020 Q2 and 2022 Q1.

Fig. 28 Asset allocation model (FLS)

Variables	2020	2022
Family type (base category single adult, no children)		
Single adult with children	0.072*	0.028
Multiple adults, no children	-0.037**	-0.019
Multiple adults with children	0.011	0.013
Employment (base category unemployed)		
Other	0.094	-0.089*
Employed full-time	-0.010	-0.201***
Employed part-time	0.035	-0.174***
Self-employed full-time	0.000	-0.129**
Self-employed part-time	0.010	-0.146**
Retired/ Semi-retired	0.050	-0.160***
Household income decile		
2	-0.011	-0.007
3	0.002	0.034
4	0.027	0.022
5	0.020	0.071***
Age group (base catergory 16-24)		
24-34	-0.042	-0.019
34-44	-0.035	-0.001
44-54	-0.004	0.034
54-64	-0.009	0.014
64-70	-0.020	0.023
70+	0.039	0.062
Has a degree	0.023*	0.006
Property tenure (base category own outright)		
Own with mortgage	0.035**	-0.006
Rent	0.059**	0.022
Female	-0.057***	-0.011
Constant	0.479***	0.586***

PREDICTING GRANULAR REGIONAL DATA AND HOUSEHOLD WEIGHTS

The publicly available WAS provides data at the Government Offices for the Regions (e.g. Scotland, Wales, North East of England, South East of England), but does not provide more granular locational data. Local authority estimates have therefore been estimated within the Barometer dataset in the following three steps:

1. Update the Barometer national weights to be consistent with census data
2. Create a data structure that has households by LAD
3. Estimate LAD specific weights for each household

Step 1: National household weights

The individual household weights at the national level have been updated to incorporate the latest data from the 2021 England and Wales Census and the 2022 Scottish Census. In the Barometer, household weights are initially derived from Round 7 of the Wealth and Assets Survey (WAS). These

have since been revised to match the demographic distributions observed in Round 8, which reflect the most recent census data.

Where significant discrepancies with census data have been identified, and where these differences are important to the Barometer's modelling, we have applied census demographic proportions. In particular, census figures were used to improve the representation of social and private renters, as well as household composition, given that the Round 7 and Round 8 WAS weights differed notably from the census benchmarks.

Step 2: Data structure of the Barometer

The WAS captures the GOR that each household resides in. The Barometer dataset duplicates each WAS household according to the number of LADs located within the GOR of that household. After this, each row within the Barometer dataset represents an individual household residing in a specific LAD.

This updated structure allows for a more precise reflection of LAD-specific trends in variables, such as rents and house prices. For instance, while house price growth was previously applied uniformly at the GOR level, it is now measured and applied at the more granular LAD level

We do not know which LAD each household resides in; therefore, we produce household-specific LAD weights to reflect the likelihood that each household resides in a given LAD based on their household characteristics in step 3.

Step 3: Household-specific LAD-weights

Household-specific weights within each LAD have been estimated, and the sum of these weights across all LADs matches the national totals, ensuring consistency between the national and local results.

For each household in our dataset, the likelihood of residing in a specific local authority is calculated based on their wealth distribution and demographic composition. This data is then used to estimate indicator scores for each local authority and different demographic splits within each local authority. The demographic splits available are income, age, tenure and family type.

The distribution of wealth across each local authority is based on sophisticated neu~~t~~ral network models. We combine information on wealth holdings from three core datasets: the Wealth and Assets Survey (WAS), the Census data[58], and the Land Registry's Price Paid datasets. Together, these datasets form part of an eco-system that allows us to generate estimates of the variation in household wealth across England, Wales, and Scotland at the local authority level. The wealth variables modelled include property and land, physical, financial and pension wealth which collectively comprise total household wealth.

[58] England and Wales use the 2021 Census data. Scotland uses the 2011 Census as the latest 2022 microdata set is unavailable

Household-specific local authority weights also account for the distribution of demographic characteristics such as age, tenure and socio-economic status based on the 2021 England and Wales Census and 2022 Scotland Census.

Through an iterative process, the model estimates a Local Authority-specific weight by adjusting the Barometer household weights until the wealth distribution and distribution of demographic characteristics for each LAD in the Barometer dataset closely match the corresponding distributions in the core secondary datasets.

The likelihood of each family residing in a specific local authority was calculated based on its wealth distribution and demographic composition. This was then combined with its national household weight to estimate a LAD-specific weight for each family.

HOUSING AND RENTAL PRICES

House prices are an important input in the "Homeownership in retirement" indicator. However, the ONS has highlighted sampling limitations in the most recent WAS property wealth estimates, especially at the regional level. Additionally, it is likely that households may not accurately report the current market value of their homes, given recent volatility in local housing markets. To improve reliability, we have continued to use Land Registry data at the local authority level to estimate property values within the Barometer.

Updated rental market data have also been incorporated. Comparisons with ONS data revealed that WAS rental values were lower than official estimates. To correct for this discrepancy, we adjusted the WAS rental figures to align with the ONS data at the government office regional level. In addition, Local Authority District (LAD) rental prices have been added to the LAD weight estimation, helping to align the average rental prices of the households in the Barometer dataset with those seen in the Local Authority.

OXFORD ECONOMICS GLOBAL ECONOMIC MODEL (GEM)

Oxford Economics' Global Economic Model (GEM) provides a rigorous and consistent structure for forecasting and testing scenarios. A globally integrated economic model covering 85 countries, it can be used to address questions on a wide range of economic topics such as the impact of oil price changes, or the effects of slower economic growth. Furthermore, individual country models are fully linked through global assumptions about trade volume and prices, competitiveness, capital flows, interest and exchange rates, and commodity prices.

Data included in the GEM is collected from a variety of sources. For the UK model, the primary data sources for the statistics used in the barometer include the ONS and the Bank of England. Where world data is used, such as the world share price total return index, the relevant series of several countries have been weighted together within the GEM.

SUMMARY OF THRESHOLDS

Pillar	Indicator	Lower Threshold	Upper Threshold	Rationale
Save a penny for a rainy day	Adequacy of liquid assets	0 = no liquid assets	100 = liquid assets covering at least three months' essential expenditure	According to the Money Advice Service, "[a] good rule of thumb to give yourself a solid financial cushion is to have three months' essential outgoings available in an instant access savings account".[59]
	Surplus income	0 = no (or negative) surplus income	100 = surplus income at least 9% of net income	The Resolution Foundation has found that, for many people, income can be volatile from month to month[60], with the size of the fluctuation being broadly proportional to income. Surplus income of 9% of net income is the 90th percentile of the distribution in the WAS.
	Redundancy pay	0 = no redundancy pay	100 = redundancy pay covering at least 1.3 months' essential expenditure	A study by Glassdoor has found that the average time it takes to interview for a job in the UK is 27.5 days.[61] Assuming an additional two weeks to find and apply for a job, the upper threshold was set at redundancy pay covering 1.3 months' essential expenditure.
Protect yourself and your family	Life insurance	0 = (assets + life insurance) covers mortgage, other liabilities and dependants' living costs with a shortfall of £256,630 or more	100 = (assets + life insurance) covers mortgage, other liabilities and dependants' living costs fully	When (assets + life insurance) – (mortgage + other liabilities + dependants' living costs) was calculated for the WAS, the 10th percentile of the distribution was a shortfall of £256,630. The indicator is only calculated for households with dependants.
	Critical illness cover	0 = no critical illness cover	100 = critical illness cover	The underlying data used to model this cover only states whether the respondent is covered or not. This is calculated for all households.

[59] https://www.moneyadviceservice.org.uk/en/articles/emergency-savings-how-much-is-enough
[60] https://www.resolutionfoundation.org/app/uploads/2018/10/Irregular-payments-RF-REPORT.pdf
[61] https://www.glassdoor.com/research/time-to-hire-in-25-countries/

Pillar	Indicator	Lower Threshold	Upper Threshold	Rationale
	Sick pay and income protection	0 = no sick pay or income protection	100 = sick pay covering at least three months' essential expenditure or a household has income protection	At sick pay covering three months' essential expenditure, full resilience is calibrated to match the period covered by the "adequacy of liquid assets" indicator. If a household has income protection, we assume this will cover three months' of essential expenditure. This is calculated for all households.
	Balance of earnings	0 = main earner earns all household income or single household	100 = main earner earns 60% or less of household income[62]	The share of earnings from the main earner ranges from 50% to 100%. The threshold was set at the 20th percentile of the distribution which was that the main earner earns 60% or less of household income.
Control your debt	Affordability of future debt repayments	0 = debt repayments are 40.8% or more of net income for those with a mortgage; or 19.6% or more of net income after rent for those without a mortgage[63]	100 = no debt repayments	The affordability of debt repayments depends on how those repayments relate to net income. Since mortgage repayments are included—but are not per se bad since they typically replace rent payments—different thresholds were used for those who are repaying mortgages and those who are not. These thresholds were set at the 90th percentiles for each population, which are 40.8% and 19.6% of income respectively.
	Uncertainty of future debt repayments	0 = all debt is variable rate	100 = no debt is variable rate	Since the share of debt that is variable rate ranges from 0% to 100%, these formed natural thresholds without the need to transform the underlying variable.
	Use of debt	0 = all debt is used for current consumption (e.g., holiday, leisure) and none for	100 = all debt is used for investment or capital consumption	Since the share of debt that is used for investment or capital consumption ranges from 0% to 100%, these formed natural thresholds without the need to transform the underlying variable.

[62] 60% is the 90th percentile of the populations within the WAS

[63] 45% and 19% are the 90th percentiles of the populations with and without a mortgage respectively

Pillar	Indicator	Lower Threshold	Upper Threshold	Rationale
		investment or capital consumption (e.g., mortgage or home improvements)		
	Arrears	0 = in arrears (excluding mortgage)	100 = not in arrears (excluding mortgage)	Being in arrears to any extent is prima facie evidence that a household is not managing its finances successfully, so the maximum penalty (i.e., a score of 0) is applied however great or small the value of arrears.
	Subjective evaluation of debt position	0 = debt is a burden	100 = debt is not a burden	Finding debt a burden to any extent is prima facie evidence that a household is not managing its finances successfully, so the maximum penalty (i.e., a score of 0) is applied whether the household finds debt somewhat of a burden or a great burden.
Plan for later life	Value of pension	0 = no pension accumulated	100 = accumulated pension is on track to provide a moderate standard of living in retirement[64]	Resilience on this pillar is scored according to the calculated rate at which households would need to accumulate a pension pot in order to have a moderate standard of living in retirement. If a household is on track, that household is considered fully resilient.
	Home ownership	0 = no housing equity	100 = housing equity at or above the national age-adjusted mean	One reason to accumulate housing equity is to have somewhere to live in later life without needing to pay rent. Since house prices change substantially over time, rather than tying this equity to a specific cash value, households are considered fully resilient if they are doing as well as or better than the average household in the same age category.

[64] See the section on pensions for more details

Pillar	Indicator	Lower Threshold	Upper Threshold	Rationale
	Other assets	0 = no (net) assets other than pension or housing equity	100 = (net) assets other than pension or housing equity at or above the national age-adjusted mean	Assets other than pensions or housing equity can help support a comfortable retirement by providing an income or a source of emergency funds. Since having enough pension to cover a moderate standard of living in retirement is covered by the "value of pension" indicator, the upper threshold for this indicator is set distributionally. However, in order to measure resilience rather than simply wealth, a cap of the age-adjusted mean was chosen, rather than the 90th percentile.
Invest	Investment intensity	0 = no savings are invested in less liquid assets	100 = all savings above three months of essential expenditure are invested in less liquid assets	Since the share of savings that is invested ranges from 0% to 100%, these formed natural thresholds without the need to transform the underlying variable. The indicator is only calculated for households who have more than three months of essential expenditure.

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