Income-Related Benefits: Estimates of Take-up 2017/18

Background information and methodology

February 2020

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Background Information

Purpose of the statistics

These statistics are designed to give an estimate of the take-up of benefits within the entitled population. They aim to provide an indication of whether and to what extent the different benefits are taken up by different groups.

They can be used to increase awareness of take-up for particular benefits, inform Government policies, and measure the effect of take-up initiatives. More details of how the statistics are commonly used can be found in a customer feedback report from 2010/11. Available here, created by the Take-Up team: Customer feedback report.

Context of the statistics

The publication covers four benefits:
- Pension Credit (PC)
- Housing Benefit (HB)
- Income Support (IS)
- Income-related Employment and Support Allowance (ESA (IR)).

These are combined in the take-up publication

There have been no significant policy changes in 2017/18 which affect the take-up estimates.

Universal Credit

Universal Credit (UC) was introduced in April 2013 in certain pathfinder areas of North West England. By December 2018, it is scheduled to be available to all types of claimants in scope, across Great Britain and Northern Ireland.

As UC is being rolled out it will affect the take-up estimates in the future as eligibility for current benefits changes.

There are specific challenges in creating a UC take-up measure and interpreting and communicating its results within the scope of the Code of Practice for Statistics.

The challenges include:

- Roll out schedule – different types of claimants at different times and geographical coverage
- New administrative data systems and admin data availability
- The number of UC cases being picked up in the Family Resources Survey, the data source of this publication
- Identifying UC eligibility. As noted below it is currently difficult to assess eligibility. This is likely to continue for some time
- Time lags in the data for analysis

Whilst there is an increasing amount of UC administrative data becoming available for use in the department, there is still only a relatively small number of cases that reported receipt of UC in the Family Resources Survey (FRS) in 2017/18. At this

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point in the UC rollout schedule, there is no practical way to distinguish between Jobseeker's Allowance (JSA) and UC at entitlement level for the purposes of estimating take-up statistics. Therefore, the JSA data are not of a suitable quality to be published. We are also unable to estimate UC take-up rates at present.

We are monitoring the situation and will make changes in the future as required.

Please see GOV.UK for more information on UC: UC information.

Statistics on UC are available here: UC Statistics.

The latest UC Publication can be found here: Latest release.

Pension Credit

Background

Pension Credit (PC) is an income-related benefit which was introduced on 6 October 2003 and replaced the Minimum Income Guarantee (MIG).

Overview

There are two parts to PC: the Guarantee Credit (GC) and the Savings Credit (SC).

Claimants may qualify for either or both parts of PC.

The GC tops up the claimant's income up to a guaranteed level (a higher guaranteed level applies for couples). The level may increase if the claimant is a carer, severely disabled, responsible for a child or young person, or has certain housing costs. To qualify:

- a claimant must live in Great Britain
- the claimant (and since 15 May 2019, their partner) must have reached PC qualifying age. Since 15 May 2019, both the claimant and their partner will normally need to have reached PC qualifying age (i.e. State Pension Age for both men and women) to be able to start getting Pension Credit

The SC is an extra amount for people aged 65 or over who have made provision for their retirement above the SC threshold (such as savings or a second pension).

Most people who reached State Pension age on or after 6 April 2016 will not be eligible for SC. But some people may continue to get SC if both of the following apply:
- they are in a couple and one of them reached State Pension age before 6 April 2016
- they were receiving SC up to 6 April 2016

If a claimant who is a member of a couple in the circumstances above stops being allowed to claim SC for any reason, they will not be able to claim it again.

Please see GOV.UK for more information on current PC entitlement rules: Pension Credit information.

Benefit Rates

The Standard Minimum Guarantee (SMG) is the minimum level of income that is guaranteed through the GC. This is uprated each year by at least the level of the increase in earnings - although in recent years it has increased by more than this to match the cash increase in the basic State Pension.

The Savings Credit Threshold (SCT) determines the level of income at which someone becomes eligible for SC, while the SC Maximum (SC max) is the maximum amount of SC that can be awarded. In recent years the rate of the increase of the SCT has had the effect of reducing the SC max.

Singles	2017/18 rates per week
Standard Minimum Guarantee	£159.35
Savings Credit Threshold	£137.35
Savings Credit Maximum	£13.20
Couples	
Standard Minimum Guarantee	£243.25
Savings Credit Threshold	£218.42
Savings Credit Maximum	£14.90

The qualifying age

Between April 2016 and November 2018, the PC qualifying age for men and women rose to 65 in line with the increase in State Pension age for women. It will then increase in line with further increases in State Pension age for both men and women, so will rise to 66 by October 2020 and to 67 by 2028. More information can be found in the following table:

Date	Qualifying Age for Women	Qualifying Age for Men
April 2009	60 years	65 years
April 2010	60 years	65 years
April 2011	Between 60 years 5 months and 60 years 7 months	65 years
April 2012	Between 60 years 11 months and 61 years 1 month	65 years
April 2013	Between 61 years 5 months and 61 years 7 months	65 years
April 2014	Between 61 years 11 months and 62 years 1 month	65 years
April 2015	Between 62 years 5 months and 62 years 7 months	65 years
April 2016	Between 62 years 11 months and 63 years 3months	65 years
April 2017	Between 63 years 8 months and 64 years	65 years
April 2018	Between 64 years 5 months and 64 years 9 months	65 years

Changes to Pension Credit rules

Capital disregards are amounts that the claimant has, but that are not taken into account when considering entitlement or calculating any assumed yield income. From November 2009, the level of the capital disregard increased to £10,000 (up from £6,000). Previously, only those who lived permanently in a care home had a £10,000 capital disregard.

Interaction with other income-related benefits

Until November 2018, men aged between state pension age for women and 65 were able to claim one of PC, ESA (IR), JSA (income-based(IB)) or, in certain areas, UC. This choice also existed for 'mixed-age' couples where one member was aged above the PC qualifying age, and the other was aged below.

For the purposes of estimating take-up, we model that men aged over the PC qualifying age, but under 65, would have claimed PC rather than ESA (IR). This can be explained as follows. It is assumed that a working-age person can only claim a working-age benefit, such as ESA (IR). Men aged over the PC qualifying age but under 65 have a choice over what they can claim – PC or a working-age benefit. Most men would opt for PC because the amount of benefit received would normally be greater than the working-age benefits. Additionally, with PC there aren't the conditionality requirements (the working-age benefits require a justification as to why you are not working). Similarly, mixed-age couples are assumed to claim PC.

PC could be paid in conjunction with HB but not with UC, JSA (IB), IS or ESA (IR).

Housing Benefit

Background

Housing Benefit (HB) helps tenants who are on a low income to pay their rent. HB is administered by local authorities who decide whether a claimant is eligible for HB, and how much they qualify for. Tenants can apply for HB irrespective of whether they are in work, or out-of-work. It may be paid alongside other means-tested benefits, non-means-tested benefits, or on its own.

Overview

Subject to having an eligible rent liability, the vast majority of those on the Guarantee Credit part of PC, IS or ESA (IR) are automatically eligible for maximum HB.

Claimants not in receipt of one of the benefits listed above may have their HB reduced if they have capital or income in excess of certain thresholds. If their capital or income is too high they may not qualify for HB at all.

The amount awarded can also vary based on the numbers, age and disabilities of members of the household. For many claimants in the private rented sector, the level of their eligible rent is also limited by the Local Housing Allowance (LHA) rates which apply to where they live. The size and composition of the claimant's household determines the size of the accommodation which they might reasonably need. In turn the specific LHA rate used to assess entitlement to HB. The benefit cap may also apply.

There are some exceptions. Those that do not qualify for HB include:
- those who live in the home of a close relative
- any full-time students - unless they are disabled or have children
- asylum seekers or those sponsored to be in the UK

Please see GOV.UK for more information on current HB entitlement rules: [Housing benefit information.](#)

Benefit Rates

There is no set rate of HB that a claimant will receive, but the thresholds used for the means-test side of the HB assessment are aligned to rates of other benefits, and claimants in the private rented sector are usually restricted to the LHA rate for their family size and postcode. Most benefit rates and LHA rates are currently frozen.

Changes to Housing Benefit rules

Since 2010 there have been a number of changes to the structure of HB.

Changes to LHA

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LHA changes:

Phased in from April 2011:

- LHA rates calculated based on the 30th percentile of rents in the area; previously, they were based on the 50th percentile (or median of rents)
- claimants are no longer entitled to keep any excess between their rent and the LHA rate (previously, this was up to £15 a week)
- LHA rates are capped to overall maximum weekly levels (affecting the most expensive areas such as inner London)
- claimants can no longer get the five-bedroom rate

Phased in from January 2012:

- the age threshold for the shared accommodation rate (SAR) (previously under 25) was extended to include single people aged under 35

Phased in from April 2016, the National Living Wage was introduced and HB family premium began to be phased out. This will tend to have reduced HB entitlement and floated people with very small entitlements under the 2015/16 system off benefit altogether.

Removal of the Spare Room Subsidy

The removal of the spare room subsidy was introduced nationally on 1 April 2013. It applies the size criteria test that pre-existed in the LHA to determine the number of bedrooms needed by working-age HB claimants living in the social rented sector. Where claimants are found to be under-occupying, their eligible rent is reduced by 14 per cent if they have one extra bedroom and by 25 per cent if they have two or more. Pensioners are exempt from the policy, with easements for certain groups (for example claimants with overnight carers).

Non-dependent deductions

A three-year staged increase in the rates of non-dependant deductions (NDDs) in HB was introduced from April 2011. By April 2013, these increases brought the NDD rates to the level they would have been had they been increased each year since 2001, to broadly reflect growth in rents.

Interaction with other income-related benefits

HB is worked out on the basis of an 'applicable amount' intended to cover basic weekly living expenses. The amount of benefit is worked out by comparing a person's income with their applicable amount which is intended to cover day-to-day living expenses, taking account of the size and make-up of the household.

If the net income is equal to or is less than the applicable amount or they are in receipt of an income-related benefit, they will receive 100 per cent of the rent for which benefit can be paid less any non-dependent deductions. This would be subject to any deductions for non-dependents who live with them, and help with rent would not exceed the LHA rate which applies to their household. If the net income is more than the applicable amount, they will receive reduced HB. For each pound of extra income over the applicable amount, after disregards, 65 pence will be deducted.

The HB payment may also be reduced to ensure that the household's total benefit income does not exceed the benefit cap.

Income Support/Income-related Employment & Support Allowance

Background

Income Support (IS) is paid to people below PC qualifying age who are on low incomes and are not in full-time work. Employment & Support Allowance (ESA) is paid to people below State Pension age who have an illness or a disability. This report combines take-up estimates of IS and income-related ESA (ESA (IR)) as it is not practically possible to distinguish between IS and ESA (IR) eligible cases in our modelling.

Overview

To qualify for IS a claimant must meet the relevant conditions of entitlement:
- between 16 and PC qualifying age
- pregnant, or a carer, or a lone parent with the youngest child under a specific age or, in some cases, unable to work because they are ill or disabled
- have either no income or a low income
- working less than 16 hours a week (and a partner working no more than 24 hours a week)
- be in Great Britain (different rules apply in Northern Ireland)
- have savings below £16,000 (exceptions apply)
- do not need permission to enter the UK (exceptions apply)
- do not get ESA (IR) (exceptions apply)
- are not a young person being looked after by a local authority (exceptions apply)

Claimants who have paid sufficient National Insurance contributions receive contribution-based ESA (ESA (C)). Those who do not qualify for ESA (C) at all or do not receive enough of a pay from their entitlement to ESA (C) to reach the ESA personal allowance benefit rate, may qualify for ESA (IR).

To qualify for ESA (IR), the claimant's illness or disability has to affect their capability to work, and they must:
- be under State Pension age
- not be getting Statutory Sick Pay or Statutory Maternity Pay and not gone back to work
- not have an income over a certain threshold - this includes the claimant and any partner's (if applicable) income
- not have savings greater than £16,000 (exceptions apply)

While this report presents take-up estimates for ESA (IR), those receiving both ESA (C) and ESA (IR) together are included in the receipt estimates. For those who qualify for but don't receive ESA (IR), the estimates only include those modelled to qualify for ESA (IR) only.

Please see GOV.UK for more information on current IS and ESA entitlement rules: Income support information and ESA entitlement rules.

Benefit Rates

The weekly amount paid is based on the difference between the benefit unit's applicable amount and income. The applicable amount is calculated from the personal allowance, premiums and certain housing costs relevant to the benefit unit. For ESA (IR), while a work capability assessment is being carried out, the benefit unit receives the 'assessment phase' personal allowance. Once assessed, the benefit unit receives the 'main phase' personal allowance, along with either the relevant support component or work-related activity component. As a result, IS and ESA (IR) payments will differ for each benefit unit due to their different circumstances. See the rates on the following table:

Personal Allowances		**2017/18 rates per week**
Single	Under 25 (ESA assessment phase/IS)	£57.90
	Under 25 (ESA main phase)	£73.10
	25 or over	£73.10
Lone Parent	Under 18 (ESA assessment phase/IS)	£57.90
	Under 18 (ESA main phase)	£73.10
	18 or over	£73.10
Couple	Both under 18 (ESA assessment phase/IS) – lower rate	£57.90
	Both under 18 (ESA main phase) – lower rate	£73.10
	Both under 18 (ESA assessment phase/IS) – higher rate	£87.50
	Both under 18 (ESA main phase) – higher rate	£114.85
	Both over 18	£114.85
	One 18-24 (ESA assessment phase/IS) – lower rate	£57.90
	One 18-24 (ESA main phase) – lower rate	£73.10
	One 18 or over – higher rate	£114.85
	One 25 or over – lower rate	£73.10
Premiums		
Disability	Single	£32.55
	Couple	£46.40
Severe Disability	Single or couple (one qualifies)	£62.45
	Couple (both qualify)	£124.90
Carer		£34.95
Enhanced Disability	Single	£15.90
	Couple	£22.85
ESA (IR) Components		
Work-related component		£29.05
Support component		£36.20

The 'Disability' premium is not available to ESA (IR) recipients. ESA (IR) has other components designed to meet the needs of people with different levels of disabilities.

Changes to IS and ESA rules

From 24 October 2009, the upper age limit of the youngest child allowing a lone parent to qualify for IS reduced progressively each year from 12 in 2009/10 to 5 years old in 2012/13. Lone parents with the youngest child aged 5 and over, able to work and with no caring responsibilities could apply for JSA and would need to look for work. Those with a disability or health condition were expected to claim ESA (IR). This resulted in a reduction in the number of lone parents receiving IS and an increase in the number of lone parents receiving JSA.

ESA was introduced on 27 October 2008, replacing Incapacity Benefit (IB) and Severe Disablement Allowance (SDA) for new claimants. Since April 2011, existing claimants of IB or SDA are gradually being assessed for eligibility for ESA. Therefore, the number of benefit units receiving ESA (IR) increased between 2009/10 and 2015/16, as those receiving IB and SDA started receiving ESA (IR) instead.

From 1 May 2012, ESA (C) has been restricted to 365 days for those in the work related activity group. This will have led more people becoming eligible for ESA (IR).

Interaction with other income-related benefits

IS and ESA (IR) can be paid in conjunction with HB but not with each other or JSA (IB).

Strengths and limitations of the statistics

Methodology

The key strength of the methodology introduced for the 2013/14 analysis (and also retrospectively applied to 2009/10 and 2012/13) is that it makes more use of existing administrative data alongside data from the FRS and Policy Simulation Model (PSM) to estimate take-up.

The FRS is data linked with DWP administrative data and where a match is made for a record, its reported amount of receipt for a benefit on the FRS is overwritten with the amount in receipt as recorded on the administrative data. This helps address some of the benefit undercount on the FRS.

Although they are based on DWP administrative data, the numbers in receipt and expenditure are not identical to official DWP statistics. This is because they are averaged across the whole year and other adjustments are made to enable consistency with the other non-administrative sources used, such as the FRS (see methodology section for a full discussion).

Although all estimates are subject to some analytical assumptions, the methodology minimises these. As a result of the changes more accurate estimates can be produced.

There is general uncertainty in estimates, especially in those of entitled non-recipients (ENRs) of benefits, given the complexity of estimation. The FRS, used in the estimation of ENRs, is not designed specifically to measure entitlement criteria to the same extent as an application for a specific benefit. It is a multi-purpose household survey.

The estimates of ENRs are also based on PSM data, which is modelled survey data, and are therefore subject to sampling variation and other forms of error associated

with a sample survey. These include reporting errors, under-reporting, systematic bias and random sampling error. See FRS Background note for more details: FRS Background note.

Furthermore, it is not possible to perfectly model ESA eligibility because there are no data available for the PSM to use on the outcomes of individual Work Capability Assessments or doctors' certificates that people would have if they applied to claim ESA. As well as this, new claims for income-related ESA are no longer available due to the introduction of Universal Credit.

Reasons for non-take-up

Trying to explain the reasons for non-take-up is difficult and we do not have the data in our modelling to do this. But in helping put results into context, it is useful to outline some of the broad factors that have been found to have an effect. Take-up may be affected by factors such as the size or other attractiveness of the benefit, lack of awareness of the benefit or application procedure, lack of awareness of their entitlement, the perceived stigma of receiving a benefit, or other factors.

A working paper reviewed the literature available on issues relating to take-up of benefits. Available here: Review of take-up issues.

Limitations of statistics

Due to restrictions in modelling and available data, certain populations are excluded from our analysis. As such the results do not include:
- those living in non-private households
- due to the differences in benefit systems, it is not possible to provide estimates for Northern Ireland (only figures for Great Britain are reported)

Comparisons between the statistics

HMRC publishes estimates of the take-up of tax credits, available here: HMRC estimates of take-up of tax credits.

The 2017/18 publication of tax credit take-up rates will be the last in the series of publications due to UC-related data issues from 2018/19 onwards.

A working paper reviewed the literature available on issues relating to take-up of benefits including the availability of take-up analysis in other European countries, available here: Issues relating to take-up including other European countries.

Given the adjustments and coverage of the take-up methodology, receipt and expenditure estimates here will not be the same as the official statistics published by DWP. DWP publishes a wide range of statistics on receipt of benefits and benefit expenditure. Official Statistics are published here: Official Statistics.

Official Statistics are produced in accordance with Statistics and Registration Service Act 2007 (Statistics and Registration Service Act 2007). We are also committed to complying with the Code of Practice for Statistics (Code of Practice for Statistics).

The benefit expenditure and caseload tables are available here: Benefit expenditure and caseload tables.

Stat-Xplore is a DWP tool that provides users with access to data. Users can download and analyse statistics on a range of different benefits, programmes, and other information collected and stored by the department. Pensioners' Incomes (PI) and Households Below Average Income (HBAI) are currently available from Stat-Xplore. Stat-Xplore can be accessed here: Stat-Xplore.

Source of the statistics

Figures in this analysis are based on DWP administrative data, Local Authority administrative data, and data from the FRS. The survey data from the FRS are modelled using a static micro simulation model known as the PSM - more details are in the methodology section.

Definitions and terminology within the statistics

Take-up refers to the receipt of benefits that a family is entitled to. Such a family is referred to as an entitled recipient (ER). There are also families who are entitled to benefits, but not in receipt of them. Such a family is referred to as an entitled non-recipient (ENR).

Take-up is estimated in two ways - by caseload and by expenditure:
- caseload take-up compares the number of benefit recipients, averaged over the year, with the estimated number that would be receiving if everyone took up their entitlement for the full period of their entitlement
- expenditure take-up compares the total amount of benefit received, in the course of a year, with the estimated total amount that would be received if everyone took up their entitlement for the full period of their entitlement

Average

In this publication, 'average', is used interchangeably with the word 'mean'.

Benefit unit or Family

A single adult or married or cohabiting couple, and any dependent children.

Confidence interval

A measure of sampling error. A confidence interval is a range around an estimate which states how likely it is that the real value that the survey is trying to measure lies within that range. A wider confidence interval indicates a greater uncertainty around the estimate. Generally, a smaller sample size will lead to estimates that have a wider confidence interval than estimates from larger sample sizes. This is because a smaller sample is less likely to reflect the characteristics of the total population and therefore there will be more uncertainty around the estimate derived from the sample. Note that a confidence interval ignores any systematic errors that may be present in the survey and analysis processes.

Entitled

A family is said to be entitled to receive a benefit if they satisfy the qualifying conditions for that benefit.

Entitled Non-Recipient (ENR)

A family that is modelled to be entitled to a benefit but is not receiving it is said to be an ENR.

Entitlement

Entitlement is the amount an entitled family is estimated to be paid in benefit, according to modelling.

Mean

The mean weekly amount claimed or unclaimed is the average, found by adding up the amount for each benefit unit in a population and dividing the result by the total number of benefit units.

Median

The median weekly unclaimed amount is the value that divides the population of entitled non-recipients, when ranked by their modelled entitlements, into two equal-sized groups. In other words, the median is the exact middle point where half the entitled non-recipients have larger unclaimed amounts and half have smaller unclaimed amounts.

Revisions to the statistics

Income-Related Benefits: Estimates of Take-up uses a complex methodology that uses numerous data sources. Each year the team checks all of the contributing codes and processes for any potential improvements that could be made to improve the accuracy of the take-up estimates produced.

Linking Permission Mechanism

The FRS tested a new approach to obtaining agreement to link respondents' data to administrative data from January 2017 to April 2017. The new approach replaces an explicit Yes/No question in the FRS questionnaire with an up-front statement that DWP will link respondents' information to administrative records held by the department. A randomised control trial ran from January 2017 to April 2017, with the FRS sample split 50:50 between those receiving the new enhanced fair processing statement and the existing explicit data linking question. The trial was a success and the new method was implemented from May 2017 onwards. This change means that the number of cases available for data linking has increased in 2017/18. The take-up methodology already uses linked survey-administrative data to improve the quality of the estimates by replacing survey responses, which are subject to reporting error, with accurate administrative data on benefit receipt. Therefore, this methodological change means that more administrative data can be used in the production of the estimates, improving their accuracy. An increased amount of linked data completes our understanding as to the number of entitled non-recipients for a benefit where benefit under-reporting has occurred in the FRS. This would have an effect on the mean/median amounts unclaimed. The actual effect on the take-up estimates will depend on the observed data for each survey year.

A statistical notice was published in advance of this publication advising users of these changes: 2017/18 Statistical notice.

Methodological refinements applied in 2017/18
Changes to the methodology

There were four methodological changes applied to the Income-Related Benefits: Estimates of Take-up 2017/18 publication. Comparisons to earlier years should be treated with caution as these changes have only been applied to 2016/17 and 2017/18 data. A decision was taken to only apply these changes from 2017/18 but also provide 2016/17 changed data to give a direct comparison to the previous year.

The changes are:
- Improvement to the modelling of State Pension receipt. By making use of more information from respondents, this prevents any assumption of no state pension being made by the model.
- PC calculations now take into account mixed-age couples working-age benefits (IS/ESA/JSA). A mixed-age couple is one where one member is aged above the PC qualifying age, and the other is aged below the PC qualifying age. This involves removing the calculated IS/ESA/JSA amount from PC.
- Additional savings information is now taken into account in capital calculations.
- Support for Mortgage Interest (SMI) entitlement is removed from estimated IS and PC entitlement amounts. Support for Mortgage Interest used to be paid within PC. Support for Mortgage Interest is now paid out separately as a loan and Support for Mortgage Interest and has therefore been removed from PC calculations.

These changes provide an improved approach to estimating eligibility of caseload and expenditure take-up which:
- reduce the estimated number of Entitled Non Recipients (ENRs) and;
- reduce the estimated unclaimed amount.

For example, for 2017/18, it is estimated that these changes affect the estimated PC take-up rate by approximately 2 percentage points (increase) for caseload and 4 percentage points (increase) for expenditure. Changes to HB and IS/ESA are more minimal (increase is less than 1 percentage point) for both caseload and expenditure. The exact scale of the effect could vary between years.

Policy Changes

With effect from April 2016, the partial abolishment of Savings Credit took place. This meant that new claims of Savings Credit were disallowed on the grounds of age. This methodological fix to Savings Credit increased the estimates of Pension Credit by 0.8 percentage points, accounting for over half of the overall 1.5 percentage points increase that resulted from methodological fixes.

For methodological refinements made in previous years please see the previous publication's background information and methodology: Background and methodology note 2016/17.

It is the statistics that are used in this publication which should take precedence over all previously published results for all years.

The department's policy statement describes how DWP will handle revisions: Policy statement.

Status of the statistics

Official statistics

Income-related Benefits: Estimates of Take-up is classified as an Official Statistic. In developing these statistics, DWP has acted in accordance with the Code of Practice for Statistics and supporting principles.

Further information about official statistics can be found here: Official Statistics.

Quality statement

The take-up estimates are based on a number of data sources all of which have their own processes in place to ensure their quality. When producing the take-up estimates, all content has been independently quality assured by different members of the team to ensure the methodology is robust. All commentary in the publication is reviewed by the team and analysts from the relevant policy areas to ensure the information presented is accurate and meets user needs.

Feedback

We welcome feedback

If you have any comments or questions, please contact:

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Useful links

This document, the statistics release and supporting tables, along with previous releases, can be found here: Collections page.

The ONS has published a guide for users of official statistics on earnings and income. This guide compares the main sources of data available and outlines which sources will best meet user needs. This can be found here: A guide to sources of data on income and earnings .

Other useful information on income and earnings is here: Explaining income and earnings. A link to the income and earnings Glossary is here: Glossary.
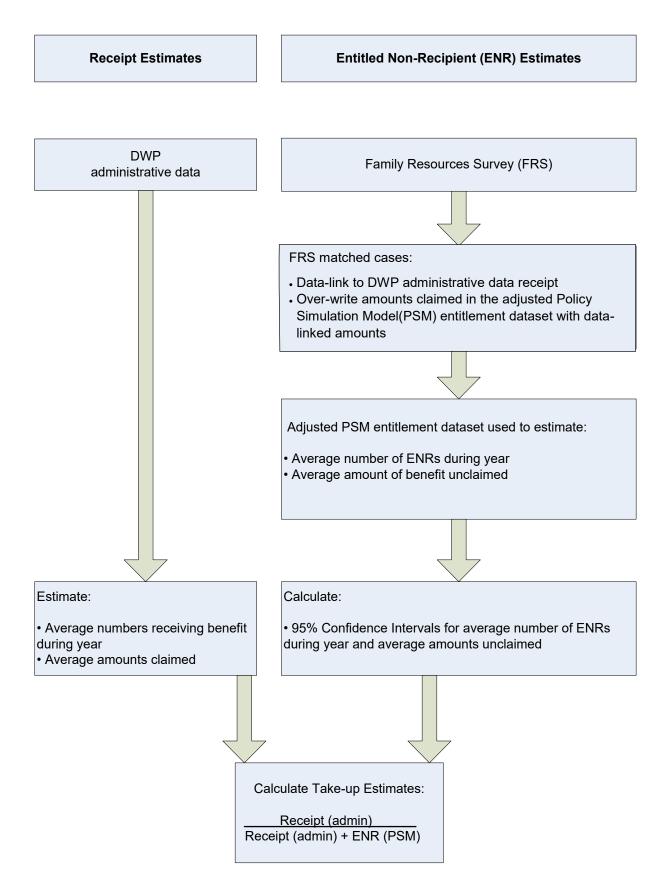
Methodology

Introduction

Overview

To produce the take-up estimates, information can be taken from DWP administrative data sources to present the average number of those in receipt of the benefit along with the average amount claimed. However, because administrative benefit entitlement datasets do not exist, survey-based estimates of the population and unclaimed amounts of those who are entitled but not receiving (ENRs) are needed. The methodology used aims to provide the best estimate based on the evidence available, using the FRS. At the same time, there are limitations with the methodology as there are known data issues in the FRS. This is also due to the inability to link to administrative data for around 29 per cent of the FRS population. This is because it was simply not possible to match data.

This report presents the methodology below, which is strongly focused on using what evidence is available from administrative sources and the FRS, to produce the take-up estimates.

The flow diagram on the following page illustrates how the methodology works:

Take-Up Estimates Process Flow Diagram

Receipt Estimates	Entitled Non-Recipient (ENR) Estimates

DWP administrative data

Family Resources Survey (FRS)

FRS matched cases:

- Data-link to DWP administrative data receipt
- Over-write amounts claimed in the adjusted Policy Simulation Model(PSM) entitlement dataset with data-linked amounts

Adjusted PSM entitlement dataset used to estimate:

- Average number of ENRs during year
- Average amount of benefit unclaimed

Estimate:

- Average numbers receiving benefit during year
- Average amounts claimed

Calculate:

- 95% Confidence Intervals for average number of ENRs during year and average amounts unclaimed

Calculate Take-up Estimates:

$$\frac{\text{Receipt (admin)}}{\text{Receipt (admin) + ENR (PSM)}}$$

Data Sources

Overview

The take-up estimates are derived using information taken directly from a number of data sources. A small number of evidence-based adjustments are introduced where necessary.

The Work and Pensions Longitudinal Study (WPLS) is the main data source for estimating receipt of PC, IS and ESA (IR), used alongside the Quarterly Statistical Enquiry (QSE).

The Single Housing Benefit Extract (SHBE) is the main data source used for HB receipt.

ENR estimates are for private households only. For consistency, the QSE is also used to adjust the receipt estimates for PC and IS/ESA (IR) to exclude any non-private households.

For ENR estimates, a combination of an adjusted entitlement dataset from the PSM and reported receipt from the FRS are used. In the production of the adjusted PSM entitlement dataset, certain benefit units are linked to their administrative records on the WPLS for estimating ENRs of PC and IS/ESA (IR) and SHBE for HB to use actual amounts paid rather than reported FRS amounts.

Work and Pensions Longitudinal Study (WPLS)

The WPLS links DWP benefit and programme data on claimants with their employment records from Her Majesty's Revenue and Customs (HMRC).

The WPLS is used to produce receipt estimates for PC and IS/ESA (IR) as it provides 100 per cent DWP administrative records for all those receiving the benefits. The datasets are available quarterly.

More information is available here: WPLS.

Quarterly Statistical Enquiry (QSE)

The QSE is a quarterly electronic scan of 5 per cent of DWP administrative records.

The key use of the QSE data is to identify the proportion of benefit units that are private households in the receipt estimates for PC and IS/ESA (IR). It is applied to the initial average numbers receiving each benefit. This adjustment ensures the estimate of the average numbers receiving each benefit is consistent with the estimate of the average number of ENRs, which are for private households only.

More information is available here: DWP benefits statistics.

Single Housing Benefit Extract (SHBE)

SHBE is a monthly electronic scan taken directly from Local Authority computer systems and provided to DWP for analysis.

The data are used as they provide 100 per cent administrative records for all those receiving HB. As predominantly only private households can receive HB, no adjustment is made to remove non-private households for the receipt estimates. SHBE is also used to data link with FRS matched cases for the ENR estimates.

More information is available here: [Caseload statistics.]

Family Resources Survey (FRS)

The FRS is an annual survey, collecting information on around 20,000 private households in the United Kingdom (UK), although only Great Britain (GB) information is used in this analysis. The primary function is to collect information on household income claimed from all sources, including wages and salaries, state benefits, payable Tax Credits, private (occupational and personal) pension schemes, and investments. The information allows analysis at an individual level, benefit unit level and household level. The survey is sponsored by the DWP.

As well as being the main data source for the PSM, information is taken directly from the FRS to identify reported receipt of the income-related benefits, where data linking was not possible.

More information is available here: [Family Resources Survey.]

Policy Simulation Model (PSM)

The DWP's PSM is a static micro simulation model of the UK tax and benefit system. It takes reported information from the FRS on benefit units and then simulates (or models) what the benefit unit might be entitled to or earn based on the tax and benefit rules in the FRS year. The model estimates what a similar benefit unit, with those same characteristics, might be entitled to or earn for future financial years, accounting for the tax and benefit rules in that future year. The PSM is used extensively by DWP analysts for policy evaluation and costing of policy options.

The PSM is used in the derivation of the ENR estimates, as it provides a modelled entitlement dataset for the income-related benefits presented in this report. Some important adjustments are made to the entitlement dataset to provide more precise initial estimates of ENRs and their average weekly amounts unclaimed.

Estimating receipt

Overview

Receipt estimates of PC and IS/ESA (IR) are taken from their data sources and adjusted to represent private households only. Since HB is predominantly only available to private households, HB receipt is taken directly from the data source. Estimates of average amounts claimed are not adjusted as private households account for around 95 per cent of all households receiving PC and IS/ESA (IR). It is assumed that the average amounts claimed remain representative of private households.

Pension Credit

The WPLS is used to estimate the average number of those receiving PC and average amounts claimed for the financial year, using data taken at the end of each quarter. Estimates are produced for the type of PC claimed (whether Guarantee Credit and/or Savings Credit) and by family type.

The estimated average number of those receiving PC is then adjusted using the proportion of private households of all households. This removes around 5 per cent

of those in receipt of PC from the estimate. The average amounts estimated are not adjusted as it is assumed that these amounts remain representative of the private households, which account for 95 per cent of all households in receipt.

Housing Benefit

SHBE datasets from each month of the financial year are combined and a 12-month average is estimated for the number of those receiving HB and average amounts of HB claimed. HB is predominantly only available to people living in private households.

Income Support/Income-related Employment and Support Allowance

This publication presents combined IS and ESA (IR) take-up estimates. However, IS and ESA (IR) are recorded separately on the WPLS. To obtain estimates for the overall average number of those receiving IS or ESA (IR) and the overall average amount of IS or ESA (IR) claimed, data are taken at the end of each quarter of the financial year for each benefit. The overall receipt estimates for IS/ESA (IR) are then produced by adding the average numbers for each benefit together.

Overall average number of benefit units receiving IS/ESA (IR):
Average number of benefit units receiving IS in the year +
Average number of benefit units receiving ESA (IR) in the year

The proportion of private households of all households receiving IS is then applied to the overall average number of those receiving IS/ESA (IR). It is assumed that the proportion is the same as for ESA (IR). This adjustment removes around 1 per cent of families receiving IS/ESA (IR).

To produce the estimate of overall average amounts claimed for IS/ESA (IR), the average total weekly expenditure for IS and for ESA (IR) are added together and then divided by the overall average numbers of families receiving IS or ESA (IR):
(Average number of benefit units receiving IS in the year * Average amount of IS claimed) +
(Average number of benefit units receiving ESA (IR) in the year * Average amount of ESA (IR))/
Average number of benefit units receiving IS/ESA (IR) in the year

The average amounts estimated are not adjusted as it is assumed that these amounts remain representative of private households, which account for 99 per cent of all households in receipt of IS/ESA (IR).

Comparisons with published DWP estimates

As the take-up receipt estimates for PC and IS/ESA (IR) focus on private households only, these are lower than published DWP estimates, which include all households. For HB, the take-up receipt estimates for 2012/13 onwards are similar to published DWP estimates. However, for 2009/10, the take-up receipt estimates are slightly lower. For 2009/10, bespoke SHBE datasets were produced for months April 2009 to November 2009 to capture the necessary information for breakdowns by family type, tenure type and employment status. These bespoke datasets were combined with the December 2009 to March 2010 datasets and a 12-month average number of those receiving HB and average amounts of HB claimed were estimated.

Estimating Entitled Non-Recipients (ENRs)

Overview

The DWP administrative data sources do not record information on those entitled to a benefit but not receiving it (ENRs). Therefore, a combination of an adjusted entitlement dataset from the DWP's PSM, which includes some linking to WPLS administrative data, and reported receipt data from the FRS are used to produce the average number of ENRs and average amounts unclaimed.

To produce the ENR estimates, some bespoke adjustments are made to the PSM entitlement dataset.

FRS matched cases are families where agreement was given by both the 'head' of the benefit unit and any partner interviewed in the FRS to link to their administrative record and it was possible from the data provided to accurately match to administrative data.

For benefit units that aren't FRS cases or did not fit the criteria to be data linked, modelled PSM entitlement for the benefit is compared to FRS reported receipt of the benefit.

Each benefit unit is categorised into one of the following groups:
- entitled not receiving (ENRs)
- entitled receiving (ERs)
- not entitled, not receiving (NENRs)

From this, the average numbers of ENRs and the average amounts unclaimed are estimated, along with 95 per cent confidence intervals to reflect uncertainty. These estimates are combined with the receipt estimates to produce the lower bound, central and upper bound take-up estimates.

It should be noted that, if existing, any 'non-entitled recipients' are assumed to be entitled to the benefits they get.

The PSM entitlement dataset

For each financial year, the PSM produces a UK-based entitlement dataset. Key characteristics are taken from the FRS and the PSM models entitlement to each of the income-related benefits by applying the tax and benefit system rules to each benefit unit. The dataset retains reported FRS characteristics such as family type, age, marital status, tenure type and employment status, but the modelled entitlement amount of income-related benefit is used and this may differ from the reported FRS amount.

The PSM models UC entitlement by using internal DWP forecasts to move a proportion of those entitled to other benefits onto UC. Those modelled as being entitled to UC are not included in the ENRs for any of the benefits.

Where a benefit unit has a member aged over the PC qualifying age but under State Pension age, or one member is above PC qualifying age and one member below (a mixed age couple), the PSM models entitlement to PC only. This is a simplification of the benefit rules, as these benefit units can choose to claim PC or one of IS or ESA (IR). However, analysis of DWP administrative data shows that the vast majority of these benefit units would choose to claim PC. Figures from February 2010 (at which

point the qualifying age for PC was 60), show that there were 432,000 recipients of PC aged 60 to 64, compared with 25,000 recipients of ESA (figures were derived from the DWP Tabtool which has since been replaced by Stat-Xplore).

Adjusting the PSM entitlement dataset

The bespoke adjustments made to the PSM entitlement dataset are:

- exclusion of Northern Ireland benefit units
- removal of National Minimum Wage (NMW) or National Living Wage (NLW) adjustment
- grossing-up to Great Britain control totals
- data linking to DWP administrative receipt records for FRS matched cases
- inclusion of FRS reported receipt and awaiting the outcome of claim information for each income-related benefit

a) Exclusion of Northern Ireland benefit units

The take-up estimates are only provided for Great Britain. Therefore, the UK- based PSM entitlement dataset is adjusted to remove any Northern Ireland benefit units, so that the average number of ENRs and average amounts unclaimed are on the same basis as the receipt estimates.

b) Removal of NMW/NLW adjustment

The PSM includes an adjustment for the NMW or NLW. This adjustment was not included in the PSM entitlement datasets used for the take-up statistics, that is, no adjustment is made to the earnings data reported in the FRS.

c) Grossing-up to Great Britain control totals

Grossing-up is the term usually given to the process of applying factors to sample data so that they yield estimates for the overall population. The simplest grossing system would be a single factor for example the number of households in the population divided by the number in the achieved sample of a survey. However, surveys are normally grossed by a more complex set of grossing factors that attempt to correct for differential non-response at the same time as they scale up sample estimates.

The bespoke grossing control variables, in addition to population grossing control variables, along with their breakdowns and data sources used to gross up the PSM entitlement dataset to the GB population are:

Grossing Control Variable	Breakdowns Used	Data Source
Household numbers	Country and region	Housing statistics - Ministry of Housing, Communities and Local Government (MHCLG)
Housing tenure (household level)	None – GB level only	Housing statistics - MHCLG
Council Tax bands (household level)	None – GB level only	Council Tax statistics - MHCLG, Scottish Government and Welsh Assembly
Employment (individual level)	Age and gender	Employment caseloads - Office for Budget Responsibility (OBR) using Labour Force Survey data

Caseloads for non-income related benefits (individual or benefit unit level)	Age and gender	Administrative data for Attendance Allowance (AA), Disability Living Allowance (DLA)/Personal Independence Payment (PIP), IB/SDA and Contributory ESA – DWP

There are issues unique to using the PSM as a model to estimate entitlement that go beyond standard sample to grossing caveats. The PSM grosses to benefit totals, based on numbers actually receiving benefits. It is not possible to gross to entitlement figures because it is not known what these are. This is why we use a model to estimate them. It is known that benefit recipients are typically under-represented in the FRS, so these tend to have larger grossing factors. It is possible that entitled non-recipients are over or under-represented by large amounts and grossing cannot correct for this. This is an unknown, but the implicit assumption is that after grossing ENRs are accurately represented.

Grossing to a total for chosen variables can also distort sub-population variables that are not grossed. It is possible that ENR totals are subject to this kind of distortion.

d) Data linking to DWP administrative receipt records for FRS matched cases

There is a known issue of under-reporting benefit receipt in the FRS. Therefore, to improve the accuracy of identifying the number of ENRs estimated in the PSM entitlement dataset, data linking allows recorded benefit amounts in DWP administrative data to replace reported FRS receipt or modelled PSM entitlement in the PSM entitlement dataset.

Before January 2017, FRS respondents were explicitly asked for agreement to link their records to DWP administrative data. A Linking Permission Mechanism was run between January 2017 and April 2017. Here the sample was split 50:50 between those asked the explicit linking permission question and those receiving a statement in advance of their interview stating that their information will be linked on completion of the questionnaire. The trial was a success, so from May 2017 onwards the statement in advance of interview method was used. Therefore, for 2017/18, one month (April 2017) is on the trial and all other months have informed agreement.

Data linking is only applied where:
- Agreement was given by both the 'head' of the benefit unit and any partner
- it was possible to match an individual's record to administrative data

Matching FRS data to the administrative data held by DWP was not a trivial exercise due to inconsistencies in the personally-identifiable-information (PII) recorded for survey participants and that were held by the department, e.g. miss-spelling of names. A deterministic 'fuzzy-match' between PII recorded on the FRS and that held by DWP on the customer-information-system (CIS) was performed. Match-keys were assigned in descending order to pairs of records, based on a hierarchy derived from a key's uniqueness score on CIS. This score is given by the fraction of CIS records that the given variables uniquely identify.

	Keys	Uniqueness
Match Key 1	DOB FORENAME SURNAME POSTCODE	99.95
Match Key 2	DOB FORENAME_INITIAL SURNAME POSTCODE	99.84
Match Key 3	DOB FORENAME SURNAME	99.23
Match Key 4	DOB FORENAME SURNAME_INITIAL POSTCODE	98.92
Match Key 5	DOB FORENAME POSTCODE	95.80
Match Key 6	DOB FORENAME_INITIAL SURNAME_INITIAL POSTCODE	95.78
Match Key 7	DOB FORENAME_INITIAL POSTCODE	90.47
Match Key 8	DOB FORENAME_INITIAL SURNAME	73.42
Match Key 9	DOB FORENAME SURNAME_INITIAL	94.52
Match Key 10	SURNAME FORENAME POSTCODE	76.45

Approximately 80 per cent of the FRS respondent cases met the above criteria to be data linked in 2017/18. Benefit units in this group were categorised as FRS matched cases and the remaining benefit units were categorised as FRS unmatched cases in the PSM entitlement dataset.

For FRS matched cases, benefit units were data linked to SHBE data for HB and WPLS data for:
- State Pension (SP)
- Pension Credit (PC)
- Disability Living Allowance care component (DLA (Care))
- Attendance Allowance (AA)
- Income Support (IS)
- Income-related Employment and Support Allowance (ESA (IR))
- Income-based Jobseeker's Allowance (JSA (IB))

While an imperfect assumption, information from administrative sources is always given precedence over survey data with the amount from administrative data overwriting the amount in the PSM entitlement dataset for each data linked benefit. This gives a more precise amount of benefit receipt and entitlement for the income-related benefits for estimating the numbers of ENRs.

Note, in addition to PC, data linking to SP was carried out as these two payments are commonly confused by pensioners. By having a more accurate amount for SP, the PSM can then model entitlement to PC more accurately. Data linking to DLA (Care) and AA were carried out as amounts for these benefits are commonly under-reported in the FRS. Accurate amounts for these benefits helps to improve the accuracy of the PC entitlement modelling as receipt of these benefits can indicate that an additional amount should be added to the appropriate minimum guarantee level in PC.

Statistical tests were carried out to determine whether characteristics of FRS matched cases had changed when the new methodology was being developed. It was concluded that the characteristics (family type, rental sector and employment

status) were not statistically different across the years. Therefore, any changes seen in the number of ENRs between 2009/10 and 2012/13 could not be attributed to changes in the characteristics of the proportion of FRS matched cases of all the benefit units.

Similar tests were carried out on the non-FRS cases or unmatched group at the same time, when the methodology was being developed. It was concluded that applying any assumptions to the non-FRS cases or unmatched group based on information seen in the FRS matched cases group would not be statistically valid and would increase uncertainty surrounding the ENR estimates.

e) Inclusion of FRS reported receipt and awaiting the outcome of a claim information for each income-related benefit

The final adjustment made to the PSM entitlement dataset is to include some more information from the FRS:

- reported receipt of benefit: this information will be used along with PSM modelled entitlement to identify which benefit units are modelled to be entitled but not receiving
- awaiting an outcome of a claim: if at the point of the FRS interview, a benefit unit is awaiting an outcome of claim, the PSM models them to be an ENR as they are not reporting receipt. Any subsequent receipt of the benefit following the outcome could be picked up if the benefit unit is a FRS matched case and they would be modelled as an entitled recipient. However, for non-FRS cases or unmatched cases, they could remain an ENR. Therefore, it is assumed that if the benefit unit reports they are awaiting an outcome of a claim and the PSM models them as entitled, it is likely that they would have gone on to receive the benefit and are categorised as entitled recipients

Estimating ENRs

Following the adjustments to the PSM dataset, each benefit unit is categorised into one of the following groups:

- entitled not receiving (ENRs)
- entitled receiving (ERs)
- not entitled, not receiving (NENRs)

FRS matched cases who are shown to be receiving benefit according to the data linking to administrative data are automatically allocated to the ER group. FRS matched cases who are not receiving benefit according to the data linking to administrative data are classed as either ENRs or NENRs depending on whether they are modelled as entitled according to the PSM.

For benefit units that are non-FRS cases or unmatched, modelled PSM entitlement to the benefit is compared to FRS reported receipt of the benefit to determine whether they are an ER, ENR or NENR. If the benefit unit reports they are awaiting an outcome of a claim and the PSM models them as entitled to the benefit, it is assumed that the benefit unit is an ER.

Finally, the average numbers of ENRs and the average amounts unclaimed are estimated by specific types and breakdowns for each income-related benefit. Due to small sample sizes for certain characteristics, further detailed breakdowns are not possible.

Uncertainty in the receipt and ENR Estimates

Overview

The receipt and ENR estimates are fully reliant on the accuracy of the data used and any subsequent adjustments, evidence-based assumptions and modelling. Any errors in the data or these processes will affect uncertainty around the estimates.

Uncertainty in the receipt estimates is assumed to be marginal due to the processes in place to produce accurate DWP administrative data for publication as statistics.

For the ENR estimates, the level of uncertainty is higher as they are reliant on reported information from FRS sample data and the subsequent modelling of entitlement in the PSM. Therefore, the estimates are affected by known areas of uncertainty surrounding survey results and using a model to estimate ENRs. While processes are in place to limit this uncertainty, such as the data-cleaning of FRS responses to produce the published FRS dataset and continuous development of the PSM methodology, confidence intervals are used to present the uncertainty in the final take-up estimates. Note that confidence intervals only estimate the sampling error, the difference between the sample and population values, and do not include other forms of uncertainty.

Areas of uncertainty

a) Use of administrative data

It is assumed that DWP administrative data are an accurate record of benefit receipt. In particular, we accept all benefit recipients as being entitled with any 'non-entitled recipients' ignored for the purpose of this publication. However, the data are subject to error at all stages of the process of data collection: from recipients giving inaccurate information, to input error, to data cleaning and analysis.

Adjusting the PC and IS/ESA (IR) receipt estimates to remove any non-private households introduces a small amount of uncertainty. This is because it is assumed that the proportions of private households of all households for the 5 per cent scan of the benefit recipients are representative of all the benefit recipients.

b) Use of survey data

The size of the FRS sample and the way in which the sample is selected are carefully designed to ensure that it is representative of the UK as a whole, whilst bearing in mind practical considerations like time and cost constraints.

Survey results are always estimates, not precise figures. This means that they are subject to a level of uncertainty which can affect how changes, especially over the short term, should be interpreted.

The FRS is subject to the nuances of using a survey, including:
- sampling error: two different random samples from one population are unlikely to give exactly the same survey results, which are likely to differ again from the results that would be obtained if the whole population was surveyed. This level of sampling error varies to a greater or lesser extent depending on the level of breakdowns at which results are presented
- non-response error: the FRS response rate in 2017/18 was 52 per cent. In an attempt to correct for differential non-response, estimates are weighted using population totals
- survey coverage: the FRS covers private households in the United Kingdom. Therefore, individuals in nursing or retirement homes, for example, will not be

included. This means that figures relating to the most elderly individuals may not be representative of the United Kingdom population, as many of those at this age will have moved into homes where they can receive more frequent help

- survey design: the FRS uses a clustered sample design to produce robust estimates at region level. The FRS is therefore not suitable for analysis below this level
- sample size: the FRS has a relatively large sample size for a household survey. From April 2011, the target achieved GB sample size for the FRS was reduced by 5,000 households, resulting in an overall achieved sample size for the UK of around 20,000 households for 2011/12 onwards

c) Under-reporting receipt and benefit confusion in the FRS

There is a known issue of benefit under-reporting in the FRS. Sometimes the FRS respondents confuse which benefit they are receiving. For example, there is often confusion over State Pension (SP) and PC payments. A benefit unit may not realise they are receiving PC and report the overall payment they receive as SP. Therefore, there is an over-reporting of the SP amount paid and under-reporting of the PC amount paid. Processes are in place for the FRS interviewer to check these responses against other questions, if there is a discrepancy. Further data-cleaning is carried out once the survey is completed to check whether responses from the benefit unit taken across the questionnaire are consistent. However, even with these processes in place, there remains scope for uncertainty and remaining under-reporting of benefit receipt.

As a result, it is possible that the PSM categorises a benefit unit into the wrong group. In the example above, the benefit unit could be modelled as an ENR, despite receiving PC as they did not report receipt or give an amount in the FRS interview. In other situations, the benefit unit might not report important information which is used to identify which group they should be allocated to, such as receiving Attendance Allowance for the estimation of PC and HB entitlement.

To reduce under-reporting and benefit confusion, data linking allows recorded benefit amounts in DWP administrative data to replace reported FRS receipt or modelled PSM receipt in the PSM entitlement dataset. This was possible for 71% of FRS respondents in 2017/18.

d) Data linking for FRS matched cases only

As noted above 71% of benefit units are data linked in the PSM entitlement dataset. As a result, this adjustment partially corrects for under-reporting and confusion of benefit receipt in the FRS.

Where a benefit unit might have been modelled as an ENR but data linking indicated that they were receiving a payment, the benefit unit would be categorised as an entitled recipient (ER) and as a result the average numbers of ENRs would reduce. However, where benefit units are non-matched cases, it is possible for it to remain an ENR but actually receive the benefit.

Additionally, there is not enough information on the FRS to identify whether the family is being sanctioned while receiving ESA (IR). In this instance, a family could report zero payment of ESA (IR) but the PSM model them as entitled, resulting in them being categorised as an ENR. Data linking would overcome this if the family was a FRS matched case, as the recorded benefit payment would be used and the

family would be categorised as an ER. However, if the family was in the non-FRS cases or unmatched group, they would remain as an ENR.

e) Imperfect modelling of entitlement

Imperfect modelling of the tax and benefit system rules in the PSM could result in:

- over-statement of entitlement: where the benefit unit is incorrectly modelled to be entitled and/or the modelled amount is too high
- under-statement of entitlement: where the benefit is incorrectly modelled to not be entitled and/or the modelled amount is too low

Processes are in place to regularly review and develop the modelling to ensure the PSM accurately represents the tax and benefit system rules for each year. However, as it is heavily reliant on reported information in the FRS, the PSM inherits the areas of uncertainty of the FRS.

Furthermore, it is not possible to perfectly model ESA eligibility because there are no data available for the PSM to use on the outcomes of individual Work Capability Assessments or doctors' certificates that people would have if they applied to claim ESA.
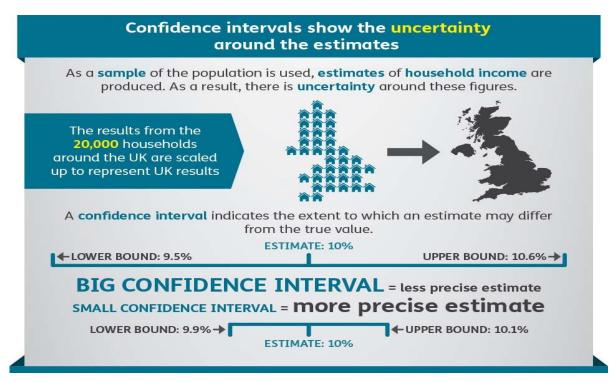
f) Inaccurate grossing-up to the GB population

The PSM grossing regime uses a number of control variables to ensure that various characteristics of the benefit units are considered in deriving the grossing factors. But it is another potential source of uncertainty as it does assume that many of the characteristics of the ENR sample are representative of all GB benefit units.

Confidence intervals for the ENR Estimates

Overview

As the ENR estimates are heavily reliant on the FRS sample, the level of uncertainty can be estimated by exploring how that estimate would change if many survey samples were drawn for the same time period instead of just one. From this, a range around the estimate can be defined, known as a confidence interval. This indicates how likely it is that the real value that the survey is trying to measure lies within that range. Confidence intervals are typically set up to be 95 per cent certain that the true value lies within the range. This is known as a 95 per cent confidence interval.

The following info-graphic summarises the purpose of confidence intervals.

Method

The 'variance estimation based on sample design' method was used to produce confidence intervals for the take-up estimates as:

- the sampling frame of the FRS is taken into consideration in this method
- it is appropriate when calculating the prevalence of a characteristic in a population, such as those entitled and not receiving

The ENR estimates are derived from the adjusted PSM entitlement dataset rather than the published FRS dataset. However, this should not affect the sampling error, as this occurs at the stage of the sampling, and therefore any modelling of FRS sample benefit units in the PSM should not affect the confidence intervals. The confidence intervals provide a lower and upper bound for the average number of ENRs and the average amount unclaimed. These estimates, along with the central estimates are incorporated into the take-up formulae.

Estimating take-up rates

Overview

The take-up rates are based on the following definition:

$$\frac{\text{In Receipt}}{\text{In Receipt} + \text{Entitled Not in Receipt}}$$

Where the take-up rate is defined as the proportion receiving the benefit of all those entitled (that is those receiving the benefit and those who are entitled but not receiving the benefit).

Caseload and expenditure take-up rates are estimated using 95 per cent confidence intervals. A central estimate for take-up is calculated using the central estimate of those not in receipt. The lower and upper take-up bounds are calculated using the upper and lower bound estimates of those not in receipt.

Caseload formulae

The formulae for lower bound, central estimate and upper bound are -

	Caseload formula
Lower Bound	Average number of benefit units receiving benefit / (Average number of benefit units receiving benefit + **Upper** average number of ENR benefit units)
Central Estimate	Average number of benefit units receiving benefit / (Average number of benefit units receiving benefit + **Central** average number of ENR benefit units)
Upper Bound	Average number of benefit units receiving benefit / (Average number of benefit units receiving benefit + **Lower** average number of ENR benefit units)

Expenditure formulae

For the expenditure formulae, the average weekly amounts claimed (received) and unclaimed (not received) are converted to yearly amounts.

The expenditure take-up formulae are -

	Expenditure formula
Lower Bound	Total amount of benefit received / (Total amount of benefit received + **Upper** total amount of benefit not received)
Central Estimate	Total amount of benefit received / (Total amount of benefit received + **Central** total amount of benefit not received)
Upper Bound	Total amount of benefit received / (Total amount of benefit received + **Lower** total amount of benefit not received)

The formulae for the total amount of benefit received and not received are -

	Total amount of benefit received formula	Total amount of benefit not received formula
Lower Bound	Average number of benefit units receiving benefit * Average amount of benefit received * Week to Year Factor	Upper total= Upper average number of benefit units ENRs * Upper average amount not received * Week to Year Factor
Central Estimate	Average number of benefit units receiving benefit * Average amount of benefit received * Week to Year Factor	Central total= Central average number of benefit unit ENRs * Central average amount not received * Week to Year Factor
Upper Bound	Average number of benefit units receiving benefit * Average amount of benefit received * Week to Year Factor	Lower total= Lower average number of benefit units ENRs * Lower average amount not received * Week to Year Factor