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Working Paper

UKMOD Country report 2019-2025

CeMPA Working Paper Series, No. CeMPA WP 2/22

Provided in Cooperation with:

University of Essex, Centre for Microsimulation and Policy Analysis (CeMPA)

Suggested Citation: Collado, Diego; Popova, Daria; Eshraghi, Mohsen (2022) : UKMOD Country report 2019-2025, CeMPA Working Paper Series, No. CeMPA WP 2/22, University of Essex, Centre for Microsimulation and Policy Analysis (CeMPA), Colchester

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CeMPA Working Paper Series

CeMPA WP 02/22

UKMOD Country report 2019-2025

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February 2022



UKMOD

COUNTRY REPORT



UNITED KINGDOM (UK)

2019-2025

Diego Collado, Daria Popova and Mohsen Eshraghi

February 17, 2022

UKMOD version A3.0+

UKMOD is a tax-benefit model for the UK and its constituent nations. It uses the EUROMOD platform. For more information on UKMOD visit <https://www.microsimulation.ac.uk/ukmod> and on EUROMOD, see: <http://www.iser.essex.ac.uk/research/euromod>. UKMOD enables researchers and policy analysts to calculate the effects of taxes and benefits on household incomes and work incentives for the UK as a whole or for the population of the each of its nations. This is done in a comparable manner with other models using the EUROMOD platform.

UKMOD is updated to recent policy systems using data from the Family Resources Survey (FRS) as the input database.

This report documents the work done in one annual update. This work was carried out by the UKMOD developer team, based ISER at the University of Essex.

UKMOD Principal Investigator: Matteo Richiardi
UKMOD developers: Diego Collado, Daria Popova

The results presented in this report are derived using UKMOD version A3.0+. UKMOD is continually being improved and the results presented here may not match those that would be obtained with later versions of UKMOD.

Acknowledgements: Diego Collado and Daria Popova are very grateful for earlier contributions to the EUROMOD UK Country Report by Sara Reis, Iva Tasseva, Holly Sutherland and Paola De Agostini. They also gratefully acknowledge technical support by Kostas Manios.

UKMOD was supported by a Nuffield Foundation grant between 2018 and 2021. The Nuffield Foundation is an independent charitable trust with a mission to advance social wellbeing. It funds research that informs social policy, primarily in Education, Welfare, and Justice. It also funds student programmes that provide opportunities for young people to develop skills in quantitative and qualitative methods. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics and the Ada Lovelace Institute. The Foundation has funded this project, but the views expressed are those of the authors and not necessarily the Foundation. Visit www.nuffieldfoundation.org

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1. BASIC INFORMATION

1.1 Basic information about the tax-benefit system

- a) The tax-benefit system is largely a unified, national system.¹ The main exceptions are *Council Tax* and *Council Tax Benefit* which do not apply in Northern Ireland, the *Social Fund*, a discretionary element of which is managed under fixed local budgets each year, from 2016 the Scottish Rates of (non-savings/non-dividend) Income Tax (from 2019 also the Welsh ones but they do not affect the tax payers' bill) and from 2018 some Scottish benefits.
- b) The tax system generally changes in April each year. The main benefit changes take place at the same time, but can also be implemented at other times, usually in June or October, especially those related to Scottish benefits.
- c) State Pension age is 65 years old in 2018. The State Pension age for women started increasing gradually in 2010 from 60 years old until it reached 65 years old in December 2018. A phased increasing of the pension age for both men and women started in 2020, with State Pension age increasing to 66 in that year.
- d) Minimum school leaving age is 16; dependent children are usually defined as being under 16 or under 19 years old and in full-time non-advanced education and not married.
- e) The Income Tax system is an individual system, with spouses being assessed independently.
- f) Income Tax liability is based on annual income and allowances and thresholds are referred to in annual terms. Income Tax withholdings are collected on a cumulative basis, i.e., the system tries to ensure withholding the exact amount due in the financial year. Only individuals paying tax on trading income (e.g. self-employed people), income from more than one job or who pay tax at a higher marginal rate must file a tax return for Income Tax. Typically, end-year adjustments to tax liability are factored into the next year's tax code.
- g) The means-tested benefit system assesses entitlement according to benefit unit income. The benefit unit is the nuclear family - the couple (cohabiting or married) or single adult plus any dependent children. Social contributions, state benefits and pensions are usually assessed and paid on a weekly basis. Amounts are referred to in weekly terms.
- h) For benefit and tax credit purposes lone parents are defined as parents of resident dependent children, not cohabiting with a partner of the opposite sex (whether or not any partner is the parent of the child is irrelevant).
- i) Generally, civil partners (same sex) are treated in the same way as married couples by the tax-benefit system.
- j) There are statutory requirements to uprate some elements of the tax-benefit system annually, while for others uprating is discretionary. Until 2011 most components were uprated annually by prices (RPI) with means-tested benefits following the "Rossi" price

¹ The way it operates in practice may vary across regions and by other characteristics.

index² excluding housing costs and local taxes. From 2011 the CPI (from the previous September) was used as the basis for price uprating of benefits and tax credits, from 2012 also for Income Tax allowances and thresholds and from 2022 for (most) National Insurance limits, thresholds and rates. On average the CPI rises more slowly than either the RPI or the Rossi index. Only a few elements are adjusted by earnings and some are not adjusted at all. Each year there may be announced departures from these rules, in either direction.

- k) Policy changes, or confirmations of standard uprating, are announced since 2017 in the UK's Autumn Budget (usually in November) for the following April. Further changes may also be announced in the March/April Spring Statement when the Government also responds to the Office for Budget Responsibility (OBR)'s forecasts. Often, structural changes are announced one or more years ahead of planned implementation. For example, the introduction of an element of joint taxation (a transferable allowance between spouses) for April 2015 was announced in December 2013. The Scottish budget is announced usually in December.

1.2 Social Benefits

In the UK, social security benefits can be divided into three different types: *contributory*, *non-contributory (non-means-tested)* and *means-tested*.

The first category consists of **contributory** benefits, which are earnings-replacement benefits and pensions. Entitlement to these benefits depends on having met certain conditions regarding National Insurance contributions. Some contributory benefits are subject to specific tests on current income.

The second type of benefits is **non-contributory (non-means-tested)** benefits. These benefits depend on certain contingencies such as disability or (lone) parenthood but do not require contributions to have been made and are not subject to an income test.

The third type of benefits is **means-tested benefits**. These benefits depend on a range of personal and family circumstances but also on family incomes - benefit entitlement is reduced if family incomes increase.

Tax credits have changed their name, format and administering authority over the past 15 years (see Section 2). In practice, despite being administered by the tax authorities, tax credits are like cash benefits and are treated as such here. The three types of benefits are reviewed separately in the next section. Table 1.1 provides an overview of different benefits by type:

² "Rossi" price index, named after Hugh Rossi, the social security minister responsible for its introduction, corresponds to the all-items RPI excluding rent, mortgage interest payments, council tax and depreciation costs. It was until recently the index used to uprate state income-related benefits.

Table 1.1 Types of Benefits in the UK tax-benefit system

Contributory (aka National Insurance Benefits)	Jobseeker's Allowance (JSA) Employment and Support Allowance (ESA) Retirement Pension Bereavement benefit Maternity Allowance (MA)
Non-contributory, non-means-tested	Child Benefit (CB) Sure Start Maternity Grant Attendance Allowance (AA) Disability Living Allowance (DLA) Personal Independence Payment (PIP) Severe Disablement Allowance (SDA) Carer's Allowance (CA) Scottish Carer's Allowance Supplement (Scotland only) Industrial Injuries Disablement Benefit Guardian's Allowance War Pensions Winter Fuel Allowance Scottish Child Winter Heating Assistance
Means-tested	Income Support (IS) Jobseeker's Allowance (income-based) Employment and Support Allowance (income-based) Pension Credit (PC) Housing Benefit (HB) Local Housing Allowance (LHA) Council Tax Reduction (CTR) Working Tax Credit (WTC) Child Tax Credit (CTC) Social Fund Universal Credit (UC) Scottish Child Payment
Other (not strictly) benefits	Statutory Sick Pay (SSP) Statutory Maternity Pay (SMP) Statutory Paternity Pay (SPP) Occupational and approved personal pensions Child support Student loans Foster Allowances

1.2.1 Contributory benefits

Also known as “National Insurance benefits”, the main contributory benefits are:

Jobseeker's Allowance contributory (JSA) is a flat-rate benefit for the unemployed, conditional on active job search with no additions for dependants. Duration of the allowance is up to six months only. Small earnings are disregarded, and it is paid only for those under the State Pension age. It is taxable. There is also a means-tested component to JSA (see section 1.2.3 below).

Employment and Support Allowance (ESA): benefit for the sick and long-term incapacitated, conditional on the claimant's inability to do paid work. From 2008 this replaced Incapacity Benefit and the disability element of Income Support (IS). The contributory part (as well as the means-tested part – see section 2.4.8) involves an initial assessment phase of 13 weeks during which a basic allowance is paid. The assessment focuses on capability to work. If claimants are assessed as having a limited capability for work-related activity, they are moved on to the support component, which means receiving a higher rate with no additional conditions. If claimants are assessed to have a capability for work-related activity (WRAG), they receive the work-related activity supplement and have to participate in regular work-focussed interviews in return. From 2012 contributory ESA for those on WRAG is limited to a period of 12 months.

Retirement pension: if individuals meet the contribution conditions when they are over State Pension age, they get a flat rate basic State Pension (“Category A”). If conditions are only partly met, a reduced pension of at least 25% of the basic can be paid. Spouses who do not meet the conditions may receive a lower pension based on their partner's contributions (“Category B”). At age 80 contribution conditions are removed. Extra pension increments can be earned if retirement is delayed and additions are paid for dependent spouses under pension age. The basic pension is taxable. For pensioners who contributed to the State Earnings Related Pension Scheme (SERPS) or other state earnings related pension schemes an additional earnings-related pension is payable. This is taxable and there are no additions for dependants.

Bereavement benefit: this is based on the late spouse's contributions; widow(er)s under 45 do not qualify unless they have dependent children. Bereavement benefit is taxable. Part of the spouse's SERPS entitlement and private pension (in some cases) can also be inherited.

Maternity Allowance (MA) is a flat-rate benefit payable for up to 26 weeks if the claimant has herself met contribution, employment and earnings conditions and does not qualify for Statutory Maternity Payment (SMP, see section 1.2.4). A standard rate is paid to women whose average earnings at least equal the National Insurance lower earnings limit and to self-employed women who have paid a Class 2 contribution (see section 1.2). Maternity Allowance is not taxable.

1.2.2 Non-contributory, non-means-tested benefits

Child Benefit (CB) is a universal flat-rate benefit paid to the carer of each dependent child (under 16 or under 19 and in full-time education or training). There is a higher rate for the eldest or only dependent child; otherwise the rate does not vary. Child Benefit is not generally taxable. Since 2013 it is effectively taxed for parents who pay income tax at the 40% (or higher) marginal rate.

Sure Start Maternity Grant (SSMG) is a one-off payment from the Social Fund for low-income families to help with the cost of a new baby. In Scotland, from late 2018 this has been replaced (and will be extended) by the **Best Start Grant**.

Attendance Allowance (AA) is a flat-rate benefit and can be claimed by individuals who need care during the day, at night or both (higher rate) due to their illness or disability. It is taxable. In Scotland, from 2022 it will be replaced by the Pension Age Disability Payment but it will remain broadly similar.

Disability Living Allowance (DLA) can be claimed by individuals if they become disabled before the age of 65 and have personal care and/or mobility needs. The care component is paid at one of three rates and the mobility component at one of two rates, depending on severity of need. DLA is not taxable. This allowance is being gradually replaced by the Personal Independence Payment (PIP) for working-age adults. In Scotland, From 2022 DLA Child will be replaced by the Child Disability Payment.

Personal Independence Payment (PIP) is being gradually introduced across the country from summer 2013 for new claimants of DLA age 16-64. It is very similar to DLA as it is non means-tested, non-contributory and non-taxable benefit. It aims at helping working-age adult with some of the extra costs caused by long-term disability or ill-health. As DLA it has two components - a living component and a mobility one. Each component has two rates: a standard rate and an enhanced rate. From 2022, PIP for disabled people of working age will be replaced by the Adult Disability Payment.

Severe Disablement Allowance (SDA) can be claimed by individuals who are at least 80% disabled but who do not qualify for ESA. It is paid at a lower rate and there are additional payments for dependents. SDA is not taxable. Since April 2002, the benefit is only maintained for existing claimants.

Carer's Allowance (CA) is a benefit for carers of severely disabled people who are themselves not earning more than a specific threshold and are aged 64 or less when first claiming. Severe disability is defined as someone getting either the DLA care component or AA. It is taxable and there are additions for dependents.

Scottish Carer's Allowance Supplement is an extra payment for people in Scotland who get Carer's Allowance. It was first paid in December 2018.

Industrial Injuries Disablement Benefit is a benefit for people who are long-term incapacitated due to injury at work. It is not taxable.

Guardian's Allowance is paid to someone bringing up children whose parents have died. It is paid in addition to Child Benefit and is not taxable.

War Pensions is an umbrella term for a series of payments made to people who have been injured, disabled or widowed as a result of service in HM Forces (not necessarily in a war). War Pensions are not taxable.

Winter Fuel Allowance is an annual payment made to households containing at least one person aged over state pension age, with a supplement paid for the presence of anyone aged over 80. The payment is not taxable and is non-means-tested.

1.2.3 Means-tested benefits

Income Support (IS) is the main social assistance benefit for working-age people whose family incomes are lower than a specified level and who are exempt from the obligation to find work (or are in work for less than 16 hours per week) and are not covered by income-tested ESA or JSA (see section 2.4.6). If family income is less than the applicable amount, IS makes up the shortfall. The applicable amount is made up of personal allowances and premiums for certain groups with special needs. Amounts for children are provided through *Child Tax Credit* (see section 2.4.3) which is paid at the maximum level. Some housing costs (mortgage interest and ground rent) are included in the applicable amount. Families who share their household with other non-dependent adults have deductions made from the amount allowed for housing costs, whether or not actual contributions to the cost are made. Rent and Council Tax are not included but are covered separately by *Housing Benefit* and *Council Tax Benefit*. Income is assessed after tax and contributions; instead of actual income from capital, a "tariff" income is calculated from capital above a lower limit. Families with more than a certain amount of financial capital are disqualified from IS altogether. Income Support is assessed weekly. It is not taxable. Certain benefits-in-kind (so called 'passport' benefits) are available to recipients of IS. These include free lunches for

school children; free prescription medicines (these are already free to all children and pensioners); free milk for babies and pregnant women.

Jobseeker's Allowance (income-based) is the social assistance benefit for the unemployed which may be claimed after entitlement to contributory JSA is exhausted or on top of it, to meet the income needs of the unemployed person and their family. The structure is the same as for *Income Support* (see section 2.4.6).

Employment and Support Allowance (income-based) is the social assistance benefit for the long-term sick and disabled which may be claimed after entitlement to contributory JSA is exhausted or on top of it, to meet the income needs of the incapacitated person and their family. The structure is similar to that for *Income Support* (see section 2.4.6).

Pension Credit (PC) is the means-tested pension for people over State Pension age and is made up of two parts. The Guarantee Credit (PC-GC) is similar to IS in structure. The Savings Credit (PC-SC) rewards older pensioners (65+) who have savings, pension or earned income above the basic State pension with an additional amount, which is reduced as incomes rise beyond a threshold. It is not taxable.

Housing Benefit (HB) covers rent for social renters. It is paid in full for IS, PC-GC and income-based JSA and ESA recipients, subject to locally specified maxima. For those with higher incomes it is tapered away with additional income, using a similar system of applicable amounts as IS. Income is assessed after Income Tax and contributions. Families who share their household with other non-dependent adults have deductions made from rent, whether or not actual contributions to the cost are made. Capital rules apply in a similar way as with IS. HB is assessed on weekly income and rent. It is not taxable.

Local Housing Allowance (LHA) provides help with private rent for low-income households, replacing HB for these households gradually between 2008 and 2013. It has a similar structure to HB (assessed on weekly income and rent) limiting the amount that can be claimed against housing costs by private sector tenants. The amount of the benefit is linked to a percentile of rent within a local Broad Rent Market Area (BRMA) for similar dwellings. Moreover, the amount of the benefit payable is subject to a national maximum distinguished by the size of the accommodation.

Council Tax Benefit (CTB) provides rebates on Council Tax for low income households. It has a structure similar to HB and is not taxable. From 2012 CTB became discretionary at the local authority level.

Working Tax Credit (WTC) tops up the wage of low-paid workers. It is paid to:

1. people aged 25 or over in employment or self-employment for at least 30 hours per week,
2. people with disabilities working at least 16 hours per week, and
3. to families with dependent children where at least one parent is in employment or self-employment for at least 16 hours per week.³

Working Tax Credit is payable and assessed on a yearly basis but is responsive to changes in household circumstances and income. Recipients are required to report changes in income which can lead to a re-assessment of their tax credit award. WTC contains an element to cover a proportion of qualifying childcare costs. It is not taxable. It has been replaced by Universal Credit for most people.

³ Specific hour limits may vary over time.

Child Tax Credit (CTC) is paid to families with children, whether or not the parents are in work. The transfer is made up of two components - the first component is a “family element” (in some years doubled for the first year following a child’s birth); the second component is a per-child payment (higher if the child is disabled) up to two children (“two-child limit”) for those families with a gross annual income up to a given threshold and is tapered off thereafter as income increases. It is payable and assessed on a yearly basis and is not taxable. It has been replaced by Universal Credit for most people.

Social Fund payments also include two components - regulated payments which contribute to maternity, funeral and cold-weather fuel costs for certain families on low income; and discretionary payments which take the form of either non-repayable grants or interest-free loans.

Universal Credit (UC) is being introduced in stages. It has been phased-in from October 2013 and its full roll-out should be complete by September 2024. It represents a very substantial reform to the system of means-tested benefits and tax credits for working-age families. The core of the reform is that almost all means-tested welfare benefits (Income Support, Jobseeker’s Allowance, Employment and Support Allowance and Housing Benefit) and in-work tax credits (Child Tax Credit and Working Tax Credit) are combined into a single programme, Universal Credit. It is payable to families where no one is in work, and to families on a low income where someone is in work. The government hopes that UC will make it easier for claimants to claim benefits, make the gains to work more transparent, and reduce the amount spent on administration and lost in fraud and error. Conditionality under UC applies to two groups of Universal Credit recipients who previously faced no forms of conditionality: some part-time workers will face obligations to seek better-paid or longer-hours work, and some adults without paid work whose partners are in low-paid work will face obligations to look for paid work.

1.2.4 Not strictly benefits

In addition, there are components of income that are not strictly part of the benefit system. These include:

Statutory Sick Pay (SSP) payable to employees by the employer for the first 28 weeks of sickness leave. SSP is paid at a flat rate (most employers pay full wages for short-term sickness). Payments are (generally) treated as earnings by the rest of the tax-benefit system.

Statutory Maternity Pay (SMP) and **Statutory Paternity Pay (SPP)** (starting from 5 April 2015) payable to employees by the employer for the first 39 weeks of maternity leave. For SMP there is a minimum flat rate payment and a higher rate (payable for only six weeks) equal to 90% of usual earnings. Similar to SSP, both payments are (generally) treated as earnings by the rest of the tax-benefit system.

Occupational (employer-provided) and approved personal pensions are **private pensions** that for the majority of employees replace the State Earnings Related Pension Scheme (SERPS).

Child Support is child maintenance paid by absent parents. It depends on an assessment of income and needs of the families of both parents and is enforced where lone parents are on *Income Support*.

Student loans are partly non-means-tested and partly means-tested on parental income.

Foster allowances are paid to families looking after children who are in Local Authority care (or similar).

Training allowances and Education Maintenance Allowance are paid under various schemes.

Coronavirus Job Retention Scheme (CJRS) or “furlough scheme” was introduced in April 2020 as an earnings subsidy to support employees during the coronavirus pandemic and the lockdown and social distancing measures introduced to combat it. It covered 80% of earnings (up to maximum of £2,500) and it ended in September 2021.

Self-Employment Income Support Scheme (SEISS) was introduced in May 2020 as an earnings subsidy to support self-employed people who had business disrupted during the coronavirus pandemic. It was paid in five lump sums in May, August, November 2020 and February and May 2021 to eligible workers based on an average of profits in previous three/four years.

1.2.5 Benefit cap

From 15 April 2013, a “benefit cap” may limit the total amount payable to a benefit unit from certain specific benefits. The benefit cap is applied by reducing HB or, from October 2013, by reducing Universal Credit. If the benefit unit is not entitled to HB or UC, the benefit cap is not applied.

1.2. Social contributions

Social contributions, known as *National Insurance Contributions (NICs)*, finance current National Insurance (NI) benefits and NI basic State Pension. Conditions regarding contributions made in the past determine eligibility to contributory benefits. There are four classes of contributions, but the most important in terms of revenue-raising is Class 1, which makes up 97% of the total.

Employees pay “primary” Class 1 contributions on their current weekly earnings between a lower and upper earnings limit (and at a lower rate above this limit) and employers pay “secondary” Class 1 contributions on the same earnings base but with no upper limit. Some employer-provided goods in kind (such as company car) are included in the earnings base.

People with self-employment income are liable for Class 2 and Class 4 contributions. These contributions only bring entitlement to the basic State Pension, not to short-term benefits. Class 2 contributions are a weekly payment at a flat-rate, which is the equivalent of employee Class 1 contributions. Low self-employment income is exempt. The equivalent of the employer contributions are the Class 4 contributions. These are payable on income between a lower and upper profits limit (and at a lower rate above this limit) and are determined annually. There is a maximum annual NIC payment for those with both employment and self-employment income which corresponds to the maximum that can be paid in a full year on employment earnings. The same maximum applies to people with earnings from several jobs.

Employees who are contracted out of the State Earnings Related Pension Scheme pay a lower rate of contribution, up to the upper earnings limit. Their employers also pay a lower rate, up to the upper earnings limit. Married women who were elected in 1977 or earlier to pay reduced contributions can still do so, as long as their contribution records have been maintained. This means they do not have to pay Class 2 contributions (if self-employed) and only have to pay a lower rate of Class 1 contributions (if employed). A woman who does this can only claim a reduced Category B state pension on the basis of her husband’s contributions on retirement and is not eligible for other contributory benefits.

Class 3 contributions are voluntary and are usually made by UK citizens living abroad, in order to maintain their contribution record.

Minimum contributions may be credited in certain circumstances, notably during registered unemployment and while caring for young children at home.

In 2022, the Health and Social Care Levy (HSCL) will be implemented. This will affect employers, employees and the self-employed who pay National Insurance contributions and individuals that would pay were it not for pension age restrictions (Class 2 and 3 contributions will not be affected). In 2022, the HSCL will be a 1.25 percentage points increase to the rates of Class 1, 1A, 1B and 4 contributions for 2022, while from 2023 it will be a separate contribution. Individuals above State Pension age will not be liable in 2022 but they will be thereafter. The HSCL will be subject to the same reliefs, thresholds and requirements of National Insurance contributions.

National Insurance contributions are not tax-deductible.

1.3. Taxes

Income Tax. The UK Income Tax system is an individual system, with the incomes of married people being taxed independently. There is an individual Personal Tax Allowance which is higher for people aged over 65 and still higher for those aged over 75 (“Age Allowances”). Age additions are withdrawn as taxable income rises. From April 2015 age additions allowances are gradually phased out and the unused Personal Tax Allowance can be transferred within non-higher tax payer married couples. From 6 April 2016, a new Personal Savings Allowance has been introduced.

The UK Income Tax system has a relatively broad base and there is - for all practical purposes - a unified tax schedule. Some employer-provided goods in kind are included in the income base (such as company cars). In 2018 there were three rate bands: a wide “basic rate” band of 20%, a “higher rate” of 40% and an “additional rate” of 45%. From April 2016 Scotland can apply different tax rates and income bands and from April 2019 Wales can also do the same with tax rates (although the latter do not affect the tax payers’ bill).

Tax assessment is annual (April - March). Most Income Tax is collected at source, either through withholding at 20% on income from capital or through the comprehensive and cumulative Pay As You Earn (PAYE) system on earnings. Most UK income taxpayers do not complete tax returns: only those who may be liable for higher-rate tax usually do so. Otherwise, most adjustments are carried out within the tax year using the PAYE system or between years using the tax code.

Council Tax is a local tax providing approximately 20% of local revenue. It replaced the notorious “poll tax” in 1993. Council Tax does not apply in Northern Ireland where the system of domestic rates remains in place. Council Tax is mainly based on the estimated market value of the property (as of April 1991). Properties are allocated to one of nine nationally-determined (i.e. different in England, Scotland and Wales) bands according to property value. The tax in each band is some multiple of the tax in the 4th band (“Band D”), ranging from 2/3 in the lowest value band to 2 in the top value band. Local authorities set the level of Band D tax each April. The Council Tax is reduced by 25% if the property contains only one resident adult (or by 50% if there is nobody resident). There are exemptions for students and members of the Armed Forces. The tax has its own rebate system for low-income families (Council Tax Benefit - see section 2.4.11).

Capital Gains Tax is levied on gains arising from the disposal of assets by individuals, representatives and trustees. There is an allowance on which an individual’s capital gain is exempt from tax (the allowance for trusts is lower). There is a taper system which reduces the proportion of the gain that is chargeable to tax, the longer the asset has been owned.

Inheritance Tax is charged at a single rate of 40% on wealth transferred at (or within seven years before) death. There is a minimum threshold and certain assets such as farms and small businesses are eligible for relief. Transfers to spouses and charities are exempt.

Property and Stamp Duties (Stamp Duty and Stamp Duty Land Tax) are levied on stock and share transactions and on conveyances and transfers of land and property. There is a threshold below which no duty is paid and a scale of proportional rates applies to property transactions, according to the value of the property.

2. SIMULATION OF TAXES AND BENEFITS IN UKMOD

2.1 Scope of simulation

Not all the taxes and benefits mentioned in the previous section are simulated by UKMOD. Some are beyond its scope entirely and are neither included in the UKMOD database nor in its output income variables. Others are not possible to simulate accurately with the available data. They are included in the database and may be chosen as components of output variables, but the rules governing them may not be changed by the model. Table 2.1 shows which benefits are simulated (or otherwise treated) whereas Table 2.2 shows which taxes and contributions are simulated. See also Annex 3 for a description of key UKMOD income variables and concepts.

Table 2.1 Simulation of Benefits in UKMOD

	Variable name(s)	Why not fully simulated?							Description
		2019	2020	2021	2022	2023	2024	2025	
Contribution-based Jobseeker's Allowance	bunct_s	PS or S	PS or S	PS or S	PS or S	PS or S	PS or S	PS or S	Eligibility for unemployment benefit is based on actual receipt plus other relevant conditions being satisfied. A full simulation of unempl benefit receipt can be switched on.
Income-based Jobseeker's Allowance	bunmt_s	S	S	S	S	S	S	S	Simulated as part of Income Support
Employment and Support Allowance + Incapacity Benefit (contributory)	bdict01, bdict02	I	I	I	I	I	I	I	Inadequate data on length of sickness spell and contribution history
Income-based Employment and Support Allowance	bsadi_s	S	S	S	S	S	S	S	

	Variable name(s)	Why not fully simulated?							Description
		2019	2020	2021	2022	2023	2024	2025	
Basic State Retirement Pension	boact00	I	I	I	I	I	I	I	No data on contribution history or retirement date
Second State Pension (State Earnings-Related Pension Scheme)	boactcm	I	I	I	I	I	I	I	Contribution history unknown
Pension Credit	boamt_s	S	S	S	S	S	S	S	
Winter Fuel Allowance	boaht_s	S	S	S	S	S	S	S	
Bereavement Benefit	bsuwd	I	I	I	I	I	I	I	No data on deceased husband's contributions or date of widowhood
Maternity Allowance(*)	bmana (bmanc_s)	I	I	I	I	I	I	I	No data on pregnancy dates, contribution conditions, previous earnings.
Statutory Sick Pay	bhlwk	I	I	I	I	I	I	I	No data on qualifying conditions
Statutory Maternity/Paternity Pay(*)	bmaer (bmact_s)	I	I	I	I	I	I	I	No data on pregnancy dates or previous employment record or earnings.
Attendance Allowance	bdioa	I	I	I	I	I	I	I	Insufficient information on disability
Disability Living Allowance	bdisc, bdimb	I	I	I	I	I	I	I	Insufficient information on disability
Personal Independence Payment	bdiscwa, bdimbwa	I	I	I	I	I	I	I	Insufficient information on disability

	Variable name(s)	Why not fully simulated?							Description
		2019	2020	2021	2022	2023	2024	2025	
Severe Disablement Allowance	bdisv	I	I	I	I	I	I	I	Insufficient information on disability
Carer's Allowance	bcrdi	I	I	I	I	I	I	I	Insufficient information on disability
Carer's Allowance Supplement (Scotland)	bcrdicm_s	PS	PS	PS	PS	PS	PS	PS	Eligibility for entitlement is based on actual receipt of CA and region of residence.
Industrial Injuries Disablement Benefit	bdiwi	I	I	I	I	I	I	I	Insufficient information on disability
War Pension	boawr	I	I	I	I	I	I	I	Insufficient information on injury
Child Benefit	bch_s	S	S	S	S	S	S	S	
Child Tax Credit	bfamt_s	S	S	S	S	S	S	S	
Working Tax Credit	bwkmt_s	S	S	S	S	S	S	S	
Income Support	bsa_s	S	S	S	S	S	S	S	
Housing Benefit	bho_s	S	S	S	S	S	S	S	
Universal Credit	bsauc_s	S	S	S	S	S	S	S	Replacing other means-tested benefits gradually from late 2013
Council Tax Benefit/Reduction	bmu_s	S	S	S	S	S	S	S	From 2013 administered at local level cannot model details of local schemes ⁴ .

⁴ From 2013 Council Tax benefit has been made the responsibility of individual local authorities. It is therefore likely that as time goes by the nature of the scheme will vary considerably by local area and may not operate at all in some. In EUROMOD we currently assume that the 2012 national scheme continues to apply in following years, with

	Variable name(s)	Why not fully simulated?							Description
		2019	2020	2021	2022	2023	2024	2025	
Social Fund		E	E	E	E	E	E	E	No data; cannot model local discretion
Educational Maintenance Allowance	bedes	I	I	I	I	I	I	I	Insufficient information on school attendance
Sure Start Maternity Grant	bmamt_s	S	S	S	S	S	S	S	
Best Start Grant	bmascm_t_s	S	S	S	S	S	S	S	Introduced in Scotland from 2019
Scottish Child Payment	bchmt_s	-	-	S	S	S	S	S	From February 2021
Scottish Child Payment Bridging Payments	bchmt01_s	-	-	S	S	-	-	-	2021 and 2022
Scottish Child Winter Heating Assistance	bchht_s	-	S	S	S	S	S	S	From winter 2020
Benefit cap on Housing Benefit	brd_s	S	S	S	S	S	S	S	From 2013
Benefit cap on Universal Credit	brduc_s	S	S	S	S	S	S	S	From 2014
Coronavirus Job Retention Scheme	bwkmcee_s, yemmc_s	-	S	S	-	-	-	-	In 2020 and until September 2021
Self-Employment Income Support Scheme	bwkmcse_s	-	S	S	-	-	-	-	From May 2020 and until September 2021

Notes: “-”: policy did not exist in that year; “E”: *excluded* from the model as it is neither included in the micro-data nor simulated; “I”: *included* in the micro-data but not simulated; “PS” *partially simulated* as some of its relevant rules are not simulated; “S” *simulated* although some minor or very specific rules may not be simulated.

parameters uprated in line with those for IS and HB in Scotland and Wales. In England, we take into account likely budget cuts due to austerities measures assuming a 10.6% reduction to the amount of Council Tax benefit effectively available under the new schemes.

(*) For consistency across time, the baseline uses non-simulated variables as reported from FRS and updated in line with Government announcements. For 2015 system onwards, Maternity Allowance (*bmanc_s*) and Statutory Maternity/Paternity Pay (*bmact_s* and *bpact_s*) can also be simulated using the Parental Benefits switch.

Table 2.2 Simulation of taxes and social contributions in UKMOD

	Variable name(s)	Why not fully simulated?							
		2019	2020	2021	2022	2023	2024	2025	
Income tax	<i>tin_s</i>	S	S	S	S	S	S	S	Some exemptions and small allowances are ignored.
National Insurance contributions	<i>tscee_s</i> , <i>tscse_s</i> , <i>tscer_s</i>	S	S	S	S	S	S	S	Special schemes for small groups are ignored.
Health and Social Care Levy		-	-	-	-	S	S	S	From 2023 (in 2022 included within NICs)
Credited (State) National Insurance Contributions	<i>tscct_s</i>	-	-	S	-	-	-	-	In 2020
Council Tax	<i>tmu</i>	I	I	I	I	I	I	I	No data on property value; no location information below standard region.
Private pension contributions	<i>tpcee_s</i>	PS	PS	PS	PS	PS	PS	PS	Implicit rate calculated from recorded contribution and earnings

Notes: “-”: policy did not exist in that year; “E”: *excluded* from the model as it is neither included in the micro-data nor simulated; “I”: *included* in the micro-data but not simulated; “PS” *partially simulated* as some of its relevant rules are not simulated; “S” *simulated* although some minor or very specific rules may not be simulated.

2.1. Order of simulation and interdependencies

Table 2.3 shows the order in which the main elements of the UK system are simulated.

The operation of the Minimum Wage (adjusts *yem*) potentially affects all instruments related to original income. That is why this is calculated first.

Next, employee and self-employed National Insurance contributions (*tscee_s*, *tscse_s*, *teehl_s* and *tsehl_s*) are simulated followed by National Insurance contributions for employers (*tscer_s* and *terhl_s*). After the simulation of NICs, unemployment benefit (contribution based JSA – *bunct_s*) is simulated. Contribution-based JSA is taxable, therefore it must be simulated before Income Tax. The simulation of Winter Fuel Allowance (*boaht_s*), Child Benefit (*bch_s*), Income Tax Allowance (*tinta_s*) and Income Tax (*tin_s*) has been done next, followed by the reduction of the Child Benefit for high earners (*bchrd_s*).

The means-tested tax credits: Working Tax Credit - WTC (*bwkmt_s*) and Child Tax Credit – CTC (*bfamt_s*) are based on gross income before Income Tax and National Insurance contributions. They have been simulated after SIC and taxed in line with the order of simulation.

The income tests for means-tested benefits also take account of income from Jobseeker's Allowance (JSA - contributory unemployment benefit) and Child Benefit (*bch_s*). Therefore, these non-means-tested benefits must be simulated before Income Support, income-based JSA (*bsa_s*), Pension Credit (*boamt_s*) and income-based Employment and Support Allowance (*bsadi_s*). Housing Benefit (*bho_s*) and Council Tax Reduction (*bmu_s*) include CTC and WTC in their means-test and their calculation depends on whether or not Income Support (income-based JSA or Pension Credit or income-based ESA) is received. Therefore, they are simulated after other means-tested benefits. A Benefit cap places a limit to the maximum amount of benefits (of specific types) that a family can receive and therefore it is simulated last.

The new simulation of Universal Credit (UC) (*bsauc_uk*) is independent from other means-tested benefits for working-age people. However, to allow the consistency of take-up behaviour between legacy (before UC) and universal credit system, UKMOD first computes all the means-tested benefits replaced by UC and then computes UC. On the other hand, the amount of UC needs to be known before computing Council Tax Reduction (*bmu_s*). Therefore, UC is simulated after Housing Benefit (*bho_s*) and before Council Tax Reduction (*bmu_s*).

Next, the Sure Start Maternity Grant (*bmamt_s*), Scotland's Best Start Grant (since 2019) (*bmasgmt_s*), Scottish Child Payment (since 2021) (*bchmt_s*), + Scottish Child Payment Bridging Payments (2021-2022) (*bchmt01_s*) and Scottish Child Winter Heating Assistance (since 2020) (*bchht_s*) are simulated. The Sure Start Maternity Grant, Scotland's Best Start Grant and the Scottish Child Payment are simulated after all legacy benefits and UC as benefit entitlements are based on receipt of legacy benefits and UC. There are no interactions between the Scottish Child Winter Heating Assistance and other simulated tax-benefit policies.

Finally, the benefit cap (respectively *brd_s* and *brduc_s*) is applied to benefit units that are receiving Housing Benefit (HB) or Universal Credit (UC) which fulfil certain criteria and exceed a certain amount of total income from 'selected benefits' (see section 1.2.5 for more information).

Table 2.3 UKMOD Spine: order of simulation

Policy	2019	2020	2021	2022	2023	2024	2025	Description of the instrument	Main output
SetDefault_uk	on	on	on	on	on	on	on	DEF: DEFAULT VALUES	---
Uprate_uk	on	on	on	on	on	on	on	DEF: UPRATING FACTORS	---
ConstDef_uk	on	on	on	on	on	on	on	DEF: CONSTANTS	---
FYA_uk	switch	switch	switch	switch	switch	switch	switch	DEF: Full Year Adjustments, i.e. model annual policies instead of 30th June (switch on/off to apply)	---
InitVars_uk	on	on	on	on	on	on	on	DEF: Initialise variables	---
ILSDef_uk	on	on	on	on	on	on	on	DEF: STANDARD INCOME CONCEPTS	---
ILSUDbDef_uk	on	on	on	on	on	on	on	DEF: STANDARD INCOME CONCEPTS (used to compare income concepts with UDB EU-SILC)	---
IIDef_uk	on	on	on	on	on	on	on	DEF: NON-STANDARD INCOME CONCEPTS	---
TUDef_uk	on	on	on	on	on	on	on	DEF: ASSESSMENT UNITS	---
BTA_uk	switch	switch	switch	switch	switch	switch	switch	DEF: settings for modelling benefit non take-up (switch on/off to apply)	---
random_uk	on	on	on	on	on	on	on	DEF: Generate random numbers used in tax-benefit simulations (for modelling transitions from DLA to PIP; legacy benefits to Universal Credit; Covid-19 shocks)	---
countries_uk	on	on	on	on	on	on	on	DEF: Keep households for respective country model. Functions within policy are switched on via extensions.	---
PAA_uk	switch	switch	switch	switch	switch	switch	switch	DEF: Pension Age Adjustment - changes in earnings and pensions due to increase in female State Pension age (switch on/off to apply 2011-onwards only)	---
yem_uk	off	off	off	off	off	off	off	DEF: Minimum wage (switch on/off to apply)	---
shocks_uk	n/a	on	on	on	on	on	on	DEF: Simulation of unemployment changes and in 2020 and 2021 of Covid-19 shocks: furloughing (i.e. eligibility to CJRS) and SEISS take-up	---
cjrs_uk	n/a	on	on	n/a	n/a	n/a	n/a	BEN: Covid-19 grant from the Coronavirus Job Retention Scheme (CJRS) in 2020 and 2021	bwkmcee_s, yemmc_s
seiss_uk	n/a	on	on	n/a	n/a	n/a	n/a	BEN: Covid-19 grant from the Self-employment Income Support Scheme (SEISS) in 2020 and 2021	bwkmcse_s
neg_uk	on	on	on	on	on	on	on	DEF: recode to 0 negative self-employed income	---
mif_uk	on	on	on	on	on	on	on	DEF: Calculate gross earnings for the self-employed as part of the Minimum Income Floor (MIF) policy of Universal Credit	---
lha_uk	on	on	on	on	on	on	on	DEF: Local Housing Allowance (LHA) rates	---
bmact_uk	switch	switch	switch	switch	switch	switch	switch	BEN: Statutory Maternity Pay (off by default)	bmact_s
bmanc_uk	switch	switch	switch	switch	switch	switch	switch	BEN: Maternity Allowance (off by default)	bmanc_s

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bpact_uk	switch	switch	switch	switch	switch	switch	switch	BEN: Statutory Paternity Pay (off by default)	bpact_s
bdisc_uk	on	on	on	on	on	on	on	BEN: DLA reduce number of recipients (post 2011)	bdisc
berdicm_uk	on	on	on	on	on	on	on	BEN: Scottish Carer's Allowance Supplement (from Sept 2018)	berdicm_s
tscee_tscse_uk	on	on	on	on	on	on	on	SIC: employee and self-employed National Insurance contribution	tscee_s and tscse_s
tscer_uk	on	on	on	on	on	on	on	SIC: employer National Insurance contribution	tscer_s
bunct_uk	on	on	on	on	on	on	on	BEN: contributory unemployment benefit (Jobseeker's Allowance)	bunct_s
boaht_uk	on	on	on	on	on	on	on	BEN: pensioner's annual heating allowance (Winter Fuel Allowance)	boaht_s
bch_uk	on	on	on	on	on	on	on	BEN: Child Benefit	bch_s
tinta_uk	on	on	on	on	on	on	on	TAX: Personal Tax Allowance	tinta_s
tin_uk	on	on	on	on	on	on	on	TAX: personal Income Tax	tin_s
bchrd_uk	on	on	on	on	on	on	on	BEN: Child Benefit reduction	bchrd_s, bch_s
bwkmt_bfamtk	on	on	on	on	on	on	on	BEN: tax credits (Working Tax Credit and Child Tax Credit)	bwkmt_s and bfamt_s
bsa_uk	on	on	on	on	on	on	on	BEN: Social Assistance (Income-based Jobseeker's Allowance, Income Support and Pension Credit)	bsa_s
bsadi_uk	on	on	on	on	on	on	on	BEN: Income-based Employment and Support Allowance (ESA)	bsadi_s
bho_uk	on	on	on	on	on	on	on	BEN: Housing Benefit	bho_s
bsauc_uk	on	on	on	on	on	on	on	BEN: Universal Credit	bsauc_s
bmu_uk	on	on	on	on	on	on	on	BEN: Council Tax Benefit/Reduction	bmu_s
bmamt_uk	on	on	on	on	on	on	on	BEN: Sure Start Maternity Grant	bmamt_s
bmascmnt_uk	n/a	on	on	on	on	on	on	BEN: Best Start Grant (for Scotland)	bmascmnt_s
bchmt_uk	n/a	n/a	on	on	on	on	on	BEN: Scotland: Child Payment (from Feb 2021)	bchmt_s
bchmt01_uk	n/a	n/a	on	on	n/a	n/a	n/a	BEN: Scotland: Child Payment Bridging Payments (2021-2022)	bchmt01_s
bchht_uk	n/a	on	on	on	on	on	on	BEN: Scotland: Child Winter Heating Assistance (from winter 2020)	bchht_s
bcap_uk	on	on	on	on	on	on	on	BEN: Total benefits capped	brd_s
covshocks_benreceipt_uk	n/a	on	on	n/a	n/a	n/a	n/a	BEN: In 2020 and 2021 Covid-19 shocks: pre-Covid-19 receipt of benefits	- - -

2.2. Policy extensions

There are several so-called policy *extensions* in UKMOD.⁵ More than one policy as well as functions from different policies can belong to a single extension. Furthermore, the same policy or function can belong to more than one extension. Extensions can be by default “switched on”, i.e. calculations are carried out, or “off”. Noteworthy, users can select whether to run the tax-benefit simulations with the extension being on or off.

The extension **Benefit Take-up Adjustments** (*BTA*) is by default switched *on*, meaning benefit calculations assume a partial take-up. Switching *off* the extension implies a full (100%) take-up. For more information on the applied benefit take-up rates, see section 3.2.3.

The **Pension Age Adjustment** (*PAA*) allows a choice between modelling policies taking into account increases in the State Pension age introduced from autumn 2010 (*on*) and modelling policies ignoring this change (*off*). The extension is *on* by default.

The **Full Year Adjustment** (*FYA*) takes into account that i) the Scottish Carer's Allowance Supplement is only being paid for 7 months (from September) in 2018, ii) the Scottish Child Winter Heating Assistance is being paid in the winter of 2020, i.e. after 30 June and iii) the Scottish Child Payment is only being paid for 11 months (from February) in 2021 and extended to u16s on December 2022. The extension is *on* by default. From UKMOD/FRS 2016 input dataset onwards, it assign benefits to people interviewed (ddt01) when the benefits where in place (not available in previous datasets, where benefits are adjusted to everybody proportionally to the months the benefits were implemented).

The **Parental Benefits** switch (*PBE_uk*) controls the simulation of the Maternity Allowance (policy *bmanc_uk*), Statutory Maternity Pay (*bmact_uk*) and Statutory Paternity Pay (*bpact_uk*). It is set to *off* by default from 2015 onwards.

The extensions **Keep Households from England** (*ENG*), **Northern Ireland** (*NI*), **Scotland** (*SCT*) and **Wales** (*WLS*) allow users to work respectively with the household micro-data sample for the respective country only. These extensions are *off* by default in the UK model. However, in each country model the respective extension is *on* (e.g. *SCT* is *on* by default in the model for Scotland).

The **Full Legacy Benefits Assumption** (*LBA*) and the **Full Universal Credit Assumption** (*UCA*) are used to control the transition between legacy benefits and Universal Credit. Both extensions control the value of the constant *\$UCtransition* in *ConstDef_uk*. *LBA* sets *\$UCtransition*=0, i.e. no UC exists and only legacy benefits apply. *UCA* sets instead *\$UCtransition*=1, i.e. only UC can be claimed while legacy benefits are no longer available. Both extensions are by default *off* for policy years 2014-2025.

The extension **Minimum Wage Adjustments** (*MWA*) allows for the simulation of the Minimum Wage/National Living Wage (MW/NLW). The extension is *off* by default. But if switched *on*, people's earnings are modified, so everyone earns at least at the level of the MW/NLW.

The extensions **Labour Market adjustment** (*LMA*) allows for the simulation of unemployment and Covid-19 shocks, i.e. increasing unemployment in policy years 2020-2025 and simulating entitlements to the Coronavirus Job Retention Scheme (CJRS) and Self-Employment Income

⁵ Policies or functions belonging to an extension are denoted with ‘switch’ in the policy spine (for a given policy year), while their default values (*on* or *off*) are set in a separate dialogue box in the model, accessible via the tab Country Tools > Set Switches in the EUROMOD User Interface (UI).

Support Scheme (SEISS) in 2020 and 2021. The extension is *on* by default. For more information, see section 2.8.3.

The extension **Benefit Take-up Adjustments Observed (BTO)** is by default switched *off* (as it is on a trial period). Switching *on* the extension and switching *off* the *BTA* implies that instead of a fully random adjustments of take-up and transition between legacy benefits and Universal Credit, benefits are assigned first to people with the observed benefits in the data. For more information on, see section 3.2.3.

2.3. National Minimum Wage and National Living Wage

- *Brief description*

A National Minimum Wage (NMW) was introduced in April 1999. It determines the minimum amount employees have a legal entitlement to earn per hour depending on their age. Minimum Wage is simulated as a temporary variable in order to validate earnings (Scottish public sector pay floor is not simulated because with our current civil servants variable *lcs* we cannot identify those affected).

From April 2021 employees age 23 and over are entitled to the National Living Wage (NLW), while from April 2024 those age 21 will be too.

- *Eligibility conditions*

The Minimum Wage covers most employees except for those exempted for various reasons. Our data do not allow UKMOD to account for exemptions.

- *Amounts*

In June 2022 the National Minimum Wage is £9.16 per hour for employees aged 22 and over, £6.83 for those aged 18-21 and £4.81 for those under 18 and not of compulsory school-age. For the rates for the other policy years, refer to Table 2.4. There are no minimum wage regulations for children of compulsory school age. The projections from 2023/24 are based on indexation to average annual earnings growth.

Table 2.4 Rate of the National Minimum Wage and National Living Wage (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per hour	£ per hour	£ per hour	£ per hour	£ per hour	£ per hour	£ per hour
Age 25+	8.21	8.72	8.91	9.50	9.88	10.18	10.40
Aged 22+	7.7	8.2	8.36	9.16	9.52	9.81	10.02
Aged 18-21	6.15	6.45	6.56	6.83	7.10	7.31	7.47

Aged 16-17	4.35	4.55	4.62	4.81	5	5.15	5.26
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Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on average annual earnings growth rate.

EUROMOD Notes: The implementation in UKMOD checks that individuals are receiving at least the National Minimum Wage. Where this does not seem to be the case in the data, the UKMOD calculation increases the income by calculating income based on the number of hours worked on the national minimum wage. From 2016/21/24 system, UKMOD checks that individuals age 25/23/21 and over receive at least the National Living Wage and in a similar manner as for NMW, where this is not the case in the data, UKMOD increases the individual income based on the hours worked and the NLW hourly rate.

2.4. Social benefits

2.4.1. Winter Fuel Allowance (*boaht_s*)

This is an annual allowance paid to any household containing a person aged over the State Pension-age limit for women (which has been linearly increasing from 2012) and is intended to cover extra heating costs for elderly people during winter months. The benefit is paid at household level (*tu_household_uk*).

- **Definitions**

A fixed annual amount is paid per household, according to whether any household member is aged over the age-threshold and whether any is aged over 80.

- **Eligibility conditions**

The general eligibility criterion is age though the amount varies according both to age and household composition (see Table 2.5).

- **Income test**

Winter Fuel Allowance is a universal, non-means-tested benefit.

- **Benefit amount**

The benefit amounts and age thresholds for the Winter Fuel Allowance over the policy years are laid out in the Table 2.5.

Table 2.5 Winter Fuel Allowance benefit amounts and age conditions (2018-2025)

As of...	Jun-18	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Age threshold	65	65	66	66	66	66	66	66
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
At least one member of the HH is aged over the threshold	200	200	200	200	200	200	200	200
At least one member of the HH is aged 80 or over	300	300	300	300	300	300	300	300

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on nominally frozen rates.

EUROMOD notes: The Winter Fuel Allowance is assumed to be shared equally between all eligible household members.

- *Interaction with taxes and other benefits*

The allowance is non-taxable and it is not taken into account in any other instrument.

2.4.2. Contributory Jobseeker's Allowance (*bunct_s*)

Contributory Jobseeker's Allowance is a flat-rate contributory benefit for the unemployed. The basic amount paid depends on the individual's age alone, with lower payments going to younger workers. There are no dependents' additions. There is no relationship with past earnings, beyond the contribution condition. Contributory JSA is payable for six months only.

- *Definitions*

The unit of assessment is the individual: *tu_individual_uk*.

- *Eligibility conditions*

There are four main eligibility conditions for contributory JSA:

- **Age:** to be eligible for contributory JSA a woman needs to be aged between 18-59 (or below the female State Pension age) and a man between 18 and 64 (or below the male State Pension age);
- **Actively seeking employment:** the claimant must be available for (and show proof of actively seeking) full-time employment. This criterion is not simulated in UKMOD;
- **Contribution record:** the claimant must have paid or been credited sufficient NI contributions in the two tax years before the benefit year of claim;
- **Work hours:** the claimant should not count as being in full-time paid work (from 2011 people working 16 or more hours per week are considered in full-time work).

- *Income test*

Contributory Jobseeker's Allowance itself is not means-tested. However, there are two ways in which the basic benefit is reduced £ for £:

- with any earnings⁶ (*yem+yse*) after the first disregarded amount of £5 per week, or
- any occupational or private pension (*ypp+ boactcm*) over £50 per week.

- *Benefit amount*

See the Table 2.6 for the different rates across the policy years. The projections from 2023/24 are based on indexation of 1%.

Table 2.6 Amount of contributory Jobseeker's Allowance by age (2019-2025)

⁶ Unless an individual earns more than their entitlement to contributory JSA plus any disregards. If that is the case, he/she would no longer be eligible.

As of... Fiscal year:	Jun-19 2019/20 £ per week	Jun-20 2020/21 £ per week	Jun-21 2021/22 £ per week	Jun-22 2022/23 £ per week	Jun-23 2023/24 £ per week	Jun-24 2024/25 £ per week	Jun-25 2025/26 £ per week
18-24 years old	57.90	58.90	59.20	61.05	63.42	64.92	66.23
25 or over	73.10	74.35	74.70	77	79.99	81.88	83.53
Occupational and personal pension disregard	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Earnings disregard	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if available or on past trends (1% increase).

- **Interaction with taxes and other benefits**

Contributory JSA is taxable and counts as income for means-tested benefits, so it needs to be simulated before income tax and means-tested benefits.

EUROMOD notes: The FRS data do not contain the required information to establish the contribution record of individuals. Instead, two options have been implemented. Firstly, in the current baseline eligibility is taken from the data (*bunct*>0) providing the other eligibility conditions outlined above are satisfied. For those currently in receipt of contributory JSA, the contribution period (*liwmy_s*) is imputed to match at least the two years required for eligibility, while for those currently unemployed and not in receipt, it is assumed to be zero. In order to simulate the monthly amount reported in the data, it is assumed that unemployment benefit is received for the whole year. The second option is to fully simulate eligibility. This option is switched off by default. The FRS data only allow us to establish whether an individual has worked for two years at some point (*liwwh*) while contributory JSA requires the individual to have worked in the last two years. Therefore, the eligibility for contributory JSA is overestimated, if fully simulated. Model also allows (the last function in the policy) to choose the option for the maximum duration of the contributory JSA to be simulated as lasting six months (which is the maximum entitlement for this benefit).

2.4.3. Working Tax Credit (*bwkm_t_s*) and Child Tax Credit (*bfamt_s*)

Working Tax Credit and Child Tax Credit are income-tested refundable tax credits. In practice they are calculated separately from Income Tax liabilities and their treatment in UKMOD reflects this and they are treated as benefits. They are calculated on the basis of the previous tax year's annual income.

In principle they are responsive to changes in income or other circumstances if the claimants report it. In practice this is only likely to happen if the claimant's situation changes in a way likely to increase entitlement. However, there is an end-of-year settlement which takes account of changes during the year. Increases in income are disregarded up to a limit. UKMOD uses current income to simulate entitlements and cannot take account of changes in income over the year. Essentially, it assumes that the end of year income disregard is very large.

- **Eligibility conditions**

Working Tax Credit (*bwkmnt_s*) is an income-based credit for working adults who are either (*i_bwfnt_ChildDLA1* = 1)

- working at least 30 hours per week and aged above 24 years old,
- working at least 16 hours per week and have a dependent child or
- working at least 16 hours per week and disabled, or from 2011 onwards, aged 60 or more, or
- if a couple with children, working at least 24 hours per week between them (and at least one of them working 16 hours), but
- those in couples (with or without children) where the partner is on Carer's Allowance need to work only 16 hours to qualify.

Child Tax credit (CTC) (*bfamt_s*) is an income-based tax credit paid to families with dependent children, regardless of whether the adults are in employment or not (*i_bfamt_Elig*). It has replaced all the child amounts previously (pre-2009) paid under Income Support, income-based Jobseeker's Allowance and Pension Credit. It is composed of a Family element and a Child element.

- **Assessment unit**

The 'assessment unit' for tax credits is the so-called 'benefit unit' (*tu_bu_uk* i.e. single people or couples (including co-habitees) with their dependent children).

- **Amounts**

The calculation of the amount of tax credit can be broken down into a number of steps by calculating:

- The 'relevant period'
- The 'maximum amount'
- The 'relevant income'
- Comparing the 'relevant income' to the 'threshold figure'
- Calculating the final entitlement

The 'relevant period'

This refers to the number of days the benefit unit is eligible within the tax year. For the purposes of UKMOD we assume that eligibility has lasted all year.

The 'maximum amount'

Working Tax Credit contains a number of elements depending on family composition (basic, couple and lone parent element), health (disability and severe disability element), number of hours worked (30-hour element) and age of the claimant (50+ element).

The maximum amount of the Working Tax Credit is calculated by adding up all the elements. In other words, if a benefit unit is entitled to Working Tax Credit according to the criteria outlined above, they qualify for the basic element. Then, according to the family circumstances they qualify for the other elements shown in the table below (*i_bwfnt_ChildCareElig*).

The maximum of the Child Tax Credit is the sum of the family element (£545 per year in 2018/19); and the child element of £2,780 yearly (in 2018/19), paid for each child in the family. Children with disability are entitled to additional payments (*i_bwfnt_FamAmt*) – see Table 2.7 and

Table 2.8 for amounts up to 2025.

For example, a lone parent working 30+ hours per week with two children aged three and five years would qualify for the WTC basic element, the WTC lone parent element and the WTC 30+ element.

In addition, they would qualify for the CTC family and two times the CTC child element, i.e. for each child. The elements for both tax credits are annual amounts and are shown in the Table 2.7, Table 2.8 and Table 2.9.

The childcare element (*i_bwkmt_ChildCare*) is to meet the cost of ‘relevant childcare’ (*xcc*). Those eligible are lone parents in employment or couples with both partners in employment or one partner receiving disability benefits. ‘Relevant childcare’ essentially refers to registered childcare for which the childcare element can be claimed. The calculation of the childcare tax credit element is based on average weekly amounts, i.e. the cost of childcare over the whole year is added together and then divided by the number of weeks that childcare has been used. This average childcare amount is then multiplied by 52 and treated as the annual amount. The childcare element is designed to meet a proportion of those costs up to a set limit. The proportion was decreased to 70% in 2011, up to £175 per week per child if only one child and £300 per week if two or more children.

There is an additional element of the WTC for individuals who are 50 years or older which they can claim for the first 12 months after having moved into work. However, as these are temporary elements, they have not been simulated in UKMOD.

The ‘relevant income’ or means-test

The means-test is based on the annual gross income of the parent(s) including earnings, pensions (net of private pension contributions), invalid care allowance, incapacity benefit and property income (see income list *il_TC_means* for the detailed list of components). Some disregards are applied (*ydg04_s*): a weekly disregard of £100 applies to Statutory Sick Pay (*bhlwk*) and Statutory Maternity Allowance (*bmana*) received by the parent(s) and an annual disregard of £300 applies to some adult income (state and occupational pension, investment and property income). Children’s income (*yshot_s*), where applicable, is disregarded. Capital itself is not included in the means-test, although the taxable part of income from capital (*yiytx*) is taken into account. In the simulation we use current short-term income (as reported in the data) and we assume that this reflects the income for the whole year without any substantial change.

Table 2.7 Working Tax Credit amounts (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
WTC Basic element	1,960	3,040	2,505*	2,060	2,140	2,190	2,235
WTC Lone parent element	2,010	2,045	2,060	2,115	2,195	2,245	2,290
WTC Couple element	2,010	2,045	2,060	2,115	2,195	2,245	2,290
WTC 30 hours element	810	825	830	855	890	910	930
WTC Disability element	3,165	3,220	3,240	3,330	3,460	3,540	3,610
WTC Severe disability element	1,365	1,390	1,400	1,440	1,495	1,530	1,560

As of... Fiscal year:	Jun-19 2019/20 £ per year	Jun-20 2020/21 £ per year	Jun-21 2021/22 £ per year	Jun-22 2022/23 £ per year	Jun-23 2023/24 £ per year	Jun-24 2024/25 £ per year	Jun-25 2025/26 £ per year
WTC Max eligible childcare expenditure, 1 child (per week)	175	175	175	175	175	175	175
WTC Max eligible childcare expenditure, 2 + (per week)	300	300	300	300	300	300	300
WTC Proportion of eligible childcare costs covered	70%	70%	70%	70%	70%	70%	70%

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (1% increase except disability elements, at CPI). *The Basic element in 2021 includes a £500 lump-sum.

Table 2.8 Child Tax Credit amounts (2019-2025)

As of... Fiscal year:	Jun-19 2019/20 £ per year	Jun-20 2020/21 £ per year	Jun-21 2021/22 £ per year	Jun-22 2022/23 £ per year	Jun-23 2023/24 £ per year	Jun-24 2024/25 £ per year	Jun-25 2025/26 £ per year
CTC Family element	545	545	545	545	545	545	545
CTC extra for child under 12 months	--	--	--	--	--	--	--
CTC Child element	2,780	2,830	2,845	2,925	3,040	3,110	3,175
CTC Disability child additional element	3,355	3,415	3,435	3,530	3,665	3,750	3,825
CTC Severe disability disabled child additional element	1,360	1,385	1,390	1,430	1,485	1,520	1,550

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (family element nominally frozen; child element 1% increase; disability elements CPI).

Comparing the ‘relevant income’ to the ‘threshold figure’

The sum of the relevant income is then compared to the ‘threshold figure’ which differs according to the tax credit that is being claimed. If a benefit unit is only eligible for Working Tax Credit, then the first threshold figure in 2022 was £6,745. The same threshold applies if a benefit unit claimed Working Tax Credit and Child Tax Credit. However, when a benefit unit is only entitled to Child Tax Credit, the first threshold was £16,935 per year in 2022. See Table 2.9 for subsequent years’ figures.

Calculating the final entitlement

If the ‘relevant income’ worked out in step 3 is lower than the applicable threshold outlined in step 4, the benefit unit is entitled to the ‘maximum’ tax credit award that had been calculated in steps 1 and 2. If the ‘relevant income’ is higher than the applicable threshold, then the amount of the threshold is subtracted from the ‘relevant income’. The difference between the two amounts

is then tapered away (at 41%). In this calculation the elements are tapered away in a particular sequence, namely:

- the WTC elements, except for the childcare tax credit element, come first,
- then the childcare tax credit element and
- then the child and any disability elements of the Child Tax Credit.

From 2012 the family element is tapered away at the 41% rate, immediately after the child element. If annual entitlement for either CTC or WTC or their sum turns out to be less than £26 per year, no award of tax credit is made. In 2022 there was also a one-off £500 payment for working households receiving WTC⁷.

Table 2.9 Child Tax Credit thresholds (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
First threshold	6,420	6,530	6,565	6,745	7,005	7,170	7,315
First threshold if not entitled to Working Tax Credit	16,105	16,385	16,480	16,935	17,590	18,005	18,370
First withdrawal rate	41%	41%	41%	41%	41%	41%	41%
Second threshold	--	--	--	--	--	--	--
Second withdrawal rate	--	--	--	--	--	--	--

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or past trends (CPI).

- **Interaction with other benefits**

WTC counts in full as income for IS, PC, HB and CTB, so needs to be simulated before these means-tested benefits. It is not taxable, so it can be simulated after income tax.

CTC counts in full as income for HB and CTB, so needs to be simulated before these means-tested benefits. It is not taxable, so it can be simulated after income tax.

EUROMOD notes: Disability for the purposes of tax credits is assessed on the basis of a disability test assigned by a doctor and receiving a so called 'qualifying benefit'. The medical test cannot be simulated in UKMOD nor can all the rules around qualifying benefits as some refer to receipt in the past six months. Therefore, eligibility for the disability element has been implemented in UKMOD as receiving one of the qualifying benefits (*il_disab*>0), namely, Employment and Support Allowance (or its predecessors, Incapacity Benefit or Severe Disablement Allowance), Attendance Allowance or the care or mobility element of the Disability Living Allowance.

⁷ Also for those receiving CTC and that were eligible for WTC but did not get it because their income was too high. However, we do not simulate people in this situation

As mentioned above, the additional elements for individuals who are 50 years or older and who have recently moved into work are not simulated as the employment history is incomplete in the data to capture all those that are eligible for this temporary benefit.

In addition, once CTC/WTC is in payment, this continues unchanged for the remainder of the tax year even if circumstances change. This means that some people calculated to not be entitled on the basis of current circumstances may have been entitled at the time when they made the application.

UKMOD applies a take-up correction to CTC/WTC by default. See section 3.2.3 for more information.

2.4.4. Child Benefit (*bch_s*) and high-income child benefit charge (*bchrd_s*)

Child Benefit (CB) is a universal flat-rate benefit paid to the person responsible for each dependent child. The amount each benefit unit (*tu_bu_uk* i.e. single people or couples, including co-habitees, with their dependent children) receives depends on the number of dependent children in the benefit unit. A child is defined as dependent if they are aged below 16, or below 19 if still in full-time education.

- **Eligibility**

Eligibility requires the presence of dependent children in the benefit unit. The claimant does not need to be the parent of the child, it is sufficient if the claimant is responsible for the upbringing of the child.

- **Income test**

Child Benefit is a universal benefit paid for all dependent children and it is not taxable. However, from 2013, Child Benefit for high-income taxpayer parents became taxable and it is effectively fully withdrawn for families with at least one parent earning over £60,000 per year (see details below).

- **Benefit amount**

Child Benefit consists of £20.70 per week for the first or only child in 2019/20. For each additional child £13.70 is paid per week (see Table 2.10 below for the rates in the other policy years). Essentially the weekly entitlement is $CB = £20.70 + (£13.70 * (\text{number of children} - 1))$.

Table 2.10 Child Benefit rates (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Only/Eldest child	20.70	21.05	21.15	21.75	22.60	22.15	23.60
Other child(ren)	13.70	13.95	14.00	14.40	14.95	15.30	15.60

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate or on past trends (1% increase).

- *Interaction with other benefits (bchrd_s)*

Child Benefit is not taxable and has been ignored in the assessment of income for means-tested benefits since 2004. However, from 2013 Child Benefit is subject to the benefit cap (see 2.4.12). Moreover, from 2013 if the parent receiving Child Benefit or his/her partner has income over £50,000 in a tax year, this person is liable to pay tax in respect of Child Benefit (called the “high-income child benefit charge”). The amount of tax is calculated as a percentage of the total amount of any Child Benefit paid to them or their partner. The tax payable is 1 per cent of the total amount of the taxable Child Benefit for each complete £100 income over £50,000. The charge cannot be more than the amount of the taxable Child Benefit awarded for the year. Therefore if income is over £60,000 in a year, the charge will equal the amount of Child Benefit awarded. These thresholds have been unchanged since 2013.

EUROMOD notes: In UKMOD the reduced Child Benefit is calculated by *bchrd_uk* after the Income Tax calculation. Note that in previous versions of UKMOD the reduction was treated as additional tax rather than a reduction in benefit.

2.4.5. Scottish Carer’s Allowance Supplement (*bcrdicm_s*)

- *Definitions*

Scottish Carer’s Allowance Supplement (*bchrdicm_s*) is an extra payment for people in Scotland who receive Carer’s Allowance. It was first paid in September 2018 and is included in the UKMOD baseline from that year onwards, if the benefit unit is receiving Carer’s Allowance in Scotland.

- *Eligibility conditions*

Scottish carers in receipt of the UK Carer’s Allowance.

- *Income test*

Not applicable for this benefit.

- *Benefit amount*

The supplement is a lump sum paid twice per year.

Table 2.11 Scottish Carer’s Allowance Supplement from (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per payment	£ per payment	£ per payment	£ per payment	£ per payment	£ per payment	£ per payment
Scottish Carer’s Allowance Supplement	226.20	230.10	231.40	237.80	247.05	252.90	258

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23; 2023/24 to 2025/26 are projections based on the statutory indexation rate (CPI).

- *Interaction with other benefits*

The Carer’s Allowance Supplement does not affect other benefits or tax credits.

2.4.6. Income Support (including Income-Based Jobseeker's Allowance) (*bsa_s*)

Income Support is a safety net payment for people of working age who are not expected to seek work, while income-based Job Seeker's Allowance is the safety net benefit for people who are able to work. They may not receive contributory JSA at the same time, but their partner can.

EUROMOD notes: In UKMOD, income-based Jobseeker's Allowance and Income Support are implemented together as the rules are largely the same.

- **Definitions**

The unit of entitlement and income assessment for both benefits is the benefit unit (*tu_bu_uk*) i.e. single people or couples (including co-habitees) with their dependent children.

- **Eligibility conditions**

Eligibility for Income Support is based on being exempt from looking for work, e.g. carers, or lone parents (from 2013/14 this only refers to lone parents whose youngest child is under 5⁸), or people on unpaid parental leave. Additional conditions are that claimants are not full-time students, are under the current female State Pension age and do not have savings above £16,000.

Eligibility for income-based Jobseeker's Allowance is based on actively looking for work.

The following additional rules apply to both benefits:

1. Working less than 16 hours per week
2. Having less than £8,000 in capital

- **Income test**

Applicable amount

The applicable amount is the figure representing weekly needs, e.g. the amount the claimant and partner are expected to live on each week. It results from the sum of:

$$IS/ib-JSA \text{ Applicable amount} = \text{personal allowances} + \text{premiums} + \text{housing costs}$$

The personal allowances (*i_bsa_PersAllow*) for both benefits are outlined in the Table 2.12.

Table 2.12 Income Support and income-based Jobseeker's Allowance rates (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Single or lone parent 16-17	57.9	58.9	59.20	61.05	63.40	64.90	66.20

⁸ If you are under 18, you can claim IS if you are a lone parent, whatever the age of your child(ren). The age limit for a child was: 16 before 24 November 2008, 12 before 26 October 2009, 10 before 25 October 2010, 7 before 21 May 2012.

Single 18-24	57.9	58.9	59.20	61.05	63.40	64.90	66.20
Single 25 or over	73.1	74.35	74.70	77.00	80.00	81.90	83.55
Lone parent 18 or over	73.1	74.35	74.70	77.00	80.00	81.90	83.55
Couple one under 18	87.5	89.00	89.45	92.20	95.80	98.05	100.05
Couple both over 18	114.8 5	116.8	117.40	121.05	125.75	128.75	131.35

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2022/23 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (1% increase).

Premia

Premia are amounts that are added to the personal allowance if the relevant conditions are satisfied (*i_bsa_EligDisPremium* to *i_bsa_DisPremium* and *i_bsa_EligPensPremium1*). Rates of premia are the same for all claimants, irrespective of their age. Relevant premium conditions and weekly rates are listed in the Table 2.13. A benefit unit can receive several premia.

Disability is defined according to receipt of certain disability benefits, called ‘qualifying benefits’. Qualifying benefits have to be received within the last six months of claiming IS/ib-JSA according to the ‘linking rule’ introduced to encourage people with disabilities to move into work without losing their disability premiums if they have to leave work.

The disability premium (*i_bsa_EligDisPremium*) is linked to the following qualifying benefits: Disability Living Allowance (either the mobility component *bdimb* and or the care component *bdisc*), Severe Disablement Allowance (*bdisv*) or long-term Incapacity Benefit (*bdict01*) or its replacement Employment and Support Allowance (*bdict02*) and the disability element of the Working Tax Credit. The latter benefit would not be received at the same time; therefore, this condition has not been simulated. The Severe Disability Premium (*i_bsa_SevDisPremium*) is given if the claimant is receiving one of the following qualifying benefits: Attendance Allowance, the middle or higher rate care component of Disability Living Allowance (*bdisc*), no one is getting the Carer’s Allowance (*bcrdi*) for looking after the claimant and there are no non-dependents living in the household. There are additional rules for those registered blind. However, as this condition cannot be identified in the data, this has not been simulated. The conditions for receiving the Enhanced Disability Premium (*i_bsa_DisPremium*) are that the Disability Living Allowance care component is received at the highest rate (*bdisc* ≥ £79.15 per week in 2013).

Income Support on grounds of disability was gradually replaced by ib-ESA from 27 October 2008 (effectively from the 2009 system in UKMOD). See section 2.4.8 for more details.

The Carer Premium (*i_bsa_CarerPremium*) will be received if the claimant receives the Carer’s Allowance (*bcrdi*).

The child elements for IS and ib-JSA are covered by the Child Tax Credit. So a family unit with children entitled to IS and ib-JSA are automatically given CTC too.

Income Support and income-based Jobseeker’s Allowance premia amounts (per week) are shown in Table 2.13.

Table 2.13 Income Support and income-based Jobseeker's Allowance premia (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Carer premium – one qualifies	36.85	37.50	37.70	38.85	40.35	41.30	42.15
Carer premium – both qualify	36.85	37.50	37.70	38.85	40.35	41.30	42.15
Disability premium – single	34.35	34.95	35.10	36.20	37.60	38.50	39.30
Disability premium – couple	48.95	49.80	50.05	51.60	53.60	54.85	55.95
Enhanced disability premium – single	16.80	17.10	17.20	17.75	18.45	18.90	19.30
Enhanced disability premium – couple	24.1	24.50	24.60	25.35	26.35	26.95	27.50
Severe Disability – one qualifies	65.85	66.95	67.30	69.40	72.10	73.80	75.30
Severe Disability- two qualify	131.7	133.90	134.60	138.80	144.20	147.60	150.60

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

Income assessment

One claim for IS/ib-JSA is made per benefit unit and the entitlement depends on the income of all the members in the benefits unit as well as the composition of the household, i.e. whether there are adult-non-dependents present in the household. The income of other people in the household is not taken into account except via the non-dependent deduction (see below). Income is defined by *il_IS_means*. It includes gross income from employment and self-employment and all other main current income sources **except** investment income and certain benefits (Housing Benefit and Council Tax Benefit, Attendance Allowance and Disability Living Allowance). In addition, half of the value of private pension contributions and all of employee and self-employed contributions and Income Tax are deducted.

Some earnings and other income are disregarded (*ydg01_s*). These are £20 per week for a lone parent; £20 for a disabled person where disability is signalled by receipt of certain benefits (see above on entitlement to disability premium) within the family unit; £10 for couples not qualifying on disability grounds and £5 for others. In addition, small amounts (£10) of war pension and maintenance payments are disregarded. Income from investment income is not included directly in the IS family income assessment. Instead, a tariff income (£1 per week for every £250 capital) is calculated on financial capital between £6,000 and the upper threshold £16,000. Income Support and income-based Jobseeker's Allowance earnings disregards and capital limits (per week) are shown in Table 2.14.

Table 2.14 Income Support and income-based Jobseeker's Allowance earnings disregards and capital limits (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
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	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Single person	5	5	5	5	5	5	5
Couple	10	10	10	10	10	10	10
Disability	20	20	20	20	20	20	20
Lone parent ^[a]	20	20	20	20	20	20	20
	£	£	£	£	£	£	£
Capital lower limit	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Capital upper limit	16,000	16,000	16,000	16,000	16,000	16,000	16,000

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23; **Notes:** [a] Lone parents on HB or CTB have £25 of their earnings ignored.

Housing costs

Housing costs not covered by Housing Benefit can potentially be included in Income Support (*i_bsa_DeductHousCosts2*). Providing that the claimant is responsible for the housing costs (*i_bsa_RespHousCosts*), mortgage interest payments (*xhcmomi*) may be included in the calculation of the applicable amount and offset by non-dependent deduction (*i_bsa_DeductHousCosts1*). The upper limit up of mortgage loans for which interest payments are covered is £100,000 (or £200,000 in some circumstances). There are variable waiting times (between 16 and 39 weeks) after qualifying for benefit before mortgage interest is included in the calculation of the applicable amount.

EUROMOD notes: The UKMOD implementation does not take into account the limit up to which interest is paid nor the waiting time. Some other housing costs (such as ground rent or service charges for the upkeep of communal areas in shared buildings) are in principle also covered by Income Support but because our data do not allow us to distinguish them from other charges that are not covered, UKMOD does not take account of these extra costs in the Income Support calculation.

Multiple ‘assessment units’ in household and non-dependents

In the case of multiple benefit unit households, simulation of means-tested benefits needs to be coordinated across the units. IS and ib-JSA can be received by each benefit unit living in the same household, but entitlement for each benefit unit might be affected by the presence of other benefit units (through so called ‘non-dependent deductions’). Deductions are made from the housing cost element of the Income Support applicable amount if there are non-dependent adults in the household in addition to the householder’s family unit (*i_bsa_EligHousCosts*). The “householder” in the UK is the person responsible for the rent or mortgage interest (*i_bsa_RespHousCosts*) and he/she is identified in the UK data (*dhr*). The size of the deduction depends on the type of non-dependent. No deduction is made where the person is aged under 18 or where they are aged under 25 and are themselves in receipt of Income Support (IS) (*i_bsa_EligHousCosts*). To establish this latter condition, IS must be simulated for each non-dependent.

Other exemptions from deductions apply when the person is a full-time student, where they are blind, or where they are in receipt of Attendance Allowance (*bdioa*), or the middle or higher rate of the care component of Disability Allowance (*bdimb*).

EUROMOD notes: None of these cases are modelled.

Generally, a single deduction applies to each single person or couple according to the following (for couples, the higher deduction applies and income is aggregated): “Work” in this case refers

to whether in full-time work for at least 16 hours or not (*lhw*) and gross income (*il_ISPC_nondep_means*), which is similar to the income definition used for IS assessment but is before the deduction of income tax and contributions. Table 2.15 sets out the rates for the different income brackets.

Table 2.15 Non-dependent deductions on Income Support and income-based Jobseeker's Allowance (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Deduction applying if	100.65	102.35	102.85	106.05	110.15	112.75	115.05
income is above	451	469	469	469	487.20	498.75	508.80
Deduction applying if	91.7	93.25	93.70	96.60	100.35	102.70	104.75
income is above	363	377	377	377	391.65	400.90	409.00
Deduction applying if	80.55	81.90	82.30	84.85	88.15	90.25	92.05
income is above	272	283	283	283	294	300.95	307
Deduction applying if	49.2	50.05	50.30	51.85	53.85	55.10	56.20
income is above	209	217	217	217	225.40	230.75	235.40
Deduction applying if	35.85	36.45	36.65	37.80	39.25	40.20	41.00
income is above	143	149	149	149	154.80	158.45	161.65
Deduction otherwise	15.6	15.85	15.95	16.45	17.10	17.50	17.85

[a]

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

Notes: [a] An additional condition is that the non-dependent is working fewer than 16 hours per week.

Preliminary IS used for the non-dependent deduction

This policy module calculates IS entitlement for all benefit units in the household except the householder-unit. It does so in exactly the same way as in the actual IS calculation except that the addition of housing needs to the applicable amount is ignored (by definition, non-dependants do not have these needs).

EUROMOD notes: Note that the parameters for IS in this calculation are specified separately to those used in the main IS calculation. When making policy changes, the user should consider whether the calculations should remain so closely aligned (generally they should).

- **Benefit amount**

The award is calculated by adding together the personal allowances, premia and disregards (plus the housing costs if responsible for them) and then subtracting any income and non-dependent deductions.

EUROMOD notes: Up to this point, IS and ib-JSA are treated together in the simulation. However, at this final stage they are separated again according to the relevant eligibility criteria for IS (*bsa_s*) and ib-JSA (*bunmt_s*).

UKMOD applies a take-up correction to this benefit by default. See section 3.2.3 for more information.

- *Interaction with other benefits*

Working Tax Credit and Contributory JSA count as income for IS/ib-JSA purposes so they need to be simulated before IS/ib-JSA. Because of non-dependent deductions and the fact that IS/ib-JSA acts as a passport to maximum HB and CTB, IS/ib-JSA is simulated before HB and CTB. IS is not taxable, while JSA is. However, the tax on ib-JSA is not deducted while the JSA is being paid but reduces the refund received on return to work. Therefore in UKMOD ib-JSA is not included in the taxable base.

2.4.7. Pension Credit (*boamt_s*)

This is an income maintenance benefit paid to those over pension age (the age threshold moves with the female State Pension age; it was 61 in 2012 and 2013, 62 in 2014 and 2015, 63 in 2016, 64 in 2017, 65 from 2018 and 66 from 2021). It is composed of two elements, the Guarantee Credit (*boamtmm_s*) meant to ensure a guaranteed level of income, and the Saving Credit (*boamtsp_s*), meant to reward those who made provisions for retirement above the basic State Pension level. Either or both components can be received. Once both the GC entitlement and SC entitlement have been calculated, Pension Credit entitlement is the sum of these two components. The housing costs provisions mirror those described for IS, with one difference. In cases where a deduction had already been made under HB it is also made to Pension Credit (whereas for IS/JSA no deduction is made in such cases).

EUROMOD notes: Pension Credit is implemented in the same policy as Income Support and income-based Jobseeker's Allowance as a number of the rules are very similar such as deductions for non-dependents.

2.4.7.1. Guarantee Credit (*boamtmm_s*)

The aim of the Guaranteed Credit (GC) is to ensure that the income of older people does not fall below an 'appropriate minimum guarantee'.

- *Eligibility*

In order to be eligible, individuals must be over the female State Pension age and have benefit unit income (*il_GC_means*) below the 'standard minimum income guarantee'. This level is set out in the Table 2.16.

Table 2.16 Pension Credit Minimum Guarantee (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Single person	167.25	173.75	177.10	182.60	189.81	195.50	199.71
Couple	255.25	265.20	270.30	278.70	289.71	298.40	304.83

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (average annual earnings growth).

Unlike for working-age claimants of IS there is no maximum capital limit for Pension Credit.

- *Income test*

Assessable income includes income of any adult in the benefit unit (the claimant and the partner if any), while income of dependent children is ignored (*il_GC_means*). Tariff income from capital

is included in the income test. Specifically, for every £500 of capital over £10,000, £1 of income is added to income for the purpose of the means-test (*yiviy01_s*).

Applicable amount

The applicable amount is the figure representing weekly needs for GC purposes, the amount the claimant and partner are expected to live on each week. It results from the sum of personal allowances + premia + housing costs. The personal allowances are shown in Table 2.16 (i.e. they are equivalent to the level of the guarantee) and the premia are set out in Table 2.17.

Table 2.17 Pension Credit (PC) premia and capital limits (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Severe Disability Premium- single or one qualifies	65.85	66.95	67.30	69.40	72.10	73.80	75.30
Severe Disability Premium- couple (both qualify)	131.70	133.90	134.60	138.80	144.20	147.60	150.60
Carer Premium- single or one partner qualifies	36.85	37.50	37.70	38.85	40.35	41.30	42.15
Carer Premium- couple (both qualify)	36.85	37.50	37.70	38.85	40.35	41.30	42.15
Capital lower limit	10,000	10,000	10,000	10,000	10,000	10,000	10,000

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

- **Benefit amount**

The income calculated above is then subtracted from the applicable amount and the difference is the Guarantee Credit award.

2.4.7.2. The Savings Credit (SC) (*boamtxp_s*)

- **Eligibility conditions**

Either the individual claimant or their partner has to be 65 or older and have income above the Savings Credit threshold (*il_SC_qualy*). The level of this threshold is shown in Table 2.18.

- **Income test**

The income taken into account is the same as for the Guarantee Credit except for sources of income linked to work, i.e. Working Tax Credit, Incapacity Benefit, contribution based-ESA and JSA, Severe Disablement Allowance, Maternity Allowance and maintenance payments.

- **Benefit amount**

The savings credit is calculated using the following steps:

Step 1: calculate the income that counts for GC purposes and includes qualifying income.

Step 2: calculate the minimum guarantee plus any additional amounts.

Step 3: calculate 60% of all income except non-qualifying income above the Savings Credit threshold (see Table 2.18 below). This amount is compared with the maximum Savings Credit which was £14.48 per week for a single person and £16.20 for a couple in 2022.

Step 4: if the income calculated in step 1 is smaller than the income in step 2, step 3 will be the savings credit amount.

Step 5: If the income from step 1 is higher than that in step 2, calculate 40% of the total income (including non-qualifying income) above the appropriate minimum guarantee.

Step 6: Deduct the amount from step 5 from step 3 and if positive this is the Savings Credit entitlement.

Table 2.18 Savings Credit thresholds, maxima and withdrawal rate (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Threshold single	144.38	150.47	153.70	158.47	164.62	168.52	171.92
Threshold couple	229.67	239.17	244.12	251.70	261.47	267.66	273.06
Maximum single	13.73	13.97	14.04	14.48	15.04	15.40	15.71
Maximum couple	15.35	15.62	15.71	16.20	16.83	17.23	17.58
Withdrawal rate	40%	40%	40%	40%	40%	40%	40%

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

EUROMOD notes: UKMOD applies a take-up correction to this benefit by default. See section 3.2.3 for more information.

- **Interaction with other benefits**

Because PC has no working hours rule, it may be possible to get both PC and WTC if income is low enough. Any WTC counts as income for PC (GC means). Pension Credit is not taxable.

2.4.8. Income-based Employment and Support Allowance (*bsadi_s*)

Employment and Support Allowance (ESA) was introduced on 27 October 2008. It is a benefit for people who have “limited capability for work” and who are not entitled to Statutory Sick Pay. ESA replaces IB and IS on “grounds of disability” for new claimants.

There are two types of ESA: contributory ESA (c-ESA – *bdict02*) which is non-means-tested and it is paid if one satisfies the National Insurance conditions; income-based ESA (ib-ESA – *bsadi_s*) which is paid subject to a means test (there is no NI conditions applying in this case). It is possible to receive c-ESA topped up with ib-ESA. C-ESA is not simulated by UKMOD.

A number of elements for the calculation of ib-ESA are similar to IS/ ib-JSA such as the personal allowances, some premiums and the inclusion of reductions for non-dependents in the calculations.

ESA is worked out in two phases: in the “assessment phase” the individual gets a basic allowance, which depends on a personal applicable amount (see below) and their income. In the “main phase” of ESA one of two additional components is added to the basic allowance depending on the level of disability. This is the “support component” if the individual is assessed to have “limited capability for work-related activity” or the “work-related activity component” if the individual is regarded as being in the “work-related activity group” (WRAG) which means he/she is required to take part in work-focused interviews and possibly undertake some work-related activity.

- ***Eligibility Conditions***

The main eligibility rules to qualify for income-based Employment and Support Allowance are:

- having limited capability for work because of mental or physical conditions, which is determined as part of a work capability assessment;
- having benefit unit income lower than the applicable amount;
- having capital less than £16,000;
- being aged 16 or over and under pension age; not in education; not entitled to Pension Credit (PC), Statutory Sick Pay, Income Support or JSA; not in a couple entitled to joint-claim JSA or IS;
- not engaged in full-time work (if a partner is present, also the partner should not be working full-time) and if with a partner, the partner should not be entitled to ib-ESA, ib-JSA or PC in his/her own right.

- ***Income Test***

The calculation of the income-based Employment and Support Allowance amount is based on the ‘applicable amount’ and the income of the claimant and their family unit (Table 2.19).

The applicable amount is calculated by adding together:

- the personal allowances (which are the same as IS and ib-JSA);
- premia (only the enhanced disability, severe disability, carer and pensioner premia may apply); and

- in the main phase, either the support component⁹ or the work-related activity component¹⁰¹¹; and
- disregards;
- plus certain housing costs if the claimant is responsible for them.

Table 2.19 Income-based Employment and Support Allowance additional premia (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Work-related activity component	29.05	29.55	29.70	30.60	31.80	32.55	33.20
Support component	38.55	39.20	39.40	40.60	42.20	43.20	44.05

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (work-related CPI; support 1% increase).

Notes: ^(a) See footnote 10 below for changes to the WRA component for new claimants from April 2017.

- **Benefit Amount**

The income and non-dependent deductions are calculated in the same way as for Income Support and these are subtracted from the applicable amount.

EUROMOD notes on implementation

Many of the parameters related to ESA are the same as those for IS and in UKMOD they are used with the same name. This means that the ESA parameters cannot be changed separately from those of IS. When making policy changes, the user should consider whether this is what they intend. If not, they should add new variables to contain the ESA parameter values.

In reality ESA was introduced gradually from October 2008 and it is fully in place from 2014. It initially applied only to new claimants, while existent claimants still received IB and/or IS (see section 3.2 for more details). During the transition period nobody was supposed to lose from the change to ESA. To take this into account UKMOD first computes IS/ib-JSA entitlement including entitlement on the basis of disability and then it computes ib-ESA. Eligibility to ib-ESA is defined in the model based on whether a person has limited capability to work (has experienced any disability period $ddipd > 0$ or is entitled to any component of DLA), he/she is of working age and not in full-time education or full-time work, and whether benefit unit's capital is less than 16,000

⁹ The support component is one of the additional components that can be included as part of ESA. It is payable only after the assessment phase has ended and if somebody is assessed as having "limited capability for work-related activity".

¹⁰ The work-related activity (WRA) component can be included as part of ESA when somebody is regarded as being in the "work-related activity group" (WRAG) which means that he/she is required to take part in work-focused interviews and possibly undertake some work-related activity. Claimants can be entitled to the WRA component if the assessment phase has ended, they are not assessed as having limited capability for work-related activity (i.e. they are not entitled to the support component), they comply with the requirement to attend work-focused interviews and associated activities.

¹¹ From April 2017 new ESA claimants in the work-related activity group (WRAG) receive per week the same amount as Jobseeker's Allowance claimants (£73.1 per week), in practice abolishing the WRAG component of ESA (which will reduce from £29.05 per week to zero) and the equivalent element of UC. This change will not create immediate losses of benefit income in our base year (2017/18), because only new recipients are affected. Ultimately though, all claims will be assessed under the new, less generous rules in the future.

a year; if there is a partner UKMOD checks also for his/her total hours of work being lower than 24 per week. Because income-based Employment and Support Allowance is payable instead of Income Support based on disability, UKMOD assumes that when somebody is entitled to both IS and ib-ESA, they will receive the higher amount so that no losses are introduced due to implementation assumptions.

EUROMOD notes: UKMOD applies a take-up correction to this benefit by default. The take-up rate is assumed to be the same as for Income Support. See section 3.2.3 for more information.

- *Interactions with other simulated components of the tax benefit system*

IS/ib-JSA, Working Tax Credit and Contributory JSA are counted as income for ib-ESA purposes so they need to be simulated before IS/ib-JSA and ib-ESA. Because of non-dependent deductions and the fact that receipt of either IS/ib-JSA or ib-ESA acts as a passport to maximum HB and CTB, IS/ib-JSA and ib-ESA are simulated before HB and CTB.

Ib-ESA is not taxable.

2.4.9. Housing Benefit (including Local Housing Allowance) (*bho_s*)

Housing Benefit (HB) and Local Housing Allowance (LHA) contribute to the cost of rent for low-income families who are public-sector tenants and private-sector tenants, respectively. There are no conditions regarding working hours: the benefits cover those in work, pensioners, the unemployed, the disabled and the inactive. A number of elements are similar to IS/ ib-ISA such as the personal allowances, premiums and the inclusion of non-dependents in the calculations.

The main change introduced from April 2008 by the LHA is a limitation to the contribution towards the cost of rent for private-sector tenants. This is achieved by:

- limiting the amount of the benefit to a certain percentile point of local market rents for similar tenancies in a Broad Rental Market Area (BRMA), and
- introducing a maximum level to the benefit for private tenants at the UK level by category of dwelling.

The policy was rolled-out between 2008 and 2013.

- *Eligibility*

The main eligibility rules for Housing Benefit and Local Housing Allowance are having low income and being responsible for paying the rent (and other housing costs of tenants). Housing Benefit and LHA are not payable if the property is owned by the partner of the claimant or is Crown property.

EUROMOD note: It is assumed that the person in the household identified in the FRS data as responsible for housing costs (*dhr*) pays the rent and claims the benefit.

The calculation of the Housing Benefit and Local Housing Allowance amount is based on the ‘applicable amount’, the ‘maximum HB/LHA’ and the income of the claimant and their family (benefit) unit.

- *Benefit calculation*

The calculation of the Housing Benefit and Local Housing Allowance amount is based on the ‘applicable amount’, the ‘maximum HB/LHA’ and the income of the claimant and their family (benefit) unit.

‘Applicable amount’ (*i bho prelimAmt*)

The ‘applicable amount’ is calculated in a similar fashion to Income Support, income-based JSA and ESA and Pension Credit, i.e. it consists of the personal allowances and premia. The rates for personal allowances (*i_bho_PersAllow*) and premia are mainly the same as for IS/ib_JSA for claimants under 60. Exceptions, and the rates and premia for those over pension aged are shown in Table 2.20.

Table 2.20 Housing Benefit Allowances and premia (where different from those for IS) (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Family premium	17.45	17.60	17.65	17.85	18.55	19.00	19.40
Disability premium – child	64.19	65.52	65.94	68.04	70.70	72.35	73.80
Enhanced disability premium - child	26.04	26.60	26.67	27.44	28.50	29.15	29.75
Single pensioner between 60 and 64	167.25	173.75	177.10	182.60	189.70	194.20	198.10
Single pensioner 65 or over	181	187.75	191.15	197.10	204.75	209.60	213.85
Pensioner couple both between 60 and 64	255.25	265.20	270.30	278.70	289.50	296.35	302.35
Pensioner couple one or both 65 or over	270.6	280.85	286.05	294.90	306.35	313.60	319.95
Dependent children under 20	66.9	68.27	68.60	70.80	73.55	75.30	76.80

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (1% increase).

Note: These allowances also apply to Council tax Benefit (see below).

‘Maximum HB/LHA’

The ‘maximum Housing Benefit’ consists of ‘eligible rent’ minus deductions for non-dependents. ‘Eligible rent’ is the amount of rent paid as long as it is within the limits specified by the respective local authorities.

EUROMOD notes: In the implementation of UKMOD we do not currently model any local specifications for Housing Benefit for social tenants. Therefore, the amount of rent paid that is reported in the data is taken as ‘eligible rent’ for the Housing Benefit calculations.

From April 2008 HB for social tenants has been separated from LHA payable to private tenants. In 2009 LHA could include actual rent plus £15 per week if this was lower than the *median (50th percentile)* of local reference rent for accommodations with similar number of bedrooms (up to five). The local reference rent is calculated for each Broad Rental Market Area (BRMA).

From 2011, for new claimants:

1. the dwelling categories were restricted to five: 1-bedroom shared accommodation, 1-bedroom self-contained accommodation, 2 bedroom, 3 bedroom and 4 or more bedroom dwellings;
2. the local reference rent was lowered and set at the *30th percentile* of local rents within each BRMA, and;

3. the LHA for each category of dwelling was also capped at a national level maximum distinguishing by number of bedrooms.

From 2012, for all claimants:

1. the £15 per week addition was removed;
2. the local reference rent categories were restricted to four (the 5+ and bedroom categories were amalgamated) plus the LHA for 1-bedroom shared accommodation.

The non-dependent deductions are the same as those operating in Income Support (IS) for housing needs (see above).

EUROMOD notes:

LHA rates in the simulations

LHA comprises a set of rates for the following accommodation types in 2019-2025: 1-bedroom shared accommodation; 1-bedroom self-contained dwellings; 2 bedroom dwellings; 3 bedroom dwellings or 4 bedroom dwellings. Next, we describe how we calculate the LHA rates for each household in the micro-data:

*Calculating the number of eligible rooms in the input micro-data (variable **bhoro**):* The UKMOD input micro-data include the derived household-level variable *bhoro* for the number of eligible rooms under LHA. The variable is derived taking into account the number, age and sex (if applicable) of the dependent children and number of adults in the household.

Defining the average regional LHA rates by accommodation type in the model: LHA rates used in UKMOD are based on average rates for the 12 UK regions. Although rates vary by BRMA, the End User License version of the FRS reports only region of residence. Thus, we map regions to a Local Authority District (LAD)-BRMA table¹² and compute averages by region. LHA rates are defined as *constants* in the model in policy *lha_uk* with the following constant names: *\$LHASHAcc* (for 1-bedroom shared accommodation), *\$LHA1bed* (1-bedroom self-contained dwellings), *\$LHA2bed* (2 bedroom dwellings), *\$LHA3bed* (3 bedroom dwellings) and *\$LHA4bed* (4 bedroom dwellings). *Condition* parameters are then used to set the rates by region.

Having these two pieces of information – number of eligible rooms and LHA rates by accommodation type and region – plus the household's region of residence (variable *drgn1*), we calculate the applicable LHA rate for each household in the micro-data (variable *i_lha30*).¹³

Income of the claimant

The income assessment that is used is very similar to that for Income Support and income-based JSA. It also includes WTC (except the 30 hours element which is disregarded) and CTC. The earnings disregard (*ydg03_s*) for HB is the same as that for IS/ib-JSA except if the following conditions are met:

1. the claimant or partner receive the 30 hours element in WTC;
2. the claimant or partner are aged 25 or over and work 30+ hours;
3. the claimant or partner work 16 hours or more and the claim includes the family premium;

¹² We would like to thank Alex F. Fenton, Research Fellow at the Centre for Analysis of Social Exclusion London School of Economics who kindly made this table available to us.

¹³ In previous versions of the model, the LHA rates were hard-coded in the input micro-data. Defining them as constants within the model makes it straightforward to modify them, e.g. to assess the impact on incomes of changing the LHA rates.

4. the claimant or the partner are working 16 hours or more and the HB claim includes the disability or higher pensioner premium.

In these instances, referred to as ‘full-time’ the earnings disregards (*i_bho_EligEarnsDisregard*) are topped up by £17.10. The earnings disregard for lone parents for the purposes of HB/LHA is £25.¹⁴

There is an additional disregard for childcare costs, designed so that those receiving the childcare element of WTC do not lose any of the payment through the HB means-test. An allowance for childcare costs (*i_bho_EligChildCareDisregard2*) up to £175 per week for one child and up to £300 for two or more children can be deducted from earnings if the claimant is a lone parent and working 16 hours or more per week or if a couple are claiming who are either both working 16 hours or more or one is working 16 hours or more and the other is ‘incapacitated’, i.e. unable to work and in receipt of income replacement disability benefits (such as Incapacity Benefit, Employment and Support Allowance or the disability element of IS).

Tariff income for working-age people is treated as in Income Support, i.e. for every £250 over £6,000, £1 is counted towards the income of a claimant. For those of Pension Credit age £1 is deducted for every £500 capital over £10,000.

For families in receipt of Income Support or Pension Credit Guarantee Credit or Income-based Employment and Support Allowance, HB covers 100% of “eligible rent” (see above), minus non-dependent deductions. Non-dependent deductions work in the same way as for IS and ib_JSA and Pension Credit (see above).

For those with higher incomes (or not in receipt of IS for some reason), the amount of eligible rent (less non-dependent deductions) that is covered by the benefit is 100% if the ‘applicable amount’ is larger than the income. Where the ‘applicable amount’ is bigger than the income, the ‘maximum Housing Benefit’ is tapered away at the rate of 65%.

EUROMOD notes on implementation: While many of the parameters related to HB/LHA are the same as those for IS or Pension Credit (and also Council Tax Benefit – see below) in UKMOD they are specified separately so that they can be varied if this is desired. When making policy changes, the user should consider whether the IS/PC and HB calculations should remain based on (largely) identical income and needs assessments.

UKMOD applies a take-up correction to this benefit by default. See section 3.2.3 for more information.

- *Interactions with other simulated components of the tax-benefit system*

Housing Benefit is simulated after tax credits and PC and IS and ib-ESA as the non-dependent deductions and means calculations require these other benefits to be simulated first. Housing Benefit (and LHA) is not taxable.

2.4.10. Universal Credit (*bsauc_s*)

Universal Credit (UC) is the newer social assistance benefit for working-age people on a low income who are in or out of work. It combines means-tested support for adults under pension age and children into one benefit. Universal Credit replaces most other (‘legacy’) means-tested

¹⁴ There is an additional condition which would result in an earnings disregard, namely getting the 50+ element in Working Tax Credit. However, as that has not been simulated, it is not included in the description.

benefits and tax credits and is a major reform now introduced nationwide for most new claimants from October 2013. In particular, UC replaces the following means-tested benefits and tax credits:

- Income Support (IS);
- Income-based Jobseeker's Allowance (ib-JSA)
- Income-based Employment and Support Allowance (ib-ESA)
- Housing Benefit (HB)
- Child Tax Credit (CTC)
- Working Tax Credit (WTC)

Universal Credit is paid monthly - or twice a month for some people in Scotland. It is a means-tested benefit for people of working-age who are on a low income. It is administered and paid by the *Department for Work and Pensions*.

A benefit cap may be applied if the total amount of certain benefits received exceeds a specified amount and UC can consequently be reduced.

UC can be paid in addition to non-means-tested benefits such as contribution-based JSA and contribution-based ESA, but they count as income when UC is calculated (and the total amount considered for the benefit cap).

- **Eligibility**

Eligibility for Universal Credit is based on satisfy the '**basic conditions**' of being of working-age (over 18 and under the current female state pension age) and not being in education and the '**financial conditions**' of having low income and having savings and other capital under £16,000.

Exceptions to the basic conditions apply for 16-17 years old with limited capabilities for work or unable to work; exemptions also apply for those exempt from looking for work because they hold 'regular and substantial caring responsibilities for a severely disabled person', e.g. carers, or lone parents, or people on unpaid parental leave.

Members of a couple should apply jointly. Both partners must satisfy the above conditions of entitlement and their income and capital is assessed jointly. However, they do not need to meet the basic age condition (i.e. if one of them is over pension age *or* receiving education).

UC is not a contributory benefit and claimants do not need to have paid national insurance contributions to qualify.

EUROMOD notes: In UKMOD eligibility conditions are checked in various steps:

1) Step 1 identifies

- Parents (*i_bsauc_elig1* =1)
- Working-age individuals not in education OR in education but receiving some disability benefits (*i_bsauc_elig2*=1)
- Exceptions: 16/17 years old with disability or parents; over female state pension age with a young partner (*i_bsauc_elig3*=1)

Step 2 combines the above conditions with financial condition (*i_bsauc_elig* =1)

- **Income test**

UC is a means-tested benefit. The amount of UC that can be received depends on the family's circumstances (see eligibility conditions above) and:

- the ‘maximum amount’ of UC - which is made up of a standard allowance and various elements - *and*
- the total amount of income and capital possessed.

EUROMOD notes: Before 16 January 2019, if members of the benefit unit are severely disabled and are transferring from a ‘legacy’ means-tested benefit to UC, they would get allocated a ‘transitional protection’ payment (a top-up to ensure that the UC payment will not be less than the legacy benefits payment). As the transition between legacy and Universal Credit system is randomly allocated, UKMOD does not account for this payment.

• *Benefit amount*

The final amount of Universal Credit received is the result of the following five steps:

1. Calculate maximum amount (basic amount + premiums)
2. Work out earnings and check how much can be ignored
3. Work out other income and how much can be ignored
4. Calculate total income
5. Calculate UC entitlement

Maximum amount

The maximum amount is the figure representing weekly needs, e.g. the amount the claimant and her family are expected to live on each week. It results from the sum of:

- Standard allowance (different amounts for single and for couples, see Table 2.21 for specific amounts)
- + child element for each child, with an increase for disabled and severely disabled children (two-child limit applies here from April 2017)
- + limited capability for work element or work-related activity element (abolished for new claims after April 2017)
- + carer element
- + housing costs element (from April 2018 not covering mortgage)
- + childcare cost element

Table 2.21 presents the benefit’s standard allowance and additional elements rates for fiscal years 2019/20 to 2025/26.

Table 2.21 Universal Credit standard allowance and additional elements rates (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m
UC							
Standard allowance							
Single Claimant under 25	251.77	342.72	344*	265.31	275.60	282.12	287.81

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m
Single Claimant over 25	317.82	409.89	411.51*	344.91	347.90	356.13	363.32
Joint Claimants (couples) both under 25	395.20	488.52	490.60*	416.45	432.61	442.85	451.79
Joint claimants (couples) either over 25	498.89	594.04	596.58*	525.72	546.12	559.04	570.32
UC							
Additional Elements							
Child element (per child/month up to 2) for children born:							
<i>b. after 6/4/2017</i>	231.67	235.83	237.08	244.58	254.07	260.08	265.33
<i>b. before 6/4/2017</i>	277.08	277.08	281.25	281.25	281.25	281.25	277.08
Childcare costs element							
<i>1 child</i>	646.35	646.35	646.35	646.35	646.35	646.35	646.35
<i>2 children</i>	1,108.04	1,108.04	1,108.04	1,108.04	1,108.04	1,108.04	1,108.04
Limited capability for work							
<i>LCW element</i>	126.11	128.25	128.89	132.89	138.05	141.32	144.17
<i>LCWRAG element</i>	336.20	341.92	343.63	354.28	368.03	376.74	384.34
Carer's element	160.20	162.92	163.73	168.81	175.36	179.51	183.13
Disabled Child Addition							
<i>Per child/m in receipt of DLA/PIP</i>	126.11	128.25	128.89	132.89	138.05	141.32	144.17
<i>Per child/m</i>	265.97	272.04	273.52	281.99	292.93	299.86	305.91

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m
<i>Severe Disability</i>							

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. Government increase the UC standard allowances provisionally in 2020/21 <https://www.gov.uk/universal-credit/what-youll-get>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (standard allowances 1% increase; additional elements CPI; childcare costs nominally frozen). * Until September 2021.

Notes: ^(a) Abolished for new claimants from April 2017, but still available for older claimants.

Minimum income floor¹⁵

A self-employed person claiming UC is treated as if they are earning a certain amount. This amount is called the 'minimum income floor' (MIF). If the MIF applies and the person earns below its level in any month, they are treated as earning the MIF. This means that although the person's earnings are lower, their UC payment won't be topped up. If the person is earning more than the MIF, their actual earnings are taken into account instead.

The MIF will only apply if the person is in the 'all-work-related requirements group', i.e. they're expected to work or look for work. The person is not in the all-work-related requirements group if (variable *i_mif_exempt*):

- looking after a child under 3
 - caring for a severely disabled person
 - assessed as having limited capability for work or limited capability for work-related activity
 - in full-time education
 - of pension age
 - a carer for a friend or family members
 - self-employed for less than 12 months
- **EUROMOD note:** Due to data limitations, the following exemption conditions are not taken into account: pregnant and it's not more than 12 weeks until due date; given birth in the last 15 weeks; adopted a child and still in the first 12 months since the adoption; a foster parent of a child under 16; under threat of domestic violence or recently have been.

The MIF depends on the number of working hours one is expected to do (*i_mif_h*):

- 16 hours if a parent of a dependent child aged between 3 and school age (5)
- 25 hours if a parent of a dependent child aged between school age (5) and 13
- 35 hours if a parent of a dependent child aged 13 or plus; or not a parent of a dependent child.

The MIF is then the equivalent of someone working the expected number of hours on the National Minimum Wage for their age group.

¹⁵ Description from Turn2us: <https://www.turn2us.org.uk/Benefit-guides/Universal-Credit-income-and-capital/Self-employed-earnings>; Citizen's Advice: <https://www.citizensadvice.org.uk/benefits/universal-credit/on-universal-credit/how-the-minimum-income-floor-works-if-youre-self-employed/>.

- **EUROMOD note:** in UKMOD, we first calculate the gross MIF (*i_mif_y*) in policy **mif_uk**. To calculate the MIF, net of NIC and income tax, we implement two loops – “nic” and “tin” – placed in the UC policy (**bsauc_uk**). Each loop runs twice through the model. In the 1st run, tax-benefit calculations are carried out taking into account person’s actual earnings. In the 2nd run, the person’s actual earnings are replaced with the gross MIF and NIC and income tax are re-calculated taking into account these notional earnings. The result from these calculations are stored in separate variables (*i_mif_nic*, *i_tin_prelim_rUK*, *i_tin_prelim_Sc*, *i_tin_prelim_Wl*). Thus, we can then derive MIF net of NIC and income tax (*i_mif*).

If in a couple, both the person’s and their partner’s actual net earnings (*i_mif_sey* and *i_mif_py*, respectively) are considered when deciding whether to apply the MIF. The MIF is applied if both these apply:

- the earnings of the self-employed are lower than their individual MIF
 - the combined earnings of the couple are lower than the couple's MIF
- **EUROMOD note:** to calculate both the person’s and their partner’s actual net earnings we take the actual earnings and subtract NIC and income tax, accounting for the share of earnings of total taxable income (up to 100%). For example, if person’s self-employed earnings account only for 50% of taxable income, then we only subtract half the income tax paid. To calculate the couple’s MIF, we take two times the person’s MIF.

Taking into account all these rules, the final self-employed earnings – either actual net earnings or MIF – are derived (*i_mif_nety*). The sum of these plus net earnings from employment are then considered in the assessment of UC entitlement (*i_bsauc_nety*).

In response to the Covid-19 crisis, in 2020 and until July 2021 the MIF was suspended.

- **EUROMOD note:** In the model, this is implemented by setting the MIF (*i_mif*) to 0, which is effectively the same as if the MIF was removed.

Housing costs

Universal Credit is due to replace Housing Benefit and Local Housing Allowance for working-age households. The Housing Element included into Universal Credit is calculated in a similar manner as for the old Housing Benefit and it is included in the calculation of the maximum UC amount.

Income assessment

One claim for UC is made per benefit unit and the entitlement depends on the income of all the members in the benefits unit as well as the composition of the household, i.e. whether there are adult-non-dependents present in the household. The income of other people in the household is not taken into account except via the non-dependent deduction (see below).

For the calculation of UC household income is distinguished into two categories:

- 1) Earned income
- 2) Unearned income.

In the calculation of what counts as income for Universal Credit, some earned income is ignored. This is known as the work allowance (ignored earned income):

Eligibility:

- People responsible for a child *OR*
- People with limited capability to work

Amount:

- Depends on whether UC includes housing costs element
- Earned income exceeding work allowance reduces UC maximum amount by 65p per extra £1 (taper 63% from 2017 and 55% from 2022)
- Only one allowance applies per family

Income is defined by *il_UC_means_earned* and *il_UC_means_unearned*. The first includes net income from employment and self-employment and all other main current income sources **except** investment income and other benefits (Council Tax Reduction, Attendance Allowance and Disability Living Allowance). *il_UC_means_unearned* includes all other main current income sources such as Carer's Allowance, contributory JSA and ESA, pensions, property income, student loan, etc.

Some earnings and other income are disregarded (*ydg02_s*). These are £20 per week for a lone parent; £20 for a disabled person where disability is signalled by receipt of certain benefits (see above on entitlement to disability premium for legacy benefits) within the family unit; £10 for couples not qualifying on disability grounds and £5 for others. In addition, small amounts (£10) of War Pension and maintenance payments are disregarded. Child Benefit and Personal Independence Payments are completely disregarded, while occupational and private pensions count in full. Income from investment income is not included directly in the UC family income assessment. Instead, a tariff income (£1 per week for every £250 capital) is calculated on financial capital between £6,000 and the upper threshold £16,000 (*yivi02_s*).

Universal Credit's allowance earnings disregards and capital limits (per week) are shown in Table 2.22.

Table 2.22 Universal Credit work allowance rates (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m	£ /m
UC work allowance							
With help for housing costs	287.00	292.00	293.00	344	357	366	373
Without help housing costs	503.00	512.00	515	573	595	609	622
Income taper	63%	63%	63%	55%	55%	55%	55%
	£	£	£	£	£	£	£
Capital lower limit	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Capital upper limit	16,000	16,000	16,000	16,000	16,000	16,000	16,000

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23 and <https://www.gov.uk/benefit-cap>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

Final award

The award is calculated by adding together the personal allowances, premia and disregards and then subtracting any income and non-dependent deductions. In practice, the final amount of Universal credit is calculated as follows:

UC final = UC max amount - unearned income - Income taper% * (earned income - work allowance)

- **Interaction with taxes and other benefits**

Claimants cannot get PC and UC at the same time. Single people must be under the qualifying age for PC (the same as the age at which State Pension is received). Until May 2019, couples with only one partner who has reached State Pension age ('mixed-age couple') could choose between claiming UC and PC. From May 2019, a mixed-age couple can only choose to claim PC instead of UC. UC can be paid in addition to non-means-tested benefits such as contribution-based JSA and contribution-based ESA, but they count as income when UC is calculated (and the total amount considered for the benefit cap).

Transition from Legacy Benefits to Universal Credit

As Universal Credit gets rolled out to all claimants by September 2024, simulations of the 'legacy benefits' and the UC is done simultaneously, and claimants are allocated randomly to one of the two benefit system using DWP estimations and OBR forecasts from the March 2021 Welfare trends report (WTR) as shown in the table below. From 2020 we utilise the pre-virus counterfactual caseloads because, as it will be explained in 2.8, new UC recipients due to COVID-19 shocks are always allocated to UC (and not to Legacy Benefits).

Table 2.23 Transition between Legacy Benefits and Universal Credit

	2019- 20	2020- 21	2021- 22	2022- 23	2023- 24	2024- 25	2025- 26
OBR WTR (n. of people in millions)	2.21	3.30	3.5	3.8	4.2	4.9	4.9
\$UCtransition (share of people)	0.36	0.45	0.54	0.61	0.68	0.77	0.89

Source: Office for Budget Responsibility March 2021 Welfare trends report: charts C3.2 and C3.3.

The transferring process between legacy benefit system and UC system can be controlled by the user in two ways: 1) using the pre-set extension "*Full Legacy Benefits Assumption*" (LBA) from the run window of EUROMOD. Switching it "on" has the effect of setting the parameter $\$UCtransition = 0$. Alternatively, one can use the extension "*Full Universal Credit Assumption*" (UCA) (setting it to *on*), which sets the parameter $\$UCtransition = 1$ and assumes UC system is fully in place. 2) The user can also change the speed of transition between legacy benefits and Universal Credit by changing the specific values assigned to the parameter $\$UCtransition$. Future improvements may account for the fact that roll-out might be different for different family types or different receivers of legacy benefits.

EUROMOD Notes: As UC gets rolled out to all claimants by September 2024, simulations of the 'legacy benefits' and UC are overestimated at times and underestimated for others. Users are

advised to consider the detailed sections in this report on further information about the assumptions and estimation quality for the duration of the transition years. Users should also note that Universal Credit sanctions are not implemented in this release – these could further impact the total income received and the poverty rates estimated in this report.

The two-child limit introduced from April 2017 implemented in UKMOD, assumes it applies to all families with children born after April 2017. In 2019 it applies to children aged 2 or younger, in 2020 it affects families with children aged 3 or younger and so on.

UKMOD applies a take-up correction to UC by default. UC take-up is implemented maintaining consistency with individual behaviours under legacy benefits. That is: 1) Who takes-up legacy benefits, takes-up UC if eligible; 2) Who does not take-up legacy benefits, does not take-up UC even if eligible; 3) If not eligible for legacy benefits, but eligible for UC, UKMOD applies probability of take-up as for Income Support for families without children. See section 3.2.3 for more information. This means that higher take-up rates and gains may arise for people who were not previously claiming all benefits they may have been entitled to.

2.4.11. Council Tax Reduction (*bmu_s*)

Council Tax is a local tax covering the costs of schools, social housing and environmental costs at a local level. The amount of Council Tax depends on the size and value of the house and the number of occupiers. Council Tax is set by local authorities and the amounts thus vary considerably between areas. The structure of Council Tax Benefit (CTB) is very similar to that of Housing Benefit. Instead of rent, Council Tax is the element that is rebated. In addition to CTB, there are a number of other reductions to Council Tax that are not simulated and are already incorporated in the Council Tax data in the database. These are: exemptions for particular groups of people, i.e. specified type of impairment or disability as well as a reduction of 25% if the dwelling is occupied by a single adult.

There are in fact two alternative forms of CTB. One is based on the council tax liability, needs and resources of a benefit unit. The other is the “Second Adult Rebate (SAR)”. Only the higher of the two benefits is paid. The SAR is allowable even when the capital limit is exceeded and is payable when there is more than one adult but only one non-exempt adult.

- **EUROMOD notes:** In most cases the main CTB is worth more, so UKMOD ignores SAR cases and does not model them.

From 2013 Council Tax Reduction has been made the responsibility of individual local authorities. It is therefore likely that as time goes by the nature of the scheme will vary considerably across local area and may not operate at all in some. In particular, Scotland and Wales maintained the 2012 national scheme with parameters uprated in line with those for IS and HB. In England we currently assume that the 2012 national scheme continues to apply in 2013 and following years, with parameters uprated in line with those for IS and HB. Because of the reduced local authorities’ budget for the benefit, we assume a general reduction of 10.6%.

- **Benefit amount**

CTB is calculated in the same way as HB except: the taper is 20% and the non-dependent deductions are different (shown in Table 2.24).

Table 2.24 Non-dependent deductions for Council Tax Benefit (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26

	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Deduction applying if	11.19	12.20	12.20	12.54	13.03	13.34	13.61
income is above	445.37	447.40	447.40	459.77	477.61	488.91	489.78
Deduction applying if	9.33	10.20	10.20	10.48	10.89	11.15	11.38
income is above	357.19	360.10	360.10	370.05	384.41	393.51	401.45
Deduction applying if	7.39	8.10	8.10	8.32	8.64	8.84	9.02
income is above	206.86	207.70	207.70	213.44	221.72	226.97	231.55
Deduction otherwise	3.74	4.00	4.00	4.11	4.27	4.37	4.46

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI). Parameters for 2013/14 onward are imputed based on those for Income Support and Housing benefit (see text).

EUROMOD notes: The parameter sheets for IS, HB and CTB are independently specified. When making policy changes, the user should consider whether the three sets of calculations should remain based on (largely) identical income and needs assessments. UKMOD applies a take-up correction to this benefit by default: if the family receives income-based ESA, IS, PC or UC, CTR is taken up by all eligible (100% take-up). But if the family does not receive any of these benefits, CTR is subject to a take-up rate lower than 100% depending on tenure type. See section 3.2.3 for more information.

2.4.12. Benefit cap (*brd_s* and *brduc_s*)

From 15 April 2013, a “benefit cap” may limit the total amount payable to a benefit unit from certain specific benefits. The benefit cap is applied by reducing Housing Benefit (HB) (or Universal Credit (UC) after October 2013). If the benefit unit is not entitled to HB (or UC), the benefit cap does not apply.

- **Cap liability**

The benefit cap only applies if:

1. the benefit unit receives HB or UC for people below the qualifying age for PC, and
2. the total amount of certain ‘specified benefits’ received is above a certain level.

Exceptions for which the benefit cap does not apply when applied through HB:

- Benefit unit receiving Working Tax Credit or earning more than a minimum amount (the equivalent of 16 hours of work at the National Living Wage) if receiving UC;
- Benefit unit not receiving IS, ib-JSA or ib-ESA;
- People who have recently stopped working: a “grace period” of 39 weeks after stopping work is allowed to people who were formerly in work for at least 50 weeks out of the 52 weeks before the last day of work and, in the 50 weeks, the person in work was not entitled to IS, JSA or ESA;
- People entitled to any of the following disability benefits: the ESA support component, people receiving Attendance Allowance, Disability Living Allowance (or PIP), Industrial Injuries Disablement Benefit, Reduced Earnings Allowance or Retirement Allowance, War Pension.

- *Specified benefits to which the cap applies*

If the cap is applied through HB: the specified benefits to be capped are: IS, JSA, ESA (if neither the claimant or his/her partner are in the support group), HB, Bereavement Allowance, Carer's Allowance, Child Benefit, Guardian's Allowance, CTC, Incapacity Benefit, Maternity Allowance, Severe Disability Allowance, Widowed Allowance, Widow's Pension.

- *Amount*

The cap applies when yearly entitlement to certain specified benefits exceeds a threshold of £26,000 a year for couples and lone parents or £18,200 a year for singles. From 2017 different caps apply to London and out of London areas (see below).

Table 2.25 Benefit cap rates (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Greater London:							
Couples (with and without children) and single with children	23,000	23,000	23,000	23,000	23,000	23,000	23,000
Single without children	15,410	15,410	15,410	15,410	15,410	15,410	15,410
Rest of the UK:							
Couples (with and without children) and single with children	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Single without children	13,400	13,400	13,400	13,400	13,400	13,400	13,400
Min Earnings	569	604	617	617	641	656	669

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23 and <https://www.gov.uk/benefit-cap>. 2023/24 to 2025/26 are projections based on nominally frozen rate.

EUROMOD notes: In UKMOD the benefit cap is not implemented as a reduction to HB or UC. The variables *brd_s* (amount of benefit cap on HB) and *brduc_s* (amount of benefit cap on UC) are subtracted from the means-tested income list (*ils_benmt*) directly.

2.4.13. Maternity Allowance (*bmana*, *bmanc_s*)

This is a non means-tested benefit paid weekly for pregnant women and new mothers who cannot claim Statutory Maternity Pay. It is intended to help women taking time off work both before and after the date the baby is due.

- *Definitions*

A fixed amount is paid to pregnant women or new mothers either for 39 weeks or 14 weeks depending on eligibility.

- *Eligibility conditions*

1. Pregnant women or new mothers and
2. Not eligible for Statutory Maternity Pay.

The benefit is paid for 39 weeks to women who in the 66 weeks before the baby is born, have been:

- employed for at least 26 weeks or
- self-employed and have paid National Insurance contributions (Class 2) for at least 26 weeks (not necessarily consecutive);
- earning (or classed as earning) £30 a week or more in at least 13 weeks out of the 26 weeks - the weeks do not have to be consecutive.

Women can still qualify if they have recently stopped working. It does not matter if they had different jobs or periods of unemployment.

The benefit is paid for 14 weeks to women who, in the 66 weeks before the baby is born, have been:

- not employed or self-employed, but
- who provided unpaid help to spouse or partner in their self-employed business, and
- spouse or partner pays Class 2 National Insurance contributions.

• ***Income test***

No.

• ***Benefit duration***

Duration of the benefit can be either 39 weeks or 14 weeks. This period normally starts at the beginning of the 11th week before the expected date of birth of the child. The latest date it can start is the day after the birth.

• ***Benefit amount***

The amount equals either 90% of the average weekly earnings or £145.18 a week, whichever is less. For people qualifying because they help with their spouse's self-employment, MA is only payable during the 14-week qualifying period. The amount received is £27 a week.

The benefit amounts by duration for the Maternity Allowance over the policy years are laid out in Table 2.26 below.

Table 2.26 Maternity Allowance amounts by duration conditions (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
% of average weekly earnings	90%	90%	90%	90%	90%	90%	90%
Maximum amount for employees for - 39 weeks	148.68	151.20	151.97	156.66	162.85	167.73	171.35
- Amount payable to self-	27	27	27	27	27	27	27

employed who do not fulfilled the NIC requirement (39 weeks)								
Non- working people helping in partner's self- employment business	27	27	27	27	27	27	27	27

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (average annual earnings growth).

- **Interactions with other benefits and taxes/SIC**

The Maternity Allowance is not taxable. It does not affect entitlement to tax credits but it may affect the amount of other benefits such as: Council Tax Reduction, Housing Benefit, Employment and Support Allowance (ESA), Income Support, Jobseeker's Allowance (JSA), bereavement benefits, Carer's Allowance, Universal Credit. Maternity Allowance is limited by the benefit cap when received in combination with Housing Benefit or Universal Credit.

- **Take up**

Nearly all mothers take maternity leave.

2.4.14. Statutory Maternity Pay (*bmaer*, *bmact_s*)

Statutory Maternity Pay (SMP) is a weekly payment made by employers to their employees or former employees. Employers pay SMP to those women who have been in their employment prior to becoming pregnant and during their pregnancy.

- **Definitions**

This is a benefit for mothers for the birth of a baby for up to 39 weeks. The first six weeks are paid at 90% of the mother's pay, and the next 33 weeks are paid at a flat rate of £156.66 in 2022.

- **Eligibility conditions**

There are two basic rules to qualify for SMP:

1. **the continuous employment rule:** the mother must have been employed for a continuous period of at least 26 weeks into the qualifying week (which is the 15th week before the week in which the baby is due). This period must include at least one day employment in the qualifying week. However, there are some circumstances when breaks in employment can be disregarded.
2. **the earnings rule:** average gross weekly earnings must be at least equal to the lower earnings limit (LEL) for National Insurance (NI) purposes. The lower earnings limit is the point at which one starts to be treated as if she has paid NI contributions (although she will not actually have to pay NI contributions until her earnings reach a higher point called the primary earnings threshold (PT)).

- **Income test**

Not applicable for this benefit.

- **Benefit duration**

SMP can be paid for a maximum period of 39 weeks. SMP can be paid from 11 weeks before the week in which the baby is due, but only if the mother stops work before then. If she continues working on or after the 11th week before the week the baby is due, she can choose the day she wants SMP to start.

The qualifying week is the 15th week before the week in which the baby is due. The definition of a week for the qualifying week is a period of 7 days that begins at midnight between Saturday and Sunday.

- **Benefit amount**

The amount of SMP depends on how much the recipient earns. The first 6 weeks of SMP are earnings-related and the mother will get a weekly rate equal to 90% of her average weekly earnings (there is no upper limit). The remaining 33 weeks are paid at the weekly standard rate SMP of £156.66 (in 2022/23) or the earnings-related rate (90% of her average weekly earnings) if this is less than standard rate SMP.

No additional SMP is payable for multiple births or adoptions.

Table 2.27 Lower Earnings Limits for National Insurance contributions (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2019/20	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
Lower Earnings Limit (LEL) (£ per week)	118	120	120	123	128	132	135
SMP amount as % of earnings	90%	90%	90%	90%	90%	90%	90%
SMP weekly standard rate	148.68	151.20	151.97	156.66	162.85	167.73	171.35

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/23. HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (average annual earnings growth).

- **Subject to taxes/SIC**

SMP is treated as earnings and the employer will apply any deductions (such as Income Tax, NI contributions, pensions' contributions) that are due.

EUROMOD notes: In UKMOD the benefit duration is modelled as being received 11 weeks before birth and 28 weeks after birth.

2.4.15. Statutory Paternity Pay (*bpact_s*)

- ***Definitions***

A child's male legal guardian is entitled to 2 weeks paid leave after birth of child. Paternity leave can be taken within 56 days (8 weeks) of the actual date of birth of the child, or if the child is born early, within the period from the actual date of birth up to 56 days after the first day of the week in which the birth was expected.

- ***Eligibility conditions***

Continuously employed by the same employer for at least 26 weeks ending with the week in which they notified adoption of child or week ending with 15th week before the baby is due and earns at least the lower earnings limit (LEL) for National Insurance (NI) purposes.

- ***Income test***

Not applicable for this benefit.

- ***Benefit duration***

2 weeks

- ***Benefit amount***

Same as for Statutory Maternity Pay: SMP weekly standard rate or 90% of a person's average earnings if less than SMP weekly standard rate.

- ***Subject to taxes/SIC***

Subject to taxation. Standard taxation rules apply.

2.4.16. Sure Start Maternity Grant (*bmamt_s*)

- ***Definitions***

The Sure Start Maternity Grant is a one-off payment to help towards the costs of having a child.

- ***Eligibility conditions***

Usually a woman qualifies for the grant if all of the following apply:

- She is expecting her first child, or she is expecting a multiple birth (such as twins) and has children already.
- She or her partner already receives at least one of the following benefits: Income Support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance, Pension Credit, Child Tax Credit, Working Tax Credit that includes a disability or severe disability element, Universal Credit.
- She must claim the grant within 11 weeks of the baby's due date or within 6 months after the baby's birth.

- ***Income test***

Not applicable for this benefit.

- ***Benefit amount***

The amount a one-off payment of £500.

- *Subject to taxes/SIC*

Sure Start Maternity Grant is not taxable and it is disregarded as income or capital for means-tested benefits or tax credits; and does not affect entitlement to any non-means-tested benefits. Sure Start Maternity Grants payment is not affected by the benefit cap.

EUROMOD notes: In Scotland, from late 2018 the Sure Maternity Grant has been replaced (and will be extended) by the Best Start Grant (see below).

2.4.17. Best Start Grant (*bmascm_t_s*)

The Best Start Grant is a package of three payments. It provides parents or carers who get certain benefits or tax credits with financial support during the early years of a child's life:

- **the Pregnancy and Baby Payment** - a one off payment of £600 for a first child or £300 for a second or subsequent child. It is to help with the costs of pregnancy or having a baby such as maternity clothes, a cot or a pram
- **the Early Learning Payment** - a one-off payment of £250 to help with the costs of having a pre-school child for example the costs of day trips, books or toys for home learning
- **the School Age Payment** – a one-off payment of £250 to help with the costs of having a child of school starting age, such as the costs of a new school bag, to pay for school trips or after school activities.

- *Eligibility*

Parents can apply for the Pregnancy and Baby Payment from 24 weeks pregnant up to the day the baby is 6 months old. This goes up to 1 year old for adopted children.

Parents with children between 2 and 3 years and 6 months old are eligible for Early Learning Payment.

Parents of children starting school are eligible for School Age Payment. Eligibility depends on the date of birth of the child (see table below):

Table 2.28 Best Start Grant Eligibility criteria – baby age (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
Child's date of birth	March 2014 - Feb 2015	Mar 2015 – Feb 2016	Mar 2016 – Feb 2017	Mar 2017 – Feb 2018	Mar 2018 – Feb 2019	Mar 2019 – Feb 2020	Mar 2020 – Feb 2021
Child age	4.3 - 5.3 y.o.	4.3 – 5.3 y.o.	4.3 – 5.3 y.o	4.3 – 5.3 y.o	4.3 – 5.3 y.o	4.3 – 5.3 y.o	4.3 – 5.3 y.o

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 to 2022/2023. 2023/24 to 2025/26 are projections based on the statutory indexation rate.

- **Income test**

There is no income test for these benefits, but people can apply if they are receiving one of the following means-tested benefits:

- Child Tax Credit
- Universal Credit
- Income Support
- Pension Credit
- Working Tax Credit
- Housing Benefit
- Income-based Jobseekers Allowance (JSA), not 'contribution based' JSA
- Income-related Employment and Support Allowance (ESA), not 'contribution based' ESA

- **Benefit duration**

One off payment.

- **Benefit amount**

The benefit amount is outlined in Table 2.29.

Table 2.29 Best Start Grant amounts (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
Pregnancy and Baby payment							
First child	600	600	600	600	600	600	600
Other children	300	300	300	300	300	300	300
Early learning payment	250	250	250	250	250	250	250
School age payment	250	250	250	250	250	250	250

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2019/20 and 2022/23. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or past trends (nominally frozen).

- **Subject to taxes/SIC**

Best Start Grants are not taxable. They are not counted as income or capital for means-tested benefits or tax credits. The Best Start Grants payments are not affected by the benefit cap.

2.4.18. Scottish Child Payment (*bchmt_s*)

The Scottish Child Payment is provided by the Scottish Government to families with children living in Scotland. The first benefit payment was made in February 2021.

- **Eligibility**

To receive the benefit, families should be in receipt of Universal Credit or one of the legacy benefits: Child Tax Credit, Working Tax Credit, Income Support, income-based Jobseeker's Allowance, income-related Employment and Support Allowance or Pension Credit.

The first benefit payment was paid in February 2021 for eligible families with children up to the age of 5. In December 2022, benefit provision will be expanded to families with children up to the age of 15.

- **Benefit duration**

Once every four weeks.

- **Benefit amount**

The benefit amount is outlined in Table 2.30.

Table 2.30 Scottish Child Payment amounts (2021-2025)

As of...	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2021/22	2022/23	2023/24	2024/25	2025/26
£ per week					
Per child	10	20	20.80	21.30	21.75

Source: Scottish Fiscal Commission: Supplementary Costing – Scottish Child Payment, 8 September 2020: <https://www.fiscalcommission.scot/forecast/supplementary-costing-scottish-child-payment/>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or past trends (CPI).

The Scottish Fiscal Commission assumes a benefit take-up rate lower than 100% which is also accounted for in the benefit calculations in UKMOD (see section 3.2.3).

- **Subject to taxes/SIC**

The Scottish Child Payment is not taxable; does not count as income or capital for means-tested benefits or tax credits; and is not affected by the benefit cap.

2.4.19. Scottish Child Payment Bridging Payments (*bchmt01_s*)

The Scottish Child Payment Bridging Payments bring together the Covid hardship payments and the Family Pandemic Payment into one payment, made 4 times a year. The benefit will be paid in 2021 and 2022. For elements not specified below, it follows the Scottish Child Payment rules and assumptions.

- **Eligibility**

To receive the benefit, families should meet the eligibility criteria for free school meals. Families can't get these payments if children are in early learning and childcare (nursery). A child can get free lunches in school if the family gets either:

- Universal Credit (where monthly earned income is not more than £625)
- Income Support
- income-based Job Seeker's Allowance
- income-based Employment and Support Allowance
- Child Tax Credit, but not Working Tax Credit, and its income is less than £16,480/16,105
- both Child Tax Credit and Working Tax Credit and have an income of up to £7,500

- **Benefit amount**

The payments add up to £540 per year

2.4.20. Scottish Child Winter Heating Assistance (*bchht_s*)

The Scottish Child Winter Heating Assistance is provided by the Scottish Government to children and young people in Scotland receiving the highest rate care component of Disability Living Allowance. The benefit is paid out on an individual basis.

- **Eligibility**

Child and young people aged under 18 years who receive the highest rate care component of Disability Living Allowance (DLA). The first benefit payment was made in winter 2020.

- **Income test**

There is no income test for this benefit.

- **Benefit duration**

One-off payment.

- **Benefit amount**

The benefit amount is outlined in Table 2.31.

Table 2.31 Scottish Child Winter Heating Assistance amounts (2020-2025)

As of...	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year					
Per child/young person	200	200	200	200	200	200

Source: Scottish Fiscal Commission: Supplementary Costing – Child Winter Heating Assistance – August 2020: <https://www.fiscalcommission.scot/forecast/supplementary-costing-child-winter-heating-assistance/>. 2022/23 to 2025/26 are projections based on the statutory indexation rate if known or past trends (nominally frozen).

- **Subject to taxes/SIC**

The Scottish Child Winter Heating Assistance is not taxable; does not count as income or capital for means-tested benefits or tax credits; and is not affected by the benefit cap.

EUROMOD notes: The FRS interviews adults aged 16 and over, except those aged 16 to 19 who are unmarried and still in full-time education or unwaged training. Thus, receipt of DLA is reported by adults only. To try to distinguish in the micro-data if a DLA payment was made to a child/young person or an adult, we allocate them (in a temporary variable) to the person (or persons) declaring being a disabled person (*ddi*=1). When there is nobody with a disability, we keep the original allocation (e.g. in FRS 2018 this happened for around 1/2 of the benefit units with DLA in Scotland). As a result, we underestimate the number of eligible children and the amount of benefit spending on the Scottish Child Winter Heating Assistance.

2.5. Social contributions

2.5.1. Employee social insurance contributions (*tscee_s*)

- *Liability for contributions*

Individuals between the ages of 16 and pension age are subject to Class 1 contributions on their gross earnings (*il_empNlearns*).

- *Income base used to calculate contributions*

The amount of so-called National Insurance contributions depends on weekly earnings from employment (*yem*) as well as earnings replacement benefits paid by the employer, namely, Statutory Sick Pay (*bhlwk*) and Statutory Maternity Pay (*bmana*).

Contributions are paid on earnings between a weekly lower limit, called the Primary Threshold (PT) and Upper Earnings Limit (UEL). Earnings above the UEL are subject to a lower rate (*i_NIclass1_empl_aboveUEL*).

- *Rates and thresholds*

The rate applying to earnings between PT and UEL varies according to whether or not the employee is contracted-out of the State-Earnings-Related-Pension-Scheme (*lim=0*). If so, the rate paid is lower. Table 2.32 shows the thresholds (gross earnings limits) and rates.¹⁶

From April 2016 contracted-out employees pay the standard rate of National Insurance contributions and no longer get the 1.4% National Insurance rebate.

Table 2.32 Gross earnings limits and rates for Class 1 (employee) National Insurance Contributions (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week	£ per week
Gross earnings limits:							
Primary Threshold (PT)	166	183	184	190	198	203	208
Upper Earnings Limit (UEL)	962	962	967	967	967	967	967
Rates:							
Between PT and UEL:							
Non contracted out	12%	12%	12%	12%	12%	12%	12%
Contracted out	12%	12%	12%	12%	12%	12%	12%
Above UEL	2%	2%	2%	2%	2%	2%	2%

¹⁶ Women who are married or divorced and opted out before 1977 pay a lower rate of 5.85% (in 2013) applying to earnings between PT and UEL. However, since this can only apply to married/divorced women aged 50 or more, and only to those continuously in the labour force since 1977 the numbers affected are now small and we do not identify these cases or simulate this lower rate of contribution.

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>. 2022/23 to 2025/26 are projections based on the statutory indexation rate (CPI).

EUROMOD notes: Whether the employee is contracted out or not is not observed as such in the data; this variable has been imputed, according to reported earnings and amount of contribution.

- **Compulsory private pension contributions**

For those who are contracted out of the State Pension scheme, the rate of their occupational private pension contribution is imputed as a flat rate in the input data (*tpceepx= yem/contributions*). The rate is then applied to uprated (or otherwise adjusted) earnings in UKMOD and the resulting private contribution (*tpcee_s*) is, by default, included within the employees social insurance contribution (in EUROMOD the standard output income list *ils_sicee*).

2.5.2. Self-employed social insurance contributions, Class 2 and Class 4 (*tscse_s*)

- **Liability for contributions**

People with income from self-employment (*yse*) may be subject to Class 2 and Class 4 contributions.

- **Rates and thresholds**

Class 2 is a flat weekly amount paid by those whose yearly profit/self-employment income (*yse*) exceeds the so-called ‘Small Earnings Exception’ – see Table 2.33 for the amounts and level of the exception.

Table 2.33 Rates for self-employment Class 2 National Insurance contributions (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Flat rate (£ per week)	3.00	3.05	3.05	3.15	3.25	3.35	3.40
Small Earnings Exception (£ per year)	6,365	6,475	6,515	6,725	6,990	7,160	7,310

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>. 2022/23 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

Class 4 contributions are paid on self-employment income (*yse*) between a Lower Profits Limit (LPL) and an Upper Profits Limit (UPL) (*i_Niclass4_onlyselfempl_bwLPLandUPL*) with a lower rate applying on income above the upper limit (*i_Niclass4_onlyselfempl_aboveUPL*) – see Table 2.34.

Table 2.34 Upper and Lower Profit Limits for self-employment Class 4 National Insurance contributions (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Lower Profits Limit(LPL) (£ per year)	8,632	9,500	9,568	9,880	10,263	10,506	10,718
Upper Profits Limit(UPL) (£ per year)	50,000	50,000	50,270	50,270	50,270	50,270	50,270

Rate between LPL and UPL	9%	9%	9%	9%	9%	9%	9%
Rate above UPL	2%	2%	2%	2%	2%	2%	2%

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>. 2022/23 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

Maximum contributions for those with income from self-employment and from employment

Class 4 contributions are subject to an annual maximum for people who have both employment (*yem*) and self-employment earnings (*yse*). It is calculated as follows:

1. First the Class 2 and Class 4 NICs maximum is calculated by taking the maximum amount of Class 4 NICs payable on profits between the UPL and the LPL and adding 53 times the weekly Class 2 NICs at the rate in force for the year in question (*i_combined_bwLPLandUPL*);
2. Then, from that combined figure any Class 1 and Class 2 NICs that have been paid are deducted (*i_combined_net*);
3. This gives the maximum amount of Class 4 NICs that the contributor is liable to pay at the main rate (*i_selfempl_income_bwLPLandUPL*);
4. Then the amount of profits that would be needed to pay that amount of Class 4 NICs is calculated and this is deducted from the contributor's total profits;
5. If that figure is positive it represents the amount of profits on which Class 4 NICs at 2% are payable (*i_selfempl_income_addrate*).

The calculation then allocates every Class 4 NICs contributor who is subject to a Class 4 NICs annual maximum into one of three categories:

1. those who are due to pay:
 - o Class 4 NICs at a rate of 9 % only (*i_NI2class4_selfempl_aboveLPL*)
2. those who are due to pay:
 - o a mixture of Class 4 NICs at rate of 9% and 1% (*i_NI1class4_selfempl_addrate*) and
3. those who are due to pay:
 - o Class 4 NICs at a rate of 1% only
(above the UEL = *i_NI3class4_selfempl_aboveUPL* and below the UEL = *i_NI3class4_selfempl_belowUPL*).

The final calculation for National Insurance contributions on income from self-employment then adds Class 2 and Class 4 contributions together (*tscse_s*).

2.5.3. Employers' social insurance contributions (*tscer_s*)

• Liability for contributions

Employers have to pay secondary Class 1 National Insurance contributions for each of their employees if their earnings are above the Secondary Threshold and if the employees are aged 16 years or older.

- **Thresholds and rates**

Contributions are paid on all earnings above the ‘Secondary Threshold’. The rate on earnings above the Upper Earnings Limit (UEL), which is the same as that for Class 1 employee contributions, is the same rate for all employees. Between the Secondary Threshold and the UEL it is lower for contracted-out employees’ earnings (*lim=2*) before April 2016. There is no upper ceiling on contributions from employers.

Table 2.35 shows the thresholds and rates of employers’ social insurance contributions.

Table 2.35 Thresholds and rates of employers’ social insurance contributions (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
Secondary Threshold (ST) £/week	166	169	170	175	181	190	197
Non contracted out rate above ST	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%
Contracted out rate between ST and UEL	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%
Contracted out rate above UEL	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%	13.8%

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (RPI)

2.5.4. Health and Social Health Care Levy (*tehl_s, tsehl_s, terhl_s*)

In 2022, the Health and Social Care Levy (HSCL) will be implemented. This will affect employers, employees and the self-employed who pay National Insurance contributions and individuals that would pay were it not for pension age restrictions (Class 2 and 3 contributions will not be affected). In 2022, the HSCL will be a 1.25 percentage points increase to the rates of Class 1, 1A, 1B and 4 contributions for 2022, while from 2023 it will be a separate contribution. Individuals above State Pension age will not be liable in 2022 but they will be thereafter. The HSCL will be subject to the same reliefs, thresholds and requirements of National Insurance contributions.

Accordingly, in 2022, the HSCL is implemented as a 1.25 percentage point increase for people up to the State Pension age to their simulated employee Class 1, self-employee Class 4 and employer secondary Class 1 NICs. From 2023, the liability, income base and first thresholds for the HSCL are the same as for the aforementioned NICs, while the rate is 1.25 percent.

2.6. Personal Income Tax (*tin_s*)

2.6.1. Tax Unit

The UK Income Tax system is an individual system. The incomes of each member of a married couple are taxed independently. Two exceptions have been introduced: in 2013, the “high-income child benefit charge” for which individual and partner’s incomes are taken into account together in order to determine liability (see section 2.4.4 for more details); in 2015, the “transferable personal tax allowance for married couples” (see 2.6.5) which allows a spouse or civil partner who is not liable to Income Tax above the basic rate to transfer up to £1,000 of their unused Personal Tax Allowance to their spouse or civil partner, provided that the recipient of the transfer is also not liable to Income Tax above the basic rate.

2.6.2. Exemptions

The following income sources are non-taxable: Disability Living Allowance, Attendance Allowance, lump sum Bereavement Payments, Pension Credit, Winter Fuel Allowance, Housing Benefit, income-base Employment and Support Allowance, Child Benefit (see section 2.4.4 for exceptions), Guardian's Allowance, Statutory Maternity Pay, Industrial Injuries Benefit, Severe Disability Allowance, War Widow's Pension, Council Tax Benefit, Income Support, Child and Working Tax Credits, maintenance payment, student payments and loans, and training allowance.

2.6.3. Tax allowances (*tinta_s*)

There is a basic tax-free **Personal Allowance** (*i_tinta_PersAllow*).¹⁷ There are also additional “**Age allowances**” for older individuals which are income-tested. Thus, if an older taxpayer has annual taxable income over a threshold (£27,000 in 2014) the additional age-related allowance is reduced using a 50% taper until the level of the standard Personal Allowance is reached (*i_tinta_IncExcess1*) – see Table 2.36.

From 2013 the age allowances will be phased out by restricting them to existing beneficiaries by increasing the age thresholds by one year each year.

From 2010 an income limit for Personal Allowances was introduced. For each £2 of taxable income above £100,000 the Personal Allowance is reduced by £1 until the entire Personal Allowance is abated to zero.

The “married couple's age allowance” is also included in the income testing and abatement referred to above. However, as this is strictly a tax credit it is described in section 2.6.7 below.

Table 2.36 Tax allowances (2019-2025)

As of... Fiscal year:	Jun-19 2019/20	Jun-20 2020/21	Jun-21 2021/22	Jun-22 2022/23	Jun-23 2023/24	Jun-24 2024/25	Jun-25 2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
Personal Allowance							
under X years old	12,500	12,500	12,570	12,570	12,570	12,570	12,570
X-Y years old	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Y years old or over[a]	n/a	n/a	n/a	n/a	n/a	n/a	n/a
X	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Y	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Income limit for age-related allowances	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Income limit for personal allowances	100,000	100,000	100,000	100,000	100,000	100,000	100,000

Source: HMRC: Rates and Allowances – Income Tax, http://www.hmrc.gov.uk/stats/tax_structure/table-a2a.pdf. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI).

¹⁷ There is an allowance for blind people. However, this is not simulated here due to lack of information in the input data.

2.6.4. Personal Savings Allowance (*tinsa_s*)

From 2016 a new **Personal Savings Allowance** (*tinsa_s*) has been introduced. The amount depends on the amount of taxable income: basic and higher rate taxpayers are able to earn up to the amounts shown in Table 2.37. No Personal Savings Allowance is available for taxpayers paying additional tax rate (income band over £150,000). Tax-free products (i.e Individual Saving accounts (ISA) or National & Saving Investments (N&SI)) do not count towards Personal Savings Allowance.

Table 2.37 Personal Savings Tax allowances (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
Personal Saving Allowance							
Basic taxpayers	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Higher taxpayers	500	500	500	500	500	500	500
Additional taxpayers	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: HMRC: Rates and Allowances – Income Tax, http://www.hmrc.gov.uk/stats/tax_structure/table-a2a.pdf. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (nominally frozen).

2.6.5. Transferable Tax Allowance

From April 2015 married and civil couples where one partner earns less than the income tax personal allowance are able to transfer part of their unused allowance to their partner up to the limits shown in Table 2.38 (10% of the Personal Tax Allowance in 2020).

Eligible couples are those where both partners were born on or after 6 April 1935 (so it includes some pensioners) and the recipient partner does not pay tax at higher tax rate (40%) or additional tax rate (45%) (in other words his/her annual income lies between £11,000 and £37,500 during the 2020/21 tax year in England).

Table 2.38 Transferable personal tax allowances for married couples (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
Transferable Personal Allowance							
Annual amount	1,250	1,250	1,260	1,260	1,260	1,260	1,260

2.6.6. Tax base

Taxable income (*il_tinty*) includes:

- Earnings from employment and benefits from employer (*yem + bmaer+ bhlwk*);
- Earnings from self-employment (*yse*);

- State, occupational, personal pensions and widow pension (*boact00* + *boactcm* + *ypp* + *bsuwd*);
- Carer's Allowance (*bcrdi*);
- Incapacity Benefit¹⁸ (*bdict01*);
- Contributory ESA (*bdict02*);
- Contributory JSA (*bunct_s*);
- Rental income from a second property or over certain limits (*yprtx*);
- Interests and dividends (except from Individual Savings Accounts (ISAs) and Personal Equity Plans (PEPs)) (*iytx*);
- Other income (from odd jobs) (*yot01*)

Contributions to personal (*xpp*), private and occupational pensions (*tpcpe*) are deducted from the tax base.

Losses from self-employment can be offset against other taxable income (or carried forward, or used against previous year income). For simulation purposes we assume they are only offset against other taxable income of the same year.

2.6.7. Tax schedule

The main tax thresholds and rates are set out in Table 2.39.

Table 2.39 Income tax thresholds and rates (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
Savings rate threshold	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Starter rate threshold in Scotland	2,049	2,085	2,097	2,162	2,240	2,352	2,433
Basic rate threshold in Scotland	12,444	12,658	12,726	13,118	13,627	13,950	14,232
Basic rate threshold rUK	37,500	37,500	37,700	37,700	37,700	37,700	37,700
Intermediate rate threshold in Scotland	30,930	30,930	31,092	31,092	32,299	33,064	33,732
Higher rate threshold	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Savings rate %	0	0	0	0	0	0	0

¹⁸ According to the legislation, IB is taxed only after the first 28 weeks of payment; we assume that receipt has lasted this long, as information of length of IB award is not available in the data at hand.

Starter rate % in Scotland	19	19	19	19	19	19	19
Basic rate %	20	20	20	20	20	20	20
Intermediate rate % in Scotland	21	21	21	21	21	21	21
Higher rate % rUK	40	40	40	40	40	40	40
Higher rate % in Scotland	41%	41%	41%	41%	41%	41%	41%
Additional rate % rUK	45	45	45	45	45	45	45
Additional rate % in Scotland	46	46	46	46	46	46	46

Source: HMRC: Rates and Allowances – Income Tax, http://www.hmrc.gov.uk/stats/tax_structure/table-a2a.pdf. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (CPI and nominally frozen).

The savings rate of 10% only applies to income from investments (*yityx*). Before 2015, this could happen only if, without the investment income, taxable income is less than the savings rate threshold (e.g. £2,880 in 2014). In that case, the tax system treated the savings income as the “top slice” and applied the lower rate of 10% to any excess of the threshold over non-savings taxable income (or to the savings income itself, if this was lower). From 2015 the saving rate of 10% has been abolished and the threshold increased, so that income from investments lower than £5,000 is free of tax, while any excess over the threshold is taxed together with the remaining taxable income.

From 2016 the Scottish Rates of Income Tax (SRIT) were implemented which allow regulating part of non-savings non-dividends (NSND) Income Tax for Scottish residents. While in 2016/17 no changes were introduced, from 2017/18 Scottish residents face a lower basic rate threshold and from 2018/19 Scotland increased the number of tax bands. From 2019 also Wales can regulate the rates of (NSND) Income Tax for Welsh residents. Welsh Rates of Income Tax (WRIT) works by reducing the UK rate by 10p in £1 (or 10 percentage points of each rate). WRIT is charged on top of these reduced rates, and can be lower, higher or the same as the UK rates. Revenues are subsequently transferred to the Welsh Government. Until now WRIT have been the same as the reduction of the UK rate; therefore, they do not change the tax-payers’ bill. Total taxes for the whole UK are stored in the variable *tin_s*, which is the variables included in the relevant final income lists. This variable is the sum of variables storing the net income taxes corresponding to the SRIT (*tin12_s*), WRIT (*tin11_s*) and the rest of the UK (*tin00_s*) (to create these variables, allowances are subtracted from the gross version of the variables proportionally to the size that those variables represent in the sum of them).

2.6.8. Tax credits

The Working Tax Credit and Child Tax Credit are considered as benefits by UKMOD and are described in the section on benefits, above.

There is a residual tax credit for older couples. Although the Married Couples Allowance (and Additional Personal Allowances for lone parents) were abolished in 2001, for taxpayer couples where one or both is aged over 65 a residual allowance has been retained in the form of a non-refundable tax credit. This residual **Married Couples Allowance (MCA)** applies to couples

(married or living together in a civil partnership; *dms=2*) where one partner was born before April 1935 (i.e. aged 83 years old or over in 2018) (*i_tin_prelimMCA*). The MCA can be claimed by the husband if the couple married before 2005 (otherwise by partner with highest income);¹⁹ any unused allowance can then be transferred to the spouse or civil partner (*i_tin_unusedMCA*).

Along with the addition to the personal allowance for older people, 50% of the difference between taxable income (before deducting allowances) and the income limit is subtracted from the MCA, down to a minimum level. This minimum is the value of the MCA for couples aged under 65 as it was before it was abolished in 2001, indexed by prices. 10% of such amount represents the MCA tax credit (*i_tin_finalMCA*). MCA levels for the relevant policy years are listed in Table 2.40.

Table 2.40 Tax credits (2019-2025)

As of...	Jun-19	Jun-20	Jun-21	Jun-22	Jun-23	Jun-24	Jun-25
Fiscal year:	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year	£ per year
MCA	8,915	9,075	9,125	9,415	9,870	10,190	10,480
Lower age limit for MCA	75	75	75	75	75	75	75
Minimum MCA	3,450	3,510	3,530	3,640	3,820	3,950	4,060
Income limit for age-related allowances	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tax relief rate for the MCA	10%	10%	10%	10%	10%	10%	10%

Source: HMRC: Rates and Allowances – Income Tax <https://www.gov.uk/government/publications/rates-and-allowances-income-tax/income-tax-rates-and-allowances-current-and-past#personal-allowances>. 2023/24 to 2025/26 are projections based on the statutory indexation rate if known or on past trends (RPI).

2.7. Changes to non-simulated instruments (if applicable)

The following non-simulated instruments have been changed from 2013:

Disability Living Allowance (DLA). DLA could be claimed by individuals if they became disabled before the state pension age and had personal care and/or mobility needs. DLA for working-age people is fully replaced by the Personal Independent Payment (PIP) by 2018. In order to take into account the lower entitlement, policy *bdisc_uk* randomly sets the DLA personal care component (*bdisc*) to zero for 20% of individuals receiving lowest or middle rate allowance for datasets that do not record PIP benefits. This reduction does not apply when using FRS 2014/15 - or any following version - as the reduction described above is observed in the survey.

¹⁹ UKMOD assumes that the MCA is claimed by the husband in all cases.

2.8. Modelling of Covid-19 shocks in 2020 and 2021, unemployment shocks until 2025 and State support from CJRS and SEISS in 2020 and 2021

2.8.1. Coronavirus Job Retention Scheme²⁰ (bwkmcee_s, yemmc_s and yem)

- *Eligibility*

Employers who could not maintain their workforce because their operations were affected by coronavirus (Covid-19) could furlough employees and apply for the Coronavirus Job Retention Scheme (CJRS) to cover a portion of their usual monthly wage costs where employees were recorded as being on furlough.

Prior to 1 July 2020, employees on furlough could not undertake any work for their employer other than training. From 1 July, employers were:

- able to flexibly furlough employees – this meant employers could bring employees back to work for any amount of time, and any work pattern;
- still able to claim the furlough grant for the hours furloughed employees did not work, compared to the hours they would normally have worked in that period.

- *Size of the grant*

From 1 March 2020 until 31 July 2020, the CJRS grant amounted to 80% of gross earnings, up to a cap of £2,500 per month, as well as the employer NICs for the time the employee was furloughed.

From 1 July 2020, employers could bring furloughed employees back to work for any amount of time and any shift pattern, while still being able to claim the CJRS grant for the hours not worked. Wage caps were proportional to the hours an employee was furloughed. For example, an employee was entitled to 60% of the £2,500 cap if they were placed on furlough for 60% of their usual hours. Employers had to pay earnings and employer NICs for the hours employees worked.

From 1 August 2020 until 31 October 2020, the level of the grant was reduced each month. For August, the government paid 80% of wages up to a cap of £2,500 for the hours an employee was on furlough and employers paid employer NICs and pension contributions for the hours the employee was on furlough.

For September 2020, the government paid 70% of wages up to a cap of £2,187.50 for the hours the employee was on furlough. Employers paid NICs and pension contributions and top up employees' wages to ensure they received 80% of their wages up to a cap of £2,500, for time they were furloughed.

For October 2020, the government paid 60% of wages up to a cap of £1,875 for the hours the employee was on furlough. Employers paid employer NICs and pension contributions and top up employees' wages to ensure they received 80% of their wages up to a cap of £2,500, for time they were furloughed.

In November 2020, the scheme was extended until September 2021. From November 2020 to June 2021 the scheme came back to its highest level (i.e. as in August 2020 with a 80% rate and a cap of £2,500) and it was decreased thereafter (in July 2021 it was as in September 2020 and in August and September 2021 as in October 2020).

²⁰ The description of the scheme is taken from <https://www.gov.uk/government/collections/coronavirus-job-retention-scheme>.

Employers were able to choose to top up employee wages above the 80% total and £2,500 cap for the hours not worked at their own expense if they wish.

- ***Income tax and National Insurance Contributions (NIC)***

Employers and furloughed employees still paid the taxes and NIC on their earnings. This included pension contributions (both employer contributions and automatic contributions from the employee), unless the employee had opted out or stopped saving into their pension.

Until 31 July 2020 employers could claim for these costs for the hours the employee was on furlough, i.e. the state covers the costs. From 1 August employers were required to pay all employer NICs and pension contributions.

Table 2.41 shows Government contribution, required employer contribution and amount employee receives where the employee is furloughed 100% of the time. Wage caps are proportional to the hours not worked.

Table 2.41 Parameters of the CJRS (for employees furloughed 100% of the time)

	Mar20-Jul20	Aug20, Nov20-Jun21	Sep20, Jul21	October 20, Aug21-Sep21
Government contribution:				
Employer NICs	yes	no	no	no
Earnings	80% up to £2,500	80% up to £2,500	70% up to £2,187.5	60% up to £1,875
Employer contribution:				
Employer NICs	no	yes	yes	yes
Earnings	-	-	10% up to £312.5	20% up to £625
Employee receives:	80% up to £2,500	80% up to £2,500	80% up to £2,500	80% up to £2,500

EUROMOD notes:

The employer NIC paid by the state are simulated and the result is saved in UKMOD variable *tsctct_s* (see section 2.5.3 for details on employer NIC).

We make a number of assumptions to simulate the CJRS:

First, as the policy rules change by calendar month, we use the month of household survey interview to simulate the policy rules in place for that month and for a given individual. For example, someone interviewed in April and simulated to be furloughed will be eligible to the earnings subsidy according to the policy rules in April.

(It should be noted that this approach diverges from the approach used in the simulation of earnings subsidies in the other country models of the EU-wide tax-benefit model EUROMOD. The other country models make use of EU-SILC data on last year's incomes and months spent in different economic activities, so they look at whole-year effects. In comparison, the Family Resources Survey for the UK includes information on past month's income and thus, we attempt to simulate the individuals' situation, taking into account the month they were interviewed.)

Second, we assume that civil servants are not affected. Third, we assume employees are furloughed for the whole month (i.e. the month of their household's interview). Fourth, we do not

account for the following eligibility condition: employers can claim for any employees that have been furloughed for at least 3 consecutive weeks (since we cannot identify whether different people work for the same firms, we do not account either for related restrictions to employers on the maximum number of employees they can furlough).

2.8.2. Self-Employment Income Support Scheme²¹ (bwkmcse_s and yse)

- *Eligibility*

Individuals, whose business was adversely affected by Covid-19, could apply for a grant from the Self-Employment Income Support Scheme (SEISS). They needed to be a self-employed individual or a member of a partnership and:

- For the first to third grant (May20-Jan21)/fourth and fifth grant (Feb21-Sep21):
 - to have traded in the tax year 2018 to 2019/2019 to 2020 and submitted a Self - Assessment tax return on or before 23 April 2020/2 March 2021 for that year
 - to have traded in the tax year 2019 to 2020/2019 to 2020 and 2020 to 2021
 - intended to continue to trade in the tax year 2020 to 2021/2021 to 2022

The business could have been adversely affected by coronavirus if, for example, the self-employed:

- were unable to work because they:
 - were shielding
 - were self-isolating
 - were on sick leave because of coronavirus
 - had caring responsibilities because of coronavirus
- have had to scale down or temporarily stop trading because:
 - their supply chain had been interrupted
 - they had fewer or no customers or clients
 - their staff were unable to come in to work

Trading profits must have been no more than £50,000 per year and at least equal to the self-employed person's non-trading income (earnings, income from rent, investment and dividend income, pension income). To work out eligibility the government first looked at the person's Self-Assessment tax return. If the person was not eligible based on that, the government then looked at maximum three previous tax years.

If the self-employed person received the grant they could continue to work, start a new trade or take on other employment including voluntary work, or duties as an armed forces reservist.

- *Size of the grant*

The SEISS grant was based on the person's average trading profit over the 3/4 tax years for the first to third/fourth and fifth grants. The average trading profit was worked out by adding together the person's total trading profits or losses.

The SEISS paid out five grants. The first grant was worth 80% of average monthly trading profits, paid out in a single instalment covering 3 months' worth of profits, and capped at £7,500 in total. Eligible self-employed could apply for the first grant between 12 May and 13 July 2020.

The second grant was paid out to eligible self-employed, whose business had been adversely affected on or after 14 July 2020. Eligible self-employed could apply for the second grant between 17 August and 19 October 2020. This grant was worth 70% of the person's average monthly

²¹ The description of the scheme is taken from <https://www.gov.uk/guidance/claim-a-grant-through-the-coronavirus-covid-19-self-employment-income-support-scheme>.

trading profits, paid out in a single instalment covering a further 3 months' worth of profits, and capped at £6,570 in total. Self-employed could claim for the second grant even if they did not make a claim for the first grant.

The amount of the third and fourth grants was as the first one and each covered three months as well, and could be claimed from November 2020 to January 2021 and February 2021 to April 2021 respectively.

The fifth grant also covered 3 months' worth of profits but its application period lasted the 5 months from May 2021 to September 2021 (therefore, it had to be smoothed out for longer). It was as the previous ones for people with a turnover reduction of 30% or more, while it was only 30% of average monthly trading profits and capped at £2,850 for people with a reduction of less than 30%. Table 2.42 summarises the parameters of the scheme.

- **Income tax and National Insurance Contributions (NIC)**

The grant is subject to income tax and self-employed NIC.

Table 2.42 Parameters of the SEISS for applications made in May-July and August

	May20-Jul20, Nov20-Jan21, Feb21- Apr21	Aug20-Oct20	May21-Sep20
Government contribution:			
Average trading profits	80% up to £7,500, covering 3 months' worth of profits	70% up to £6,570, covering 3 months' worth of profits	80%/30% up to £7,500/£2,850 covering 3 months' worth of profits, for those with a turnover reduction of 30% or more/less than 30%
Self-employed person's contribution:			
Self-employed NICs	yes	yes	yes

EUROMOD notes:

We make a number of assumptions to simulate the SEISS:

First, we do the same assumptions as for CJRS with respect to policy rules changing by calendar.

Second, in the simulation of the grant, eligibility is restricted to those with self-employed income less than £50k per year and at least equal to the sum of non-trading income, and who have been in current self-employment for at least a year. We do not condition on having been adversely affected by the pandemic. In the Family Resources Survey we do not have information on the person's trading profits in the previous years. We use instead information on the total amount from self-employment based on profit or income for self-employed (UKMOD variable *yse*/FRS variable *seincam2*). We only compared the difference between this variable before and after the shock to classify people to the two levels in the fifth grant. We also use information on the number of years in current self-employment to approximate if the person has had a Self-Assessment tax return in the previous tax year (UKMOD variable *yse_{ny}* ≥ 1).

2.8.3. Modelling of Covid-19 shocks in 2020 and 2021 and unemployment shocks until 2025

We model Covid-19 shocks: in 2020 and 2021, we account for changes to the unemployment rate; self-employed affected by hours reductions; becoming furloughed and receiving support from the Coronavirus Job Retention Scheme (CJRS); and receiving the Self-Employment Income Support Scheme (SEISS). In 2022-2025, we account for changes to the unemployment rate only.

Hereafter, we will often refer to “pre-shock” incomes or people’s characteristics before modelling the shocks. In 2020 or 2021, we will interchangeably also refer to “pre-Covid-19” incomes as the situation before the modelling of Covid-19 shocks in particular.

The baseline simulations in UKMOD include the simulation of Covid-19 shocks. This is done via the *Extension* LMA in the model (see EUROMOD Help file accessible via the User Interface).

In the rest of the section, we first document the external data which we base our modelling of shocks on. Finally, we describe in detail how the shocks are simulated within the model.

- ***Data on unemployment, self-employed affected by hours reduction, furloughing and SEISS take-up***

We use data from the Office for Budget Responsibility (OBR) in their October 2021 Economic and fiscal outlook for unemployment. For the percentage of self-employed affected by hours reduction, we use data from the Understanding Society COVID-19 survey from Apr20 to Jul20, and from Aug20 onwards the proportion that this shock represented as a percentage of the SEISS take-up is kept constant. In the absence of reliable data on the magnitude of these reductions, we assume the affected self-employed workers reduced their hours by 50%. For the caseloads of furloughed workers and SEISS take-up, we use information from Her Majesty Revenue & Customs (HMRC). Table 2.43 shows the unemployment rate in 2020-2025 and Table 2.44 shows the proportion of self-employed affected by earnings reduction 2020-2021.

Table 2.43 LFS unemployment 2020-2025

	2020	2021	2022	2023	2024	2025
LFS unemployment	0.046	0.049	0.048	0.043	0.042	0.042

Note: Projections from 2021 onwards. Table T1.1 of the OBR October 2021 Economic and fiscal outlook.

Table 2.44 Proportion of self-employed affected by earnings reduction 2020-2021

	Apr20-Jul20	Aug20-Oct20	Nov20-Jan21	Feb21-Apr21	May21-Sep21
LFS unemployment (rate, per cent)	0.67	0.60	0.57	0.50	0.33

Note: we use data from the Understanding Society COVID-19 survey from Apr20 to Jul20, and from Aug20 onwards the proportion that this shock represented as a percentage of the SEISS take-up is kept constant.

We use furlough caseloads from HMRC broken down by industry. To obtain the proportion of furloughed workers per industry, we divide the caseloads by information on employment by industry from the ONS (to it make comparable, we adjust the ONS/LFS data to the smaller employment by industry found in FRS 2019-20). We then group industries according to the highest proportion of furloughed workers they had over the months of the CJRS, and calculate the proportion of furloughed workers by group each month. This represents the probability of being furloughed. We group industries into:

- Low impact: Agriculture, forestry & fishing; Mining, energy and water supply; Transport & storage; Information & communication; Financial & insurance activities; Professional, scientific & technical activities; Education; Human health & social work activities
- Medium impact: Manufacturing; Construction; Wholesale, retail & repair of motor vehicles; Real estate activities; Administrative & support services; Other services
- High impact: Accommodation & food services

Moreover, we calibrate these probabilities according to the level of earnings of people to match the total yearly expenditure reported in HMRC statistics (see Annex 5: Validation Tables). For this, within each industry-month group, we divided people into those with earnings above and below the (yearly) median earnings in the industry group. We then increased the probability of those with low earnings by a percentage, and decrease the probability of those with high earnings so as to maintain the average probability within each industry-month group. This resulted in increasing the probability of low earners by 73% in 2020 and 90% in 2021. The resulting probabilities can be seen in Table 2.45.

Table 2.45 Probability of being furloughed by month, industry group and earnings level in 2020 and 2021

Industry group	Month	2020		2021	
		Low earning	High earnings	Low earning	High earnings
Low impact	Apr	0.260	0.041	0.107	0.006
	May	0.263	0.045	0.088	0.006
	Jun	0.227	0.031	0.076	0.003
	July	0.188	0.029	0.067	0.004
	Aug	0.140	0.026	0.059	0.005
	Sep	0.098	0.014	0.049	0.002
	Oct	0.076	0.016	n/a	n/a
	Nov	0.099	0.014	n/a	n/a
	Dec	0.102	0.018	n/a	n/a
	Jan	0.135	0.021	n/a	n/a
	Feb	0.135	0.027	n/a	n/a
	Mar	0.120	0.023	n/a	n/a
Medium impact	Apr	0.834	0.085	0.328	0.000
	May	0.774	0.121	0.219	0.012
	Jun	0.608	0.105	0.185	0.013
	July	0.465	0.073	0.155	0.008
	Aug	0.326	0.061	0.134	0.012
	Sep	0.242	0.034	0.116	0.004
	Oct	0.203	0.004	n/a	n/a
	Nov	0.341	0.064	n/a	n/a
	Dec	0.348	0.076	n/a	n/a
	Jan	0.436	0.053	n/a	n/a
	Feb	0.420	0.079	n/a	n/a
	Mar	0.381	0.066	n/a	n/a
High impact	Apr	1.000	1.000	1.000	0.609
	May	1.000	1.000	0.939	0.000

	Jun	1.000	0.894	0.531	0.125
	July	1.000	0.664	0.375	0.020
	Aug	0.970	0.239	0.284	0.044
	Sep	0.794	0.150	0.223	0.020
	Oct	0.835	0.258	n/a	n/a
	Nov	1.000	0.770	n/a	n/a
	Dec	1.000	0.834	n/a	n/a
	Jan	1.000	0.998	n/a	n/a
	Feb	1.000	0.929	n/a	n/a
	Mar	1.000	0.805	n/a	n/a

Notes: Data on furloughed workers from Table 3 CJRS time series: number of employments on furlough by sector from HMRC; data on employment from EMP13: All in employment by industry: People (not seasonally adjusted) from ONS. If $p = \text{prob CJRS within industry group month}$, $ph/pl = \text{prob CJRS for high/low earnings within industry group month}$, $qh/ql = \text{proportion of high/low earnings within industry group month}$, $ph*qh + pl*ql = p$. We then increase a in $pl = p(1 + a)$ and adjust $ph = (p - pl*ql)/qh$ to maintain p , until getting close to the yearly expenditure reported in HMRC statistics. We found $a=73\%$ in 2020 and 90% in 2021.

From Jul20, furloughed workers were allowed to do working hours while furloughed. For this, we use statistics from HMRC on the proportion of people on partial furlough at the end of each month, shown in Table 2.46. In the absence of information on the exact hours worked by these partially furloughed workers, we assumed they reduced 50% of their working hours.

Table 2.46 Proportion of people on partial furlough 2020 and 2021

Month	2020	2021
Apr (there was no partial furlough during Apr-Jun 2020)	n/a	0.40
May (there was no partial furlough during Apr-Jun 2020)	n/a	0.47
Jun (there was no partial furlough during Apr-Jun 2020)	n/a	0.47
Jul	0.21	0.47
Aug	0.31	0.45
Sep	0.39	0.44
Oct	0.41	n/a
Nov	0.35	n/a
Dec	0.37	n/a
Jan	0.28	n/a
Feb	0.27	n/a
Mar	0.29	n/a

Notes: Data from Table 8 CJRS time series: number of employments on furlough by full and flexible furlough from HMRC.

Lastly, we use HMRC statistics on the SEISS take-up rate among potentially eligible population, shown in Table 2.47.

Table 2.47 SEISS take-up 2020 and 2021

Grant	2020	2021
1st grant May20-Jul20	0.77	n/a
2nd grant Aug20-Oct20	0.69	n/a
3rd grant Nov20-Jan21	0.65	n/a
4th grant Feb21-April21	0.58	0.58

5th grant May21-Sep21	n/a	0.38
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Notes: Data from Table 0b - Total SEISS claims up to 7 October 2021 from HMRC.

- ***Simulation of unemployment changes, self-employed affected by hours reduction, CJRS, SEISS and tax-benefit policies in UKMOD***

Table 2.48 gives an overview of the modelling of shocks – simulations of unemployment changes (in 2020-2025) and self-employment shocks, CJRS, SEISS and tax-benefit policies (in 2020 and 2021) – going through each relevant policy in the model. There are three important parts to the simulations:

1. Define proportions of (self-)employed to become unemployed, self-employed to be affected by hours reduction, to become furloughed (i.e. receive support from CJRS) and take-up SEISS; define policy parameters of CJRS and SEISS; generate random variables used to select who is to be affected by shocks;
2. Simulate unemployment and self-employment changes – i.e. put (self-)employed into unemployment and reduced hours for self-employed – and support from CJRS and SEISS;
3. Simulate NIC, income tax and benefit entitlements
 - in 2020 and 2021: keep benefit take-up behaviour fixed and ensure new benefit claims only to Universal Credit.

On part 1, the proportions of (self-)employed to become unemployed, self-employed to be affected by hours reduction, to become furloughed (i.e. receive support from CJRS) and take-up SEISS are defined as *constants* in UKMOD. Where the proportions vary by month, these are coded using *condition* parameters. As all assumptions for the nature and size of shocks are modelled within the model, they can be modified by users. Users can not only change the size of these proportions but they can also account for other relevant dimensions (e.g. person's gender or age) by modifying/extending the conditions. For a description of the data used to define the relevant proportions, see previous subsection. For information on the CJRS and SEISS, see sections 2.8.1 and 2.8.2, respectively.

In part 2, individuals are selected randomly – subject to the proportions and conditions defined in part 1 – to become unemployed, being affected by hours reduction, furloughed and/or take-up SEISS. In the case of new unemployed, UKMOD internally calculates the difference between the unemployment rate in the data (e.g. in FRS 2019-20) and the one defined in the previous section, and uses that difference (only if the one defined is larger than the observed one in the data). For this group, an important part of the simulations is to modify their pre-shock incomes and characteristics, e.g. by setting their earnings, private pension contributions and working hours to 0. In other words, we modify the variables from the FRS micro-data to make the selected employed look like unemployed. We do the same to the hours and earnings of those self-employed affected by hours reductions. These modifications then have a direct effect on the simulation of NIC, tax liabilities and benefit entitlements for these newly unemployed. For those selected to become furloughed or take-up SEISS, we simulate their entitlements to the CJRS and SEISS, according to the policy parameters defined in part 1 and taking into account the person's month of interview in the FRS. For example, someone interviewed in May and simulated to become furloughed will get state support from the CJRS according to the May policy rules. Due to changes to the policy rules, the simulated amount of CJRS support would thus differ for a furloughed worker with the same pre-Covid-19 earnings but interviewed in October. The purpose of accounting for the person's month of interview and policy rules by month is essentially to simulate the income distribution as it would be captured in the future FRS 2020/21, subject to a range of assumptions.

In part 3, NIC, income tax and benefit entitlements are simulated, accounting for the increase in number of unemployed, change in hours worked by self-employed and receipt of support from the CJRS and SEISS. It is important to consider here the simulation of legacy benefits (LB) and Universal Credit (UC) in 2020 and 2021. Due to the take-up assumptions in the model, two issues arise related to: 1) changing benefit take-up and 2) new benefit claims as a result of Covid-19 shocks. We discuss these two issues in turn and then explain how we have addressed them in the model:

On 1), UKMOD first simulates entitlements to LB and then, using information on LB eligibility and take-up, UC is simulated. LB are subject to take-up rates as published by DWP and HMRC (see section 3.2.3). For UC, we distinguish in particular between two groups: i) eligible and simulated to take-up LB are simulated to take-up UC (100 % take-up) and ii) not eligible to LB are simulated to take-up UC subject to (at the time of writing) 89% take-up rate.²² We also assume based on DWP and OBR estimates that among all LB/UC claimants, 45% in 2020 and 54% are selected randomly to claim UC and the rest LB based on DWP estimates (see section 2.4.10). As a result of the Covid-19 shocks simulations, a pre-Covid-19 UC non-taker from group ii) can become a UC taker after the shocks by moving into group i). This happens when someone becomes eligible to both LB and UC as a result of the shock. Furthermore, the take-up of Council Tax Reduction (CTR) benefit in the model is linked to the take-up of UC: a UC taker is simulated to take up CTR (100% take-up) while the CTR take-up goes below 100% for a UC non-taker. Thus, by letting artificially more people taking-up UC as a result of the Covid-19 shocks, the take-up of CTR also increases. This change in the take-up behaviour of UC and CTR is purely a result of the way the model is set up rather than actual modelling of take-up behaviour. This is an important limitation of the model that needs to be understood as it can have implications for some types of distributional analysis (noteworthy, the higher the take-up of a benefit, the bigger the impact of policy reforms on household incomes).

On 2), as a result of the Covid-19 shocks all new benefit claims can only be to UC. However, this is not ensured by the model and so, new benefit claims can be simulated to both the LB and UC.

To address these two issues, we need to acquire information on people's benefit eligibility and take-up pre-Covid-19 which we can then use to simulate benefit entitlements after the Covid-19 shocks. To do so, we implement a loop which runs twice through a part of the policy spine: in the first run, the model calculates NIC, income tax liabilities and benefit entitlements before the Covid-19 shocks in 2020 and 2021 and also based on the pre-Covid-19 policy rules in 2020. The results on entitlements to LB and UC are stored in separate variables. In the second run, the model simulates the Covid-19 shocks, and in the case of 2020, it also applies the policy rules including the Covid-19 policy measures. When simulating LB and UC, the model uses information on the pre-Covid-19 benefit receipt to ensure a fixed take-up behaviour, i.e. someone simulated to be entitled but not taking-up UC pre-Covid-19 remains a non-taker after the Covid-19 shocks, and that all *new* benefit claims go to UC only (subject to 89% take-up rate). This approach is also used in Brewer & Tasseva (2020) who analyse the distributional impact of the UK policy response to Covid-19 (see Appendix C in Brewer & Tasseva (2020)).

Noteworthy, this loop is only implemented within the 2020 and 2021 policy years as it is clearer what the benchmark scenario is, i.e. the pre-Covid-19 situation in 2020 and 2021. Such a loop has not been added to 2022-2025 simulations when only unemployment shocks are simulated, which are much smaller compared to those simulated in previous years (moreover, as the loop runs the spine twice, running a system requires roughly twice as long). In these systems, instead of using information on pre-shock benefit receipt, benefit units with newly unemployed can only receive UC (with the caveat that they might have been receiving LB before the shock). To deal with the issues above for certain types of analysis, users may consider switching on the extension "Full

²² There is also a third group: eligible but not taking-up LB are simulated to not take-up UC.

Universal Credit Assumption” (UCA) in the model which assumes a full roll-out of UC and no LB (see section 2.2).

A final word of caution for users is that, as it has hopefully become clear, the simulation of the Covid-19 shocks is subject to a range of assumptions about the size of shocks and who is affected by them. Notably, the simulations do not account for differences e.g. by age and other variables, which has so far been known to matter during the current pandemic (see e.g. Benzeval et al., 2020). We attempted to strike a balance between trying to model the labour market shocks, the breakdowns already provided by HMRC, and the large number of parameters that the shocks introduce in the model.

Table 2.48 Overview of shocks simulations in UKMOD by policy

Policy in UKMOD	Policy years	Description
ConstDef_uk	2020-2025	Define as constants: <ul style="list-style-type: none"> - <u>2020-2025</u>: an extension switch used to rule the simulation (constant <i>\$shocks</i>) - <u>2020-2025</u>: unemployment rate target (<i>\$p_un</i>), % of self employed being affected by earnings reduction (<i>\$p_mase</i>) and % of working hours done by self-employed affected (<i>\$mase_hours</i>) - <u>2020-2021</u>: grouped industries by CJRS impact (<i>i_lin</i>), proportion of furloughed workers by industry-earnings group (<i>\$p_furlough</i>), % doing working hours (<i>\$furlough_inwork</i>, <i>\$furlough_hours</i>), and self-employed taking-up SEISS (<i>\$p_seiss</i>), which all vary by person’s month of interview (<i>ddt01</i>) in the FRS - <u>2020</u>: policy parameters of the CJRS and SEISS (<i>\$mcee_*</i>, <i>\$mcse_*</i>) by month, using information on person’s month of interview
InitVars_uk	2020-2025	Intermediate variables used in calculations defined
ILSdef_uk, ILdef_uk	2020-2021	Variables for state support from CJRS (<i>bwkmcee_s</i>), CJRS employer contribution (<i>yemmc_s</i>) and state support from SEISS (<i>bwkmcse_s</i>) added to relevant income lists
random_uk	2020-2025	Setting seeds and generating random variables used to select who is to be affected by shocks (<i>i_rand_un</i> , <i>i_rand_furlough</i> , <i>i_rand_mase</i> , <i>i_rand_seiss</i> , <i>i_rand_furlwork</i>)
shocks_uk	2020-2025	Policy simulates shocks: <ul style="list-style-type: none"> - <u>2020-2025</u>: calculating % of employed transitioning into unemployment (based on the difference between the unemployment rate in the data and the target if the latter is larger) - <u>2020-2021</u>: set a loop (“covshocks”) which calculates receipt of LB and UC 1) pre-Covid-19 and 2) after Covid-19 shocks <ul style="list-style-type: none"> o Loop starts from follow-up function within policy and ends at the last function in policy <i>covshocks_benreceipt_uk</i> o Run 1 of loop: no simulation of labour market changes in 2020 and 2021 and also tax-benefit calculations based on pre-Covid-19

		<p>policies in 2020, i.e. pre-Covid-19 income distribution; store information on pre-Covid-19 benefit receipt</p> <ul style="list-style-type: none"> ○ Run 2 of loop: simulation of Covid-19 shocks in 2020 and 2021 and also tax-benefit calculations after Covid-19 policy response in 2020, accounting for pre-Covid-19 benefit receipt <p>- <u>2020</u>: set WTC, UC and HB amounts: pre-Covid-19 and after UK policy response to Covid-19 in 2020</p> <p>- <u>2020-2025</u>: transitions from (self-)employment to unemployment</p> <ul style="list-style-type: none"> ○ select randomly who to become unemployed based on proportions specified in ConstDef_uk and random variable generated in random_uk (variable <i>i_lnu</i>) ○ modify characteristics and incomes of newly unemployed (e.g. set earning, private pension contributions and working hours to 0, define as actively looking for a job, change employment status to unemployed etc.) <p>- <u>2020-2021</u>: becoming furloughed</p> <ul style="list-style-type: none"> ○ select randomly who to become furloughed based on proportions specified in ConstDef_uk and random variable generated in random_uk (<i>lmcee_s</i>) ○ while furloughed select randomly who is doing working hours and what proportion of hours is being done (<i>i_lhw00sr</i>) <p>- <u>2020-2021</u>: self-employed affected by hours reduction</p> <ul style="list-style-type: none"> ○ select randomly who is affected based on proportions specified in ConstDef_uk and random variable generated in random_uk (variable <i>lmase</i>) and what proportion of hours is being done (<i>i_lhw01sr</i>) ○ Re-calculate self-employed earnings taking into account hours reduction (<i>yse</i>) <p>- <u>2020-2021</u>: taking-up SEISS grant</p> <ul style="list-style-type: none"> ○ select randomly who can receive SEISS grant based on proportions specified in ConstDef_uk and random variable generated in random_uk, accounting for SEISS eligibility conditions (e.g. earning up to £50k per year) (<i>lmcse_s</i>) ○ adjust self-employed working hours (<i>lhw01</i>) and re-calculate total working hours (<i>lhw= lhw00+lhw01</i>)
cjrs_uk	2020-2021	<ul style="list-style-type: none"> - If furloughed, simulate amount of state support from CJRS (<i>bwkmcee_s</i>) as well as CJRS contribution paid by employer for September-October 2020 (<i>yemmc_s</i>) - Re-calculate employment earnings taking into account furloughing and hours worked (<i>yem</i>)
seiss_uk	2020-2021	<ul style="list-style-type: none"> - If taking-up SEISS grant, calculate size of grant (<i>bwkmcse_s</i>)

lha_uk	2020	- Set LHA rates: pre-Covid-19 and after UK policy response to Covid-19
tscse_tscee_uk	2020-2021	- Add SEISS to self-employed earnings for calculating self-employed NIC - (For employee NIC, CJRS support already added to relevant income list in ILdef_uk)
tscer_uk	2020	- Simulate NIC paid by the state for furloughed workers (<i>tscct_s</i>)
bunct_uk	2020-2025	- Simulate “number of months worked in qualifying period” (<i>liwmy_s</i>) to calculate contribution-based JSA for new unemployed
bwkmt_bfamt_uk, bsa_uk, bsadi_uk, bho_uk, bsauc_uk, bmu_uk, bcap_uk	2020-2021	- Simulation of LB after Covid-19 shocks <ul style="list-style-type: none"> Only take-up benefits if taking them up pre-Covid-19 - Simulation of UC after Covid-19 shocks <ul style="list-style-type: none"> If eligible and not taking-up UC pre-Covid-19, remain a UC non-taker New claims to UC only: if only becoming eligible to UC after simulation of Covid-19 shocks, take-up UC subject to a take-up rate of 89% - Simulation of CTR <ul style="list-style-type: none"> If taking-up UC pre-Covid-19 and after Covid-19 shocks, take up CTR If not taking-up UC pre-Covid-19 or after shocks, take-up CTR subject to a take-up rate below 100% - Simulation of benefit cap on Universal Credit <ul style="list-style-type: none"> Approximate 39 weeks of grace period after Covid-19 shocks
bwkmt_bfamt_uk, bsa_uk, bsadi_uk, bho_uk, bsauc_uk	2022-2025	- Simulation of LB and UC after shocks <ul style="list-style-type: none"> Benefit units with newly unemployed can only receive UC (with the caveat that they might have been receiving LB before the shock)
covshocks_benreceipt_uk	2020-2021	Store information from run 1 of “covshocks” loop on pre-Covid-19 receipt of LB (<i>i_bfamt_b, i_bwkmt_b, i_boamt_b, i_bsa_b, i_bsadi_b, i_bho_b, i_lb_b</i>) and UC (<i>i_bsauc_b, i_bsaucft_b, i_brduc_b, i_bcap_b</i>)

Notes: All elements that belong to the simulations of Covid-19 shocks in the model belong to the so-called Group “Covid-19 shocks”, highlighted by a blue square in the most left column in the model (for definition of Groups see EUROMOD Help file accessible via the User Interface). To expand all elements of the Group, go to tab “Display”, click on option “Expand” and select “Covid-19 shocks”.

2.9. Additional policy systems in UKMOD

The latest version of UKMOD includes policy systems up to 2025. The systems for 2023, 2024, and 2025 are forecast based on the different tax-benefits statutory indexation rules as well as uprated income data. We make use of OBR projections on earnings growth, inflation, etc for these years (see section 2 for details of each tax and benefit projections and section 3.2.4 for details on the uprating of the income data).

3. DATA

3.1 General description

The UK database is drawn from the Family Resources Survey (FRS). Specifically, for this year there is a new UKMOD input dataset generated from FRS 2019/20.²³ This is a cross-sectional household survey based on a two-stage stratified clustered probability sample of private households and collected throughout the fiscal year (April-March). It was launched in 1992 to meet the information requirements of the Department for Work and Pensions. In Great Britain the sampling frame for the FRS is the Royal Mail Small Users Postcode Address File (PAF), listing addresses receiving less than 50 items of mail a day (intended to exclude business or other non-private residential addresses). Postcode sectors are drawn with probability proportional to size and subsequently stratified according to Government Office Regions, proportion of heads of households in particular socio-economic groups, economic activity rate and male unemployment rate as derived from the 2011 Census of Population. In a second stage a random sample of 27 addresses is drawn within each Primary Sampling Unit (PSU) and represents an interviewer's monthly assignment.

The Northern Ireland 2019/20 sample frame is the Land & Property Services' list of domestic properties (Pointer) and follows an unclustered, geographically stratified design. The sample covers only households living at private residential addresses. The main exclusions consist of people living in student accommodation, the homeless, those in nursing homes, hospitals or other types of residential care, prisoners and people living in military or police institutions.²⁴ This sample limitation means that taxes and benefits and other income components are under-represented for Northern Ireland to the extent that they are received (or paid) by people living in institutions.

Fieldwork is carried out by two organisations continuously from April to March of the following year in such a way that each quarter sub-sample is nationally representative. Interviewers are instructed to choose up to three households at multi household addresses and in 2018/19 interviewers averaged six calls per address before declaring an address a non-contact. A few days before the beginning of the fieldwork, an advance letter is posted to selected addresses providing information about the purpose of the survey. Non-response questionnaires collecting information about non-responding households are completed by interviewers. The face-to-face interview lasts on average 65 minutes per household and involves all adult individuals (aged 16 years old or more, excluding unmarried people 16 to 18 years old who are full-time students in non-advanced education). It is carried out using the Computer Assisted Personal Interviewing (CAPI) mode, and makes use of built-in consistency checks. Respondents are also encouraged to consult documentation when asked about reporting monetary amounts. Where possible, questions are harmonised to maximise comparability with other surveys.²⁵ After the interview, additional survey leaflets are left with the household, informing about the prospective use of data collected, the relevance of survey response and confidentiality issues.

Several adjustment procedures take place after the data collection, including taking into account interviewers' notes, checking fixed-amounts benefits, disentangling multiple benefit receipts, investigating outliers and zero amounts. Item non-response mostly relates to self-employment

²³ See <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020/family-resources-survey-financial-year-2019-to-2020> . From 2013 to 2016 the EU-SILC for the UK has been based on the FRS.

²⁴ For a quantitative assessment of the non-household population see 'Out for the count: the incomes of the non-household population and the effect of their exclusion from national income profiles', Martin Evans, LSE Welfare State Programme WSP/111, 1995.

²⁵ <http://www.statistics.gov.uk/about/data/harmonisation/default.asp>

and investment income and is limited to 0.5% of all responses. The UKMOD database makes use of the imputed data.

Table 3.1 UKMOD databases description

UKMOD database	UK_2019_a1
Original name	Family Resources Survey
Provider	Department for Work and Pensions
Year of collection	2019/20
Period of collection	April 2019 – March 2020
Income reference period	Current year incomes
Sampling	Stratified clustered probability sample for Great Britain and unclustered, geographically stratified design for Northern Ireland
Coverage	Residents in private households
Effective sample	39,216 households
Response rate	50%

Source: DWP, Family Resources Survey 2019/20. <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020>

3.1.1. Non-response

In 2019/20, 49% of the 39,216 sampled households provided full cooperation and proxy responses were obtained for 22% of adults.²⁶

Table 3.2 Household response rates in the FRS 2019/20 by Government Office Regions

Region/Country	Share of households
	2019/20
United Kingdom	49
England	49
Wales	48
Scotland	45
Northern Ireland	56
North East	53
North West	51
Yorkshire and the Humber	55
East Midlands	52
West Midlands	50
East	48
London	42
South East	46

²⁶ Individual full cooperation requires less than 13 “don’t know” or “refusal” answers to monetary amount questions out of approx. 50 questions. [https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020Sample quality and weights](https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020Sample%20quality%20and%20weights)

Region/Country	Share of households
	2019/20
South West	51

Source: DWP, Family Resources Survey 2019/20 (Table M2. Methodology and standard error data tables. <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020>)

Lower response rates than the average were seen in households in London, South East, South West, West Midlands and in Scotland (as shown in Table 3.2), single person households, households containing couples with non-dependent children or lone parents, households in purpose-built flats or maisonettes, households who owned their house outright, and households whose household responsible person (HRP) was self-employed or unemployed. In contrast, higher response rates occur, for example, in households with dependent children.

3.1.2. Weights

The FRS data are provided with weights attempting to correct for differential non-response while scaling up sample numbers to the overall population. They are calculated as the ratio of population to sample counts for subgroups defined according to variables reflecting differential response rates. Population control totals are derived from external data sources and are adjusted to exclude people non-resident in private households.

Control totals for Great Britain 2019/20 are based on population totals by sex and age groups in each Government Office Region (ONS and General Register Office for Scotland); number of families with children in Scotland, England and Wales (DWP Child Benefit data); number of male and female lone parents in Great Britain (DWP estimates); households tenure type (ODPM,²⁷ Scottish Executive, National Assembly for Wales) and Council Tax band (Valuation Office; Scottish Executive; except for Northern Ireland). Control totals for Northern Ireland include population totals by sex and age group (NISRA²⁸), number of lone parents and households (Northern Ireland Department for Social Development estimates).²⁹

Table 3.3 Descriptive Statistics of the Grossing-up weight (*dwt*)

	UK_2019_a1
Number	43,314
Mean	1,514.859
SD	858.6672
Maximum	33,820
Minimum	217
Max/Min	155.8

For 2019/20, no households have been dropped from the sample. For 2019/20 sample size is 43,314 individuals and 19,210 households. Applying weights included in the dataset to gross the numbers up to population figures gives 65,614,604 individuals and 28,023,811 households.

²⁷ Then, the Office of the Deputy Prime Minister.

²⁸ Northern Ireland Statistics and Research Agency.

²⁹ For more detail about the extent of imputation and control totals variables used to generate grossing factors, see DWP, Family Resources Survey 2019/20 <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020/family-resources-survey-background-information-and-methodology>.

3.2. Imputations and assumptions

The FRS data are obtained from the UK Data Archive at the University of Essex.³⁰ Adjustments to variables are kept to a minimum.

It should be noted that in the 2019/20 FRS data:

- Age is top-coded at 80.

Key variables that are imputed are:

- Mortgage interest is imputed for cases where a single repayment amount includes both interest and capital repayment;
- Rent is calculated to be gross (in some cases housing benefit has been deducted);
- The regime under which individuals pay National Insurance contributions (Not contracted out or contracted out) is imputed from information on (imputed) gross earnings and the contribution payment.

FRS data include a single variable covering all state pension payments. As well as the basic state retirement pension, this includes payments under the State Earnings Related Pension Scheme (SERPS) and the graduated pension scheme that preceded it (under which some current pensioners receive relatively small payments) and the State Second Pension which followed it. It also includes any increases due to deferred retirement. This single variable is split into two in the UKMOD database. One part is the basic state pension. This is imputed by calculating what it would be for the person in question assuming they had made full contributions and, in the case of married women, also if they had made no contributions of their own. In the latter case a rough judgement is made about which situation applied in each case by comparing the two calculated values with the actual pension payment. Then, any excess is assumed to be SERPS/State Second Pension.

Council Tax: variables “*tmu01*” and “*tmu02*”.

Because only about 20% of households (i.e. those paying it yearly) report the amount of Council Tax (after discounts, but gross of Council Tax Reduction), it needs to be imputed. Households are assigned to mutually exclusive strata defined according to Council Tax band, Government Office Region, and separately for single person households. The average Council Tax for each stratum is calculated based on non-missing observations, and then such sample average is imputed to the missing ones (more precisely, the variable *tmu01* is derived when stratum average is imputed to all households; the variable *tmu02* is derived when the stratum average is imputed to missing households only). By default, *tmu02* is used. This variable is net of CT reduction; therefore it is grossed up with the observed CT reduction *bmu* in the model.

The input database contains also a variable for Council Tax band (*amriv00*).

Carer for means-tested benefits premium purposes: “*lcr01*”

Individuals providing care for at least 35 hours a week³¹ can qualify for IS if the following applies to them: (a) they receive Carer’s Allowance (CA) or (b) the person they care for has claimed or already receives Attendance Allowance (AA) or the higher or middle rate care component of

³⁰ Data from the Family Resources Survey are Crown Copyright. They have been made available by the Office for National Statistics (ONS) through the Data Service and are used by permission. Neither the ONS nor the Data Service bear any responsibility for the analysis or interpretation of the data reported here.

³¹ To qualify for IS, if somebody does not receive CA, the decision maker may consider the quality and quantity of care provided, and grant entitlement to IS on the basis of care provided even if the total number of hours is less than 35 per week.

Disability Living Allowance (DLA), either rate of the daily living component of Personal Independence Payment (PIP).

In the FRS we distinguish two cases: care provided within the household for which we can control for the conditions described above; care provided outside the household, for which we do not observe whether care recipients receive AA, DLA or PIP. For this second case we create a binary variable *lrc01*, which takes value 1 for somebody who (a) receives ICA (in this case should implicitly be providing more than 35 hours per week); or provides care to somebody inside the household receiving AA/DLA(care) at the middle rate or above or PIP: or (b) provides care to somebody outside the household for more than 35 hours per week.

In UKMOD this variable is used to distinguish IS from ib-JSA.

Benefits

Consistency checks are carried out for most benefit variables; for example, checking the coherence between recipients' age and benefit rules (e.g. Pension Credit and Income Support); or reported receipt of mutually exclusive benefits (e.g. Attendance Allowance, Disability Living Allowance and Personal Independence Payment); also, where reported amounts were higher than the maximum benefit rates, amounts were reset to such maximum value (e.g. Incapacity Benefit, Carer's Allowance, etc.).

Earnings and hours of work

Earnings information refers to employment income (*yem*) based on current employment, self-employment income (*yse*) estimated from information from survey questions on accounts and income drawn from own business, and earnings from odd jobs (*yot01*). Hours of work in employment and self-employment are stored in variables *lhw00* and *lhw01*, respectively. Total number of hours, *lhw*, equals *lhw00+lhw01*.

Basic State Pension and Second State Pension

FRS data include a single variable covering all State Pension payments. As well as the basic State Pension, this includes payments from the Second State Pension (also known as the State Earnings Related Pension Scheme (SERPS)) and the graduated pension scheme that preceded it (under which some current pensioners receive relatively small payments). It also includes any increases due to deferred retirement. This single variable is split into two in the UKMOD database. One part is the basic State Pension (variable *boact00*). This is imputed by calculating what it would be for the person in question assuming they had made full contributions and, in the case of married women, also if they had made no contributions of their own. In the latter case a rough judgement is made about which situation applied in each case by comparing the two calculated values with the actual pension payment. Then, any excess is assumed to be the Second State Pension (*boactcm*). (Noteworthy, the underlying assumption here is that no one receives the new State Pension.) For tax-benefit calculations, the split matters only as far as uprating is concerned as the basic State Pension is uprated by the triple lock indexation (except in 2022 when it was a double lock) and the Second State Pension is assumed to be uprated by CPI (see section 3.2.4).

Increase to the State Pension Age

From 6 April 2010, the age at which women become entitled to the State Pension (SPA) and cease having to pay National Insurance contributions is rising by six months every year (hence, one year every two years) from its pre-2010 level of 60. The State Pension age will then rise from 65 to 66 for both men and women in October 2020. This changes the composition of the sample of people who are of “working-age”, which is clearly important when simulating how various fiscal

systems will affect the working-age population. But it also has implications for household incomes, as it affects receipt of several state benefits and liability to national insurance.

During the financial year 2019/20, the State Pension age (SPA) for men and women increased from 65 to 66 years. Our base data (FRS 2019/20) includes women and men aged 65 receiving the State Pension neither of whom would be entitled to it from 2021 onwards³². 65-year-old women and men in 2021-2025 could either be working, inactive or receiving/entitled to some kind of income replacement benefit.

We allow for some mechanical response to the increases in the SPA for these affected people.³³ Moving towards 2021-2025, when we observe 65-year-old women and men in 2019 in receipt of the basic State Pension or over pension-age benefits we, first, remove entitlement to the basic State Pension, Pension Credit, and other benefits payable only to those above the SPA (this is done directly in UKMOD by policy *PAA_uk*); and second, we predict entitlement to IB/ESA, which are invalidity benefits paid only to working-age adults. We do this by using data on women and men aged 64 in our base data to estimate a probit regression of receipt of IB/ESA, using the following as predictors: education, region or residence, Council Tax band, housing tenure, marital status, whether partner works (if present), disability status, and local authority. This regression is then used to generate predicted IB/ESA entitlement probabilities for women and men aged 65 in our base data. Finally, we allow for a labour supply response to the rise in the female SPA amongst those directly affected. We do this by using data on women aged 51-65 and men aged 56-65 in our base data to estimate a regression of employment status, using the following as predictors: education, number of children in various age groups, region, housing tenure, Council Tax band, local authority disability status, entitlement to Disability Living Allowance (DLA), a cubic age and an indicator variable for being under SPA.

For individuals in couples we include an indicator of the partner's employment status. We use this to predict the probability of being in work for women and men aged 65 in our base data in a world where the SPA has increased over 65 years for both women and men. Aggregating these predicted probabilities tells us the predicted proportion of those directly affected by the SPA change who will be in work after that change, and we then select sufficient number of women with highest predicted probabilities of being in work when below SPA in order to match the predicted increased employment rate each year. Finally, for those women and men aged 65 whom we have now simulated as being entitled to ESA/IB or being in work, we impute additional information (if simulated as being entitled to IB/ESA we allocate an IB/c-ESA amount (*bdict01yy* or *bdict02yy*); if simulated as being in work we allocate monthly earnings (*yemiv* or *yseiv*), hours of work (*lhwiv00* or *lhwiv01*) and a compulsory private pension contribution (*tpceivpx*)).³⁴

Although relatively complicated, this procedure still embodies the following assumptions:

- People below the original SPA and those above the new SPA are not affected by the rise in SPA: in this sense, there are no anticipation effects or dynamic effects on employment of raising the SPA.

³² See Pension Act 2007 and 2011 for more details.

³³ Note that this correction for the moment only applies moving forward, i.e. using FRS 2019/20 data with 2020-2025 policy years. Using FRS 2019/20 data with policy years before 2018 would mean that, depending on the policy year, women aged 60-63 observed in work or receiving working-age benefits in the data would have instead been eligible to State Pension and pension-age benefits in those years. UKMOD does not correct for these inconsistencies between SPA and receiving working-age benefits. As we move forwards more women and men will be observed in work or receiving working-age benefits in the data, while they would have been above the SPA in previous years. We will consider this issue and how to adjust the data backwards in future country reports.

³⁴ We do this by matching on the propensity score, where the "treatment" variable identifies people being either below SPA and the propensity score is estimated using a probit regression with the same predictors as the employment equation, other than the cubic in age.

- Other members of the household not directly affected by the SPA increase do not change their labour market behaviour (i.e., no change in hours worked or postponed retirement). Having simulated the additional IB/ESA entitlements and gross earnings, we can run the modified base data with UKMOD.

Transitions from Incapacity Benefit to Employment and Support Allowance

Incapacity Benefit (IB) has been unavailable to new claimants since October 2008, with adults who are unable to work through disability or ill-health having to claim employment support allowance (ESA) instead. For tax-benefit calculations for policy year 2020 and onwards, we take into account the transition from IB to ESA. We simulate this transition by randomly selecting some individuals receiving IB in our base data to no longer receive it, and, from those, randomly select some to receive ESA (we store the result of these simulations in variable *bdict0220*). Of those reassessed, we assume that 30% move into the Support Group, 29% to the Work Related Activities Group (WRAG) and 41% are found to be fit for work and lose entitlement to disability benefits.³⁵

In the model, we then create the variables *bdict01* (IB) and *bdict02* (c-ESA) in policy *SetDefault_uk*: for 2005-2019 tax-benefit simulations *bdict01* and *bdict02* equal the reported benefit amounts in the FRS 2019/20, i.e. *bdict0119* and *bdict0219* respectively. For tax-benefit simulations for 2020 and onwards, *bdict01* is set to 0 (i.e. no one receives IB anymore) and *bdict02* equals *bdict0220*.

3.2.1. Time period³⁶

Information on earnings refers to the last pay period. Similarly, information about pensions and benefits refers to receipts in the most recent relevant period (e.g. week, 4-week, month, etc.) before the interview. Self-employment income is based on the most recent period (usually 12 months) for which annual business accounts are prepared for the Inland Revenue for tax purposes; in some cases this may be several years prior to the interview. Investment income is based on the last 12-month receipt. All monetary amounts in the FRS are expressed in weekly terms. These are converted into monthly terms for the UKMOD database. In the UKMOD calculations it is implicitly assumed that income is received at the same rate throughout the year. However, it should be remembered that this may not be the case and in particular that Income Tax (based on annual income) simulations do not take account of changes that may happen during the year. On the other hand, it is generally the case that personal and household characteristics are consistent with the current incomes that are observed, since they apply to the same or very similar reference periods. For more information about the adjustment of FRS variables into the UKMOD database variables see the UK Data Requirements Document (DRD).

3.2.2. Gross incomes

Gross incomes are imputed using the simple formula:

$$\text{Gross income} = \text{net income} + \text{tax} + \text{employee National Insurance Contributions} + \text{other deductions}$$

³⁵ Figures taken from <https://www.gov.uk/government/statistics/work-capability-assessment-support-group-outcomes-and-disability-benefit-history-of-esa-claimants>

³⁶ For more information about the FRS variables as originally available see the FRS documentation available at: <https://discover.ukdataservice.ac.uk/Catalogue/?sn=8013&type=Data%20catalogue>

FRS data include variables on Income Tax, employee National Insurance Contributions and other deductions from gross earnings. In general, net income and taxes paid are recorded separately. For the great majority of people, the quality of data on direct taxes is very good. People in receipt of regular income are taxed through a Pay-As-You-Earn system and most taxable sources of investment income are paid net of standard rate tax. The difficulty comes for those whose earnings are irregular, particularly the self-employed and, to a lesser extent, those moving in and out of employment during the year and higher rate taxpayers with significant income from investments. In these cases, the individuals may make lump sum tax payments or receive tax refunds. This information is collected in the FRS. However, these lump sums may not be contemporaneous with the reported income. Basing net income on the reported direct tax, including lump sum payments, can lead to a few households having disposable income very much out of line with their expenditure. In future a more elaborate procedure for imputing gross income from net will be considered for these individuals.

3.2.3. Correcting for non-take-up

As will be clear from the report on validation exercises in the next section, assuming that all means-tested benefits and tax credits are received by those calculated by UKMOD to be entitled would result in over-estimates of most of these instruments and an under-estimate of poverty and inequality. To adjust for this we employ a simple non-take-up correction by applying the take-up proportions estimated on a caseload basis by the Department of Work and Pensions (DWP, 2020) and HM Revenue & Customs (HMRC, 2019).³⁷ We also make use of 2020 projections by the Scottish Fiscal Commission for the take-up of the Scottish Child Payment. For example we assume that some 5% of lone parents do not receive the combination of Child Tax Credit and Working Tax Credit to which they are entitled, and that this proportion is higher in London (19% of all families with children). Of those entitled to Pension Credit, 32% do not take it up, with the proportion much higher (58%) if there is only entitlement to the Savings Credit component. Take-up probabilities are applied at the household level (so that people entitled to the same benefits within a household exhibit the same take-up behaviour), for each benefit separately. In general, we assume that take-up behaviour is not affected by changes in the size of benefit or tax credit entitlements. However, by applying differential take-up probabilities according to type of claimant, as summarised in Table 3.4, some of this effect is captured.

Table 3.4 Take-up probabilities

Benefit and tax credit claimant type	Probability of take-up
Housing benefit for pensioners (>60/65) if not receiving PC(GC)	0.86
Housing benefit for people of working age in work if not receiving IS	0.57
Housing benefit for people of working age without work if not receiving IS	0.96
Council tax benefit for owners (with and without mortgage) if not receiving IS or PC	0.36
Council tax benefit for tenants if not receiving IS or PC(GC)	n/a
Council tax benefit for private tenants	0.77
Council tax benefit for social tenants	0.87
Pension credit (guarantee or guarantee + savings)	0.70
Pension credit (savings only)	0.42
Income support for people without children	0.89
Income support for people with children	0.92
Child tax credit* and working tax credit for lone parents (not London)	0.95

³⁷ Where ranges of take-up proportions are published, the mid-point is used.

Child tax credit* and working tax credit for couples with children (not London)	0.73
Child tax credit* and working tax credit (all parents) in London	0.81
Child tax credit* and working tax credit (all parents) in Scotland	0.85
Child tax credit* and working tax credit (all parents) in Wales	0.87
Child tax credit* and working tax credit (all parents) in Northern Ireland	0.82
Child tax credit family element only	0.66
Working tax credit (no children)	0.32
Working tax credit (no children) – single	0.34
Working tax credit (no children) - couple	0.32
Scottish Child Payment – families with children under the age of 6	0.8
Scottish Child Payment – families with children aged 6-15 years	0.74 in 2023 and 0.75 in 2024 and 2025

Notes: * If parents are taking up IS, CTC is assumed to be taken up.

Source: HMRC, 2019: <https://www.gov.uk/government/statistics/child-tax-credit-and-universal-credit-claimants-statistics-related-to-the-policy-to-provide-support-for-a-maximum-of-2-children-april-2019>

DWP, 2020: <https://www.gov.uk/government/collections/income-related-benefits-estimates-of-take-up--2#latest-release>

Scottish Fiscal Commission, 2021: <https://www.fiscalcommission.scot/wp-content/uploads/2021/10/Scotlands-Economic-and-Fiscal-Forecasts-August-2021-Chapter-5-Social-Security-Supplementary-Tables-Revised-October-2021>

The correction is switched on by default in the baseline. To switch the take-up corrections off throughout any UKMOD module, a user needs to apply the relevant switch (BTA) from the run window of EUROMOD. Take-up probabilities summarised in Table 3.4 are stored as single constant parameter (defined in *ConstDef_uk*) in the model and the specific take-up correction is computed in each relevant policy sheet at the end of the simulation. Users can change these probabilities by changing the correspondent constants or switch off the take-up correction for each benefit separately by switching off the relevant function in each policy sheet.

There is also a new extension to correct for non-take-up which is on a trial period and therefore switched off. This extension is called Benefit Take-up Adjustments Observed (BTO). Switching on the extension and switching off the BTA extension introduces a step before both the random adjustment to benefits' take-up and the random transition between LB and UC. This step consists in assigning the simulated benefits first to people with these benefits observed in the data. After this step, temporary take-up and transition rates up to this point are calculated (using the *Totals* function in EUROMOD). Subsequently, the random processes are carried out if the original take-up and transition probabilities are still higher than the calculated temporary rates (see Table 2.23 on the UC transition probabilities). In this case, the random processes are carried out until the temporary rates reach those original probabilities, which then become the 'targets'. On the contrary, if the targets are lower than the temporary rates, benefits are randomly removed until coming back to those targets. In practice, when targets are higher, the original random processes are performed but with smaller recalculated probabilities, so that when adding those randomly chosen recipients, the targets are reached. For their part, when targets are lower, similar random processes are performed with the necessary probabilities to remove assigned benefits until coming back to the targets.

We now explain the specific formulas to calculate the probabilities involved. We explain it for the take-up adjustment process, but they are homologous for the transition to UC. We will refer to the temporary rates after assigning the simulated benefits first to those with them observed in the data as 'TU%_obs', and to the target probabilities simply as 'target'. Then, those eligible to a benefit and without the benefit observed in the data are $(1 - \text{TU\%_obs})$ of the total of those eligible.

- If $\text{target} > \text{TU\%_obs}$, we need a probability for the random process Pr such that we sample from $(1 - \text{TU\%_obs})$ and match the target, i.e. $\text{target} = \text{TU\%_obs} + (1 - \text{TU\%_obs}) * \text{Pr}$. This means that this probability is $\text{Pr} = (\text{target} - \text{TU\%_obs}) / (1 - \text{TU\%_obs})$.
- If $\text{target} < \text{TU\%_obs}$, we need a random process with a probability Pr such that we sample from TU\%_obs and come back to the target, i.e. $\text{target} = \text{TU\%_obs} - \text{TU\%_obs} * \text{Pr}$. This means that this probability is $\text{Pr} = 1 - \text{target} / \text{TU\%_obs}$.

3.2.4. Updating

Annex 1 reports information about the updating indices used to update (or backdate) monetary variables from the mid-point of the data year (October 2019 for FRS 2019/20) to the mid-point of the policy years applying on 30 June (i.e. October 2021 to October 2025) (see also the *Updating Indices* table accessible via tab “Country Tools” in the User Interface). No other updating adjustments are employed. Thus, the distributions of characteristics (such as employment status and demographic variables) as well as the distribution of each income source that is not simulated remain as they were in the original fiscal year.

For the simulation of 2023/24 policy year onwards, we uprate the financial values of income variables using the latest forecast of earnings and prices made by the Office for Budget Responsibility.³⁸

3.3. Multi-year datasets

In addition to the standard UKMOD input data based on a single-year of FRS data, a multi-year UKMOD input dataset is made available to users: UK_2019_b1. The multi-year dataset is constructed by appending three consecutive UKMOD input data files (i.e. three FRS waves). The increased sample size allows increasing variability in the data especially when analysing subnational reforms affecting subgroups of the population (e.g. lone parents in Scotland and Wales). Household sample weights are divided by 3 (i.e. the number of appended waves) to make the sample representative of the UK population. The household-level variable *dpd* denotes the income data period and is used to uprate correctly the financial values of the income data to the policy year (this is done by Uprate parameter *DBYearVar* in policy *Uprate_uk*).

Table 3.5 UKMOD multi-year dataset description

	UK_2019_b1
Original name	Family Resources Survey
Provider	Department for Work and Pensions
Year of collection	2017/18, 2018/19, 2019/20
Period of collection	April 2017 – March 2020
Income reference period	Current year incomes as indicated by variable <i>dpd</i>
Sample statistics:	
Number of individuals	129,248
<i>dpd</i> =2017	42,847
<i>dpd</i> =2018	43,087
<i>dpd</i> =2019	43,314
Number of households	57,484
Sample weights (dwt):	
Mean	504.8035

³⁸ The analysis was done in the 2nd semester of 2021, and so we use the OBR forecasts from October 2021.

SD	313.0084
Maximum	16884.7
Minimum	72.3333
Max/Min	233.42914
Population statistics:	
Number of individuals	65,244,836.7
Number of households	27,825,169.1

4. VALIDATION

4.1 Aggregate Validation

UKMOD results are validated against external benchmarks. Detailed comparisons of the number of people receiving a given income component and total yearly amounts are shown in Annex 5: Validation Tables. Both market incomes and non-simulated taxes and benefits in the input dataset as well as simulated taxes and benefits are validated against external official data. The main discrepancies between UKMOD results and external benchmarks are discussed in the following subsections. Factors that may explain the observed differences are also discussed.

Table 4.1 Components of disposable income

	UKMOD	FRS
	ils_dispy	NINDINC+CHINCDV
Employee cash or near cash income	+	+
Employer's social insurance contribution	0	0
Company car	0	0
Contributions to individual private pension plans	0	0
Cash benefits or losses from self-employment	+	+
Pension from individual private plans	+	+
<i>Unemployment benefits</i>	+	+
<i>Old-age benefits</i>	+	+
<i>Survivor' benefits</i>	+	+
Sickness benefits	+	+
Disability benefits	+	+
Education-related allowances	+	+
Income from rental of a property or land	+	+
<i>Family/children related allowances</i>	+	+
Social exclusion not elsewhere classified	+	+
Housing allowances	+	+
Regular inter-household cash transfer received	+	+
Interests, dividends, etc.	+	+
Income received by people aged under 16	+	+
Regular taxes on property	-	-
<i>Regular inter-household cash transfer paid</i>	-	-
<i>Tax on income and social contributions</i>	-	-
<i>Repayments/receipts for tax adjustment</i>	0	+

4.1.1 Components of disposable income

The definition of disposable income in UKMOD follows closely FRS definition with the only difference being that the FRS net individual income (NINDINC for adults and CHINCDV for children) results from the sum of (already) net income components. In particular, total individual net income in FRS is the sum of the following components: net income from employment (NINEARNS), net earn from self-employment (NINSEIN2), net investment income (NININV), income from retirement pension including Pension Credit (INRPINC), net pensions income (NINPENINC), total income from disability benefits (INDISBEN³⁹), total income from other

³⁹ Total income from disability benefits in FRS is the sum of the following benefits: DLAc, DLAm, War Disablement Pension, Severe Disability Allowance, Attendance Allowance, and Industrial Injury Disablement Benefit.

benefits (INOTHBEN⁴⁰), remaining income (NINRINC⁴¹) and total amount of tax credits received (INTXCRED⁴²).

The disposable income in UKMOD is constructed using (whenever possible) simulated “gross” components but explicitly including together with earnings, pensions and benefits also taxes and social insurance contribution, hence, the values of the two disposable income concepts are not identical. The differences between UKMOD and the FRS are outlined in Table 4.1.

4.1.1. Validation of incomes inputted into the simulation

- *Earnings*

While many sources of original income are difficult to validate because of lack of independent and comparable sources of information, this does not apply to earnings from employment. Table 4.2 compares aggregate earnings in UKMOD with estimates from the Annual Survey of Hours and Earnings (ASHE) in 2019. ASHE is based on a 1% sample of employees on the Inland Revenue PAYE register for February and April in the relevant year, supplemented by data from the Inter Departmental Business Register for businesses registered for VAT but not registered for PAYE, to cover businesses which do not have employees above the PAYE threshold. Table 4.2 shows that average earnings across all employees in the UKMOD/FRS 2018/19 databases is close (4% overestimated) to the corresponding average value from ASHE 2019, across all employees whose pay is not affected by absence.

Table 4.2 Average gross monthly earnings from employment in 2019, comparing ASHE and the UKMOD (UK) input database

	2019		
	UK	ASHE	Ratio
All	2,585	2,475	1.04
Male	3,075	2,960	1.04
Female	2,071	1,992	1.04

Sources: Source: Annual Survey of Hours and Earnings 2019 and earlier years, Office for National Statistics. Table 1.1a, weekly gross pay including overtime for adults whose gross pay was not affected by absence, multiplied by 4.333 to produce the monthly figures. Latest version available via <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/allemployees/ashetable1>

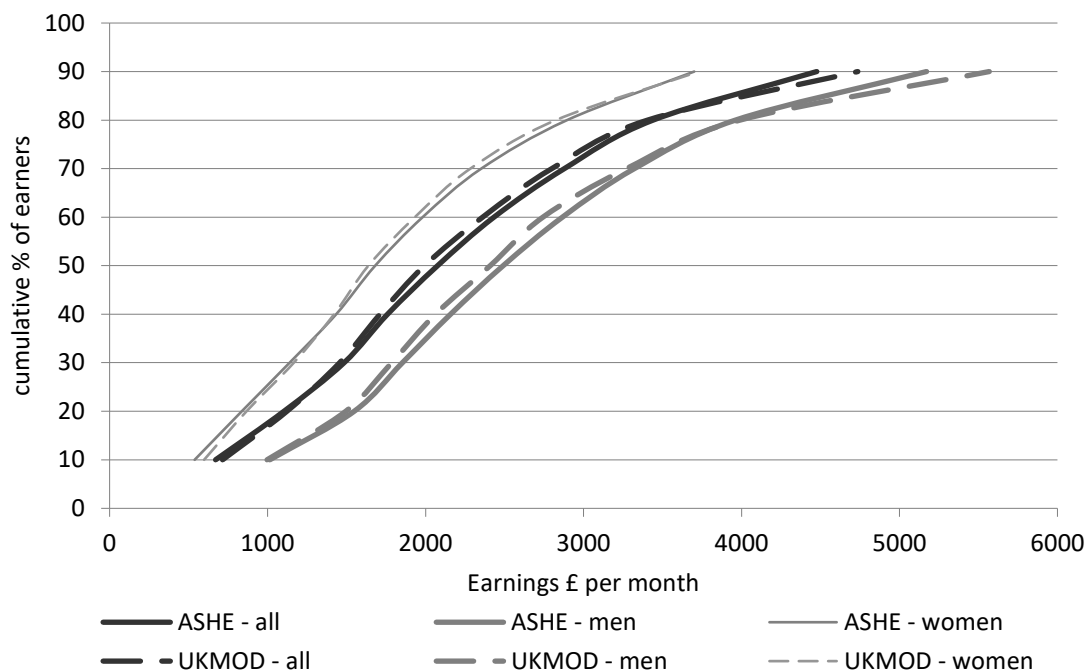
Figure 4.1 compares the cumulative earnings distribution from ASHE and the UKMOD input data for 2019 for all employees and for men and women (plotting decile points cumulatively).

⁴⁰ Total income from other benefits in FRS includes income from Child Benefit, Widow's Pension/Bereavement Allowance, Widowed Mothers/Widowed Parents Allowance, War Widow's/Widower's Pension, Invalid Care Allowance, Jobseeker's Allowance, Incapacity Benefit, DWP third party payments - JSA, Maternity Allowance, NI or state benefit, Guardian's Allowance, Work-Search Premium, In-work credit, Return to work credit, Work-related activity premium, Maternity Grant from Social Fund, Funeral Grant from Social Fund, Community Care grant from Social Fund, Child Maintenance Bonus/Premium, Lone Parent Benefit run-on/Job Grant, Widow's Payment, Winter Fuel Payments, Social Fund Loan: Repayment from JSA and extended HB and/or CTB, Income Support, DWP third party payments - IS/PC and Social Fund Loan: Repayment from IS/PC. Amounts are also added for SAP, SMP, SPP, SSP and Housing/Council Tax benefit.

⁴¹ Remaining income includes income from Sub-Tenants, Odd-jobs, School Milk, School Meals, Healthy Start Scheme Private Benefits, New Deal/GTA, Student/School Grants, Royalties, Allowances from Friends, Relatives or an Organisation, and allowances from Local Authorities/SS for foster and adopted children (INRINC) minus amount of tax paid on the rent received from property.

⁴² Total amount of tax credits sums Working Tax Credit and Child Tax Credit.

Figure 4.1 Cumulative earnings distributions in 2019: UKMOD (FRS) and ASHE



- *Benefits and taxes*

Table 7.3 and Table 7.4 (Annex 5: Validation Tables) compare statistics on benefits and taxes that are not simulated by UKMOD with external sources. This provides an assessment of the quality of the database and hence the estimates are referred to as “UKMOD/FRS estimates” although in a few cases some imputation has taken place in order to provide UKMOD with the necessary information for simulation (see Section 3). The tables also provide some useful background information for the validation of simulated components of income which may depend on, or are associated with, the non-simulated components.

Table 7.3 shows the ratio of the UKMOD/FRS estimate of the number of recipients of benefits or payers of tax to that given by administrative statistics. The UKMOD/FRS estimate is generally the same for each policy year but the external estimate naturally varies with time. And exceptions are the UKMOD estimates for the State Pension 2018-21, since these vary over time according to our imputations related to the increase in the state pension age from 65 to 66 in 2021.

Compared to the external statistics, the number of recipients of the contributory Employment and Support Allowance (c-ESA) is under-reported in FRS by 19% in 2019, and of State Pension is somewhat under-reported by 10%.

While the numbers in receipt of the basic State Pension are well estimated in UKMOD in 2019 (the external statistics are adjusted to remove recipients living outside the UK) the actual numbers decrease slowly over the period but our simulation of the effect of the rising State Pension age reduces the UKMOD estimate from 2019 to 2025 more slowly (see Section 3.2). It is likely that the general trends of number of retirees qualifying for the pension in their own right, plus the ageing of the population, neither of which are captured in our simulation, is the cause of this discrepancy.

In contrast, recipients of the Second State Pension are underestimated by UKMOD/FRS by 9% in 2019, getting it right in 2021, and overestimating thereafter. The two sources of State Pension are reported in a single variable in the data, which we split into the Basic and Second State Pensions (see Section 3.2). This split may contribute to this over/under-estimation. One might expect both to be under-estimated to some extent, because of not capturing recipients living in residential care.

Widows/Bereavement benefit recipient numbers are falling between 2019 and 2025 according to the external statistics. But they are overestimated in UKMOD/FRS by 67% in 2019, 71% in 2020, 76% in 2021, 90% in 2022, 104% in 2023, 114% in 2024 and 125% in 2025.

For some of the benefits with small numbers of recipients (especially Maternity Allowances but also War Pension and Industrial Injuries Disablement Allowance), it is to be expected that there would be a wide variation around the actual number from a survey.

The actual number in receipt of Carer's Allowance is growing over the period according to the external statistics but in 2019 it is underestimated in UKMOD/FRS by 18% and by 41% in 2025.

Severe Disablement Allowance (SDA) is significantly under-reported in the FRS and this is thought to be explained by respondent confusion between SDA and the disability premia in the Pension Credit (PC). The number of recipients is continuing to drop until 2025 which cannot be captured by the static simulation of UKMOD. Many claimants of one of these benefits receive both SDA and PC and may not report the actual situation accurately when asked in the survey. Attendance allowance (AA) is also under-reported, by 43-44% between 2019 and 2025. Disability Living Allowance (DLA) is being replaced by Personal Independence Payment (PIP) for new claimants from 2013. UKMOD/FRS underestimates recipients of DLA in 2019 (26%) and overestimates them from 2022 (4%) through to 2025 (22%). For PIP, UKMOD/FRS overestimates recipients between 2019 (29%) and 2022 (8%) and underestimates them in 2025 (12%).

Finally, on the basis of an earlier comparison (see Sutherland et al., 2008; later figures are not available) the number of Council Tax payers appears to remain well in-trend with previous years in the FRS. However, past external figures correspond to the number of dwellings on which payments were potentially due and includes second homes and empty properties which are not captured by the FRS data.

Table 7.4 shows ratios of UKMOD estimates of total expenditure on each benefit (or revenue from Council Tax) and administrative totals. In this comparison the expenditures vary across policy years, driven by the uprating factors described in the previous section. Generally, the closeness of expenditure/revenue estimates to external statistics follows the same pattern as for the number of recipients/payers shown in Table 7.3 suggesting that average amounts per recipient/payer are approximately right.

In the case of contributory-ESA the ratios for expenditures are almost always higher than those for recipients due to the fact that imputation of benefit amount assumes that the claims are within the “main phase” (not assessment phase). The amount paid in the main phase is higher and it includes the support or WRAG component, while in the assessment phase only a lower “basic” amount without any addition is paid.

External figures for Gross Council Tax revenue were not available between 2019-2025, hence comparison with actual numbers was not possible.

Under-representation of non-simulated benefits has implications for the values of the benefits that are simulated that depend in some way upon receipt of the non-simulated benefits. Where receipt of the latter automatically “passports” eligibility for a simulated benefit this will lead to under-

estimation of that benefit. On the other hand, if income from the non-simulated benefit is included in a means-test for a simulated benefit, under-estimation of the former will lead to over-estimation of the latter. Similar mechanisms apply in reverse to the case of over-estimation of non-simulated benefits.

4.1.2. Validation of outputted (simulated) incomes

Validation of simulated elements of income is carried out in relation to independent external sources. Table 7.5 (Annex 5: Validation Tables) shows comparisons of the number of benefit recipients and tax and contribution payers against official statistics based on administrative sources. These comparisons apply non-take-up probabilities as described in the previous section. Table 7.6 shows the aggregate annual expenditure, or revenue from each instrument, compared with official sources. Finally, Table 4.3 below compares UKMOD and external estimates of expenditure for 2019 for selected simulated benefits and tax credits with aggregates from the FRS data (using the same weights as in the UKMOD estimates).

Table 4.3 Selected benefits that are simulated by UKMOD: comparison of aggregates with external statistics and data from FRS (2018/19) assuming partial take-up in UKMOD estimates. Expenditure/revenue (£million/year)

	FRS 2019	UKMOD 2019	External 2019	Ratio FRS / External	Ratio UKMOD / External
Child Benefit	10,139	11,340	11,081	0.91	1.02
Working Tax Credit (WTC)	2,413	2,138	3,825	0.63	0.56
Child Tax Credit (CTC)	10,249	8,451	13,875	0.74	0.61
<i>CTC and WTC</i>	12,662	10,589	17,700	0.72	0.60
<i>WTC only</i>	363	334	560	0.65	0.60
Income Support+JSAinc+ESA	2,082	10,668	11,318	0.18	0.94
Universal Credit	11,614	17,419	18,386	0.63	0.95
Pension Credit (PC) total	3,522	4,442	5,061	0.70	0.88
Housing benefit (total)	13,494	12,560	18,364	0.73	0.68

Source: See Table 7.6 (Annex 5: Validation Tables).

- ***Child Benefit***

UKMOD produces estimates very close to the administrative figures for the number of families/children in receipt of Child Benefit. Given the universal nature of the benefit and the fact that the FRS weights control for the number of families with children eligible for Child Benefit (in 2019/20), this is not surprising. The number of children for whom the benefit is received is under-estimated by 1% and the expenditure on the benefit over-estimated by 2% in 2019 (see Table 7.5 and Table 7.6 in Annex 5: Validation Tables).

- ***Winter Fuel Allowance***

UKMOD over-estimates recipients and expenditure by 5% in 2019, compared to the external statistics. On the other hand, from 2022 the number of recipients is under-estimated, while expenditures as well from 2021.

- *Means-tested benefits and tax credits*

In 2019, the numbers on Income Support (including income-tested JSA and income-tested ESA) are high relative to external statistics (36%), for Child Tax Credit and Pension Credit are rather close, while Working Tax Credit and Housing Benefit recipients are under-estimated respectively by 36% and 14%.

For all mean-tested benefit the expenditure is underestimated. More specifically, in 2019, Income Support, income-based JSA and income-based ESA is under the administrative total by 6%, Housing Benefit by 32%, Pension Credit by 12%, Child Tax Credit by 46% and Working Tax Credit by 46% and Universal Credit by 5%. Correcting for take-up in the way that we do does not allow for the fact that within client group, it is likely that those with small entitlements are the most likely to not claim. Our caseload-based correction thus probably over-corrects on an expenditure basis for some means-tested benefits on the legacy system. In the future we will explore the impact of turning on the BTO extension instead of BTA, which should increase expenditure.

We now consider each benefit/credit separately and discuss reasons for the apparent discrepancies. It is worth noticing that generally external data is based on outturn only for 2019, while from 2020 onwards is forecasted.

- *Tax Credits*

A possible cause of the apparent under-estimation of WTC and the expenditure on CTC is related to the administrative statistics that we use which are for finalised awards of tax credits. Adjustments are made after the end of the tax year to take account of changes in income during the year. It is likely that those with changes that lead to increased entitlement would re-claim during the year. Thus those with end of year adjustments are likely to see reductions in their awards. Our simulations, on the other hand, are based on current incomes and circumstances. If circumstances stay the same all year our simulation should match the (probably lower) final awards. Entitlement is even more likely to vary over the year as this depends on being in low-paid work which is likely to be unstable in various ways. Moreover, as shown in Table 4.3, FRS reported income from WTC is also low relative to the administrative total. This may be due to respondents not knowing how much of their total tax credit payment is from WTC or from CTC. It is also possible that the FRS data under-represent the WTC client group. For their part, families are unlikely to shift on and off Child Tax Credit but are likely to meet the eligibility criteria for Working Tax Credit for short periods but still receive payments when they would not qualify if re-assessed. This might explain the better fit of CTC recipients. Finally, note that some of the mismatching might be due to the widening introduction of Universal Credit, replacing the ‘legacy benefits’ from 2013. UKMOD randomly allocates benefits recipients to either the legacy system or the universal credit system. It is possible that this method contributes to the mismatch described above.

- *Income Support*

The number of recipients of Income Support (IS) is over-estimated by 146% (the external figures include those on income-tested JSA which are simulated along with Income Support in UKMOD). The numbers on income-related ESA are under-estimated in 2019 (by 34%). The period of transition for those potentially qualifying for IS or ib-ESA was supposed to last until 2014, however in reality there were still people receiving IB in 2018 and it is difficult to capture the individual components correctly in UKMOD simulations in particular because the entitlement to ib-ESA is based on a “limited capability for work” which is not explicitly measured in the FRS. The combined (IS+ib-JSA+ib-ESA) total expenditure from UKMOD is lower than the external total (by 6% in 2019 increasing to 40% in 2025).

- *Pension Credit*

Pension Credit recipients as a whole are under-reported by 3% as well as by 12% for the total pension credit expenditure in 2019 with a somewhat stable trajectory. The external administrative total includes payments to recipients living in institutions who are not captured by FRS/UKMOD. Moreover, the shortfall might be explained by UKMOD not controlling for size of entitlement in the take-up adjustment.

- *Housing Benefit*

Housing Benefit recipients are under-estimated by UKMOD by 14% in 2019. Expenditure is under-estimated by 32% in 2019 increasing to 42% in 2025. The updating of rents to 2019 may not capture differential growth in rent satisfactorily and contribute to this growing discrepancy. However, since Housing Benefit is calculated at the end of the UKMOD “spine” and entitlement depends on income including other simulated components, the main explanation for any under-estimation of expenditure probably lies in the over-simulation of some benefits/tax credits, perhaps for certain groups of people that cannot be identified in the sort of aggregate validation exercise reported here. Moreover, also the gradual introduction of Universal Credit, which has been speeding up from 2018 onwards, should contribute to the reduction of spending on Housing Benefit for working-age individuals. On the other hand, UKMOD transferred people from the legacy benefit system to the Universal Credit system on a random selection base. In reality, the gradual introduction of Universal Credit has been done by groups of claimants based on the specific means-tested benefits they are claiming. Our results suggest that such random allocation may not be capturing properly the transition process to UC. As mentioned, in the future we will analyse the use of the BTO extension which should increase expenditure.

- *Universal Credit*

Since 2013 working-age means-tested benefits are being replaced by Universal Credit. While the initial plan was to transfer people from the so-called ‘legacy benefit’ system to Universal Credit by the end of 2018, the process has slowed down, and the full introduction of Universal Credit has been moved forward. UKMOD take such transition into account so that only some people each year are transferred to Universal Credit system. The number of recipients is on the spot in 2019, low during the COVID period and again on the spot thereafter. Expenditure follows a similar pattern with an slight underestimation. The underestimation

- *Benefit cap*

From April 2013 a benefit cap was introduced to reduce the maximum income from benefits received by a benefit unit. A benefit unit whose entitlement exceeds the benefit cap limit has the amount of HB or UC (whichever it receives) reduced to match the benefit cap limit. The benefit cap was fully functional from September 2013.⁴³ In 2019, the number of benefit units affected by housing benefit cap are only slightly over-estimated by UKMOD.

- *Income Tax*

Compared with tax statistics, the number of Income Tax payers estimated by UKMOD is under-simulated in 2019 by 5 percentage points. Revenue from income tax is under-estimated by 15%.

The most likely explanation is that there is some under-reporting of high incomes and under-representation in the FRS of high-income earners. Annex 2 in De Agostini & Sutherland, 2014 (an earlier version of the Country Report) describes a case study for 2010, comparing /UKMOD

⁴³ The first external statistics on the numbers of households affected can be found here https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/542734/benefit-cap-statistics-to-may-2016.pdf

estimates with administrative statistics from tax records in more detail. Indeed, this is confirmed by comparing number of taxpayers and revenue by tax rate bands with official statistics. Table 7.5 shows that UKMOD under-simulates the number of taxpayers paying tax at the basic rate – i.e. with this as their marginal rate – (with a 11% under-simulation), while the precision of the simulation varies with income (1% under-simulation of higher rate taxpayers and 27% for those paying tax at the additional rate). Table 7.6 highlights a shortfall of simulated tax revenue, compared to the external statistics, of 54% at the additional rate in 2019, while tax revenue collected at the higher rate are over-estimated by 4% and basic rate tax revenue are under-estimated by 5%.

It should be noted that the assumption that the incomes recorded in the FRS for the previous week or month are in fact received for the whole tax year is likely to have an effect on the UKMOD estimates. If UKMOD could account for part-year incomes there would be more taxpayers in any whole year, resulting in an over-estimate. But to the extent that a part-year income is subject to a lower average tax rate than the equivalent whole year income (because of the progressivity of the tax schedule), accounting for part-year incomes would reduce the estimated tax revenue on aggregate.

- ***Social insurance contributions***

Detailed comparable external figures on employees and self-employed contributors are only available up to 2008, to our knowledge. From the revenue side, UKMOD overestimates the total revenues from self-employed NIC by 35% in 2019, which is in line with data from earlier Country Reports.

4.2. Income distribution

All income distribution results presented here are computed for individuals according to their household disposable income (HDI) equivalised by the “modified OECD” equivalence scale. HDI are calculated as the sum of all income sources of all household members net of income tax and social insurance contributions. The weights in the OECD equivalence are: first adult=1; additional people aged 14+ = 0.5; additional people aged under 14 = 0.3.

4.2.1. Income inequality

Table 7.7 compares estimates of income inequality and descriptions of the income distribution from UKMOD with those published in the official UK HBAI statistics for 2019/20. Also shown are statistics calculated by us from the FRS, using the UKMOD sample and income concept.

In 2018 there is quite a large discrepancy between the HBAI Gini estimate (0.35) and the UKMOD estimate (0.30). The main contributory factor is the way in which the HBAI statistics are corrected for lack of enough households with sufficiently high income in the FRS data. The HBAI correction uses information from tax statistics to inflate the incomes of some of the higher income households in the data (DWP, 2016). This has no effect on the median or poverty estimates but does affect the HBAI estimates shown in Table 7.7 for the Gini and the income share of the top decile group. It also, by implication, reduces the share of all other decile groups. Once this is taken into account, the UKMOD and HBAI estimates are generally relatively close.

4.2.2. Poverty rates

Table 7.8 shows a comparison of poverty figures based on UKMOD versus the FRS or published UK official statistics (Households Below Average Income or HBAI). It shows the comparison of 2019/20 HBAI (Before Housing Costs) poverty statistics with UKMOD 2019 policy year.

Because of differences due to using simulated rather than recorded income components and any differences in the precise sample or income concept⁴⁴ there is no reason to expect the HBAI and UKMOD results to be identical. Also shown for 2019 are our own calculations using FRS micro-data and the same sample and income concept as is employed in the UKMOD statistics. The differences between the HBAI estimates and our own indicate the effects of the different income concepts and sample selections. The UKMOD income concept and use of the full FRS sample results in a slightly higher poverty threshold (median). At the same time, UKMOD results in lower poverty, especially for children at the 50% threshold, which is probably due to the use of simulated values for taxes and benefits.

Using the 60% of median poverty threshold the total rate from UKMOD is 16.3% compared with 18% in HBAI in 2019. The (rounded) poverty rate is less than 1 and 2 percentage points lower relative to HBAI at the 70% and 50% thresholds respectively.

At the 60% threshold the child poverty rate is 21% compared to 22.9% from HBAI. The discrepancy is 2.3 percentage points at the 50% threshold and 0.4 percentage points at the 70% threshold.

The comparisons for older people show that UKMOD slightly underestimates at each threshold. At the 60% threshold the poverty rate for older people is 19.9% compared with 19.2% from HBAI.

One plausible explanation for the underestimation of poverty rates relative to those shown by HBAI is the fact that FRS data – and hence HBAI – under-report receipt of means-tested benefits, particularly Pension Credit but also some working-age income-tested benefits and Housing benefits (see FRS versus external statistics in Table 7.5). To the extent that UKMOD estimates provide a closer match to external statistics on recipients of these benefits, we might expect UKMOD estimates of poverty to be lower than those from HBAI.

Under-reporting of means-tested benefits in FRS/HBAI is a plausible component of the explanation of the discrepancy between HBAI and UKMOD. However, we cannot be certain about this as it depends on the underlying reason for the FRS shortfall in recipients of these benefits. It could be due to non-reporting by recipients, misreporting by recipients (the income appears, but as part of another income component) or differential non-response by recipients. We would need to draw different conclusions, depending on which of these applies. If the main explanation is confusion about income sources by recipients, then the explanation above is not relevant. However, this seems unlikely, as few benefits are over-represented in terms of expenditure in FRS (see FRS versus external statistics in Table 7.6), although it is possible that this applies to some extent to the basic state retirement pension, leading to underestimation in recorded Pension Credit. But if this were the case, we would also expect to under-simulate Pension Credit to the same extent and this does not happen.

4.3. Summary of “health warnings”

This final section summarises the main findings in terms of particular aspects of UKMOD or its database that should be borne in mind when planning appropriate uses of the model and in interpreting results.

Although the sample size of the FRS survey data is large by international standards, care should still be taken in interpreting results for small sub-groups of the population.

⁴⁴ HBAI excludes cases with spouses living away from home. UKMOD includes them. HBAI includes, for students, top-up loans and deducts loan repayments. UKMOD ignores the loan repayments. HBAI adds the cash value of certain forms of income in kind (free school meals, Healthy Start vouchers and free school milk for children and free TV licences for those aged 75 and over); UKMOD ignores these.

High-income people, self-employment earnings and investment income are generally underrepresented, possibly due to higher survey non-response by the types of people concerned, and under-reporting of such sources of income, particularly by high-income respondents.

Receipt of benefits or tax credits based on past circumstances is not modelled. It is effectively assumed that entitlement is based on current circumstances. This has particular bearing on simulations of Child Tax Credit and especially Working Tax Credit, which are in practice based on income in the previous year. Final awards are only adjusted if current year income exceeds a threshold.

Our baseline applies a correction for non-take-up of means-tested benefits and tax credits to reduce the proportions of those entitled who are modelled to receive the benefit/credit. This correction is only approximate. It improves poverty and inequality estimates relative to those produced officially using the same underlying data. But some benefits remain over-simulated (Income Support) and others under-simulated (Working Tax Credit and Child Tax Credit). For some applications of UKMOD users are advised to explore the full-take-up option as well.

When comparing results for the UK with those for other countries it is important to remember that:

1. UK results are based on FRS data, not data from the EU-SILC. These data relate to 2019/20. However, from 2012 to 2017, the EU-SILC makes use of data from the FRS.
2. The reference time period for UK data is (generally) the last month, rather than the previous year (as for other countries in the EU-SILC).

When using the *baseline* results from the 2020 to 2025 policy years it is important to remember that no adjustments have been made for demographic changes or changes in the composition or distribution of market incomes since 2019/20, except those captured by updating by income source, by simulating unemployment shocks, and in 2020 and 2021, by simulating Covid-19 shocks as well.

Relatedly, although we include Covid-19 shocks in our baseline, users should be cautious in interpreting the results from these simulations. The simulation of the Covid-19 shocks is subject to a range of assumptions about the size of shocks and who is affected by them. We attempted to strike a balance between trying to model the labour market shocks, the breakdowns already provided by HMRC, and the large number of parameters that the shocks introduce in the model.

The validation exercises conducted so far point to some puzzles that require further work to fully understand. Users are advised to read the validation section of this report and be aware of the issues raised in interpreting the results of their simulations.

As Universal Credit gets rolled out to everyone, simulations of the ‘legacy benefits’ tend to be underestimated. Users are advised to consider the detailed sections in this report on further information about the assumptions and estimation quality for the duration of the transition years.

Users should also note that Universal Credit Sanctions and Conditionalities are not implemented in UKMOD – these could further impact the total income received by families and the poverty rates estimated in this report.

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For previous versions of the EUROMOD/UKMOD Country Reports, see:

- De Agostini, Paola and Kakia Chatsiou (2019): “EUROMOD Country Report: United Kingdom 2016-2020”, https://www.euromod.ac.uk/sites/default/files/country-reports/year10/Y10_CR_UK_Final.pdf
- De Agostini, Paola (2018a), “EUROMOD Country Report: United Kingdom 2015-2018” https://www.euromod.ac.uk/sites/default/files/country-reports/year9/Y9_CR_UK_Final.pdf
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- De Agostini, Paola and Holly Sutherland (2015), “EUROMOD Country Report: United Kingdom 2011-2015” https://www.euromod.ac.uk/sites/default/files/country-reports/year6/Y6_CR_UK_final_13-04-2016.pdf

6. SOURCES FOR TAX-BENEFIT DESCRIPTIONS/RULES

6.1 General sources for tax-benefit descriptions/rules

- Child Poverty Action Group (2016) “Welfare Benefits and Tax Credits Handbook 2016/2017”, CPAG London
- Child Poverty Action Group (2017) “Welfare Benefits and Tax Credits Handbook 2017/2018”, CPAG London
- Child Poverty Action Group (2018) “Welfare Benefits and Tax Credits Handbook 2018/2019”, CPAG London
- Child Poverty Action Group (2019) “Welfare Benefits and Tax Credits Handbook 2019/2020”, CPAG London

6.2 Useful websites

www.hmrc.gov.uk

<https://www.gov.uk/>

<https://www.gov.uk/browse/tax>

<https://www.gov.uk/browse/benefits>

<https://www.gov.uk/government/publications>

<http://www.ifs.org.uk/fiscalFacts/taxTables>

7. ANNEXES

7.1 Annex 1: Uprating factors

Table 7.1 Uprating factors

Uprate factor	Constant name	Value of the indices							Source	Income components uprated by the factor
		2019	2020	2021	2022	2023	2024	2025		
Default uprating factor (CPI)	\$f_cpi	107.80	108.70	112.26	116.39	119.11	121.53	123.96	Until 2020: ONS Consumer price inflation tables; from 2021 series projected using OBR Economic and fiscal outlook – October 2021 (CPI (year-on-year change), Table 2.12)	yls, bedsl, bedes, buntr, boactcm, bot, ypp
Earnings index	\$f_yem	172.51	176.54	166.88	170.30	175.52	180.07	185.69	Until 2020: ONS EARN01 Average Weekly Earnings including bonuses excluding arrears (seasonally adjusted); from 2021 series projected using OBR Economic and fiscal outlook – October 2021 (Average hourly earnings index (2008Q1=100), Table 1.6)	yem, yemiv, yse, yseiv, yot01, yot02, xcc, xmp, yptmp, yptot, xpp, yempy_a, yem_a
Attendance allowance	\$f_bdioa	87.65	89.15	89.60	92.40	96.00	98.25	100.25	Change in main rate of benefit; until 2022: DWP/HMT/HMRC announcements; from 2023 (forecasts): statutory indexation based on September's CPI (2022-24 Q3 from OBR Economic and fiscal outlook – October 2021, Table 1.7)	bdioa, bdisc
Disability living allowance (mobility)	\$f_bdimb	61.20	62.25	62.55	64.50	67.00	68.60	70.00	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bdimb
Incapacity Benefit + Employment	\$f_bdiet	112.25	114.15	114.70	118.25	122.85	125.75	128.30	Change in main rate of benefit; DWP/HMT/HMRC announcements	bdiet, bdiet01, bdiet02

Uprate factor	Constant name	Value of the indices							Source	Income components uprated by the factor
		2019	2020	2021	2022	2023	2024	2025		
and Support Allowance									plus statutory indexation for projections (September's CPI) as in \$f_bdioa	
Industrial injuries pension	\$f_bdiwi	179.00	182.00	182.90	188.60	195.90	200.55	204.60	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bdiwi
Invalid care allowance + Carer's Allowance	\$f_bcrdi	66.15	67.25	67.60	69.70	72.40	74.10	75.60	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bcrdi
National insurance retirement pension	\$f_boact00	129.20	134.25	137.60	141.85	146.25	149.90	154.10	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (Triple lock guarantee, OBR Economic and fiscal outlook – October 2021, Table 2.12)	boact00
Severe disablement allowance	\$f_bdisv	79.50	80.85	81.25	83.75	87.00	89.05	90.85	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bdisv
Statutory sick pay	\$f_bhlwk	94.25	95.85	96.35	99.35	103.20	105.65	107.80	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bhlwk
Unemployment benefit (contributory)	\$f_bunct	73.10	74.35	74.70	77.00	80.00	81.90	83.55	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for	bunct

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Uprate factor	Constant name	Value of the indices							Source	Income components uprated by the factor
		2019	2020	2021	2022	2023	2024	2025		
Jobseeker's Allowance)									projections (September's CPI) as in \$f_bdioa	
War pension	\$f_boawr	189.80	193.00	194.00	199.35	207.10	212.00	216.30	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	boawr
Widow's pension/benefit	\$f_bsuwd	119.90	121.95	122.55	126.35	131.25	134.35	137.05	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bsuwd
Maternity Allowance	\$f_bmana	148.68	151.20	151.97	156.66	162.75	166.60	169.95	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections (September's CPI) as in \$f_bdioa	bmana, bmaer
Mortgage interest payment	\$f_xhcmomi	44.30	39.42	37.77	40.07	43.52	44.21	44.78	Until 2020: Bank of England's 'Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, loans secured on dwellings to households (in percent) not seasonally adjusted', CFMHSDE. From 2021 (forecast): OBR Economic and fiscal outlook – October 2021 (Table 1.9).	xhcmomi
Council Tax: rest of England	\$f_tmu1	1,750	1,818	1,898	1,935	1,971	2,009	2,047	Until 2021: Council Tax levels set by local authorities in England (Table 6: Average area Band D council tax and the annual percentage change by area of authority 2017-18 to 2021-22);	tmu (England, excluding London)

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Uprate factor	Constant name	Value of the indices							Source	Income components uprated by the factor
		2019	2020	2021	2022	2023	2024	2025		
									from 2022: series projected using OBR Economic and fiscal outlook – March 2021 (Council tax receipts, Table 3.1)	
Council Tax: Wales	\$f_tmu11	1,591	1,667	1,731	1,807	1,888	1,973	2,061	Until 2021: StatsWales, Composition of average band D council tax, by year; from 2022, the same data for projections as for \$f_tmu1	tmu (Wales)
Tax free investment income	\$f_yiynt	30.05	12.86	29.03	30.16	31.89	33.21	34.25	Source: Until 2008: data from the Bank of England's index "IUMWTTA"; for 2009-2010, data from the Bank of England's index "IUMB6RH"; for 2011-2020: data from the Bank of England's 'Monthly interest rate of UK monetary financial institutions (excl. Central Bank) sterling cash ISA deposits including unconditional bonuses from households (in percent) not seasonally adjusted: IUMB6VL'. The data series is re-calculated so 2011 value is the reference, i.e. 2011=100. From 2021: the pp increase in the Long-term interest rates is added, taken from OBR Economic and fiscal outlook – October 2021 (Table 1.9).	yiynt, yiytx
Financial capital	\$f_afc	100	100	100	100	100	100	100		afc, xhcmomc
Observed values to be kept constants	\$f_const	100	100	100	100	100	100	100		bch, bfamt, bho, bmu, boaht, boamt, bwkmt, bsauc, tpcpe, yds, tmu01, tmu02, bsa, bsa01, ked, kivho, khl

Uprate factor	Constant name	Value of the indices							Source	Income components uprated by the factor
		2019	2020	2021	2022	2023	2024	2025		
Rent CPI	\$f_xhcrtCPI	103.90	105.40	107.10	109.10	112.30	115.70	118.60	Until 2020: ONS CPI INDEX 04.1 : ACTUAL RENTS FOR HOUSING 2015=100. From 2021 (forecast) OBR Economic and fiscal outlook – October 2021 (Table 1.7).	xhcrt (excluding social rent), yprnt, yprrx, ypr, xhcot, xhcsc, xhc01, xhc_hbai
Rent RPI	\$f_xhcrtRPI	372.8	379.5	384.1	388.8	393.5	398.2	403.1	Until 2020: ONS RPI: housing: rent (Jan 1987=100); from 2021 series projected using OBR Economic and fiscal outlook – October 2021 (RPI (Jan 1987=100), Table 1.7)	xhcrt (social rent, Northern Ireland, Scotland and Wales)
Rent CPI/1% decrease	\$f_xhcrtCPIeng	101.30	102.80	104.40	106.40	109.50	112.80	115.60	Until 2017: same as \$f_xhcrtCPI. In 2018-2019: forecast 1% reduction from previous year. From 2020: uprated using \$f_xhcrtCPI	xhcrt (social rent, England)
Council Tax: London	\$f_tmu8	1,477	1,534	1,622	1,653	1,684	1,716	1,749	Until 2021: Council Tax levels set by local authorities in England (Table 6: Average area Band D council tax and the annual percentage change by area of authority 2017-18 to 2021-22); from 2022, the same data for projections as for \$f_tmu1	tmu (Greater London)
Council Tax: Scotland	\$f_tmu12	1,251	1,308	1,308	1,329	1,353	1,379	1,407	Until 2021: Scottish Government, Council tax datasets, Band D, Band D council tax 1996-97 to 2021-22; from 2020, the same data for projections as for \$f_tmu1	tmu (Scotland)

7.2 Annex 2: Policy Effects in 2021-2022

In this section we analyse the direct tax-benefit policy effect on household disposable income in the United Kingdom between 2021 and 2022. We try to understand how changes (or non-changes) to tax-benefit policies have affected household incomes in the period, abstracting from changes in the population characteristics and the distribution of market/original gross incomes. In other words, **we do not account for increases to unemployment, reduction in hours for self-employed and furloughing of workers due to the Covid-19 crisis.**

Table 7.1 and Figure 7.1 show the effect, measured in real terms, of the 2022 announced policy reforms on mean equivalised household disposable income by income component and income decile group. The effect is estimated as the difference between simulated household net income under 2022 tax-benefit policies (deflating the tax-benefit monetary parameters by OECD's Harmonized Index of Consumer Prices, HICP = 1.037) and net incomes simulated under 2021 policies, as a percentage of mean equivalised household disposable income in 2021. The total policy effect on household income is decomposed into different components representing main elements of the national tax-benefit system.

Table 7.2 shows that, abstracting from changes to original (gross) market incomes, household net income will decrease, by 1.32% on average, due to policy changes in 2021-2022. Net incomes will decrease across the entire distribution. The income losses across the distribution will be mainly due to increases in **employee NICs and direct taxes**. This will probably be primarily the result of freezing parameters such as the Personal Allowance (including the transferable one), the Intermediate rate threshold in Scotland and the similar Basic rate threshold for the rest of the UK, and the Upper Earnings Limit for employee NICs, and the implementation of the Health and Social Care Levy.

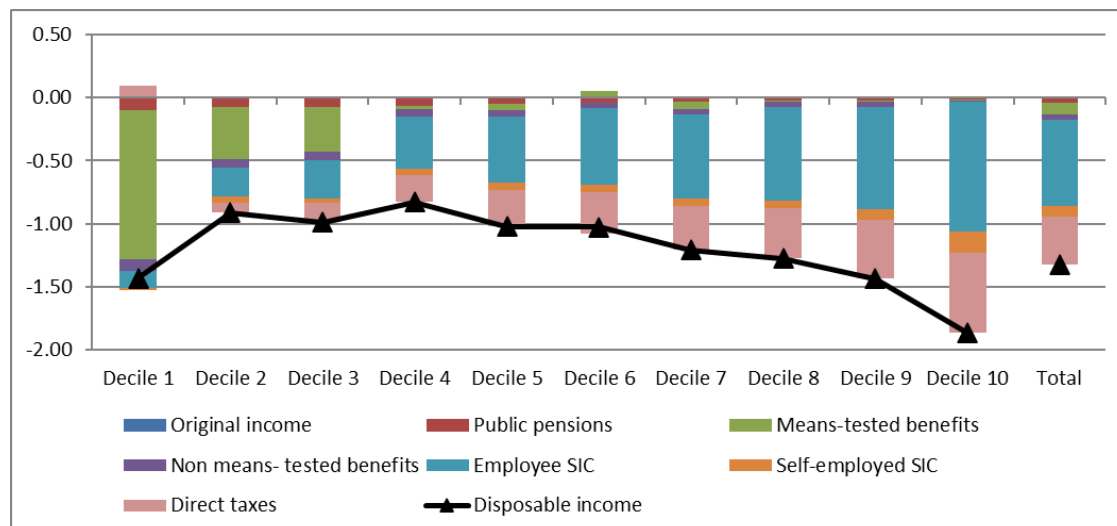
We also see a reduction in **means-tested benefits**. This is probably mostly the result of the end of the Covid-19 benefit increases. Until September 2021, the standard allowance of Universal Credit (UC) was increased substantially, while Working Tax Credit (WTC) recipients at the beginning of that year received a generous lump-sum.

Table 7.2 Policy Effects 2021-2022, using CPI indexation, %

Decile	Original income	Public pensions	Means-tested benefits	Non means-tested benefits	Employee SIC	Self-employed SIC	Direct taxes	Disposable income
1	0.00	-0.10	-1.19	-0.09	-0.13	-0.02	0.10	-1.43
2	0.00	-0.07	-0.41	-0.07	-0.23	-0.05	-0.08	-0.91
3	0.00	-0.07	-0.35	-0.07	-0.31	-0.03	-0.15	-0.99
4	0.00	-0.06	-0.03	-0.06	-0.42	-0.05	-0.22	-0.83
5	0.00	-0.05	-0.04	-0.05	-0.53	-0.05	-0.29	-1.02
6	0.00	-0.04	0.05	-0.05	-0.60	-0.06	-0.33	-1.03
7	0.00	-0.04	-0.06	-0.04	-0.67	-0.05	-0.35	-1.21
8	0.00	-0.03	-0.01	-0.04	-0.74	-0.06	-0.40	-1.28
9	0.00	-0.02	-0.01	-0.04	-0.81	-0.08	-0.47	-1.44
10	0.00	-0.01	-0.01	-0.01	-1.03	-0.17	-0.64	-1.87
Total	0.00	-0.04	-0.09	-0.04	-0.69	-0.08	-0.38	-1.32

Notes: shown as a percentage change in mean equivalised household disposable income by income component and income decile group. Income decile groups are based on equivalised household disposable income in 2021, using the modified OECD equivalence scale. Each policy system has been applied to the same input data, deflating monetary parameters of 2022 policies by projected OECD's Harmonized Index of Consumer Prices (HICP)

Figure 7.1 Policy Effects 2021-22, using CPI indexation (CPI=1.037), %



7.3 Annex 3: UKMOD key income concepts

Annex 3 describes some of the key income concepts in UKMOD and lists their corresponding variable names:

➤ **Components of disposable income:**

Income from employment and self-employment: ils_earn (UKMOD variable name)

Original/market income: ils_origy

Means-tested non-pension benefits: ils_benmt

Non-means-tested non-pension benefits: ils_bennt

Pensions: ils_pen

All benefits: $\text{ils_ben} = \text{ils_pen} + \text{ils_benmt} + \text{ils_bennt}$

Direct taxes: ils_tax

Employee National Insurance contributions: ils_sicee

Self-employed National Insurance contributions: ils_sicse

Other National Insurance contributions (non-existent in the UK): ils_sicot

All employee/self-employed/other National Insurance Contributions: $\text{ils_sicdy} = \text{ils_sicee} + \text{ils_sicse} + \text{ils_sicot}$

Disposable income: $\text{ils_dispy} = \text{ils_origy} + \text{ils_ben} - \text{ils_tax} - \text{ils_sicdy}$

➤ **National Insurance contributions paid by the employer/state:**

Employer National Insurance contributions: ils_sicer

Credited National Insurance contributions (in 2020 only with simulation of Covid-19 shocks and Coronavirus Job Retention Scheme): ils_sicct

➤ **Original/market income in more detail:**

Non-simulated:

Employment income: yem

Self-employment income: yse

Investment income: yiy

Income from odd jobs: yot01

Property income: ypr

Personal pension: ypp

Private transfers (non-taxable): yptot

Received maintenance payment: yptmp

Maintenance paid: xmp

Coronavirus Job Retention Scheme contribution paid by employer (in 2020 only with simulation of Covid-19 shocks): yemmc_s

Grouped in income lists:

Income from employment and self-employment: $\text{ils_earn} = \text{yem} + \text{yse} + \text{yemmc_s}$ (in 2020)

Original/market income: $\text{ils_origy} = \text{yem} + \text{yse} + \text{yiy} + \text{yot01} + \text{ypr} + \text{ypp} + \text{yptot} + \text{yptmp} - \text{xmp} + \text{yemmc_s}$ (in 2020)

➤ **National Insurance contributions in more detail:**

Simulated:

Employee National Insurance Contributions: tscee_s

Occupational pension contribution: tpcee_s

Self-employed National Insurance contributions: tscse_s

Employer National Insurance contributions: tscer_s

Credited (State) National Insurance contributions (in 2020 only with simulation of Covid-19 shocks): $tscct_s$

Health and Social Health Care Levy: $teehl_s$, $tsehl_s$, $terhl_s$

Grouped in income lists:

Employee National Insurance contributions: $ils_sicee = tscee_s + tpcee_s + teehl_s$

Self-employed National Insurance contributions: $ils_sicse = tscse_s + tsehl_s$

Employer National Insurance contributions: $ils_sicer = tscer_s + terhl_s$

Credited (State) National Insurance contributions (in 2020 only with simulation of Covid-19 shocks): $ils_sicct = tscct_s$

➤ **Taxes in more detail:**

Simulated:

Personal Income Tax: tin_s (and although not included in any income list, we also create $tin12_s$, $tin11_s$ and $tin00_s$ that included the revenues going to Scotland, Wales and the rest of the UK and add up to tin_s)

Non-simulated:

Council tax: tmu

Grouped in income lists:

Direct taxes: $ils_tax = tin_s + tmu$

Simulated taxes: $ils_taxsim = tin_s$

➤ **Benefits in more detail:**

Simulated:

Working Tax Credit: $bwkmt_s$

Child Tax Credit: $bfamt_s$

Income Support & income-based Jobseeker's Allowance (unless simulated separately): bsa_s

Income-based Jobseeker's Allowance: $bunmt_s$

Income-related Employment and Support Allowance: $bsadi_s$

Pension Credit: $boamt_s$

Housing Benefit: bho_s

Council Tax Reduction: bmu_s

Sure Start Maternity Grant: $bmamt_s$

Best Start Grant (Scotland) (since 2019): $bmascm_s$

Universal Credit: $bsauc_s$

Scottish Child Payment (since 2021): $bchmt_s$

Scottish Child Payment Bridging Payments (2021-2022): $bchmt01_s$

Benefit cap (reducing Housing Benefit): brd_s

Benefit cap (reducing Universal Credit): $brduc_s$

Winter Fuel Allowance: $boaht_s$

Child Benefit: bch_s

Contribution-based Jobseeker's Allowance: $bunct_s$

Scottish Carer's Allowance Supplement: $bcrdicm_s$

Scottish Child Winter Heating Assistance (since 2020): $bchht_s$

Coronavirus Job Retention Scheme (in 2020 only with simulation of Covid-19 shocks): $bwkmcee_s$

Self-Employment Income Support Scheme (in 2020 only with simulation of Covid-19 shocks): $bwkmce_s$

Non-simulated:

Student payments: $bedes$

Student Loan: bedsl
 Attendance allowance: bdioa
 Disability Living Allowance: bdisc
 Disability Living (mobility) Allowance: bdimb
 Personal Independence Payment living allowance: bdiscwa
 Personal Independence Payment mobility: bdimbwa
 Incapacity Benefit: bdict01
 Contributory Employment and Support Allowance: bdict02
 Industrial injuries pension: bdiwi
 Invalid Care Allowance: bcrdi
 Severe Disablement Allowance: bdisv
 Statutory Sick Pay: bhlwk
 Training Allowance: buntr
 Statutory Maternity Pay: bmaer
 Maternity Allowance: bmana
 other non-means-tested benefits: bot
 Basic State pension: boact00
 Second State Pension: boactcm
 War pension: boawr
 Widow's pension: bsuwd

Grouped in income lists:

Means-tested non-pension benefits: $ils_benmt = bwkmt_s + bfamt_s + bsa_s + bsadi_s + boamt_s + bho_s + bmu_s + bunmt_s + bmamt_s + bmascm_s$ (since 2019) + $bsauc_s + bchmt_s$ (since 2021) + $bchmt01_s$ (2021-2022) - $brd_s - brduc_s$

Non-means-tested non-pension benefits: $ils_bennt = bedes + bedsl + bdioa + bdisc + bdimb + bdiscwa + bdimbwa + bdict01 + bdict02 + bdiwi + bcrdi + bdisv + bhlwk + buntr + bot + bmaer + bmana + boact_s + bch_s + bunct_s + bcrdicm_s + bchht_s$ (since 2020) + $bwkmcee_s$ (in 2020) + $bwkmcse_s$ (in 2020)

Pensions: $ils_pen = boact00 + boactcm + boawr + bsuwd$

Simulated benefits: $ils_bensim = bwkmt_s + bfamt_s + bsa_s + bsadi_s + boamt_s + bho_s + bmu_s + bunmt_s + bsauc_s + boact_s + bch_s + bunct_s + bmamt_s + bmascm_s$ (since 2019) + $bchmt_s$ (since 2021) + $bchmt01_s$ (2021-2022) + $bchht_s$ (since 2020) + $bwkmcee_s$ (in 2020) + $bwkmcse_s$ (in 2020) - $brd_s - brduc_s$

Benefits by function:

Childbirth-related benefits: $ils_b1_bcb = bmana + bmanc_s + bmaer + bmact_s + bpact_s + bmamt_s + bmascm_s$ (since 2019)

Family-related benefits: $ils_b1_bfa = ils_b1_bcb + bfamt_s + bch_s + bchmt_s$ (since 2021) + $bchmt01_s$ (2021-2022)

Education-related benefits: $ils_b1_bed = bedes + bedsl + bot$

Old-age benefits: $ils_b1_boa = boact00 + boactcm + boamt_s + boact_s$

Survivor benefits: $ils_b1_bsu = bsuwd + boawr$

Disability-related benefits: $ils_b1_bdi = bdict02 + bsadi_s + bdioa + bdisc + bdimb + bdiscwa + bdimbwa + bdisv + bdiwi + bcrdi + bchht_s$ (since 2020)

Unemployment benefits: $ils_b1_bun = bunct_s + bunmt_s + buntr + bwkmcee_s$ (in 2020) + $bwkmcse_s$ (in 2020)

Health and sickness-related benefits: $ils_b1_bhl = bdict01 + bhlwk$

Housing benefits: $ils_b1_bho = bho_s + bmu_s - brd_s$

Social assistance/exclusion benefits: $ils_b1_bsa = bwkmt_s + bsa_s + bsauc_s - brduc_s$

Family and education benefits: $ils_b2_bfaed = ils_b1_bfa + ils_b1_bed$

Old-age and health benefits: $ils_b2_penhl = ils_b1_boa + ils_b1_bsu + ils_b1_bhl + ils_b1_bdi$

Social assistance and housing benefits: $ils_b2_bsaho = ils_b1_bsa + ils_b1_bho$

7.4 Annex 4: UKMOD-specific elements

Compared to the former UK-component of the EU-wide model EUROMOD, the UKMOD model includes the following additional elements:

- **Multi-year data:** In addition to the standard UKMOD input data based on a single-year of FRS data, a multi-year UKMOD input dataset is made available to users: UK_2019_b1. The multi-year dataset is constructed by appending three consecutive UKMOD input data files (i.e. three FRS waves). The increased sample size allows increasing variability in the data especially when analysing subnational reforms affecting subgroups of the population (e.g. lone parents in Scotland and Wales). More details in section 3.3.
- **Country models for the UK four nations:** In the UKMOD model there is the option of choosing to work with subnational country models for England, Wales, Scotland and Northern Ireland. These country models can be used in combination with the multi-year data to increase sample variance. In the simulation analysis they apply only to the households located in the respective country.
- **Forecast policy systems for 2023-2025:** The latest version of UKMOD includes policy systems up to 2025. The forecast systems include policy projections for 2023, 2024 and 2025 based on the different tax and benefits' uprating factors, including earnings growth projections, inflation, etc for these years, forecast by external official sources, usually OBR (see Section 2 for details of each tax and benefit projections).

7.5 Annex 5: Validation Tables

Table 7.3 Tax benefit instruments included but not simulated in UKMOD - Number of recipients/ payers (in thousands)

	Variable name	UKMOD (1)							External (2)							Ratio (1/2)						
		2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
Benefits																						
Contributory Employment and Support Allowance (ESA)	bdict02	291	291	291	291	291	291	291	360	390	439	481	509	583	699	0.81	0.75	0.66	0.60	0.57	0.50	0.42
Retirement Pension	boact00	11,313	11,313	11,142	11,142	11,142	11,142	11,142	11,224	10,650	10,145	9,641	9,165	8,688	8,216	1.01	1.06	1.10	1.16	1.22	1.28	1.36
Second State Pension	boactcm	8,423	8,423	8,423	8,423	8,423	8,423	8,423	9,238	8,818	8,446	8,074	7,723	7,362	7,001	0.91	0.96	1.00	1.04	1.09	1.14	1.20
Bereavement Benefits	bsuwtd	169	169	169	169	169	169	169	101	99	96	89	83	79	75	1.67	1.71	1.76	1.90	2.04	2.14	2.25
Attendance Allowance	bdioa	813	813	813	813	813	813	813	1,443	1,298	1,292	1,303	1,336	1,373	1,418	0.56	0.63	0.63	0.62	0.61	0.59	0.57
Disability Living Allowance (either part)		1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,556	1,193	1,136	1,108	1,074	1,004	941	0.74	0.96	1.01	1.04	1.07	1.15	1.22
Severe Disablement Allowance	bdisv	15	15	15	15	15	15	15	24	15	13	11	10	8	7	0.63	1.00	1.15	1.36	1.50	1.88	2.14
Carer's Allowance	bcrdi	663	663	663	663	663	663	663	808	844	890	949	1,003	1,057	1,124	0.82	0.79	0.74	0.70	0.66	0.63	0.59
Industrial Injuries Disablement Allowance	bdiwi	152	152	152	152	152	152	152	280	237	224	217	210	203	196	0.54	0.64	0.68	0.70	0.72	0.75	0.78
Maternity allowances	bmana	14	14	14	14	14	14	14	55	53	53	53	54	55	56	0.25	0.26	0.26	0.26	0.26	0.25	0.25
War Pension and allowances	boawr	58	58	58	58	58	58	58	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statutory Maternity Pay	bmaer	163	163	163	163	163	163	163	263	262	262	262	264	267	269	0.62	0.62	0.62	0.62	0.62	0.61	0.61
Personal Independence Payment (PIP) (care)	bdiscwa	1,617	1,617	1,617	1,617	1,617	1,617	1,617	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIP (mobility)	bdimbwa	1,210	1,210	1,210	1,210	1,210	1,210	1,210	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIP (total)		2,827	2,827	2,827	2,827	2,827	2,827	2,827	2,190	2,187	2,390	2,629	2,838	3,003	3,221	1.29	1.29	1.18	1.08	1.00	0.94	0.88
Taxes and Social Insurance contributions																						
Council tax	tmu	26,985	26,985	26,985	26,985	26,985	26,985	26,985	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unless otherwise specified: Department for Work and Pensions https://www.gov.uk/government/publications/benefit-expenditure-and-caseload-tables-2021																						
Notes: in green forecasted external sources; External Statistics for War Pension and allowances no longer available																						

Table 7.4 Tax benefit instruments included but not simulated in UKMOD - Annual amounts (in mil. GBP)

	Variable name	UKMOD (1)							External (2)							Ratio (1/2)						
		2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
Benefits																						
Contributory ESA	bdict02	1,833	1,864	1,873	1,930	2,006	2,053	2,095	4,512	4,580	4,768	4,929	4,997	4,940	4,814	0.41	0.41	0.39	0.39	0.40	0.42	0.44
Retirement Pension	boact00	70,479	73,233	73,927	76,209	78,573	80,535	82,791	66,793	66,134	65,147	65,095	64,010	62,209	60,479	1.06	1.11	1.13	1.17	1.23	1.29	1.37
Second State Pension	boactcm	17,776	17,924	18,511	19,192	19,641	20,040	20,440	18,329	17,966	17,377	17,046	16,810	16,415	16,028	0.97	1.00	1.07	1.13	1.17	1.22	1.28
Bereavement Benefits	bsuud	862	876	881	908	943	965	985	506	496	393	357	299	279	263	1.70	1.77	2.24	2.54	3.15	3.46	3.75
Attendance Allowance	bdioa	3,216	3,271	3,288	3,390	3,523	3,605	3,679	5,908	5,355	5,367	5,550	5,818	6,076	6,397	0.54	0.61	0.61	0.61	0.61	0.59	0.58
Disability Living Allowance (either part)		5,370	5,462	5,489	5,660	5,880	6,019	6,142	7,233	5,801	5,524	5,446	5,360	5,091	4,767	0.74	0.94	0.99	1.04	1.10	1.18	1.29
Severe Disablement Allowance	bdisv	64	65	65	67	70	72	73	89	72	64	57	50	43	35	0.72	0.90	1.02	1.18	1.40	1.69	2.09
Carer's Allowance	bcrdi	2,271	2,309	2,321	2,393	2,486	2,544	2,596	2,941	3,058	3,194	3,455	3,684	3,921	4,275	0.77	0.76	0.73	0.69	0.67	0.65	0.61
Industrial Injuries Disablement Allowance	bdiwi	479	487	490	505	524	537	548	831	721	690	679	669	655	642	0.58	0.68	0.71	0.74	0.78	0.82	0.85
Maternity allowances	bmana	95	97	97	100	104	107	109	419	386	386	393	410	425	441	0.23	0.25	0.25	0.25	0.25	0.25	0.25
War Pension and allowances	boawr	280	285	287	294	306	313	319	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statutory Maternity Pay	bmaer	1,211	1,231	1,237	1,276	1,325	1,356	1,384	2,515	2,564	2,610	2,665	2,757	2,849	2,931	0.48	0.48	0.47	0.48	0.48	0.48	0.47
Personal Independence Payment (PIP) (care)	bdiscwa	6,039	6,143	6,173	6,366	6,614	6,769	6,907	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIP (mobility)	bdimbwa	2,848	2,897	2,911	3,001	3,118	3,192	3,257	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PIP (total)		8,887	9,040	9,084	9,367	9,732	9,961	10,164	12,500	13,569	14,776	16,359	17,769	19,138	20,950	0.71	0.67	0.61	0.57	0.55	0.52	0.49
Taxes and Social Insurance contributions																						
Council tax (payers)		41,853	43,521	45,320	46,244	47,167	48,140	49,126	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sources: Unless otherwise specified: Department for Work and Pensions https://www.gov.uk/government/publications/benefit-expenditure-and-caseload-tables-2021																						
Notes: in green forecasted external sources; External Statistics for War Pension and allowances no longer available																						

Table 7.5 Tax benefit instruments simulated in UKMOD - Number of recipients/payers (in thousands) - partial benefit take-up

	Variable name		UKMOD (1)							FRS (2)	Ratio (1/2)	External (3)							Ratio (1/3)							External Source	
		Unit	2019	2020	2021	2022	2023	2024	2025	2019	2019	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025		
Benefits																											
Child Benefit		Children	12,516	12,504	12,622	12,543	12,466	12,382	12,324	11,029	1.13	12,660	12,524	-	-	-	-	-	0.99	1.00	N/A	N/A	N/A	N/A	N/A	N/A	B
Child Benefit	bch_s	Families	7,102	7,094	7,159	7,116	7,072	7,022	6,990	6,260	1.13	7,282	7,211	-	-	-	-	-	0.98	0.98	N/A	N/A	N/A	N/A	N/A	N/A	B
Sure Maternity Grant	bmamnt_s	Families	72	75	90	96	95	96	96	#N/A	#N/A	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found
Scottish Best Start Grant	bmscmnt_s	Families	60	61	59	62	62	63	63	#N/A	#N/A	80	77	-	-	-	-	-	0.75	0.79	N/A	N/A	N/A	N/A	N/A	N/A	C
Working Tax credit (WTC) (all)	bwkmt_s	Families	810	621	664	540	443	297	129	1,036	0.78	1,268	-	-	-	-	-	-	0.64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
Child Tax Credit (CTC) (all)	bfamt_s	Families	1,737	1,480	1,312	1,080	890	643	292	1,871	0.93	1,612	-	-	-	-	-	-	1.08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
Both CTC and WTC		Families	618	496	499	414	343	225	108	911	0.68	1,056	-	-	-	-	-	-	0.59	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
Either CTC or WTC		Families	1,929	1,605	1,477	1,206	989	714	313	1,995	0.97	2,534	-	-	-	-	-	-	0.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
Without children (WTC only)		Families	192	125	165	126	100	71	21	139	1.38	212	-	-	-	-	-	-	0.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
contribution-based Jobseeker's Allowance (JSA)	bunct_s	Families	25	185	275	251	118	88	88	29	0.86	24	157	73	49	42	38	37	1.03	1.18	3.77	5.13	2.80	2.32	2.39	A	
Income Support + income-based JSA	bsa_s	Families	1,222	1,052	888	756	620	452	207	566	2.16	497	368	273	195	113	69	38	2.46	2.86	3.25	3.88	5.49	6.55	5.45	A	
income-based Employment and Support Allowance	bsadi_s	Families	891	793	680	581	489	342	146	#N/A	#N/A	1,056	964	902	840	754	566	269	0.84	0.82	0.75	0.69	0.65	0.61	0.54	A	
Income Support+income-based JSA+ESA		Families	2,113	1,845	1,568	1,337	1,109	795	353	566	3.73	1,553	1,332	1,175	1,035	867	635	307	1.36	1.38	1.33	1.29	1.28	1.25	1.15	A	
Income Support lone parents only		Families	250	211	169	144	121	92	48	207	1.21	218	158	116	86	62	40	22	1.15	1.34	1.46	1.67	1.95	2.30	2.18	A	
Universal Credit	bsauc_s	Families	2,128	3,147	3,566	4,214	4,656	5,311	6,146	1,340	1.59	2,159	4,004	4,339	4,436	4,658	5,146	5,908	0.99	0.79	0.82	0.95	1.00	1.03	1.04	A	
Pension credit - any	boamt_s	Families	1,522	1,546	1,422	1,413	1,445	1,442	1,417	1,161	1.31	1,563	1,668	1,658	1,596	1,532	1,513	1,493	0.97	0.93	0.86	0.89	0.94	0.95	0.95	A	
Pension Credit GC only		Families	744	773	704	687	718	703	677	-	n/a	776	829	844	833	817	823	812	0.96	0.93	0.83	0.82	0.88	0.85	0.83	A	
Pension Credit GC+SC		Families	493	493	446	454	460	476	476	-	n/a	533	556	538	502	466	444	439	0.92	0.89	0.83	0.90	0.99	1.07	1.08	A	
Pension Credit SC only		Families	285	281	272	272	267	263	264	-	n/a	254	282	276	261	248	246	242	1.12	1.00	0.99	1.04	1.08	1.07	1.09	A	
Housing Benefit	bho_s	Households	2,912	2,685	2,435	2,262	2,050	1,783	1,432	2,829	1.03	3,394	2,987	2,832	2,647	2,415	2,110	1,719	0.86	0.90	0.86	0.85	0.85	0.85	0.83	A	
Council Tax Reduction	bmu_s	Households	5,450	5,593	5,687	5,692	5,674	5,691	5,651	3,839	1.42	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found	
Winter Fuel Payment	boiht_s	Households	11,926	11,926	11,239	11,239	11,239	11,239	11,239	11,707	1.02	11,391	11,205	11,230	11,439	11,661	11,893	12,125	1.05	1.06	1.00	0.98	0.96	0.94	0.93	A	
Benefit cap (Housing Benefit)	brd_s	Families	41	59	33	31	29	23	10	#N/A	#N/A	40	30	-	-	-	-	-	1.02	1.97	N/A	N/A	N/A	N/A	N/A	E	
Benefit cap (Universal Credit)	brduc_s	Families	44	86	89	88	115	140	169	#N/A	#N/A	38	115	-	-	-	-	-	1.14	0.75	N/A	N/A	N/A	N/A	N/A	E	
Benefit cap (Total)		Families	85	145	122	120	144	164	179	#N/A	#N/A	79	145	-	-	-	-	-	1.08	1.00	N/A	N/A	N/A	N/A	N/A	E	
Scottish Carer's Allowance Supplement	bcrdicm_s	Individuals	52	52	52	52	52	52	52	#N/A	#N/A	81	82	83	-	-	-	-	0.64	0.63	0.62	N/A	N/A	N/A	N/A	F	
Scottish Child Payment	bchmt_s	Children	0	16	100	132	193	193	194	#N/A	#N/A	-	26	147	359	340	325	-	N/A	0.62	0.68	0.37	0.57	0.59	N/A	G	
Scottish Child Winter Heating Assistance	bchht_s	Children	0	1	3	3	3	3	3	#N/A	#N/A	-	6	16	17	18	18	-	N/A	0.22	0.18	0.17	0.16	0.16	N/A	H	
Coronavirus Job Retention Scheme	bwkmcee_s	Individuals	0	4,904	955	0	0	0	0	#N/A	#N/A	-	5,019	998	-	-	-	-	N/A	0.98	0.96	N/A	N/A	N/A	N/A	I	
Self-employment Income Support Scheme	bwkmcee_s	Individuals	0	2,029	658	0	0	0	0	#N/A	#N/A	-	2,115	689	-	-	-	-	N/A	0.96	0.96	N/A	N/A	N/A	N/A	J	
Taxes and Social Insurance contributions																											
Income tax	tin_s	Individuals	29,853	29,545	29,431	30,011	30,583	30,939	31,466	#N/A	#N/A	31,400	31,700	32,200	-	-	-	-	0.95	0.93	0.91	N/A	N/A	N/A	N/A	N/A	K
Basic rate		Individuals	23,599	23,303	23,476	23,805	24,104	24,225	24,344	#N/A	#N/A	26,400	26,600	27,000	-	-	-	-	0.89	0.88	0.87	N/A	N/A	N/A	N/A	N/A	K
Higher rate		Individuals	3,813	3,870	3,549	3,743	3,958	4,152	4,515	#N/A	#N/A	3,860	3,970	4,130	-	-	-	-	0.99	0.97	0.86	N/A	N/A	N/A	N/A	N/A	K
Additional rate		Individuals	308	278	276	296	325	348	363	#N/A	#N/A	425	420	440	-	-	-	-	0.73	0.66	0.63	N/A	N/A	N/A	N/A	N/A	K
NIC Employees (Class 1)	tscee_s	Individuals	23,826	22,924	22,986	23,001	23,100	23,131	23,161	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found	
NIC Self-employed (Class 2 + any Class 4)	tscee_s	Individuals	3,097	-2,601	2,280	3,083	3,094	3,108	3,110	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found	
NIC Employees and Self-Employed		Individuals	26,923	20,323	25,266	26,084	26,194	26,239	26,271	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found	

Table 7.6 Tax benefit instruments simulated in UKMOD - Annual amounts (in mil. GBP) - partial benefit take-up

	Variable name	UKMOD (1)								FRS (2)		Ratio (1/2)		External (3)								Ratio (1/3)								External Source
		2019	2020	2021	2022	2023	2024	2025	2019	2019	2019	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025					
Benefits																														
Child Benefit	bch_s	11,340	11,539	11,703	11,963	12,331	12,547	12,679	10,139	1.12	11,081	11,172	11,256	11,380	11,508	11,530	11,525	1.02	1.03	1.04	1.05	1.07	1.09	1.10	A					
Sure Maternity Grant	bmamt_s	37	39	46	49	49	49	49	#N/A	#N/A	26	28	30	28	28	28	28	1.43	1.39	1.53	1.74	1.75	1.76	1.77	A					
Scottish Best Start Grant	bmascmt_s	20	20	20	21	21	21	20	#N/A	#N/A	19	18	-	-	-	-	-	1.05	1.11	N/A	N/A	N/A	N/A	N/A	C					
Working Tax credit (WTC) (all)	bwkmt_s	2,138	2,412	2,099	1,573	1,320	897	423	2,413	0.89	3,825	-	-	-	-	-	-	0.56	N/A	N/A	N/A	N/A	N/A	N/A	D					
Child Tax Credit (CTC) (all)	bfamt_s	8,451	7,795	6,538	5,382	4,546	3,287	1,461	10,249	0.82	13,875	-	-	-	-	-	-	0.61	N/A	N/A	N/A	N/A	N/A	N/A	D					
CTC and WTC		10,589	10,207	8,636	6,955	5,866	4,184	1,884	12,662	0.84	17,700	14,520	10,518	8,042	6,112	4,105	1,882	0.60	0.70	0.82	0.86	0.96	1.02	1.00	D and A					
Without children (WTC only)		334	370	347	251	225	179	61	363	0.92	560	-	-	-	-	-	-	0.60	N/A	N/A	N/A	N/A	N/A	N/A	D					
contribution-based Jobseeker's Allowance (JSA)	bunct_s	94	704	1,053	993	481	368	375	108	0.87	111	599	282	191	170	154	154	0.85	1.17	3.73	5.20	2.84	2.39	2.44	A					
Income Support + income-based JSA	bsa_s	4,527	3,957	3,328	2,934	2,488	1,863	884	2,082	2.17	1,979	1,495	1,126	820	467	307	115	2.29	2.65	2.95	3.58	5.33	6.07	7.69	A					
income-based Employment and Support Allowance	bsadi_s	6,141	5,521	4,772	4,203	3,664	2,680	1,221	#N/A	#N/A	9,339	8,787	8,692	8,225	7,734	6,199	3,384	0.66	0.63	0.55	0.51	0.47	0.43	0.36	A					
Income Support+income-based JSA+ESA		10,668	9,477	8,100	7,137	6,152	4,543	2,105	2,082	5.12	11,318	10,282	9,819	9,045	8,200	6,506	3,499	0.94	0.92	0.82	0.79	0.75	0.70	0.60	A					
Income support lone parents only		953	806	664	593	509	380	199	636	1.50	810	602	455	347	259	193	79	1.18	1.34	1.46	1.71	1.96	1.97	2.53	A					
Universal Credit	bsauc_s	17,419	26,397	29,821	34,073	39,133	45,644	53,800	11,614	1.50	18,386	38,162	41,273	42,223	45,966	52,239	61,451	0.95	0.69	0.72	0.81	0.85	0.87	0.88	A					
Pension Credit Guarantee Credit	boamttm_s	4,108	4,210	3,740	3,829	4,062	4,123	4,092	#N/A	#N/A	4,668	4,703	4,627	4,627	4,568	4,514	4,493	0.88	0.90	0.81	0.83	0.89	0.91	0.91	A					
Pension Credit Savings Credit	boamtxp_s	334	343	315	324	348	367	374	#N/A	#N/A	392	380	372	347	330	324	315	0.85	0.90	0.85	0.93	1.06	1.13	1.19	A					
Pension Credit (PC) total	boamt_s	4,442	4,553	4,055	4,153	4,410	4,491	4,466	3,522	1.26	5,061	5,083	4,999	4,975	4,897	4,839	4,807	0.88	0.90	0.81	0.83	0.90	0.93	0.93	A					
Housing Benefit	bho_s	12,560	12,319	10,955	10,332	9,622	8,476	6,706	13,494	0.93	18,364	17,290	16,923	16,166	15,156	13,757	11,555	0.68	0.71	0.65	0.64	0.63	0.62	0.58	A					
Council Tax Reduction	bmu_s	6,849	7,332	7,675	7,857	8,044	8,257	8,410	3,215	2.13	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found					
Winter Fuel Payment	boht_s	1,997	1,997	1,903	1,903	1,903	1,903	1,903	1,940	1.03	1,974	1,999	1,980	2,010	2,051	2,094	2,138	1.01	1.00	0.96	0.95	0.93	0.91	0.89	A					
all IS+PC+income-based JSA		15,110	14,031	12,154	11,290	10,562	9,034	6,571	5,603	2.70	7,039	6,578	6,126	5,795	5,364	5,146	4,922	2.15	2.13	1.98	1.95	1.97	1.76	1.33	A					
Benefit cap (Housing Benefit)	brd_s	127	286	122	126	124	93	65	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found					
Benefit cap (Universal Credit)	brduc_s	123	500	261	275	376	496	598	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found					
Benefit cap (Total)		250	786	383	401	500	589	663	#N/A	#N/A	-	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not found					
Scottish Carer's Allowance Supplement	bcrdicm_s	23	24	24	25	26	26	27	#N/A	#N/A	18	19	29	-	-	-	-	1.28	1.26	0.83	N/A	N/A	N/A	N/A	F					
Scottish Child Payment	bchmt_s	0	9	65	209	356	364	374	#N/A	#N/A	-	11	77	111	184	179	-	N/A	0.82	0.84	1.88	1.93	2.03	N/A	G					
Scottish Child Winter Heating Assistance	bchht_s	0	0	1	1	1	1	1	#N/A	#N/A	-	3	3	3	4	4	-	N/A	0.00	0.31	0.29	0.29	0.28	N/A	H					
Coronavirus Job Retention Scheme	bwkmcce_s	0	59,471	7,652	0	0	0	0	#N/A	#N/A	-	59,500	7,800	-	-	-	-	N/A	1.00	0.98	N/A	N/A	N/A	N/A	N/A	I				
Self-employment Income Support Scheme	bwkmcse_s	0	29,133	4,309	0	0	0	0	#N/A	#N/A	-	23,420	4,682	-	-	-	-	N/A	1.24	0.92	N/A	N/A	N/A	N/A	N/A	J				
Taxes and Social Insurance contributions																														
Income tax	tin_s	163,270	159,230	152,443	161,197	170,626	178,488	187,865	#N/A	#N/A	192,000	193,000	199,000	-	-	-	-	0.85	0.83	0.77	N/A	N/A	N/A	N/A	N/A	K				
Basic rate		62,026	62,072	60,061	62,011	64,469	66,281	67,299	#N/A	#N/A	65,000	65,100	66,900	-	-	-	-	0.95	0.95	0.90	N/A	N/A	N/A	N/A	N/A	K				
Higher rate		66,366	65,784	61,099	65,357	69,506	73,179	79,222	#N/A	#N/A	63,600	66,500	69,200	-	-	-	-	1.04	0.99	0.88	N/A	N/A	N/A	N/A	N/A	K				
Additional rate		28,226	25,057	24,918	27,112	29,630	31,769	33,706	#N/A	#N/A	62,000	60,500	62,500	-	-	-	-	0.46	0.41	0.40	N/A	N/A	N/A	N/A	N/A	K				
NIC Employees (Class 1)	tscee_s	60,241	56,906	54,902	62,727	56,911	58,022	59,411	#N/A	#N/A	56,161	57,466	-	-	-	-	-	1.07	0.99	N/A	N/A	N/A	N/A	N/A	N/A	L				
SIC Self employed (Class 2 + any Class 4)	tsce_s	5,382	3,329	4,426	5,845	5,142	5,252	5,388	#N/A	#N/A	3,997	3,478	-	-	-	-	-	1.35	0.96	N/A	N/A	N/A	N/A	N/A	N/A	L				
NIC Employers	tscer_s	83,789	80,596	78,366	87,444	83,061	84,616	87,076	#N/A	#N/A	82,728	82,593	-	-	-	-	-	1.01	0.98	N/A	N/A	N/A	N/A	N/A	N/A	L				
NIC total (any NIC)		149,412	140,831	137,694	156,016	145,114	147,890	151,875	#N/A	#N/A	142,886	143,537	-	-	-	-	-	1.05	0.98	N/A	N/A	N/A	N/A	N/A	N/A	L				

Notes: in green forecasted external sources; Income Support (IS) also takes into account the income-based JSA; income-based ESA is effectively simulated as part of IS in EUROMOD; for CIRs accumulated values from Mar21 to Apr21 are split equally over 2020 and 2021 financial years, and similarly for SEISS the Fourth grant claims (Feb21-Apr21) are split 2/3 for 2020 and 1/3 for 2021 financial years.

Sources:

A <https://www.gov.uk/government/publications/benefit-expenditure-and-caseload-tables-2021> (Outturn and forecast: Spring Budget 2021) (Child Benefit in this source also include One Parent Benefit & Guardian's Allowance)

C Scottish Best Start Grant: <https://www.gov.scot/publications/best-start-grant-and-best-start-foods-high-level-statistics-to-31-may-2021/>

D Child and Working Tax Credit statistics: <https://www.gov.uk/government/statistics/child-and-working-tax-credits-statistics-finalised-annual-awards-2019-to-2020>

F Scottish Carer's Allowance Supplement: <https://www.gov.scot/publications/carers-allowance-supplement-april-eligibility-date-2021-and-carers-allowance-disability-living-allowance-attendance-allowance-and-severe-disablement-allowance-at-february-2021-statistics/>

G Scottish Child Payment: Scottish Fiscal Commission <https://www.fiscalcommission.scot/forecast/supplementary-costing-scottish-child-payment>

H Scottish Child Winter Heating Assistance: Scottish Fiscal Commission <https://www.fiscalcommission.scot/forecast/supplementary-costing-child-winter-heating-assistance>

I Coronavirus Job Retention Scheme <https://www.gov.uk/government/statistics/coronavirus-job-retention-scheme-statistics-4-november-2021>

J Self-Employment Income Support <https://www.gov.uk/government/statistics/self-employment-income-support-scheme-statistics-november-2021>

K Income Tax Statistics and Distributions <https://www.gov.uk/government/collections/income-tax-statistics-and-distributions>

L National Insurance Contributions <https://www.ons.gov.uk/economy/grossdomesticproductgdp/compendium/unitedkingdomnationalaccounts/thebluebook/2021>

Table 7.7 Distribution of equivalised disposable income - partial benefit take-up

UKMOD (1)								External (FRS) (2)	External (HBAI) (3)	Ratio (1/2)	Ratio (1/3)
	2019	2020	2021	2022	2023	2024	2025	2019	2019	2019	2019
Gini	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.33	0.35	0.91	0.86
Mean	1,854	1,859	1,822	1,858	1,918	1,964	2,013	1,948	1,926	0.95	0.96
Median	1,606	1,612	1,582	1,619	1,674	1,716	1,758	1,699	1,579	0.95	1.02
Decile medians (£/month equivalised)											
D1	666	667	664	680	708	725	742	532	589	1.25	1.13
D2	935	957	940	967	1,004	1,028	1,055	927	886	1.03	1.05
D3	1,124	1,146	1,131	1,160	1,205	1,234	1,268	1,148	1,086	1.00	1.03
D4	1,304	1,327	1,304	1,339	1,386	1,424	1,460	1,367	1,284	0.97	1.02
D5	1,499	1,514	1,481	1,520	1,572	1,612	1,649	1,583	1,479	0.96	1.01
D6	1,710	1,725	1,681	1,717	1,773	1,818	1,864	1,818	1,681	0.95	1.02
D7	1,952	1,967	1,920	1,954	2,014	2,062	2,114	2,086	1,922	0.94	1.02
D8	2,265	2,279	2,222	2,261	2,330	2,385	2,447	2,412	2,228	0.94	1.02
D9	2,694	2,706	2,643	2,686	2,764	2,827	2,902	2,891	2,679	0.94	1.01
D10	3,839	3,785	3,725	3,782	3,897	3,986	4,094	4,134	3,938	0.92	0.97
Decile group share											
D1	3.2	3.2	3.3	3.3	3.3	3.3	3.3	2.1	3.0	1.51	1.07
D2	5.0	5.1	5.2	5.2	5.2	5.2	5.2	4.7	4.0	1.08	1.26
D3	6.1	6.2	6.2	6.2	6.3	6.3	6.3	5.9	6.0	1.05	1.01
D4	7.0	7.1	7.2	7.2	7.2	7.2	7.2	7.0	7.0	1.01	1.01
D5	8.1	8.1	8.1	8.2	8.2	8.2	8.2	8.1	7.0	1.00	1.16
D6	9.2	9.3	9.2	9.3	9.3	9.3	9.3	9.3	9.0	1.00	1.03
D7	10.5	10.6	10.5	10.5	10.5	10.5	10.5	10.7	10.0	0.99	1.05
D8	12.2	12.3	12.2	12.2	12.2	12.2	12.2	12.4	12.0	0.99	1.02
D9	14.7	14.7	14.6	14.5	14.4	14.5	14.4	15.0	14.0	0.98	1.05
D10	23.9	23.3	23.5	23.4	23.3	23.3	23.3	24.6	28.0	0.95	0.85
Source: HBAI data from https://www.gov.uk/government/statistics/households-below-average-income-for-financial-years-ending-1995-to-2020											

Table 7.8 Poverty rates by age and gender - partial benefit take-up (baseline)

(using a poverty line equal to 50%/60%/70% of median equivalised household net income)											
UKMOD (1)								External (FRS) (2)	External (HBAI) (3)	Ratio (1/2)	Ratio (1/3)
	2019	2020	2021	2022	2023	2024	2025	2019	2019	2019	2019
Median (£/month)											
	1,606	1,612	1,582	1,619	1,674	1,716	1,758	1,699	1,579	0.95	1.02
Poverty risk: all											
50%	9.2	8.7	8.3	8.2	8.1	8.0	8.1	12.2	11.0	0.75	0.83
60%	16.3	15.5	15.4	15.3	15.0	15.1	15.0	18.9	18.0	0.86	0.91
70%	25.0	24.1	23.6	23.4	23.2	23.2	23.2	26.9	26.0	0.93	0.96
Poverty risk: children											
50%	10.8	10.1	10.0	10.4	10.3	10.3	10.6	17.0	13.1	0.63	0.82
60%	21.0	19.4	20.2	20.3	20.1	20.4	20.1	26.5	22.9	0.79	0.92
70%	33.5	31.4	32.1	32.0	31.9	31.9	32.0	36.6	33.9	0.91	0.99
Poverty risk: older people											
50%	10.8	10.1	8.3	7.6	7.6	7.6	7.6	10.3	11.1	1.04	0.98
60%	18.9	18.4	16.5	16.2	16.3	16.6	16.6	18.9	19.2	1.00	0.98
70%	29.7	29.0	25.8	25.3	25.6	25.8	26.1	30.3	30.7	0.98	0.97
Poverty risk: gender											
60% male adult	15.4	14.7	14.7	14.6	14.3	14.4	14.2	18.0	15.7	0.86	0.98
60% female adult	17.2	16.3	16.2	16.0	15.7	15.8	15.7	19.8	17.3	0.87	0.99
Source: HBAI data from https://www.gov.uk/government/statistics/households-below-average-income-for-financial-years-ending-1995-to-2020											