

EUROMOD

COUNTRY REPORT



UNITED KINGDOM (UK)

2015-2018

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EUROMOD version I1.0



EUROMOD is a tax-benefit microsimulation model for the European Union (EU) that enables researchers and policy analysts to calculate, in a comparable manner, the effects of taxes and benefits on household incomes and work incentives for the population of each country and for the EU as a whole.

EUROMOD has been enlarged to cover 28 Member States and is updated to recent policy systems using data from the European Union Statistics on Income and Living Conditions (EU-SILC) as the input database, supported by DG-EMPL of the European Commission.

This report documents the work done in one annual update for United Kingdom. This work was carried out by the EUROMOD core developer team, based mainly in ISER at the University of Essex, in collaboration with a national team.

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The results presented in this report are derived using EUROMOD version I1.0. EUROMOD is continually being improved and the results presented here may not match those that would be obtained with later versions of EUROMOD.

For more information, see: <http://www.iser.essex.ac.uk/research/euromod>

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1. BASIC INFORMATION

1.1 Basic information about the tax-benefit system

- 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 and the *social fund*, a discretionary element of which is managed under fixed local budgets each year.
- 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.
- State pension age in 2015 was 62 for women and 65 for men; the state pension age for women started increasing gradually in 2010 from 60 years old it will reach 65 years old in December 2018. After that, a phased increasing of the pension age for both men and women is planned. State pension age will reach 66 years old by 2020.
- 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.
- The income tax system is an individual system, with spouses being assessed independently.
- 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.
- 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.
- 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).
- Generally, civil partners (same sex) are treated in the same way as married couples by the tax-benefit system.
- 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 and from 2012 also for income tax allowances and thresholds. 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.

- Policy changes, or confirmations of standard uprating, are usually announced in the Autumn Financial Statement (usually in early December) for the following April. Further changes may also be announced in the March/April Budget. 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. From 2017, a new timetable is introduced: the Autumn Budget will be announced in November as the major update on the UK's finances. While in March/April the Government will respond to the Office for Budget Responsibility (OBR)'s forecasts with a Spring Statement.

1.2 Social Benefits

In the UK, social security benefits can be divided into three different types: 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 1.2.3). 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 below.

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. Private pension income over £50 per week, results in reductions to JSA payments. It is taxable. There is also a means-tested component to JSA (see 1.2.3 below).

Employment and Support Allowance (ESA): benefit for the sick and long-term incapacitated, conditional on claimants' 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 chapter 2.5.7) 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

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.

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-focused interviews in return. From 2012 contributory ESA for those on WRAG is limited to twelve months duration period.

Retirement pension: if individuals meet the contribution conditions when they are over state pension age, they get a flat rate basic 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 chapter 1.2.3). 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 chapter 1.3). There are no additions for dependants. 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. A dependent child is a child that is either 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.

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.

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 will be fully replaced by the Personal Independence Payment (PIP) by 2018 for working-age adults.

Personal Independence Payment (PIP) is gradually introduced across the country from summer 2013 for new claimants of DLA age 16-64. It should be fully rolled-out by mid 2019³. It is very similar to DLA as it is non means-tested, non-contributory and non-taxable benefit. It

³ <https://www.gov.uk/government/publications/2010-to-2015-government-policy-welfare-reform/2010-to-2015-government-policy-welfare-reform#appendix-6-introducing-personal-independence-payment> <https://www.benefitsandwork.co.uk/personal-independence-payment-pip/pip-timetable> and https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/529079/pip-statistics-to-apr-2016.pdf
<https://www.benefitsandwork.co.uk/news/3646-dla-to-pip-roll-out-behind-schedule>

aims at helping working-age adult with some of the extra costs caused by long-term disability, ill-health or terminal ill-health. As DLA it has two components - a living component and a mobility one. However each component has only two rates: a standard rate and an enhanced rate.

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 dependants. 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. There are additions for dependants and the benefit is taxable.

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 that may be 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 female state pension age, with a supplement paid for the presence of anyone aged over 80. The payment is not taxable and not 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 chapter 2.5.5). 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 chapter 2.5.3) 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 passported 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. Income Support for people aged 60 or over, known as Minimum Income Guarantee (MIG), was replaced by Pension Credit in October 2003.

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 chapter 2.5.5).

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 chapter 2.5.5).

Pension Credit (PC) is the means-tested pension for people aged over female 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 state basic 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:

- people aged 25 or over in employment or self-employment for at least 30 hours per week,
- people with disabilities working at least 16 hours per week, and
- to families with dependent children where at least one parent is in employment or self-employment for at least 16 hours per week.⁴

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 child care costs. It is not taxable.

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), which is paid regardless of income for those not in the 40% tax bracket or higher; the second component is a per-child

⁴ Specific hour limits may vary over time.

payment (higher if the child is disabled) 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.

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 March 2022. It will represent 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) will be combined into a single programme, Universal Credit. It will be administered by the Department for Work and Pensions (DWP), and will be 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. As well as changes to the way that benefit entitlements are calculated, the conditionality regime faced by Universal Credit recipients in work will be substantially different from that which currently applies. In particular, conditionality will apply to two groups of Universal Credit recipients who currently face 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.

- *Not strictly benefits*

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

1) Statutory Sick Pay (SSP) and Statutory Maternity Pay (SMP) payable to employees by the employer for the first 28 weeks of sickness or 18 weeks of maternity leave. SSP is paid at a flat rate (most employers pay full wages for short-term sickness). For SMP there is a minimum flat rate payment and a higher rate (payable for only six weeks) equal to 90% of usual earnings. Both payments are (generally) treated as earnings by the rest of the tax-benefit system.

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

3) 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*.

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

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

6) Training allowances and education maintenance allowance are paid under various schemes.

1.2.4 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.

1.3 Social contributions

1.3.1 Brief description

Social contributions, known as National Insurance Contributions (NICs), finance current National Insurance (NI) benefits and NI basic retirement 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 being 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 retirement 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.

There are some special schemes for small groups such as share fishermen.

National Insurance contributions are not tax-deductible.

1.4 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 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 saving 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 2009 there were two rate bands: a wide “standard rate” band of 20% and a higher rate of 40%. A top rate was added in 2010. From April 2016 Scotland can apply different tax rate and income band.

Tax assessment is annual (April - March). Most income tax is collected at source, either through with-holding at 20% on income from capital or through the comprehensive and cumulative Pay As You Earn (PAYE) system on earnings. Most UK income tax payers 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 chapter 2.5.9).

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 7 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 EUROMOD

2.1 Scope of simulation

Not all the taxes and benefits mentioned in the previous section are simulated by EUROMOD. Some are beyond its scope entirely and are neither included in the EUROMOD 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) and

Table 2.2 shows which taxes and contributions are simulated.

Table 2.1 Simulation of benefits in EUROMOD

	Variable name(s)	Treatment in EUROMOD				Why not fully simulated?
		2015	2016	2017	2018	
Jobseeker's Allowance (contributory)	bunct_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 unemployment benefit receipt can be switched on.
Jobseeker's Allowance (income based)	bunmt_s	S	S	S	S	Simulated as part of Income Support
Employment Support Allowance + Incapacity Benefit (contributory)	bdict01, bdict02	I	I	I	I	Inadequate data on length of sickness spell and contribution history
Employment Support Allowance (income based)	bsadi_s	S	S	S	S	
Basic State Retirement Pension	boact00	I	I	I	I	No data on contribution history or retirement date
Earnings related state pension	boactcm	I	I	I	I	Contribution history unknown
Pension Credit	boamt_s	S	S	S	S	
Winter Fuel Allowance	boht_s	S	S	S	S	
Bereavement Benefit	bsuwd	I	I	I	I	No data on deceased husband's contributions or date of widowhood
Maternity Allowance	bmana	I	I	I	I	No data on pregnancy dates, contribution conditions, previous earnings
Statutory Sick Pay	bhlwk	I	I	I	I	No data on qualifying conditions

	Variable name(s)	Treatment in EUROMOD				Why not fully simulated?
		2015	2016	2017	2018	
Statutory Maternity Pay	bmaer	I	I	I	I	No data on pregnancy dates or previous employment record or earnings.
Attendance Allowance	bdioa	I	I	I	I	Insufficient information on disability
Disability Living Allowance	bdisc, bdimb	I	I	I	I	Insufficient information on disability
Personal Independence Payment	bdiscwa, bdimbwa	I	I	I	I	Insufficient information on disability
Severe Disablement Allowance	bdisv	I	I	I	I	Insufficient information on disability
Carers Allowance	bcrdi	I	I	I	I	Insufficient information on disability
Industrial Injuries Disablement Benefit	bdiwi	I	I	I	I	Insufficient information on disability
War Pension	boawr	I	I	I	I	Insufficient information on injury
Child Benefit	bch_s	S	S	S	S	
Child Tax Credit	bfamt_s	S	S	S	S	
Working Tax Credit	bwkmt_s	S	S	S	S	
Income Support	bsa_s	S	S	S	S	
Housing Benefit	bho_s	S	S	S	S	
Local Housing Allowance	bho_s	S	S	S	S	

	Variable name(s)	Treatment in EUROMOD				Why not fully simulated?
		2015	2016	2017	2018	
Council Tax Benefit	bmu_s	S	S	S	S	From 2013 administered at local level cannot model details of local schemes ⁵ .
Social Fund		E	E	E	E	No data; cannot model local discretion
Educational Maintenance Allowance	bedes	I	I	I	I	Insufficient information on school attendance
Benefit cup	brd_s	S	S	S	S	Introduced from 2013

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.

Table 2.2 Simulation of taxes and social contributions in EUROMOD

	Variable name(s)	Treatment in EUROMOD				Why not fully simulated?
		2015	2016	2017	2018	
Income tax	tin_s	S	S	S	S	Some exemptions and small allowances are ignored.
National Insurance contributions	tscee_s, tscse_s, tscer_s	S	S	S	S	Special schemes for small groups are ignored.
Council Tax	tmu	I	I	I	I	No data on property value; no location information below standard region.
Private pension contributions	tpcee_s	PS	PS	PS	PS	Implicit rate calculated from recorded contribution and earnings

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

⁵ 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 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.

2.2 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* and *tscse_s*) are simulated followed by National Insurance contributions for employers (*tscer_s*). After the simulation of SICs, 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*) and income tax (*tin_s*) has been done next.

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 tax in line with the order of simulation in other countries.

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 Benefit (*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.

Table 2.3 EUROMOD Spine: order of simulation

Policy	2015	2016	2017	2018	Description of the instrument	Main output
FYA_uk	switch	switch	switch	switch	DEF: full year adjustment settings for modelling DLA phase-out and PIP phase-in (switch on/off to apply)	\$FYA
BTA_uk	switch	switch	switch	switch	DEF: settings for modelling benefit non take-up (switch on/off to apply)	- - -
random_uk	on	on	on	on	DEF: Generate random number for bdisc_uk	- - -
Paa_uk	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	DEF: Minimum wage (switch on/off to apply)	- - -
neg_uk	on	on	on	on	DEF: recode to 0 negative self employed income	- - -
bdisc_uk	on	On	on	On	BEN: DLA reduce number of recipients (post 2011)	bdisc
tscee_tscse_uk	on	on	on	on	SIC: employee and self employed national insurance contribution	tscee_s and tscse_s
tscer_uk	on	on	on	on	SIC: employer national insurance contribution	tscer_s
bunct_uk	on	on	on	on	BEN: contributory unemployment benefit (Job Seekers Allowance)	bunct_s
boaht_uk	on	on	on	on	BEN: pensioner's annual heating allowance (Winter Fuel Allowance)	boaht_s
bch_uk	on	on	on	on	BEN: child benefit	bch_s
tin_uk	on	on	on	on	TAX: personal income tax	tin_s
bchrd_uk	on	on	on	on	BEN: child benefit reduction	bchrd_s, bch_s
bwkmt_bfamt_uk	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	BEN: Social Assistance (Income based JSA, Income Support and Pension Credit)	bsa_s
bsadi_uk	on	on	on	on	BEN: Social Assistance (income-related Employment Support Allowance)	bsadi_s
bho_uk	on	on	on	on	BEN: housing benefit and local housing allowance	bho_s
bmu_uk	on	on	on	on	BEN: council tax benefit/support	bmu_s
bcap_uk	on	on	on	on	BEN: Total benefits capped	brd_s

2.3 Policy switches

There are three switches used in the UK model.⁶ First, there is a switch controlling benefit take-up modelling (BTA_uk). If the switch is set to *on* then partial take-up is applied (the default), otherwise (*off*) full take-up is assumed. Another switch (Paa_uk) allows a choice between modelling policies taking into account increases in female pension age introduced from autumn 2010 (*on*) and modelling policies ignoring this change (*off*). The switch is set to *on* by default). The third switch (FYA_uk) controls the transition from Disability Living Allowance (DLA) and Personal Independence Payment (PIP) in policy *bdisc_uk* which started in 2013 and should be fully implemented by 2018. The switch default value depends from the combination of datasets and policy year. It is by default *off* for all datasets collected from 2013 onward as they record entitlement to either PIP or DLA. It is by default *off* in 2013 system (with any dataset) as the first phase of introduction of PIP involved a reduced number of post codes. It is by default *on* from 2014 to 2018 systems (for dataset previous to 2013) to take into account the gradual transition from DLA to PIP.

2.4 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.

From April 2016 employees age 25 and over are entitled to the National Living Wage (NLW).

- *Eligibility conditions*

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

- *Amounts*

In June 2014 the National Minimum Wage was £6.31 per hour for employees aged 22 and over, £5.03 for those aged 18-21 and £3.72 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. In April 2016 the National Living Wage was set to add £0.5 per hour to the National Minimum Wage of employees age 25 and over.

Table 2.4 Rate of the National Minimum Wage and National Living Wage 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per hour	£ per hour	£ per hour	£ per hour
Age 25+	--	7.2	7.5	7.83
Aged 22+	6.5	6.7	7.05	7.38

⁶ Policy switches 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.

Aged 18-21	5.13	5.3	5.6	5.9
Aged 16-17	3.79	3.87	4.05	4.20

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

EUROMOD Notes: The implementation in EUROMOD checks that individuals are receiving at least the National Minimum Wage. Where this does not seem to be the case in the data, the EUROMOD calculation increases the income by calculating income based on the number of hours worked on the national minimum wage. From 2016 system, EUROMOD checks that individuals age 25 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, EUROMOD increases the individual income based on the hours worked and the NLW hourly rate.

2.5 Social benefits

2.5.1 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 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
Age threshold	62	62	63	64
	£ per year	£ per year	£ per year	£ per year
At least one member of the HH is aged over the threshold	200	200	200	200
At least one member of the HH is aged 80 or over	300	300	300	300

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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.

2.5.2 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 dependants’ 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 woman needs to be aged between 18-59 (or below the female state pension age) and man between 18 and 64;
- **Actively seeking employment:** the claimant must be available for (and show proof of actively seeking) full time employment. This criterion is not simulated in EUROMOD;
- **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 earnings⁷ (*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.

Table 2.6 Amount of contributory Jobseeker’s Allowance by age for 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week

⁷ 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.

18-24 years old	57.90	57.90	57.90	57.90
25 or over	73.10	73.10	73.10	73.10
Occupational and personal pension disregard	50.00	50.00	50.00	50.00
Earnings disregard	5.00	5.00	5.00	5.00

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

- **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).

2.5.3 Working Tax Credit and Child Tax Credit

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 EUROMOD 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 which has varied over the period 2011-2013. It was £10,000 in 2011 and was reduced to £5,000 in 2013/14 onwards. EUROMOD 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 (see section [□](#) for more information).

- **Eligibility conditions**

Working Tax Credit (*bwkmnt_s*) is an income-based credit for working adults who are either (*sin02_s* = 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
- from 2011, if a couple with children, working at least 24 hours per week between them (and at least one of them working 16 hours), but
- (from 2011/12) those in couples (with or without children) where the partner is on Carers 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 (*sin06_s*). 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:

- 1) The 'relevant period'
- 2) The 'maximum amount'
- 3) The 'relevant income'
- 4) Comparing the 'relevant income' to the 'threshold figure'
- 5) 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 EUROMOD 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 (*sin04_s*).

The maximum of the Child Tax Credit is the sum of the family element (£545 per year (in 2014/15);) and the child element of £2,750 yearly (in 2014/15), paid for each child in the family. Children with disability are entitled to additional payments (*sin08_s*).

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 (*sin03_s*) 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 EUROMOD.

Table 2.7 Working Tax Credit amounts from 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per year	Jun-16 2016/17 £ per year	Jun-17 2017/18 £ per year	Jun-18 2018/19 £ per year
WTC Basic element	1,960	1,960	1,960	1,960
WTC Lone parent element	2,010	2,010	2,010	2,010
WTC Couple element	2,010	2,010	2,010	2,010
WTC 30 hours element	810	810	810	810
WTC Disability element	2,970	2,970	3,000	3,030
WTC Severe disability element	1,275	1,275	1,290	1,330
WTC Max eligible childcare expenditure, 1 child (per week)	175	175	175	175
WTC Max eligible childcare expenditure, 2 + (per week)	300	300	300	300
WTC Proportion of eligible childcare costs covered	70%	70%	70%	70%

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

Table 2.8 Child tax credit amounts 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per year	Jun-16 2016/17 £ per year	Jun-17 2018/18 £ per year	Jun-18 2018/19 £ per year
CTC Family element	545	545	545	545
CTC extra for child under 12 months	545	545	545	545
CTC Child element	2,780	2,780	2,780	2,780
CTC disability child additional Element	3,140	3,140	3,175	3,275
CTC Severe disability disabled child additional element	1,275	1,275	1,290	1,325

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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 (*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 (*yhot_s*), where applicable, is disregarded. Capital itself is not included in the means-test, although the taxable part of income from capital (*yiylx*) 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.

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 2014 was £6,420. 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 £16,010 per year in 2014. See Table 2.9 for subsequent years’ figures.

Table 2.9 Child tax credit thresholds from 2014 to 2017

As of...	Jun-15	Jun-16	Jun-16	Jun-18
Fiscal year:	2015/16	2016/17	2016/17	2018/19
	£ per year	£ per year	£ per year	£ per year
First threshold	6,420	6,420	6,420	6,420
First threshold if not entitled to Working Tax Credit	16,105	16,105	16,105	16,105
First withdrawal rate	41%	41%	41%	41%
Second threshold	--	--	--	--
Second withdrawal rate	--	--	--	--

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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 2014). 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.

In 2011 the family element of CTC was only tapered away if the ‘relevant income’ was in excess of the second threshold, i.e. £40,000. From 2012 the family element is also 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.

- *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 EUROMOD 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 EUROMOD 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.

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.

EUROMOD applies a take-up correction to CTC/WTC by default. See section 2.3 for more information.

2.5.4 Child Benefit (*bch_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 it is 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 tax payer 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 £20.50 per week for the first or only child in 2014/15. For each additional child £13.55 is paid per week (see Table 2.10 below for the rates in the other policy years). Essentially therefore the weekly entitlement is $CB = £20.50 + (13.55 * (\text{number of children} - 1))$.

Table 2.10 Child benefit rates from 2014 to 2017

As of... Fiscal year:	Jun-15 2015/16 £ per year	Jun-16 2016/17 £ per year	Jun-17 2017/18 £ per year	Jun-18 2018/19 £ per year
Only/Eldest child	20.70	20.70	20.70	20.70
Other child(ren)	13.70	13.70	13.70	13.70

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

- **Interaction with other benefits**

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 2.5.10). Moreover, in 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 EUROMOD the reduced Child Benefit is calculated by *bchrd_uk* after the income tax calculation. Note that in previous versions of EUROMOD the reduction was treated as additional tax rather than a reduction in benefit.

2.5.5 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 Seekers 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 EUROMOD, 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:

- Working less than 16 hours per week
- 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:

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

The personal allowances (*sin05_s*) for both benefits are outlined in the Table 2.11.

Table 2.11 Income Support and income-based Jobseeker’s Allowance rates 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
	£ per week	£ per week	£ per week	£ per week
Single or lone parent 16-17	57.9	57.9	57.9	57.9
Single 18-24	57.9	57.9	57.9	57.9
Single 25 or over	73.1	73.1	73.1	73.1
Lone parent 18 or over	73.1	73.1	73.1	73.1
Couple one under 18	87.5	87.5	87.5	87.5
Couple both over 18	114.85	114.85	114.85	114.85

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

Premia

Premia are amounts that are added to the personal allowance, if the relevant conditions are satisfied (*sin01_s* to *sin04_s* and *sin06_s*). Rates of premia are the same for all claimants, irrespective of their age. Relevant premium conditions and weekly rates are listed in the Table 2.12. 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.

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.

The disability premium (*sin01_s*) 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 (*sin02_s*) 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 carers allowance (*bcrdi*) for looking after the claimant and there are no non-dependants 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 (*sin04_s*) 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 EUROMOD). See section 2.5.7 for more details.

The carer premium (*sin03_s*) 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 2.12.

Table 2.12 Income Support and income-based Jobseeker's Allowance premia, 2015-2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
	£ per week	£ per week	£ per week	£ per week
Carer premium - one qualifies	34.60	34.60	34.95	36.00
Carer premium - both qualify	69.20	34.60	34.95	36.00
Disability premium - single	32.25	32.25	32.55	33.55
Disability premium - couple	45.95	45.95	46.40	47.80
Enhanced disability premium - single	15.75	15.75	15.90	16.40
Enhanced disability premium - couple	22.60	22.60	22.85	23.55
Severe Disability – one qualifies	61.85	61.85	62.45	64.30
Severe Disability- two qualify	123.70	123.70	62.45	64.30

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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-dependants 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 2.13.

Table 2.13 Income Support and income-based Jobseeker's Allowance earnings disregards and capital limits 2015 to 2018

Table 14

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
	£ per week	£ per week	£ per week	£ per week
Single person	5	5	5	5
Couple	10	10	10	10
Disability	20	20	20	20
Lone parent ^[a]	20	20	20	20
	£	£	£	£
Capital lower limit	6,000	6,000	6,000	6,000
Capital upper limit	16,000	16,000	16,000	16,000

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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 (*sin27_s*). Providing that the claimant is responsible for the housing costs (*sin24_s*), mortgage interest payments (*xhcmomi*) may be included in the calculation of the applicable amount and offset by non-dependent deduction (*sin26_s*). 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 EUROMOD 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, EUROMOD does not take account of these extra costs in the Income Support calculation.

Multiple 'assessment units' in household and non-dependants

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 (*sin25_s*). The “householder” in the UK is the person responsible for the rent or mortgage interest (*sin24_s*) 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) (*sin25_s*). 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 2.14 sets out the rates for the different income brackets.

Table 2.15 Non-dependent deductions on Income Support and income-based Jobseeker’s Allowance from 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
	£ per week	£ per week	£ per week	£ per week
Deduction applying if income is above	93.8 408	94.5 420	95.45 430	98.30 439
Deduction applying if income is above	85.45 328	86.1 338	86.95 346	89.55 354
Deduction applying if income is above	75.05 246	75.6 253	76.35 259	78.65 265
Deduction applying if income is above	45.85 189	46.2 195	46.65 200	48.05 204
Deduction applying if income is above	33.4 129	33.65 133	34 136	35 139
Deduction otherwise ^[a]	14.55	14.65	14.8	15.25

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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

Preliminary IS used for the nondependent 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*).

EUROMOD applies a take-up correction to this benefit by default. See section 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 EUROMOD ib-JSA is not included in the taxable base.

2.5.6 Pension Credit (*boamt_s*)

This is an income maintenance benefit paid to those aged 60 years or older (the age threshold moves with the female state pension age; it is 61 in 2012 and 2013, 62 in 2014 and 2015, 63 in 2016 and 2017). It is composed of two elements, the Guarantee Credit (*boamtmm_s*) meant to ensure a guaranteed level of income, and the Saving Credit (*boamtxp_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.

2.5.6.1 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 (*sin16_s*) and have benefit unit income (*il_GC_means*) below the ‘standard minimum income guarantee’. This level is set out in the Table 2.15.

Table 2.16 Pension Credit Minimum Guarantee, 2015-2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week

Single person	151.2	155.6	159.35	163.00
Couple	230.85	237.55	243.25	248.80

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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 2.15 (i.e. they are equivalent to the level of the guarantee) and the premia are set out in Table 2.16.

Table 2.17 Pension Credit (GC) premia and capital limits 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week
Severe Disability Premium- single or one qualifies	61.85	61.85	62.45	64.30
Severe Disability Premium- couple (both qualify)	123.7	123.7	124.9	128.60
Carer Premium- single or one partner qualifies	34.6	34.6	34.95	36.00
Carer Premium- couple (both qualify)	69.2	34.6	34.95	36.00
Capital lower limit	10,000	10,000	10,000	10,000

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

- **Benefit amount**

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

2.5.6.2 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 2.17.

- **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 2.17 below). This amount is compared with the maximum savings credit which was £16.8 per week for a single person and £20.7 for a couple in 2014.

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 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per week	Jun-16 2016/17 £ per week	Jun-17 2017/18 £ per week	Jun-18 2018/19 £ per week
Threshold single	126.5	133.82	137.35	140.67
Threshold couple	201.8	212.97	218.42	223.82
Maximum single	14.82	13.07	13.20	13.40
Maximum couple	17.43	14.75	14.90	14.99
Withdrawal rate	40%	40%	40%	40%

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

Note that the maximum Savings Credit has been reduced from 2012 onwards.

EUROMOD notes: EUROMOD applies a take-up correction to this benefit by default. See section 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.

2.5.7 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 not 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 EUROMOD.

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-dependants 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;
- being 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 2.18).

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 component^{10,11}; and

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 Activities Group (WRAG) receive per week the same amount as jobseekers 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

- disregards;
- plus certain housing costs if the claimant is responsible for them.

Table 2.19 Income-based Employment and Support Allowance additional premia 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week
Work-related activity component	29.05	29.05	29.05	29.05
Support component	36.2	36.2	36.55	37.65

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

- **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 EUROMOD 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 3.3 for more details). During the transition period nobody was supposed to lose from the change to ESA. To take this into account EUROMOD 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 a year; if there is a partner EUROMOD 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, EUROMOD 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: EUROMOD 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 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.

only new recipients are affected. Ultimately though, all claims will be assessed under the new, less generous, rules, in the future.

Ib-ESA is not taxable.

2.5.8 Housing Benefit and 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-dependants in the calculations.

The main change introduced from April 2008 by the LHA is a limitation to the contribution toward 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’ (*sin09_s*)

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 (*sin07_s*) 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 in Table 2.19.

Table 2.20 Housing Benefit Allowances and premia (where different from those for IS) from 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week

Family premium	17.45	17.45	17.45	17.45
Disability premium – child	60.06	60.06	60.90	62.86
Enhanced disability premium - child	24.43	24.43	24.78	25.48
Single pensioner between 60 and 64	151.2	155.60	159.35	163.00
Single pensioner 65 or over	166.05	168.70	172.55	176.55
Pensioner couple both between 60 and 64	230.85	237.55	243.25	248.80
Pensioner couple one or both 65 or over	248.3	252.30	258.15	263.80
Dependent children under 20	66.9	66.9	66.9	66.9

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19

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 EUROMOD 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 5). The local reference rent is calculated for each Broad Rental Market Area (BRMA).

From 2011, for new claimants:

- a) the dwelling categories were restricted to five: one-bedroom shared accommodation, one-bedroom self-contained accommodation, two-bedrooms, three-bedrooms and four or more bedroom dwellings;
- b) the local reference rent was lowered and set at the *30th percentile* of local rents within each BRMA, and;
- c) the LHA for each category of dwelling was also capped at a national level maximum distinguishing by number of bedrooms, as shown in Table 2.20.

Table 2.21 Local Housing Allowance national rent limits, from 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per week	Jun-16 2016/17 £ per week	Jun-17 2017/18 £ per week	Jun-18 2018/19 £ per week
One-bedroom shared accommodation	250.00	250.00	260.64	268.46
One-bedroom self-contained accommodation	250.00	250.00	260.64	268.46
Two-bedroom accommodation	290.00	290.00	302.33	311.40
Three-bedroom accommodation	340.00	340.00	354.46	365.09
Four + bedroom accommodation	400.00	400.00	417.02	429.53

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19 and <https://www.gov.uk/housing-benefit/what-youll-get>

From 2012, for all claimants:

- a) the £15 per week addition was removed;
- b) the local reference rent categories were restricted to 4 (the 5+ and 4 bedroom categories were amalgamated) plus the LHA for one-bedroom shared accommodation.

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

EUROMOD notes: FRS does not report BRMAs. See section 3 on how this upper limit has been taken into account through indicators that have been imputed and provided in the EUROMOD input data.

New claimants are identified based on how long they have been claiming HB (*bhomy*). Households who have claimed HB for less than a year (12 months) are considered new claimants and treated as described above. Households who have been on HB for more than a year are considered existing claimants.

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:

- the claimant or partner receive the 30 hour element in WTC;
- the claimant or partner are aged 25 or over and work 30+ hours;
- the claimant or partner work 16 hours or more and the claim includes the family premium;
- 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 (*sin11_s*) are topped up by £17.10. The earnings disregard for lone parents for the purposes of HB/LHA is £25.¹²

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 (*sin13_s*) 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 aged 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), less non-

¹² 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 simulation.

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 EUROMOD 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.

EUROMOD applies a take-up correction to this benefit by default. See section 3.3.3 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.

2.5.9 Council Tax Benefit/Support (`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 EUROMOD ignores SAR cases and does not model them.

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 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 2.21).

Table 2.22 Non-dependent deductions for Council Tax benefit from 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per week	Jun-16 2016/17 £ per week	Jun-17 2017/18 £ per week	Jun-18 2018/19 £ per week
Deduction applying if income is above	10.58 421	10.58 421	10.64 424	10.82 431
Deduction applying if income is above	8.82 338	8.82 338	8.87 340	9.02 345
Deduction applying if income is above	7 196	7 196	7.04 197	7.16 200
Deduction otherwise	3.53	3.53	3.55	3.61

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19. Parameters for 2013/14 onward are assumed, 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. EUROMOD applies a take-up correction to this benefit by default. See section 3.3.3 for more information.

2.5.10 Benefit Cap (*brd_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:

- the benefit unit receives HB for people below the qualifying age for PC, and
- 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;
- 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 2.23 Benefit cap rates from 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per week	Jun-16 2016/17 £ per week	Jun-17 2017/18 £ per week	Jun-18 2018/19 £ per week
Greater London:				
Couples (with and without children) and single with children	26,000	26,000	23,000	23,000
Single without children	18,200	18,200	15,410	15,410
Rest of the UK:				
Couples (with and without children) and single with children	26,000	26,000	20,000	20,000
Single without children	18,200	18,200	13,400	13,400

Source: CPAG Welfare Benefits and Tax Credits Handbooks, 2015/16 to 2018/19 and <https://www.gov.uk/benefit-cap>.

EUROMOD notes: In EUROMOD the benefit cap is not implemented as a reduction to HB (or UC). The variable *brd_s* is subtracted from the means-tested income list (*ils_benmt*) directly.

2.6 Social contributions

2.6.1 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 depend 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 (*sin02_s*).

- *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 2.23 shows the thresholds (gross earnings limits) and rates.¹³

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 2.24 Gross earnings limits and rates for Class 1 (employee) National Insurance Contributions 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per week	£ per week	£ per week	£ per week
Gross earnings limits:				
Primary Threshold (PT)	155	155	157	162
Upper Earnings Limit (UEL)	815	827	866	892
Rates:				
Between PT and UEL:				
<i>Non contracted out</i>	12%	12%	12%	12%
<i>Contracted out</i>	10.6%	12%	12%	12%
Above UEL	2%	2%	2%	2%

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>

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 EUROMOD 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*).

2.6.2 Self-employed social insurance contributions, Class 2 and Class 4 (*tsce_s*)

- *Liability for contributions*

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

¹³ 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.

- **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 2.24 for the amounts and level of the exception.

Table 2.25 Rates for self-employment Class 2 National Insurance contributions, 2015-2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
Flat rate (£ per week)	2.8	2.8	2.85	2.95
Small Earnings Exception (£ per year)	5,965	5,965	6,025	6,025

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>

Class 4 contributions are paid on self-employment income (*yse*) between a Lower Profits Limit (LPL) and an Upper Profits Limit (UPL) (*sin04_s*) with a lower rate applying on income above the upper limit (*sin05_s*) – see Table 2.25.

Table 2.26 Upper and Lower Profit Limits for self-employment Class 4 National Insurance contributions from 2015-2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
Lower Profits Limit(LPL) (£ per year)	8,060	8,060	8,164	8,424
Upper Profits Limit(UPL) (£ per year)	42,385	43,000	45,000	46,350
Rate between LPL and UPL	9%	9%	9%	9%
Rate above UPL	2%	2%	2%	2%

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>

2.6.2.1 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:

- 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 (*sin06_s*);
- Then, from that combined figure any Class 1 and Class 2 NICs that have been paid are deducted (*sin07_s*);
- This gives the maximum amount of Class 4 NICs that the contributor is liable to pay at the main rate (*sin08_s*);
- 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;

- If that figure is positive it represents the amount of profits on which Class 4 NICs at 2% are payable (*sin09_s*).

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:
 - Class 4 NICs at a rate of 9 % only (*sin12_s*)
2. those who are due to pay:
 - a mixture of Class 4 NICs at rate of 9% and 1% (*sin11_s*) and
3. those who are due to pay:
 - Class 4 NICs at a rate of 1% only
(above the UEL = *sin13_s* and below the UEL = *sin14_s*).

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

2.6.3 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 2.26 shows the thresholds and rates of employers' social insurance contributions.

Table 2.27 Thresholds and rates of employers' social insurance contributions 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16	Jun-16 2016/17	Jun-17 2017/18	Jun-18 2018/19
Secondary Threshold (ST) £/week	156	156	157	162
Non contracted out rate above ST	13.8%	13.8%	13.8%	13.8%
Contracted out rate between ST and UEL	10.4%	13.8%	13.8%	13.8%
Contracted out rate above UEL	13.8%	13.8%	13.8%	13.8%

Source: HMRC: Rates and Allowances – National Insurance Contributions, <http://www.hmrc.gov.uk/rates/nic.htm>

2.7 Personal Income Tax (tin_s)

2.7.1 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 2.5.4 for more details); in 2015, the “transferable personal tax allowance for married couples” (see 2.7.5) 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 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.

2.7.2 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 2.5.4. 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.

2.7.3 Tax allowances (tinta_s)

There is a basic tax free **Personal Allowance** (*sin01_s*).¹⁴ 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 (*sin02_s*) – see Table 2.27.

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 2.7.7 below.

Table 2.28 Tax allowances 2015 to 2018

As of... Fiscal year:	Jun-15 2015/16 £ per year	Jun-16 2016/17 £ per year	Jun-17 2017/18 £ per year	Jun-18 2018/19 £ per week
Personal Allowance				
under X years old	10,600	11,000	11,500	11,850
X-Y years old	n/a	n/a	n/a	n/a

¹⁴ There is an allowance for blind people. However, this is not simulated here due to lack of information in the input data.

Y years old or over[a]	10,660	n/a	n/a	n/a
X	n/a	n/a	n/a	n/a
Y	78	n/a	n/a	n/a
Income limit for age-related allowances	27,700	27,700	n/a	n/a
Income limit for personal allowances	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

Notes: [a] In 2016/17 personal tax allowance becomes the same for all age groups. HMRC 2015,
<http://www.hmrc.gov.uk/rates/it.htm>.

2.7.4 Personal Saving Allowance (*tinsa_s*)

From 2016 a new **Personal Saving Allowance** (*tinsa_s*) has been introduced. The amount depends on the amount of taxable income: basic rate taxpayers will be able to earn up to £1,000 per year in savings income tax-free before paying tax on savings, higher rate taxpayers will be able to earn up to £500 per year. No personal saving 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 toward personal saving allowance.

Table 2.29 Personal Saving Tax allowances from 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per year	£ per year	£ per year	£ per week
<i>Personal Saving Allowance</i>				
Basic taxpayers	n/a	1,000	1,000	1,000
Higher taxpayers	n/a	500	500	500
Additional taxpayers	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

2.7.5 Transferable tax allowance

From April 2015 married and civil couples where one partner earns less than the £10,600 income tax personal allowance will be able to transfer part of their unused allowance to their partner up to a limit of £1,060 (10% of the personal tax allowance in 2015).

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 £10,601 and £42,385 during the 2015/16 tax year).

Table 2.30 Transferable personal tax allowances for married couples from 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per year	£ per year	£ per year	£ per week
<i>Transferable Personal Allowance</i>				

Annual amount	1,060	1,100	1,500	1,850
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2.7.6 Tax base

Taxable income (*il_tinty*) includes:

- Earnings from employment and benefits from employer (*yem + bmana + bhlwk*);
- Earnings from self-employment (*yse*);
- State, occupational, personal pensions and widow pension (*boact00 + boactcm + ypp + bsuwd*);
- Carer’s allowance (*bcrdi*);
- Incapacity benefit¹⁵ (*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.

2.7.7 Tax schedule

The main tax thresholds and rates are set out in Table 2.30.

Table 2.31 Income tax thresholds and rates from 2015 to 2018

As of...	Jun-15	Jun-16	Jun-17	Jun-18
Fiscal year:	2015/16	2016/17	2017/18	2018/19
	£ per year	£ per year	£ per year	£ per week
Savings rate threshold	5,000	5,000	5,000	5,000
Starter rate threshold in				13,850

¹⁵ 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.

Scotland				
Basic rate threshold in Scotland		32,000	31,500	24,000
Basic rate threshold rUK	31,785	32,000	33,500	34,500
Intermediate rate threshold in Scotland				44,273
Higher rate threshold	150,000	150,000	150,000	150,000
Savings rate %	0	0	0	0
Starter rate % in Scotland				19
Basic rate %	20	20	20	20
Intermediate rate % in Scotland				21
Higher rate % rUK	40	40	40	40
Higher rate % in Scotland				41%
Additional rate % rUK	45	45	45	45
Additional rate % in Scotland				46

Source: HMRC: Rates and Allowances – Income Tax, http://www.hmrc.gov.uk/stats/tax_structure/table-a2a.pdf

The savings rate of 10% only applies to income from investments (*yiytx*). This happens in practice 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 treats the savings income as the “top slice” and applies the lower rate of 10% to any excess of the threshold over non-savings taxable income (or to the savings income itself, if this is 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 April 2016 Scotland can regulate part of income tax for Scottish resident. While in 2016/17 no changes were introduced, from 2017/18 Scottish residents face a lower basic rate threshold.

2.7.8 Tax credits

The Working Tax Credit and Child Tax Credit are considered as benefits by EUROMOD 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 79 years old or over in 2014) (*sin05_s*). The MCA can be claimed by the husband if the couple married before 2005 (otherwise by partner with highest income);¹⁶ any unused allowance can then be transferred to the spouse or civil partner (*sin09_s*).

¹⁶ EUROMOD assumes that the MCA is claimed by the husband in all cases.

Along with the addition to the personal allowance for older people, fifty per cent 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 (*sin08_s*). MCA levels for the relevant policy years are listed in Table 2.31.

Table 2.32 Tax credits from 2015 to 2018

	As of...	Jun-15	Jun-16	Jun-17	Jun-18
	Fiscal year:	2015/16	2016/17	2017/18	2018/19
		£ per year	£ per year	£ per year	£ per week
MCA		8,355	8,355	8,445	8,695
Lower age limit for MCA		75	75	75	75
Minimum MCA		3,220	3,220	3,260	3,360
Income limit for age-related allowances		27,700	27,700	28,000	<i>n/a</i>
Tax relief rate for the MCA		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>

2.8 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 age of 65 and had personal care and/or mobility needs. DLA for people age 16 to 64 will be 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 as the reduction describe above is observed in the survey.

3. DATA

3.1 General description

The UK database is drawn from the Family Resources Survey (FRS) 2011/16.¹⁷ 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 requirement 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 1991 Census of Population. In a second stage

¹⁷ See <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-201415>.

From 2013 the EU-SILC for the UK will be based on the FRS.

a random sample of 25 addresses is drawn within each Primary Sampling Unit (PSU) and represents an interviewer’s monthly assignment.

The Northern Ireland 2015/16 sample frame is the Valuation and Land Agency’s list of domestic properties and follows an unclustered, regionally 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.¹⁸ 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 are required to try a minimum of four calls per households. 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 one hour and 20 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.¹⁹ 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 and investment income and is limited to 0.5% of all responses. The EUROMOD database makes use of the imputed data.

Table 3.1 EUROMOD database description

EUROMOD database	UK_2015_a1
Original name	Family Resources Survey
Provider	Department for Work and Pensions
Year of collection	2015/16
Period of collection	April 2015 – March 2016
Income reference period	Current year incomes
Sampling	Stratified clustered probability sample for Great Britain and unclustered, regionally stratified design for Northern Ireland
Coverage	Residents in private households
Achieved sample	43,678 individuals

¹⁸ 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.

¹⁹ <http://www.statistics.gov.uk/about/data/harmonisation/default.asp>

Response rate 56%

Source: DWP, Family Resources Survey 2015/16

<https://www.gov.uk/government/statistics/family-resources-survey-financial-year-201415>

3.2 Sample quality and weights

3.2.1 Non-response

In 2015/16, 56% of the 37,608 sampled households provided full cooperation²⁰ with regional variation in response rates reflecting patterns found in other major surveys. In 2015/16, for those households classed as fully co-operating, proxy responses were obtained for 18 per cent of adults.

Table 3.2 Household response rates in the FRS 2015/16 by government office regions

Region/Country	Percentage of households
United Kingdom	56
England	56
Wales	59
Scotland	51
Northern Ireland	57
North East	58
North West	61
Yorkshire and the Humber	57
East Midlands	58
West Midlands	57
East of England	56
London	48
South East	57
South West	57

Source: DWP, Family Resources Survey 2014/15 (Table M_2

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/599750/frs-methodology-and-standard-error-data-tables-2015-16.xlsx

Lower response rates than the average were seen in households in London, Yorkshire and the Humber, 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

²⁰ 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/uploads/system/uploads/attachment_data/file/437481/family-resources-survey-2013-14.pdf

household responsible persons (HRP) was self-employed or unemployed. In contrast, higher response rates occur, for example, in households with dependent children.

3.2.2 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 2015/16 are based on population totals by gender 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 (ODPM²¹, 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 gender and age group (NISRA²²), number of lone parents and households (Northern Ireland Department for Social Development estimates).²³

Table 3.3 Descriptive Statistics of the Grossing-up weight

	UK_2015_a1
Number	43,678
Mean	1,463.14
SD	825.01
Maximum	36,158
Minimum	225
Max/Min	160.70

No households have been dropped from the sample. The original sample size includes 43,678 individuals and 19,322 households. Applying weights included in the dataset to gross the numbers up to population figures gives 63,907,072 individuals and 27,548,426 households.

3.3 Imputations and assumptions

The FRS data are obtained from the UK Data Archive at the University of Essex.²⁴ Adjustments to variables are kept to a minimum.

It should be noted that in the 2015/16 FRS data:

- Age is top-coded at 80.

²¹ Then, the Office of the Deputy Prime Minister.

²² Northern Ireland Statistics and Research Agency.

²³ For more detail about the extent of imputation and control totals variables used to generate grossing factors, see DWP, Family Resources Survey 2013/14 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437481/family-resources-survey-2013-14.pdf.

²⁴ Data from the Family Resources Survey are Crown Copyright. They have been made available by the Office for National Statistics (ONS) through the Data Archive and are used by permission. Neither the ONS nor the Data Archive bear any responsibility for the analysis or interpretation of the data reported here.

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 EUROMOD 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 benefit), 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 on stratum average is imputed to missing households only). By default, *tmu02* is used.

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 week²⁵ 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 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 EUROMOD this variable is used to distinguish IS from ib-JSA.

²⁵ 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.

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, Invalid Carer Allowance, etc.).

Earnings and hours of work variables

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*). Moreover, last employment earnings not from the last pay period are recorded in the variable *yot02*, but these do not enter in the simulations or the definition of disposable income. Each earning variable, with the exception of *yot01*, has a corresponding hours of work variable: *yem* (*lhw00*), *yse* (*lhw01*) and *yot02* (*lhw02*). The total number of hours, *lhw*, is equal to *lhw00+lhw01*.

Local reference rent and housing benefit restrictions

Local Housing Allowance (LHA) restricts entitlement to Housing Benefit for tenants in privately rented accommodation. It has been gradually rolled out from 7th April 2008 and it is fully in place from 2013.

The amount of the benefit results from a combination of a claimant's actual rent and the LHA rate that applies in their local area (specifically, LHA entitlement = min(LHA rate, actual rent+£15) in 2008-2010; and LHA entitlement = min(LHA rate, actual rent) from 2011 onward). See section 2.5.8 for more details on calculations.

LHA rates were initially set at the median of local rents within each Broad Rental Market Areas (BRMA) and separately according to the dwelling's number of bedrooms.

The End User License version of the FRS reports only standard regions of residence for each individual. Thus, in order to include the information about LHA into the input data used by EUROMOD we need to approximate the local LHA rate faced by claimants in each region. To do this we link the FRS by region to a Local Authority District (LAD)-BRMA table²⁶.and compute averages of LHA rates across standard regions. A new variable *bhoen50* for each household records the 50th centile of local rent for the corresponding number of bedrooms per house. By doing this, we are also able to model the cut in LHA rates starting from April 2011 that sets LHA rates at the 30th centile of local rents for 6 dwelling categories (*bhoen1130*) for new claimants and the further cut in LHA from April 2012 that sets LHA rates at the 30th centile of local rents by 5 dwelling categories (*bhoen30*).

Increase in female 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 between December 2018 and April 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

²⁶ 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.

has implications for household incomes, as it affects receipt of several state benefits and liability to national insurance.

During the financial year 2015/16, the State Pension age (SPA) for women increased from 62 years and 7 months to 63 years 1 months. In our base data (FRS 2015/16), we observe women entitled to SPA from age 62, while in 2015 women were entitled to State Pension only from age 62 and seven months²⁷, and in 2016 from age 63 and one months, and in 2017 from age 63 and seven month and so on. Therefore only some women age 62 observed receiving the State Pension in our base data in 2015, would not be entitled to it in our simulated year 2015 and only some of those aged 62 would be entitled to it in 2015. 62 years old women in 2015 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 female SPA for these affected women²⁸. Moving toward 2016, 2017 and 2018, when we observe 62 (and 63) years old women in 2016 and 2017 (and 2018) in receipt of basic state pensions 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 female SPA (this is done directly in EUROMOD 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 aged 59-60 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) and local authority disability status. This regression is then used to generate predicted IB/ESA entitlement probabilities for women age 62 and over (up to the new SPA) in our base data. Finally, we allow for a labour supply response to the rise in the female SPA amongst the women directly affected. We do this by using data on women aged 51-65 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 in age and an indicator variable for being under SPA. For women 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 62 and over (up to the new SPA) in our base data in a world where the SPA has increased over 62 years. 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 aged 62 and over (up to the new SPA) whom we have now simulated as being entitled to ESA/IB or being in work, we impute additional information (each woman simulated as being entitled to IB/ESA is allocated an IB/c-ESA amount (*bdict01yy* or *bdict02yy*), disability status (*ddi01* and *ddi02* = 12, 13, 14 indicating the year when somebody become entitled to IB or ESA respectively) and duration on benefit (*ddipd00*), and women simulated as being in work are

²⁷ See Pension Act 2007 and 2011 for more details.

²⁸ Note that this correction for the moment only applies moving forward, hence using 2010 data on 2011-2015 systems, using 2012 data on 2013-2015 systems, using 2013 data on 2014-2016 systems and using 2014 data on 2015-2017 systems. Using 2010 data on systems before 2012 does not need any pension age adjustments because the SPA corresponds to that observed in the data; while using 2012-2014 data on system years before 2012-2014 respectively, would mean that female age 60(61) observed in work or receiving working-age benefits in the data, would have instead been eligible to pension and pension-age benefits in those years. EUROMOD does not correct for these inconsistencies between SPA and receiving working-age benefits because only few observations are affected by this issue. However, as more recent data will become available, more women will be observed in work or receiving working-age benefits in the data, while they would have been eligible to pension and pension-age benefits in previous years. We will consider this issue and how to adjust the data backward in future country reports.

allocated a monthly earning (*yemiv* or *yseiv*), hours of work (*lhwiv01* or *lhwiv02*) and a compulsory private pension contribution (*tpceeivpx*).²⁹

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.
- 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 through EUROMOD.

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. By 2014 all those unable to work through disability or ill health should have been transferred from IB to ESA. This is not the case and the FRS 2015/16 still records some individual receiving IB instead of ESA. In simulating the population in 2016-17, we take into account the steady fall in the number receiving IB, and the steady rise in the number receiving ESA assuming that the transition between IB and ESA will be completed by June 2016. We replicate changes between 2014-2015 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.

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

The final IB/c-ESA benefit values for each year are recorded in specific variables. The IB amount is saved in *bdict0111-bdict0115* for each simulated year between 2011 and 2015. The c-ESA amount is reported by *bdict0211-bdict0216* for each year between 2011 and 2015. From 2016 nobody should be receiving IB anymore. In EUROMOD this is taken into account by setting the default values of variables *bdict01* (IB) and *bdict02* (c-ESA) to the appropriate variable for the policy system in use within the parameter sheet *SetDefault_uk*.

From April 2012, contributory ESA for those in the WRAG has been limited to a maximum duration of one year. We simulate this by removing entitlement from some of those we estimate to be entitled to c-ESA.

3.3.1 Time period

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

²⁹ 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.

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 EUROMOD database. In the EUROMOD 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 EUROMOD database variables see the UK Data Requirements Document (DRD).

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>

3.3.2 Gross incomes

Gross incomes are imputed using the simple formula:

$$\text{Gross income} = \text{net income} + \text{tax} + \text{employee social insurance contributions} + \text{other deductions}$$

FRS data include variables on income tax, employee social 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 tax-payers 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.

3.3.3 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 EUROMOD to be entitled results 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, 2010) and HM Revenue and Customs (HMRC, 2010).³⁰ 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 (24% of all families with children). Of those entitled to Pension Credit, 23.5% do not take up, with the proportion much higher (51%) 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

³⁰ Where ranges of take-up proportions are published, the mid point is used.

credit entitlements. However, by applying differential take-up probabilities according to type of claimant, as summarised in the 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)	0.81
Housing benefit for people of working age in work if not receiving IS	0.53
Housing benefit for people of working age without work if not receiving IS	0.92
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)	0.65
Pension credit (savings only)	0.49
Income support for people without children	0.81
Income support for people with children	0.9
Child tax credit* and working tax credit for lone parents (not London)	0.95
Child tax credit* and working tax credit for couples with children (not London)	0.72
Child tax credit* and working tax credit (all parents) in London	0.79
Child tax credit* and working tax credit (all parents) in Scotland	0.83
Child tax credit* and working tax credit (all parents) in Wales	0.90
Child tax credit family element only	0.63
Working tax credit (no children)	0.31
Working tax credit (no children) – single	0.33
Working tax credit (no children) - couple	0.27

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

Source: DWP 2016 and HMRC 2016

<https://www.gov.uk/government/statistics/child-benefit-child-tax-credit-ctc-and-working-tax-credit-wtc-take-up-rates-2015-to-2016>

<https://www.gov.uk/government/statistics/income-related-benefits-estimates-of-take-up-financial-year-201516>

The correction is switched on by default in the baseline. To switch the take-up corrections off throughout the UK module, a user needs to use the relevant switch (BTA) in the run window of EUROMOD. Take-up probabilities summarised in **Table 3.4** are defined as constants (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. A user 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.

3.3.4 Updating

Information about the factors that are used to update (or backdate) monetary variables (parameter sheet *Uprate_uk*) from the mid-point of the data year (October 2015) to the mid-point of the policy years applying on June 30th (i.e. October 2015 to October 2018) and the sources that have been used are reported in Annex 1. 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 2015/16.

4. VALIDATION

4.1 Aggregate Validation

EUROMOD 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 3. 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 EUROMOD 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

	EUROMOD 2015	FRS 2015/16
	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 EUROMOD 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 (INDISBEN³¹), total income from other benefits (INOTHBEN³²), remaining income (NINRINC³³) and total amount of tax credits received (INTXCRED³⁴).

The disposable income in EUROMOD 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 EUROMOD and the FRS are outlined in Table 4.1.

4.1.2 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 EUROMOD with estimates from the Annual Survey of Hours and Earnings (ASHE) in 2015 to 2018. 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 EUROMOD/FRS 2015/16 database is close (101%) to the corresponding average value from ASHE 2015, across all employees whose pay is not affected by absence. The male earnings correspond (100%) and female earnings are correspondingly over-represented (by 1%). Also shown are the EUROMOD averages for 2016, 2017 and 2018 compared with ASHE for the corresponding years. The match is similar for the non-updated or backdated FRS data, with the EUROMOD estimate under-representing ASHE slightly in 2018 by 1%.

Figure 4.1 compares the cumulative earnings distribution from ASHE and the EUROMOD input data for 2015 for all employees and for men and women (plotting decile points cumulatively). The distributions are close; although the distribution diverges around the middle for women (earnings are somewhat lower in the ASHE data).

³¹ 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.

³² 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, Guardians 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.

³³ 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.

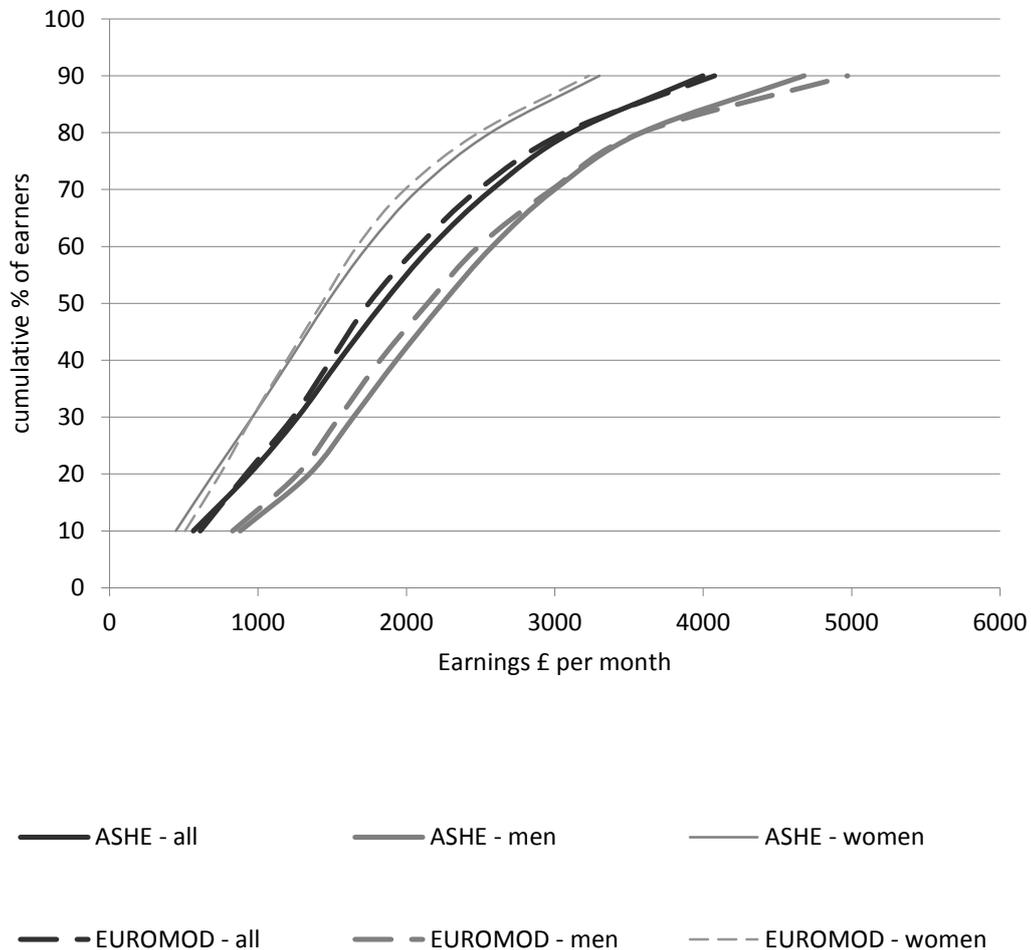
³⁴ Total amount of tax credits sums Working Tax Credit and Child Tax Credit.

Table 4.2 Average gross monthly earnings from employment in 2015-2018, comparing ASHE and the EUROMOD (EM) input database

	2015			2016			2017			2018		
	EM	ASHE	Ratio									
All	2216	2198	1.01	2270	2275	1.00	2321	2331	1.00	2380	2405	0.99
Male	2664	2655	1.00	2729	2742	1.00	2790	2803	1.00	2860	2889	0.99
Female	1754	1736	1.01	1798	1800	1.00	1838	1849	0.99	1885	1911	0.99

Sources: Source: Annual Survey of Hours and Earnings 2018 (provisional) 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.

Figure 4.1 Cumulative earnings distributions in 2015: EUROMOD (FRS) and ASHE



- *Benefits and taxes*

Table 4.4 and Table 4.5 compare statistics on benefits and taxes that are not simulated by EUROMOD with external sources. This provides an assessment of the quality of the database and hence the estimates are referred to as “EUROMOD/FRS estimates” although in a few cases some imputation has taken place in order to provide EUROMOD with the necessary information for simulation (see previous section). 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 4.4 shows the ratio of the EUROMOD/FRS estimate of the number of recipients of benefits or payers of tax to that given by administrative statistics. The EUROMOD/FRS estimate is generally the same for each policy year but the external estimate naturally varies with time. Exceptions are the EUROMOD estimates for Incapacity Benefit and Employment and Support Allowance 2015-2016 and the State Pension 2015-18, since these vary over time according to our imputations related to the phasing out of Incapacity Benefit and phasing in of Employment and Support Allowance, as well as the increase in the state pension age for women from 60 to 61 years of age in 2012 and 2013, 62 in 2014 and 2015, 63 in 2016, 64 in 2017 and 65 in 2018. See Section 3.3 “Increase of female pension age” and “Transition from Incapacity Benefit to Employment and Support Allowance”.

According to official sources, the combined number of Incapacity Benefit (IB) and contributory Employment and Support Allowance (c-ESA) recipients is underreported in FRS by 46% (reflecting over-reporting of IB by 410% and under-reporting of c-ESA by 90%). Over time the recipients of these benefits have slightly decreased, a trend that is partly simulated by EUROMOD as well (see Section 3.3). However, number of recipients remain under-simulated in EUROMOD/FRS by 62% in 2016, and by 61% in 2017 and 57% in 2018. Base on initial forecasts, the transition from IB to ESA should have been finalized by 2014³⁵, however separating the two sources of incapacity support reveals that in reality the transition has been slower than expected and some people remain on IB up to 2017. EUROMOD/FRS over-simulates recipients of IB in 2015 and under-simulates those in receipt of c-ESA.

Similarly while the numbers in receipt of basic state retirement pension are well estimated in EUROMOD in 2015 (the external figures 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 for women reduces the EUROMOD estimate from 2015 to 2018 more slowly (see section 3.3). 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 EUROMOD/FRS by 25% in 2015 decreasing to 24% in 2016, 21% in 2017 and 19% in 2018. The two sources of state pension are not distinguished in the data, our imputations may contribute to this over/under-estimation (see section 3.3). 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 were slightly falling between 2015 and 2016 and increasing after that. They are under-estimated by 11% in EUROMOD in 2015 but by only 9% by 2016.

³⁵ EUROMOD assumes that everybody entitled to some disability support has transitioned from IB to c-ESA by 2015, thus no IB recipients are simulated from 2015 onwards.

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 number in receipt of Carer's Allowance has grown over the period and in 2015 it is underestimated in EUROMOD/FRS by 21% and in 2018 by 34%.

Severe Disability 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). In 2016 external sources show a sudden drop in number of recipients which cannot be captured by the static simulation of EUROMOD. 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 around 49%. Disability Living Allowance (DLA) is being replaced by Personal Independence Payment (PIP) for new claimants from 2013. EUROMOD underestimates recipients of these benefits from 2016 (29%) to 2017 (52%) and in 2018 by 63% and overestimates them in 2015 (26%).

Finally, on the basis of a 2011 comparison (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 corresponds 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, suggesting that EUROMOD slightly over-estimates the number of payers.

Table 4.5 shows ratios of EUROMOD 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 4.4 suggesting that average amounts per recipient/payer are approximately right.

In the case of contributory ESA the ratios for expenditures are always a bit higher than those for recipients due to the fact that imputation of benefit amount assumes that the claims is 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.

Gross Council tax revenue is well-estimated by EUROMOD/FRS in 2015. External figures for the later years are net of Council tax support (after 2013) while EUROMOD figures are gross of this.

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 "passes" 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.

4.1.3 Validation of outputted (simulated) incomes

Validation of simulated elements of income is carried out in relation to independent external sources. Table 4.6a shows comparisons of the number of benefit recipients and tax and contribution payers against official statistics based on administrative sources. These comparisons assume 100% take-up of means-tested benefits and tax-credits. Table 4.6b repeats

the comparison for the means-tested instruments, applying non take-up probabilities as described in the previous section.

Table 4.7a shows the aggregate annual expenditure, or revenue from each instrument, compared with official sources, assuming full take-up. Table 4.7b makes the same comparison for means-tested benefits and tax credits, correcting for non-take-up. Finally, Table 4.3 (below) compares EUROMOD and external estimates of expenditure for 2015 for selected simulated benefits and tax credits with aggregates from the FRS data (using the same weights as in the EUROMOD estimates).

Table 4.3 Selected benefits that are simulated by EUROMOD: comparison of aggregates with external statistics and data from FRS (2015/16) assuming incomplete take-up in EUROMOD estimates. Expenditure/revenue (£million/year)

	FRS 2015	EUROMOD 2015	External 2015	Ratio FRS / External	Ratio EUROMOD/ External
Child Benefit	10,655	11,509	11,681	0.91	0.99
Working Tax Credit (WTC)	4,212	4,242	7,017	0.60	0.60
Child Tax Credit (CTC)	15,932	17,287	21,351	0.75	0.81
<i>CTC and WTC</i>	20,145	21,528	28,539	0.71	0.75
<i>WTC only</i>	883	615	1,131	0.78	0.54
Income Support+JSAinc+ESA	5,240	18,283	14,358	0.36	1.27
Pension Credit(PC) total	4,364	5,567	6,079	0.72	0.92
Housing benefit	19,091	19,649	24,244	0.79	0.81

Source: See Table 4.7b..

- *Child benefit*

EUROMOD produces estimates very close to the administrative figures for the number of families 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 2015/16), this is not surprising. However, the number of children for whom benefit is received is under-estimated by 3% and the expenditure on the benefit under-estimated by 1% in 2015. Nevertheless, as shown by Table 4.3 the FRS data on Child Benefit (weighted) under-estimate expenditure by more: 9%. Estimations over the period remain in line with those of 2015.

- *Winter fuel allowance*

EUROMOD over-estimates recipients by 9% and expenditure by 4% in 2015. There is no clear reason for this pattern given that the payment depends only on the age of the oldest person in the household. By 2017 the number of recipients are only overestimated by 1% while expenditures are under-estimated 2%.

- *Means-tested benefits and tax credits*

When complete take-up of means-tested benefits and tax credits is assumed (as in Table 4.6a for recipients and Table 4.7a for expenditure) the number of recipients in 2015 is over-estimated compared with administrative statistics. This applies particularly to Income Support (including income tested JSA and income tested ESA), Pension Credit Working and Child Tax Credit and

Housing Benefit. Once the take-up correction described in section 3.3.3 is applied, as shown in Table 4.6b, the ratios of the number of recipients generally improve and move closer to one. The numbers on Income Support (including other working age income tested benefits) are still too high relative to external statistics (by 43%) for Child Tax Credit and Housing Benefit they are underestimated (by 7%); but Pension Credit and Working Tax Credit recipients are underestimated by 28%.

For Income Support (including other working age income tested benefits) and Pension Credit the expenditure is over-estimated by EUROMOD before any take-up correction (Table 4.7b) but is too low for Working Tax Credit (by 9%) and Child Tax Credit (by 2%). The take up correction reduces expenditure such that Income Support is still over the administrative total but - Housing Benefit, Pension Credit, Child Tax Credit and especially Working Tax Credit are under estimated by 8%, 19%, 19% and 40% respectively (Table 4.7b). 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. However, with the exception of the Working Tax Credit, Table 4.3 shows how the weighted aggregates from FRS are generally similar to those from EUROMOD or compare less favourably with external statistics.

We now consider each benefit/credit separately and discuss reasons for the apparent discrepancies.

- ***Tax Credits***

Probably the main cause of the apparent under-estimation of both Child Tax Credit and Working Tax Credit 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 final award. However, as shown by Table 4.3 FRS reported income from Child Tax Credit 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 CTC client group.

Working Tax Credit expenditure is also underestimated (by almost half the administrative figure) for the same reasons: due to the “overhang” of entitlement, especially when there is a large year-to-year disregard. 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. Working Tax Credit recipients are also dramatically under-estimated by EUROMOD (by 28%) relative to Child Tax Credit recipients and the “overhang” is again the explanation. 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.

- ***Income Support***

Even after the take-up correction the number of recipients of Income Support (IS) is over-estimated by 43% (Table 4.6b). (The external figures include those on income-tested JSA which are simulated along with Income Support in EUROMOD.) The numbers on income-related ESA are under-estimated in 2015 (by 14%) . The period of transition for those potentially qualifying for IS or ib-ESA was supposed to last until 2014, however in reality there are still people receiving IB in 2017 and it is difficult to capture the individual components correctly in EUROMOD 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 EUROMOD is somewhat too high relative to the external total (by 27% in 2015 rising to 35% in 2016, to 42% in 2017 and to 29% in 2018).

- ***Pension Credit***

After accounting for non take-up, Pension Credit recipients as a whole are under-reported by 8% as well as total pension credit expenditure in 2015, while by 2018 these discrepancies reduce respectively to 6%, but increases for expenditure to 12%. However the external administrative total includes payments to recipients living in institutions who are not captured by FRS/EUROMOD. The shortfall might be explained by EUROMOD not controlling for size of entitlement in the take-up adjustment (although it is worth noting that our adjustment does move the aggregate number of recipients in the right direction).

However, within PC there are too few recipients of Saving Credit alone or recipients of both Savings Credit (SC) and Guarantee Credit (GC) compared to those receiving GC alone. The latter may rise when the incomes which give rise to SC entitlement are under-reported. This maybe the case given the under-estimation of SC recipients.

Since 2011 Pension Credit expenditure has fallen by about 23% according to the external statistics. This is due in part to cohort effects: the newly retired have higher non means-tested pensions than the older retired. It is also partly to do with the basic state pension rising as fast, or faster, than Pension Credit in this period, and because of the increase in the female state pension age. EUROMOD captures the second and third of these effects, at least in principle, but not the first. This means that estimated expenditures falls but not to the same extent as external statistics. As a result, there is a bigger shortfall in EUROMOD by the end of the period compares to external statistics than at the beginning of the period (8% and 12% respectively).

- ***Housing Benefit***

After the take-up correction Housing Benefit recipients are under-estimated by EUROMOD by 7% in 2015. This is lower than the under-estimation in the FRS data (under-reported by 21%). Expenditure is under-estimated by 19% in 2015 decreasing to 15% in 2017. The updating of rents to 2017 may not capture differential growth in rent satisfactorily and the modelling of LHA rent restrictions which were strengthened just before the beginning of this period, can only be approximated. However, since Housing Benefit is calculated at the end of the EUROMOD “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.

- ***Council Tax Benefit***

In 2013 responsibility for Council Tax Benefit was devolved to Local Authorities and renamed local Council Tax Reduction (CTR). This scheme is different in England, Wales and Scotland and national statistics are no longer available. In EUROMOD, number of recipients and aggregated expenditures remain in line with previous years. As before, it is possible that they are over-estimated even after the take-up correction. The reasons for this are difficult to establish exactly, except that entitlement to CTR depends not only on receipt of IS or PC (in which case it is virtually automatic) but also on whether tax credits or any non means-tested benefits are received. As with Housing Benefit, to the extent that some non-simulated benefits are under-reported and tax credits are under-simulated, we might expect some over-estimation of CTR.

- ***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 reduced to match the benefit cap limit. The benefit cap was fully functional from September 2013 and the first external statistics on the numbers of households affected can be found

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/542734/benefit-cap-statistics-to-may-2016.pdf . The number of benefit unit affected by the cap in EUROMOD are low. The reason for this may be due to the fact that not all benefits are subject to the cap and entitlement to certain benefits provides exemption. Hence, under-simulation of HB as well as under-reported non-simulated benefits may explain under-estimation of the benefit cap.

- ***Income tax***

Compared with tax statistics, the number of income tax payers estimated by EUROMOD is under-simulated in 2015 by 11 percentage points (Table 4.6a). Revenue from income tax is under-estimated, however, by 17% (Table 4.7a).

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 of the 2009-13 UK Country Report describes a case study for 2010, comparing EUROMOD 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 4.6a shows that EUROMOD under-simulates the number of taxpayers paying tax at the basic rate – i.e. with this as their marginal rate – (with a 7% under-simulation), while the precision of the simulation decreases with income (14% under-simulation of higher rate taxpayers and 53% for those paying tax at the additional rate). Table 4.7b highlights a shortfall of tax collected at the additional rate of 60% in 2015, while tax revenue collected at the higher rate (9%) and standard rate tax revenue (98%) is very well estimated (very small discrepancy in 2015).

Over the period 2015-18 income tax revenue grew by 9% according to external statistics but only by 3% according to EUROMOD. In 2015 the reduction in income tax estimated by EUROMOD corresponds to a drop in number of taxpayers between 2014 and 2015 due to the reduction from 10% to 0% of the starting rate for savings income and the increase of the starting rate limit to £5,000 from April 2015 (as well as the introduction of a transferable personal tax allowance between married couples - although this contributes in a minor way to the drop of income tax). But no such reduction appears in the official statistics which instead forecast (these are still provisional numbers) an increase of taxpayers paying taxes on saving incomes (as shown in Table 4.6b) and a decrease in the amount of income tax collected from them (Table 4.7b). A natural consequence of income tax from savings being not well-captured by EUROMOD is that the model under simulates income tax. This is reflected on the reduction in income tax simulated by EUROMOD between 2014 and 2015 (not shown by the tables). In 2016 total number of income tax payers decreases according to both EUROMOD and external statistics. However, income tax revenue according to both EUROMOD and external statistics increases, despite the reduction in number of taxpayers following the introduction of the saving tax allowance from April. This is driven by the difficulty in capturing well additional rate incomes, which is under simulated by 60% as shown by Table 4.7b.

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 EUROMOD estimates. If EUROMOD 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***

External figures on contributors are only available up to 2008. At that point there was a shortfall of 19%. The explanation for the underestimation of numbers of both employed and self-employed contributors by EUROMOD is that the administrative figures refer to any payment of a contribution within the year while employee contributions are paid depending on weekly earnings. At any one point in time the number of contributors is less than that shown by the administrative statistics. Consistent with this explanation, revenue from employee contributions are relatively well captured (97% in 2015) – see Table 4.7a. Information on the number of employees for whom employers make contributions is not available. There is a shortfall of revenue from employer contributions of 13% over the period.

Aggregated revenue from contributions made by the self-employed are not available from 2013 (they have been aggregated with employees-contributions). EUROMOD estimates remain in line with previous years when revenue from contributions made by the self-employed were larger (by 55% in 2012, not shown) than those given in external statistics and estimates of number of contributors smaller (by 17% in 2008, not shown). The explanations for this are a combination of those provided above for income tax and for employee contributions. Self-employed contributions are of two types. Class 2 are weekly flat-rate payments and external estimates count those making any contribution within the year. Class 4 contributions depend on annual self-employment income in a previous year. The explanations for income tax are relevant for Class 4 and the explanations for employee contributions are relevant for Class 2.

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 4.8a and Table 4.8b compare estimates of income inequality and descriptions of the income distribution from EUROMOD with those published in the official UK HBAI statistics for 2015/16. The two tables show two sets of EUROMOD estimates: assuming 100% take-up of means-tested benefits and tax credits, and using the incomplete take-up assumption. Also shown are statistics calculated by us from the FRS, using the EUROMOD sample and income concept.

The correction for non take-up improves the comparison. The Gini coefficient is increased by two points (from 0.28 to 0.30) although there is still quite a large discrepancy between the HBAI estimate (0.34) and the EUROMOD 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 FRS estimate is the same as that from EUROMOD). The HBAI correction uses information from tax statistics to inflate the incomes of some of the higher income households in the data (DWP, 2015). This has no effect on the median or poverty estimates but does affect the HBAI estimates shown in Table 4.8b 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 EUROMOD and HBAI estimates are generally quite close.

4.2.2 Poverty rates

Table 4.9a and Table 4.9b show a comparison with published UK official statistics (Households Below Average Income or HBAI) based on the same data as EUROMOD (FRS) (2015/16). Table 4.10a and Table 4.10b show a comparison with EUROSTAT published statistics based on SILC 2015.

The unshaded, panel shows the comparison of 2015/16 HBAI (Before Housing Costs) poverty statistics with EUROMOD's 2015 policy year. Because of differences due to using simulated rather than recorded income components and any differences in the precise sample or income concept³⁶ there is no reason to expect the HBAI and EUROMOD results to be identical. Also shown for 2015 are our own calculations using FRS micro-data and the same sample and income concept as is employed in the EUROMOD statistics. The differences between the HBAI estimates (which are rounded to the nearest whole percentage) and our own calculations (here rounded to one decimal point) indicate the effects of the different income concepts and sample selections. The EUROMOD income concept and use of the full FRS sample results in a slightly lower poverty threshold (median) and the difference mainly impacts on poverty measured at the 50% threshold and poverty among older people, at 50% of the median. The differences between the "FRS" measures and those from EUROMOD are due to the use of simulated values for taxes and benefits, including the imprecise take-up adjustments.

Before any take-up correction, EUROMOD estimates of poverty rates are too low relative to the HBAI estimates. Using the 60% of median poverty threshold the rate from EUROMOD is 11% compared with 16% in HBAI. Once the take-up correction is applied the EUROMOD estimate rises to 14.3%. The (rounded) poverty rate is less than 1 percentage points too low relative to HBAI at the 50% and 70% thresholds.

At the 60% threshold the child poverty rate (after the take up adjustments) is 15.1% compared to 19% from HBAI. The discrepancy is small at the 50% threshold (less than 2 percentage points) and less than 3 percentage points at the 70% threshold.

The comparisons for older people show that EUROMOD again underestimates at each threshold. At the 60% threshold the poverty rate for older people is 14.5% compared with 16% from HBAI.

Table 4.9a and Table 4.9b also compare HBAI poverty statistics using 2015/16 data with estimates from the EUROMOD baseline for the corresponding policy year. While there is no reason to expect the statistics from the two sources to move in the same way (since one fully captures economic and demographic changes as well as policy changes and the other does not), it is still interesting to compare the estimates. The HBAI estimates increase from 2015 to 2016 as they do in EUROMOD but at a slower proportion, as they do for children and the elderly.

One plausible explanation for the underestimation of poverty rates, relative to those shown by HBAI is the fact that FRS data under-report receipt of means-tested benefits, particularly Pension Credit but also some working-age income tested benefits and Housing benefits (Table 4.6b). To the extent that EUROMOD estimates provide a closer match to external statistics on recipients of these benefits, we might expect EUROMOD estimates of poverty to be lower than those from HBAI.

³⁶ HBAI excludes cases with spouses living away from home. EUROMOD includes them. HBAI includes, for students, top-up loans and deducts loan repayments. EUROMOD 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); EUROMOD ignores these.

Under-reporting of means-tested benefits in FRS is a plausible component of the explanation of the discrepancy between HBAI and EUROMOD. 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, mis-reporting 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 Table 4.3), 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.

Comparing the poverty rates resulting from EUROMOD with the Eurostat figures (Table 4.10a and Table 4.10b in Annex 3) we find that in 2015, EUROMOD estimates poverty at 40% well when accounting for benefits take-up corrections. It underestimates poverty by 17% using the 50% of median threshold, by 12% and 6% using the 60% and 70% of median thresholds respectively. Differentiated by age group we see that the underestimation using the 60% threshold is largest in the 16-24 age group (by 31%). Euromod also underestimates poverty among children 0-15 by 23% and among elderly by 12%. By contrast, EUROMOD slightly overestimates poverty among the 50-64 years old by 12%.

4.3 Summary of “health warnings”

This final section summarises the main findings in terms of particular aspects of the UK part of EUROMOD 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.

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 EUROMOD 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:

- UK results are based on FRS data, not data from the EU-SILC. These data relate to 2015/16. However, from 2012, the EU-SILC makes use of data from the FRS.

- 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 results from the 2016 to 2018 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 2015/16 (except those captured by updating by income source). In particular 2016 to 2018 baseline results do not capture the effects of recession and slow recovery on increased unemployment and inactivity or reductions in hours worked; nor of increases in employment following increases in the size of the labour force.

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.

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6. SOURCES FOR TAX-BENEFIT DESCRIPTIONS/RULES

6.1 General sources for tax-benefit descriptions/rules

Child Poverty Action Group (2013) “Welfare Benefits and Tax Credits Handbook 2013/2014”, CPAG London

Child Poverty Action Group (2014) “Welfare Benefits and Tax Credits Handbook 2014/2015”, CPAG London

Child Poverty Action Group (2015) “Welfare Benefits and Tax Credits Handbook 2015/2016”, CPAG London

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

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

Annex 1 Updating factors

Annex 2 Policy Effects in 2017-18

Annex 3 Validation Statistics

7.1 Annex 1: Uprating factors

Table 7.1 Monetary variables and uprating factors

Variable	Variable Label	Update factor	Update factor description
yem	employment income PAA: imputed employment	\$f_yem	Earnings index
yemiv	income	\$f_yem	Earnings index
yi	investment income	\$f_yiynt	Investment income
yse	self-employment income PAA: imputed self-	\$f_yem	Earnings index
yseiv	employment income	\$f_yem	Earnings index
bdioa	Attendance allowance	\$f_bdioa	Attendance allowance
bdisc	Disability living allowance (self care)	\$f_bdioa	Attendance allowance
bdimb	Disability living allowance (mobility)	\$f_bdimb	Disability living allowance (mobility)
bdict	Incapacity benefit+ESA	\$f_bdict	Incapacity benefit+ESA
bdict01	Incapacity benefit	\$f_bdict	Incapacity benefit+ESA
bdict02	ESA	\$f_bdict	Incapacity benefit+ESA
bdiwi	Industrial injuries pension	\$f_bdiwi	Industrial injuries pension
bcrdi	Invalid care allowance	\$f_bcrdi	Invalid care allowance + Carers Allowance
boact00	NI retirement pension	\$f_boact00	NI retirement pension
bdisv	Severe disability allowance	\$f_bdisv	Severe disablement allowance
bhlwk	Statutory sick pay	\$f_bhlwk	Statutory sick pay
bunct	Unemployment benefit	\$f_bunct	Unemployment benefit (JSAc)
boawr	War pension	\$f_boawr	War pension
bsuwd	Widow's pension	\$f_bsuwd	Widow's pension
bmana	Maternity Allowance	\$f_bmana	Maternity Allowance
bmaer	Statutory maternity pay	\$f_bmana	Maternity Allowance
xhcmomi	Mortgage interest payment	\$f_xhcmo	Mortgage interest payment
xhcert	Rent	mi	Rent
bhoen30	Local reference rent 30th percentile	\$f_xhcert	Rent
bhoen50	Local reference rent 50th percentile	\$f_xhcert	Rent
bhoen130	Local reference rent 30th percentile	\$f_xhcert	Rent
yot01	Earnings from odd jobs	\$f_yem	Earnings index
yot02	Last earnings for those no longer working	\$f_yem	Earnings index
yprnt	Income from rent received (not taxable)	\$f_xhcert	Rent
yprtx	Income from rent received (taxable)	\$f_xhcert	Rent
ypr	Total income from rent received	\$f_xhcert	Rent
xcc	Childcare costs expenditure	\$f_yem	Earnings index
xhcot	Other housing costs	\$f_xhcert	Rent
xhcsc	Housing costs - service charges	\$f_xhcert	Rent
xmp	Maintenance paid	\$f_yem	Earnings index
yptmp	Income from maintenance	\$f_yem	Earnings index

Variable	Variable Label	Update factor	Update factor description
	received		
yptot	Other private transfers	\$f_yem	Earnings index
xpp	Private and personal pension contributions	\$f_yem	Earnings index
yls	Lump sum income	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
ypp	Personal pension income	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
tmu	Council tax	\$f_tmu1	Council Tax: England
tmu	Council tax	\$f_tmu7	Council Tax: London
tmu	Council tax	\$f_tmu10	Council Tax: Wales
tmu	Council tax	\$f_tmu11	Council Tax: Scotland
	NRR/LMA: previous		
yempv_a	employment income	\$f_yem	Earnings index
	NRR/LMA: employment		
yem_a	income	\$f_yem	Earnings index
yiylnt	Tax free investment income	\$f_yiylnt	Investment income
yiyltx	Taxable investment income	\$f_yiylnt	Investment income
afc	Financial capital	\$f_afc	Financial capital
	Mortgage Payment		
xhcmomc	(interest+capital)	\$f_afc	Financial capital
bedsl	Student loan	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
bedes	Student payment	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
buntr	Training allowance	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
boactem	Occupational pension	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)
bot	Other benefits	\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)

Table 7.2 Uprating factors and their sources

Update factor	Update factor description	Factor Source	
\$f_hicp	default uprating factor (Eurostat CPI) (forecast Nov 2015 onwards)	Eurostat CPI; financial year (April-March) average; extrapolated from Jan 2016 using UK OBR CPI forecast Table 3.5 ^[1]	
\$f_yem	Earnings index	ONS financial year (March-April) annual average K54U; extrapolated from Jan 2016 using UK OBR earnings forecast Table 3.5 ^[1]	
\$f_bdioa	Attendance allowance	Change in main rate of benefit; DWP/HMT/HMRC announcements plus statutory indexation for projections	
\$f_bdimb	Disability living allowance (mobility)		
\$f_bdicit	Incapacity benefit+ESA		
\$f_bdiwi	Industrial injuries pension		
\$f_bcrdi	Invalid care allowance + Carers Allowance		
\$f_boact00	NI retirement pension		
\$f_bdisv	Severe disablement allowance		
\$f_bhlwk	Statutory sick pay		
\$f_bunct	Unemployment benefit (JSAc)		
\$f_boawr	War pension		
\$f_bsuwd	Widow`s pension		
\$f_bmana	Maternity Allowance		
\$f_xhcmomi	Mortgage interest payment		Bank of England IUMTLMV[4]; extrapolated assuming moves with trend (2 years) ^[2]
\$f_xhcrtr	Rent		ONS ^[3] ; extrapolated to 2016 using same method as for earnings
\$f_tmuXX	Council Tax	https://www.gov.uk/government/organisations/department-for-communities-and-local-government/series/council-tax-statistics	
\$f_yiynt	Investment income	Newly-constructed index (2011/12=100) based on changes to rates of return using Bank of England data (see tab Bank of England interest rates). Forecast assumes no change on the previous year.	

[1] <https://obr.uk/efo/economic-fiscal-outlook-march-2016/>

[2] <http://www.bankofengland.co.uk/boeapps/iadb/index.asp?first=yes&SectionRequired=I&HideNums=1&ExtraInfo=true&Travel=NIxIRxSUx>

[3] <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/d7ce>

7.2 Annex 2: Policy Effects 2017-18

Table 7.3 and Figure 7.1 show the effect of 2018 policies on mean equivalised household disposable income by income component and income decile group. The effect is estimated as a difference between simulated household net income under the 2018 tax-benefit policies (deflating monetary parameters by Eurostat's Harmonized Index of Consumer Prices, HICP) and net incomes simulated under 2017 policies, as a percentage of mean equivalised household disposable income in 2017.

The total effect of (deflated) 2018 policies on mean household income is -0.24 per cent. This is mainly the result of lower (in real terms) means-tested benefits (-0.22 per cent) and slightly higher direct taxes (-0.08 per cent) only partly compensated by higher public pensions and lower social insurance contributions.

The distributional pattern of policy effects between 2017 and 2018 shows a half-inverse U-shape: with the second decile group losing around 1.04 per cent of income and the top three deciles losing between 0.01 and 0.08 per cent of income on average. Hence, although all decile groups lose on average, people from the sixth to the tenth decile lose relatively less than those from the first to the fifth. The bottom part of the income distribution loses from frozen (in nominal value) means-tested and non means-tested benefits. On the other hand, state pension rising slightly more than inflation thanks to the triple-lock indexation, means that there are small but positive real changes to Public Pension across the income distribution.

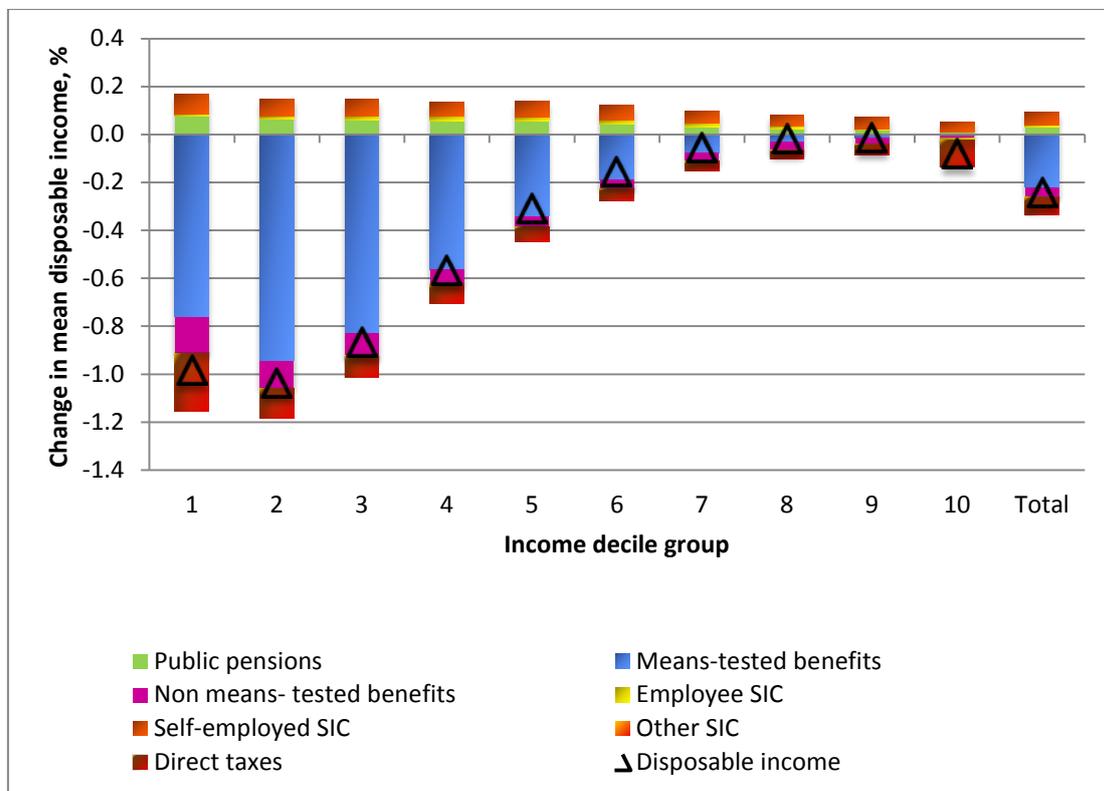
Direct taxes are shown by Table 7.3 to have a negative impact on household disposable income between 2017 and 2018. This is mainly driven by Council Tax increasing faster than inflation across the whole UK. The combination of other changes to Personal Income Tax Allowance (which increased faster than inflation), uprating of income tax band limits and the new income schedule introduced in Scotland - with a combination of five income tax rates (19%, 20%, 21%, 41%, 46%) instead of the usual three adopted in the rest of the UK (20%, 40% and 45%) - had an average positive effect on disposable household income (not shown by Table 7.3).

Table 7.3 Policy Effects 2017-18, using CPI indexation, %

Decile	Original income	Public pensions	Means-tested benefits	Non means-tested benefits	Employee SIC	Self-employed SIC	Other SIC	Direct taxes	Disposable income
1	0.00	0.08	-0.76	-0.15	0.01	0.08	0.00	-0.24	-0.98
2	0.00	0.06	-0.94	-0.11	0.01	0.07	0.00	-0.13	-1.04
3	0.00	0.06	-0.83	-0.09	0.02	0.07	0.00	-0.09	-0.87
4	0.00	0.06	-0.57	-0.06	0.02	0.06	0.00	-0.08	-0.57
5	0.00	0.06	-0.34	-0.04	0.02	0.06	0.00	-0.06	-0.31
6	0.00	0.04	-0.19	-0.04	0.02	0.06	0.00	-0.05	-0.16
7	0.00	0.03	-0.08	-0.03	0.02	0.05	0.00	-0.04	-0.06
8	0.00	0.02	-0.03	-0.03	0.01	0.05	0.00	-0.04	-0.02
9	0.00	0.02	-0.01	-0.02	0.01	0.05	0.00	-0.05	-0.01
10	0.00	0.01	0.00	-0.01	-0.01	0.04	0.00	-0.11	-0.08
Total	0.00	0.03	-0.22	-0.04	0.01	0.05	0.00	-0.08	-0.24

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 2017, using the modified OECD equivalence scale. Each policy system has been applied to the same input data, deflating monetary parameters of 2018 policies by *projected* Eurostat's Harmonized Index of Consumer Prices (HICP).

Figure 7.1 Policy Effects 2017-18, using CPI indexation (CPI=1.025), %



7.3 Annex 3: Validation Tables

Table 4.4 Tax benefit instruments included but not simulated in EUROMOD -Number of recipients/ payers (in thousands)

	EUROMOD				External				Ratio			
	2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits												
Incapacity benefit+ c-ESA	268	184	184	184	499	486	471	429	0.54	0.38	0.39	0.43
Incapacity benefit	41	0	0	0	10	3	2	0	4.10	0.00	0.00	N/A
c-ESA	227	184	184	184	2356	2357	2285	2343	0.10	0.08	0.08	0.08
Retirement Pension	11,628	11,570	11,270	10,966	11096	11145	10995	10569	1.05	1.04	1.03	1.04
Second State Pension	7,761	7,761	7,761	7,761	10335	10250	9875	9556	0.75	0.76	0.79	0.81
Bereavement Benefits	83	83	83	83	93	91	98	110	0.89	0.91	0.85	0.75
Attendance Allowance	747	747	747	747	1457	1457	1457	1457	0.51	0.51	0.51	0.51
Disability Living Allowance (either part)	2,438	2,438	2,438	2,438	2989	2605	2123	1724	0.82	0.94	1.15	1.41
Severe Disablement Allowance	8	8	8	8	113	59	35	31	0.07	0.14	0.23	0.26
Carer's Allowance	599	599	599	599	760	798	854	909	0.79	0.75	0.70	0.66
Industrial Injuries Disablement Allowance	149	149	149	149	313	307	302	296	0.48	0.49	0.49	0.50
Maternity allowances	31	31	31	31	62	61	59	60	0.50	0.51	0.53	0.52
War Pension and allowances	62	62	62	62	0	0	0	0	N/A	N/A	N/A	N/A
Statutory Maternity Pay	171	171	171	171	264	263	266	268	0.65	0.65	0.64	0.64
Personal Independent Payment (PIP)	738	738	738	738	587	1041	1529	2005	1.26	0.71	0.48	0.37
Taxes and Social Insurance contributions												
Council tax (payers)	26,561	26,561	26,561	26,561	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Sources: Unless otherwise specified: Department for Work and Pensions <https://www.gov.uk/government/publications/benefit-expenditure-and-caseload-tables-2018>

War Pension and allowances: War Pensions Quarterly Statistics (mean of June, Sep, Dec and Mar):

<http://www.dasa.mod.uk/applications/newWeb/www/index.php?page=67&pubType=1&thiscontent=500&date=2009-09-10>

Note: c-ESA is contributory Employment and Support Allowance

Table 4.5 Tax benefit instruments included but not simulated in EUROMOD -Annual amounts (in mil. GBP)

	EUROMOD				External				Ratio			
	2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits												
Incapacity benefit+ c-ESA	1,271	1,032	1,042	1,074	4,519	4,702	4,731	4,607	0.28	0.22	0.22	0.23
Incapacity benefit	226	0	0	0	62	15	7	0	3.65	0.00	0.00	0.00
c-ESA	1,045	1,032	1,042	1,074	4,457	4,687	4,724	4,606	0.23	0.22	0.22	0.23
Retirement Pension	63,657	65,157	65,021	65,097	68,093	68,936	68,243	67,716	0.93	0.95	0.95	0.96
Second State Pension	15,213	15,379	15,786	16,166	18,225	18,135	17,986	18,192	0.83	0.85	0.88	0.89
Bereavement Benefits	443	443	447	461	569	557	512	496	0.78	0.79	0.87	0.93
Attendance Allowance	2,699	2,699	2,726	2,808	5,490	5,483	5,543	5,761	0.49	0.49	0.49	0.49
Disability Living Allowance (either part)	10,215	10,215	10,313	10,624	13,233	11,514	9,388	7,809	0.77	0.89	1.10	1.36
Severe Disablement Allowance	37	37	37	38	470	234	120	105	0.08	0.16	0.31	0.36
Carer's Allowance	1,917	1,917	1,936	1,995	2,545	2,667	2,853	3,228	0.75	0.72	0.68	0.62
Industrial Injuries Disablement Allowance	379	379	383	394	892	861	844	854	0.42	0.44	0.45	0.46
Maternity allowances	175	175	177	182	441	437	432	448	0.40	0.40	0.41	0.41
War Pension and allowances	301	301	304	314	-	-	-	-	N/A	N/A	N/A	N/A
Statutory Maternity Pay	1,105	1,105	1,116	1,150	2,352	2,373	2,439	2,520	0.47	0.47	0.46	0.46
Personal Independent Payment (PIP)	2033	2033	2053	2115	3005	5160	8102	11308	0.68	0.39	0.25	0.19
Taxes and Social Insurance contributions												
Council tax (payers)	31,749	32,543	33,747	35,339	28,300	-	-	-	1.12	N/A	N/A	N/A

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Table 4.6a Tax benefit instruments simulated in EUROMOD -Number of recipients/ payers (in thousands) - full take up

		EUROMOD				External				Ratio			
	Unit	2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits													
Child Benefit	Children	12,572	12,528	12,491	12,448	12,895	12,877	12,847	N/A	0.97	0.97	0.97	N/A
	Families	7,401	7,378	7,359	7,332	7,417	7,396	7,377	N/A	1.00	1.00	1.00	N/A
Working Tax credit (all)	Families	2,657	2,551	2,496	2,437	2,239	2,055	N/A	N/A	1.19	1.24	N/A	N/A
Child Tax Credit (all)	Families	4,299	4,239	4,182	4,103	3,793	3,638	N/A	N/A	1.13	1.17	N/A	N/A
Both CTC and WTC	Families	1,508	1,459	1,436	1,409	1,759	1,654	N/A	N/A	0.86	0.88	N/A	N/A
Either CTC or WTC	Families	5,449	5,331	5,242	5,131	4,284	4,047	N/A	N/A	1.27	1.32	N/A	N/A
Without children (WTC only)	Families	1,149	1,092	1,061	1,028	480	401	N/A	N/A	2.39	2.72	N/A	N/A
Job Seekers contributory	Families	70	70	70	70	112	73	60	87	0.63	0.96	1.17	0.80
Income Support+JSAinc	Families	3,164	3,203	3,285	3,348	1,309	1,031	944	1,173	2.42	3.11	3.48	2.85
inc ESA	Families	1,509	1,600	1,627	1,649	1,398	1,363	1,294	1,346	1.08	1.17	1.26	1.23
Income Support+JSAinc+inc ESA	Families	4,673	4,803	4,912	4,997	2,707	2,394	2,238	2,519	1.73	2.01	2.19	1.98
Income Support lone parents only	Families	614	620	619	619	431	400	378	376	1.42	1.55	1.64	1.65
Pension credit - any	Families	3,045	2,839	2,735	2,577	2,055	1,903	1,778	1,655	1.48	1.49	1.54	1.56
Pension Credit GC only	Families	1,570	1,541	1,435	1,293	946	918	878	805	1.66	1.68	1.63	1.61
Pension Credit GC+SC	Families	789	694	697	675	723	646	590	554	1.09	1.07	1.18	1.22
Pension Credit SC only	Families	686	604	603	609	429	339	310	296	1.60	1.78	1.95	2.06
Housing benefit: total	Households	5,662	5,621	5,579	5,519	4,777	4,594	4,386	4,626	1.19	1.22	1.27	1.19
Council tax benefit	Households	8,157	8,078	8,078	8,059	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winter fuel payment	Households	13,282	12,571	11,918	11,245	12,215	12,025	11,810	11,574	1.09	1.05	1.01	0.97
Benefit cap	Families	126	135	453	454	20,346	20,124	169,861	N/A	0.00	0.00	0.00	N/A
Taxes and Social Insurance contributions													
Income tax	Individuals	27,675	27,220	26,771	26,644	31,000	30,800	30,800	31,000	0.89	0.88	0.87	0.86
Basic rate	Individuals	23,607	23,172	22,929	20,903	25,300	25,400	25,500	25,600	0.93	0.91	0.90	0.82
Higher rate	Individuals	3,898	3,869	3,651	3,607	4,510	4,420	4,260	4,280	0.86	0.88	0.86	0.84
Additional rate	Individuals	170	179	190	185	362	341	368	393	0.47	0.52	0.52	0.47
SIC Employees (Class 1)	Individuals	20,237	20,486	20,581	20,613	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SIC Self employed (Class 2 + any Class4)	Individuals	2,860	2,889	2,903	2,577	N/A	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-2018>

Income tax: HMRC statistics <https://www.gov.uk/government/statistics/income-tax-liabilities-statistics-tax-year-2013-to-2014-to-tax-year-2017-to-2018>

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Child tax credit and working tax credit: HMRC statistics <https://www.gov.uk/government/statistics/child-and-working-tax-credits-statistics-finalised-annual-awards-2016-to-2017> ; Child benefit: HMRC statistics <https://www.gov.uk/government/statistics/child-benefit-statistics-geographical-analysis-august-2017>

Table 4.6b Tax benefit instruments simulated in EUROMOD -Number of recipients/ payers (in thousands) - partial take up

	Unit	EUROMOD				External				Ratio			
		2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits													
Child Benefit	Children	12,572	12,528	12,491	12,448	12,895	12,877	12,847	N/A	0.97	0.97	0.97	N/A
	Families	7,401	7,378	7,359	7,332	7,417	7,396	7,377	N/A	1.00	1.00	1.00	N/A
Working Tax credit (all)	Families	1,612	1,551	1,516	1,475	2,239	2,055	N/A	N/A	0.72	0.75	N/A	N/A
Child Tax Credit (all)	Families	3,523	3,489	3,445	3,394	3,793	3,638	N/A	N/A	0.93	0.96	N/A	N/A
Both CTC and WTC	Families	1,266	1,225	1,201	1,179	1,759	1,654	N/A	N/A	0.72	0.74	N/A	N/A
Either CTC or WTC	Families	3,869	3,816	3,760	3,690	4,284	4,047	N/A	N/A	0.90	0.94	N/A	N/A
Without children (WTC only)	Families	346	326	315	296	480	401	N/A	N/A	0.72	0.81	N/A	N/A
Job Seekers contributory	Families	70	70	70	70	112	73	60	87	0.63	0.96	1.17	0.80
Income Support+JSAinc	Families	2,658	2,695	2,763	2,818	1,309	1,031	944	1,173	2.03	2.61	2.93	2.40
inc ESA	Families	1,201	1,277	1,284	1,298	1,398	1,363	1,294	1,346	0.86	0.94	0.99	0.96
Income Support+JSAinc+inc ESA	Families	3,859	3,972	4,047	4,115	2,707	2,394	2,238	2,519	1.43	1.66	1.81	1.63
Income Support lone parents only	Families	553	559	558	558	431	400	378	376	1.28	1.40	1.48	1.48
Pension credit - any	Families	1,895	1,764	1,703	1,616	2,055	1,903	1,778	1,655	0.92	0.93	0.96	0.98
Pension Credit GC only	Families	1,045	1,016	955	880	946	918	878	805	1.10	1.11	1.09	1.09
Pension Credit GC+SC	Families	519	455	459	446	723	646	590	554	0.72	0.70	0.78	0.81
Pension Credit SC only	Families	332	293	289	290	429	339	310	296	0.77	0.86	0.93	0.98
Housing benefit: total	Households	4,429	4,405	4,384	4,343	4,777	4,594	4,386	4,626	0.93	0.96	1.00	0.94
Council tax benefit	Households	5,885	5,842	5,843	5,838	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winter fuel payment	Households	13,282	12,571	11,918	11,245	12,215	12,025	11,810	11,574	1.09	1.05	1.01	0.97
Taxes and Social Insurance contributions													
Income tax	Individuals	27,675	27,220	26,771	26,644	31,000	30,800	30,800	31,000	0.89	0.88	0.87	0.86
Basic rate	Individuals	23,607	23,172	22,929	20,903	25,300	25,400	25,500	25,600	0.93	0.91	0.90	0.82
Higher rate	Individuals	3,898	3,869	3,651	3,607	4,510	4,420	4,260	4,280	0.86	0.88	0.86	0.84
Additional rate	Individuals	170	179	190	185	362	341	368	393	0.47	0.52	0.52	0.47
SIC Employees (Class 1)	Individuals	20,237	20,486	20,581	20,613	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SIC Self employed (Class 2 + any Class4)	Individuals	2,860	2,889	2,903	2,577	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 4.7a Tax benefit instruments simulated in EUROMOD -Annual amounts (in mil. GBP) - full take up

	EUROMOD				External				Ratio			
	2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits												
Child Benefit	11,509	11,481	11,447	11,402	11,681	11,640	11,581	11,546	0.99	0.99	0.99	0.99
Working Tax credit (all)	6,367	6,145	5,968	5,749	7,017	6,299	N/A	N/A	0.91	0.98	N/A	N/A
Child Tax Credit (all)	20,873	20,575	20,311	20,019	21,351	20,726	N/A	N/A	0.98	0.99	N/A	N/A
CTC and WTC	27,240	26,720	26,279	25,769	28,539	27,429	25,839	26,018	0.95	0.97	1.02	0.99
Without children (WTC only)	2,101	2,007	1,947	1,862	1,131	931	N/A	N/A	1.86	2.16	N/A	N/A
Jobseeker's Allowance (contributory)	262	262	262	262	306	264	227	303	0.86	0.99	1.15	0.87
Income Support+JSAinc	12,844	13,025	13,677	14,123	4,543	3,843	3,636	4,407	2.83	3.39	3.76	3.20
inc ESA	9,246	9,844	10,075	10,341	9,815	10,143	10,143	11,274	0.94	0.97	0.99	0.92
Income Support+JSAinc+ESA	22,090	22,869	23,753	24,465	14,358	13,987	13,779	15,682	1.54	1.64	1.72	1.56
Income support lone parents only	2,415	2,432	2,476	2,497	1,559	1,403	1,352	1,343	1.55	1.73	1.83	1.86
Pension Credit Guarantee Credit	7,695	6,994	6,511	5,976	5,456	5,224	4,952	4,639	1.41	1.34	1.31	1.29
Pension Credit Savings Credit	702	544	549	555	622	442	429	403	1.13	1.23	1.28	1.38
Pension Credit total	8,397	7,539	7,060	6,532	6,079	5,666	5,381	5,042	1.38	1.33	1.31	1.30
Housing benefit: total	24,294	24,562	24,593	24,164	24,244	23,441	22,493	23,955	1.00	1.05	1.09	1.01
Council tax benefit	5,993	6,062	6,296	6,549	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winter fuel payment	2,151	2,060	1,977	1,890	2,074	2,049	2,014	1,979	1.04	1.01	0.98	0.96
all IS+PC+JSAinc	30,487	30,407	30,813	30,996	20,436	19,652	19,160	20,723	1.49	1.55	1.61	1.50
Taxes and Social Insurance contributions												
Income tax	129,865	130,291	130,422	133,195	156,339	160,731	164,432	170,250	0.83	0.81	0.79	0.78
Basic rate	54,780	54,299	55,337	52,012	55,713	56,323	58,142	60,037	0.98	0.96	0.95	0.87
Higher rate	58,495	58,599	56,792	57,295	58,927	60,764	60,013	61,326	0.99	0.96	0.95	0.93
Additional rate	16,590	17,393	18,293	18,032	41,623	43,829	46,218	48,958	0.40	0.40	0.40	0.37
SIC Employees (Class 1) + S/employed (class 2 & 4)	46,578	50,164	51,960	52,867	48,100	N/A	N/A	N/A	0.97	N/A	N/A	N/A
SIC Employers	56,403	58,348	59,917	61,299	65,000	N/A	N/A	N/A	0.87	N/A	N/A	N/A
SIC total (any SIC)	102,981	108,512	111,877	114,166	113,100	N/A	N/A	N/A	0.91	N/A	N/A	N/A

Note (1): Income Support also takes into account JSA means tested; ib-ESA is effectively simulated as part of IS in EUROMOD

Sources: Unless otherwise specified: Department for Work and Pensions <https://www.gov.uk/government/publications/benefit-expenditure-and-caseload-tables-2018>

Income tax: HMRC statistics. Child tax credit and working tax credit: HMRC statistics <https://www.gov.uk/government/statistics/child-and-working-tax-credits-statistics-finalised-annual-awards-2016-to-2017> National Insurance Contributions: ONS Blue Book Table 5.2.4s

Table 4.7b Tax benefit instruments simulated in EUROMOD -Annual amounts (in mil. GBP) - partial take up

	EUROMOD				External				Ratio			
	2015	2016	2017	2018	2015/16	2016/17	2017/18	2018/19	2015	2016	2017	2018
Benefits												
Child Benefit	11,509	11,481	11,447	11,402	11,681	11,640	11,581	11,546	0.99	0.99	0.99	0.99
Working Tax credit (all)	4,242	4,100	3,981	3,837	7,017	6,299	N/A	N/A	0.60	0.65	N/A	N/A
Child Tax Credit (all)	17,287	17,123	16,920	16,682	21,351	20,726	N/A	N/A	0.81	0.83	N/A	N/A
CTC and WTC	21,528	21,223	20,901	20,519	28,539	27,429	25,839	26,018	0.75	0.77	0.81	0.79
Without children (WTC only)	615	579	557	522	1,131	931	N/A	N/A	0.54	0.62	N/A	N/A
Jobseeker's Allowance (contributory)	262	262	262	262	306	264	227	303	0.86	0.99	1.15	0.87
Income Support+JSAinc	10,935	11,095	11,668	12,081	4,543	3,843	3,636	4,407	2.41	2.89	3.21	2.74
inc ESA	7,348	7,826	7,924	8,103	9,815	10,143	10,143	11,274	0.75	0.77	0.78	0.72
Income Support+JSAinc+ESA	18,283	18,921	19,592	20,183	14,358	13,987	13,779	15,682	1.27	1.35	1.42	1.29
Income support lone parents only	2,162	2,180	2,214	2,235	1,559	1,403	1,352	1,343	1.39	1.55	1.64	1.66
Pension Credit Guarantee Credit	5,155	4,636	4,432	4,126	5,456	5,224	4,952	4,639	0.94	0.89	0.90	0.89
Pension Credit Savings Credit	411	320	322	323	622	442	429	403	0.66	0.72	0.75	0.80
Pension Credit total	5,567	4,955	4,753	4,450	6,079	5,666	5,381	5,042	0.92	0.87	0.88	0.88
Housing benefit: total	19,649	19,901	19,985	19,691	24,244	23,441	22,493	23,955	0.81	0.85	0.89	0.82
Council tax benefit	4,401	4,450	4,614	4,811	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Winter fuel payment	2,151	2,060	1,977	1,890	2,074	2,049	2,014	1,979	1.04	1.01	0.98	0.96
all IS+PC+JSAinc	23,849	23,876	24,345	24,633	20,436	19,652	19,160	20,723	1.17	1.21	1.27	1.19
Taxes and Social Insurance contributions												
Income tax	129,865	130,291	130,422	133,195	156,339	160,731	164,432	170,250	0.83	0.81	0.79	0.78
Basic rate	54,780	54,299	55,337	52,012	55,713	56,323	58,142	60,037	0.98	0.96	0.95	0.87
Higher rate	58,495	58,599	56,792	57,295	58,927	60,764	60,013	61,326	0.99	0.96	0.95	0.93
Additional rate	16,590	17,393	18,293	18,032	41,623	43,829	46,218	48,958	0.40	0.40	0.40	0.37
SIC Employees (Class 1)	46,578	50,164	51,960	52,867	48,100	N/A	N/A	N/A	0.97	N/A	N/A	N/A
SIC Employers	56,403	58,348	59,917	61,299	65,000	N/A	N/A	N/A	0.87	N/A	N/A	N/A
SIC total (any SIC)	102,981	108,512	111,877	114,166	113,100	N/A	N/A	N/A	0.91	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-2018> Income tax: HMRC statistics. Child tax credit and working tax credit: HMRC statistics <https://www.gov.uk/government/statistics/child-and-working-tax-credits-statistics-finalised-annual-awards-2016-to-2017> National Insurance Contributions: ONS Blue Book Table 5.2.4s

Table 4.8a Distribution of equivalised disposable income (Full take-up assumption)

	EUROMOD				External (FRS)	External (HBAI)				Ratio (EM/FRS)	Ratio (EM/HBAI)			
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018
Gini	0.28	0.28	0.29	0.29	0.31	0.34	0.35	N/A	N/A	0.91	0.83	0.81	N/A	N/A
Mean	1,598	1,616	1,638	1,668	1,758	1,678	1,713	N/A	N/A	0.92	0.95	0.94	N/A	N/A
Median	1,352	1,370	1,390	1,414	1,486	1,369	1,390	N/A	N/A	0.92	0.99	0.99	N/A	N/A
Decile medians (£/month equivalised)														
D1	682	693	692	690	620	552	544	N/A	N/A	1.12	1.24	1.27	N/A	N/A
D2	878	883	881	887	874	806	793	N/A	N/A	1.01	1.09	1.11	N/A	N/A
D3	999	1,009	1,013	1,024	1,046	968	955	N/A	N/A	0.96	1.03	1.06	N/A	N/A
D4	1,122	1,134	1,145	1,161	1,206	1,112	1,108	N/A	N/A	0.94	1.01	1.02	N/A	N/A
D5	1,267	1,282	1,301	1,320	1,387	1,280	1,269	N/A	N/A	0.92	0.99	1.01	N/A	N/A
D6	1,441	1,465	1,488	1,516	1,589	1,462	1,459	N/A	N/A	0.92	0.99	1.00	N/A	N/A
D7	1,659	1,683	1,715	1,749	1,840	1,687	1,683	N/A	N/A	0.91	0.98	1.00	N/A	N/A
D8	1,929	1,959	1,994	2,036	2,150	1,962	1,964	N/A	N/A	0.91	0.98	1.00	N/A	N/A
D9	2,338	2,371	2,410	2,465	2,602	2,378	2,357	N/A	N/A	0.91	0.98	1.01	N/A	N/A
D10	3,200	3,244	3,302	3,377	3,688	3,418	3,448	N/A	N/A	0.88	0.94	0.94	N/A	N/A
Decile group share														
D1	4.0	3.9	3.8	3.8	3.0	3.0	3.0	N/A	N/A	1.31	1.32	1.31	N/A	N/A
D2	5.5	5.4	5.4	5.3	5.1	5.0	5.0	N/A	N/A	1.07	1.09	1.09	N/A	N/A
D3	6.3	6.2	6.2	6.1	6.0	6.0	6.0	N/A	N/A	1.04	1.04	1.04	N/A	N/A
D4	7.0	7.0	7.0	7.0	6.9	6.0	6.0	N/A	N/A	1.02	1.17	1.17	N/A	N/A
D5	7.9	8.0	8.0	7.9	7.9	8.0	8.0	N/A	N/A	1.01	0.99	0.99	N/A	N/A
D6	9.1	9.1	9.1	9.1	9.1	8.0	8.0	N/A	N/A	1.00	1.13	1.13	N/A	N/A
D7	10.4	10.4	10.5	10.5	10.5	11.0	11.0	N/A	N/A	0.99	0.95	0.95	N/A	N/A
D8	12.1	12.2	12.2	12.3	12.3	11.0	11.0	N/A	N/A	0.99	1.10	1.11	N/A	N/A
D9	14.7	14.7	14.8	14.8	15.0	15.0	14.0	N/A	N/A	0.98	0.98	1.05	N/A	N/A
D10	23.1	23.1	23.1	23.2	24.0	27.0	28.0	N/A	N/A	0.96	0.86	0.82	N/A	N/A

Sources: <https://www.gov.uk/government/statistics/households-below-average-income-199495-to-201617>

Table 4.8b Distribution of equivalised disposable income (Partial take-up assumption)

	EUROMOD				External (FRS)	External (HBAI)				Ratio (EM/FRS)	Ratio (EM/HBAI)			
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018
Gini	0.30	0.30	0.30	0.31	0.31	0.34	0.35	N/A	N/A	0.97	0.89	0.86	N/A	N/A
Mean	1,563	1,581	1,604	1,634	1,758	1,678	1,713	N/A	N/A	0.90	0.93	0.92	N/A	N/A
Median	1,331	1,351	1,370	1,394	1,486	1,369	1,390	N/A	N/A	0.91	0.97	0.97	N/A	N/A
Decile medians (£/month equivalised)														
D1	546	550	556	558	620	552	544	N/A	N/A	0.89	0.99	1.01	N/A	N/A
D2	811	816	812	822	874	806	793	N/A	N/A	0.93	1.01	1.03	N/A	N/A
D3	958	967	970	982	1,046	968	955	N/A	N/A	0.92	0.99	1.01	N/A	N/A
D4	1,087	1,100	1,113	1,128	1,206	1,112	1,108	N/A	N/A	0.91	0.98	0.99	N/A	N/A
D5	1,240	1,258	1,274	1,296	1,387	1,280	1,269	N/A	N/A	0.91	0.97	0.99	N/A	N/A
D6	1,425	1,446	1,470	1,500	1,589	1,462	1,459	N/A	N/A	0.91	0.98	0.99	N/A	N/A
D7	1,649	1,676	1,705	1,739	1,840	1,687	1,683	N/A	N/A	0.91	0.98	1.00	N/A	N/A
D8	1,925	1,955	1,989	2,031	2,150	1,962	1,964	N/A	N/A	0.91	0.98	1.00	N/A	N/A
D9	2,337	2,368	2,408	2,463	2,602	2,378	2,357	N/A	N/A	0.91	0.98	1.00	N/A	N/A
D10	3,200	3,237	3,302	3,377	3,688	3,418	3,448	N/A	N/A	0.88	0.94	0.94	N/A	N/A
Decile group share														
D1	3.1	3.1	3.0	3.0	3.0	3	3	N/A	N/A	1.03	1.03	1.02	N/A	N/A
D2	5.2	5.2	5.1	5.0	5.0	5	5	N/A	N/A	1.04	1.03	1.03	N/A	N/A
D3	6.1	6.1	6.1	6.0	6.0	6	6	N/A	N/A	1.03	1.02	1.02	N/A	N/A
D4	7.0	7.0	6.9	6.9	6.9	6	6	N/A	N/A	1.01	1.16	1.16	N/A	N/A
D5	8.0	8.0	8.0	8.0	7.9	8	8	N/A	N/A	1.01	0.99	1.00	N/A	N/A
D6	9.1	9.2	9.2	9.2	9.1	8	8	N/A	N/A	1.01	1.14	1.15	N/A	N/A
D7	10.6	10.6	10.6	10.7	10.5	11	11	N/A	N/A	1.01	0.96	0.96	N/A	N/A
D8	12.4	12.4	12.5	12.5	12.3	11	11	N/A	N/A	1.01	1.13	1.13	N/A	N/A
D9	15.0	15.0	15.1	15.1	14.9	15	14	N/A	N/A	1.01	1.00	1.07	N/A	N/A
D10	23.6	23.5	23.6	23.7	24.6	27	28	N/A	N/A	0.96	0.87	0.84	N/A	N/A

Sources: <https://www.gov.uk/government/statistics/households-below-average-income-199495-to-201617>

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Table 4.9a Poverty rates by age (Full take-up assumption)

	EUROMOD				External (FRS)	External (HBAI)				Ratio (EM/FRS)	Ratio(EM/HBAI)				
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018	
Median (£/month)															
	1,352	1,370	1,390	1,414	1,486	1,369	1,390	N/A	N/A	0.92	1.00	1.00	N/A	N/A	
Poverty risk: all															
Total	50%	4.6	4.5	5.1	5.6	9.0	9.0	10.0	N/A	N/A	0.50	0.50	0.51	N/A	N/A
	60%	10.8	11.3	12.3	12.7	16.0	16.0	16.0	N/A	N/A	0.71	0.71	0.77	N/A	N/A
	70%	20.5	20.9	21.9	22.3	24.7	24.0	25.0	N/A	N/A	0.85	0.87	0.88	N/A	N/A
Poverty risk: children															
	50%	3.2	3.3	4.5	4.9	10.0	10.0	10.0	N/A	N/A	0.33	0.33	0.45	N/A	N/A
	60%	9.9	10.6	12.7	13.4	20.4	19.0	20.0	N/A	N/A	0.52	0.56	0.64	N/A	N/A
	70%	24.1	24.9	27.4	28.2	32.3	31.0	32.0	N/A	N/A	0.77	0.80	0.86	N/A	N/A
Poverty risk: older people															
	50%	3.0	2.3	2.8	3.1	8.6	9.0	10.0	N/A	N/A	0.26	0.25	0.28	N/A	N/A
	60%	11.6	11.8	12.2	12.6	16.3	16.0	17.0	N/A	N/A	0.72	0.74	0.72	N/A	N/A
	70%	21.2	21.2	21.5	21.5	26.7	26.0	27.0	N/A	N/A	0.79	0.81	0.80	N/A	N/A

Sources: <https://www.gov.uk/government/statistics/households-below-average-income-199495-to-201617>

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Table 4.9b Poverty rates by age (Partial take-up assumption)

	EUROMOD				External (FRS)	External (HBAI)				Ratio (EM/FRS)	Ratio(EM/HBAI)				
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018	
Median (£/month)															
	1,331	1,351	1,370	1,394	1,486	1,369	1,390	N/A	N/A	0.91	0.99	0.99	N/A	N/A	
Poverty risk: all															
Total	50%	7.9	8.1	8.4	8.8	9.0	9.0	10.0	N/A	N/A	0.90	0.90	0.84	N/A	N/A
	60%	14.3	14.7	15.6	15.8	16.0	16.0	16.0	N/A	N/A	0.92	0.92	0.97	N/A	N/A
	70%	23.1	23.5	24.3	24.6	24.7	24.0	25.0	N/A	N/A	0.95	0.98	0.97	N/A	N/A
Poverty risk: children															
	50%	8.3	8.3	8.9	9.4	10.0	10.0	10.0	N/A	N/A	0.82	0.83	0.89	N/A	N/A
	60%	15.1	15.7	17.9	18.2	20.4	19.0	20.0	N/A	N/A	0.77	0.83	0.89	N/A	N/A
	70%	28.1	28.9	31.1	31.8	32.3	31.0	32.0	N/A	N/A	0.90	0.93	0.97	N/A	N/A
Poverty risk: older people															
	50%	5.8	6.0	6.4	6.7	8.6	9.0	10.0	N/A	N/A	0.69	0.66	0.64	N/A	N/A
	60%	14.5	14.6	15.1	15.4	16.3	16.0	17.0	N/A	N/A	0.90	0.91	0.89	N/A	N/A
	70%	23.3	23.2	23.4	23.5	26.7	26.0	27.0	N/A	N/A	0.87	0.89	0.87	N/A	N/A

Sources: <https://www.gov.uk/government/statistics/households-below-average-income-199495-to-201617>

Table 4.10a Poverty rates by gender and age groups comparing to EUROSTAT published statistics (Full take-up assumption)

	EUROMOD				External (FRS)	External (EUROSTAT)				Ratio (EM/FRS)	Ratio (EM/EUROSTAT)			
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018
40% median HDI														
Total	1.94	2.15	2.27	2.46	4.46	N/A	N/A	N/A	N/A	0.43	0.45	N/A	N/A	N/A
Males	1.95	2.15	2.28	2.48	4.39	N/A	N/A	N/A	N/A	0.44	0.43	N/A	N/A	N/A
Females	1.94	2.16	2.25	2.45	4.53	N/A	N/A	N/A	N/A	0.43	0.46	N/A	N/A	N/A
50% median HDI														
Total	4.63	4.54	5.12	5.57	9.00	N/A	N/A	N/A	N/A	0.51	0.47	N/A	N/A	N/A
Males	4.65	4.67	5.29	5.72	8.82	N/A	N/A	N/A	N/A	0.53	0.49	N/A	N/A	N/A
Females	4.61	4.41	4.94	5.43	9.17	N/A	N/A	N/A	N/A	0.50	0.45	N/A	N/A	N/A
60% median HDI														
Total	10.84	11.33	12.27	12.72	15.99	N/A	N/A	N/A	N/A	0.68	0.68	N/A	N/A	N/A
Males	10.55	11.06	11.99	12.42	15.47	N/A	N/A	N/A	N/A	0.68	0.69	N/A	N/A	N/A
Females	11.13	11.60	12.54	13.01	16.50	N/A	N/A	N/A	N/A	0.67	0.67	N/A	N/A	N/A
70% median HDI														
Total	20.53	20.94	21.89	22.30	24.69	N/A	N/A	N/A	N/A	0.83	0.84	N/A	N/A	N/A
Males	19.98	20.43	21.31	21.74	23.67	N/A	N/A	N/A	N/A	0.84	0.85	N/A	N/A	N/A
Females	21.06	21.44	22.46	22.84	25.68	N/A	N/A	N/A	N/A	0.82	0.82	N/A	N/A	N/A
60% median HDI														
0-15 years	9.01	9.69	11.92	12.60	19.93	19.50	N/A	N/A	N/A	0.45	0.50	N/A	N/A	N/A
16-24 years	14.41	14.97	15.84	16.16	18.74	24.90	N/A	N/A	N/A	0.77	0.60	N/A	N/A	N/A
25-49 years	9.33	9.64	10.38	10.78	13.38	13.60	N/A	N/A	N/A	0.70	0.71	N/A	N/A	N/A
50-64 years	12.55	13.62	14.70	15.62	14.98	14.50	N/A	N/A	N/A	0.84	0.94	N/A	N/A	N/A
65+ years	11.62	11.64	11.44	11.35	16.12	N/A	N/A	N/A	N/A	0.72	0.71	N/A	N/A	N/A

Sources: External statistics: Eurostat, online database

Table 4.10b Poverty rates by gender and age groups comparing to EUROSTAT published statistics (Partial take-up assumption)

	EUROMOD				External (FRS)	External (EUROSTAT)				Ratio (EM/FRS)	Ratio (EM/EUROSTAT)			
	2015	2016	2017	2018	2015	2015	2016	2017	2018	2015	2015	2016	2017	2018
40% median HDI														
Total	4.66	4.77	4.88	5.00	4.46	4.80	N/A	N/A	N/A	1.04	0.99	N/A	N/A	N/A
Males	4.55	4.64	4.73	4.85	4.39	5.00	N/A	N/A	N/A	1.04	0.93	N/A	N/A	N/A
Females	4.77	4.89	5.02	5.14	4.53	4.70	N/A	N/A	N/A	1.05	1.04	N/A	N/A	N/A
50% median HDI														
Total	7.93	8.06	8.42	8.77	9.00	9.70	N/A	N/A	N/A	0.88	0.83	N/A	N/A	N/A
Males	7.80	7.94	8.30	8.65	8.82	9.60	N/A	N/A	N/A	0.88	0.83	N/A	N/A	N/A
Females	8.07	8.17	8.54	8.88	9.17	9.80	N/A	N/A	N/A	0.88	0.83	N/A	N/A	N/A
60% median HDI														
Total	14.32	14.65	15.57	15.83	15.99	16.60	N/A	N/A	N/A	0.90	0.88	N/A	N/A	N/A
Males	13.92	14.23	15.11	15.30	15.47	16.10	N/A	N/A	N/A	0.90	0.88	N/A	N/A	N/A
Females	14.71	15.05	16.01	16.35	16.50	17.20	N/A	N/A	N/A	0.89	0.88	N/A	N/A	N/A
70% median HDI														
Total	23.07	23.48	24.29	24.58	24.69	25.00	N/A	N/A	N/A	0.93	0.94	N/A	N/A	N/A
Males	22.32	22.74	23.42	23.69	23.67	23.90	N/A	N/A	N/A	0.94	0.95	N/A	N/A	N/A
Females	23.80	24.19	25.14	25.45	25.68	26.00	N/A	N/A	N/A	0.93	0.93	N/A	N/A	N/A
60% median HDI														
0-15 years	14.51	15.08	17.33	17.63	19.93	19.50	N/A	N/A	N/A	0.73	0.77	N/A	N/A	N/A
16-24 years	17.13	17.25	18.11	18.28	18.74	24.90	N/A	N/A	N/A	0.91	0.69	N/A	N/A	N/A
25-49 years	12.56	12.73	13.41	13.61	13.38	13.60	N/A	N/A	N/A	0.94	0.94	N/A	N/A	N/A
50-64 years	15.50	16.26	17.23	17.96	14.98	14.50	N/A	N/A	N/A	1.03	1.12	N/A	N/A	N/A
65+ years	14.49	14.51	14.46	14.38	16.12	16.50	N/A	N/A	N/A	0.90	0.88	N/A	N/A	N/A

Source: External statistics: Eurostat, online database