



## **Income-based policies in Scotland:** how would they affect health and health inequalities?

### **Triple I: Informing • Inequalities • Interventions**

Comparing the impact of interventions to  
improve health and reduce health inequalities

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**Please note:** This report was updated in April 2019 to correct an error identified in the original October 2018 version. The error had a small effect on the results for years of life lost (YLL) and inequalities in YLL. Results for premature deaths and hospital stays are unchanged. Some of the cost-effectiveness estimates in Table 2b have changed.

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# Contents

Background.....	2
Methods.....	3
Results.....	9
Appendix 1.....	17
Appendix 2.....	19
Appendix 3.....	20
Appendix 4.....	22
Appendix 5.....	23
Appendix 6.....	24
References.....	25

# Background

Improving health and reducing health inequalities are important joint policy objectives. Income is a key social determinant of health, but there is little robust evidence about the relative health impacts of income-based policies.

Modelling policies that affect household incomes provides a practical and cost-effective way of estimating their effects on health and health inequalities without implementing them. We did this in our project 'Informing Interventions to reduce health Inequalities' ('Triple I').

We have published a briefing, **Income-based policies in Scotland: how would they affect health and health inequalities** to discuss the key findings from our analysis. Further details about the data and methodology are described in this document. The original Triple I work, undertaken by the Scottish Public Health Observatory (ScotPHO), is described elsewhere.<sup>1,2</sup>

# Methods

## The income-based policies

We considered three types of policies that can change household incomes:

- 1 taxation-based policies
- 2 benefits-based policies
- 3 novel approaches.

These were selected to represent a range of options, with varying levels of feasibility. The policies modelled are described below. Policy names underlined were included in the briefing paper.

## Taxation-based policies

- **Income Tax +1p**<sup>†,\*</sup>: All Income Tax rates increased by 1p (to 21p basic rate, 41p higher rate and 46p additional rate).
- **Income Tax -1p**<sup>†,\*</sup>: All Income Tax rates decreased by 1p (to 19p basic rate, 39p higher rate and 44p additional rate).
- **Income Tax basic rate -1p**<sup>†,\*</sup>: Income Tax basic rate decreased by 1p (to 19p).
- **Income Tax basic rate +5p**<sup>†,\*</sup>: Income Tax basic rate increased by 5p (to 25p).
- **Income Tax additional rate +5p**<sup>†,\*</sup>: Income Tax additional rate increased by 5p (to 50p).
- **Personal Allowance +£1K**<sup>†</sup>: Income Tax Personal Allowance increased from £11,000 to £12,000.
- **Personal Allowance -£1K**<sup>†</sup>: Income Tax Personal Allowance decreased from £11,000 to £10,000.
- **Council Tax increase**<sup>\*</sup>: Council Tax increased for bands E (+7.5%, representing an increase from the Scottish average of £1,390 to £1,494 pa), F (+12.5%, from £1,643 to £1,848 pa), G (+17.5%, from £1,895 to £2,227 pa), and H (+22.5%, from £2,275 to £2,786 pa).

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<sup>†</sup> The Income Tax structure reflects the regime in Scotland at the baseline year of 2016. A new system of Income Tax rates and bands came into force in Scotland in April 2018.

<sup>\*</sup> These policies could be introduced in Scotland with existing devolved powers.

# Benefits-based policies

- **Means-tested benefits +50%**: 50% increase in these benefits paid to those who pass an income test: Child Tax Credit, Working Tax Credit, Housing Benefit, income-based Jobseeker's Allowance, income-based Employment and Support Allowance, and Income Support. See **Appendix 1** for the increased rates.
- **Means-tested benefits +10%**: 10% increase in the above benefits. See **Appendix 1** for the increased rates.
- **Devolved benefits +50%\***: 50% increase in these benefits devolved to the Scottish Government: Attendance Allowance, Carer's Allowance, Disability Living Allowance/Personal Independence Payment, Industrial Injuries Disability Benefit, Severe Disability Allowance and Winter Fuel Allowance. See **Appendix 2** for the increased rates for all policies.
- **Devolved benefits + 10%\***: 10% increase in the above benefits.
- **Attendance Allowance +10%\***: 10% increase in the devolved benefit Attendance Allowance.
- **Attendance Allowance +50%\***: 50% increase in the devolved benefit Attendance Allowance.
- **Carer's Allowance +10%\***: 10% increase in the devolved benefit Carer's Allowance.
- **Carer's Allowance +50%\***: 50% increase in the devolved benefit Carer's Allowance.
- **DLA/PIP +10%\***: 10% increase in the devolved benefit Disability Living Allowance/Personal Independence Payment (DLA/PIP).
- **DLA/PIP +50%\***: 50% increase in the devolved benefit Disability Living Allowance/Personal Independence Payment (DLA/PIP).
- **Industrial Injuries Disability Benefit +10%\***: 10% increase in the devolved benefit Industrial Injuries Disability Benefit.
- **Industrial Injuries Disability Benefit +50%\***: 50% increase in the devolved benefit Industrial Injuries Disability Benefit.
- **Severe Disability Allowance +10%\***: 10% increase in the devolved benefit Severe Disability Allowance.

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\* These policies could be introduced in Scotland with existing devolved powers.

- **Severe Disability Allowance +50%\***: 50% increase in the devolved benefit Severe Disability Allowance.
- **Winter Fuel Allowance +10%\***: 10% increase in the devolved benefit Winter Fuel Allowance.
- **Winter Fuel Allowance +50%\***: 50% increase in the devolved benefit Winter Fuel Allowance.

## Novel policies

- **Citizen's Basic Income (CBI)‡**: Illustrative CBI scheme introduced: an income from the state received by every citizen, not dependent on need. Rates = £67.01/week for < 18 years old, £73.10/week for women aged 18–62 years old and men aged 18–64 years old; £155.60/week for women aged > 62 years old and men > 64 years old. Most other benefits would be withdrawn. National Insurance would be set to 12% flat rate for all earnings, and Income Tax rates increased by 6p. See **Appendix 3** for further details on all novel approaches.
- **Citizen's Basic Income Plus‡**: Introduction of illustrative CBI scheme with additional payments for disabled adults (£35.75/week, or £112.40/week for severely disabled) and children (£24.07/week, or £83.52/week if severely disabled). Income Tax rates increased by 7p.
- **Local Income Tax†,\***: Council Tax removed, and all Income Tax rates increased by 3p.
- **Living Wage**: Mandatory payment of the real Living Wage to all employees (calculated as £8.25 per hour for 2016/17 by the Living Wage Foundation based on living costs).
- **Benefit uptake +1%\***: A 1% increase in the number of claimants of means-tested benefits, which may arise from wider availability of income-maximisation advice services, for example. The increased uptake rates are given in **Appendix 4**.

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‡ Many different versions of CBI have been proposed. We selected two illustrative schemes considered to be 'plausible' by the Institute of Policy Research at the University of Bath (Martinelli 2017, see references 7 and 8). We set Income Tax rates to approximate fiscal neutrality for Scotland, and incorporated partial benefit uptake. See Appendix 3 for more detail.

† The Income Tax structure reflects the regime in Scotland at the baseline year of 2016.

A new system of Income Tax rates and bands came into force in Scotland in April 2018.

\* These policies could be introduced in Scotland with existing devolved powers.

## Modelling effects on household incomes

We modelled the effect of each policy on the incomes (before housing costs) of a representative sample of Scottish households ( $n = 2,871$ ) in the 2014/15 Family Resources Survey (FRS). We used EUROMOD H1.0+, a detailed tax-benefit microsimulation model.<sup>3</sup> We modelled the year 2016, with monetary values uprated accordingly. The benefit uptake rates were taken from the Department for Work and Pensions (DWP) and Her Majesty's Revenue and Customs (HMRC). How EUROMOD models the UK economy is described fully by De Agostini (2017).<sup>3</sup> We used FRS weights that account for differential non-response when scaling up to the overall population.

For each policy we estimated average household income change from baseline (no policy) for each quintile of the 2016 Scottish Index of Multiple Deprivation<sup>§</sup> (SIMD), using FRS data linked to SIMD quintiles for us by the DWP. We equivalised the household incomes using the Organisation for Economic Co-operation and Development (OECD) modified equivalence scale,<sup>4</sup> so that they could be compared between households of differing sizes and compositions.

The implications for government expenditure on benefits and revenue from taxes and National Insurance contributions were also estimated from the EUROMOD output.

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<sup>§</sup> It should be noted that the SIMD measures the deprivation levels of areas rather than individuals. In reality areas grouped according to a certain level of deprivation will contain people with varying income levels.



## **Modelling the effects of income change on health**

In the absence of evidence quantifying the effect of income change on mortality, we regressed log-transformed all-cause mortality rates [European age-standardised rates, calculated using data from National Records of Scotland (NRS) and the European Standard Population 2013] on log-transformed mean equivalised household income (before housing costs, values updated to 2016 from FRS 2014/15) for SIMD quintiles (see **Appendix 5**). The coefficient was used to estimate the effect on mortality rates of the change in household income resulting from each policy, by SIMD quintile.

The same process was used to estimate effects of income change on all-cause hospitalisation rates, using 2016 data on continuous inpatient stays from NHS Information Services Division (ISD; Scottish Morbidity Records SMR01 and SMR04).

## **Modelling the effects of policies on health and health inequalities**

The predicted effects of the policies on mortality and hospitalisation rates were entered into the Triple I modelling tool (a Microsoft Excel workbook). The estimated policy impacts on health and health inequalities were compared to baseline, after five years of implementation.

The Triple I tool models policy impacts on the Scottish adult population (16 years and over) in 2016, over follow-up periods from 1 to 20 years. It uses a closed cohort approach, which does not reflect subsequent immigration or emigration, or children reaching 16 years of age. Population totals for the cohort (by sex, five-year age group and SIMD quintile) were obtained from NRS. Rates of all-cause mortality and hospitalisation over time for the subgroups were estimated using data from NRS (mortality records 2002–2016 and projected mortality 2016–2036) and ISD (hospital stays 2002–2016, from SMR01 and SMR04). Parametric survival models (exponential distribution) were used to estimate changes in these rates over time.

The tool uses these rates to estimate the cumulative number of deaths and hospital stays across a follow-up period specified by the user. This is the

baseline (no policy) scenario. For the policy scenario, the predicted effects of the policy on mortality and hospitalisation rates are used to adjust the baseline rates.

The **Triple I spreadsheet tool** can be downloaded and used to produce detailed results for different geographies (Scotland, council areas, Health Boards, city regions or Integrated Joint Boards) and follow-up periods (1 to 20 years), and for three health outcomes:

- hospital stays
- premature deaths: deaths under 75 years of age
- years of life lost: the difference between a person's age at death and their predicted life expectancy (based on their age and sex; NRS data for 2014–16).

For this work we modelled impacts at the national level for five years of follow up. We restricted the results presented in the briefing to those for premature mortality only, but present the other health outcomes here.

# Results

Given that our joint policy objectives are to **improve** health and **reduce** health inequalities, we refer to changes in the health outcomes as positive if they represent an improvement, and changes in health inequalities as negative if they represent a narrowing of the gap. As a result we have inverted the health outcome measures, and talk about hospitalisations prevented, premature deaths prevented and years of life saved.

## How do the policies affect household incomes?

**Table 1** gives the percentage change in equivalised household income (before housing costs), by SIMD 2016 quintile, under each of the policies compared to baseline.

## How do the policies affect health and health inequalities?

**Tables 2a–c** give the percentage change in health outcomes and health inequalities for all the policies. **Table 2a** shows the estimated effect on premature deaths, **2b** shows the estimated effect on years of life saved and **2c** shows the estimated effect on hospitalisations.

## Which policies are most cost-effective?

Compared with the baseline scenario, the additional government revenue and costs of each policy are outlined in **Appendix 6**. The estimated net cost to the government is used in **Tables 2a–c** to estimate the cost per percentage improvement in health, or percentage narrowing of inequalities.

**Table 1:** Change in household income before housing costs (%) under each policy, compared to baseline, by SIMD 2016 quintile

<b>Policy</b>	<b>Q1 (most deprived)</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q5 (least deprived)</b>
Attendance Allowance +10%	0.031	0.067	0.024	0.025	0.027
Attendance Allowance +50%	0.156	0.335	0.118	0.127	0.137
Benefit uptake +1%	0.236	0.051	0.000	0.018	0.000
Carer's Allowance +10%	0.012	0.010	0.005	0.000	0.001
Carer's Allowance +50%	0.066	0.060	0.026	0.003	0.004
Citizen's Basic Income	1.777	1.110	0.991	-0.282	-2.549
Citizen's Basic Income Plus	3.330	2.264	1.166	-0.579	-3.027
Council Tax increase	-0.017	-0.072	-0.144	-0.222	-0.401
Devolved benefits +10%	0.501	0.386	0.268	0.136	0.092
Devolved benefits +50%	2.511	1.941	1.344	0.682	0.461
DLA/PIP +10%	0.415	0.248	0.192	0.075	0.033
DLA/PIP +50%	2.074	1.242	0.960	0.376	0.165
Income Tax additional rate +5p	-0.079	-0.009	-0.046	-0.043	-0.137
Income Tax basic rate +5p	-1.539	-2.127	-2.411	-2.811	-2.949
Income Tax basic rate -1p	0.308	0.426	0.482	0.562	0.590
Income Tax rates +1p	-0.358	-0.482	-0.598	-0.694	-0.806
Income Tax rates -1p	0.358	0.483	0.598	0.694	0.806
Industrial Injuries Disability Benefit +10%	0.006	0.014	0.011	0.006	0.000
Industrial Injuries Disability Benefit +50%	0.028	0.071	0.053	0.031	0.000
Living Wage	3.089	2.113	2.111	1.829	0.943
Local Income Tax	2.120	1.997	2.065	2.122	1.967
Means-tested benefits +10%	1.765	1.019	0.508	0.323	0.170
Means-tested benefits +50%	8.637	5.059	2.483	1.591	0.850
Personal Allowance -£1K	-0.669	-0.761	-0.798	-0.860	-0.816
Personal Allowance +£1K	0.638	0.695	0.759	0.817	0.793
Severe Disability Allowance +10%	0.004	0.010	0.000	0.002	0.000
Severe Disability Allowance +50%	0.020	0.048	0.000	0.008	0.000
Winter Fuel Allowance +10%	0.034	0.037	0.037	0.028	0.031
Winter Fuel Allowance +50%	0.168	0.186	0.187	0.138	0.156

**Tables 2a–c** show the implications for health and health inequalities of each policy, relative to baseline, after five years. Estimated government costs per percentage improvement in the health outcome or inequalities in the health outcome are given in each table. In each table, policies are ranked in descending order of number of premature deaths prevented.

**Table 2a:** Estimated effect of policies on premature deaths prevented

Policy	Gov't cost (£m per year)	Premature deaths (% improvement)	Inequalities in premature deaths (% change)	Cost per % improvement in premature deaths	Cost per % improvement in inequalities
<b>Policies with net cost</b>					
Means-tested benefits +50%	2,173	4.7	-8.0	460	273
Living Wage	1,264	2.4	-1.8	528	718
Local Income Tax	1,288	2.2	<-0.1	576	100,654
Devolved benefits +50%	773	1.8	-2.2	442	360
DLA/PIP +50%	529	1.3	-1.9	417	273
Means-tested benefits +10%	442	1.0	-1.7	438	263
Citizen's Basic Income Plus	535	1.4	-5.9	395	90
Personal Allowance +£1K	513	0.8	0.2	646	-2,456
Income Tax rates -1p	429	0.6	0.5	719	-924
Income Tax basic rate -1p	340	0.5	0.5	694	-1,095
Citizen's Basic Income	442	0.7	-3.6	654	121
Devolved benefits +10%	154	0.4	-0.4	434	356
DLA/PIP +10%	106	0.3	-0.4	412	270
Attendance Allowance +50%	101	0.2	-0.1	502	1,341
Winter Fuel Allowance +50%	89	0.2	<-0.1	474	4,768
Benefit uptake +1%	36	0.1	-0.2	386	146
Industrial Injuries Disability Benefit +50%	22	<0.1	<-0.1	497	1,018
Attendance Allowance +10%	20	<0.1	<-0.1	501	1,356
Carer's Allowance +50%	23	<0.1	<-0.1	528	308

<b>Policy</b>	<b>Gov't cost (£m per year)</b>	<b>Premature deaths (% improvement)</b>	<b>Inequalities in premature deaths (% change)</b>	<b>Cost per % improvement in premature deaths</b>	<b>Cost per % improvement in inequalities</b>
Winter Fuel Allowance +10%	18	<0.1	<-0.1	473	4,752
Severe Disability Allowance +50%	9	<0.1	<-0.1	456	317
Industrial Injuries Disability Benefit +10%	4	<0.1	<-0.1	496	1,012
Carer's Allowance +10%	4	<0.1	<-0.1	535	301
Severe Disability Allowance +10%	2	<0.1	<-0.1	455	315
<b>Policies with net savings</b>					
Income Tax additional rate +5p	-51	-0.1	<-0.1	797	-1,592
Council Tax increase	-135	-0.1	-0.4	921	-387
Income Tax rates +1p	-429	-0.6	-0.5	711	-913
Personal Allowance -£1K	-541	-0.9	-0.2	634	-2,618
Income Tax basic rate +5p	-1,697	-2.5	-1.6	674	-1,064

**Table 2b:** Estimated effect of policies on years of life saved (YLS)

Policy	Gov't cost (£m pa)	YLS (% improvement)	Inequalities in YLS (% change)	£m pa per % improvement in YLS	£m pa per %-pt improvement in inequalities
<b>Policies with net cost</b>					
Means-tested benefits +50%	2,173	4.7	-7.9	461	274
Living Wage	1,264	2.4	-1.7	531	725
Local Income Tax	1,288	2.2	<0.1	580	-294,155
Devolved benefits +50%	773	1.7	-2.1	443	362
Citizen's Basic Income Plus	535	1.4	-5.9	393	90
DLA/PIP +50%	529	1.3	-1.9	418	274
Means-tested benefits +10%	442	1.0	-1.7	439	264
Personal Allowance +£1K	513	0.8	0.2	652	-2,388
Citizen's Basic Income	442	0.7	-3.7	652	121
Income Tax rates -1p	429	0.6	0.5	727	-914
Income Tax basic rate -1p	340	0.5	0.3	701	-1,082
Devolved benefits +10%	154	0.4	-0.4	436	358
DLA/PIP +10%	106	0.3	-0.4	413	272
Attendance Allowance +50%	101	0.2	-0.1	506	1,358
Winter Fuel Allowance +50%	89	0.2	<-0.1	478	5,114
Benefit uptake +1%	36	0.1	-0.2	385	147
Industrial Injuries Disability Benefit +50%	22	<0.1	<-0.1	501	1,018
Carer's Allowance +50%	23	<0.1	-0.1	529	310
Attendance Allowance +10%	20	<0.1	<-0.1	505	1,353
Winter Fuel Allowance +10%	18	<0.1	<-0.1	477	5,096
Severe Disability Allowance +50%	9	<0.1	<-0.1	457	318
Industrial Injuries Disability Benefit +10%	4	<0.1	<-0.1	500	1,012
Carer's Allowance +10%	4	<0.1	<-0.1	536	302
Severe Disability Allowance +10%	2	<0.1	<-0.1	456	316

<b>Policy</b>	<b>Gov't cost (£m pa)</b>	<b>YLS (% improvement)</b>	<b>Inequalities in YLS (% change)</b>	<b>£m pa per % improvement in YLS</b>	<b>£m pa per %-pt improvement in inequalities</b>
<b>Policies with net savings</b>					
Income Tax additional rate +5p	-51	-0.1	<-0.1	803	-1,541
Council Tax increase	-135	-0.1	-0.4	934	-385
Income Tax rates +1p	-429	-0.6	-0.5	719	-903
Personal Allowance -£1K	-541	-0.8	-0.2	640	-2,542
Income Tax basic rate +5p	-1,697	-2.5	-1.6	681	-1,052



**Table 2c:** Estimated effect of policies on hospitalisations prevented

Policy	Gov't cost (£m per year)	Hospitalisations prevented (% improvement)	Inequalities in hospitalisations (% change)	Cost per % improvement in hospitalisations	Cost per % improvement in inequalities
<b>Policies with net cost</b>					
Means-tested benefits +50%	2,173	3.7	-12.5	588	174
Living Wage	1,264	2.0	-2.9	647	438
Local Income Tax	1,288	1.9	<0.1	677	149,551
Devolved benefits +50%	773	1.4	-3.5	555	221
DLA/PIP +50%	529	1.0	-3.1	534	170
Means-tested benefits +10%	442	0.8	-2.6	563	167
Citizen's Basic Income Plus	535	0.4	10.1	619	53
Personal Allowance +£1K	513	0.7	0.3	750	-1,488
Income Tax rates -1p	429	0.5	0.8	811	-552
Income Tax basic rate -1p	340	0.4	0.5	789	-668
Citizen's Basic Income	442	0.4	-6.4	1,155	69
Devolved benefits +10%	154	0.3	-0.7	547	219
DLA/PIP +10%	106	0.2	-0.6	528	168
Attendance Allowance +50%	101	0.2	-0.1	600	724
Winter Fuel Allowance +50%	89	0.2	<-0.1	561	2,653
Benefit uptake +1%	36	0.1	-0.4	524	97
Industrial Injuries Disability Benefit +50%	22	<0.1	<-0.1	608	440
Attendance Allowance +10%	20	<0.1	<-0.1	599	721
Carer's Allowance +50%	23	<0.1	-0.1	681	189
Winter Fuel Allowance +10%	18	<0.1	<-0.1	560	2,642
Severe Disability Allowance +50%	9	<0.1	<-0.1	576	181
Industrial Injuries Disability Benefit +10%	4	<0.1	<-0.1	607	438
Carer's Allowance +10%	4	<0.1	<-0.1	693	186

Policy	Gov't cost (£m per year)	Hospitalisations prevented (% improvement)	Inequalities in hospitalisations (% change)	Cost per % improvement in hospitalisations	Cost per % improvement in inequalities
Severe Disability Allowance +10%	2	<0.1	<-0.1	575	180
<b>Policies with net savings</b>					
Income Tax additional rate +5p	-51	-0.1	-0.1	897	-620
Council Tax increase	-135	-0.1	-0.6	949	-223
Income Tax rates +1p	-429	-0.5	-0.8	802	-545
Personal Allowance -£1K	-541	-0.7	-0.3	737	-1,624
Income Tax basic rate +5p	-1,697	-2.2	-2.6	768	-650

## Notes

1. Health inequalities are measured using the Relative Index of Inequality (RII): a regression-based index which summarises relative inequalities in health by socioeconomic status.<sup>5</sup>
2. All policies with a net cost improved health, and all but three also narrowed inequalities. For the three that widened inequalities the negative cost per % improvement in RII represents the cost per % widening in inequalities.
3. Policies with net savings worsened health, so their positive costs per % change in health represent the amount saved per % worsening in health. They also narrowed health inequalities, therefore, their negative costs per % change in RII represent the amount saved per % narrowing of inequalities.
4. Government cost for Living Wage includes £2,148 m increased wage bill that is likely to be borne between the government and employers, minus the government's net savings arising from increased tax and National Insurance contributions, and reduced benefit expenditure.
5. Government cost for benefit uptake +1% excludes cost of implementing the intervention (income-maximisation advice services).
6. <-0.1 indicates a % change between 0 and -0.1.
7. The costs for increasing spending on devolved benefits calculated from EUROMOD do not correspond to expenditure on these benefits as published by DWP. This is most likely because devolved benefit income is underreported in the FRS and we were unable to incorporate increases to certain benefits.

# Appendix 1

**Table 3:** Baseline and policy rates (£) for the means-tested benefits.<sup>3,6</sup>

Benefit	Frequency	Baseline (2016/17)	Scenario +50%	Scenario +10%
<b>IS and income-based (ib)-JSA</b>				
Single or lone parent aged 16–17	Weekly	57.90	86.85	63.69
Single aged 18–24	Weekly	57.90	86.85	63.69
Single 25 years or over	Weekly	73.10	109.65	80.41
Lone parent 18 years or over	Weekly	73.10	109.65	80.41
Couple, one/both under 18	Weekly	87.50	131.25	96.25
Couple, both over 18	Weekly	114.85	172.28	126.34
Carer premium – one qualifies	Weekly	34.60	51.90	38.06
Carer premium – both qualify	Weekly	34.60	51.90	38.06
Disability premium – single	Weekly	32.25	48.38	35.48
Disability premium – couple	Weekly	45.95	68.93	50.55
Enhanced disability premium – single	Weekly	15.75	23.63	17.33
Enhanced disability premium – couple	Weekly	22.60	33.90	24.86
Severe disability – one qualifies	Weekly	61.85	92.78	68.04
Severe disability – both qualify	Weekly	123.70	185.55	136.07
<b>Income-based (ib)-ESA</b>				
Work-related Activity Component	Weekly	29.05	43.58	31.96
Support Component	Weekly	36.20	54.30	39.82
<b>Housing Benefit</b>				
Family premium	Weekly	17.45	26.18	19.20
Disability premium - child	Weekly	60.06	90.09	66.07
Enhanced disability premium – child	Weekly	24.43	36.65	26.87
Single pensioner between 60 and 64	Weekly	155.60	233.40	171.16
Single pensioner 65+	Weekly	168.70	253.05	185.57
Pensioner couple, both 60–64	Weekly	237.55	356.33	261.31
Pensioner couple, one or both 65+	Weekly	252.30	378.45	277.53
Dependent children under 20	Weekly	66.90	100.35	73.59
<b>Working Tax Credit</b>				
Basic element	Annual	1960.00	2940.00	2156.00
Lone parent element	Annual	2010.00	3015.00	2211.00
Couple element	Annual	2010.00	3015.00	2211.00
30 hours element	Annual	810.00	1215.00	891.00
Disability element	Annual	2970.00	4455.00	3267.00

<b>Benefit</b>	<b>Frequency</b>	<b>Baseline (2016/17)</b>	<b>Scenario +50%</b>	<b>Scenario +10%</b>
Severe disability element	Annual	1275.00	1912.50	1402.50
Max eligible childcare expenditure, 1 child	Weekly	175.00	262.50	192.50
Max eligible childcare expenditure, 2+ children	Weekly	300.00	450.00	330.00
<b>Child Tax Credit</b>				
Family element	Annual	545.00	817.50	599.50
Extra for child under 12 months	Annual	545.00	817.50	599.50
Child element	Annual	2780.00	4170.00	3058.00
Disabled child additional element	Annual	3140.00	4710.00	3454.00
Severely disabled child additional element	Annual	1275.00	1912.50	1402.50

### Notes

1. IS, Income Support; ib-JSA, Income-based Job-Seeker's Allowance; ib-ESA, Income-based Employment Support Allowance.
2. Eligibility criteria available from [www.gov.uk/browse/benefits](http://www.gov.uk/browse/benefits).

## Appendix 2

**Table 4:** Baseline and policy rates (£) for the benefits devolved to the Scottish government<sup>3,6</sup>

Benefit	Frequency	Baseline (2016/17)	Scenario +50%	Scenario +10%
<b>Winter Fuel Allowance</b>				
1+ member of household > 62 years	Annual	200.00	300.00	220.00
1+ member of household > 80 years	Annual	300.00	450.00	330.00
<b>Attendance Allowance</b>				
Higher rate	Weekly	82.30	123.45	90.53
Lower rate	Weekly	55.10	82.65	60.61
Severe Disablement Allowance	Weekly	74.65	111.98	82.12
<b>Industrial Injuries Disability Benefit</b>				
Lowest rate (20% assessed level of disability)	Weekly	33.60	50.40	36.96
Highest rate (100% assessed level of disability)	Weekly	168.00	252.00	184.80
Carer's Allowance	Weekly	62.10	93.15	68.31
<b>DLA/PIP</b>				
DLA Care Component lowest rate	Weekly	21.80	32.70	23.98
DLA Care Component middle rate	Weekly	55.10	82.65	60.61
DLA Care Component highest rate	Weekly	82.30	123.45	90.53
DLA Mobility Component higher rate	Weekly	57.45	86.18	63.20
DLA Mobility Component lower rate	Weekly	21.80	32.70	23.98
PIP Daily Living Component standard rate	Weekly	55.10	82.65	60.61
PIP Daily Living Component enhanced rate	Weekly	82.30	123.45	90.53
PIP Mobility Component standard rate	Weekly	21.80	32.70	23.98
PIP Mobility Component enhanced rate	Weekly	57.45	86.18	63.20

### Notes

1. DLA, Disability Living Allowance; PIP, Personal Independent Payment.
2. Eligibility criteria available from [www.gov.uk/browse/benefits](http://www.gov.uk/browse/benefits).
3. Only the Winter Fuel Allowance is simulated by EUROMOD, as it is only conditional on age. The other five are not simulated (e.g. by assessing eligibility and determining payment level) because there is insufficient information on disability in the FRS. The rates could therefore not be explicitly increased as for the simulated benefits (hence the increased values here are illustrative), but the relevant amounts of these benefits reported to have been received by FRS respondents could still be increased by 10 or 50%.

# Appendix 3

## Description of the illustrative CBI schemes

A CBI is an income for all citizens, irrespective of their income from other sources, and not dependent on need. The background to CBI is described in more detail in NHS Health Scotland's '**Universal Income**' briefing paper. There are different variations of the policy. We based our models on two illustrative schemes considered 'plausible' that were modelled for the UK by Martinelli (2017 a,b).<sup>7,8</sup> We set Income Tax rates to approximate fiscal neutrality for Scotland, and incorporated partial benefit uptake.

### CBI

This illustrative scheme was based on Model B from Martinelli (2017)<sup>7</sup> (Model 2.5 from Martinelli<sup>8</sup>):

- CBI set to approximate existing benefits (£67.01/week for < 18 years, £73.10/week for women aged 18–62 years and men aged 18–64 years; £155.60/week for women > 62 years and men aged > 64 years).
- Personal Income Tax Allowance (PITA) withdrawn.
- Basic State Pension withdrawn.
- Benefits withdrawn: Carer's Allowance, Child Benefit, Child Tax Credit, Employment and Support Allowance (contributory and income based), Income Support, Jobseeker's Allowance (contributory and income based), Pension Credit and Working Tax Credit.
- CBI untaxed, but taken into account in the calculation of other means-tested benefits (Housing Benefit and Council Tax Benefit).
- Income Tax rates and National Insurance contributions set to approximate fiscal neutrality within the existing tax-band structure:
  - National Insurance contributions for employees and self-employed set to flat rate of 12% of earnings, with no thresholds.
  - Income Tax rates increased by 1p at each level (basic, higher and additional) from the existing 20p, 40p and 45p until revenue neutrality achieved. In Scotland the rates needed were 26p, 46p and 51p (cost to

government £0.442 billion, as CBI cost £24.026 billion, but other benefit savings were £10.211 billion and additional tax and National Insurance takings were £13.374 billion).

## **CBI Plus**

This illustrative scheme was based on Model C from Martinelli (2017)<sup>7</sup> (Model 3.5 from Martinelli<sup>8</sup>):

- As CBI described above, with additional premium for disabled individuals.
  - Disabled adults in receipt of disability benefits get additional £35.75/week.
  - Disabled adults in receipt of benefits for severely disabled individuals get additional £76.65/week (total extra £112.40/week).
  - Disabled children (identified as those in receipt of disability benefits) receive additional £59.45/week.
  - Severely disabled children (identified as those in receipt of disability benefits paid to severely disabled children) receive additional £24.07/week (total extra £83.52/week)
- Income Tax rates were increased by 7p, to 27p, 47p and 52p to approximate fiscal neutrality (total cost to government £0.535 billion). This resulted in costs of £24.832 billion/year, savings on other benefits of £10.223 billion, and additional tax/National Insurance income of £14.074 billion.

## Appendix 4

**Table 5:** Baseline and policy rates for benefit uptake (% eligible claimants) from DWP and HMRC 2014/15, used in EUROMOD

<b>Benefit</b>	<b>Description</b>	<b>Baseline rate 2014/15</b>	<b>1% increase</b>
IS, JSA and ESA	People with children	78.0	78.8
	People without children	86.0	86.9
Housing Benefit	Pensioners if not receiving Pension Credit	85.0	85.9
	Working age not in work, if not receiving IS	92.0	92.9
	Working age in work, if not receiving IS	55.0	55.6
Working Tax Credit	No children	33.0	33.3
	No children, couple	27.0	27.3
	No children, single	36.0	36.4
Child Tax Credit	Family element only	65.0	65.7
Working Tax Credit and Child Tax Credit	Lone parents, not London	97.0	98.0
	Couples with children, not London	75.0	75.8

### Notes

IS, income support; JSA, Jobseeker's Allowance; ESA, Employment Support Allowance.



# Appendix 5

## Modelling effects of income change on health

In the absence of evidence quantifying the effect of income change on mortality and hospitalisation, we performed regression analyses using the data below. The mortality regression produced a coefficient of  $\beta = -0.789$  (standard error 0.036,  $p < 0.001$ ,  $R^2 = 0.99$ ). This was exponentiated to give a mortality effect size (rate ratio) of 0.454 per doubling of income. For the hospitalisation analysis, the regression coefficient of  $\beta = -0.677$  (standard error 0.075,  $p = 0.003$ ,  $R^2 = 0.96$ ) was exponentiated to give a rate ratio of 0.508 per doubling of income.

**Table 6:** Income, mortality and hospitalisation data for SIMD quintiles, 2016

<b>SIMD 2016 quintile</b>	<b>Mean equivalised household income (£/month)</b>	<b>Mortality rate per 100,000</b>	<b>Hospitalisation rate per 100,000</b>
Q1 (most deprived)	1,124.58	1,572	30,737
Q2	1,343.07	1,300	25,562
Q3	1,513.08	1,148	21,952
Q4	1,656.56	985	19,534
Q5 (least deprived)	1,967.32	843	18,266

### Notes

Sources: Household income (before housing costs) from FRS 2014/15, updated to 2016, and weighted to represent Scottish population. European age-standardised all-cause mortality rates, calculated using 2016 mortality data from NHS ISD, 2016 population data from NRS, and the European Standard Population 2013. European age-standardised all-cause hospitalisation rates, calculated from 2016 data on continuous inpatient stays from NHS ISD (Scottish Morbidity Records SMR01 and SMR04), 2016 population data from NRS, and the European Standard Population 2013.

# Appendix 6

**Table 7:** Fiscal implications of each policy (£m per annum) relative to the 2016 baseline

Policy	Additional revenue (£m)	Additional costs (£m)	Net policy cost (£m)
Attendance Allowance +10%	0	20	20
Attendance Allowance +50%	0	101	101
Benefit uptake +1%	0	36	36
Carer's Allowance +10%	0	4	4
Carer's Allowance +50%	2	25	23
CBI	13,374	13,816	442
CBI Plus	14,074	14,609	535
Council Tax increase	146	10	-135
Devolved benefits +10%	0	155	154
Devolved benefits +50%	2	776	773
DLA/PIP +10%	0	106	106
DLA/PIP +50%	0	529	529
Income Tax additional rate +5p	51	0	-51
Income Tax basic rate +5p	1,704	7	-1,697
Income Tax basic rate -1p	-341	-1	340
Income Tax rates +1p	430	1	-429
Income Tax rates -1p	-430	-1	429
Industrial Injuries Disability Benefit +10%	0	4	4
Industrial Injuries Disability Benefit +50%	0	22	22
Living Wage	740	-144	1,264
Local Income Tax	-1,712	-424	1,288
Means-tested benefits +10%	0	442	442
Means-tested benefits +50%	0	2,173	2,173
Personal Allowance -£1K	547	6	-541
Personal Allowance +£1K	-518	-5	513
Severe Disability Allowance +10%	0	2	2
Severe Disability Allowance +50%	0	9	9
Winter Fuel Allowance +10%	0	18	18
Winter Fuel Allowance +50%	0	89	89

## Notes

1. Costs for Living Wage include the £2,148 m increased wage bill that is likely to be borne between the government and employers, minus the £884 m net savings on reduced benefit expenditure and increased tax and National Insurance income.

2. The costs for increasing spending on devolved benefits calculated from EUROMOD do not correspond to expenditure on these benefits as published by DWP. This is most likely because devolved benefit income is underreported in the FRS and we were unable to incorporate increases to certain benefits.

# References

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