

Supplementary material : methodological clarifications and additional Tables

EUROMOD tax-benefit modelling

EUROMOD simulates tax liabilities (direct taxes and social insurance contributions) and cash benefit entitlements on the basis of the tax-benefit rules in place and information available in the underlying dataset. The components of the tax-benefit system which are not simulated due to lack of information in the cross-sectional survey data (e.g. on previous employment), as well as market incomes, are taken directly from the data. EUROMOD is a static model: the arithmetic simulation of taxes and benefits takes no account of potential behavioural reactions of individuals. As such, EUROMOD is of value in terms of assessing the first order effects of tax-benefit policies and in understanding how tax-benefit policy reforms may affect income distributions, work incentives and government budgets in a partial equilibrium (see Sutherland and Figari (2013); Figari and Narazani (2015) for further information).

Table A1: Basic poverty and inequality indicators for Italy, Poland, Belgium and Sweden, individuals aged between 18-64 years old, 2018.

	Italy	Poland	Belgium	Sweden
At risk of poverty or social exclusion (%)	20.6	17.3	15.5	16.2
In-work poverty (%)	11.8	10.9	4.7	6.8
Gini (market income, before taxes and transfers)	0.452	0.408	0.429	0.364
Gini (disposable income, after taxes and transfers)	0.339	0.296	0.268	0.269
Wage inequality P50/P10 (gross monthly earnings, full-time equivalent)	1.50	1.92	1.34	1.36

Source: At risk of poverty and in-work poverty based on EUROSTAT, EU-SILC (2018). Wage inequality refers to 2014 and is based on OECD Earnings Database (2018). Gini coefficients refer to 2015 and come from the OECD Income Distribution Database (2018). Data extracted on the 26th of June 2018.

Table A2: Basic descriptive statistics of the four subsamples

A. Belgium

	Couples, both available		Couples, one available	Single male	Single female
	Male	Female			
Average working time/week (hours)	36.8	26.9	23.5	31	25.8
Average hourly gross wage (€)	20.5	17.2	17.7	18.7	17
Participation rate (%)	91.2	80.8	64.1	77.9	76.6
Average age (years)	41.5	39	48.8	42.8	43.6
Higher education degree (%)	43.4	50.8	36.8	39.1	39.8
Presence of child (0-18) (%)	65.1		36.1	7.5	38.4
Income quintile 1 (%)	11.7		21.5	25.2	35.2
Income quintile 2 (%)	12.5		24	16.8	22
Income quintile 3 (%)	18.8		21.4	17.4	20.8
Income quintile 4 (%)	25.2		16.2	18.8	12.5
Income quintile 5 (%)	31.8		16.9	21.9	9.5
Number of households	1,494		674	453	631

B. Italy

	Couples, both available		Couples, one available	Single male	Single female
	Male	Female			
Average working time/week (hours)	38.3	23	21.5	36.1	30.3
Average hourly gross wage (€)	15.8	15.4	19.7	15.5	15.7
Participation rate (%)	95.5	68	60.4	91.2	83.5
Average age (years)	44.1	41.2	47.7	42.2	44.8
Higher education degree (%)	14.4	18.3	17.6	19.1	24.2
Presence of child (0-18) (%)	68.7		46.8	4.8	28.8
Income quintile 1 (%)	13.3		18.7	16.1	27.5
Income quintile 2 (%)	17		17.7	8.6	17.5
Income quintile 3 (%)	18.6		16.5	13.3	18
Income quintile 4 (%)	25.2		19.2	26.1	19.5
Income quintile 5 (%)	25.9		26.9	36	17.6
Number of households	3,693		2,394	1,112	1,519

C. Poland

	Couples, both available		Couples, one available	Single male	Single female
	Male	Female			
Average working time/week (hours)	40.7	29.9	32	33.8	29.8
Average hourly gross wage (€)	19.7	15.7	17.4	19	16.4
Participation rate (%)	96	78.3	79.7	83.4	78
Average age (years)	40.9	38.7	46.2	43.9	44.7
Higher education degree (%)	24.5	35.8	25.5	26.3	30.7
Presence of child (0-18) (%)	68.8		46.8	8.2	39.6
Income quintile 1 (%)	16.4		21.8	29.9	22.8
Income quintile 2 (%)	16.7		16.4	15.1	23.8
Income quintile 3 (%)	17.8		17.1	16.3	19
Income quintile 4 (%)	21.2		19	16	16.2
Income quintile 5 (%)	27.9		25.8	22.7	18.2
Number of households	2,556		1,498	331	667

D. Sweden

	Couples, both available		Couples, one available	Single male	Single female
	Male	Female			
Average working time/week (hours)	32.1	30	31.3	32	28.9
Average hourly gross wage (€)	28	24.2	37.3	24	26.2
Participation rate (%)	98.4	95.6	95.1	95.3	94.2
Average age (years)	43.9	41.6	48	41.3	43.8
Higher education degree (%)	35.7	48.5	36.9	23	41.9
Presence of child (0-18) (%)	62.8		39.2	13.5	32.3
Income quintile 1 (%)	7.2		14.2	22.3	32
Income quintile 2 (%)	13.4		13.5	19.8	23.2
Income quintile 3 (%)	20.1		20.1	23.8	21.3
Income quintile 4 (%)	26		22.9	21.8	12.7
Income quintile 5 (%)	33.4		29.3	12.5	108
Number of households	2,109		843	400	465

Source: own calculations based on EUROMOD (using EU-SILC 2012 for BE, IT, PL and SE)

Table A3: Estimated parameters of the quadratic utility function for single females

A. Belgium

	Coefficient		Standard error
Disposable household income			
Work experience female	0.0145	***	0.003
Work experience female squared	-0.000	***	0.000
Constant	1.4644	*	0.758
Disposable household income squared	-0.178	***	0.046
Non-working time			
Presence of child 0-3y ¹	0.0278	***	0.010
Presence of child 4-6y ¹	0.010		0.010
Presence of child 7-12y ¹	0.003		0.006
Age	-0.001		0.002
Age squared	0.000		0.000
Constant	0.490	***	0.069
Non-working time squared	-0.004	***	0.000
Non-working time * Consumption	-0.002		0.007
Dummy for working part-time	1.584	***	0.138

Note: *: p<0.1; **:p<0.05; ***:p<0.01. Excluded categories are ¹: Presence of child 13-18y. Estimations for the other subgroups are available from the authors upon request.

B. Italy

	Coefficient		Standard error
Disposable household income			
Work experience female	0.031	***	0.002
Work experience female squared	-0.000	***	0.000
Constant	4.085	***	0.413
Disposable household income squared	-0.217	***	0.038
Non-working time			
Number of children in household	0.022	***	0.004
Age	-0.019	***	0.003
Age squared	0.000	***	0.000
Middle education ¹	-0.004		0.013
Higher education ¹	-0.018	**	0.008
EU-migrant ²	-0.1	***	0.014
Non EU-migrant ²	-0.114	***	0.012
Regio2 ³	-0.009		0.009
Regio3 ³	-0.039	***	0.009
Regio4 ³	-0.013		0.009
Regio5 ³	0.004		0.013
Constant	1.206	***	0.069
Non-working time squared	-0.006	***	0.000
Non-working time * Consumption	-0.015	***	0.003
Dummy for working part-time	2.888	***	0.108

Note: *: p<0.1; **:p<0.05; ***:p<0.01. Excluded categories are ¹: Lower education; ²: Non-migrant; ³: Regio1. Estimations for the other subgroups are available from the authors upon request.

C. Poland

	Coefficient		Standard error
Disposable household income			
Work experience female	0.001		0.003
Work experience female squared	0.000		0.000
Constant	0.082		0.550
Disposable household income squared	-0.021		0.036
Non-working time			
Number of children in household	-0.018	***	0.004
Age	-0.013	***	0.003
Age squared	0.000	***	0.000
Middle education ¹	-0.031	**	0.014
Higher education ¹	0.008		0.010
Migrant ²	-0.202		0.136
Regio2 ³	0.023	**	0.010
Regio3 ³	0.019		0.011
Regio4 ³	0.020		0.010
Regio5 ³	0.008		0.011
Regio6 ³	0.012		0.010
Constant	0.472	***	0.074
Non-working time squared	-0.002	***	0.000
Non-working time * Consumption	0.057	***	0.008
Dummy for working part-time	2.329	***	0.154

Note: *: p<0.1; **:p<0.05; ***:p<0.01. Excluded categories are ¹: Lower education; ²: Non-migrant; ³: Regio1. Estimations for the other subgroups are available from the authors upon request.

D. Sweden

	Coefficient		Standard error
Disposable household income			
Work experience female	0.002	***	0.000
Work experience female squared	-0.000	***	0.000
Constant	0.639	***	0.201
Disposable household income squared	-0.004	**	0.002
Non-working time			
Number of children in household	-0.004		0.010
Age	0.011	**	0.005
Age squared	-0.000	***	0.000
Middle education ¹	-0.051		0.031
Higher education ¹	-0.109	***	0.018
EU-Migrant ²	0.014		0.031
Non EU-Migrant ²	0.053	**	0.021
Regio2 ³	0.009		0.017
Regio3 ³	0.006		0.022
Constant	1.069	***	0.181
Non-working time squared	-0.008	***	0.001
Non-working time * Consumption	0.002		0.002
Dummy for working part-time	1.790	***	0.208

Note: *: p<0.1; **:p<0.05; ***:p<0.01. Excluded categories are ¹: Lower education; ²: Non-migrant; ³: Regio1. Estimations for the other subgroups are available from the authors upon request.

Source: own calculations based on EUROMOD (using EU-SILC 2012 for BE, IT, PL and SE)

Table A4: Poverty rates for the different budget-neutral scenarios of in-work benefits, 2015

Individual-based IWB	Belgium	Italy	Poland	Sweden	Household-based IWB	Belgium	Italy	Poland	Sweden
Scenario					Scenario				
Existing system	10.1	17.5	16.9	13.7	Existing system	10.1	17.5	16.9	13.7
<i>First order, fixed poverty line</i>					<i>First order, fixed poverty line</i>				
0. Abolish existing	<i>10.3</i>	<i>18.5</i>	<i>16.9</i>	<i>15.9</i>	0. Abolish existing	<i>10.3</i>	<i>18.5</i>	<i>16.9</i>	<i>15.9</i>
1. Lump sum	<i>9.4</i>	<i>16.9</i>	<i>16.5</i>	<i>14.2</i>	1. Lump sum	<i>9.1</i>	<i>16.7</i>	<i>16.4</i>	<i>14.0</i>
2A. Threshold based on gross income	<i>8.5</i>	<i>16.1</i>	<i>16.2</i>	<i>12.3</i>	2B. Threshold based on gross income	<i>7.7</i>	<i>15.5</i>	<i>15.6</i>	<i>11.4</i>
2C. Threshold based on hourly wage	<i>8.5</i>	<i>16.5</i>	<i>16.1</i>	<i>12.7</i>					
3A. Tapering-out	<i>8.6</i>	<i>16.1</i>	<i>16.1</i>	<i>12.5</i>	3B. Tapering-out	<i>8.9</i>	<i>16.6</i>	<i>16.3</i>	<i>13.6</i>
4A. Tapering-in	<i>8.7</i>	<i>16.1</i>	<i>16.0</i>	<i>12.7</i>	4B. Tapering-in	<i>8.3</i>	<i>15.6</i>	<i>15.6</i>	<i>12.0</i>
<i>Second order, fixed poverty line</i>					<i>Second order, fixed poverty line</i>				
0. Abolish existing	<i>10.4</i>	<i>18.0</i>	<i>16.9</i>	<i>16.6</i>	0. Abolish existing	<i>10.4</i>	<i>18.0</i>	<i>16.9</i>	<i>16.6</i>
1. Lump sum	<i>9.1</i>	<i>17.0</i>	<i>16.7</i>	<i>15.4</i>	1. Lump sum	<i>9.0</i>	<i>16.9</i>	<i>16.6</i>	<i>15.4</i>
2A. Threshold based on gross income	<i>8.4</i>	<i>17.4</i>	<i>16.7</i>	<i>16.2</i>	2B. Threshold based on gross income	<i>8.0</i>	<i>17.3</i>	<i>16.6</i>	<i>16.6</i>
2C. Threshold based on hourly wage	<i>8.7</i>	<i>17.6</i>	<i>16.8</i>	<i>15.9</i>					
3A. Tapering-out	<i>8.6</i>	<i>17.3</i>	<i>16.6</i>	<i>16.1</i>	3B. Tapering-out	<i>9.1</i>	<i>17.0</i>	<i>16.6</i>	<i>15.6</i>
4A. Tapering-in	<i>8.6</i>	<i>17.3</i>	<i>16.6</i>	<i>15.8</i>	4B. Tapering-in	<i>8.2</i>	<i>17.1</i>	<i>16.6</i>	<i>16.3</i>
<i>Second order, floating poverty line</i>					<i>Second order, floating poverty line</i>				
0. Abolish existing	<i>10.2</i>	<i>17.7</i>	<i>16.9</i>	<i>13.6</i>	0. Abolish existing	<i>10.2</i>	<i>17.7</i>	<i>16.9</i>	<i>13.6</i>
1. Lump sum	<i>9.7</i>	<i>17.2</i>	<i>16.8</i>	<i>13.6</i>	1. Lump sum	<i>9.6</i>	<i>17.1</i>	<i>16.8</i>	<i>13.6</i>
2A. Threshold based on gross income	<i>9.0</i>	<i>17.3</i>	<i>16.8</i>	<i>13.5</i>	2B. Threshold based on gross income	<i>8.4</i>	<i>17.2</i>	<i>16.7</i>	<i>13.3</i>
2C. Threshold based on hourly wage	<i>9.1</i>	<i>17.5</i>	<i>16.9</i>	<i>13.5</i>					
3A. Tapering-out	<i>9.3</i>	<i>17.2</i>	<i>16.8</i>	<i>13.5</i>	3B. Tapering-out	<i>9.7</i>	<i>17.1</i>	<i>16.8</i>	<i>13.6</i>
4A. Tapering-in	<i>9.4</i>	<i>17.2</i>	<i>16.8</i>	<i>13.4</i>	4B. Tapering-in	<i>8.8</i>	<i>17.0</i>	<i>16.7</i>	<i>13.2</i>

Note: Poverty rates are calculated using 60% of median equivalent income as the poverty line. The poverty line is calculated on the basis of either the income distribution in the existing system ('fixed poverty line') or the changed income distribution ('floating poverty line'). Second order poverty rates take account of changes in labour supply. Statistically significant poverty rates at 5% confidence interval are put in italics; the difference relates to a comparison with the previous scenario, as described in Table 2.

Source: own calculations based on EUROMOD (using EU-SILC 2012 for BE, IT, PL and SE).

Table A4: Work incentives, share of individuals working specified number of hours for the different budget-neutral scenarios of in-work benefits, 2015

Individual-based IWB						Household-based IWB					
	0 hours	19 hours	30 hours	38 hours	50 hours		0 hours	19 hours	30 hours	38 hours	50 hours
Belgium											
Existing system	21.8	11.1	10.6	45.3	12.3	Existing system	21.8	11.1	10.6	45.3	12.3
0. Abolish existing	22.1	11.1	10.5	45.0	12.4	0. Abolish existing	22.1	11.1	10.5	45.0	12.4
1. Lump sum	20.4	11.5	10.8	45.8	12.4	1. Lump sum	20.8	11.4	10.8	45.7	12.3
2A. Threshold based on gross income	19.6	15.4	11.3	43.2	11.6	2B. Threshold based on gross income	21.1	13.5	11.1	44.0	11.3
2C. Threshold based on hourly wage	20.8	11.5	10.8	45.6	12.4						
3A. Tapering-out	19.8	14.0	11.5	44.2	11.6	3B. Tapering-out	21.0	11.8	10.8	45.3	12.1
4A. Tapering-in	20.1	12.2	11.5	45.5	11.7	4B. Tapering-in	20.9	13.0	11.2	44.6	11.4
Italy	0 hours	20 hours	30 hours	40 hours	50 hours		0 hours	20 hours	30 hours	40 hours	50 hours
Existing system	21.6	10.3	8.2	49.9	10.0	Existing system	21.6	10.3	8.2	49.9	10.0
0. Abolish existing	22.1	9.5	7.7	50.3	10.3	0. Abolish existing	22.1	9.5	7.7	50.3	10.3
1. Lump sum	21.3	9.8	7.9	50.7	10.3	1. Lump sum	21.8	9.7	7.8	50.5	10.3
2A. Threshold based on gross income	21.5	11.1	7.9	49.3	10.2	2B. Threshold based on gross income	22.4	10.5	8.0	49.0	10.1
2C. Threshold based on hourly wage	21.8	9.7	7.8	50.4	10.3						
3A. Tapering-out	21.5	11.1	8.0	49.3	10.1	3B. Tapering-out	21.9	9.9	7.8	50.2	10.2
4A. Tapering-in	21.6	10.3	8.0	49.9	10.2	4B. Tapering-in	22.3	10.7	8.1	49.0	10.0
Poland	0 hours	20 hours	30 hours	40 hours	50 hours		0 hours	20 hours	30 hours	40 hours	50 hours
Existing system	17.0	7.5	7.9	51.0	17.7	Existing system	17.0	7.5	7.9	51.0	17.7
0. Abolish existing	17.0	7.5	7.9	51.0	17.7	0. Abolish existing	17.0	7.5	7.9	51.0	17.7
1. Lump sum	16.8	7.6	7.9	51.1	17.6	1. Lump sum	16.8	7.6	7.9	51.1	17.6
2A. Threshold based on gross income	16.7	7.9	8.0	50.8	17.6	2B. Threshold based on gross income	16.8	7.8	8.0	50.9	17.5
2C. Threshold based on hourly wage	16.9	7.6	7.9	51.0	17.7						
3A. Tapering-out	16.7	7.9	8.0	50.8	17.6	3B. Tapering-out	16.9	7.6	7.9	51.0	17.6
4A. Tapering-in	16.8	7.7	8.0	50.9	17.6	4B. Tapering-in	16.8	7.8	8.0	50.9	17.5
Sweden	0 hours	16 hours	26 hours	36 hours	50 hours		0 hours	16 hours	26 hours	36 hours	50 hours
Existing system	7.7	9.2	14.5	66.1	3.5	Existing system	7.7	9.2	14.5	66.1	3.5
0. Abolish existing	9.4	9.4	13.9	64.5	3.8	0. Abolish existing	9.4	9.4	13.9	64.5	3.8
1. Lump sum	8.7	9.9	14.3	64.5	3.7	1. Lump sum	8.9	9.8	14.2	64.4	3.7
2A. Threshold based on gross income	8.4	12.7	14.8	61.5	3.6	2B. Threshold based on gross income	9.4	12.5	16.2	59.5	3.5
2C. Threshold based on hourly wage	9.0	9.8	14.0	64.4	3.7						
3A. Tapering-out	8.5	12.2	15.5	61.3	3.6	3B. Tapering-out	9.0	10.4	14.8	63.3	3.6
4A. Tapering-in	8.5	10.5	16.1	62.4	3.6	4B. Tapering-in	9.0	12.1	17.0	59.5	3.4

Note: Statistically significant differences at 5% confidence interval are put in italics; the difference relates to a comparison with the previous scenario, as described in Table 2.

Source: own calculations based on EUROMOD (using EU-SILC 2012 for BE, IT, PL and SE)

