

# SOUTHMOD

Exercises with solutions

## Zambia

MicroZAMOD v2.0

September 2019



UNITED NATIONS  
UNIVERSITY  
**UNU-WIDER**

## Contents

Exercise 1: Add a new system .....	3
<b>Solution</b> .....	3
Exercise 2: Increase the VAT rate .....	4
<b>Solution</b> .....	4
Exercise 3: Change the Turnover Tax policy in 2016 .....	6
<b>Solution</b> .....	6
Exercise 4: Change the VAT rules by making certain additional items VAT-exempt.....	8
<b>Solution</b> .....	8
Exercise 5: Change the Personal Income Tax policy by increasing the tax rates for all but the lowest band.	10
<b>Solution</b> .....	10
Exercise 6: Introduce a child benefit .....	12
<b>Solution</b> .....	12
Exercise 7: Introduce an old aged benefit for older people 65+ .....	18
<b>Solution</b> .....	18
Exercise 8: Introduce a benefit for unemployed young people .....	22
<b>Solution</b> .....	22
Exercise 9: Introduce three benefit reforms and change the income tax policy to cover the costs.....	27
<b>Solution</b> .....	27
Exercise 10: Amending SCT for 2017 .....	28
<b>Solution</b> .....	28

*Note: The exercises and solutions presented below are applicable to MicroZAMOD model v2.0.*

## Part A: Preparing to implement a policy reform in MICROZAMOD

### Exercise 1: Add a new system

**Difficulty level: Beginner**

#### Activity:

Add a new system to MicroZAMOD.

#### Solution

**Step 1:** Before amending existing or adding new policies you need to add a new system; then do the amendments and additions in the new system.

- How to add a new system?

Right click on the system 'ZM\_2017' → copy/paste system → name it 'ZM\_2017\_reform'

Policy	Gr...	ZM_2010	ZM_2015	ZM_2016	ZM_2017	Comment
1	• uprate_zm					
2	• ildef_zm					
3	• tudef_zm					
4	• constdef...					
5	• poverty...					
6	• tsceepi_...					
7	• tscepi_...					
8	• ttn_zm					
9	• tin_zm					
10	• thl_zm					
11	• bsa_rur...					
12	• bsa_urb...					
13	• bedot_zm					
14	• bot_zm					
15	• tva_zm					
16	• tex_zm					
17	• output_...					
18	• output ...					

## Part B: Changing Existing Policies in MICROZAMOD

### Exercise 2: Increase the VAT rate

Difficulty level: Beginner

#### Activity:

Increase the VAT rate from 16% to 18%.

#### Question:

How much extra VAT would this raise?

#### Solution

**Step 1:** Before amending existing or adding new policies you need to add a new system (See Part 1); then do the amendments in the new system.

**Step 2:** Amend the value of the parameter \$VAT\_Rate in the Constants

- How to update the value of the parameter \$VAT\_RATE?

*As the VAT rate is included in the policy tva\_ZM as a constant, the value of the constant needs to be amended in the constdef\_ZM policy. Go to the policy constdef\_ZM and change the value of the parameter \$VAT\_RATE from 0.16 to 0.18 (only for the ZM\_2017\_reform system). You do not need to make any amendments to the policy tva\_zm.*

Zambia - EUROMOD microzamed v2.0 (c:\microzamed-v2.0)					
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info					
Run EUROMOD loaded					
Policy		ZM_2017	ZM_2017_Reform	Comment	
4.1.5	\$bsa_amount	90#m	90#m	Social cash transfer amount (standard)	
4.1.6	\$bsa_disabled_amount	90#m	90#m	Social cash transfer amount (additional for disabled households)	
4.1.7	\$bedot_amount	n/a	n/a	Home grown amount	
4.1.8	\$bot_Amount	400#y	400#y	Minimum FISP amount	
4.1.9	\$ttn_upper_limit	800000#y	800000#y	Upper Limit for Turnover Tax	
4.1.10	\$clear_beer_ed_rate	0.4	0.4	Clear beer excise duty ad valorem rate	
4.1.11	\$other_alcoholic_bev_ed_rate	0.6	0.6	Wine and spirits excise duty ad valorem rate	
4.1.12	\$opaque_beer_ed_rate_per_litre	0.15	0.15	Opaque beer excise duty per litre	
4.1.13	\$transport_fuels_ed_rate_per_litre	1.14	1.14	Petrol/Deisel excise duty per litre	
4.1.14	\$tobacco_ed_rate_per_piece	0.24	0.24	Tobacco excise duty per single piece	
4.1.15	\$VAT_Rate	0.16	0.18	VAT rate	
4.1.16	\$pline_s	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)	
4.1.17	\$pline_m	276.7	276.7	Poverty line - moderate (uprated by CPI from 2015 figure)	
4.1.18	\$ttn_rate	0.03	0.03	Turnover Tax rate	
5	poverty_lines...	on	on	INC: Poverty lines	
6	tsceepi_zm	on	on	SIC: Employee Pension	
7	tscerpi_zm	on	on	SIC: Employer Pension	

**Step 4:** Run the ZM\_2017 and ZM\_2017\_Reform systems in Statistics Presenter to identify how much extra VAT the reform would raise.

**Answer: 228.53 million Kwacha**

## Exercise 3: Change the Turnover Tax policy in 2016

**Difficulty level: Intermediate**

### Activity:

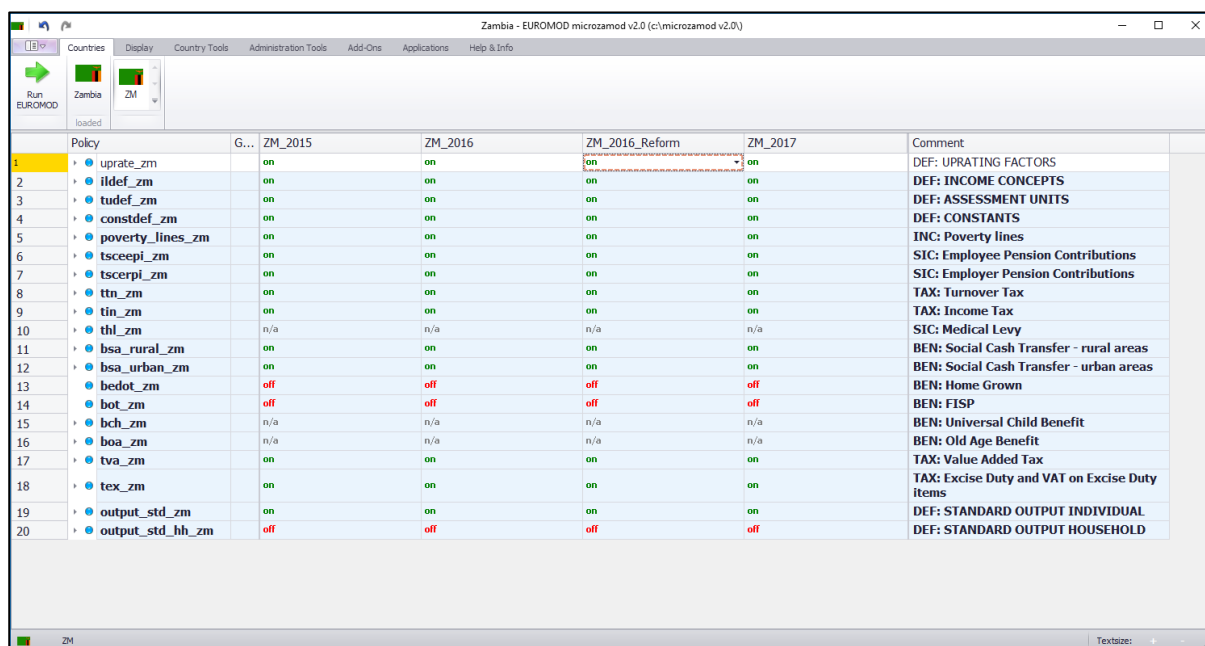
Amend the Turnover Tax policy in 2016. Increase the upper limit for Turnover tax from 800,000 Kwacha to 1,000,000 Kwacha and increase the turnover tax rate from 3% to 5%.

### Questions:

How much will the government gain or lose in direct taxes? What would the impact on poverty and inequality be?

### Solution

**Step 1:** Before amending existing or adding new policies you need to add a new system (See Part 1); then do the amendments in the new system.



Policy	G...	ZM_2015	ZM_2016	ZM_2016_Reform	ZM_2017	Comment
1	• uprate_zm	on	on	on	on	DEF: UPDATING FACTORS
2	• ildef_zm	on	on	on	on	DEF: INCOME CONCEPTS
3	• tudef_zm	on	on	on	on	DEF: ASSESSMENT UNITS
4	• constdef_zm	on	on	on	on	DEF: CONSTANTS
5	• poverty_lines_zm	on	on	on	on	INC: Poverty lines
6	• tscepi_zm	on	on	on	on	SIC: Employee Pension Contributions
7	• tscepi_zm	on	on	on	on	SIC: Employer Pension Contributions
8	• ttn_zm	on	on	on	on	TAX: Turnover Tax
9	• tin_zm	on	on	on	on	TAX: Income Tax
10	• thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11	• bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12	• bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13	• bedot_zm	off	off	off	off	BEN: Home Grown
14	• bot_zm	off	off	off	off	BEN: FISP
15	• bch_zm	n/a	n/a	n/a	n/a	BEN: Universal Child Benefit
16	• boia_zm	n/a	n/a	n/a	n/a	BEN: Old Age Benefit
17	• tva_zm	on	on	on	on	TAX: Value Added Tax
18	• tex_zm	on	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
19	• output_std_zm	on	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL
20	• output_std_hh_zm	off	off	off	off	DEF: STANDARD OUTPUT HOUSEHOLD

**Step 2:** Amend the value of the parameters \$ttn\_upper\_limit & \$ttn\_rate for the 2016 reform system only

- How to change the value of the parameter \$ttn\_upper\_limit and \$ttn\_rate?

As the turnover tax upper limit amount is included in the policy ttn\_ZM as a constant, the value of the constant needs to be amended in the constdef\_ZM policy. Go to the policy constdef\_ZM and amend the values for the parameter called \$ttn\_upper\_limit. Change the value of the parameter \$ttn\_upper\_limit from 800,000 per year (which is shown as #y) to 1,000,000 per year (only for the ZM\_2016\_reform system). Change the value of the parameter \$ttn\_rate from 0.03 to 0.05 (only for the ZM\_2016\_reform system).

**Step 3:** Run the ZM\_2016 and ZM\_2016\_Reform systems in Statistics Presenter to identify how much revenue has been lost/gained in direct taxes as a result of this reform.

*Note: The turnover tax threshold is also taken into account in the rules for personal income tax – see the second BenCalc function in the policy tin\_ZM. As the reform involves raising the threshold for turnover tax, this means that some people will move from paying personal income tax to paying turnover tax.*

Policy	...	ZM_2016	ZM_2016_Reform	ZM_2017	Comment
4	constdef_zm	on	on	on	DEF: CONSTANTS
4.1	DefConst	on	on	on	Define constants
4.1.1	\$tsceepi_rate	0.05	0.05	0.05	Employee social insurance pension contributions - rate
4.1.2	\$tsceepi_upplim	844#m	844#m	895#m	Employee social insurance pension contributions - upper limit
4.1.3	\$tscerpi_rate	0.05	0.05	0.05	Employer social insurance pension contributions - rate
4.1.4	\$tscerpi_upplim	844#m	844#m	895#m	Employer social insurance pension contributions - upper limit
4.1.5	\$bsa_amount	90#m	90#m	90#m	Social cash transfer amount (standard)
4.1.6	\$bsa_disabled_amount	90#m	90#m	90#m	Social cash transfer amount (additional for disabled households)
4.1.7	\$bedot_amount	n/a	n/a	n/a	Home grown amount
4.1.8	\$bot_Amount	400#y	400#y	400#y	Minimum FISP amount
4.1.9	\$ttn_upper_limit	800000#y	1000000#y	800000#y	Upper Limit for Turnover Tax
4.1.10	\$ttn_rate	0.03	0.05	0.03	Turnover Tax rate

**Answer:** Gained 563.57 million Kwacha in direct tax revenue

**Answer:** In terms of consumption-based poverty and inequality, this reform leads to an increase in the poverty rate of 0.4 percentage points and an increase in the Gini coefficient of 0.0010.

## Exercise 4: Change the VAT rules by making certain additional items VAT-exempt

Difficulty level: Beginner

### Activity:

A number of products which had been included in the normal rate of VAT are to become exempted. These products are all bread and cereals (coicop code: x011197), vegetables (coicop code: x011797) and meat (coicop code: x011297).

### Question:

How much will the government lose in indirect taxes?

### Solution

**Step 1:** Before amending existing or adding new policies you need to add a new system (See Part 1); then do the amendments in the new system. Call this new system: *ZM\_2017\_reform\_3*.

**Step 2:** The standard rated items for VAT are in the policy ildef\_ZM.

- How to change standard rated items to VAT-exempt status?

Go to the policy ildef\_ZM → Standard rated items for VAT purposes (used in VAT policy) → replace '+' with 'n/a' for the products which are now exempted (only ZM\_2017\_reform\_3 system).

Policy	Defl	ZM_2017	ZM_2017_Reform_4	ZM_2017_Reform_2	ZM_2017_Reform_3	Comment
2.20	Defl	on	on	on	on	Define income list for VAT
2.20.1	Name	il_vat_01	il_vat_01	il_vat_01	il_vat_01	
2.20.2	x011198	n/a	n/a	n/a	n/a	Bread and cereals (exempt)
2.20.3	x011197	+	+	+	n/a	Bread and cereals (standard rated)
2.20.4	x011199	n/a	n/a	n/a	n/a	Bread and cereals (zero rated)
2.20.5	x011798	n/a	n/a	n/a	n/a	Vegetables (exempt)
2.20.6	x011797	+	+	+	n/a	Vegetables (standard rated)
2.20.7	x011398	n/a	n/a	n/a	n/a	Fish and seafood (exempt)
2.20.8	x011397	+	+	+	+	Fish and seafood (standard rated)
2.20.9	x011298	n/a	n/a	n/a	n/a	Meat (exempt)
2.20.10	x011297	+	+	+	n/a	Meat (standard rated)
2.20.11	x011498	n/a	n/a	n/a	n/a	Milk, cheese and eggs (exempt)
2.20.12	x011497	+	+	+	+	Milk, cheese and eggs (standard rated)
2.20.13	x011597	+	+	+	+	Oils and fats (standard rated)
2.20.14	x011897	+	+	+	+	Sugar, jam, honey, chocolate and confectionery (standard rated)
2.20.15	x012197	+	+	+	+	Coffee, tea and cocoa (standard rated)
2.20.16	x012297	+	+	+	+	Mineral waters, soft drinks, fruit and vegetable juices (standard rated)
2.20.17	x011998	n/a	n/a	n/a	n/a	Food products n.e.c. (exempt)
2.20.18	x111197	+	+	+	+	Restaurants, cafés and the like (standard rated)
2.20.19	x011997	+	+	+	+	Food products n.e.c. (standard rated)
2.20.20	x045497	+	+	+	+	Solid fuels (standard rated)
2.20.21	x041198	n/a	n/a	n/a	n/a	Actual rentals paid by tenants (exempt)
2.20.22	x044198	n/a	n/a	n/a	n/a	Water supply (exempt)
2.20.23	x045198	n/a	n/a	n/a	n/a	Electricity (exempt)
2.20.24	x045398	n/a	n/a	n/a	n/a	Liquid fuels (exempt)



**Step 3:** Run the ZM\_2017 and ZM\_2017\_reform\_3 systems in Statistics Presenter to identify how much revenue has been lost in indirect taxes as a result of this reform.

**Answer:** A reduction in indirect tax revenue of 109.36 million Kwacha

## Exercise 5: Change the Personal Income Tax policy by increasing the tax rates for all but the lowest band

**Difficulty level: Beginner**

### Activity:

Amend the Personal Income Tax policy. The current tax band rates are 0%, 25%, 30%, and 37.5%. Increase the personal income tax rate for every tax band (excluding the first band) by one percentage point.

### Questions:

How much will the government gain in tax revenue? What would the impact on poverty and inequality be?

### Solution

**Step 1:** Before amending existing or adding new policies you need to add a new system (See Part 1); then do the amendments in the new system. Call the new system: *ZM\_2017\_Reform\_4*.

**Step 2:** Amend the tax rates in the policy tin\_ZM, within the function 'SchedCalc'

- How to change the tax rates?

*In this example, the lowest tax band (band 1) is unaffected. For all other tax bands, increase the tax band by one percentage point by amending the parameter Band\_Rate.*

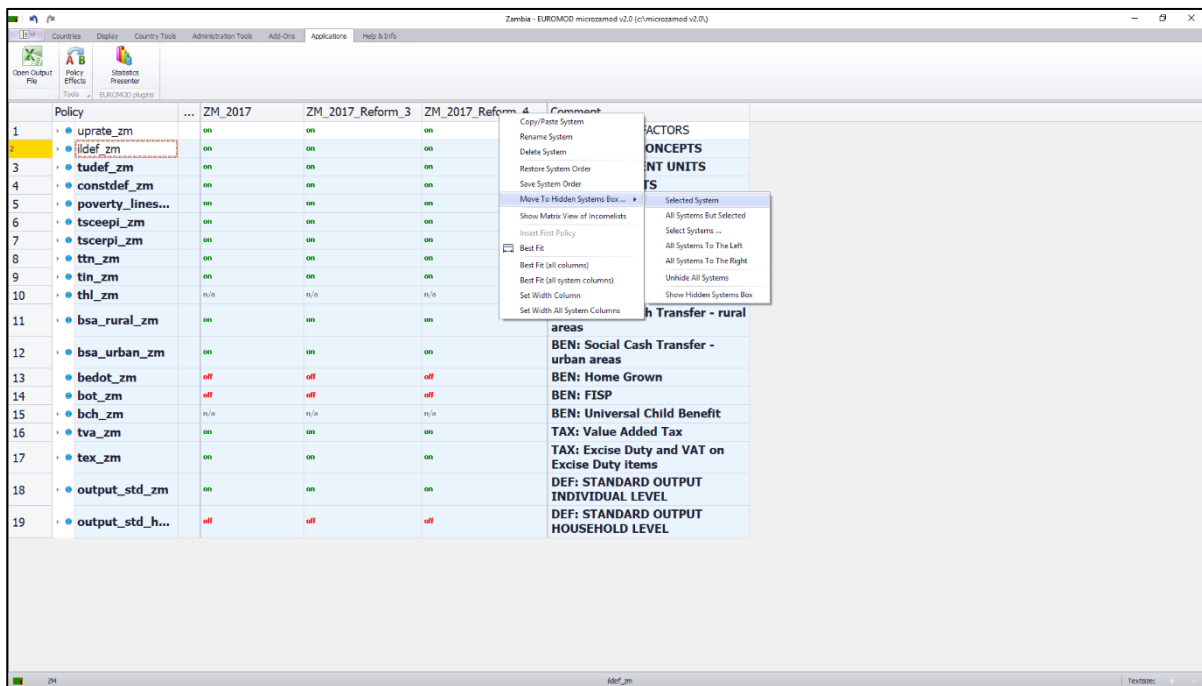
Zambia - EUROMOD microzmod v2.0 (c:\microzmod v2.0\)						
Policy						
	tin_zm	on	on	on	on	TAX: Income Tax
9.1	BenCalc	on	on	on	on	
9.1.1	Comp_Cond	1 {ttn_s=0}	{ttn_s=0}	{ttn_s=0}	{ttn_s=0}	
9.1.2	Comp_perTU	1 il_taxabley01	il_taxabley01	il_taxabley01	il_taxabley01	
9.1.3	Output_Var	ttn_s	ttn_s	ttn_s	ttn_s	
9.1.4	TAX_UNIT	tu_individual_zm	tu_individual_zm	tu_individual_zm	tu_individual_zm	
9.2	BenCalc	on	on	on	on	
9.2.1	Comp_Cond	1 {ttn_s>0}	{ttn_s>0}	{ttn_s>0}	{ttn_s>0}	
9.2.2	Comp_perTU	1 il_taxabley02	il_taxabley02	il_taxabley02	il_taxabley02	
9.2.3	Output_Add...	ttn_s	ttn_s	ttn_s	ttn_s	
9.2.4	TAX_UNIT	tu_individual_zm	tu_individual_zm	tu_individual_zm	tu_individual_zm	
9.3	SchedCalc	on	on	on	on	Apply tax bands to income
9.3.1	Base	ttn_s	ttn_s	ttn_s	ttn_s	
9.3.2	Band_LowLim	1 0#y	0#y	0#y	0#y	
9.3.3	Band_Rate	1 0	0	0	0	
9.3.4	Band_LowLim	2 39600#y	39600#y	39600#y	39600#y	
9.3.5	Band_Rate	2 0.25	0.25	0.25	0.26	
9.3.6	Band_LowLim	3 49200#y	49200#y	49200#y	49200#y	
9.3.7	Band_Rate	3 0.30	0.30	0.30	0.31	
9.3.8	Band_LowLim	4 74400#y	74400#y	74400#y	74400#y	
9.3.9	Band_Rate	4 0.375	0.375	0.375	0.385	
9.3.10	output_var	ttn_s	ttn_s	ttn_s	ttn_s	
9.3.11	TAX_UNIT	tu_individual_zm	tu_individual_zm	tu_individual_zm	tu_individual_zm	

**Step 3:** Run the ZM\_2017 and ZM\_2017\_4 reform systems in Statistics Presenter to identify how much revenue has been gained in direct taxes as a result of this reform.

**Answer:** Additional direct tax revenue of 193.13 million Kwacha.

This would have no impact on poverty rates. It would lead to a very small reduction (0.0005) in the Gini coefficient.

Useful Tip: If one is making a number of policy amendments or policy reforms, one can elect to *'hide'* one or more systems for simplicity. To do this, simply right click on the system you want to *'hide'*, go to *'Move to Hidden Systems Box'* and select the systems you wish to hide. You can also *'unhide'* systems by following the same steps and simply go to *'Unhide All Systems'*



## Part C: Introducing New Policies in MicroZAMOD

### Exercise 6: Introduce a child benefit

**Difficulty level: Intermediate**

#### Activity:

Introduce a universal child benefit of 180 Kwacha per month for children who are aged 0-2 inclusive.

#### Question:

How much will this policy cost the government? What would the impact on poverty and inequality be?

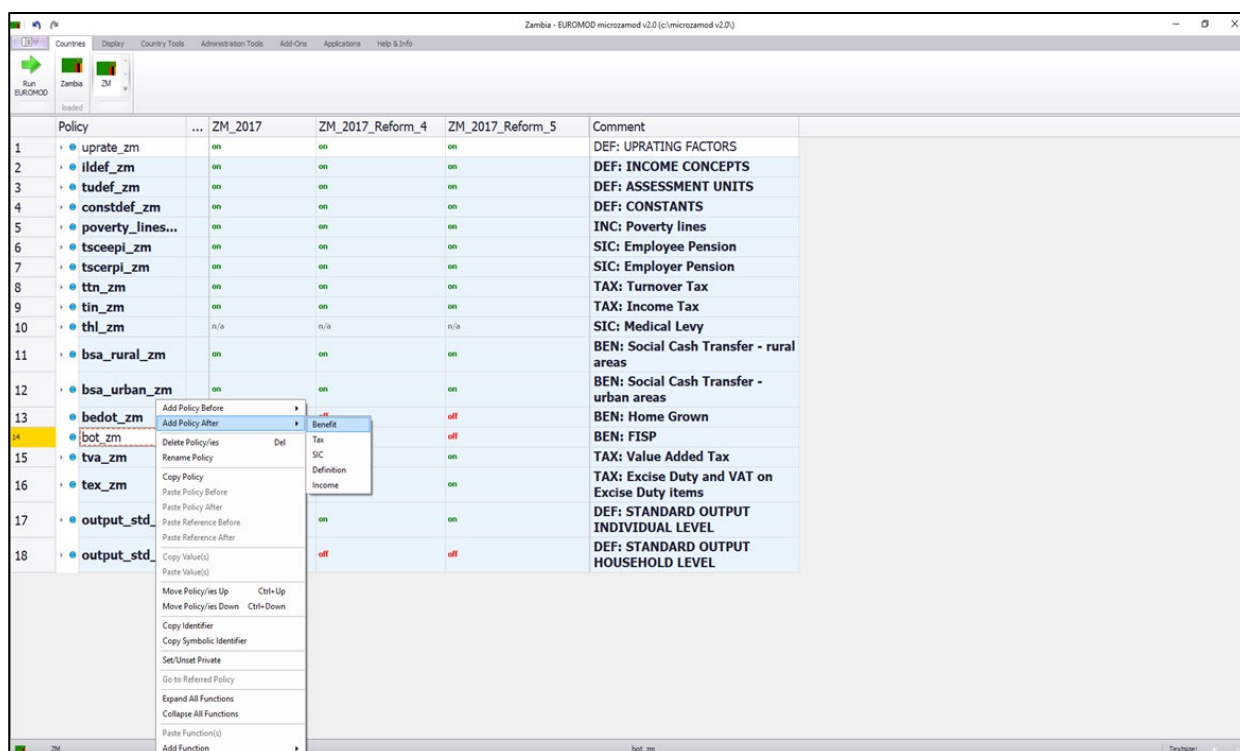
#### Solution

**Step 1:** Before adding a new policy you need to add a new system (See Part 1); then make the changes in the new system. Call this new system: *ZM\_2017\_Reform\_5*.

**Step 2:** The new policy will be called *bch\_zm*

- How to add this new policy?

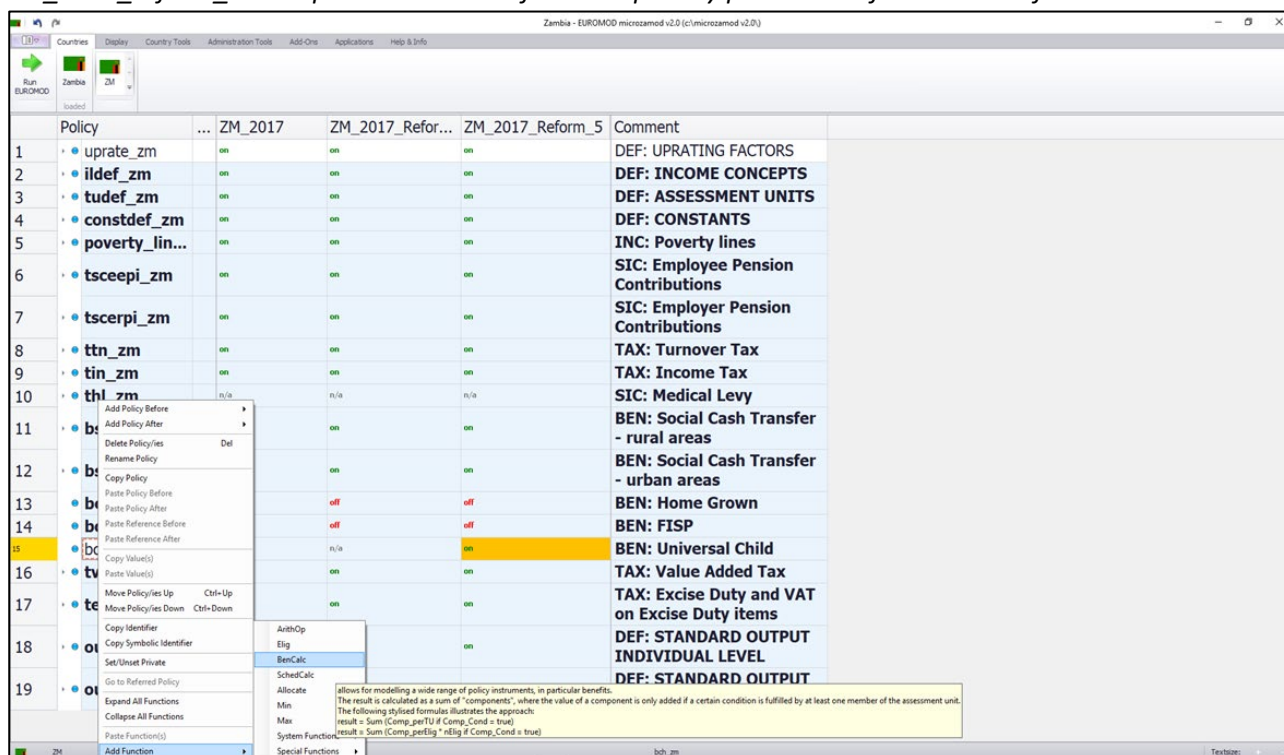
*For this example, the new benefit can be added to the end of the list of benefits and – importantly – it does not affect any of the other existing benefits. So, simply right click on the last 'benefits' policy → add policy after → benefit → name the policy 'bch\_zm' → ok → switch on the policy only for the system ZM\_2017\_reform\_5.*



### Step 3: Add a BenCalc function to the policy bch\_zm

- How to add the BenCalc function?

Right click on the policy bch\_zm → add function → BenCalc → turn on the function only for the system ZM\_2017\_reform\_5. This process adds all of the compulsory parameters for a BenCalc function.



### Step 4: Add the eligibility conditions to the 'Comp\_Cond' parameter: children aged 0-2 inclusive are eligible.

Zambia - EUROMOD microzamed v2.0 (c:\microzamed v2.0\)						
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info						
Tools → EUROMOD plugins						
Policy	G...	ZM_2017	ZM_2017_Reform_3	ZM_2017_Reform_4	ZM_2017_Reform_5	Comment
10	thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	off	off	BEN: Home Grown
14	bot_zm	off	off	off	off	BEN: FISP
15	bch_zm	n/a	n/a	n/a	on	BEN: Universal Child Benefit
15.1	BenCalc	n/a	n/a	n/a	on	
15.1.1	Comp_Cond	1	n/a	n/a	{dag>=0} & {dag<=2}	Children aged between 0 and 2 inclusive are eligible
15.1.2	Comp_perTU	1	n/a	n/a	n/a	
15.1.3	Output_Var	n/a	n/a	n/a	n/a	
15.1.4	TAX_UNIT	n/a	n/a	n/a	n/a	

## Step 5: specify the benefit amount

- go to the policy constdef\_ZM and create a new parameter \$child\_benefit\_amount. Add the amount of the benefit (180 Kwacha) to this parameter.

right click on the last parameter → show add parameter form → placeholder → add  
→ replace 'placeholder' with '\$child\_benefit\_amount' → add 180#m (only ZM\_2017\_reform\_5 system).

Zambia - EUROMOD microzamed v2.0 (c:\microzamed v2.0\)						
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info						
Tools → EUROMOD plugins						
Policy	...	ZM_2017	ZM_2017_Reform_3	ZM_2017_Reform_5	Comment	
4.1.1.1	\$clear_beer_ed_rate	0.4	0.4	0.4	Clear beer excise duty ad valorem rate	
4.1.1.1	\$other_alcoholic_bev_ed_rate	0.6	0.6	0.6	Wine and spirits excise duty ad valorem rate	
4.1.1.1	\$opaque_beer_ed_rate_per_litre	0.15	0.15	0.15	Opaque beer excise duty per litre	
4.1.1.1	\$transport_fuels_ed_rate_per_litre	1.14	1.14	1.14	Petrol/Deisel excise duty per litre	
4.1.1.1	\$tobacco_ed_rate_per_piece	0.24	0.24	0.24	Tobacco excise duty per single piece	
4.1.1.1	\$VAT_Rate	0.16	0.16	0.16	VAT rate	
4.1.1.1	\$VAT_Rate_Reform	n/a	n/a	n/a	VAT rate reform	
4.1.1.1	\$pline	196.5	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)	
4.1.1.1	\$pline	276.7	276.7	276.7	Poverty line - moderate (uprated by CPI from 2015 figure)	
4.1.2	\$ttn_r	0.03	0.03	0.03	Turnover Tax rate	
4.1.2	\$child_benefit_amount	n/a	180#m	180#m	Universal Child Benefit amount	
5	poverty_lines	on	on	on	INC: Poverty lines	
6	tscepi	on	on	on	SIC: Employee Pension Contributions	

Add Parameters

DefConst (order: 1) in policy constdef\_zm

Add	Parameter	Replaces	Grp/No	Count	Description
<input type="checkbox"/>	Const_Dataset		3	1	If set, constant is only defined if the respective dataset is used for the run.
<input type="checkbox"/>	Const_SystemYear		3	1	If set, constant is only defined if the run concerns the respective system year.
<input checked="" type="checkbox"/>	[Placeholder]		3	1	[Placeholder] stands for the name of the constant, which is defined in the policy column. The v...
<input type="checkbox"/>	Run_Cond				Function is only called out if the condition is fulfilled. The parameter is intended to be a conditio...
<input type="checkbox"/>	#_LimPriority		1	1	Footnote parameter for the further specification of an operand. Possible values: If upper limit (#_...
<input type="checkbox"/>	#_LowLim		1	1	Footnote parameter for the further specification of an operand: replaces operand if operand is s...
<input type="checkbox"/>	#_UpLim		1	1	Footnote parameter for the further specification of an operand: replaces operand if operand is hi...
<input type="checkbox"/>	#_Amount		1	1	Footnote parameter for the further specification of an operand: indicates the numeric value of a...
<input type="checkbox"/>	#_DataBasename		1	1	Parameter of query isUsedDatabase.

☒ Show Common Parameters  
☒ Show Footnote Parameters

Description (F5) Summary (F6)

+ Add - Close

- ii. go back to bch\_zm and modify 'Comp\_perTU' by adding the constant - *\$child\_benefit\_amount*
- iii. Modify the Output\_Var and TAX\_UNIT as follows for the ZM\_2017\_reform\_5

Zambia - EUROMOD microzomod v2.0 (c:\microzomod v2.0\)

Policy	G...	ZM_2017	ZM_2017_Reform_3	ZM_2017_Reform_4	ZM_2017_Reform_5	Comment
10	thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	off	off	BEN: Home Grown
14	bot_zm	off	off	off	off	BEN: FISP
15	bch_zm	n/a	n/a	n/a	on	BEN: Universal Child Benefit
15.1	BenCalc	n/a	n/a	n/a	on	
15.1.1	Comp_Cond	1	n/a	n/a	{dag>=0} & {dag<=2}	Children aged between 0 and 2 inclusive are eligible
15.1.2	Comp_perTU	1	n/a	n/a	\$child_benefit_amount	Amount received
15.1.3	Output_Var	n/a	n/a	n/a	bch_s	Output Variable
15.1.4	TAX_UNIT	n/a	n/a	n/a	tu_individual_zm	

ZM bch\_zm - BenCalc Textsize: 8

- iv. Whenever you add a new benefit policy on the spine, you also need to add it in the policy ildef\_ZM in two income lists [Simulated benefits & the relevant income list needed in order for the statistics presenter to work, i.e Child benefits ('Child benefits' in Statistics Presenter] and put '+' only for ZM\_2017\_reform\_5.

Zambia - EUROMOD microzamed v2.0 (c:\microzamed v2.0\)					
Policy	...	ZM_2017	ZM_2017_Refor...	ZM_2017_Reform_5	Comment
2.2	DefI	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	DefI	on	on	on	Define income list - Original income
2.4	DefI	on	on	on	Define income list - Simulated Benefits
2.4.1	Name	ils_bensim	ils_bensim	ils_bensim	
2.4.2	bsa_s	+	+	+	Social cash transfer
2.4.3	bedot_s	n/a	n/a	n/a	Home grown
2.4.4	bot_s	n/a	n/a	n/a	Farmer Input support pack
2.5	DefI	on	on	on	Define income list - Benefits
2.6	DefI	on	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	DefI	on	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	DefI	on	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)
2.9	DefI	on	on	on	Define income list - Simulated Taxes
					Taxes ("Direct taxes" in

Zambia - EUROMOD microzamed v2.0 (c:\microzamed v2.0\)					
Policy	...	ZM_2017	ZM_2017_Reform_4	ZM_2017_Reform_5	Comment
1	uprate_zm	on	on	on	DEF: UPRATING FACTORS
2	ildef_zm	on	on	on	<b>DEF: INCOME CONCEPTS</b>
2.1	DefI	on	on	on	Define income list - Taxable income (used in income tax policy where no turnover tax)
2.2	DefI	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	DefI	on	on	on	Define income list - Original income
2.4	DefI	on	on	on	Define income list - Simulated Benefits
2.4.1	Name	ils_bensim	ils_bensim	ils_bensim	
2.4.2	bsa_s	+	+	+	Social cash transfer
2.4.3	bedot_s	n/a	n/a	n/a	Home grown
2.4.4	bot_s	n/a	n/a	n/a	Farmer Input support pack
2.4.5	bch_s	n/a	n/a	+	Universal Child Benefit
2.5	DefI	on	on	on	Define income list - Benefits
2.6	DefI	on	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	DefI	on	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	DefI	on	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)
2.9	DefI	on	on	on	Define income list - Simulated Taxes
2.10	DefI	on	on	on	Taxes ("Direct taxes" in Statistics Presenter)



Zambia - EUROMOD microzamod v2.0 (c:\microzamod v2.0\)						
<div> <div> <div>Run EUROMOD</div> <div>loaded</div> </div> <div> <div>Zambia</div> <div>ZM</div> </div> </div>						
Policy	...	ZM_2017	ZM_2017_Reform_4	ZM_2017_Reform_5	Comment	
2.6	Defil	on	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)	
2.7	Defil	on	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)	
2.8	Defil	on	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)	
2.9	Defil	on	on	on	Define income list - Simulated Taxes	
2.10	Defil	on	on	on	Taxes ("Direct taxes" in Statistics Presenter)	
2.11	Defil	on	on	on	Define income list -Indirect taxes ("Indirect taxes" in Statistics Presenter)	
2.12	Defil	on	on	on	Define income list -Social security contributions ("SSC (employer and employee)" in Statistics Presenter)	
2.13	Defil	on	on	on	Define income list -Child benefits ("Child benefits" in Statistics Presenter)	
2.13.1	Name	ils_bch	ils_bch	ils_bch	NB ils_bch ils_bsa ils_bsu ils_bdi ils_bun ils_pen all mutually exclusive	
2.13.2	bch_s	n/a	n/a	+	Universal Child Benefit	
2.14	Defil	on	on	on	Define income list -Social assistance benefits ("Social assistance benefits" in Statistics Presenter)	
2.15	Defil	on	on	on	Define income list -Widows and Orphans Benefits none in Zambia but needed for Stats Presenter	

**Answers:** This reform would cost the government 2,423.72 million Kwacha in 2017. In terms of consumption-based poverty, it would lead to a reduction in the poverty rate of 3.9 percentage points. In terms of consumption-based inequality, it would lead to a reduction in the Gini coefficient of -0.0194.

## Exercise 7: Introduce an old aged benefit for older people 65+

**Difficulty level: Intermediate**

### Activity:

Introduce an old age benefit for people who are aged 65 and over. Decide on the monetary amount and the periodicity. **For this example, eligible individuals are awarded 150 Kwacha per month.**

### Question:

How much will this policy cost the government? What impact would this have on poverty and inequality?

### Solution

**Step 1:** Before adding a new policy, you need to add a new system (See Part 1); then make the changes in the new system. Call this new system: *ZM\_2017\_Reform\_6*.

**Step 2:** The new policy will be called *boa\_zm*

- How to add this new policy?

For this example, the new benefit can be added to the end of the list of benefits. So, right click on the last 'benefits' policy → add policy after → benefit → name the policy 'boa\_zm' → ok → switch on the policy only for the system *ZM\_2017\_reform\_6*

Policy	ZM_2017	ZM_2017_Reform_6	Comment
1	• uprate_zm	on	DEF: UPRATING FACTORS
2	• ildef_zm	on	DEF: INCOME CONCEPTS
3	• tundef_zm	on	DEF: ASSESSMENT UNITS
4	• constdef_zm	on	DEF: CONSTANTS
5	• poverty_lines...	on	INC: Poverty lines
6	• tsceepi_zm	on	SIC: Employee Pension
7	• tsceerpi_zm	on	SIC: Employer Pension
8	• ttn_zm	on	TAX: Turnover Tax
9	• tin_zm	on	TAX: Income Tax
10	• thl_zm	n/a	SIC: Medical Levy
11	• bsa_rural_zm	on	BEN: Social Cash Transfer - rural areas
12	• bsa_urban_zm	on	BEN: Social Cash Transfer - urban areas
13	• bedot_zm	off	BEN: Home Grown
14	• bot_zm	off	BEN: FISP
15	• bch_zm	n/a	BEN: Universal Child Benefit
16	• tva_zm	on	TAX: Value Added Tax
17	• tex_zm	on	TAX: Excise Duty and VAT on Excise Duty Items
18	• output_std_zm	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
19	• output_std_h...	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

**Step 3:** Add a BenCalc function to the policy *boa\_zm*

- How to add the BenCalc function?

Right click on the policy *boa\_zm* → add function → BenCalc → turn on the function only for the system *ZM\_2017\_reform\_6*. This process adds all of the compulsory parameters for a BenCalc function.

The screenshot shows the EUROMOD microzomod v2.0 interface. The 'Policy' list on the left includes various policies like 'uprate\_zm', 'ildef\_zm', 'tundef\_zm', etc. The 'ZM\_2017' and 'ZM\_2017\_Reform\_6' columns show the status of these policies. The 'Comment' column provides details for each policy. A right-click context menu is open for the 'boa\_zm' policy, showing options like 'Add Function', 'BenCalc', and 'SchedCalc'. The 'BenCalc' option is highlighted. A 'Hidden Systems Box' is visible on the right, listing systems like 'ZM\_2010', 'ZM\_2015', 'ZM\_2016', 'ZM\_2017\_Reform', and 'ZM\_2017\_Reform\_2'.

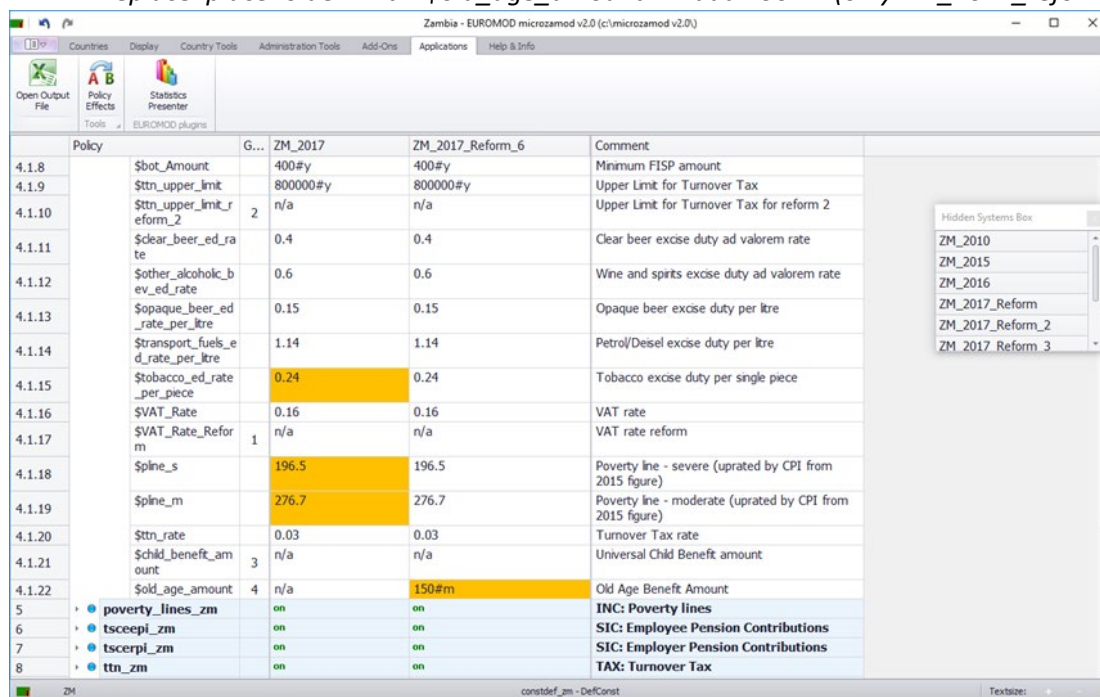
#### Step 4: Add the eligibility conditions to the parameter 'Comp\_Cond'

The screenshot shows the EUROMOD microzomod v2.0 interface. The 'Policy' list on the left includes various policies like 'uprate\_zm', 'ildef\_zm', 'tundef\_zm', etc. The 'ZM\_2017' and 'ZM\_2017\_Reform\_6' columns show the status of these policies. The 'Comment' column provides details for each policy. A right-click context menu is open for the 'boa\_zm' policy, showing options like 'Add Function', 'BenCalc', and 'SchedCalc'. The 'BenCalc' option is highlighted. A 'Hidden Systems Box' is visible on the right, listing systems like 'ZM\_2010', 'ZM\_2015', 'ZM\_2016', 'ZM\_2017\_Reform', 'ZM\_2017\_Reform\_2', and 'ZM\_2017\_Reform\_3'. The 'Comp\_Cond' parameter is highlighted in the 'boa\_zm' policy row, and its value is set to '1'.

- i. Go to the policy *constdef\_ZM* and create a new parameter *\$old\_age\_amount*.

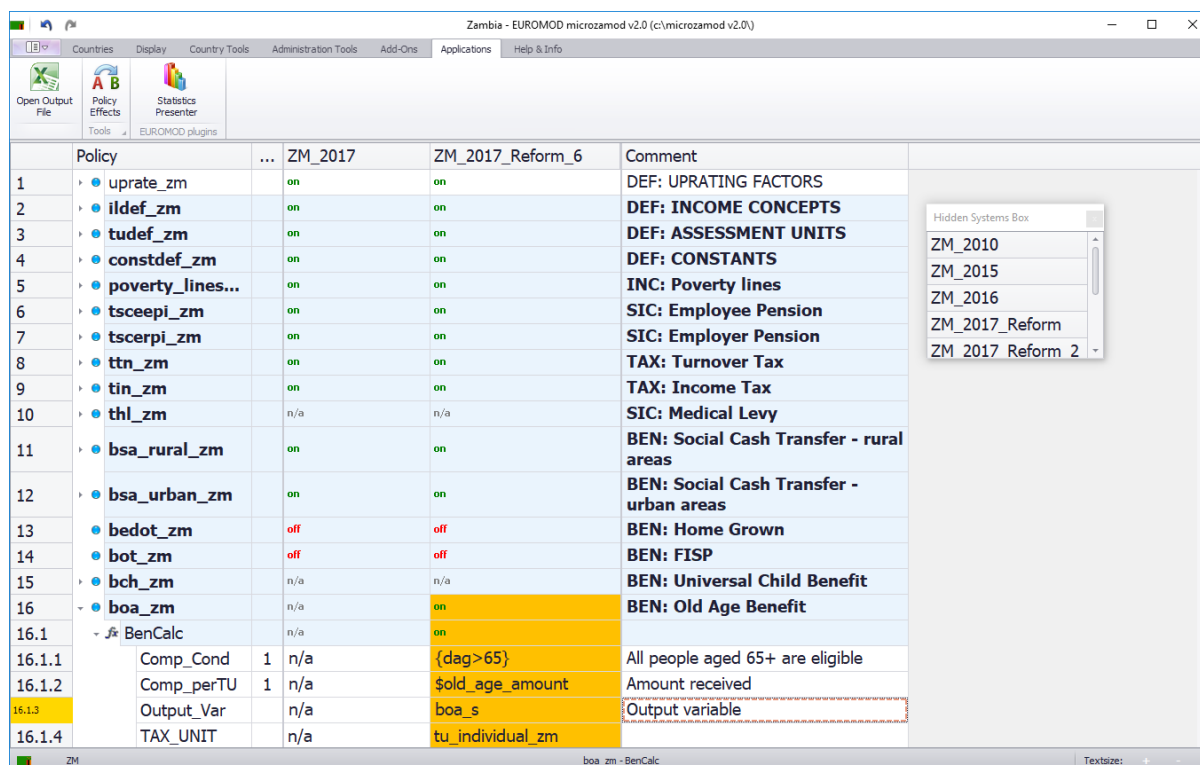
right click on the last parameter → show add parameter form → placeholder → add

replace 'placeholder' with '\$old\_age\_amount' → add 150#m (only ZM\_2017\_reform\_6 system).



Policy	G...	ZM_2017	ZM_2017_Reform_6	Comment
4.1.8	\$bot_Amount	400#y	400#y	Minimum FISP amount
4.1.9	\$ttn_upper_limit	800000#y	800000#y	Upper Limit for Turnover Tax
4.1.10	\$ttn_upper_limit_reform_2	n/a	n/a	Upper Limit for Turnover Tax for reform 2
4.1.11	\$clear_beer_ed_rate	0.4	0.4	Clear beer excise duty ad valorem rate
4.1.12	\$other_alcoholic_bev_ed_rate	0.6	0.6	Wine and spirits excise duty ad valorem rate
4.1.13	\$opaque_beer_ed_rate_per_litre	0.15	0.15	Opaque beer excise duty per litre
4.1.14	\$transport_fuels_ed_rate_per_litre	1.14	1.14	Petrol/Diesel excise duty per litre
4.1.15	\$tobacco_ed_rate_per_piece	0.24	0.24	Tobacco excise duty per single piece
4.1.16	\$VAT_Rate	0.16	0.16	VAT rate
4.1.17	\$VAT_Rate_Reform	n/a	n/a	VAT rate reform
4.1.18	\$pline_s	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)
4.1.19	\$pline_m	276.7	276.7	Poverty line - moderate (uprated by CPI from 2015 figure)
4.1.20	\$ttn_rate	0.03	0.03	Turnover Tax rate
4.1.21	\$child_benefit_amount	n/a	n/a	Universal Child Benefit amount
4.1.22	\$old_age_amount	n/a	150#m	Old Age Benefit Amount
5	poverty_lines_zm	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	SIC: Employee Pension Contributions
7	tscerpi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax

- ii. Go back to bch\_zm and modify 'Comp\_perTU'.
- iii. Modify the Output\_Var and TAX\_UNIT as follows in the ZM\_2017\_reform\_6 system.



Policy	...	ZM_2017	ZM_2017_Reform_6	Comment
1	uprate_zm	on	on	DEF: UPDATING FACTORS
2	ildef_zm	on	on	DEF: INCOME CONCEPTS
3	tudef_zm	on	on	DEF: ASSESSMENT UNITS
4	constdef_zm	on	on	DEF: CONSTANTS
5	poverty_lines...	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	SIC: Employee Pension
7	tscerpi_zm	on	on	SIC: Employer Pension
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	BEN: Home Grown
14	bot_zm	off	off	BEN: FISP
15	bch_zm	n/a	n/a	BEN: Universal Child Benefit
16	boa_zm	n/a	on	BEN: Old Age Benefit
16.1	BenCalc	n/a	on	
16.1.1	Comp_Cond	1	{dag>65}	All people aged 65+ are eligible
16.1.2	Comp_perTU	1	\$old_age_amount	Amount received
16.1.3	Output_Var	n/a	boa_s	Output variable
16.1.4	TAX_UNIT	n/a	tu_individual_zm	

- iv. Whenever you add a new benefit policy on the spine, you also need to add it in the policy ildef\_ZM in two income lists [Simulated benefits & the relevant income list needed in order for the statistics presenter to work, i.e Pension benefits ('Pension benefits' in Statistics Presenter] and put '+' only for ZM\_2017\_reform\_6.

Zambia - EUROMOD microzamod v2.0 (c:\microzamod v2.0\)				
Policy	...	ZM_2017	ZM_2017_Reform_6	Comment
2.2	Defil	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	Defil	on	on	Define income list - Original income
2.4	Defil	on	on	Define income list - Simulated Benefits
2.4.1	Name	ils_bensim	ils_bensim	
2.4.2	bsa_s	+	+	Social cash transfer
2.4.3	bedot_s	n/a	n/a	Home grown
2.4.4	bot_s	n/a	n/a	Farmer Input support pack
2.4.5	bch_s	n/a	n/a	Universal Child Benefit
2.4.6	boa_s	n/a	+	Old Age Benefit
2.5	Defil	on	on	Define income list - Benefits
2.6	Defil	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	Defil	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	Defil	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)
2.9	Defil	on	on	Define income list - Simulated Taxes ("Direct taxes" in Statistics)

Zambia - EUROMOD microzamod v2.0 (c:\microzamod v2.0\)				
Policy	...	ZM_2017	ZM_2017_Reform_6	Comment
2.17	Defil	on	on	Define income list - Unemployment benefit ("Unemployment benefits" in Statistics Presenter)
2.18	Defil	on	on	Define income list - Pension benefits ("Pension benefits" in Statistics Presenter)
2.18.1	Name	ils_pen	ils_pen	
2.18.2	boa_s	n/a	+	Old Age Benefit
2.19	Defil	on	on	Define income list - Disposable income
2.20	Defil	on	on	Define income list for VAT
2.21	Defil	on	on	Define income list - Benefits Data in Base data
2.22	Defil	on	on	Define income list - Direct taxes from the data (needed for Statistics Presenter - do not change)
2.23	Defil	on	on	Define income list - Disposable income with imputed home produce if appropriate (needed for Statistics Presenter - do not change)
2.24	Defil	on	on	Define income list - Simulated Consumption (needed for Statistics Presenter - do not change)
3	tundef_zm	on	on	<b>DEF: ASSESSMENT UNITS</b>
4	constdef_zm	on	on	<b>DEF: CONSTANTS</b>

**Step 4:** Run the ZM\_2017 and ZM\_2017\_6 reform systems in Statistics Presenter to identify how much government expenditure will be on this reform. What is the resulting impact on poverty and inequality of this reform?

**Answer:** This reform would cost the government 799.52 million Kwacha in 2017. It would lead to a 1.1 percentage point reduction in the overall poverty rate (consumption-based), but a 9.0 percentage point reduction in the poverty rate for households containing older persons. It would also result in a reduction of the Gini coefficient of -0.0055.

## Exercise 8: Introduce a benefit for unemployed young people

**Difficulty level: Intermediate**

### Activity:

Introduce a benefit for unemployed youth. Decide on the age band, monetary amount and periodicity. *For this example, the age band 18 to 35 inclusive was used. All eligible individuals receive 100 Kwacha per month*

### Question:

How much will this policy cost the government? What is the impact on poverty and inequality?

### Solution

**Step 1:** Before adding a new policy, you need to add a new system (See Part 1); then make the changes in the new system. Call the new system: *ZM\_2017\_Reform\_7*.

Policy	ZM_2017	ZM_2017_Reform_5	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
1 • uprate_zm	on	on	on	on	DEF: UPRATING FACTORS
2 • ildef_zm	on	on	on	on	DEF: INCOME CONCEPTS
3 • tudef_zm	on	on	on	on	DEF: ASSESSMENT UNITS
4 • constdef_zm	on	on	on	on	DEF: CONSTANTS
5 • poverty_lines...	on	on	on	on	INC: Poverty lines
6 • tscepi_zm	on	on	on	on	SIC: Employee Pension
7 • tscepi_zm	on	on	on	on	SIC: Employer Pension
8 • ttn_zm	on	on	on	on	TAX: Turnover Tax
9 • tin_zm	on	on	on	on	TAX: Income Tax
10 • thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11 • bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12 • bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13 • bedot_zm	off	off	off	off	BEN: Home Grown
14 • bot_zm	off	off	off	off	BEN: FISP
15 • bch_zm	n/a	on	n/a	n/a	BEN: Universal Child Benefit
16 • boa_zm	n/a	n/a	on	n/a	BEN: Old Age Benefit
17 • tva_zm	on	on	on	on	TAX: Value Added Tax
18 • tex_zm	on	on	on	on	TAX: Excise Duty and VAT on Excise Duty Items
19 • output_std_zm	on	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
20 • output_std_h...	off	off	off	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

**Step 2:** The new policy will be called bun\_zm. (Note: **B: Benefit; UN: Unemployment**) As per EUROMOD naming conventions

- How to add this new policy?

*For this example, the new benefit can be added to the end of the list of benefits. So, right click on the last 'benefits' policy → add policy after → benefit → name the policy 'bun\_zm' → ok → switch on the policy only for the system ZM\_2017\_reform\_7*

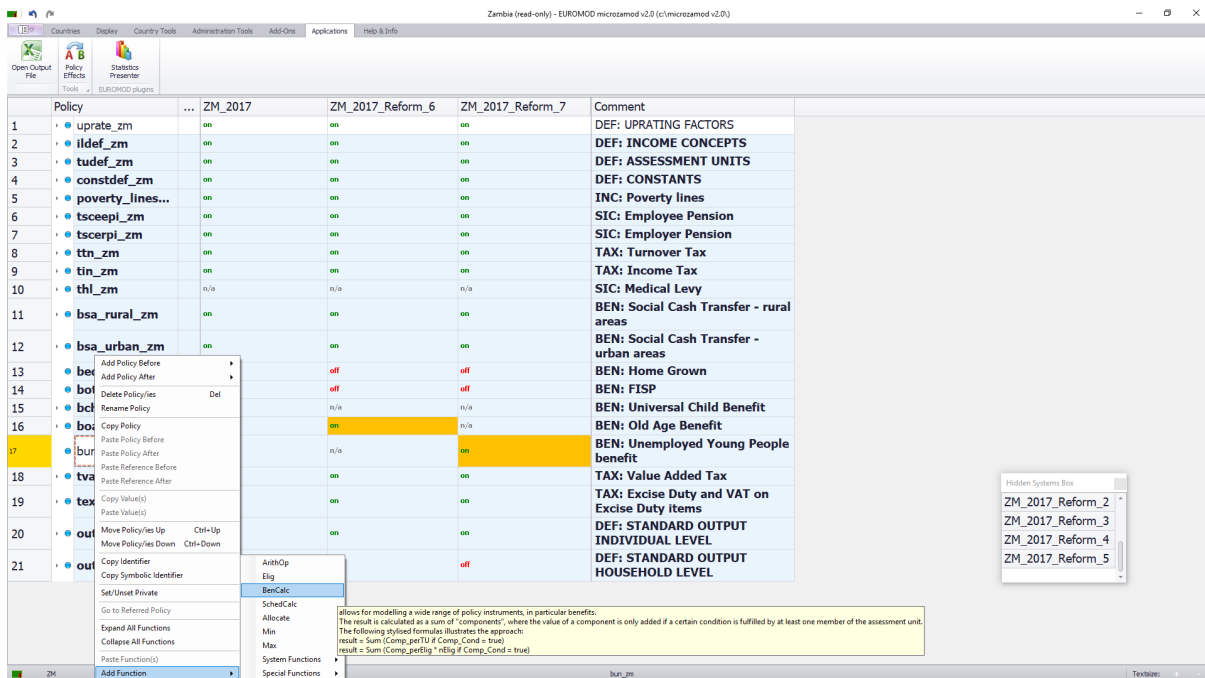
The screenshot shows the EUROMOD microzomod v2.0 interface for Zambia. The main table lists policies and their status across different systems. A context menu is open for the 'boa\_zm' policy, showing options like 'Add Policy Before', 'Add Policy After', 'Benefit', 'Tax', 'SIC', 'Definition', and 'Income'. A 'Hidden Systems Box' is visible on the right, showing a list of systems including ZM\_2010, ZM\_2015, ZM\_2016, ZM\_2017\_Reform, and ZM\_2017\_Reform\_2.

Policy	ZM_2017	ZM_2017_Reform_5	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
1 uprate_zm	on	on	on	on	DEF: UPDATING FACTORS
2 ildef_zm	on	on	on	on	DEF: INCOME CONCEPTS
3 tudef_zm	on	on	on	on	DEF: ASSESSMENT UNITS
4 constdef_zm	on	on	on	on	DEF: CONSTANTS
5 poverty_lines...	on	on	on	on	INC: Poverty lines
6 tsceepi_zm	on	on	on	on	SIC: Employee Pension
7 tscerpi_zm	on	on	on	on	SIC: Employer Pension
8 ttn_zm	on	on	on	on	TAX: Turnover Tax
9 tin_zm	on	on	on	on	TAX: Income Tax
10 thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11 bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12 bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13 bedot_zm	off	off	off	off	BEN: Home Grown
14 bot_zm	off	off	off	off	BEN: FISP
15 bch_zm	n/a	n/a	n/a	n/a	BEN: Universal Child Benefit
16 boa_zm	on	on	on	on	BEN: Old Age Benefit
17 tva_zm	on	on	on	on	TAX: Value Added Tax
18 tex_zm	on	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
19 output	on	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
20 output	off	off	off	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

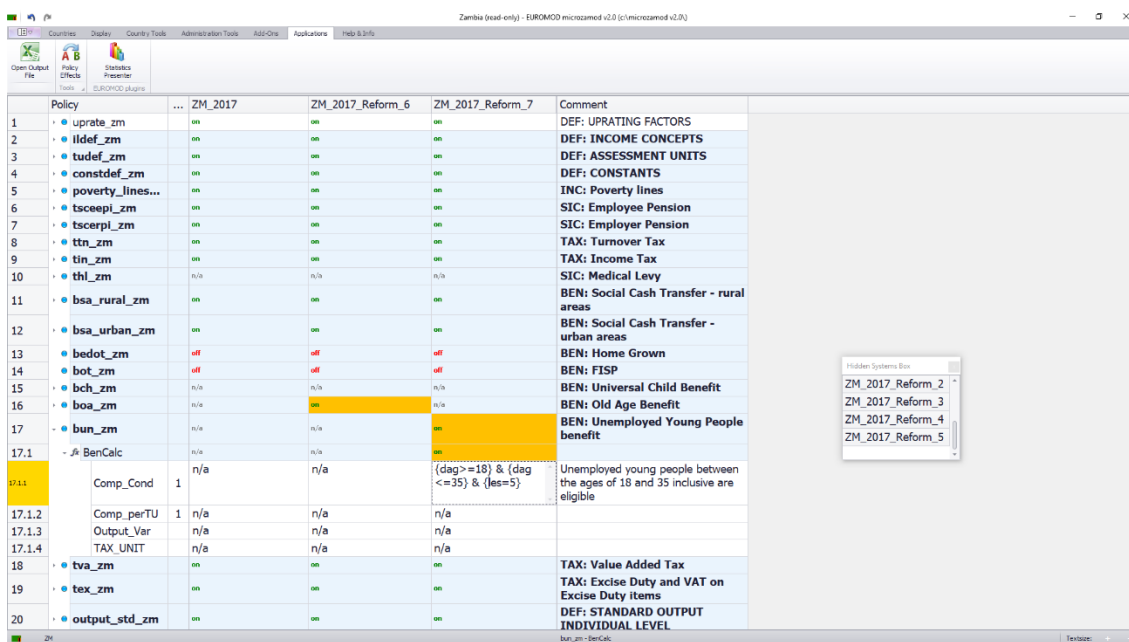
### Step 3: Add a BenCalc function to the policy bun\_zm

- How to add the BenCalc function?

Right click on the policy bun\_zm -> add function-> BenCalc -> turn on the function only for the system ZM\_2017\_reform\_7. This process adds all of the compulsory parameters for a BenCalc function.



#### Step 4: Add the eligibility conditions to the parameter 'Comp\_Cond'



- go to the policy constdef\_ZM and create a new parameter \$unemployed\_benefit\_amount

right click on the last parameter → show add parameter form → placeholder → add replace 'placeholder' with '\$unemployed\_benefit\_amount' → add 100#m (only ZM\_2017\_reform\_7 system).



Policy		ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
4.1.15	\$tobacco_ed_rate_per_plec	0.24	0.24	0.24	Tobacco excise duty per single piece
4.1.16	\$VAT_Rate	0.16	0.16	0.16	VAT rate
4.1.17	\$VAT_Rate_Reform	n/a	n/a	n/a	VAT rate reform
4.1.18	\$pline_s	196.5	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)
4.1.19	\$pline_m	276.7	276.7	276.7	Poverty line - moderate (uprated by CPI from 2015 figure)
4.1.20	\$ttn_rate	0.03	0.03	0.03	Turnover Tax rate
4.1.21	\$child_benefit_amount	n/a	n/a	n/a	Universal Child Benefit amount
4.1.22	\$old_age_amo	n/a	150#m	n/a	Old Age Benefit Amount
4.1.22	\$unemployed_benefit_amo	n/a	n/a	100#m	Unemployed Benefit Amount
5	poverty_lines...	on	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	on	SIC: Employee Pension
7	tscepi_zm	on	on	on	SIC: Employer Pension
8	ttn_zm	on	on	on	TAX: Turnover Tax
9	tin_zm	on	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	off	BEN: Home Grown
14	bot_zm	off	off	off	BEN: FISP
15	bch_zm	n/a	n/a	n/a	BEN: Universal Child Benefit
16	boa_zm	n/a	on	n/a	BEN: Old Age Benefit
17	bun_zm	n/a	n/a	on	BEN: Unemployed Young People benefit

- ii. go back to bun\_zm and modify 'Comp\_perTU' with the new constant
- iii. Modify the Output\_Var and TAX\_UNIT as follows for the ZM\_2017\_reform\_7 system

Policy		ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
4.1	DefConst	on	on	on	Define constants
5	poverty_lines...	on	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	on	SIC: Employee Pension
7	tscepi_zm	on	on	on	SIC: Employer Pension
8	ttn_zm	on	on	on	TAX: Turnover Tax
9	tin_zm	on	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	off	BEN: Home Grown
14	bot_zm	off	off	off	BEN: FISP
15	bch_zm	n/a	n/a	n/a	BEN: Universal Child Benefit
16	boa_zm	n/a	on	n/a	BEN: Old Age Benefit
17	bun_zm	n/a	n/a	on	BEN: Unemployed Young People benefit
17.1	BenCalc	n/a	n/a	on	
17.1.1	Comp_Cond	n/a	n/a	{dag>=18} & {dag<=35} & {les=5}	Unemployed young people between the ages of 18 and 35 inclusive are eligible
17.1.2	Comp_perTU	n/a	n/a	\$unemployed_benefit_a mount	Amount received
17.1.3	Output_Var	n/a	n/a	bun_s	Output Variable
17.1.4	TAX_UNIT	n/a	n/a	tu_individual_zm	
18	tva_zm	on	on	on	TAX: Value Added Tax
19	tex_zm	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
20	output_std_zm	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
21	output_std_h...	off	off	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

- iv. Whenever you add a new benefit policy to the model, you also need to add it in the policy ildef\_ZM in two income lists [Simulated benefits & the relevant income list needed in order for the statistics presenter to work, i.e ('Unemployment benefits' in Statistics Presenter) and put '+' only for ZM\_2017\_reform\_7.

Zambia (read-only) - EUROMOD microzmod v2.0 (c:\microzmod v2.0)					
Policy	...	ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
1	• uprate_zm	on	on	on	DEF: UPDATING FACTORS
2	• ildef_zm	on	on	on	DEF: INCOME CONCEPTS
2.1	• DefI	on	on	on	Define income list - Taxable income (used in income tax policy where no turnover tax)
2.2	• DefI	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	• DefI	on	on	on	Define income list - Original income
2.4	• DefI	on	on	on	Define income list - Simulated Benefits
2.4.1	Name	ils_bensim	ils_bensim	ils_bensim	
2.4.2	bsa_s	+	+	+	Social cash transfer
2.4.3	bedot_s	n/a	n/a	n/a	Home grown
2.4.4	bot_s	n/a	n/a	n/a	Farmer Input support pack
2.4.5	bch_s	n/a	n/a	n/a	Universal Child Benefit
2.4.6	boa_s	n/a	+	n/a	Old Age Benefit
2.4.7	bun_s	n/a	n/a	+	Unemployed Young People Benefit
2.5	• DefI	on	on	on	Define income list - Benefits
2.6	• DefI	on	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	• DefI	on	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	• DefI	on	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plug In)
2.9	• DefI	on	on	on	Define income list - Simulated Taxes
2.10	• DefI	on	on	on	Taxes ("Direct taxes" in Statistics Presenter)
					Define income list - Indirect taxes

Zambia (read-only) - EUROMOD microzmod v2.0 (c:\microzmod v2.0)					
Policy	...	ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
2.11	• DefI	on	on	on	Define income list - Indirect taxes ("Indirect taxes" in Statistics Presenter)
2.12	• DefI	on	on	on	Define income list - Social security contributions ("SSC (employer and employee)" in Statistics Presenter)
2.13	• DefI	on	on	on	Define income list - Child benefits ("Child benefits" in Statistics Presenter)
2.14	• DefI	on	on	on	Define income list - Social assistance benefits ("Social assistance benefits" in Statistics Presenter)
2.15	• DefI	on	on	on	Define income list - Widows and Orphans Benefits none in Zambia but needed for Stats Presenter
2.16	• DefI	on	on	on	Define income list - Disabled benefits ("Disabled benefits" in Statistics Presenter)
2.17	• DefI	on	on	on	Define income list - Unemployment benefit ("Unemployment benefits" in Statistics Presenter)
2.17.1	Name	ils_bun	ils_bun	ils_bun	NB ils_bch ils_bsa ils_bsu ils_bdi ils_bun ils_pen all mutually exclusive
2.17.2	bun_s	n/a	n/a	+	Unemployed Young People Benefit
2.18	• DefI	on	on	on	Define income list - Pension benefits ("Pension benefits" in Statistics Presenter)
2.19	• DefI	on	on	on	Define income list - Disposable income
2.20	• DefI	on	on	on	Define income list for VAT
2.21	• DefI	on	on	on	Define income list - Benefits Data in Base data
2.22	• DefI	on	on	on	Define income list - Direct taxes from the data (needed for Statistics Presenter - do not change)

**Step 5:** Run the ZM\_2017 and ZM\_2017\_reform\_7 systems in Statistics Presenter to identify how much this reform will cost the government. What is the impact on poverty and inequality?

**Answers:** This reform would cost 656.02 million Kwacha in 2017. It would lead to a reduction in the (consumption-based) poverty rate of 0.6 percentage points and it would lead to a decrease in the (consumption-based) Gini coefficient of -0.0026.

## Exercise 9: Introduce three benefit reforms and change the income tax policy to cover the costs

**Difficulty level: Advanced**

### Activity:

Introduce all three benefit reforms (child benefit, older persons benefit, and unemployed youth benefit) at the same time, then change the income tax policy to cover the costs.

### Question:

What is the impact on poverty and inequality?

### Solution

**Step 1:** Before adding a new policy, you need to add a new system (See Part 1); then make the changes in the new system. Call the new system: *ZM\_2017\_Reform\_8*.

**Step 2:** Repeat the process of introducing bch\_zm, boa\_zm and bun\_zm policies, but this time introducing them all into the same reform scenario: *ZM\_2017\_Reform\_8*.

**Step 3:** Modify the income tax policy (tin\_zm) in the *ZM\_2017\_Reform\_8* system by changing the tax band thresholds in the SchedCalc function as follows:

		<i>ZM_2017</i>	<i>ZM_2017_Reform_8</i>
SchedCalc		on	on
Base		ttb_s	ttb_s
Band_LowLim	1	0#y	0#y
Band_Rate	1	0	0
Band_LowLim	2	39600#y	20000#y
Band_Rate	2	0.25	0.25
Band_LowLim	3	49200#y	30000#y
Band_Rate	3	0.3	0.3
Band_LowLim	4	74400#y	40000#y
Band_Rate	4	0.375	0.375
output_var		tin_s	tin_s
TAX_UNIT		tu_individual_zm	tu_individual_zm

**Step 4:** Run the *ZM\_2017* and *ZM\_2017\_Reform\_8* systems in Statistics Presenter to identify how much government expenditure will be on this combination of benefit reforms, and how much extra revenue the government will raise through the tax reform. What are the resulting impacts on poverty and inequality of these combined tax and benefit reforms? Are the reforms budget neutral?

**Answers:** The three benefit reforms will cost an extra 3,879.26 million kwachas in 2017, but this would be more than offset by the additional income tax revenue of 4,020.46 million kwacha. The combined tax and benefit reforms would lead to a 4.7 percentage point reduction in the poverty rate and a reduction in the Gini coefficient of -0.0323.

## Part D: Changing Eligibility Rules in MicroZAMOD

### Exercise 10: Amending SCT for 2017

Difficulty level: Advanced

#### Activity:

In 2017 the eligibility rules for SCT changed. Currently, in MicroZAMOD v2.0, the policy rules for SCT are identical to 2016 and are therefore not correct, so we need to update them to reflect the new rules that applied in 2017.

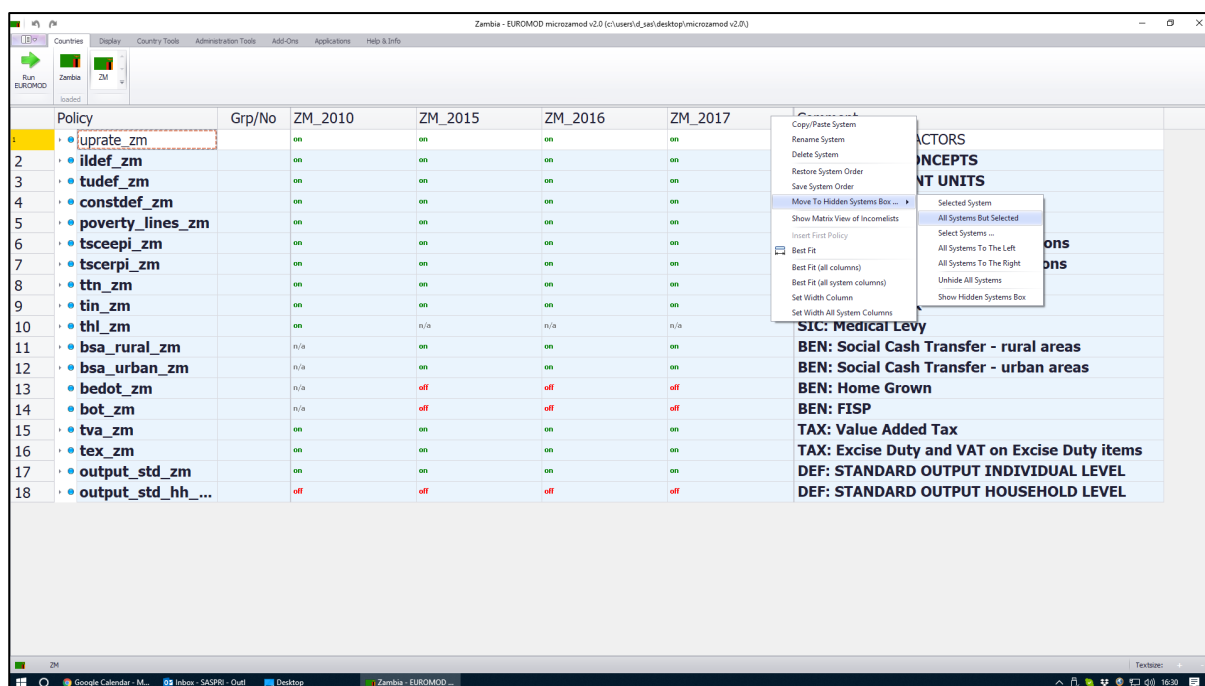
#### Questions:

How much more or less will the government expenditure on SCT be in 2017 under the new SCT rules compared to what would have been required under the old SCT rules? What are the effects on poverty and inequality in 2017 of changing the SCT eligibility rules?

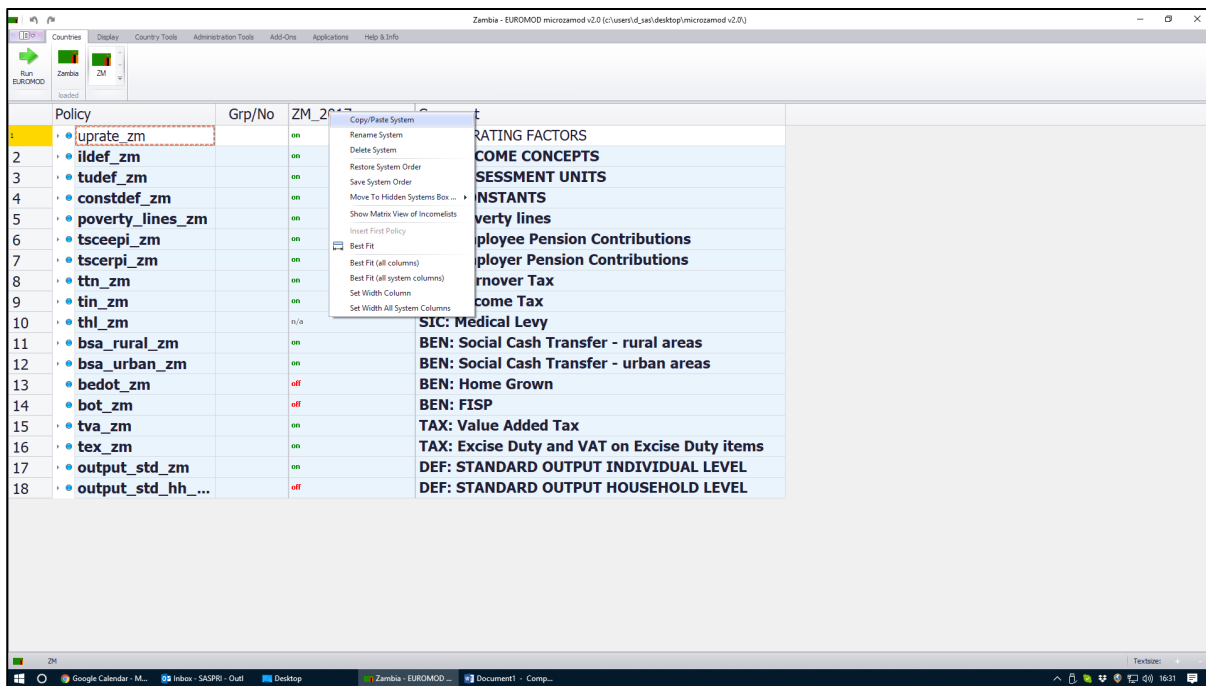
#### Solution

**Step 1:** Firstly we will hide all systems in MicroZAMOD v2.0 except the 2017 system – (this will help us to focus on the changes that we make to the SCT policy).

*Right-click on the column header 'ZM\_2017' → 'Move To Hidden Systems Box' → 'All Systems But Selected'.*



**Step 2:** Next we need to make a copy of the 'ZM\_2017' system and call it 'ZM\_2017\_SCT' to show that we are going to model the changes to SCT.



System Name

ZM\_2017\_SCT

System Year

2017

OK

Cancel

**Step 3:** Check to make sure that the 'base' system for our new 'ZM\_2017\_SCT' system is the 'ZM\_2017' system so that the 'conditional formatting' will show any changes we make in our new system compared to the base system.

Go to the 'Display' tab at the top of the screen → 'Conditional Formatting' → new 'ZM\_2017\_SCT' system → check the base system is 'ZM\_2017'.

Conditional Formatting

ZM

Conditional Formatting

Condition	Systems to Apply	Back Color	Text Color

Differences to Base System Formatting

System	Base System	Back Color	Text Color	Expand Differences
ZM_2010		FFFFC000	no special color	<input type="checkbox"/>
ZM_2015		FFFFC000	no special color	<input type="checkbox"/>
ZM_2016	ZM_2015	FFFFC000	no special color	<input type="checkbox"/>
ZM_2017	ZM_2016	FFFFC000	no special color	<input type="checkbox"/>
ZM_2017_SCT	ZM_2017	FFFFC000	no special color	<input type="checkbox"/>

Restore Default Back Color

OK

Cancel

**Step 4:** Open up the policy ‘bsa\_rural\_zm’. The eligibility rules for this policy in MicroZAMOD v2.0 currently consist of the following: (i) a district residency test; (ii) a fit-for-work ratio test; and (iii) a living conditions index test. If we open up the function DefVar we see that we have specified four temporary variables to enable us to operationalise these three eligibility criteria. All four of these temporary variables are set to a value of zero for all in the dataset in this initial DefVar function, but they are then re-coded as appropriate in the relevant functions below.

The new SCT eligibility rules in operation in 2017 consist of: (i) the same district residency test as before; (ii) a new ‘elderly person’ eligibility test; (iii) a new ‘female-headed household’ eligibility test; (iv) a new ‘child-headed household’ eligibility test; (v) a new ‘disabled person in the household’ test; and (vi) the same living conditions index test as before. We therefore need to add new temporary variables for the eligibility categories that were not present in the previous SCT rules, and we need to set the i\_rural\_fit\_for\_work parameter to n/a in ‘ZM\_2017\_SCT’ as this eligibility criterion is no longer applicable.

Note: The underpinning dataset already contains a variable called ddi01 which is a binary flag to indicate whether anyone in the household is disabled, so we do not need to add a temporary variable to calculate this. As such, we need new temporary variables for ‘elderly person’, ‘female-headed’ and ‘child-headed’.

Zambia - EUROMOD microzomod v2.0 (c:\users\d\_sas\desktop\microzomod v2.0\)

☒ Full Spine  
☐ Single Policy

Conditional Formatting  
 Automatic Conditional Formatting  
 Suspend System Formatting

Clear  
 Set Bookmark  
 Clear All

Show Key Parameters  
 Show Matrix View of Incomelists  
 Show Hidden Systems Box

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
1	uprate_zm	on	on	DEF: UPDATING FACTORS
2	ildef_zm	on	on	DEF: INCOME CONCEPTS
3	tudef_zm	on	on	DEF: ASSESSMENT UNITS
4	constdef_zm	on	on	DEF: CONSTANTS
5	poverty_lines_zm	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	SIC: Employee Pension Contributions
7	tscerpi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.1.1	i_rural_12m	1	0	
11.1.2	i_rural_fit_for_work	2	0	
11.1.3	i_rural_liv_score	3	0	
11.1.4	i_rural_liv_score_scaled	4	0	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	on	fit-for-work ratio test (SCT coded)
11.4	BenCalc	on	on	highest level of education in the household (SCT coded)
11.5	BenCalc	on	on	Toilet categories (SCT coded)
11.6	BenCalc	on	on	Roof material (SCT coded)
11.7	BenCalc	on	on	Energy for lighting (SCT coded)
11.8	BenCalc	on	on	Energy for cooking (SCT coded)
11.9	BenCalc	on	on	Asset ownership: mattress
11.10	BenCalc	on	on	Asset ownership: sofa
11.11	BenCalc	on	on	Asset ownership: TV
11.12	BenCalc	on	on	Asset ownership: clock

ZM bsa\_rural\_zm Textsize: + -

Zambia - EUROMOD microzomod v2.0 (c:\users\d\_sas\desktop\microzomod v2.0\)

☒ Full Spine  
☐ Single Policy

Conditional Formatting  
 Automatic Conditional Formatting  
 Suspend System Formatting

Clear  
 Set Bookmark  
 Clear All

Show Key Parameters  
 Show Matrix View of Incomelists  
 Show Hidden Systems Box

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
1	uprate_zm	on	on	DEF: UPDATING FACTORS
2	ildef_zm	on	on	DEF: INCOME CONCEPTS
3	tudef_zm	on	on	DEF: ASSESSMENT UNITS
4	constdef_zm	on	on	DEF: CONSTANTS
5	poverty_lines_zm	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	SIC: Employee Pension Contributions
7	tscerpi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.1.1	i_rural_12m	1	0	
11.1.2	i_rural_fit_for_work	2	n/a	
11.1.3	i_rural_liv_score	3	0	
11.1.4	i_rural_liv_score_scaled	4	0	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	on	fit-for-work ratio test (SCT coded)
11.4	BenCalc	on	on	highest level of education in the household (SCT coded)
11.5	BenCalc	on	on	Toilet categories (SCT coded)
11.6	BenCalc	on	on	Roof material (SCT coded)
11.7	BenCalc	on	on	Energy for lighting (SCT coded)
11.8	BenCalc	on	on	Energy for cooking (SCT coded)
11.9	BenCalc	on	on	Asset ownership: mattress
11.10	BenCalc	on	on	Asset ownership: sofa
11.11	BenCalc	on	on	Asset ownership: TV
11.12	BenCalc	on	on	Asset ownership: clock

ZM bsa\_rural\_zm - DefVar Textsize: + -

Right-clicking on the parameter 'i\_rural\_fit\_for\_work' → add three blank [Placeholder] parameters using the 'Add Parameters' tool.

Add Parameters

DefVar (order: 0) in policy bsa\_rural\_zm

Add	Parameter	Replaces	Grp/No	Count	Description
<input type="checkbox"/>	Var_Dataset		5	1	If set, variable is only defined if the respective dataset is used for the run.
<input type="checkbox"/>	Var_SystemYear		5	1	If set, variable is only defined if the run concerns the respective system year.
<input type="checkbox"/>	Var_Monetary		5	1	If set to no: variable is treated as a non-monetary variable, otherwise as a monetary variable.
<input checked="" type="checkbox"/>	[Placeholder]		5	3	[Placeholder] stands for the name of the variable, which is defined in the policy column. Optional...
<input type="checkbox"/>	Run_Cond				Function is only carried out if the condition is fulfilled. The parameter is intended to be a conditio...
<input type="checkbox"/>	#_LimPriority		1	1	Footnote parameter for the further specification of an operand: Possible values: If upper limit (#_U...
<input type="checkbox"/>	#_LowLim		1	1	Footnote parameter for the further specification of an operand: replaces operand if operand is s...
<input type="checkbox"/>	#_UpLim		1	1	Footnote parameter for the further specification of an operand: replaces operand if operand is hi...
<input type="checkbox"/>	#_Amount		1	1	Footnote parameter for the further specification of an operand: indicates the numeric value of an...
<input type="checkbox"/>	#_DataBasename		1	1	Parameter of query IsUsedDatabase.

☒ Show Common Parameters  
☒ Show Footnote Parameters

Description (F5)
Summary (F6)

Add
Close

Zambia - EUROMOD microzamod v2.0 (c:\users\d_sas\desktop\microzamod v2.0\)					
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info					
<div> Run EUROMOD Zambia ZM loaded </div>					
Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment	
1	uprate_zm	on	on	DEF: UPGRATING FACTORS	
2	ildef_zm	on	on	DEF: INCOME CONCEPTS	
3	tudef_zm	on	on	DEF: ASSESSMENT UNITS	
4	constdef_zm	on	on	DEF: CONSTANTS	
5	poverty_lines_zm	on	on	INC: Poverty lines	
6	tscepi_zm	on	on	SIC: Employee Pension Contributions	
7	tscepi_zm	on	on	SIC: Employer Pension Contributions	
8	ttn_zm	on	on	TAX: Turnover Tax	
9	tin_zm	on	on	TAX: Income Tax	
10	thl_zm	n/a	n/a	SIC: Medical Levy	
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas	
11.1	DefVar	on	on		
11.1.1	i_rural_12m	1	0		
11.1.2	i_rural_fit_for_work	2	0		
11.1.3	i_rural_elderly	5	n/a		
11.1.4	i_rural_female_headed	6	0		
11.1.5	i_rural_child_headed	7	0		
11.1.6	i_rural_liv_score	3	0		
11.1.7	i_rural_liv_score_scaled	4	0		
11.2	Elig	on	on	Rural area & same district for 12 months	
11.3	Elig	on	on	fit-for-work ratio test (SCT coded)	
11.4	BenCalc	on	on	highest level of education in the household (SCT coded)	
11.5	BenCalc	on	on	Toilet categories (SCT coded)	
11.6	BenCalc	on	on	Roof material (SCT coded)	
11.7	BenCalc	on	on	Energy for lighting (SCT coded)	
11.8	BenCalc	on	on	Energy for cooking (SCT coded)	
11.9	BenCalc	on	on	Asset ownership: mattress	
11.10	BenCalc	on	on	Asset ownership: sofa	
11.11	BenCalc	on	on	Asset ownership: TV	
11.12	BenCalc	on	on	Asset ownership: clock	
11.13	BenCalc	on	on	Asset ownership: electric iron	

Make sure that the new parameters are all given a value of zero in the 'ZM\_2017\_SCT' system and are set to 'n/a' in the base 'ZM\_2017' system.



Next, we need to remove the 'fit-for-work' eligibility test from the new SCT rules in the 'ZM\_2017\_SCT' system. We do this by setting the relevant function to 'n/a' (and making sure all the parameters within that function are also set to 'n/a'). This ensures that the 'fit-for-work' test will not form part of the eligibility assessment for SCT in the 'ZM\_2017\_SCT' system.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
7	tscerpi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.1.1	i_rural_12m	1	0	
11.1.2	i_rural_fit_for_work	2	n/a	
11.1.3	i_rural_elderly	5	0	
11.1.4	i_rural_female_headed	6	0	
11.1.5	i_rural_child_headed	7	0	
11.1.6	i_rural_liv_score	3	0	
11.1.7	i_rural_liv_score_scaled	4	0	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	n/a	fit-for-work ratio test (SCT coded)
11.3.1	Elig_Cond	{dhh=1} & {dfl=1}	n/a	
11.3.2	Output_Var	i_rural_fit_for_work	n/a	
11.3.3	TAX_UNIT	tu_individual_zm	n/a	
11.4	BenCalc	on	on	highest level of education in the household (SCT coded)
11.5	BenCalc	on	on	Toilet categories (SCT coded)
11.6	BenCalc	on	on	Roof material (SCT coded)
11.7	BenCalc	on	on	Energy for lighting (SCT coded)
11.8	BenCalc	on	on	Energy for cooking (SCT coded)
11.9	BenCalc	on	on	Asset ownership: mattress
11.10	BenCalc	on	on	Asset ownership: sofa
11.11	BenCalc	on	on	Asset ownership: TV
11.12	BenCalc	on	on	Asset ownership: clock
11.13	BenCalc	on	on	Asset ownership: electric iron
11.14	ArithOp	on	on	Scaling the score to make it range between 0 and 1000
11.15	BenCalc	on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.16	BenCalc	on	on	Additional SCT payment for households containing one or more disabled people

We can then begin to add the new eligibility criteria into the 'ZM\_2017\_SCT' system.

**Step 5:** We will start with the 'elderly person' criterion. The eligibility rule is that any household with an elderly person (aged 65 or over) is now eligible for SCT. Because SCT is paid to the household head in MicroZAMOD (it is possible to change who the benefit is paid to, but this would add unnecessary complexity to the model) we need to construct a function to tell MicroZAMOD that the household head is eligible for SCT if \*anyone\* in the household is aged 65 or over. There are a few different ways to implement this on the model, but the cleanest way is to use a BenCalc function.

We will place our new BenCalc after the 'fit-for-work' Elig function which we have just set to 'n/a':

Right-click on the 'fit-for-work' Elig function → 'Add Function After' → 'BenCalc' → Turn this function 'on' → put a suitable label in the 'Comment' column.

We now need to specify the eligibility rules:

The first thing to consider is whether this function should perform its assessment at the level of the household or the individual. The policy documentation states that a household is eligible if any member is aged 65 or over. So although we need to assess each individual to see whether he/she is aged 65 or over, we actually want to give the result of the eligibility test to the household head, as it is the head who will potentially be eligible to receive SCT on behalf of the household. We can do this by operationalising this particular function at household level, by specifying the TAX\_UNIT to be 'tu\_household\_zm'. We can then begin to think through how we need to set up the other parameters in the function.

Starting with the Comp\_Cond parameter, we need to specify that each individual should be assessed in terms of their age to see whether they are aged 65 or over. We do this by typing {dag>=65} into this parameter. In addition, because we are currently looking at the rural element of SCT, we need to tell the function that we are only interested in people living in rural households, so we add a further condition to this parameter, typing {dru=0}. These two conditions are combined with an '&' sign to specify that only people aged 65 or over AND living in rural areas are able to pass this part of the eligibility test for the rural component of SCT.

**NOTE:** Remember that because we have operationalised this function using the household tax unit, the head of household will be flagged as being eligible on behalf of the household if anyone within the household meets the criteria set out in the Comp\_Cond parameter.

In the Comp\_per\_TU parameter we need to tell MicroZAMOD what value to allocate to household heads where their household meets the 'elderly' eligibility criteria. We want to simply flag up a household's eligibility, so we can add a value of 1 to the Comp\_per\_TU parameter. This means that for any household that does contain an elderly person, the household head will be allocated a value of 1. All other people in the dataset will receive a value of zero. Finally, we tell MicroZAMOD that we wish for this eligibility flag to be outputted into the temporary variable 'i\_rural\_elderly' which we introduced into the model in the earlier step.

The screenshot shows the 'Zambia - EUROMOD microzomod v2.0' application window. The 'Policy' tab is active, displaying a tree view of policies and their parameters. The 'bsa\_rural\_zm' policy is expanded, showing its parameters and values. The 'Comp\_Cond' parameter is highlighted in yellow, indicating it is the current selection. The 'Output\_Var' parameter is also highlighted in yellow, indicating it is the current selection. The 'TAX\_UNIT' parameter is highlighted in yellow, indicating it is the current selection. The 'TAX\_UNIT' parameter is highlighted in yellow, indicating it is the current selection.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
tin_zm		on	on	TAX: Income Tax
thl_zm		n/a	n/a	SIC: Medical Levy
bsa_rural_zm		on	on	BEit: Social Cash Transfer - rural areas
DefVar		on	on	
i_rural_12m	1	0	0	
i_rural_fit_for_work	2	0	n/a	
i_rural_elderly	5	n/a	0	
i_rural_female_headed	6	n/a	0	
i_rural_child_headed	7	n/a	0	
i_rural_liv_score	3	0	0	
i_rural_liv_score_scaled	4	0	0	
Elg		on	on	Rural area & same district for 12 months
Elg_Cond		{dhh=1} & {dfl=1}	n/a	fit-for-work ratio test (SCT coded)
Output_Var		i_rural_fit_for_work	n/a	
TAX_UNIT		tu_individual_zm	n/a	
BenCalc		n/a	on	Elderly eligibility criteria (must be 65 and over)
Comp_Cond	1	n/a	n/a	
Comp_perTU	1	n/a	n/a	
Output_Var		n/a	n/a	
TAX_UNIT		n/a	n/a	
BenCalc		on	on	highest level of education in the household (SCT coded)
BenCalc		on	on	Toilet categories (SCT coded)
BenCalc		on	on	Roof material (SCT coded)
BenCalc		on	on	Energy for lighting (SCT coded)
BenCalc		on	on	Energy for cooking (SCT coded)
BenCalc		on	on	Asset ownership: mattress
BenCalc		on	on	Asset ownership: sofa
BenCalc		on	on	Asset ownership: TV
BenCalc		on	on	Asset ownership: clock
BenCalc		on	on	Asset ownership: electric iron

Zambia - EUROMOD microzomod v2.0 (c:\users\d_sas\desktop\microzomod v2.0\)					
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info					
Run EUROMOD Zambia ZM loaded					
Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment	
9 tin_zm		on	on	TAX: Income Tax	
10 thl_zm		n/a	n/a	SIC: Medical Levy	
11 bsa_rural_zm		on	on	BEN: Social Cash Transfer - rural areas	
11.1 DefVar		on	on		
11.1.1 i_rural_12m	1	0	0		
11.1.2 i_rural_fit_for_work	2	0	n/a		
11.1.3 i_rural_elderly	5	n/a	0		
11.1.4 i_rural_female_headed	6	n/a	0		
11.1.5 i_rural_child_headed	7	n/a	0		
11.1.6 i_rural_liv_score	3	0	0		
11.1.7 i_rural_liv_score_scaled	4	0	0		
11.2 Elig		on	on	Rural area & same district for 12 months	
11.3 Elig		on	n/a	fit-for-work ratio test (SCT coded)	
11.3.1 Elig_Cond		{dhh=1} & {dfr=1}	n/a		
11.3.2 Output_Var		i_rural_fit_for_work	n/a		
11.3.3 TAX_UNIT		tu_individual_zm	n/a		
11.4 BenCalc		n/a	on	Elderly eligibility criteria (must be 65 and over)	
11.4.1 Comp_Cond	1	n/a	{dag>=65} & {dru=0}		
11.4.2 Comp_perTU	1	n/a	1		
11.4.3 Output_Var		n/a	i_rural_elderly		
11.4.4 TAX_UNIT		n/a	tu_household_zm		
11.5 BenCalc		on	on	highest level of education in the household (SCT coded)	
11.6 BenCalc		on	on	Toilet categories (SCT coded)	
11.7 BenCalc		on	on	Roof material (SCT coded)	
11.8 BenCalc		on	on	Energy for lighting (SCT coded)	
11.9 BenCalc		on	on	Energy for cooking (SCT coded)	
11.10 BenCalc		on	on	Asset ownership: mattress	
11.11 BenCalc		on	on	Asset ownership: sofa	
11.12 BenCalc		on	on	Asset ownership: TV	
11.13 BenCalc		on	on	Asset ownership: clock	
11.14 BenCalc		on	on	Asset ownership: electric iron	

**Step 6:** Adding the 'female-headed household' criterion. To qualify for SCT under this eligibility rule, the person needs to satisfy the following criteria: (i) be the head of household; (ii) be female; (iii) be aged 19-64 inclusive; (iv) not be married; (v) be living in a rural area; and (vi) have three or more dependent children aged 0-18 inclusive.

Unlike the 'elderly persons' eligibility criterion above, in which the head of household became eligible even if he or she was not elderly (as long as there was one or more elderly people in the household), the 'female-headed' households criterion is slightly more straightforward because, by definition, only the head of household can be eligible. As such, this part of the SCT eligibility rules can be implemented using an Elig function rather than a BenCalc.

Right-click on the BenCalc we added above → 'Add Function After' → 'Elig' → Turn this function 'on' → put a suitable label in the 'Comment' column.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
6	tsceepi_zm	on	on	SIC: Employee Pension Contributions
7	tscerpi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	n/a	fit-for-work ratio test (SCT coded)
11.4	BenCalc	n/a	on	Elderly eligibility criteria (must be 65 and over)
11.5	Elig	n/a	on	Eligibility criteria for female-headed households
11.5.1	Elig_Cond	n/a	n/a	
11.5.2	Output_Var	n/a	n/a	
11.5.3	TAX_UNIT	n/a	n/a	
11.6	BenCalc	on	on	highest level of education in the household (SCT coded)
11.7	BenCalc	on	on	Toilet categories (SCT coded)
11.8	BenCalc	on	on	Roof material (SCT coded)
11.9	BenCalc	on	on	Energy for lighting (SCT coded)
11.10	BenCalc	on	on	Energy for cooking (SCT coded)
11.11	BenCalc	on	on	Asset ownership: mattress
11.12	BenCalc	on	on	Asset ownership: sofa
11.13	BenCalc	on	on	Asset ownership: TV
11.14	BenCalc	on	on	Asset ownership: clock
11.15	BenCalc	on	on	Asset ownership: electric iron
11.16	ArithOp	on	on	Scaling the score to make it range between 0 and 1000
11.17	BenCalc	on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.18	BenCalc	on	on	Additional SCT payment for households containing one or more disabled people
12	bsa_urban_zm	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	BEN: Home Grown
14	bot_zm	off	off	BEN: FISP
15	hva_zm	on	on	TAX: Value Added Tax

As we have discussed, the outcome of an Elig function is a binary 0/1 variable, where a value of 0 means the person does *not* meet the specified eligibility conditions, and a value of 1 means the person *does* meet the specified eligibility conditions. Earlier in this practical exercise we added a temporary variable called 'i\_rural\_female\_headed' which we intended to populate in this way. In order to enable us to do this, we first need to use the 'Add parameter' option to add the 'Output Var' parameter to our new Elig function. In the Output\_Var parameter we can then type 'i\_rural\_female\_headed'.

We then need to add the necessary eligibility rules to the Elig\_Cond parameter of the function. As noted at the beginning of **Step 6** of this exercise, there are six different elements to this particular eligibility rule:

1. The condition for being head of household is {dhh=1};
2. The condition for being female is {dgn=0};
3. The conditions for being aged between 19 and 64 inclusive are {dag>=19} and {dag<=64};
4. The condition for not being married is !{dms=2} and note that the exclamation mark before the bracket means 'not'; and
5. the condition for living in a rural area is {dru=0}.
  - These are all straightforward to apply as they are all individual level characteristics relating to the person themselves.
6. However, the final eligibility component specifies that, in addition to the above eligibility factors, the person will only be eligible for SCT if she has three or more dependent children aged 0-18 inclusive. As we do not have a variable in the underpinning dataset showing how many children aged 0-18 a person has, we will need to ask MicroZAMOD to calculate this for us 'on model'. We do this by using one of MicroZAMOD's in-built 'queries': {nDepChInTu>=3} which can be translated as 'number of dependent children in the tax unit' and, in this case, is expressed as >=3 which means the number of dependent children in the tax unit must be greater or equal to 3. This is one of the many queries that MicroZAMOD automatically calculates and allows users to draw upon.

7. The important thing here is to ensure that we specify the correct tax unit. If we go back up the 'tudef\_zm' policy towards the top of the model we can expand it out to see that it contains three functions, each of which is a DefTu function. The DefTu function specifies what we mean by 'household' or 'family' etc, and we can see that currently two of the three functions are turned on. We see that 'family' is not currently turned on because it is not use elsewhere in the model. For our 'female-headed households' Elig function in the SCT policy below we know we need a type of household tax unit because we need to assess how many dependent children aged 0-18 inclusive belong to the female head of household. Within the 'tudef\_zm' policy, we can see that the tax unit called 'tu\_household\_zm' is not suitable for our 'female-headed households' policy criterion because the 'tu\_household\_zm' tax unit only regards children as being *dependent children* if they are aged 0-17 inclusive. So, for the purpose of modelling this part of the SCT policy, we need to create another tax unit called 'tu\_household2\_zm' by copying the existing 'tu\_household\_zm' function and pasting it directly below the existing 'tu\_household\_zm' function, then renaming the newly pasted function 'tu\_household2\_zm'. Make sure that this new function is turned on. We then need to modify the dependent children age range in this new 'tu\_household2\_zm' tax unit to be between 0-18 inclusive, which is what is needed for this part of the SCT policy. Do to this we simply change the upper age range in the parameter 'DepChildCond; to be: {dag<=18} & {dag>=0}. This means that our definition of dependent children in tax unit 'tu\_household2\_zm' matches the definition of children needed for the 'female-headed households' eligibility criterion of SCT.

Turning back to the SCT policy, we need to set the TAX\_UNIT parameter to be 'tu\_household2\_zm' in our 'ZM\_2017\_SCT' system. We also need to tell MicroZAMOD to output the resulting 0/1 eligibility flag into the relevant temporary variable that we created earlier: 'i\_rural\_female\_headed'.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
6	tscepi_zm	on	on	SIC: Employee Pension Contributions
7	tscepi_zm	on	on	SIC: Employer Pension Contributions
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	n/a	fit-for-work ratio test (SCT coded)
11.4	BenCalc	n/a	on	Elderly eligibility criteria (must be 65 and over)
11.5	Elig	n/a	on	Eligibility criteria for female-headed households
11.5.1	Elig_Cond	n/a	{dhh=1} & {dgn=0} & {dag >=19} &	
11.5.2	Output_Var	n/a	i_rural_female_headed	
11.5.3	TAX_UNIT	n/a	tu_household2_zm	
11.6	BenCalc	on	on	highest level of education in the household (SCT coded)
11.7	BenCalc	on	on	Toilet categories (SCT coded)
11.8	BenCalc	on	on	Roof material (SCT coded)
11.9	BenCalc	on	on	Energy for lighting (SCT coded)
11.10	BenCalc	on	on	Energy for cooking (SCT coded)
11.11	BenCalc	on	on	Asset ownership: mattress
11.12	BenCalc	on	on	Asset ownership: sofa
11.13	BenCalc	on	on	Asset ownership: TV
11.14	BenCalc	on	on	Asset ownership: clock
11.15	BenCalc	on	on	Asset ownership: electric iron
11.16	ArithOp	on	on	Scaling the score to make it range between 0 and 1000
11.17	BenCalc	on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.18	BenCalc	on	on	Additional SCT payment for households containing one or more disabled people
12	bsa_urban_zm	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	BEN: Home Grown
14	bot_zm	off	off	BEN: FISP
15	bva_zm	on	on	TAX: Value Added Tax

**Step 7:** Adding in the ‘child-headed household’ criterion. The final new eligibility criterion for SCT in our ‘ZM\_2017\_SCT’ system is households that are ‘child-headed’. This is the most straightforward of the new eligibility components, as any household headed by a person aged 18 or under who is not married will qualify for SCT under this rule. As this rule is dependent only on the personal information relating to the household head, it can be easily implemented using an Elig function and specifying the tax unit as ‘tu\_individual\_zm’. To be eligible the person needs to be the head of household {dhh=1} and aged 18 or under {dag<=18} and *not* be married !{dms=2} and be living in a rural area {dru=0}. We again need to add the ‘Output Var’ parameter and this time tell MicroZAMOD to place the resulting 0/1 eligibility flag into the relevant temporary variable we created earlier, called ‘i\_rural\_child\_headed’.

	Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
6	tsceepi_zm		on	on	SIC: Employee Pension Contributions
7	tscerpi_zm		on	on	SIC: Employer Pension Contributions
8	ttn_zm		on	on	TAX: Turnover Tax
9	tin_zm		on	on	TAX: Income Tax
10	thl_zm		n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm		on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar		on	on	
11.2	Elig		on	on	Rural area & same district for 12 months
11.3	Elig		on	n/a	fit-for-work ratio test (SCT coded)
11.4	BenCalc		n/a	on	Elderly eligibility criteria (must be 65 and over)
11.5	Elig		n/a	on	Eligibility criteria for female-headed households
11.6	Elig		n/a	on	Eligibility criteria for child-headed households
11.6.1	Elig_Cond		n/a	n/a	
11.6.2	Output_Var		n/a	n/a	
11.6.3	TAX_UNIT		n/a	n/a	
11.7	BenCalc		on	on	highest level of education in the household (SCT coded)
11.8	BenCalc		on	on	Toilet categories (SCT coded)
11.9	BenCalc		on	on	Roof material (SCT coded)
11.10	BenCalc		on	on	Energy for lighting (SCT coded)
11.11	BenCalc		on	on	Energy for cooking (SCT coded)
11.12	BenCalc		on	on	Asset ownership: mattress
11.13	BenCalc		on	on	Asset ownership: sofa
11.14	BenCalc		on	on	Asset ownership: TV
11.15	BenCalc		on	on	Asset ownership: clock
11.16	BenCalc		on	on	Asset ownership: electric iron
11.17	ArithOp		on	on	Scaling the score to make it range between 0 and 1000
11.18	BenCalc		on	on	Final BenCalc: to assess eligibility (rural threshold = 460)
11.19	BenCalc		on	on	Additional SCT payment for households containing one or more disabled people
12	bsa_urban_zm		on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm		off	off	BEN: Home Grown
14	hot_zm		off	off	RFN: FTSP

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
6				
7				
8				
9				
10				
11				
11.1				
11.2				
11.3				
11.4				
11.5				
11.6				
11.6.1				
11.6.2				
11.6.3				
11.7				
11.8				
11.9				
11.10				
11.11				
11.12				
11.13				
11.14				
11.15				
11.16				
11.17				
11.18				
11.19				
12				
13				
14				

Once we have implemented the new ‘child-headed household’ eligibility criterion to the model as explained above, we see that the next functions within this policy are used to implement the ‘living conditions index’ test. It requires eleven separate functions to implement the ‘living conditions index’ test for people living in rural areas, starting with the BenCalc function that assesses the highest level of education in the household and ending with the ArithOp function that is used to transform the composite ‘living conditions index score’ onto a scale ranging from 0 to 1000. We have been informed by our government contacts that the ‘living conditions index’ test has not changed since 2016, and so **we do not need to amend these eleven functions.**

**Step 8:** Bringing the constituent eligibility criteria together to apply the overall eligibility rules for SCT. Following the calculation of the ‘living conditions index’, there are two functions remaining in the bsa\_rural\_zm policy. The first of these two remaining functions performs the task of assessing each person in the dataset to determine whether they qualify for SCT based on the combination of eligibility criteria. As noted above, some of the eligibility criteria remained the same from 2016 to 2017 (specifically, that to be eligible to claim SCT on behalf of the household the person needs to be: head of household; resident in the same rural district for the last 12 months; and have a living conditions index score lower than the specified threshold), while one eligibility criterion in 2016 was no longer applicable in 2017 (the ‘fit-for-work ratio test’) and a series of new eligibility criteria were introduced in 2017. The new eligibility criteria are the three we modelled above: ‘elderly persons’, ‘female-headed household’ and ‘child-headed household’, plus an additional criterion of having a disabled person within the household. The ‘disabled person’ criterion can be easily incorporated here because we already have a variable in the input dataset called ‘ddi01’ which relates to the presence of a disabled person within the household: if the household contains one or more disabled people, then all members of the household are allocated a value of 1 on the ‘ddi01’ variable, whereas if the household does not contain a disabled person then all members of the household are allocated a value of zero on the ‘ddi01’ variable.

To implement the new SCT rules for 2017 in our 'ZM\_2017\_SCT' system, we can use the contents of the BenCalc function in the 'ZM\_2017' system as our starting point and modify it accordingly. We need to remove the condition relating to the 'fit-for-work ratio test' and add the conditions relating to the new eligibility criteria. It is important here to ensure that the correct usage of the AND (&) and OR (|) operators are used to combine the respective components of the overall eligibility test, and remember to use standard brackets (...) to combine conditions when appropriate.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
8	ttn_zm	on	on	TAX: Turnover Tax
9	tin_zm	on	on	TAX: Income Tax
10	thl_zm	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	BEN: Social Cash Transfer - rural areas
11.1	DefVar	on	on	
11.2	Elig	on	on	Rural area & same district for 12 months
11.3	Elig	on	n/a	fit-for-work ratio test (SCT coded)
11.4	BenCalc	n/a	on	Elderly eligibility criteria (must be 65 and over)
11.5	Elig	n/a	on	Eligibility criteria for female-headed households
11.6	Elig	n/a	on	Eligibility criteria for child-headed households
11.7	BenCalc	on	on	highest level of education in the household (SCT coded)
11.8	BenCalc	on	on	Toilet categories (SCT coded)
11.9	BenCalc	on	on	Roof material (SCT coded)
11.10	BenCalc	on	on	Energy for lighting (SCT coded)
11.11	BenCalc	on	on	Energy for cooking (SCT coded)
11.12	BenCalc	on	on	Asset ownership: mattress
11.13	BenCalc	on	on	Asset ownership: sofa
11.14	BenCalc	on	on	Asset ownership: TV
11.15	BenCalc	on	on	Asset ownership: clock
11.16	BenCalc	on	on	Asset ownership: electric iron
11.17	ArithOp	on	on	Scaling the score to make it range between 0 and 1000
11.18	BenCalc	on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.18.1	Comp_Cond	1	{(dhh=1) & (!rural_12m=1) & (!rural_fit_for_work=1) & (!rural_liv_score_scaled < 460)}	All three eligibility criteria for rural areas
11.18.2	Comp_perTU	1	\$bsa_amount	Standard monthly CST amount per household
11.18.3	Output_Var		bsa_s	
11.18.4	TAX_UNIT		tu_individual_zm	Allocate the SCT amount to the Head of Household
11.19	BenCalc	on	on	Additional SCT payment for households containing one or more disabled people
12	bsa_urban_zm	on	on	BEN: Social Cash Transfer - urban areas

The final BenCalc in this policy allocates an additional 'disability premium' to households which qualify for SCT and which contain a disabled person. We have been informed during this training course that this component of the SCT policy is still in operation and so we do not need to amend this final function within the policy.

This completes the updating of the 2017 bsa\_rural\_zm policy in our 'ZM\_2017\_SCT' system.

**Step 9:** repeat for the urban component of the SCT policy. Your next task is to repeat the steps above to update the bsa\_urban\_zm policy within our 'ZM\_2017\_SCT' system. Note that the same changes made for bsa\_rural\_zm need to be made for bsa\_urban\_zm.

**Step 10:** check the results: Once you have completed the changes to both the rural and urban SCT policies, you can run the model and assess the output using the Statistics Presenter. If you use the 'SOUTHMOD COMPARISON' option within the Statistics Presenter, specifying the 'ZM\_2017' system as the 'base scenario' and the 'ZM\_2017\_SCT' system as the 'alternative scenario', and look at consumption-based poverty measures, then you should get the following results:



<b>Tax-benefit policy</b>			
Yearly, mill. national currency			
	Base scenario	Alternative scenario	Difference base vs alternative
Government revenue through taxes, SSC and indirect taxes	13,168.05	13,168.05	0.00
... direct taxes	6,548.98	6,548.98	0.00
... indirect taxes	2,171.23	2,171.23	0.00
... social security contributions (employee and employer)	4,447.84	4,447.84	0.00
Government expenditure on social transfers	594.98	938.24	343.25
... child benefits	0.00	0.00	0.00
... social assistance	594.98	938.24	343.25
... orphan/widow benefits	0.00	0.00	0.00
... disabled benefits	0.00	0.00	0.00
... unemployment benefits	0.00	0.00	0.00
... pension benefits	0.00	0.00	0.00

<b>Poverty - Consumption based</b>			
after taxes and transfers			
	Base scenario	Alternative scenario	Difference base vs alternative
Share of poor population, in %:			
All	41.43	40.90	-0.53
Poor households out of ...			
... male headed households	41.15	40.86	-0.29
... female headed households	42.58	41.07	-1.51
... households with children	42.80	42.33	-0.47
... households with older persons	48.24	45.82	-2.42
Poverty gap (average normalised poverty gap, FGT(1)):			
All	17.56	17.17	-0.40
Poor households out of ...			
... male headed households	17.30	17.12	-0.18
... female headed households	18.64	17.36	-1.28
... households with children	18.24	17.90	-0.34
... households with older persons	20.10	17.90	-2.20
Absolute national poverty line, in national currency, yearly:	2,358.00	2,358.00	0.00

<b>Inequality and the household income distribution - Consumption based</b>			
after taxes and transfers, yearly			
	Base scenario	Alternative scenario	Difference base vs alternative
Gini (household income)	0.54	0.54	0.00
P80/P20	5.31	5.24	-0.07
Quantiles of distribution and median			
20th	1,326.31	1,350.02	23.70
40th	2,271.48	2,307.88	36.40
50th	2,938.83	2,986.51	47.68
60th	3,860.18	3,881.63	21.45
80th	7,042.75	7,072.28	29.53
Absolute national poverty line, in national currency, yearly	2,358.00	2,358.00	0.00