

SOUTHMOD

Exercises with solutions

Zambia

MicroZAMOD v2.0

September 2019



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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	• tscerpi_...	✓	✓	✓	✓	
8	• ttn_zm	✓	✓	✓	✓	
9	• tin_zm	✓	✓	✓	✓	
10	• thl_zm	✓	N/A	N/A	N/A	
11	• bsa_rur...	N/A	✓	✓	✓	
12	• bsa_urb...	N/A	✓	✓	✓	
13	• bedot_zm	N/A	✗	✗	✗	
14	• bot_zm	N/A	✗	✗	✗	
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.

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_excise_rate	0.4	0.4	Clear beer excise duty ad valorem rate
4.1.11	\$other_alcoholic_bev_excise_rate	0.6	0.6	Wine and spirits excise duty ad valorem rate
4.1.12	\$opaque_beer_excise_rate_per_litre	0.15	0.15	Opaque beer excise duty per litre
4.1.13	\$transport_fuels_excise_rate_per_litre	1.14	1.14	Petrol/Deisel excise duty per litre
4.1.14	\$tobacco_excise_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:

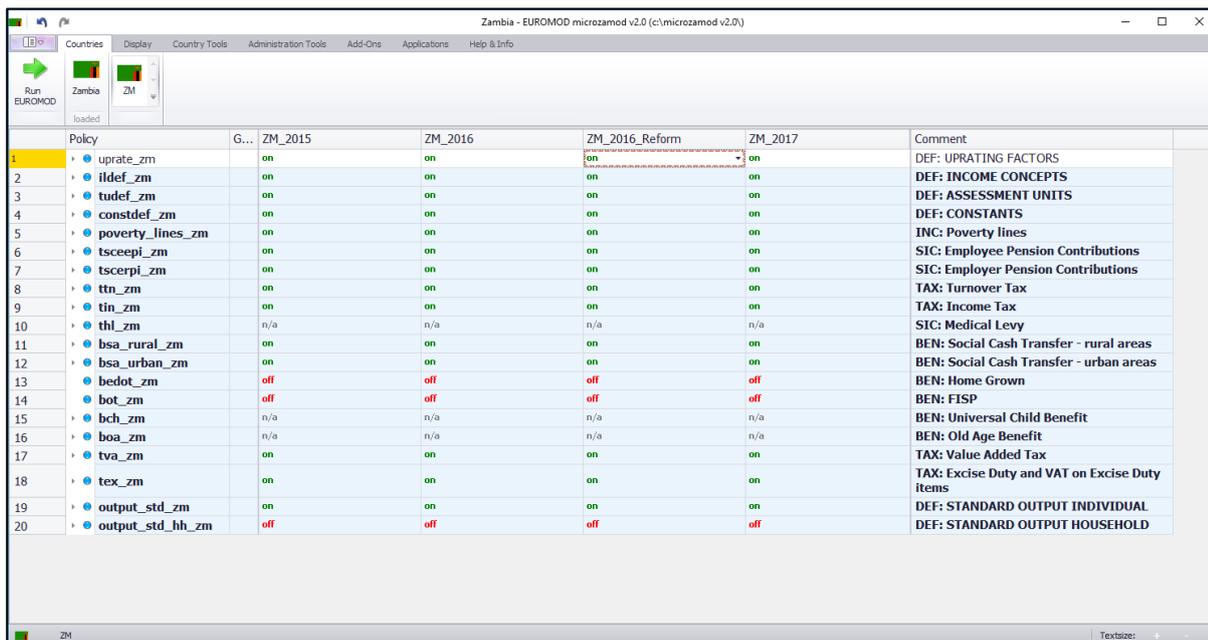
Amend the Turnover Tax policy in 2016. Increase the upper limit for Turnover tax from 800,000 Kwacha to 1,000,000 Kwacha and increase the turnover tax rate from 3% to 5%.

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: UPGRATING FACTORS
2	• ildef_zm	on	on	on	on	DEF: INCOME CONCEPTS
3	• tundef_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	• tsceepi_zm	on	on	on	on	SIC: Employee Pension Contributions
7	• tscerpi_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	• boa_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	Name	ZM_2017	ZM_2017_Reform_4	ZM_2017_Reform_2	ZM_2017_Reform_3	Comment
2.20	il_vat_01	on	on	on	on	Define income list for VAT
2.20.1	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)
2.20.11	x011497	+	+	+	+	Milk, cheese and eggs (standard rated)
2.20.11	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)
2.20.14	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)
2.20.15	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)
2.20.21	x044198	n/a	n/a	n/a	n/a	Water supply (exempt)
2.20.21	x045198	n/a	n/a	n/a	n/a	Electricity (exempt)
2.20.21	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.

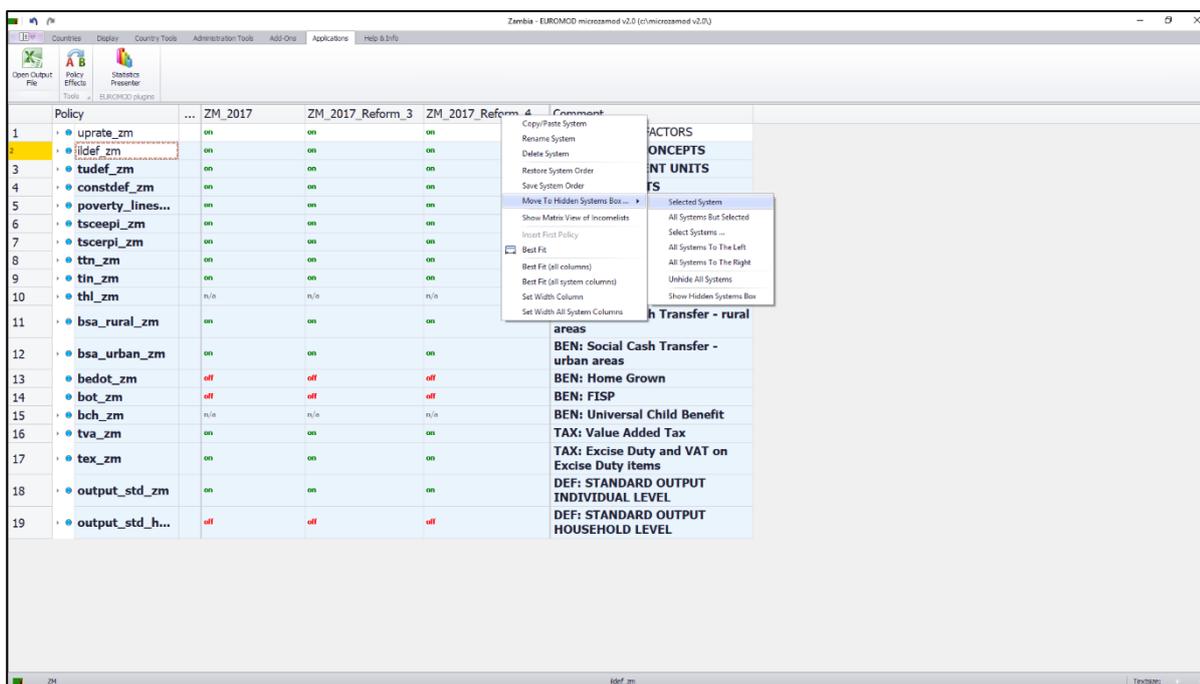
Policy		ZM_2017_Reform	ZM_2017_Reform_2	ZM_2017_Reform_3	ZM_2017_Reform_4	Comment
tin_zm		on	on	on	on	TAX: Income Tax
- BenCalc		on	on	on	on	
9.1.1	Comp_Cond	{ttn_s=0}	{ttn_s=0}	{ttn_s=0}	{ttn_s=0}	
9.1.2	Comp_perTU	il_taxabley01	il_taxabley01	il_taxabley01	il_taxabley01	
9.1.3	Output_Var	ttb_s	ttb_s	ttb_s	ttb_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	{ttn_s>0}	{ttn_s>0}	{ttn_s>0}	{ttn_s>0}	
9.2.2	Comp_perTU	il_taxabley02	il_taxabley02	il_taxabley02	il_taxabley02	
9.2.3	Output_Add...	ttb_s	ttb_s	ttb_s	ttb_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	ttb_s	ttb_s	ttb_s	ttb_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	tin_s	tin_s	tin_s	tin_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?

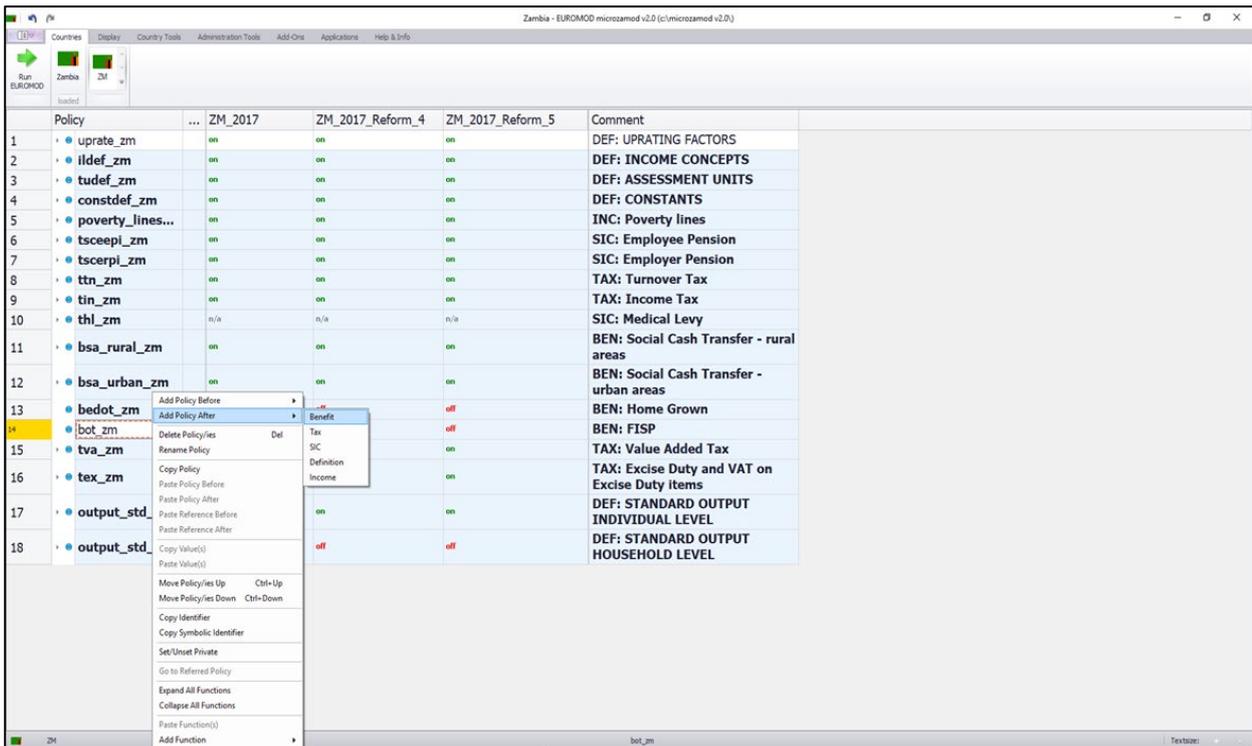
Solution

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?

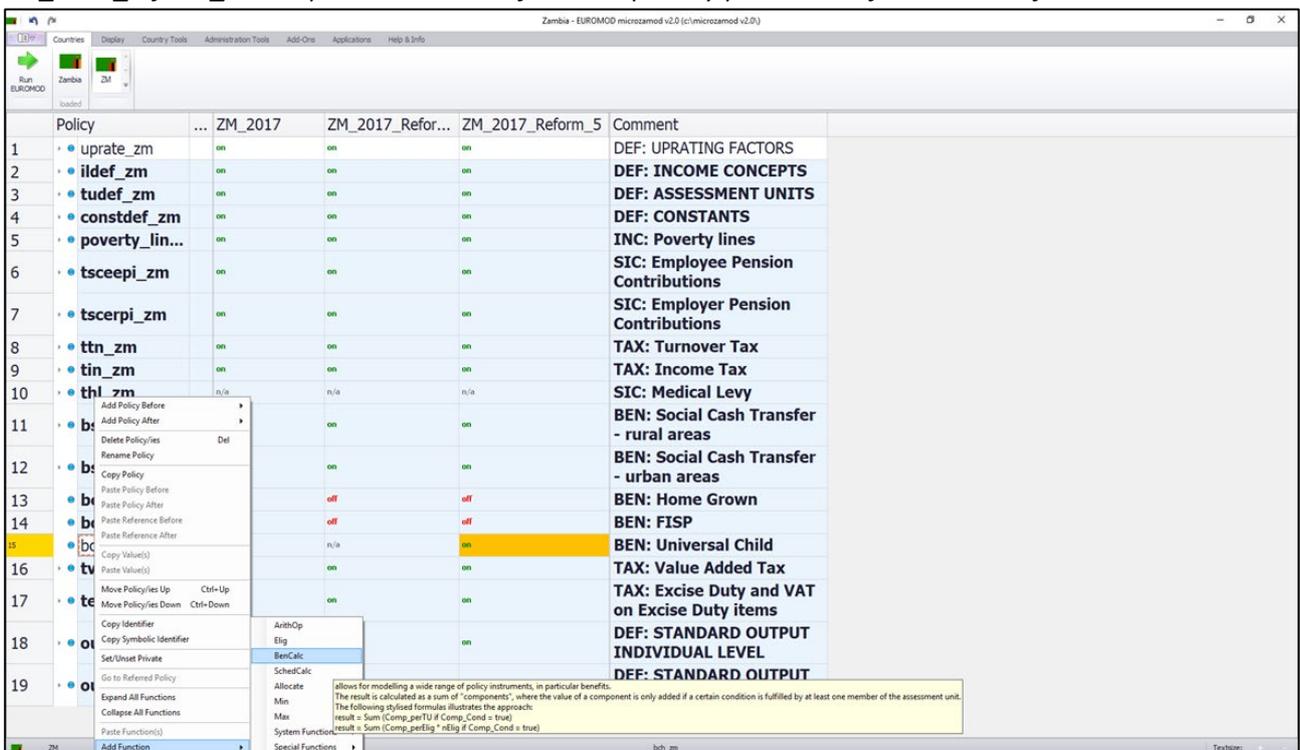
*For this example, the new benefit can be added to the end of the list of benefits and – importantly – it does not affect any of the other existing benefits. So, simply right click on the last 'benefits' policy → add policy after → benefit → name the policy 'bch_zm' → ok → switch on the policy only for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

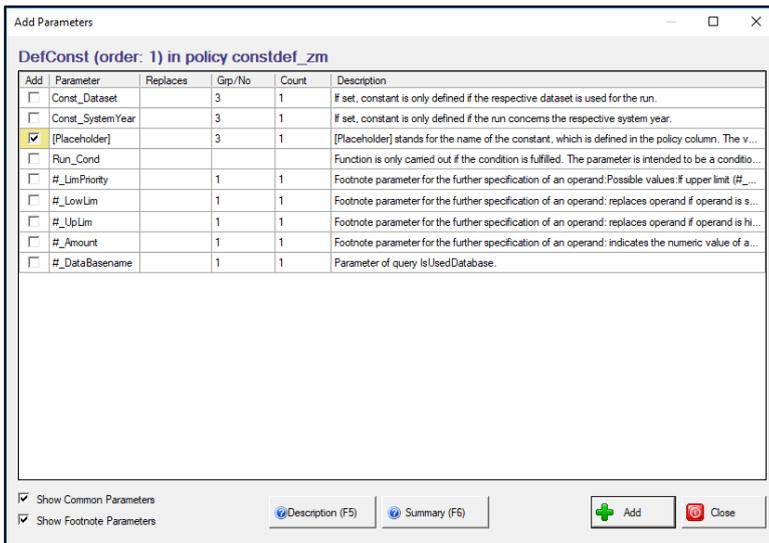
Policy	G...	ZM_2017	ZM_2017_Reform_3	ZM_2017_Reform_4	ZM_2017_Reform_5	Comment
10	thl_zm	n/a	n/a	n/a	n/a	SIC: Medical Levy
11	bsa_rural_zm	on	on	on	on	BEN: Social Cash Transfer - rural areas
12	bsa_urban_zm	on	on	on	on	BEN: Social Cash Transfer - urban areas
13	bedot_zm	off	off	off	off	BEN: Home Grown
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

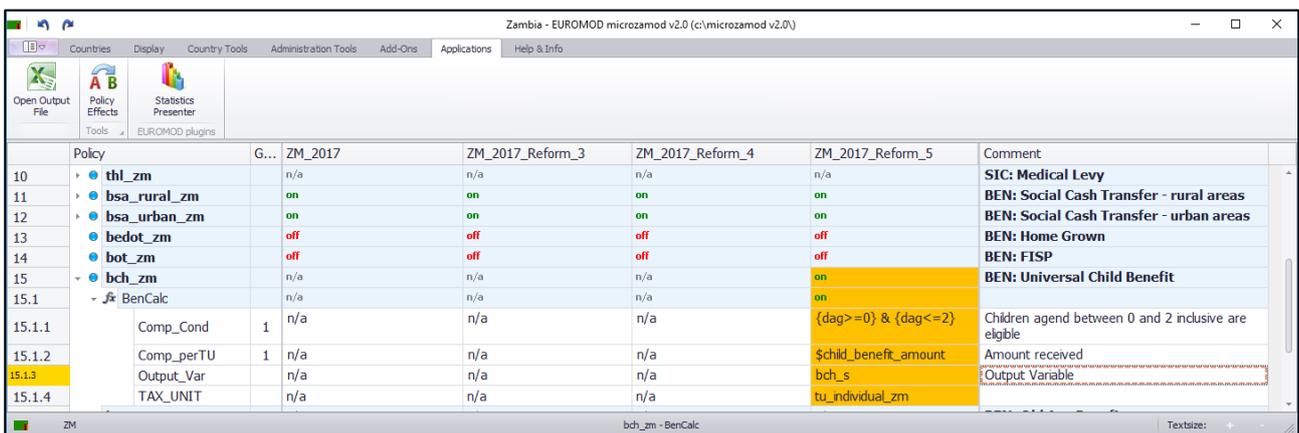
- i. go to the policy constdef_ZM and create a new parameter \$child_benefit_amount. Add the amount of the benefit (180 Kwacha) to this parameter.

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).

Policy	ZM_2017	ZM_2017_Reform_3	ZM_2017_Reform_5	Comment	
4.1.1!	\$clear_beer_ed_rate	0.4	0.4	0.4	Clear beer excise duty ad valorem rate
4.1.1!	\$other_alcoholic_bev_ed_rate	0.6	0.6	0.6	Wine and spirits excise duty ad valorem rate
4.1.1!	\$opaque_beer_ed_rate_per_litre	0.15	0.15	0.15	Opaque beer excise duty per litre
4.1.1!	\$transport_fuels_ed_rate_per_litre	1.14	1.14	1.14	Petrol/Deisel excise duty per litre
4.1.1!	\$tobacco_ed_rate_per_piece	0.24	0.24	0.24	Tobacco excise duty per single piece
4.1.1!	\$VAT_Rate	0.16	0.16	0.16	VAT rate
4.1.1!	\$VAT_Rate_Reform	n/a	n/a	n/a	VAT rate reform
4.1.1!	\$pline	196.5	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)
4.1.1!	\$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	n/a	180#m	Universal Child Benefit amount
5	poverty	on	on	on	INC: Poverty lines
6	tscepi	on	on	on	SIC: Employee Pension Contributions



- 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



- 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.

Policy	...	ZM_2017	ZM_2017_Refor...	ZM_2017_Reform_5	Comment
2.2	DefIl	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	DefIl	on	on	on	Define income list - Original income
2.4	DefIl	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	DefIl	on	on	on	Define income list - Benefits
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
					Taxes ("Direct taxes" in

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	DEF: INCOME CONCEPTS
2.1	DefIl	on	on	on	Define income list - Taxable income (used in income tax policy where no turnover tax)
2.2	DefIl	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	DefIl	on	on	on	Define income list - Original income
2.4	DefIl	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	DefIl	on	on	on	Define income list - Benefits
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)

Zambia - EUROMOD microzamod v2.0 (c:\microzamod v2.0\)						
Countries Display Country Tools Administration Tools Add-Ons Applications Help & Info						
Run EUROMOD loaded Zambia ZM						
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?

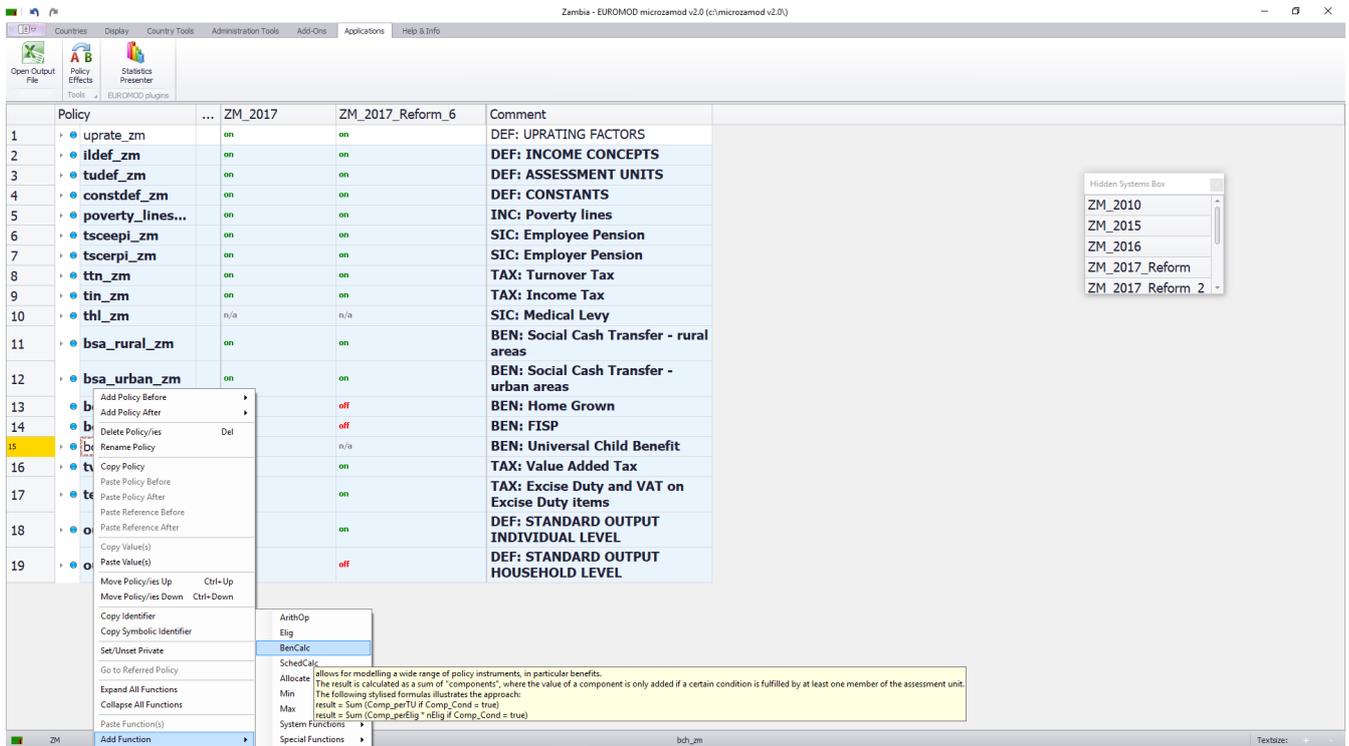
For this example, the new benefit can be added to the end of the list of benefits. So, right click on the last 'benefits' policy → add policy after → benefit → name the policy 'boa_zm' → ok → switch on the policy only for the system *ZM_2017_reform_6*

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

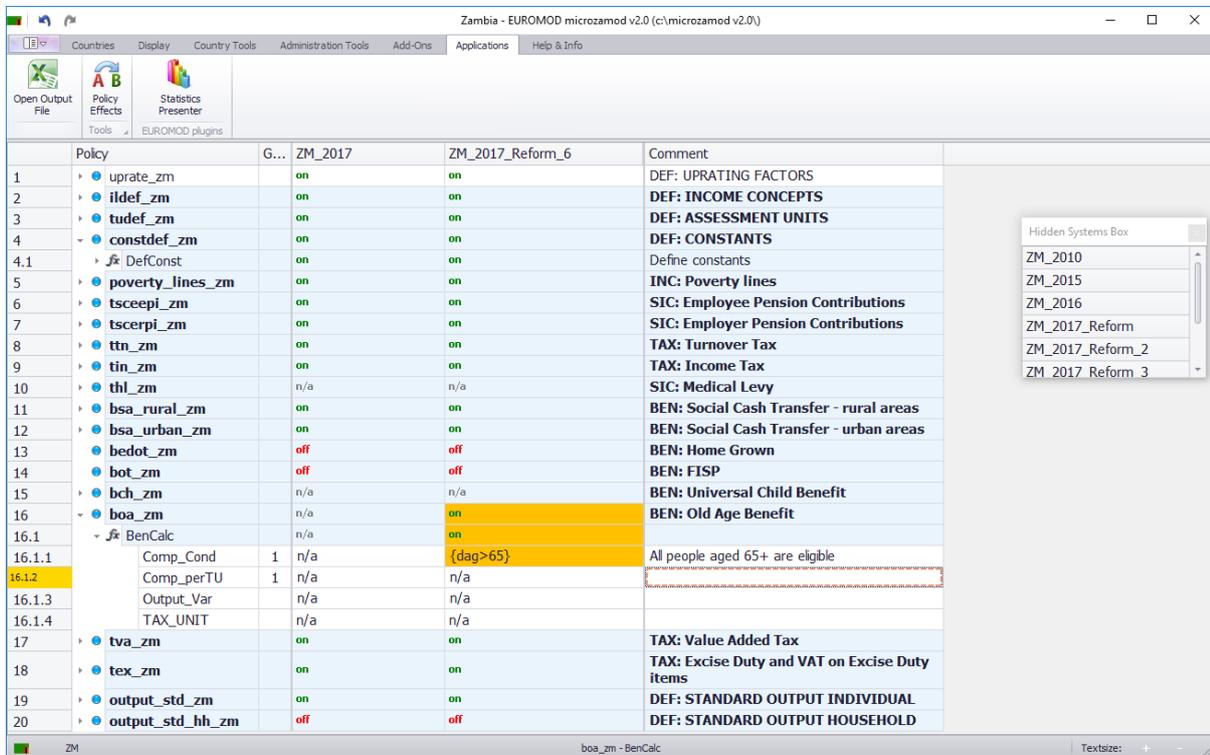
Step 3: Add a BenCalc function to the policy *boa_zm*

- 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.



Step 4: Add the eligibility conditions to the parameter 'Comp_Cond'



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	\$spine_s	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)
4.1.19	\$spine_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	tundef_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.

Policy	...	ZM_2017	ZM_2017_Reform_6	Comment
2.2	DefI1	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	DefI1	on	on	Define income list - Original income
2.4	DefI1	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	DefI1	on	on	Define income list - Benefits
2.6	DefI1	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	DefI1	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	DefI1	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)
2.9	DefI1	on	on	Define income list - Simulated Taxes ("Direct taxes" in Statistics

Policy	...	ZM_2017	ZM_2017_Reform_6	Comment
2.17	DefI1	on	on	Define income list - Unemployment benefit ("Unemployment benefits" in Statistics Presenter)
2.18	DefI1	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	DefI1	on	on	Define income list - Disposable income
2.20	DefI1	on	on	Define income list for VAT
2.21	DefI1	on	on	Define income list - Benefits Data in Base data
2.22	DefI1	on	on	Define income list - Direct taxes from the data (needed for Statistics Presenter - do not change)
2.23	DefI1	on	on	Define income list - Disposable income with imputed home produce if appropriate (needed for Statistics Presenter - do not change)
2.24	DefI1	on	on	Define income list - Simulated Consumption (needed for Statistics Presenter - do not change)
3	tundef_zm	on	on	DEF: ASSESSMENT UNITS
4	constdef_zm	on	on	DEF: CONSTANTS

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	DEF: UPDATING FACTORS
2	• ildef_zm	on	on	on	DEF: INCOME CONCEPTS
3	• tundef_zm	on	on	on	DEF: ASSESSMENT UNITS
4	• constdef_zm	on	on	on	DEF: CONSTANTS
5	• poverty_lines...	on	on	on	INC: Poverty lines
6	• tsceepi_zm	on	on	on	SIC: Employee Pension
7	• tscerpi_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	on	n/a	BEN: Universal Child Benefit
15	• boa_zm	n/a	n/a	on	BEN: Old Age Benefit
17	• tva_zm	on	on	on	TAX: Value Added Tax
18	• tex_zm	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
19	• output_std_zm	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
20	• output_std_h...	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

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

Policy	ZM_2017	ZM_2017_Reform_5	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
3	tundef_zm	on	on	on	DEF: ASSESSMENT UNITS
4	constdef_zm	on	on	on	DEF: CONSTANTS
5	poverty_lines...	on	on	on	INC: Poverty lines
6	tsceepi_zm	on	on	on	SIC: Employee Pension
7	tscerpi_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	on	off	off	BEN: Home Grown
14	bot_zm	on	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	tva_zm	on	on	on	TAX: Value Added Tax
18	tex_zm	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
19	output_zm	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
20	output_h...	off	off	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

Hidden Systems Box

- ZM_2010
- ZM_2015
- ZM_2016
- ZM_2017_Reform
- ZM_2017_Reform 2

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

Policy	ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
1	uprate_zm	on	on	DEF: UPDATING FACTORS
2	ildef_zm	on	on	DEF: INCOME CONCEPTS
3	tundef_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
17	bun_zm	n/a	on	BEN: Unemployed Young People benefit
18	tva_zm	on	on	TAX: Value Added Tax
19	tex_zm	on	on	TAX: Excise Duty and VAT on Excise Duty items
20	output_std_zm	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
21	output_std_h...	off	off	DEF: STANDARD OUTPUT HOUSEHOLD LEVEL

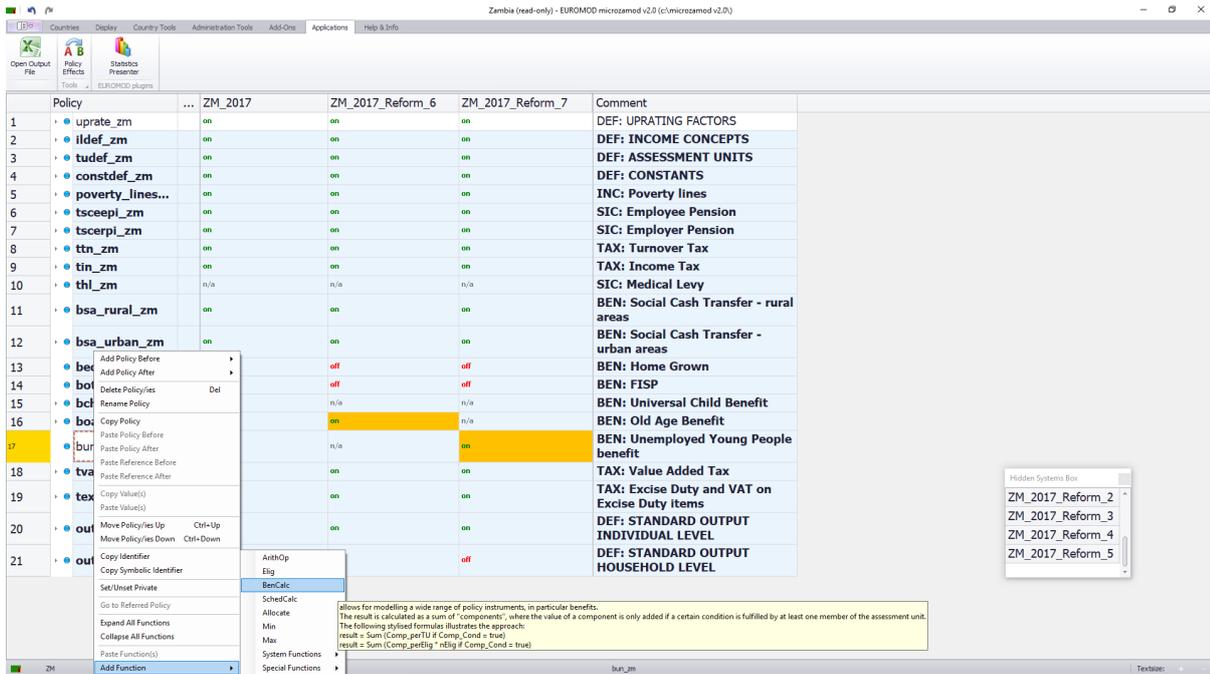
Hidden Systems Box

- ZM_2017_Reform_2
- ZM_2017_Reform_3
- ZM_2017_Reform_4
- ZM_2017_Reform_5

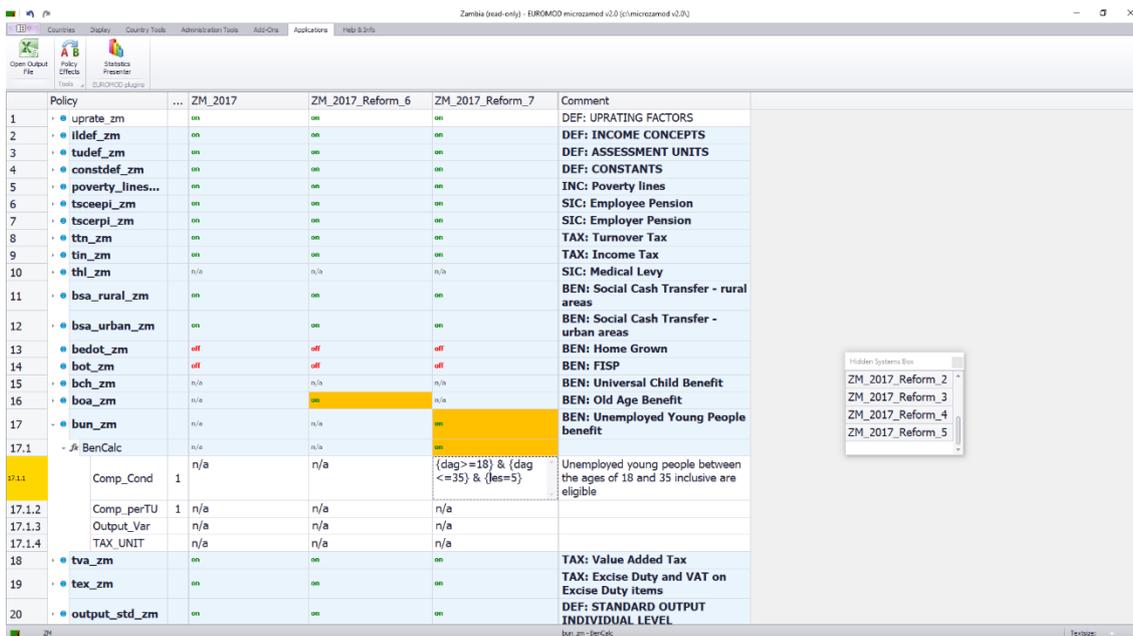
Step 3: Add a BenCalc function to the policy bun_zm

- 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'



- i. 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	0.24	0.24	0.24	Tobacco excise duty per single piece
4.1.16	0.16	0.16	0.16	VAT rate
4.1.17	n/a	n/a	n/a	VAT rate reform
4.1.18	196.5	196.5	196.5	Poverty line - severe (uprated by CPI from 2015 figure)
4.1.19	276.7	276.7	276.7	Poverty line - moderate (uprated by CPI from 2015 figure)
4.1.20	0.03	0.03	0.03	Turnover Tax rate
4.1.21	n/a	n/a	n/a	Universal Child Benefit amount
4.1.22	n/a	150#m	n/a	Old Age Benefit Amount
4.22	n/a	n/a	100#m	Unemployed Benefit Amount
5	on	on	on	INC: Poverty lines
6	on	on	on	SIC: Employee Pension
7	on	on	on	SIC: Employer Pension
8	on	on	on	TAX: Turnover Tax
9	on	on	on	TAX: Income Tax
10	n/a	n/a	n/a	SIC: Medical Levy
11	on	on	on	BEN: Social Cash Transfer - rural areas
12	on	on	on	BEN: Social Cash Transfer - urban areas
13	off	off	off	BEN: Home Grown
14	off	off	off	BEN: FISP
15	n/a	n/a	n/a	BEN: Universal Child Benefit
16	n/a	on	n/a	BEN: Old Age Benefit
17	n/a	n/a	on	BEN: Unemployed Young People

- 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	on	on	on	Define constants
5	on	on	on	INC: Poverty lines
6	on	on	on	SIC: Employee Pension
7	on	on	on	SIC: Employer Pension
8	on	on	on	TAX: Turnover Tax
9	on	on	on	TAX: Income Tax
10	n/a	n/a	n/a	SIC: Medical Levy
11	on	on	on	BEN: Social Cash Transfer - rural areas
12	on	on	on	BEN: Social Cash Transfer - urban areas
13	off	off	off	BEN: Home Grown
14	off	off	off	BEN: FISP
15	n/a	n/a	n/a	BEN: Universal Child Benefit
16	n/a	on	n/a	BEN: Old Age Benefit
17	n/a	n/a	on	BEN: Unemployed Young People benefit
17.1	n/a	n/a	n/a	
17.1.1	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	n/a	n/a	sunemployed_benefit_amount	Amount received
17.1.3	n/a	n/a	bun_s	Output Variable
17.1.4	n/a	n/a	tu_individual_zm	
18	on	on	on	TAX: Value Added Tax
19	on	on	on	TAX: Excise Duty and VAT on Excise Duty items
20	on	on	on	DEF: STANDARD OUTPUT INDIVIDUAL LEVEL
21	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.

Policy	ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
1	on	on	on	DEF: UPGRATING FACTORS
2	on	on	on	DEF: INCOME CONCEPTS
2.1	on	on	on	Define income list - Taxable income (used in income tax policy where no turnover tax)
2.2	on	on	on	Define income list - Taxable income (used in income tax policy where there is turnover tax)
2.3	on	on	on	Define income list - Original income
2.4	on	on	on	Define income list - Simulated Benefits
2.4.1	Name	ils_bensim	ils_bensim	ils_bensim
2.4.2	bsa_s	+	+	+
2.4.3	bedot_s	n/a	n/a	n/a
2.4.4	bot_s	n/a	n/a	n/a
2.4.5	bch_s	n/a	n/a	n/a
2.4.6	boa_s	n/a	+	n/a
2.4.7	bun_s	n/a	n/a	+
2.5	on	on	on	Define income list - Benefits
2.6	on	on	on	Define income list - Employee social insurance contributions (needed for Summary Statistics Plug In)
2.7	on	on	on	Define income list - Employer social insurance contributions (needed for Summary Statistics Plug In)
2.8	on	on	on	Define income list - Self-employed social insurance contributions (not relevant but needed for Summary Stats Plugin)
2.9	on	on	on	Define income list - Simulated Taxes
2.10	on	on	on	Taxes ("Direct taxes" in Statistics Presenter)"
				Define income list - Indirect taxes

Policy	ZM_2017	ZM_2017_Reform_6	ZM_2017_Reform_7	Comment
2.11	on	on	on	Define income list - Indirect taxes ("Indirect taxes" in Statistics Presenter)
2.12	on	on	on	Define income list - Social security contributions ("SSC (employer and employee)" in Statistics Presenter)
2.13	on	on	on	Define income list - Child benefits ("Child benefits" in Statistics Presenter)
2.14	on	on	on	Define income list - Social assistance benefits ("Social assistance benefits" in Statistics Presenter)
2.15	on	on	on	Define income list - Widows and Orphans Benefits none in Zambia but needed for Stats Presenter
2.16	on	on	on	Define income list - Disabled benefits ("Disabled benefits" in Statistics Presenter)
2.17	on	on	on	Define income list - Unemployment benefit ("Unemployment benefits" in Statistics Presenter)
2.17.1	Name	ils_bun	ils_bun	ils_bun
2.17.2	bun_s	n/a	n/a	+
2.18	on	on	on	Define income list - Pension benefits ("Pension benefits" in Statistics Presenter)
2.19	on	on	on	Define income list - Disposable income
2.20	on	on	on	Define income list for VAT
2.21	on	on	on	Define income list - Benefits Data in Base data
2.22	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.

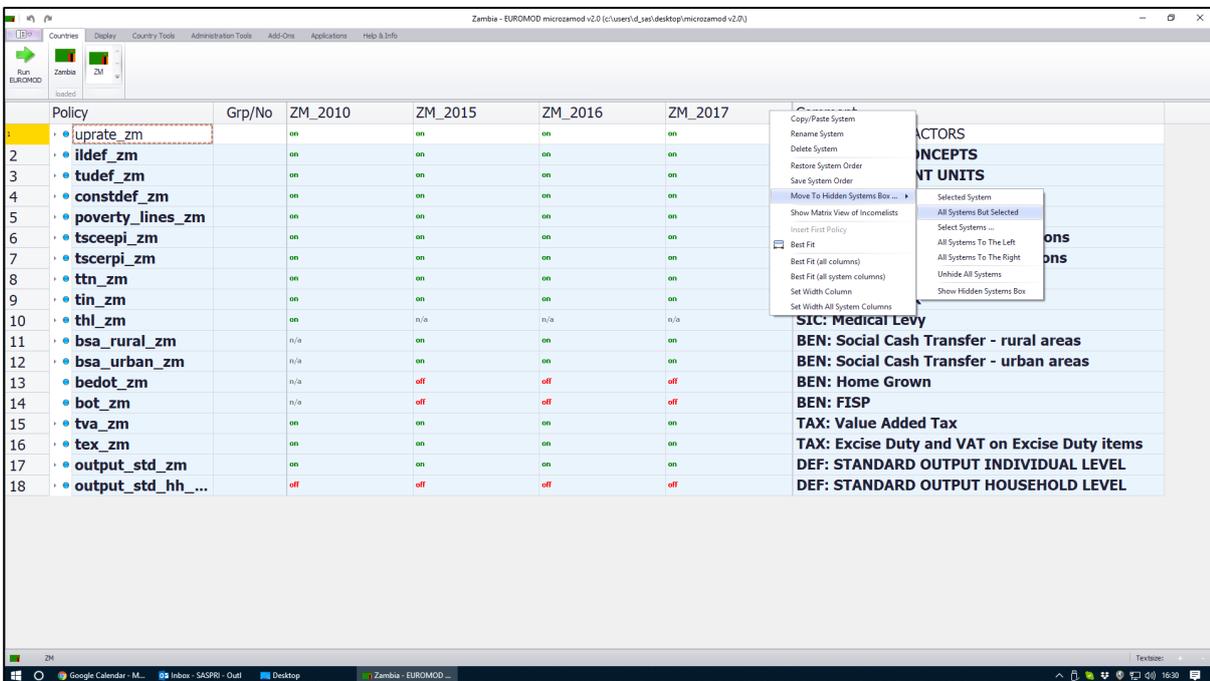
Questions:

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?

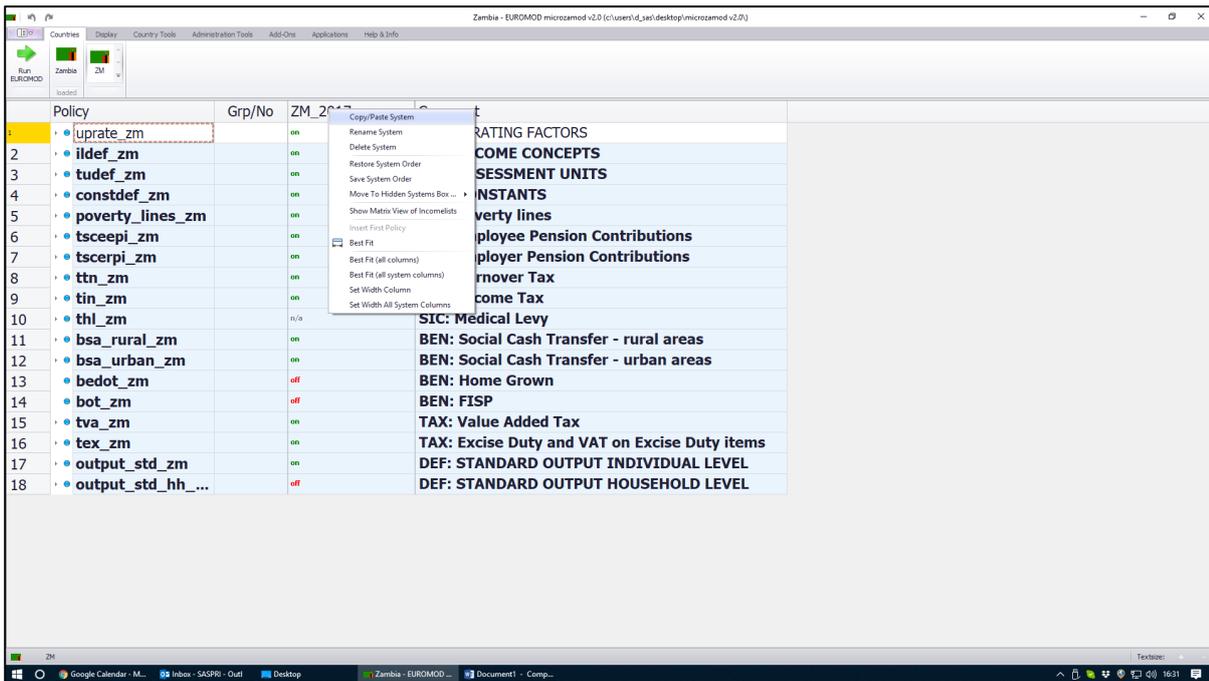
Solution

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.

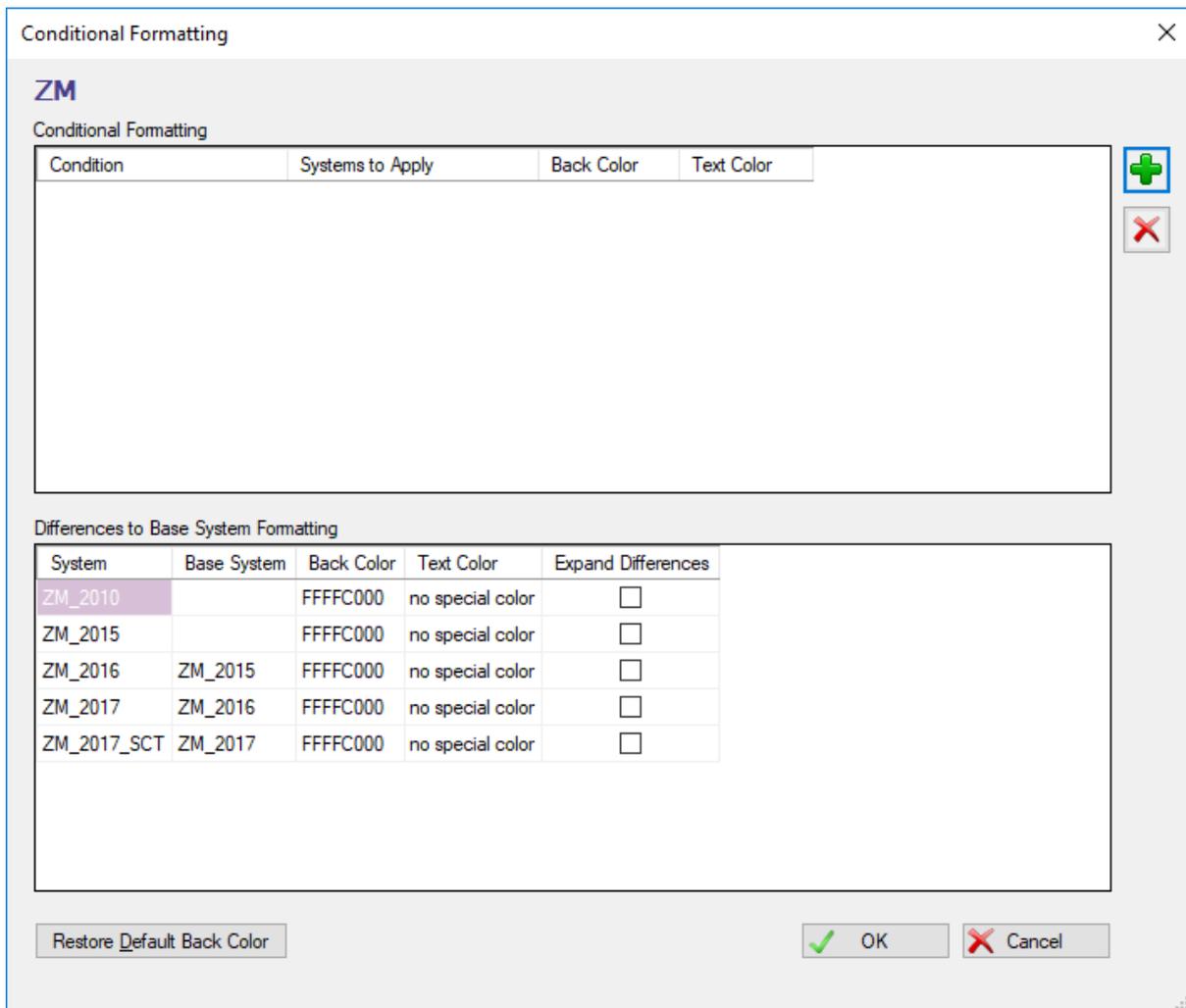


System Name

System Year

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’.



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 [x] Single Policy []

Policy View | Format | Marking | Misc

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	tundef_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 [x] Single Policy []

Policy View | Format | Marking | Misc

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	tundef_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 - 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 microzomod v2.0 (c:\users\d_sas\desktop\microzomod v2.0\)

Run EUROMOD

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
1		on	on	DEF: UPRATING FACTORS
2		on	on	DEF: INCOME CONCEPTS
3		on	on	DEF: ASSESSMENT UNITS
4		on	on	DEF: CONSTANTS
5		on	on	INC: Poverty lines
6		on	on	SIC: Employee Pension Contributions
7		on	on	SIC: Employer Pension Contributions
8		on	on	TAX: Turnover Tax
9		on	on	TAX: Income Tax
10		n/a	n/a	SIC: Medical Levy
11		on	on	BEN: Social Cash Transfer - rural areas
11.1		on	on	
11.1.1	1	0	0	
11.1.2	2	0	n/a	
11.1.3	5	n/a	0	
11.1.4	6	n/a	0	
11.1.5	7	n/a	0	
11.1.6	3	0	0	
11.1.7	4	0	0	
11.2		on	on	Rural area & same district for 12 months
11.3		on	on	fit-for-work ratio test (SCT coded)
11.4		on	on	highest level of education in the household (SCT coded)
11.5		on	on	Toilet categories (SCT coded)
11.6		on	on	Roof material (SCT coded)
11.7		on	on	Energy for lighting (SCT coded)
11.8		on	on	Energy for cooking (SCT coded)
11.9		on	on	Asset ownership: mattress
11.10		on	on	Asset ownership: sofa
11.11		on	on	Asset ownership: TV
11.12		on	on	Asset ownership: clock
11.13		on	on	Asset ownership: electric iron

ZM bsa_rural_zm - DefVar Textsize: + -

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		on	on	SIC: Employer Pension Contributions
8		on	on	TAX: Turnover Tax
9		on	on	TAX: Income Tax
10		n/a	n/a	SIC: Medical Levy
11		on	on	BEN: Social Cash Transfer - rural areas
11.1		on	on	
11.1.1	1	0	0	
11.1.2	2	0	n/a	
11.1.3	5	n/a	0	
11.1.4	6	n/a	0	
11.1.5	7	n/a	0	
11.1.6	3	0	0	
11.1.7	4	0	0	
11.2		on	on	Rural area & same district for 12 months
11.3		on	n/a	fit-for-work ratio test (SCT coded)
11.3.1		{dhh=1} & {dfl=1}	n/a	
11.3.2		i_rural_fit_for_work	n/a	
11.3.3		tu_individual_zm	n/a	
11.4		on	on	highest level of education in the household (SCT coded)
11.5		on	on	Toilet categories (SCT coded)
11.6		on	on	Roof material (SCT coded)
11.7		on	on	Energy for lighting (SCT coded)
11.8		on	on	Energy for cooking (SCT coded)
11.9		on	on	Asset ownership: mattress
11.10		on	on	Asset ownership: sofa
11.11		on	on	Asset ownership: TV
11.12		on	on	Asset ownership: clock
11.13		on	on	Asset ownership: electric iron
11.14		on	on	Scaling the score to make it range between 0 and 1000
11.15		on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.16		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.

Policy	Grp/No	ZM_2017	ZM_2017_SCT	Comment
9		on	on	TAX: Income Tax
10		n/a	n/a	SIC: Medical Levy
11		on	on	BEH: Social Cash Transfer - rural areas
11.1		on	on	
11.1.1	1	0	0	
11.1.2	2	0	n/a	
11.1.3	5	n/a	0	
11.1.4	6	n/a	0	
11.1.5	7	n/a	0	
11.1.6	3	0	0	
11.1.7	4	0	0	
11.2		on	on	Rural area & same district for 12 months
11.3		on	n/a	fit-for-work ratio test (SCT coded)
11.3.1		{dnh=1} & {dfi=1}	n/a	
11.3.2		i_rural_fit_for_work	n/a	
11.3.3		tu_individual_zm	n/a	
11.4		n/a	on	Elderly eligibility criteria (must be 65 and over)
11.4.1	1	n/a	n/a	
11.4.2	1	n/a	n/a	
11.4.3		n/a	n/a	
11.4.4		n/a	n/a	
11.5		on	on	highest level of education in the household (SCT coded)
11.6		on	on	Toilet categories (SCT coded)
11.7		on	on	Roof material (SCT coded)
11.8		on	on	Energy for lighting (SCT coded)
11.9		on	on	Energy for cooking (SCT coded)
11.10		on	on	Asset ownership: mattress
11.11		on	on	Asset ownership: sofa
11.12		on	on	Asset ownership: TV
11.13		on	on	Asset ownership: clock
11.14		on	on	Asset ownership: electric iron

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	
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	n/a	
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} & {dfi=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	{dag>=65} & {dru=0}	
11.4.2	Comp_perTU	1	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: dock
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		on	on	SIC: Employee Pension Contributions
7		on	on	SIC: Employer Pension Contributions
8		on	on	TAX: Turnover Tax
9		on	on	TAX: Income Tax
10		n/a	n/a	SIC: Medical Levy
11		on	on	BEN: Social Cash Transfer - rural areas
11.1		on	on	
11.2		on	on	Rural area & same district for 12 months
11.3		on	n/a	fit-for-work ratio test (SCT coded)
11.4		n/a	on	Elderly eligibility criteria (must be 65 and over)
11.5		n/a	on	Eligibility criteria for female-headed households
11.5.1		n/a	n/a	
11.5.2		n/a	n/a	
11.5.3		n/a	n/a	
11.6		on	on	highest level of education in the household (SCT coded)
11.7		on	on	Toilet categories (SCT coded)
11.8		on	on	Roof material (SCT coded)
11.9		on	on	Energy for lighting (SCT coded)
11.10		on	on	Energy for cooking (SCT coded)
11.11		on	on	Asset ownership: mattress
11.12		on	on	Asset ownership: sofa
11.13		on	on	Asset ownership: TV
11.14		on	on	Asset ownership: clock
11.15		on	on	Asset ownership: electric iron
11.16		on	on	Scaling the score to make it range between 0 and 1000
11.17		on	on	Final BenCalc to assess eligibility (rural threshold = 460)
11.18		on	on	Additional SCT payment for households containing one or more disabled people
12		on	on	BEN: Social Cash Transfer - urban areas
13		off	off	BEN: Home Grown
14		off	off	BEN: FISP
15		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 'tundef_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 'tundef_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	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	{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'.

The screenshot shows the 'Zambia - EUROMOD microzomod v2.0' application window. The main area displays a table with columns for Policy, Grp/No, ZM_2017, ZM_2017_SCT, and Comment. The table lists various policies and their status in both the 2017 and 2017_SCT systems. Several rows are highlighted in yellow, indicating changes or specific focus.

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	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	(dhh=1) & (dag<=18) & !(dms=2) &	
11.6.2	Output_Var	n/a	r_rural_child_headed	
11.6.3	TAX_UNIT	n/a	tu_individual_zm	
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	bot_zm	off	off	RFN: FTSP

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_lv_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:

Tax-benefit policy			
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

Poverty - Consumption based			
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

Inequality and the household income distribution - Consumption based			
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