Exercise 3: Introducing a supplement to the Child Benefit in the UK

Objectives:
- perform a policy reform in UKMOD that involves adding Elig and ArithOp functions in the existing policy sheets.

Description:

The aim of this exercise is to perform a reform of the Child Benefit in the UK in 2022. In that year, the child benefit was a monthly universal non-means-tested benefit paid to families with children below an age limit. The amount for the first child was £21.75 per week and the amount for the second and any other child was £14.4 per week. Your task is to **add** a supplement to the child benefit. Access to the supplement should be restricted to families with at least two children. The supplement is equal to £30 per week for the whole family. Analyse the results after introducing the reform.

Directions:

- Open UKMOD and access the UK policy descriptions
- Copy the *UK_2022* system, and call the copy *UK_2022bch*
- Open the Child Benefit policy (*bch_uk*)
- Modify the Child Benefit policy to add the supplement using functions *Elig* and *ArithOp*
  - Use the same assessment unit for the supplementary as for Child Benefit
  - Use the same variable name for the supplement as for Child Benefit (*bch_s*)
  - Number of dependent children in a tax unit is given by *nDepChildrenInTu*
  - £XX per week is defined as XX#w in EUROMOD
- Save your changes
- Run both UK_2022 and UK_2022bch, on *training* data
- Use the Statistics Presenter, Baseline/Reform option, to analyse effects

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Step-by-step solution and further information:

The aim of the reform is to give an additional £30 per week to families with at least two children.

Step 1: Analysing the current policy

Access the Child Benefit policy in the UK (*bch_uk*). Consider year 2022.

Figure 1: The Benefit child policy in 2022.

bch_uk		on	BEN: child benefit
BenCalc		on	Child Benefit: amount
comp_cond	1	(IsNtoMchild#1)	First child entitled to receive…
#_N	1	1	
#_M	1	1	
comp_perElig	1	$CBFirst	this amount | par69
comp_cond	2	(IsNtoMchild#2)	"From second child on, each child is entitled to receive…"
#_N	2	2	
#_M	2	99	
comp_perElig	2	$CBOther	this amount | par70
output_var		bch_s	
TAX_UNIT		tu_bu_uk	

► *Who is entitled to receive the existing Child Benefit?*

► *Which amount is received?*

► *Which variable stores it?*

Step 2: Adding a new system

Add a new system. There are two ways of doing it: 1) right-click on the system heading UK_2022 and select the option 'copy/paste system' and 2) click on the button *Add System* in the Country Tools tab. Using 1), specify a name for the reform system (type e.g. *UK_2022bch*).

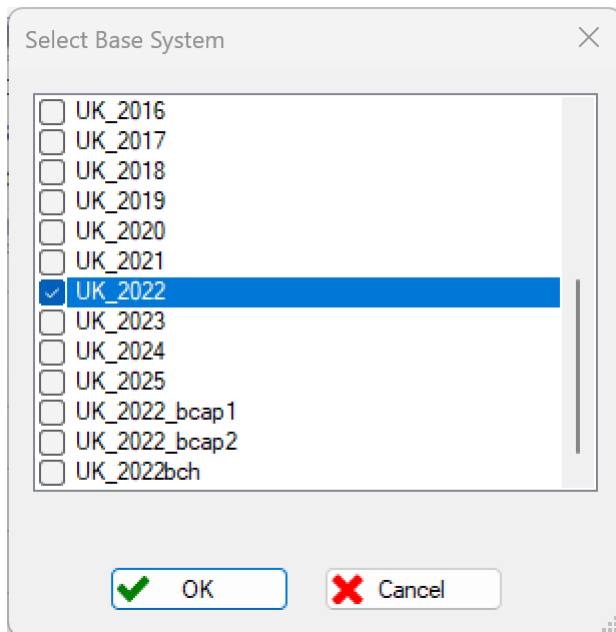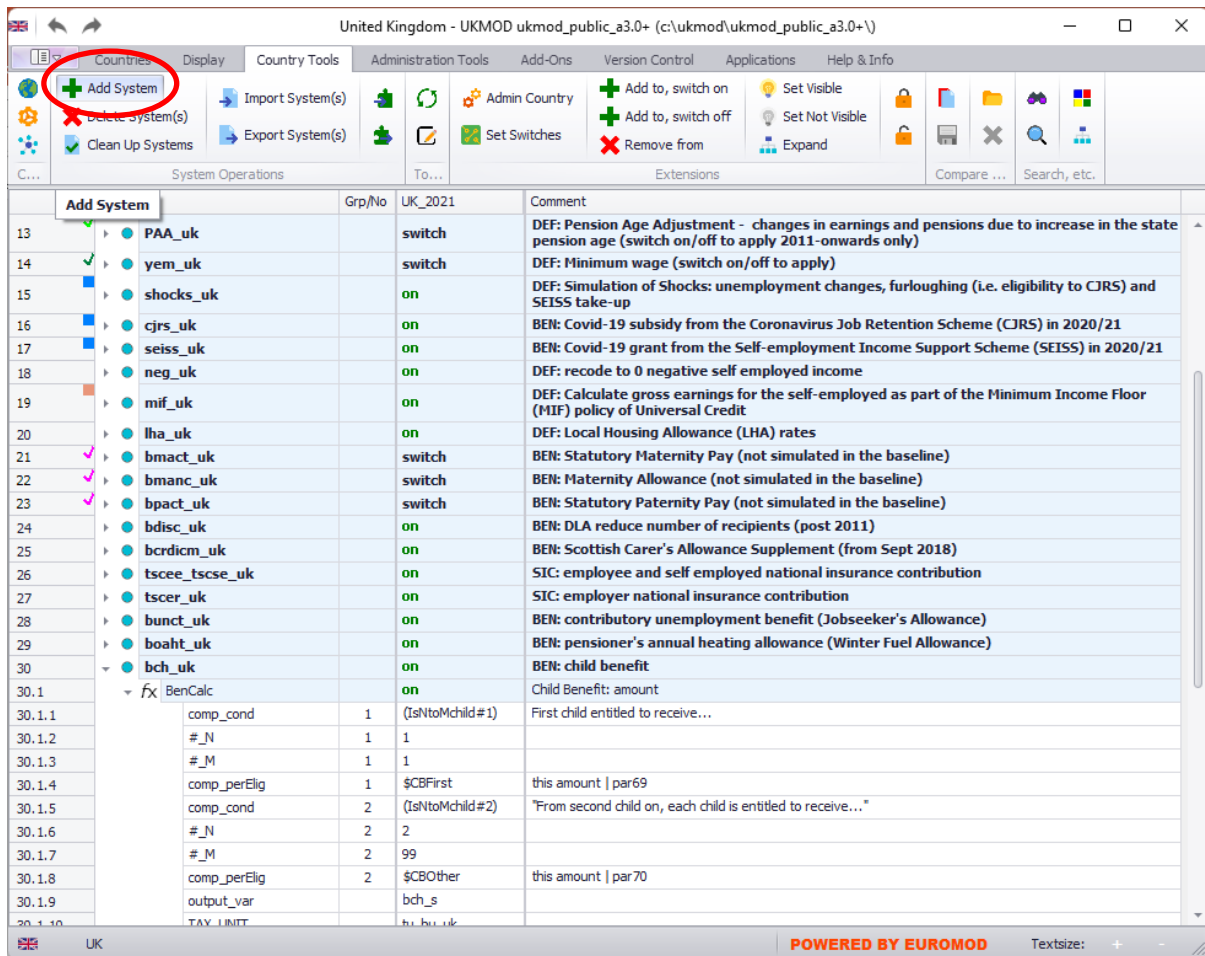*Figure 2: Adding a reform system using the "Country Tools" option*

Figure 3: Giving a name to the reform system

*Figure 4: Baseline and new reform system*

	Policy		Grp/No	UK_2022	UK_2022bch	Comment
30	▾ ●	**bch_uk**		**on**	**on**	**BEN: child benefit**
30.1	▾ *fx*	BenCalc		on	on	Child Benefit: amount
30.1.1		comp_cond	1	(IsNtoMchild#1)	(IsNtoMchild#1)	First child entitled to receive...
30.1.2		#_N	1	1	1	
30.1.3		#_M	1	1	1	
30.1.4		comp_perElig	1	$CBFirst	$CBFirst	this amount | par69
30.1.5		comp_cond	2	(IsNtoMchild#2)	(IsNtoMchild#2)	"From second child on, each child is entitled to receive..."
30.1.6		#_N	2	2	2	
30.1.7		#_M	2	99	99	
30.1.8		comp_perElig	2	$CBOther	$CBOther	this amount | par70
30.1.9		output_var		bch_s	bch_s	
30.1.10		TAX_UNIT		tu_bu_uk	tu_bu_uk	

Step 3: Implementing the reform

1. First, to give a supplement to families who have at least two children, we need an eligibility function to <u>define the families entitled to receive the supplement</u>:

   a. In the Child Benefit policy, right-click on the first function *BenCalc* and select from the option *Add Function After* the function *Elig*. This creates the new function with its two compulsory parameters *Elig_Cond* and *TAX_UNIT* (with default values *n/a*).

Figure 5: Adding a new function – Elig
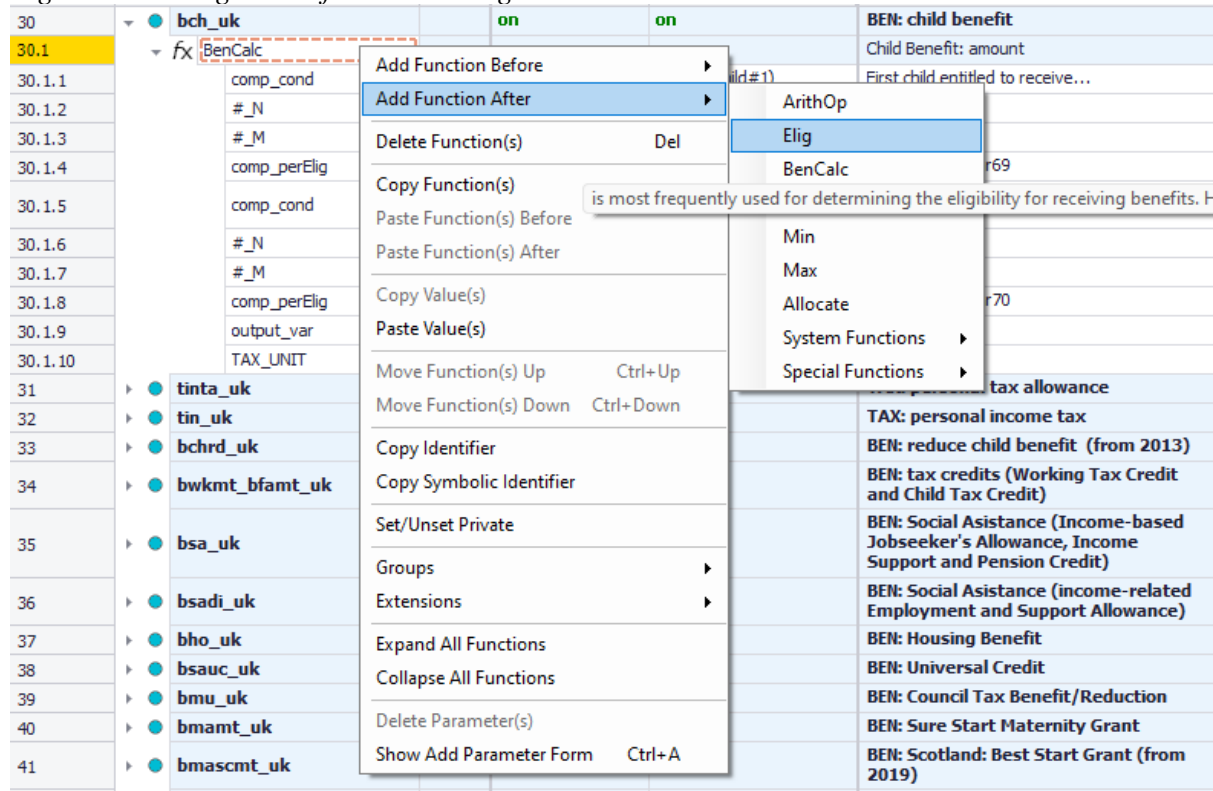
b. Set the function *on* for the reform system (*UK_2022bch*).

c. For the system we are reforming, <u>set the value of the parameter TAX_UNIT</u> from *n/a* to *tu_bu_uk* (i.e. the relevant benefit unit or the family used to calculate the Child Benefit) and change the value of the parameter *Elig_Cond* to *nDepChildrenInTu >= 2*. Thus, the eligibility condition says that the number of dependent children should equal at least 2.

Note that the condition is at the family level (i.e. the unit of assessment is *tu_bu_uk*) and, in this case, the eligibility variable (*sel_s*) will take the same value – 0 for not eligible or 1 for being eligible – for each member of the family.

2. Second, to <u>calculate the benefit amount</u> of £30 per week we need an arithmetic function:

a. Add a new arithmetical function *ArithOp* after *Elig* to implement the supplement. Right-click on the function *Elig* and select from the option *Add Function After* the function *ArithOp*. This creates the new function with its three compulsory parameters *Formula*, *Output_Var* and *TAX_UNIT* (with default values *n/a*).

b. Set this function switch to *on* for the reform system (*UK_2022bch*).

c. Set the value of the parameter *Output_Var* from *n/a* to the simulated benefit *bch_s*.

d. Set the value of the parameter *TAX_UNIT* from *n/a* to *tu_bu_uk*.

e. Finally, set the value of the parameter *Formula* from *n/a* to *30#w*.

Figure 6: Calculating the benefit amount with ArithOp

United Kingdom - UKMOD ukmod_public_a3.0+ for training (c:\users\matteo\box\u

	Policy		Grp/No	UK_2022	UK_2022bch	Comment
30	● **bch_uk**			**on**	**on**	**BEN: child benefit**
30.1	*fx* BenCalc			on	on	Child Benefit: amount
30.1.1		comp_cond	1	(IsNtoMchild#1)	(IsNtoMchild#1)	First child entitled to receive...
30.1.2		#_N	1	1	1	
30.1.3		#_M	1	1	1	
30.1.4		comp_perElig	1	$CBFirst	$CBFirst	this amount | par69
30.1.5		comp_cond	2	(IsNtoMchild#2)	(IsNtoMchild#2)	"From second child on, each child is entitled to receive..."
30.1.6		#_N	2	2	2	
30.1.7		#_M	2	99	99	
30.1.8		comp_perElig	2	$CBOther	$CBOther	this amount | par70
30.1.9		output_var		bch_s	bch_s	
30.1.10		TAX_UNIT		tu_bu_uk	tu_bu_uk	
30.2	*fx* Elig			n/a	on	Eligibility for child benefit supplement
30.2.1		Elig_Cond		n/a	nDepChildrenInTu>=2	No. of children: 2 or more
30.2.2		TAX_UNIT		n/a	tu_bu_uk	Assessment level: Benefit unit
30.3	*fx* ArithOp			n/a	on	Calculate value of supplement
30.3.1		Formula		n/a	30#w	amount (per week)
30.3.2		Output_Var		n/a	bch_s	result saved to variable bch_s
30.3.3		TAX_UNIT		n/a	tu_bu_uk	calculated for tax unit

3. Third, we need to <u>assign the benefit only to families who satisfy the eligibility condition</u>. This is done by creating an interaction between the eligibility function (*Elig*) and the arithmetical function (*ArithOp*):

    a. Right-click on the function or a parameter name in the function *ArithOp* and select *Show Add Parameter Form.*

    b. In the *Add Parameters* list select the parameter W*ho_Must_Be_Elig* and click the *Add* button. You can drag the new parameter in order to have it at the beginning of the function.

    c. Set its value to *all* or any of the other values (*one, all_adults, one_adult*) – all will give the same result as the eligibility condition is at the family unit and takes, in this case, the same value for each member of the unit.

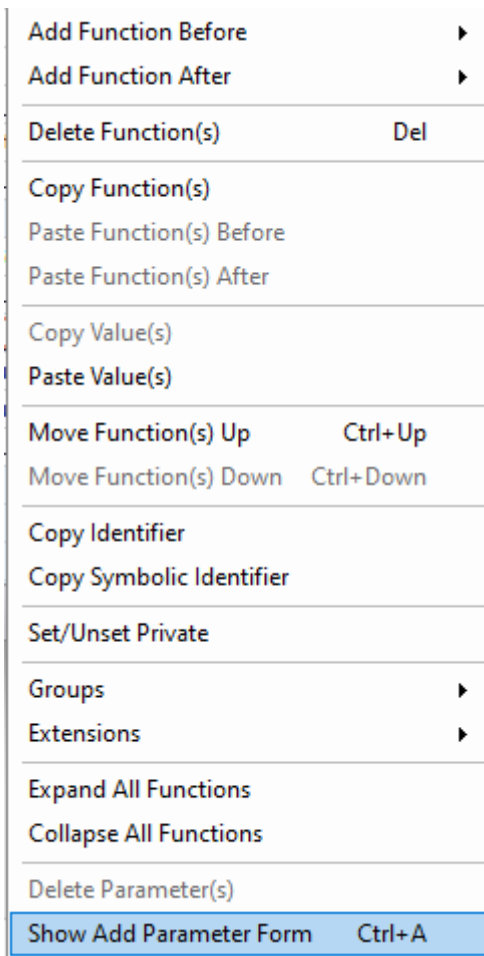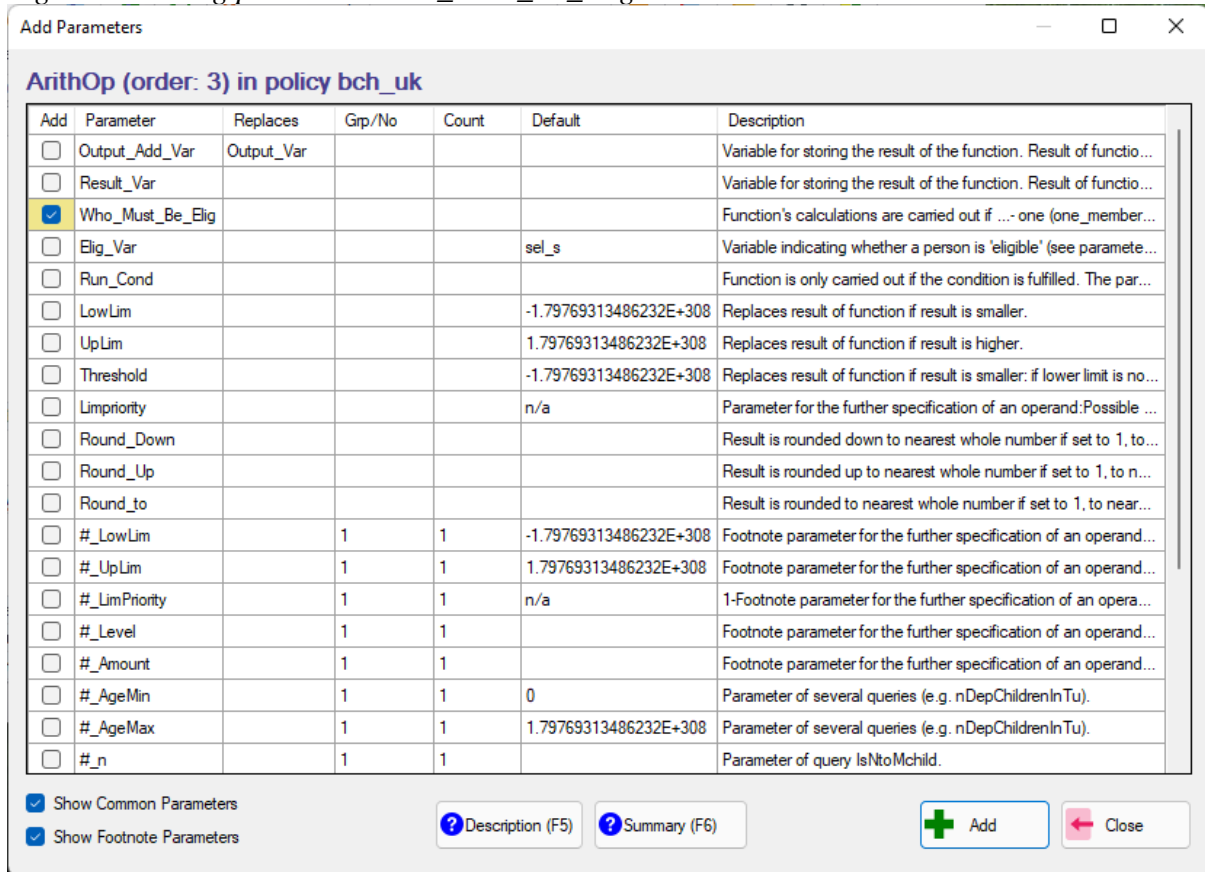*Figure 7: Adding a new parameter in function ArithOp*

Figure 8: Adding parameter Who_Must_Be_Elig

Add Parameters — □ ✕

ArithOp (order: 3) in policy bch_uk

Add	Parameter	Replaces	Grp/No	Count	Default	Description
☐	Output_Add_Var	Output_Var				Variable for storing the result of the function. Result of functio…
☐	Result_Var					Variable for storing the result of the function. Result of functio…
☑	Who_Must_Be_Elig					Function's calculations are carried out if …- one (one_member…
☐	Elig_Var				sel_s	Variable indicating whether a person is 'eligible' (see paramete…
☐	Run_Cond					Function is only carried out if the condition is fulfilled. The par…
☐	LowLim				-1.79769313486232E+308	Replaces result of function if result is smaller.
☐	UpLim				1.79769313486232E+308	Replaces result of function if result is higher.
☐	Threshold				-1.79769313486232E+308	Replaces result of function if result is smaller: if lower limit is no…
☐	Limpriority				n/a	Parameter for the further specification of an operand:Possible …
☐	Round_Down					Result is rounded down to nearest whole number if set to 1, to…
☐	Round_Up					Result is rounded up to nearest whole number if set to 1, to n…
☐	Round_to					Result is rounded to nearest whole number if set to 1, to near…
☐	#_LowLim		1	1	-1.79769313486232E+308	Footnote parameter for the further specification of an operand…
☐	#_UpLim		1	1	1.79769313486232E+308	Footnote parameter for the further specification of an operand…
☐	#_LimPriority		1	1	n/a	1-Footnote parameter for the further specification of an opera…
☐	#_Level		1	1		Footnote parameter for the further specification of an operand…
☐	#_Amount		1	1		Footnote parameter for the further specification of an operand…
☐	#_AgeMin		1	1	0	Parameter of several queries (e.g. nDepChildrenInTu).
☐	#_AgeMax		1	1	1.79769313486232E+308	Parameter of several queries (e.g. nDepChildrenInTu).
☐	#_n		1	1		Parameter of query IsNtoMchild.

☑ Show Common Parameters
☑ Show Footnote Parameters

❓ Description (F5)   ❓ Summary (F6)   ✚ Add   ← Close

4. As things stand, the calculation of the *ArithOp* will overwrite the previous results stored on the *bch*_s, since we are using the *Output_Var* parameter. To avoid this, you need to use the parameter *Output_Add_Var* instead of the parameter *Output_Var*, in order to <u>add</u> the supplement to (rather than replace the value of) the benefit calculated with the first BenCalc function.

    a. Click on the parameter *Output_Var* and you will be asked to replace it

Figure 10: Using the parameter Output_Add_Var instead of Output_Var
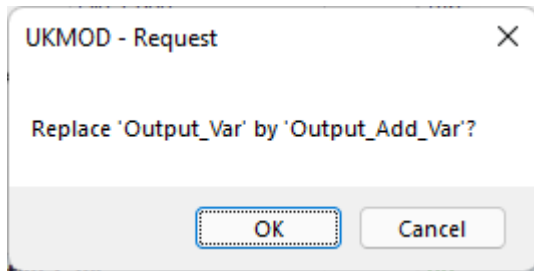
You might be prompted with a warning message that this action will have an effect to all hidden systems as well (since you are now just editing UK_2022 and its reform). Click OK.
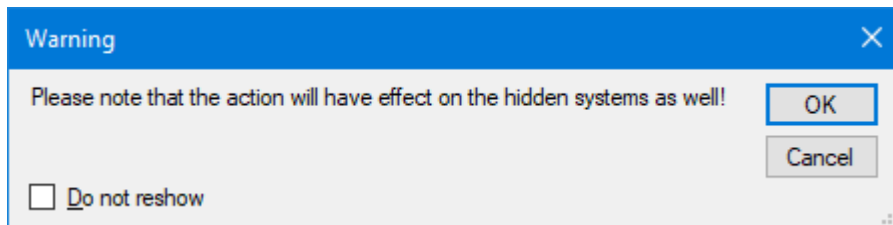
Figure 11: Warning

Figure 12: Final policy

		Policy	Grp/No	UK_2022	UK_2022bch	Comment
29	▶ ●	**boaht_uk**		**on**	**on**	**BEN: pensioner's annual heating allowance (Winter**
30	▼ ●	**bch_uk**		**on**	**on**	**BEN: child benefit**
30.1	▼ *fx*	BenCalc		on	on	Child Benefit: amount
30.1.1		comp_cond	1	(IsNtoMchild#1)	(IsNtoMchild#1)	First child entitled to receive...
30.1.2		#_N	1	1	1	
30.1.3		#_M	1	1	1	
30.1.4		comp_perElig	1	$CBFirst	$CBFirst	this amount | par69
30.1.5		comp_cond	2	(IsNtoMchild#2)	(IsNtoMchild#2)	"From second child on, each child is entitled to receive..."
30.1.6		#_N	2	2	2	
30.1.7		#_M	2	99	99	
30.1.8		comp_perElig	2	$CBOther	$CBOther	this amount | par70
30.1.9		output_var		bch_s	bch_s	
30.1.10		TAX_UNIT		tu_bu_uk	tu_bu_uk	
30.2	▼ *fx*	Elig		n/a	on	Eligibility for child benefit supplement
30.2.1		Elig_Cond		n/a	nDepChildrenInTu>=2	No. of children: 2 or more
30.2.2		TAX_UNIT		n/a	tu_bu_uk	Assessment level: Benefit unit
30.3	▼ *fx*	ArithOp		n/a	on	Calculate value of supplement
30.3.1		Who_Must_Be_Elig		n/a	all	
30.3.2		Formula		n/a	30#w	amount (per week)
30.3.3		Output_Add_Var		n/a	bch_s	result saved to variable bch_s
30.3.4		TAX_UNIT		n/a	tu_bu_uk	calculated for tax unit

5. Finally, save the country, before the next step.

Step 4: Produce and analyse micro-data output

Run the model to produce micro-data output for the baseline and reform system. Use the Statistics Presenter – option Baseline/Reform – to analyse differences in government revenues and income poverty due to the changes in the Child Benefit (see Exercise 2 for details).

Figure 13: Selecting policy systems and data
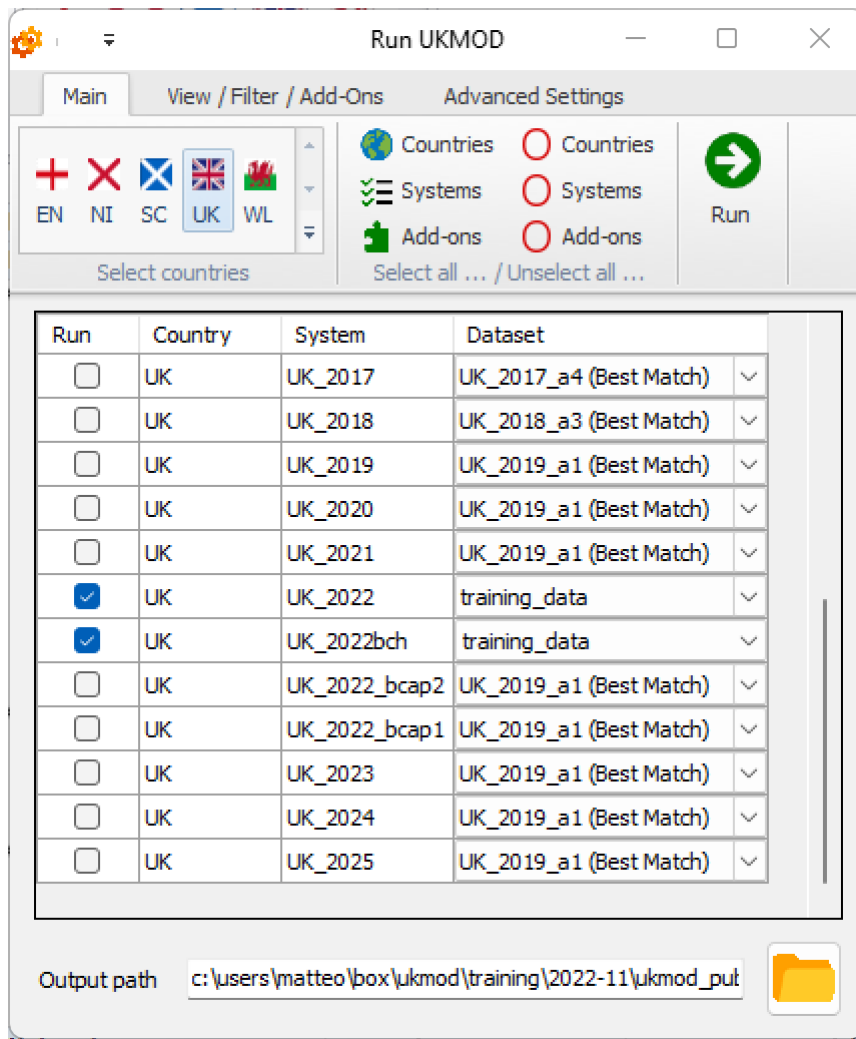
Solution

See Excel file "Exercise 3.xls"