Exercise 3: The *Elig* and *ArithOp* functions

Implementing a reform using *Elig* and *ArithOp*

# Objectives

* Use the *Elig* and *ArithOp* functions to add a benefit worth £30 per week payable to benefit units with at least two dependent children to the 2026 tax and benefit system for the UK.
* Analyse effects of the reform.

# Directions

We will implement the new reform as a supplementary component to child benefit and use the Statistics Presenter to analyse the associated effects.

* Open UKMOD and access the UK policy descriptions.
* Copy the *UK\_2026* system and call the copy *UK\_2026\_ex3*.
* Open the child benefit policy (*bch\_uk*).
* Add an *Elig* function to the end of the *bch\_uk* policy of the *UK\_2026\_ex3* system that identifies benefit units (*tu\_bu\_uk*) with at least 2 dependent children.
  + *nDepChildrenInTu* is a query that returns the number of dependent children in a tax unit – check EUROMOD help for further details.
* Add an *ArithOp* function after the preceding *Elig* function that adds the supplementary benefit to the child benefit.
* Use the *Who\_Must\_Be\_Elig* parameter to the *ArithOp* function to limit payment of the supplement to eligible benefit units described by the *Elig* function.
* Save the model changes.
* Run both *UK\_2026* and *UK\_2026\_ex3*.
* Use the Statistics Presenter’s *Baseline/Reform* template to analyse the distributional effects.

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Step-by-step solutions and further information

# Step 1: Add a new system

*This step is the same as for Exercise 1 – see the notes to that exercise for extended details.*

* Open the UK model, by clicking on the UK country flag.
* To work more easily with the *UK\_2026* system, limit the display by right-clicking on the system name (*UK\_2026*), selecting *move to hidden system box* and then selecting *all systems but selected*.
* Right-click the system heading (*UK\_2026*) and select the option *copy/paste system*, entering the new system name *UK\_2026\_ex3*.
* Access the search and replace tool by pressing Ctrl+F to find the policy *bch\_uk*.

# Step 2: Implement the desired reform

*NOTE: You should analyse the existing description of policy bch\_uk before attempting to alter it.*

We will append the supplementary benefit to the existing code. The *Elig* function will be used to determine which benefit units receive the new benefit, and the *ArithOp* function will allocate the new benefit to those that are eligible.

## Adding the *Elig* function

* Right-click on the *BenCalc* function in the *bch\_uk* policy.
* Select the option *Add Function After*.
* Select the function *Elig*.

Figure 1: Adding the Elig function

A screenshot of a computer

Description automatically generated

* Set the *Elig* function to “on” in the *UK\_2026\_ex3* system.
* Set the TAX\_UNIT of the *Elig* function in the *UK\_2026\_ex3* system to *tu\_bu\_uk*.
  + This is the same as the *BenCalc* function of the *bch\_uk* policy, and directs UKMOD to evaluate eligibility at the level of the benefit unit.
* Set the eligibility condition *Elig\_Cond* of the *Elig* function in the *UK\_2026\_ex3* system to *nDepChildrenInTu* >= 2.
  + This directs UKMOD to consider all benefit units with more than one child to be eligible. The *Elig* function will generate a variable *sel\_s*, for each benefit unit, with a value 1 if the eligibility condition is met and 0 otherwise.

Figure 2: The new Elig function

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## Adding the *ArithOp* function

* Right-click on the *Elig* function in the *bch\_uk* policy.
* Select the option *Add Function After*.
* Select the function *ArithOp*.

Figure 3: Adding the ArithOp function

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* Set the *ArithOp* function to “on” in the *UK\_2026\_ex3* system.
* Set the TAX\_UNIT of the *ArithOp* function in the *UK\_2026\_ex3* system to *tu\_bu\_uk*.
* Under Formula of the *ArithOp* function in the *UK\_2026\_ex3* system, enter the benefit value to pay £30 per week (30#w).
* Change *Output\_Var* of the *ArithOp* function to *Output\_Add\_Var* by clicking on the parameter in the policy column and selecting “OK” in the resulting pop-up window.
  + You may be prompted with a warning message that this action will affect hidden systems as well – click “OK”.

Figure 4: Changing Output\_Var to Output\_Add\_Var

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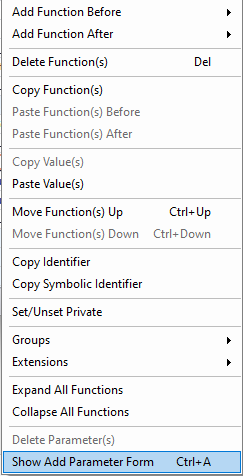
* Enter the variable name *bch\_s* to the *Output\_Add\_Var* parameter of the *ArithOp* function in the *UK\_2026\_ex3* system.
  + This directs the *ArithOp* function to append the value described by Formula to whatever value is already stored in variable *bch\_s*.

## Linking the *ArithOp* function to the *Elig* function

At this point the *Elig* function will have no effect on the simulation, and the £30 per week benefit will be provided to all benefit units. We now alter the *ArithOp* function, so that it will only apply to benefit units that satisfy the *Elig* function.

* Right-click any of the parameters listed under the *ArithOp* function, and select *Show Add Parameter Form*.

Figure 5: Adding a new function parameter



* Click the check box next to the *Who\_Must\_Be\_Elig* and press the *Add* button.
  + NOTE: Only the order of policies and functions in the policy spine have any effect on model calculations – the order of function parameters does not
    - The *Who\_Must\_Be\_Elig* parameter could be the first or last listed under the *ArithOp* function and the result would be the same.
* Set the value of *Who\_Must\_Be\_Elig* to *all* in the *UK\_2026\_ex3* system.

Figure 6: Add the Who\_Must\_Be\_Elig function parameter

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Figure 7: The new ArithOp function

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# Step 3: Run the model and analyse the output

*This step is similar to Exercise 2 – see the notes to that exercise for extended details.*

* Save the model.
* Run the model for the two systems of interest (*UK\_2026* and *UK\_2026\_ex3*).
  + Remember to change the Dataset to *training\_data*.
  + Strictly speaking, you only need to run the model for the new policy *UK\_2026\_ex3.*
* Start the Statistics Presenter and select the Baseline/Reform template.
* Select output data to assume for the *baseline* and *alternative* scenarios.
* Inspect the results.

Figure 8: Inspect the results

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