UNI-CGE
MODEL

How To Change an Elasticity Parameter

Elasticities are parameters in the CGE model that define the responsiveness of consumers and producers to changes in prices and income. This exercise shows you how to change the value of elasticities in the UNI-CGE model.

CONTENTS

1.   ELASTICITIES IN THE COUNTRY DATA FILE

Elasticities are parameters in the CGE model that define the responsiveness of consumers and producers to changes in prices and income. Parameter values have an important role in driving model results. Larger values lead to larger impacts of a shock on the economy, and vice versa.

A country database includes default values of elasticity parameters. You may want to change one or more elasticity values if you have better information on the appropriate values, or if you want to check the sensitivity of your results to the assumed elasticity values.

To do so, you can follow these directions for any country file that you are using in the UNI-CGE model.

2. CHANGE THE ELASTICITY PARAMETERS

Download and open the Excel data file for the country you are studying. The bottom of the Excel file has a list of all worksheets in the file (Figure 1). Choose the worksheet named "ELAST'".

Figure 1. Worksheets in a country data file
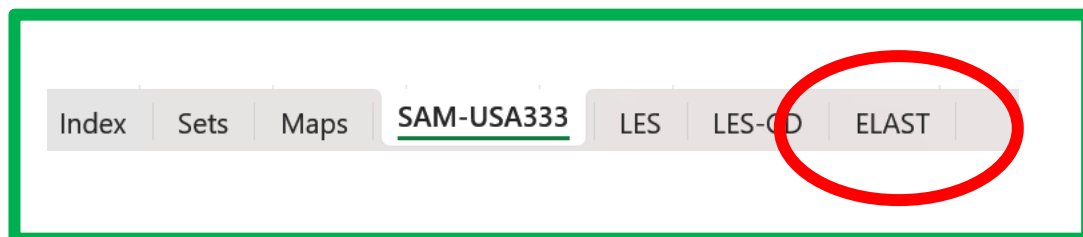
The elasticity worksheet reports four elasticities used in the model:

$ESUBQ_c$ – the domestic-import (Armington) substitution elasticity for commodity c
$ETRAX_c$ - the domestic-export substitution elasticity for commodity c
$ESUBVA_a$ – the factor substitution elasticity for production activity a
EDE_c – foreign demand elasticity

The elasticity parameter values in the worksheet and shown in Figure 2 are the default values that come with the US333 data file and are used in the hands-on modeling exercises. To change an elasticity, overwrite the value with a new value. For example, change the ESUBVA, the factor substitution elasticity in the services activity, from 0.8 to 10.

**Figure 2. Default elasticities in the US333 database**

	A	B	C
1	Elasticities		
2		ESUBQ	
3	c-AGR	0.7	
4	c-MFG	0.7	
5	c-SER	0.7	
6			
7		ETRAX	
8	c-AGR	2	
9	c-MFG	2	
10	c-SER	2	
11			
12		ESUBVA	
13	a-AGR	0.8	
14	a-MFG	0.8	
15	a-SER	0.8	
16			
17		EDE	
18	c-AGR	0	
19	c-MFG	3	
20	c-SER	0	
21			

3. LES AND COBB-DOUGLAS PARAMETERS

The UNI-CGE model uses a linear expenditure system (LES) to describe private household demand. The LES requires income elasticities of demand by commodity and household type (LESELAS$_{c,h}$). It also requires a Frisch (FRISCH$_h$) parameter for each household type, which defines the share of private household expenditure that is spent on subsistence requirements. Our US333 database has only one household type.

The Excel country data file includes two worksheets that contain the parameters for the LES demand system: LES and LES-CD (Figure 3). First, choose the worksheet named "LES'".

Figure 3. Two worksheets with LES parameters
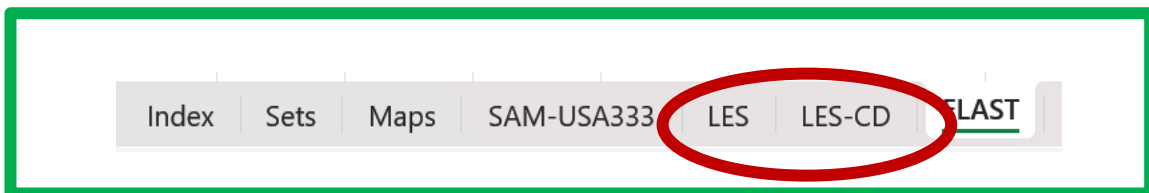
The default values for these parameters are reported in Table 1. The Frisch value of -2 indicates that some share of US consumers' expenditures are for necessity goods. The LESELAS parameters, the income elasticities of demand, describe AGR as an inferior good with an elasticity less than one. MFG and SER are luxury goods, with income elasticities of demand greater than one.

Table 1. LES and Cobb-Douglas parameters in the US333 database

DEFAULT LES PARAMETER VALUES for all household h		COBB-DOUGLAS PARAMETER VALUES for all household h	
Frisch	-2	Frisch	-1
LES		LES	
c-AGR	0.5	c-AGR	1
c-MFG	1.5	c-MFG	1
c-SER	1.5	c-SER	1

The LES-CD worksheet shows the LES parameter values that transform the LES demand system into a Cobb-Douglas utility function. Inclusion of the LES-CD worksheet is just for your information on the parameter values needed to use a Cobb-Douglas function in your model. The LES-CD worksheet is not read into the UNI-CGE model.

If you want to use a Cobb-Douglas consumer demand function, you must overwrite the LES parameter values on the LES page with the Cobb-Douglas parameter values. You can learn more about LES and Cobb-Douglas in the household demand lecture in the module on Demand.

4. SAVE/CLOSE DATA FILE

After you change an elasticity or the Frisch parameter, save and close the Excel country data file before you run the model.

** Important – SAVE your data file before running the model.

** Important – CLOSE the data file before running the model

** Important – Remember that you have changed the elasticity in your model. You may want to restore the default values and save the Excel file again.

5.   VERIFY THE NEW ELASTICITY VALUE

The UNI-CGE model includes a command to display all elasticity parameters. After you run the model, verify that your new elasticity value is used in the model by checking the displayed values in the listing file (.lst file). The .lst file is created after the model is solved and should open on your screen automatically. (If not, check the settings in the getting-ready guide on downloading GAMS and the CGE model).

Follow the 5 steps in Figure 4 to search for, view and verify the new elasticity parameter value. In this example, you are shown how to verify parameter ESUBQ, the Armington elasticity of import demand.

Figure 4. Verify the new elasticity parameter value

6. RESTORE DEFAULT ELASTICITIES

The default elasticity values are the parameter values that are included in the Excel data file. If you have changed an elasticity parameter and want to restore the default values, open the Excel country data file, overwrite the new values with the original values, and save and close the file.

It is a good practice to follow the checklist before running the CGE model, and to

verify the elasticities after running the model. It is a (common) mistake to run new experiments without realizing the elasticities have been changed.