

A Tutorial Guide to Using **ASSESS**

ASSESS is an interactive computer program for assessing utility functions. A utility function is a quantitative scale of how an individual values different levels of a payoff, for example, the personal value that you attach to various monetary outcomes. The utility function of an individual may be used to help him/her make decisions among complex alternatives involving risk and multiple objectives. *ASSESS* can elicit a user's preferences towards risky alternatives using a variety of methods, derive the resulting utility measures, and fit a function through these data. To calculate a utility function, *ASSESS* assumes that the respondent's risk preferences comply with a number of rationality principles. Although this assumption may be imperfectly met, *ASSESS* can be useful to investigate whether and how an individual's preferences depart from consistency, for example, by using different assessment methods and checking for consistency. It can also be a helpful tool for those who would like to think in a more lucid, rigorous fashion about their risk taking attitude.

This document is a brief, tutorial-like introduction to using the *ASSESS* software.

Installing and uninstalling **ASSESS**

The program runs under the Windows[™] operating system. It comes in a compressed file archive called *ASSESSinstall.zip*. To install the program, launch the *Setup.exe* wizard contained in the archive. By default all program files will be copied to a folder named *ASSESS* in the Program Files folder on your computer. A program shortcut will be put on your desktop. You can uninstall *ASSESS* through the "Add or Remove Programs" utility found in your computer's Control Panel.

Using **ASSESS**

The *ASSESS* program will lead you through a structured interview in order to construct your utility function according to the setup you specify. A typical session of *ASSESS* consists of the following:

1. Specify the assessment parameters (attribute definition, elicitation method)
2. Go through an interactive interview in which *ASSESS* probes your preferences
3. Obtain and save the utility assessment results from Step [2] (data and best fitting functions)
4. Plot the utility function(s)

Eventually, you can use your utility function to determine the choices or combination of choices best aligned with your objectives in a situation involving risks and trade-offs.

A utility assessment session will be illustrated through an example. Having a meaningful context can make it easier to think about one's preferences. Let us make up the following, just for the sake of illustration.

Suppose that you have invested some money in a venture project with uncertain return. Your net financial payoff from this project could be anywhere from a loss of \$7,000 to a gain of up to \$53,000. The goal here is to build a utility function describing how you value different outcomes in that range. This utility function could eventually be used to help you decide whether, and for how much, to sell all or part of your participation in the venture.

You will measure your utility function using a classic method, the Certainty Equivalence (CE) method. ASSESS supports other elicitation methods, including the Probability Equivalence and the Lottery Equivalence methods.

Double-click on the ASSESS icon to start the program. The main program window appears.

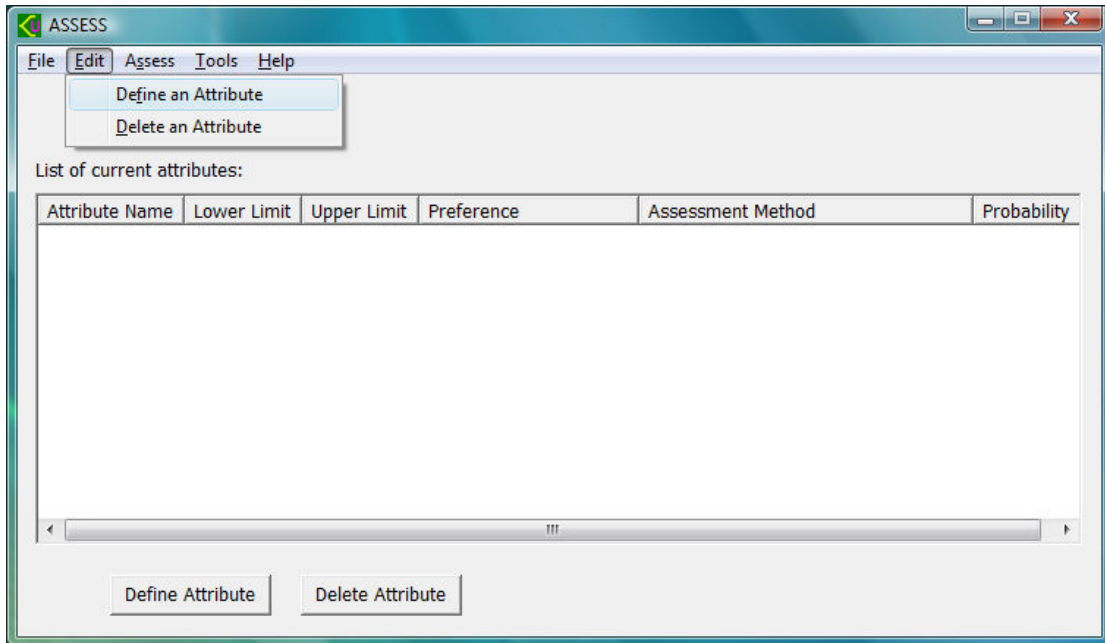


Figure 1. ASSESS main program window

1. Specifying the assessment parameters

Go to Edit / Define an Attribute, (or just press the Define Attribute button) to define the attribute for which you would like to measure utility. This will bring up the Attribute Settings dialog box shown in Figure 2, which displays the inputs you should enter for our example.

In the Attribute definition box, the item ‘Probability in assessment lotteries’ refers to the probability of the most preferred outcome in the lotteries to be evaluated. It is set at 0.50 by default. In the example at hand, we will use 0.70.

2. Interactive interview to elicit preferences

Go to *Assess / Utility* for an Attribute, and select the attribute for which you wish to assess utility, that is, '\$' in our example. *ASSESS* will run you through a sequence of choices between two alternatives, A and B. Figure 4 shows an example of the choices you are faced with.

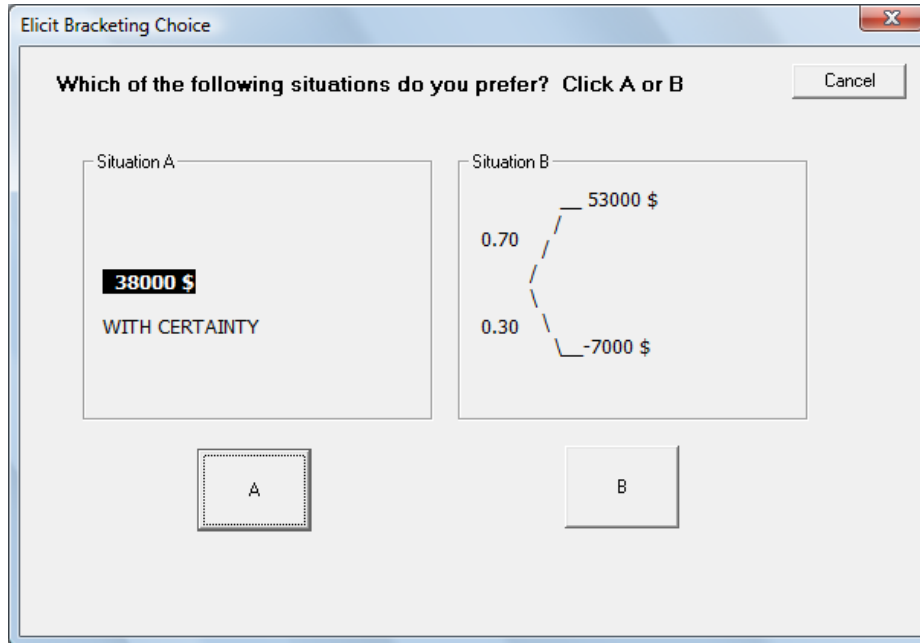


Figure 4. Example of choice question to elicit preference

In Situation A you have a net gain of \$38,000 for sure. In Situation B, you face a gamble with a 0.70 probability of a \$53,000 gain and 0.30 probability of incurring a \$7,000 loss. Indicate your preference by clicking A or B. *ASSESS* will propose a series of such choice questions designed to zero in on your point of indifference between the alternatives A and B. During this process, be sure to carefully examine each choice question, because alternative A is updated with every answer you give. It is better to consider each and every choice independently and let the process run its course. In answering the preference questions, remember: this is not a test of aptitude, there are no right or wrong answers to the questions asked. Only *you* know your preferences!

After a number of choice iterations, the bracketing process will converge to a possible zone of indifference. You are then invited to specify an indifference point, as in the dialog box of Figure 5.

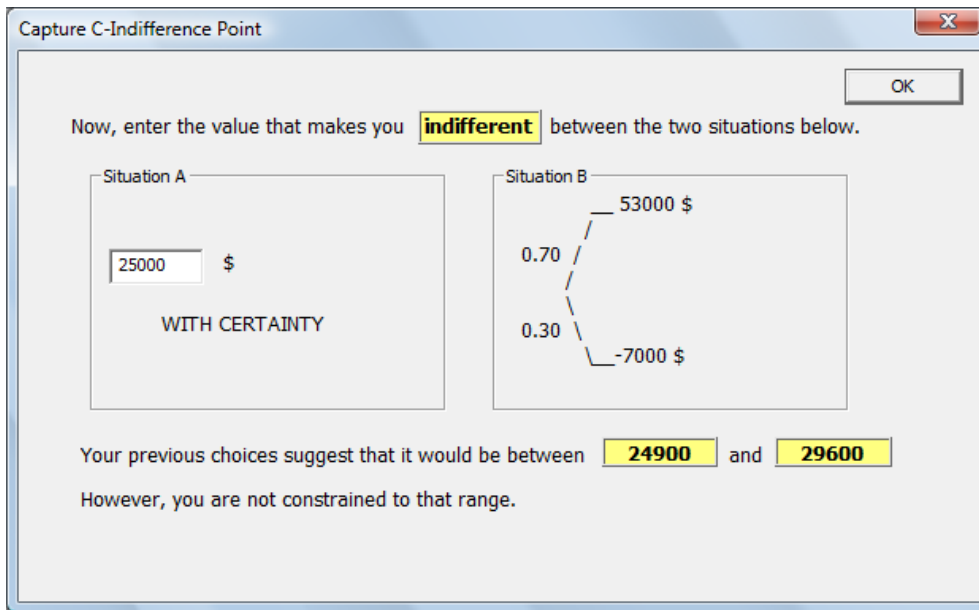


Figure 5. Indifference point dialog box

You should not be too worried about precision in pinpointing an indifference value. An indifference point may not be clearly defined in the mind, so there will always be some measurement error. Given enough data points, the impact of inaccuracy in measurements on the overall assessment of the utility function will be mitigated.

Entering an indifference value completes the measurement of one point of the utility function. You may now choose to construct one more data point of the utility curve or stop the assessment interview, by answering ‘Yes’ or ‘No’ to the prompt in Figure 6.

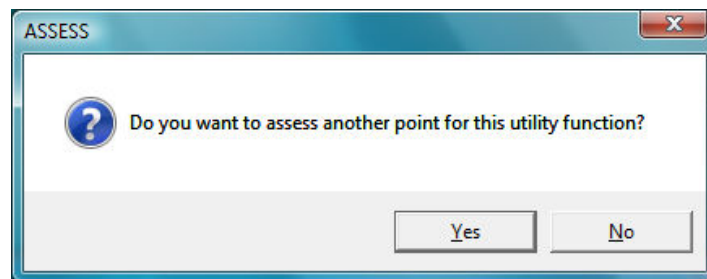


Figure 6. Elicit one more utility value or quit

The more points you assess, the better the definition of your utility function will be. *ASSESS* will allow you to construct up to seven points for a utility function.

3. Saving utility assessment results

When you are finished with the preference elicitation questionnaire, *ASSESS* will determine best fitting equations for your utility function and display them in a box, as shown in Figure 7.

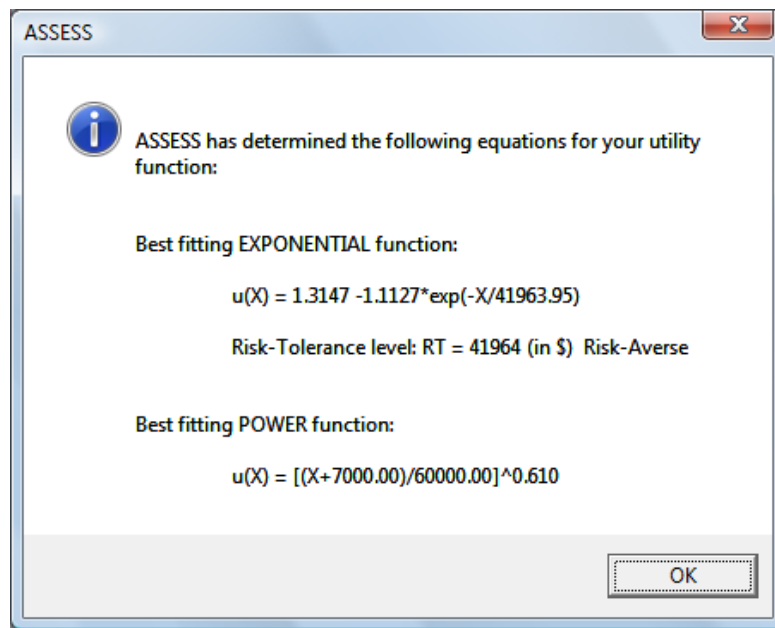


Figure 7. ASSESS reports the best fitting utility function forms

The Risk-Tolerance (RT) level is a parameter of the exponential utility function. It measures the individual's degree of risk-aversion (or risk-seeking). It may be used as an input in a decision analysis, such as in decision tree software.

Next, the program will request a file name to save your utility data and equations. Enter an appropriate file name: CE.xls, for example (ASSESS will save your file in an Excel format).

4. Plotting a utility function

To get a graph of your utility function, go to Tools / Plot Utility Function. This opens an Excel chart template, called **ASSESS Plots.xls**. Depending on your macro security level in Excel, you may need to press Enable Macros when prompted. Press one of the four 'Plot' buttons, and retrieve your utility data file¹ (e.g. CE.xls) in the browsing dialog box. Your utility data and the best fitting exponential function will be plotted in the color corresponding to the button you pressed. The graph resulting from our example is shown in Figure 8.

You can plot several utility functions on the same chart. This can be useful to make visual comparisons of utility functions, such as comparing the utility functions of two individuals, or utility functions of the same individual obtained through different measurement methods. Such comparisons make sense if the utility functions are defined over the same attribute, with the same scaling.

If you wish to save your graph, use File / Save As... in Excel. It is recommended that you do not save the ASSESS Plots.xls template file upon closing it.

¹ If your computer has a language version or regional setting that uses the comma (,) instead of the dot (.) as a decimal separator, you may need to replace the dots with commas in your utility data file before proceeding.

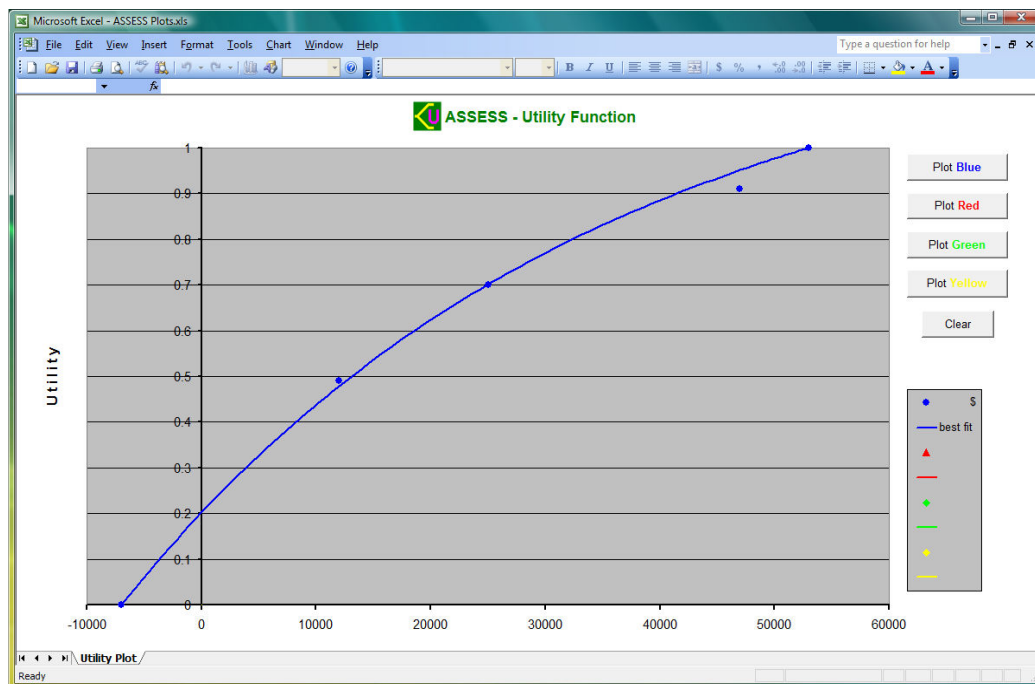


Figure 9. Utility function plot in Excel chart template

5. Other program features at a glance

ASSESS saves a log of all written output in a file called AssessLog.xls, located in the program folder. You can recover lost utility data from this log file. You may delete this file if it gets too big.

ASSESS can construct multiattribute utility functions. For this, you need to define at least two attributes. In addition to assessing the utility function for each attribute (as illustrated above), the program will measure the scaling coefficients of the attributes and calculate the so-called multiattribute scaling constant, using the lottery method.

- F**ile / **C**onstruct **N**ew Function Delete all current attribute definitions and start from scratch
- F**ile / **S**ave Attributes Definition Save attribute(s) definition(s) for later use
- F**ile / **O**pen Attributes Definition Open a previously saved attribute(s) definition(s) file
- E**dit / **D**elete an Attribute Delete an attribute from the list of defined attributes
- A**ssess / **S**caling Coefficients of Attributes Assess the scaling factors for the attributes in a multiattribute utility function (using the lottery method)
- T**ools / **F**it Function to Utility Data Fits the exponential and the power forms to utility data. This can be used to fit functional forms to utility data from independently created (text) files, as long as the files are put in the same format as those created by ASSESS.

ASSESS is a “home-made” program designed for education and research purposes. Several of its features are at development (not release) stage. The program is made freely available by the author.

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