

UEP USER GUIDE

by John Schuyler

Quick Start	1
Purpose of UEP	2
Touring UEP	3
Future Enhancements	9

Quick Start

If you are familiar with using utility functions, then you might want to start right in.

Online resources as book supplements are linked at:
<http://www.maxvalue.com/online.htm>.

In the page upper-left are links to several resources. “Risk Policy as a Utility Function,” either video or pdf written form, is the brief reference to the concepts used in EUP. The two bound books provide more comprehensive discussion of decision analysis methods and decision policy:

Risk and Decision Analysis in Projects, 3.0 Edition

Decision Analysis for Petroleum Exploration, 3.0 Edition

Accessing EUP

On the web page is a [Utility Elicitation Program](#) link. Click it.

At some point, UEP will be relocated behind the login wall.

UEP will work with most larger devices and browsers.

Some small screens may have trouble reconfiguring and fitting.

UEP is offered free except to trainers and consultants, i.e., my competitors. Read the About text for a description of this restriction (it is reproduced below). Call or write if you are concerned about permission or to obtain authorization.

Of course, the user interface is intended to be intuitive. You can hover the mouse over text fields and buttons, and short descriptions will appear.

Two Functions

UEP online presently has only two functions:

- Question generation. Clicking Next Question will generate a random question of the question type, transaction perspective, output view, and currency settings.
- Solving. Entering an answer value will execute a routine that calculates the *risk tolerance coefficient* (r) that corresponds your answer.

UEP will return either a value for r or a message if something goes wrong.

Purpose of UEP

The function of Utility Elicitation Program (UEP) is to assist you in determining your or your company's risk policy as a utility function.

The exponential utility function is featured, because of its *delta property* and other highly desirable features. If you are unfamiliar with utility functions, please look at the accompanying videos and/or documents about decision analysis and about risk policy as a utility function.

elicit: evoke or draw out a judgment from someone.

Commonly, in decision analysis, analysts or other persons are assigned to interview subject matter experts (SME's) to *elicit* their judgments about uncertainty inputs and other aspects of decision models. Decision makers' judgments are elicited about decision policy.

UEP focuses on one part of decision policy: *risk policy*. We assume the most-popular utility function shape, which has highly desirable characteristics. The exponential utility function requires only one parameter to completely define its shape scale. This serves as a complete risk policy for you or your organization. That parameter is the *risk tolerance coefficient* (r).

Rather than send someone interview you about your risk preference, we have this little program. UEP will help you self- elicit your r value.

Your, or your company's, preference for risk—captured in the utility function—should be reasonably stable. It should not change unless there is a substantial change in wealth or situation.

With practice, using UEP, you may become reasonably “calibrated” in making consistent risk versus value trade-offs in your decision making. Expect that the r 's imputed by your answers will converge with practice and feedback.

However, the point is not for you to become calibrated. Although your emotions about risk may change from day-to-day, your r should not be mood dependent. You want decision policy to be consistent. This policy should be established and reasonably stable across years in settled times. UEP will assist with the risk policy part.

Situations where someone might want to be calibrated about decision policy is when there isn't time for careful quantitative analysis, such as fast-paced, high impact situations. Examples include bidding in a live auction and decision-making during crisis.

Simulations are a way to train people to make good intuitive decisions in fast-paced, intense situations. Decisions under simulated stressful conditions can be scored against values determined separately with decision policy, careful thought, and problem modeling.

Touring UEP

When the UEP web page opens, you will see a screen much like the Figure 1. Resizing the screen size and text size will rearrange the elements to fit—up to a point.

Figures 2a and 2b show Help and About popups that appear when you click the respective links, similar to what you expect with typical software. The contents may be updated from time to time.

Question Type

Conceptually, you could answer one question, and your risk tolerance coefficient (r) could be determined. In using UEP, initially, you will likely find that your r 's vary considerably among questions. Partly, the variance is due to framing, i.e., the way problems are presented.

All lotteries presented will have two possible outcomes: Success (NPV_S) or Failure (NPV_F).

For variety, hypothetical decision “lotteries” are generated in three Question Types:

- Ps Probability of success is the probability of NPV_S .
- CE Certain equivalent. P_s is provided. You will be asked to judge a cash-in-hand value of a lottery. For reference, the EMV is calculated for you. For a risk-

averse person or organization, the *CE* is less than the *EMV*.

An occasional CE type question will have both outcomes with the same sign. In some cases, someone would have to pay *you* to take the risk, or you would pay someone to take the risk away (e.g., like buying insurance).

Share The Share question type asks you to judge what portion of a large project you would like to have. What is the optimal *Share* you would choose to own?

The Question Type selection is made by clicking one of the “radio buttons.” Hover the mouse cursor above a button for a brief description.

The screenshot shows the top portion of the Utility Elicitation Program interface. At the top, the title "Utility Elicitation Program" is displayed in a large, bold, black font. Below the title, there are two links: "HELP" and "ABOUT", both in blue text. The interface is organized into several sections, each with a bold heading:

- Question Type:** This section contains three radio buttons labeled "Ps", "CE", and "Share". The "Ps" button is selected, indicated by a filled circle.
- Perspective:** This section contains two radio buttons labeled "Buy" and "Sell". The "Buy" button is selected, indicated by a filled circle.
- Output View:** This section contains two radio buttons labeled "Text" and "Graphic". The "Text" button is selected, indicated by a filled circle.
- Currency Settings:** This section contains two input fields. The first is labeled "Units" and has a text box containing "\$k". The second is labeled "Max Investment" and has a text box containing "50".

Below the "Currency Settings" section, there is a button labeled "Next Question". At the bottom of the interface, there are two stacked text input fields. The top field contains the text "your answer" and the bottom field contains the text "risk tolerance coefficient".

Figure 1. Screen top.

Perspective

Framing is a well-known cognitive bias. Here, you may select whether the lottery is worded in one of these contexts:

- Buy You are buying or acquiring the risk project, investment, or asset. For a Share type question, you are entering or increasing a position in the risk.
- Sell You are selling or disposing of the risk project, investment, or asset. For a Share type question, you are selling-off or reducing your position in the risk.

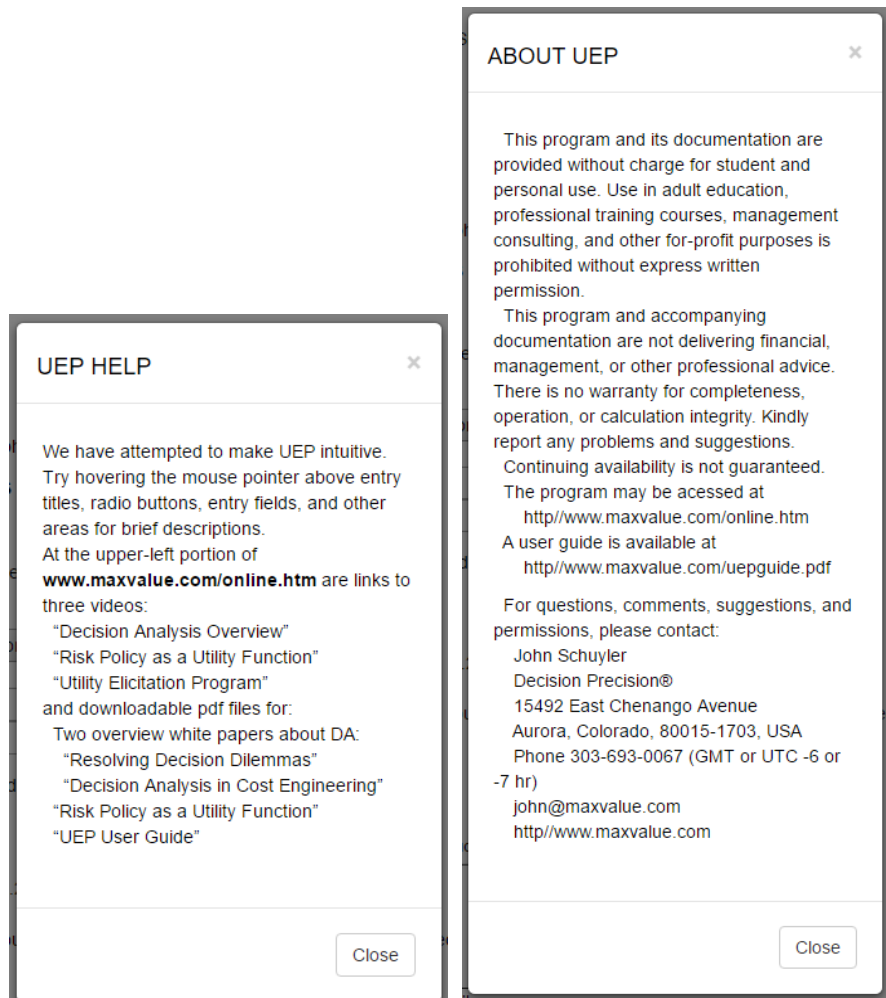


Figure 2a and 2b. Help and About popup messages.

Output View

- Text The lottery is presented as a simple word problem.
- Graphic Adds a chance node figure.

Also added is a table of supplemental values that may help your decision.

Although a portfolio can be optimized for CE , in UEP we are considering investments one at a time. UEP presumes a financially healthy individual or enterprise and that there is no capital or other constraint.

Currency Settings

Units Enter up to eight characters to label the $NPVs$, r , and CE units. Label your currency, e.g., \$, GBP, €
Add a multiplier, such as 000, k, M, B.

The units label has no effect on calculations.

Max Investment

In currency “units,” what is the largest investment that you would typically consider? This will be used as an approximate maximum when generating NPV failures.

Changing currency, units, or Max Investment may invalidate r 's recorded from prior sessions. So choose your units carefully and remain consistent.

We do not record any session settings or data. Unfortunately, if “\$k” isn't the appropriate units and \$50k isn't your maximum investment, then you will need to reenter these values at the start of each session.

Next Question

This button generates another random question in the form of the various settings, above. Figure 3 is an example.

When Graphic is selected, the detail in Figure 4 is added.

Your Answer

After you have read and considered the presented question, enter your numerical answer. Only risk-averse (conservative) values are acceptable. Outside these limits should generate an error warning:

$$P_{be} < P_s < 1 \quad \text{where } P_{be} \text{ is the breakeven probability}^1 \\ \text{where } EMV = 0 \text{ (whatever currency)}$$

$$NPV_F < CE < EMV$$

$$0 < Share < 1$$

Risk Tolerance Coefficient

The textbox below Your Answer is where the calculated r result is presented, as shown in Figure 5. If UEP was unable to calculate r , a popup message will explain the issue.

Utility Elicitation Program

[HELP](#) [ABOUT](#)

Question Type

Ps CE Share

Perspective

Buy
 Sell

Output View

Text Graphic

Currency Settings

Units
Max Investment

Suppose you are presented with an investment opportunity:
Success NPV is 96.4 \$k.
Failure NPV is -41.0 \$k.

EMV is positive when $P_s > .298$

What is the minimum P_s you would require to be just willing to approve this project?

Figure 3. Screen with Text Output View.

¹ If $S = NPV_S > \$0$ and $F = -NPV_{SF} > \$0$, then $P_{be} = F/(F+S)$

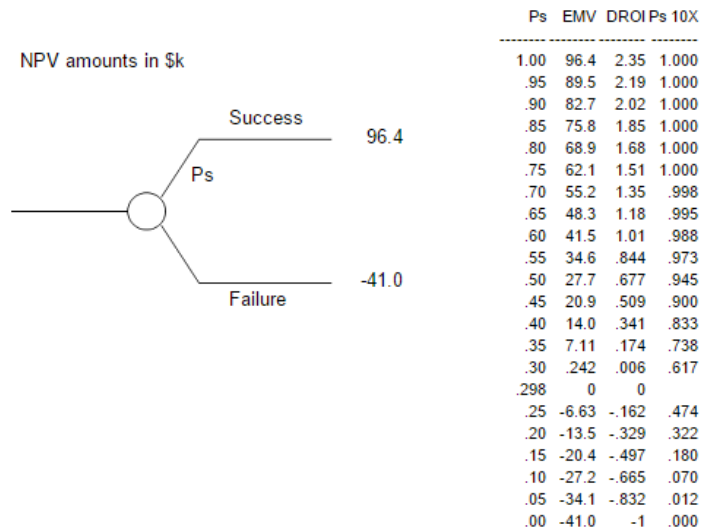


Figure 4. Added question detail with “Graphics” selected. The table contents are explained, below.

Next Question

.55
60.2

Figure 5. A $P_s = .50$ entry into “my answer” led to the 60.2 \$k returned “risk tolerance coefficient.”

Supplement Information in Questions

Depending upon the question type, supplemental information is provided that may help or detract.

Ps Questions

“EMV is positive when $P_s > \#\.\#\#$ ”

The lower-bound is the breakeven probability, P_{be} , mentioned above. Obviously, you aspire to make a profit, so your P_s answer should be higher than P_{be} . The table shows this crossover point where $EMV = DROI = \$0$.

The table has recalculated $EMVs$ for example probabilities that you might answer. UEP won’t like an answer than makes $EMV \leq \$0$.

$DROI =$ discounted return on investment $= EMV / NPV_F$

This is a popular ranking criterion for portfolio

optimization when capital-constrained. UEP assumes that you are not resource constrained.

Ps 10X. What if you made ten investments, identical yet independent? What is the probability such a portfolio will have a positive *NPV*? Some decision makers worry excessively about low *Ps* values, and this calculation may often sooth your fear.

CE Questions

EMV and *DROI*

P(profit with 10 like projects)

The outcomes are occasionally both positive or both negative. In these cases, *Ps* is the probability of the better outcome (*NPF_S*).

The table adjusts values, having paid the *CE* (or, received if the *CE* is negative):

$$\text{Exposure} = NPF_S - CE$$

$$\text{Potential} = NPF_F - CE$$

Share Questions

EMV and *DROI*

P(profit with 10 like projects)

How much each .01 share obligates you to pay in *NPF_F*.

The table simply factors *NPF_S*, *NPF_F*, and *EMV* by *Share*.

Future Enhancements

The online UEP does not yet have all the features of the Windows Forms version. Much of the programming must be done differently for the web and where we are not installing or writing to your machine or device.

Most importantly, we are planning a way for the user to capture, view, and copy session data. These data can then be pasted into an Excel-compatible file for graphing or other analysis.

This is an early roll-out of UEP and the documentation. Your comments, suggestions, and questions are welcome. Please contact:

John Schuyler

john@maxvalue.com

303-693-0067 (Denver, Colorado; GMT -6 or -7).

Copyright © 2016 by John R. Schuyler. All rights reserved.

