

## Tree Workbook Companion Guide

### Overview

With TreeAge Pro 2008 Candidate Release 1.0, the Excel module added a new function to create a *Tree Workbook*, which is specifically designed to communicate with a TreeAge Pro tree document. A *Tree Workbook* allows you to perform two main functions:

- View and update tree input values.
- Execute and export analysis output data.

The *Tree Workbook* serves as a de facto Excel front-end for your model.

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### Input Data

When the *Tree Workbook* is created, it imports data from the tree and places the data in a series of Excel worksheets. Each data worksheet will be discussed later in this document.

### Output Data (Updated in v2009)

The *Tree Workbook* executes three types of analysis:

- Cost-Effectiveness Analysis.
- Monte Carlo Simulation.
- 1- and 2-Way Sensitivity Analysis

Specific worksheets that execute analyses and handle the output will be discussed later in this document.

## Requirements

You must meet the following requirements to create a *Tree Workbook*:

- A current TreeAge Pro license including the Excel Module (either the TreeAge Pro Suite or TreeAge Pro Excel product).
- Microsoft Excel 2000 or later.

## Create a Tree Workbook

To create a *Tree Workbook*, simply select TreeAge > Create Tree Workbook from the Excel menu. This will immediately create a new *Tree Workbook* with a series of worksheets, each with its own purpose.

Additional functions of the *Tree Workbook* are triggered by command buttons within the workbook.

## Custom Worksheets

The *Tree Workbook* is separated into the following series of worksheets, described in detail on the following pages:

- *Control Worksheet*
- *Variables Worksheet*
- *Tables Listing Worksheet*
- *Table Worksheets*
- *Distributions Worksheet*
- *Analysis Input and Output Worksheets (various)*

### Control Worksheet (Updated in v2009)

One of the *Control Worksheet*'s primary functions is to store the tree document filename. This is a critical link back to the tree document. ***The tree filename should never be changed manually or this link will no longer function.***

The *Control Worksheet* also facilitates a few file system options for the tree document. The **Reopen Tree** command button will open the tree document in an existing or new TreeAge Pro application window. If the tree document is already open, that document will be activated as the top document in the application window.

The **Save/Rename Tree** command button will save the tree document similar to using the TreeAge Pro application's Save As menu command. Note that this will save the tree document rather than the *Tree Workbook*. To save the *Tree Workbook*, use the existing Excel File menu.

In addition, the *Control Worksheet* has command buttons for executing analyses – **Run CE Analysis** and **Prepare MC Simulation**.

The **Run CE Analysis** button executes a cost-effectiveness analysis. As soon as the analysis completes, the CE graph and text report are imported into a new *Cost-Effectiveness Output Worksheet* (see below). The node option next to the command button is used to specify whether to run the analysis from the root node or from the node that is currently selected in TreeAge Pro.

The **Prepare MC Simulation** button does not immediately run the simulation because simulation parameters must be provided first. Therefore, the button creates a new *Monte Carlo Execution Worksheet* (see below) to allow you to provide those parameters.

The **Sensitivity Analysis** buttons execute an analysis immediately after gathering parameters and ranges using dialog boxes. As soon as the analysis completes, the graph and text report are imported into a new *Sensitivity Analysis Output Worksheet* (see below). The node option next to the command button is used to specify whether to run the analysis from the root node or from the node that is currently selected in TreeAge Pro.

## Variables Worksheet

The *Variables Worksheet* is used to view and update all variables that are defined at the root node. In order to avoid confusion, only root node (default) definitions are presented.

When the *Tree Workbook* is created, each variable defined at the root node is imported to excel with its definition, description, and comments. The root node variable definitions can be updated in Excel. Clicking the **Update Variables in Tree** button will send every new definition back to the tree within TreeAge Pro. Note that the tree document must be saved for the new definitions to be stored permanently with the tree.

Clicking the **Refresh Variables from Tree** will refresh the definitions in Excel with the definitions from the tree within TreeAge Pro.

It is possible to export variable definitions from other nodes into Excel via the TreeAge Pro Variables and Tables window. However, root-specific definitions are not supported in the *Tree Workbook*.

## Tables Listing Worksheet

The *Tables Listing Worksheet* presents a listing of all tables that are referenced or could be referenced by the tree.

TreeAge Pro package files are used to store tables with a tree in a single document. Since package tables are already associated with the tree, they are automatically imported – generating a *Table Worksheet* for each.

Global tables are stored in the tables folder on your computer or network. They may or may not be referenced by a specific tree. Therefore, global tables are not automatically imported. However, any global table can be imported by selecting the row for that table from the list, then clicking the **Import Table for Selected Row** button. The manual import process generates a *Table Worksheet* for the selected table.

## Table Worksheets

A *Table Worksheet* is created for every table that is imported into the *Tree Workbook*, automatically or manually. Each *Table Worksheet's* Excel worksheet name will match the name of the associated table.

Each *Table Worksheet* contains all information related to the TreeAge Pro table, including the table name, the table data, how to handle missing rows, etc.

Clicking the **Update Table in Tree** button will send the updated table properties and data back to TreeAge Pro for use within the model.

There is no refresh option in the *Table Worksheet*. However you can re-import the table data from the *Tables Listing Worksheet*, and a new *Table Worksheet* will be created with the table data from TreeAge Pro.

## Distributions Worksheet

The *Distributions Worksheet* is very similar to the *Variables Worksheet*. Each distribution is presented in a list with all property data, including variable name, description, distribution type, distribution arguments, etc.

The **Update Distributions in Tree** button will update all the distributions in the TreeAge Pro document with the data from Excel.

The **Refresh Distributions from Tree** button will re-import all the data from Excel from the distributions in the TreeAge Pro document.

Two columns, “Help/Explanation” and “Sample Rate Desc”, are used to provide guidance on how the arguments, option, and sample rate are used by that specific distribution type. Please note that these fields do not update automatically when the distribution properties are updated in Excel. They can be updated by updating the distributions in TreeAge Pro then refreshing the Excel data (see buttons above).

## Cost-Effectiveness Output Worksheet

As described earlier, the *Control Worksheet* can execute a cost-effectiveness analysis on a tree. When the analysis is executed, the *Cost-Effectiveness Output Worksheet* captures the cost-effectiveness output. Specifically, the cost-effectiveness graph and text report are imported and presented in Excel.

## Sensitivity Analysis Output Worksheet (Updated in v2009)

As described earlier, the *Control Worksheet* can execute a 1- or 2-way sensitivity analysis on a tree. When the analysis is executed, the *Sensitivity Analysis Output Worksheet* captures the sensitivity output. Specifically, a line graph and text report are imported and presented in Excel.

## Monte Carlo Execution Worksheet

As described earlier, the *Control Worksheet* cannot execute a Monte Carlo simulation directly. Instead, the *Control Worksheet* creates a *Monte Carlo Execution Worksheet*.

The *Monte Carlo Execution Worksheet* provides three functions:

- Supply parameters for a Monte Carlo simulation.
- Execute a Monte Carlo simulation.
- Import Monte Carlo simulation output.

The Monte Carlo simulation parameters include the analysis node, the number of trials, the number of samples, etc. Default values are provided for each parameter. Invalid parameters can cause a Monte Carlo simulation to fail even with a valid tree.

Click the **Run Analysis** button to send the parameter values to TreeAge Pro and execute the analysis. Back in the TreeAge Pro application window, you will see the simulation window which shows the progress of the simulation.

The simulation results are not handled immediately upon completion of the analysis. Rather, the *Monte Carlo Execution Worksheet* contains two buttons for handling simulation results.

The **Get Stats Report** imports the simulation's stats report into a new *Monte Carlo Output Worksheet* while the **Get Text Report** does the same with the simulation's text report. No other simulation output is currently handled by the *Tree Workbook*.

Note that simulation output can exceed the limit on rows and columns native to Excel. The parameter values "Max Output Rows" and "Max Output Cols" set limits on the data imported into a single *Monte Carlo Output Worksheet*, possibly breaking up the total output into a set of worksheets. The default values for "Max Output

Rows” and “Max Output Cols” are set to meet the requirements for Excel 2003. With Excel 2007, these limits can be set significantly higher.

## Monte Carlo Output Worksheets

*Monte Carlo Output Worksheets* display text output from Monte Carlo simulations. The name of the worksheet refers back to the *Monte Carlo Execution Worksheet* from which the output was imported. It also uses numbers at the end of the worksheet name to track the run number, the row group, and the column group as follows:

Example Worksheet Name: “MC-1-Stats.2.3.4”

- “MC-1” – Pulled from the first Monte Carlo Execution Worksheet (MC-1-Run).
- “Stats” – Output type for a Stats report. This value would be “Text” for a Text report.
- “2” – Indicates that this is the second report output of this type processed by the *Monte Carlo Execution Worksheet* MC-1-Run.
- “3” – Third row group of the total number of *Monte Carlo Output Worksheets* generated for this output report.
- “4” – Forth column group of the total number of *Monte Carlo Output Worksheets* generated for this output report.

## Note on Data Scenarios

A *Tree Workbook* can be used to store a set of data values for your tree, which can be thought of as a *Data Scenario* for the model.

For example, you could have a model that needs to run under four sets of data values. You could create a *Tree Workbook* for the tree, then save four copies of the *Tree Workbook* to represent four distinct *Data Scenarios*. Then, if you changed your tree and needed to run analyses for each *Data Scenario*, you could simply open the *Tree Workbook* for the first *Data Scenario*, run the analyses, and then repeat for the other three *Tree Workbooks*.

## To Avoid Errors

When using the *Tree Workbook*, here are some things to avoid:

**Do not move cells or add rows/columns.** The *Tree Workbook*’s functions will look for data in specific cells of worksheets it creates within the workbook. If you change the location of those cells, some functions may fail. You may instead want to insert your own, customizable worksheets into the workbook.

**Do not modify field/column tables.** The *Tree Workbook's* functions will look for data in cells next to field labels or below column labels. If you change labels created by the Tree Workbook, some of its functions may fail.

**Do not open multiple TreeAge Pro application windows.** The *Tree Workbook* (and the *TreeAge Pro Object Interface* in general) will always grab the first TreeAge Pro application window that was opened. If you open your tree in a second application window (for example, by double-clicking on a tree in an e-mail), Excel may not communicate with the TreeAge Pro application window you expect.

### **Access to Source Code, Support**

We will make the underlying *Tree Workbook* Visual Basic code publicly available. This will allow you to use the code as a guide to the *TreeAge Pro Object Interface*. In addition, you may be able to improve and enhance the code.

However, modifying the code may cause it to fail. We may not be able to support your modified Visual Basic code if it fails to work correctly, and you may need to reinstall the TreeAge Pro Excel Add-in.

If you have suggestions for changes to the code, please email them to [support@treeage.com](mailto:support@treeage.com).