

IBM Rational Focal Point

Working with Financier

Version 6.4.1

Before using this information and the product it supports, read the information in Appendix. Notices.

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Getting Started with IBM Research Financier in Focal Point

Use Financier to build financial models of expected cost and benefit estimates of your project over time. Estimates are, by definition, uncertain quantities. To express the uncertainty of your estimates, Financier allows you to input values for likely, or nominal, estimates with high and low bounds. Financier then analyzes the bounded estimates and computes a likely net present value (NPV) for the project's life.

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Logging In

To access Financier, first login with you Focal Point credentials (Fig. 1).

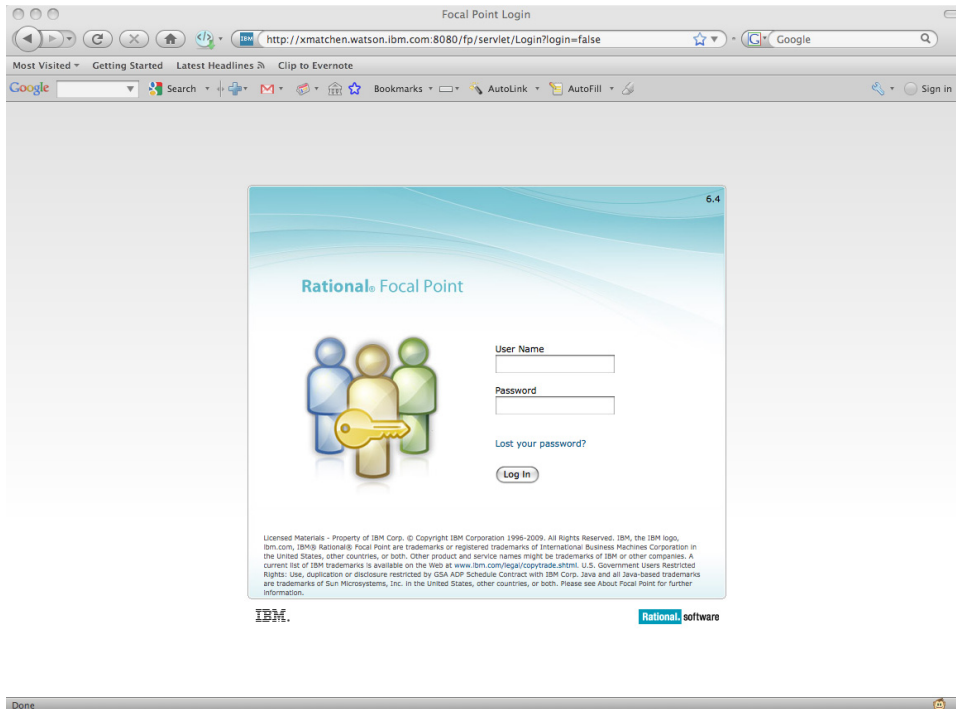


Figure 1 – FocalPoint login screen

Select Financier Test Workspace from My Workspaces. Select Modules and then Financier Projects from the left navigation window (Fig. 2).

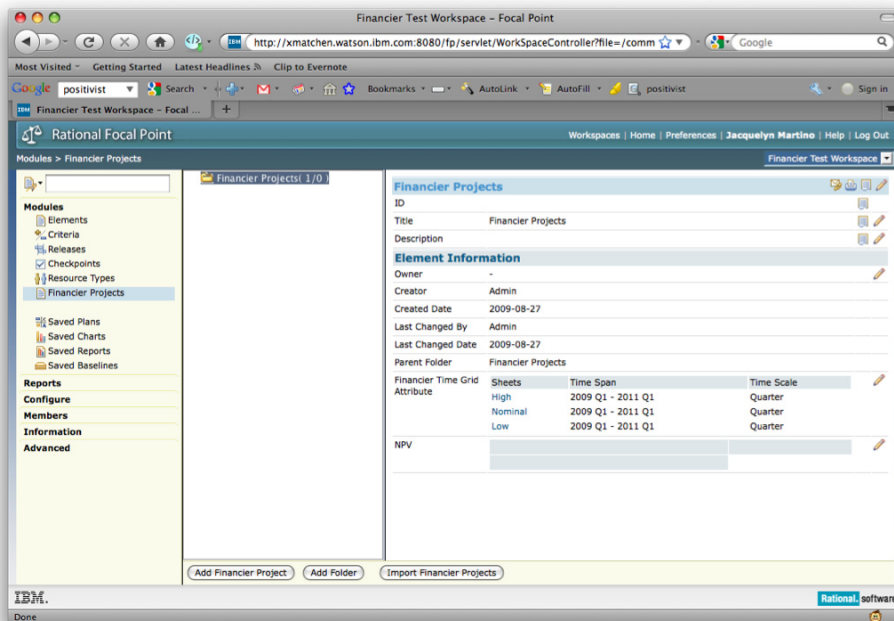


Figure 2 – Setting up a project

Creating a new project

In Financier, a project corresponds to a single financial model of a development project. Create a new Financier project by selecting the Add Financier Project button from the bottom of the interface. Enter information about the project such as a Title and a Description using the available fields. Define the project start and end dates using the Financier Time Grid Attribute (Fig. 3).

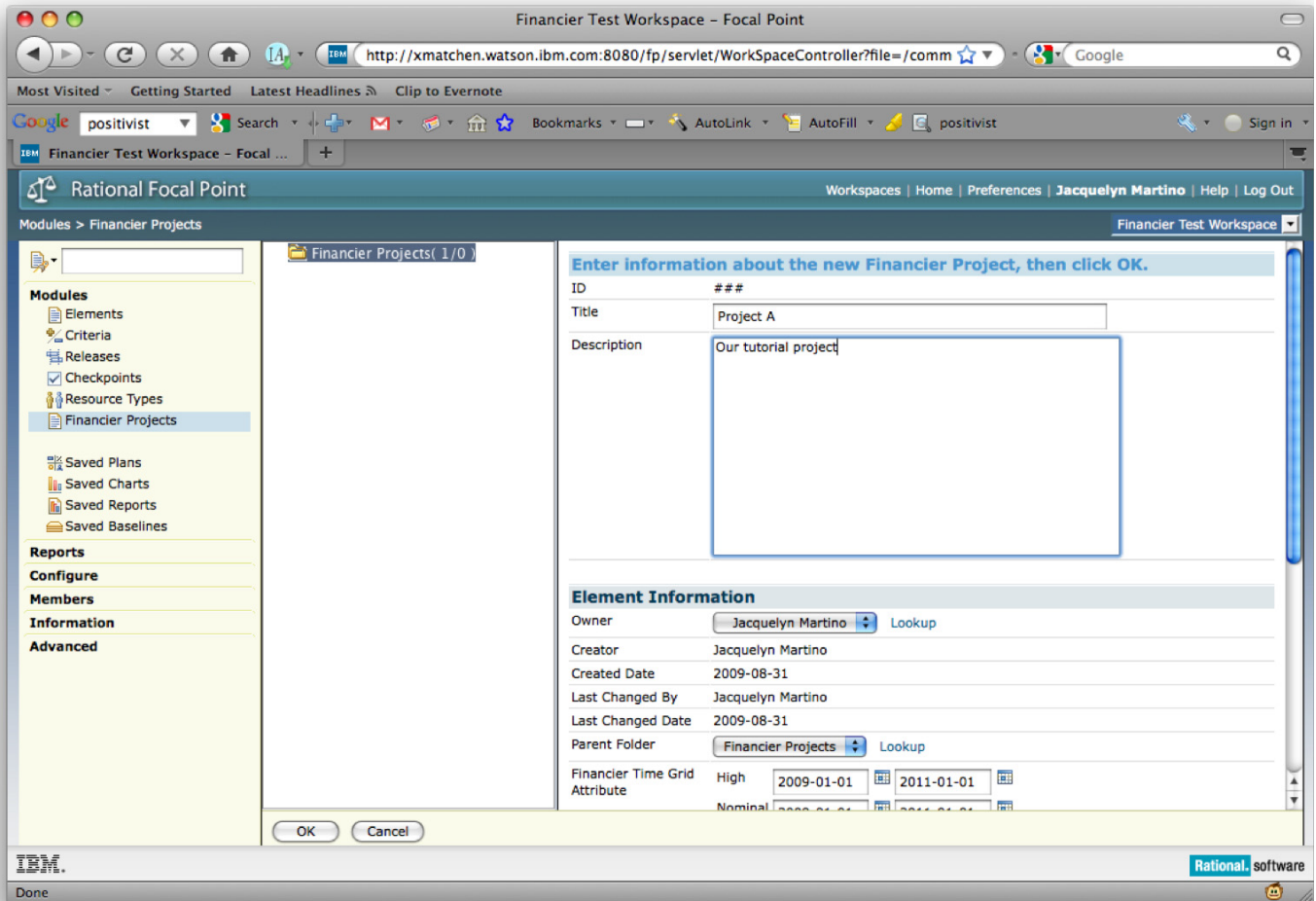


Figure 3 – Enter project details and confirm with OK

! The time grid start and end dates must be exactly the same for each of the High, Nominal and Low data inputs.

Financier Time Grid Attribute	High	Nominal	Low
	2009-01-01	2009-01-01	2009-01-01
	2011-01-01	2011-01-01	2011-01-01

Save the new project by clicking the Ok button at the bottom of the interface (Fig. 3).

Building a model

The screenshot shows the Rational Focal Point web application interface. The browser address bar displays the URL: `http://xmatchen.watson.ibm.com:8080/fp/servlet/WorkSpaceControl`. The application title is "Financier Test Workspace - Focal Point". The user is logged in as "Jacquelyn Martino".

The interface is divided into several sections:

- Left Navigation Panel:** Contains a tree view for "Financier Projects" and a list of modules including Elements, Criteria, Releases, Checkpoints, Resource Types, and Financier Projects (selected). Other sections include Saved Plans, Saved Charts, Saved Reports, Saved Baselines, Reports, Configure, Members, Information, and Advanced.
- Center Panel:** Shows a folder structure for "Financier Projects(1/1)" containing "003:Project A".
- Right Panel (Project A Details):** Displays project information such as ID (003), Title (Project A), Description (Our tutorial project), Owner (Jacquelyn Martino), Creator (Jacquelyn Martino), Created Date (2009-08-31), Last Changed By (Admin), and Last Changed Date (2009-09-01). It also shows the Parent Folder (Financier Projects).
- Financier Time Grid Attribute Table:** A table with columns: Sheets, Time Span, and Time Scale. The 'Nominal' link in the 'Sheets' column is highlighted.

Financier Time Grid Attribute	Sheets	Time Span	Time Scale
	High	2009 Q1 - 2011 Q1	Quarter
	Nominal	2009 Q1 - 2011 Q1	Quarter
	Low	2009 Q1 - 2011 Q1	Quarter

At the bottom of the right panel, there are buttons for "Add Financier Project", "Add Folder", "Turn Into Folder", "Delete", and "Import Financier Projects".

Figure 4 - Select the link Nominal in the Sheets column of the Financier Time Grid Attribute

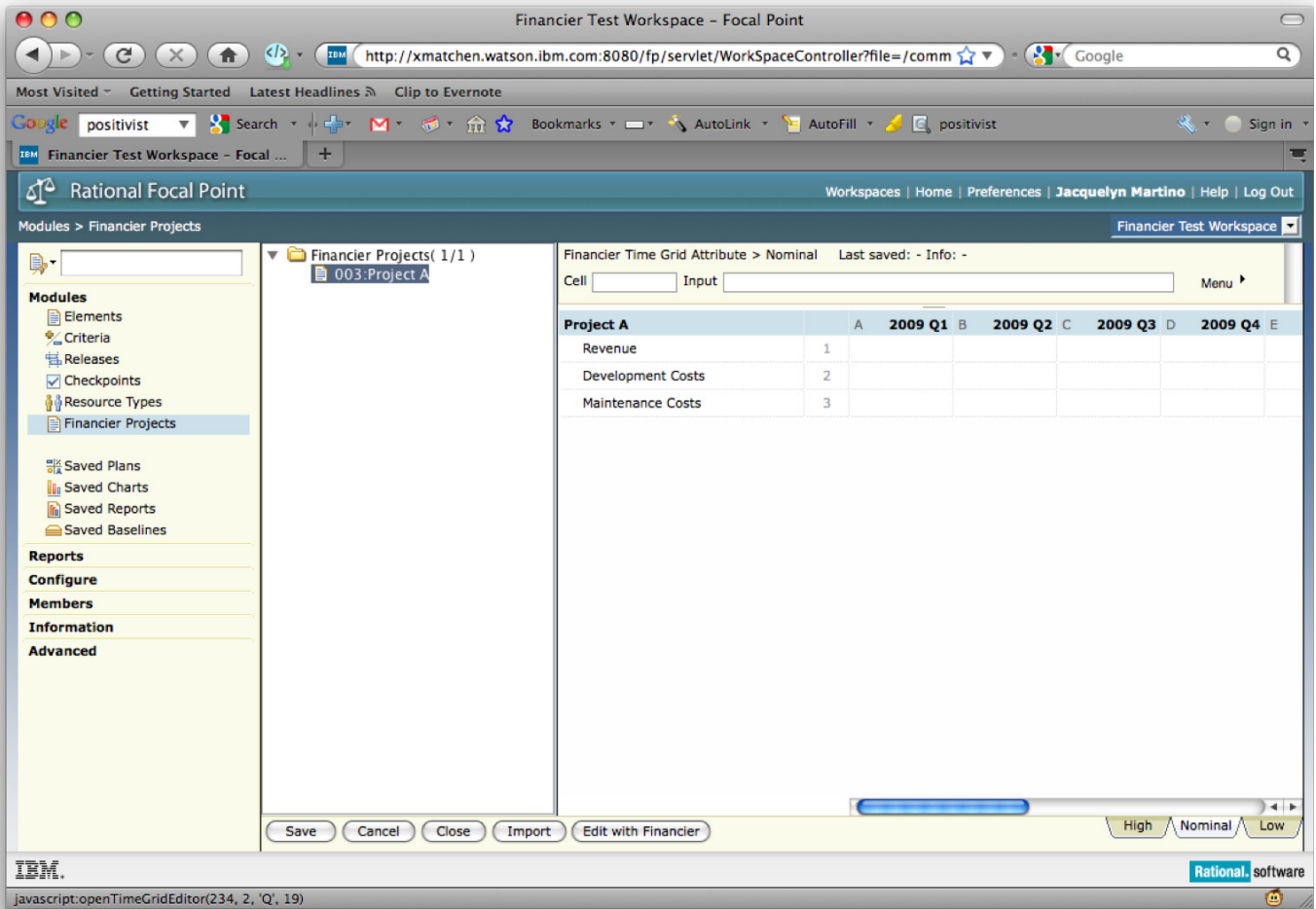


Figure 5 – Launch Financier from the Edit with Financier button

To build a model, you must enter estimated values (low, nominal, high) for costs and benefits over the life of the project.



The easiest way to enter and edit these values is via the Financier interface.

While still in Focal Point, select the link Nominal in the Sheets column of the Financier Time Grid Attribute (Fig. 4). Launch Financier from the Edit With Financier button at the bottom of the interface (Fig. 5).

Financier opens in a new browser window (Fig. 6). The project appears in tab. To the right side of the project tab, the Current Project Stats pane displays the project dates and duration and computed simulation values for the project.

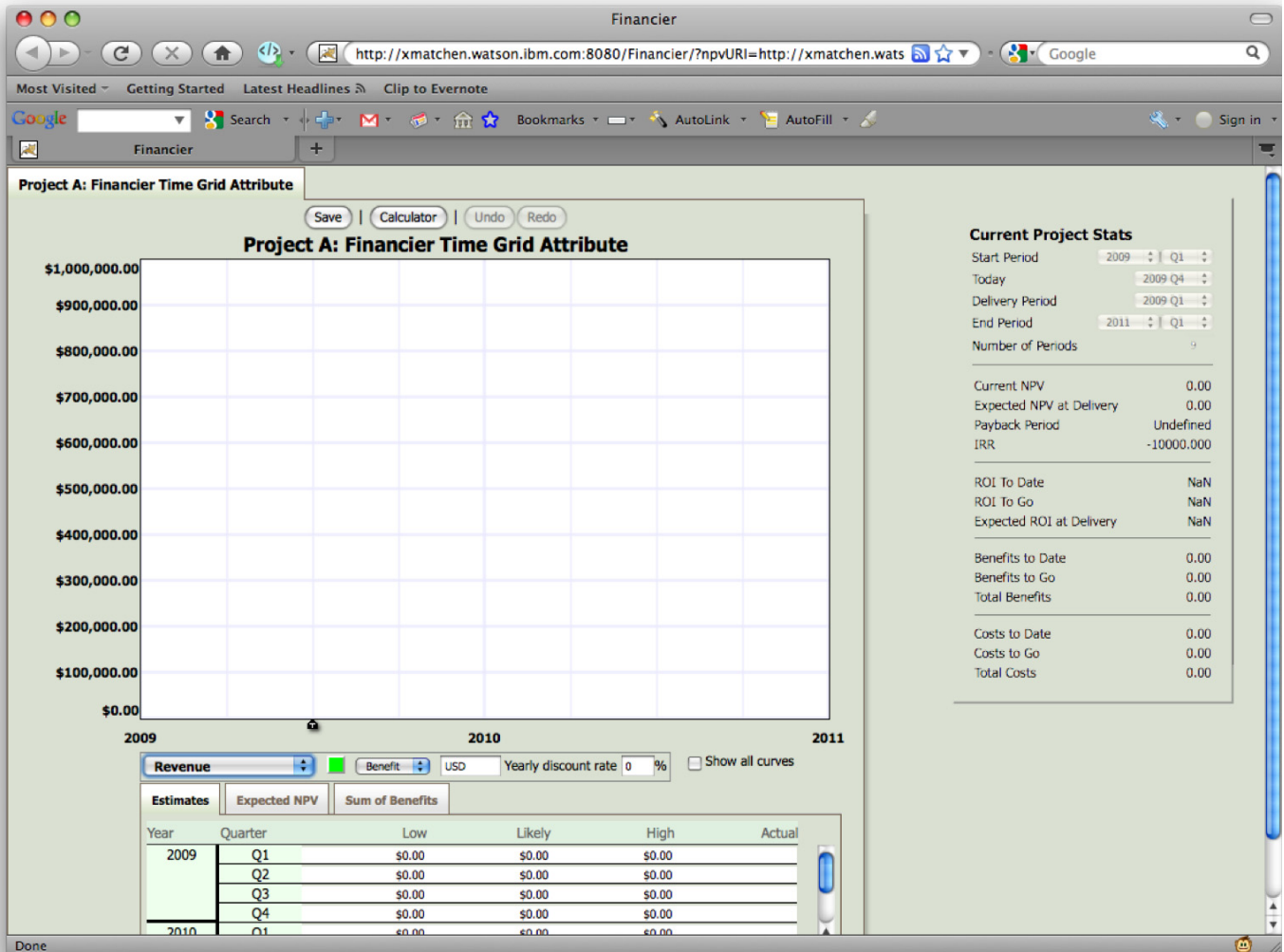


Figure 6 – Project open in Financier

Financier allows you to manipulate the data estimates of one cost or one benefit at a time. The first step to inputting data is to choose which cost or benefit to work with. To select a cost or benefit, select one from the pull-down list below the graph paper grid.

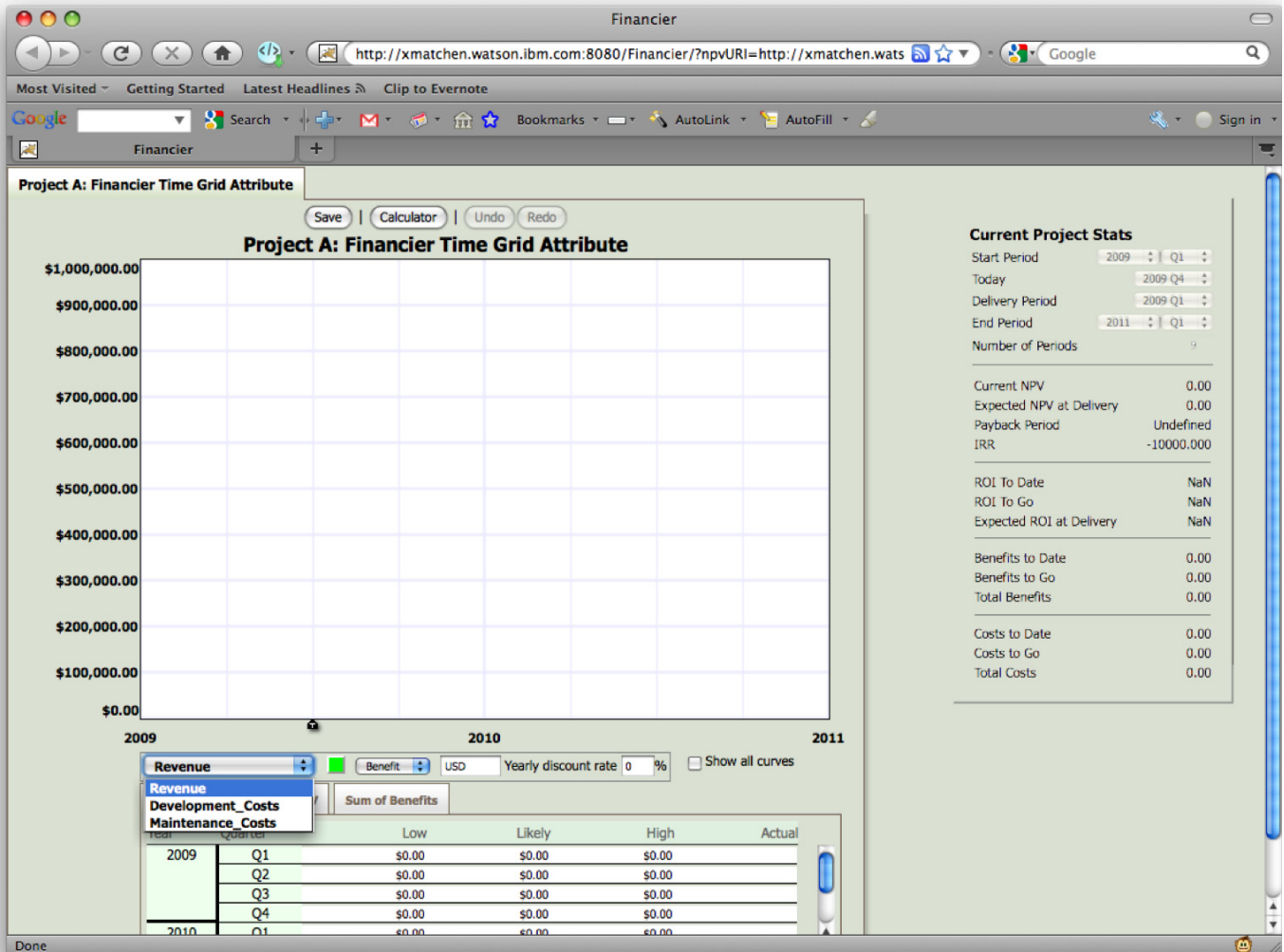


Figure 7 – Default Benefit and Cost sheets.

The default model defines one benefit and two costs on individual project Sheets as follows (Fig. 7):

- Revenue - the real benefits derived from the success of the project.
- Development Costs - the cost of development associated with the project.
- Maintenance Costs - the cost of maintaining the project throughout its lifetime.

In addition to entering data points for each benefit or cost in your model, you may also define units and discount rates over the life of the project. Once you have selected a cost or benefit to work with, you are ready to input your data estimates. Financier supports two methods for entering the estimates into a model: Graphical Data Entry and Spreadsheet Data Entry.

Graphical Data Entry

Graphical data entry allows you to input rough estimates rapidly. Working directly on the graph paper grid portion of the interface, you point and click to generate data points for quick what-if scenarios.

To plot a point on the graph paper, move the mouse over the grid area. Notice that a point appears at the mouse location. On the vertical axis, you will see the value for the point. On the horizontal axis, you will see the time period for the point. Move the mouse to the desired value, time coordinates and click to enter the data point. This newly entered data point is the likely, or nominal, estimate for the desired value, time pair (Fig. 8).

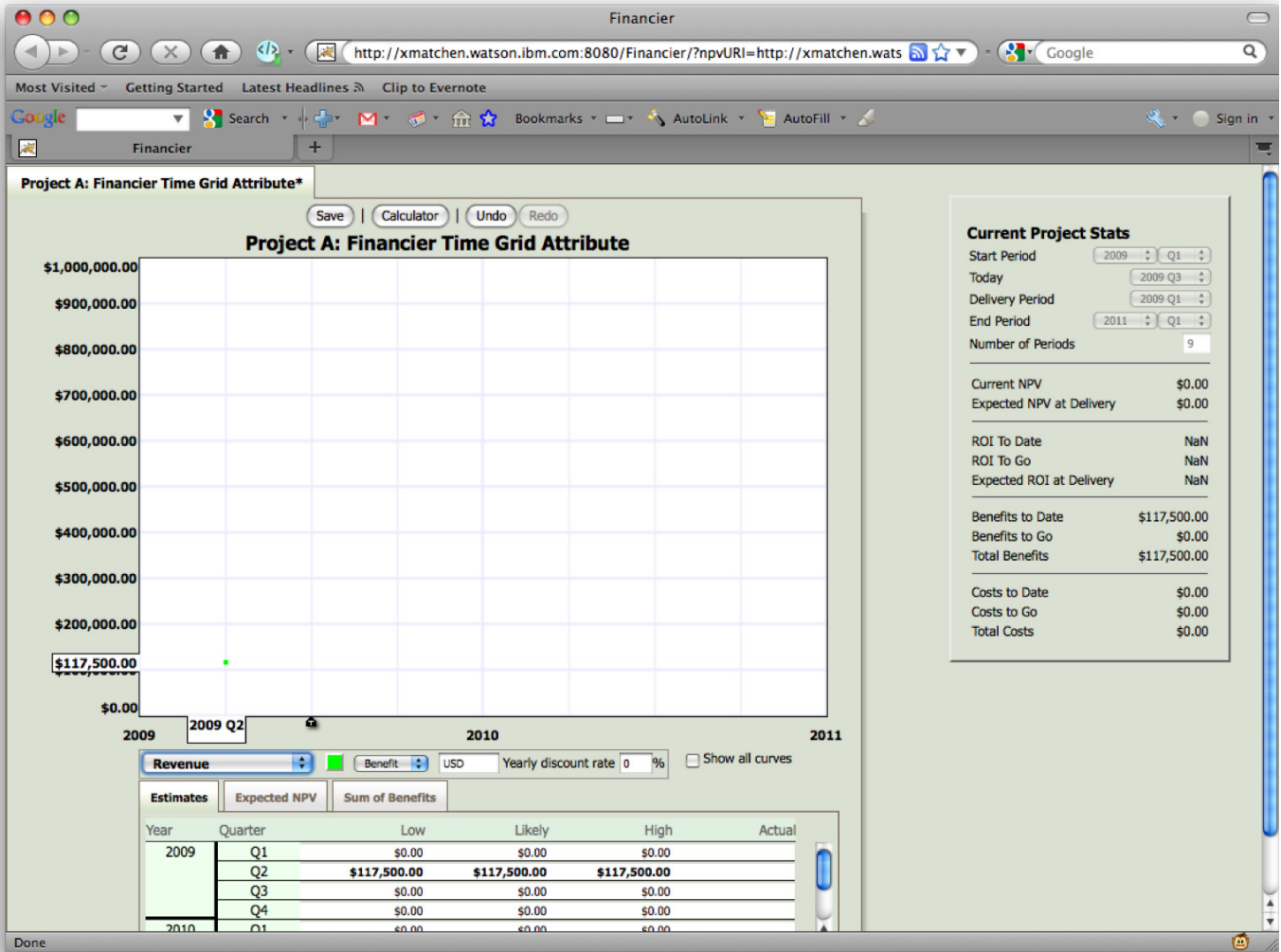


Figure 8 – Graphical data entry.



Notice that the project name in the tab now contains an * (asterisk) to signify unsaved data entered into the project.

To enter a second data point, move the mouse elsewhere on the grid. As you move the mouse within the grid area, the value and time axes will update to indicate the data point that your mouse is pointing to. While pointing to a desired value, time pair, click the mouse to enter the data point. Financier enters a new likely estimate and draws a line between the first and second estimates (Fig. 9).

Any data between the two estimates is interpolated based on the trajectory of the connecting line.

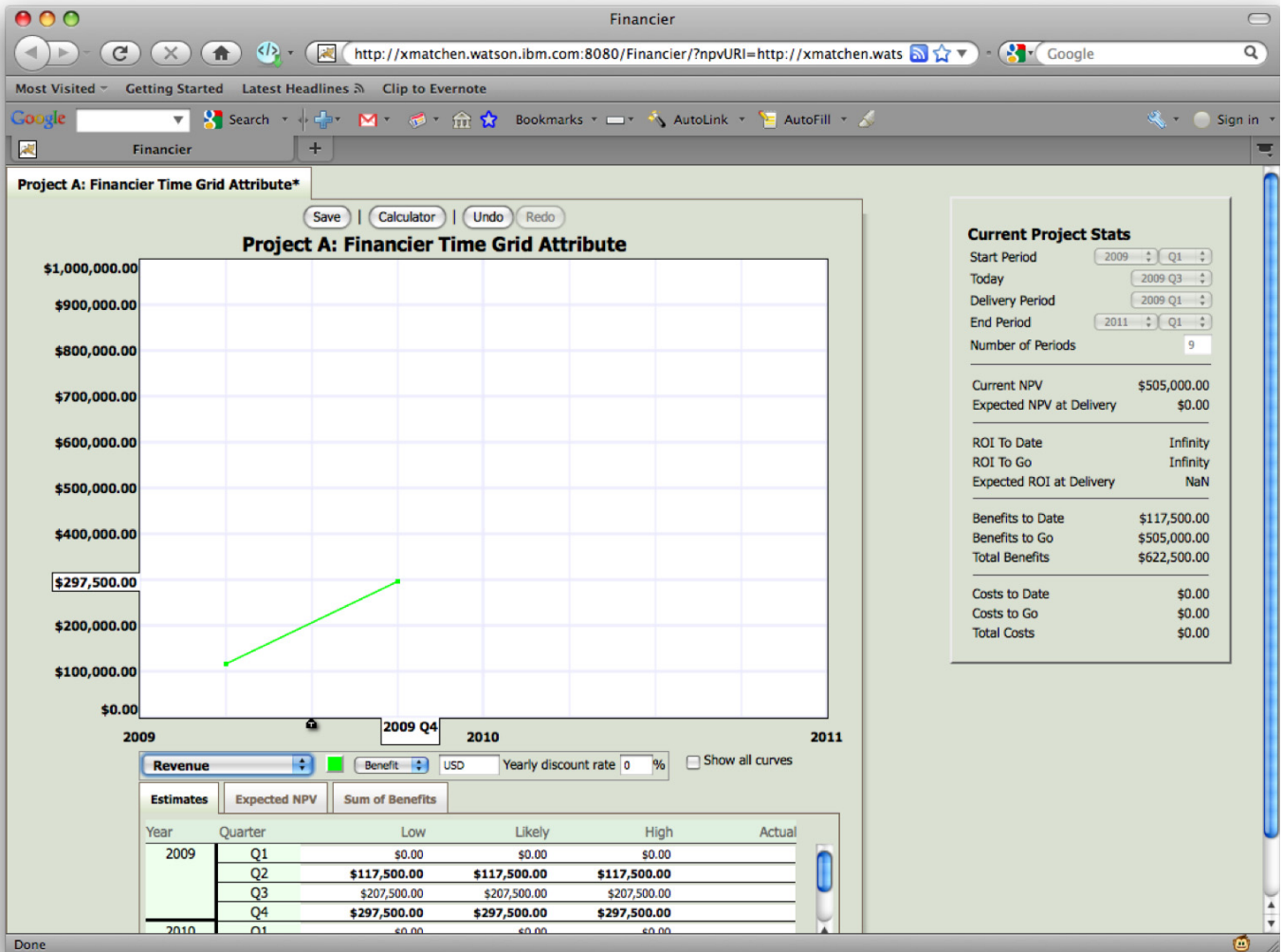


Figure 9 – Interpolation between two data entries.

To enter a third likely estimate, continue in a similar manner as above. Financier will draw a smooth curve from the data points and interpolate data from your explicit inputs (Fig. 10).

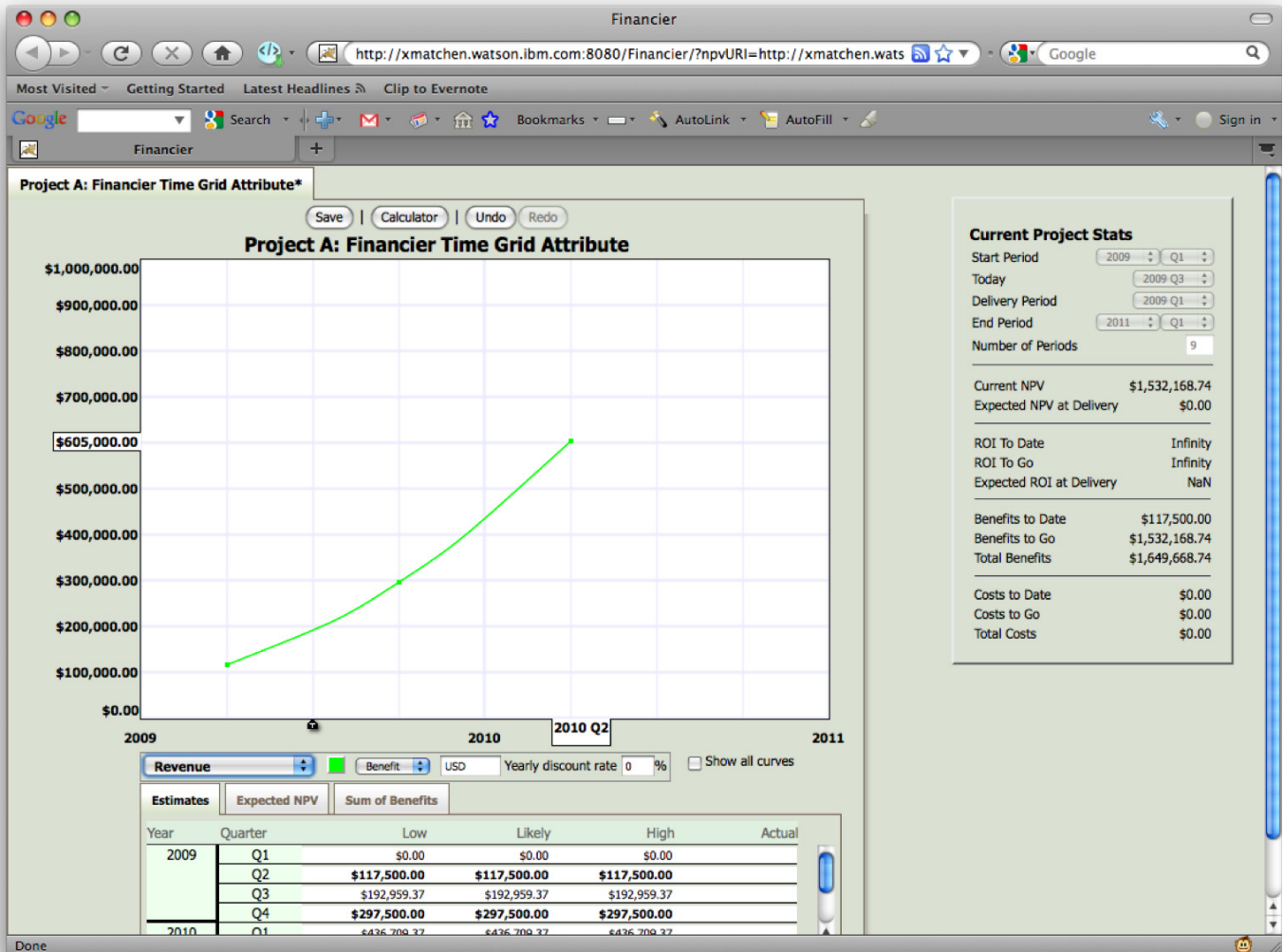


Figure 10 – Smooth curve from three data entries.

To add uncertainty to the current likely estimates, position your mouse above or below an existing data point. To add a high bound to a likely estimate, click the mouse above the data point (Fig. 11). To add a low bound to a likely estimate, click the mouse below the data point. Notice that the high and low bounds remain in the same time period as the original likely estimate.

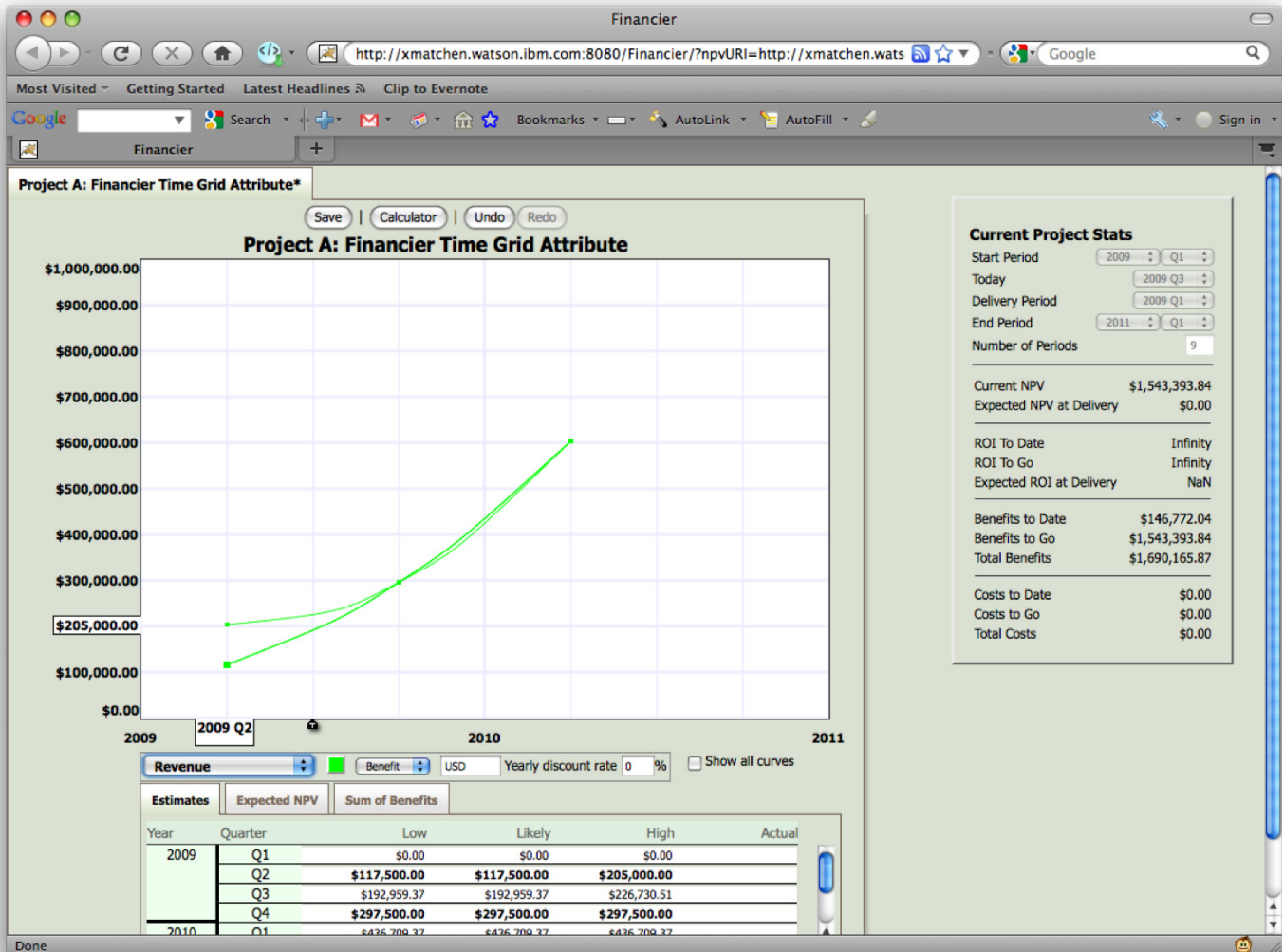


Figure 11 – Adding uncertainty to a data entry.

Also notice that if you add uncertainty to an interpolated data point, Financier will add a corresponding explicit likely data point to your model as well as the bounding data point (high or low) (Fig. 12).

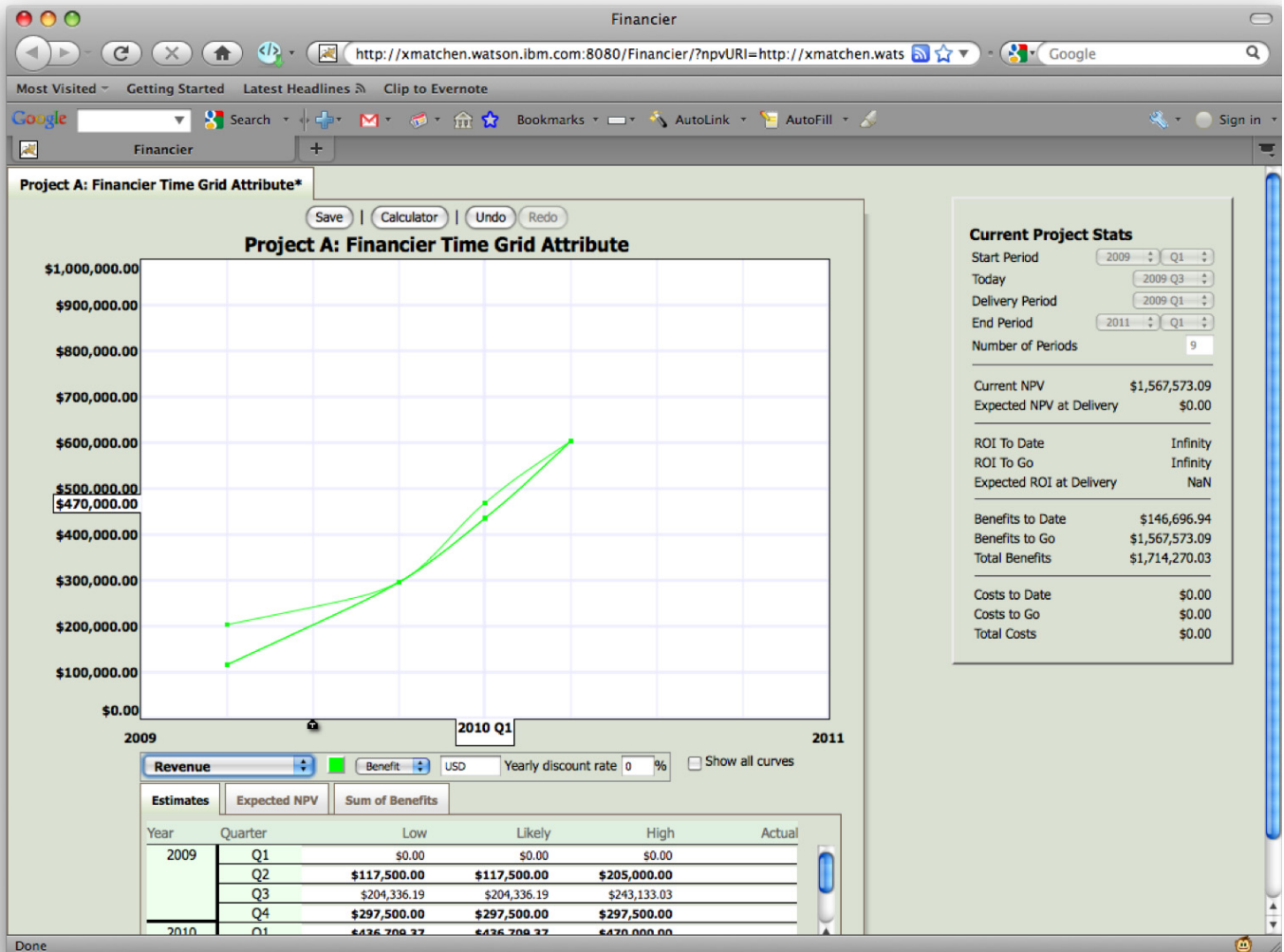


Figure 12 – Adding uncertainty to an interpolated data point.

To move a single data point--high, likely or low--position the mouse near the point you want to move and drag to the new value. Notice that a likely data point cannot be dragged higher or lower than an existing upper or lower bound, respectively. To move all the data points for a given time while maintaining their relative value relationship, hold the shift key while dragging the mouse to the new absolute values (Fig. 13).

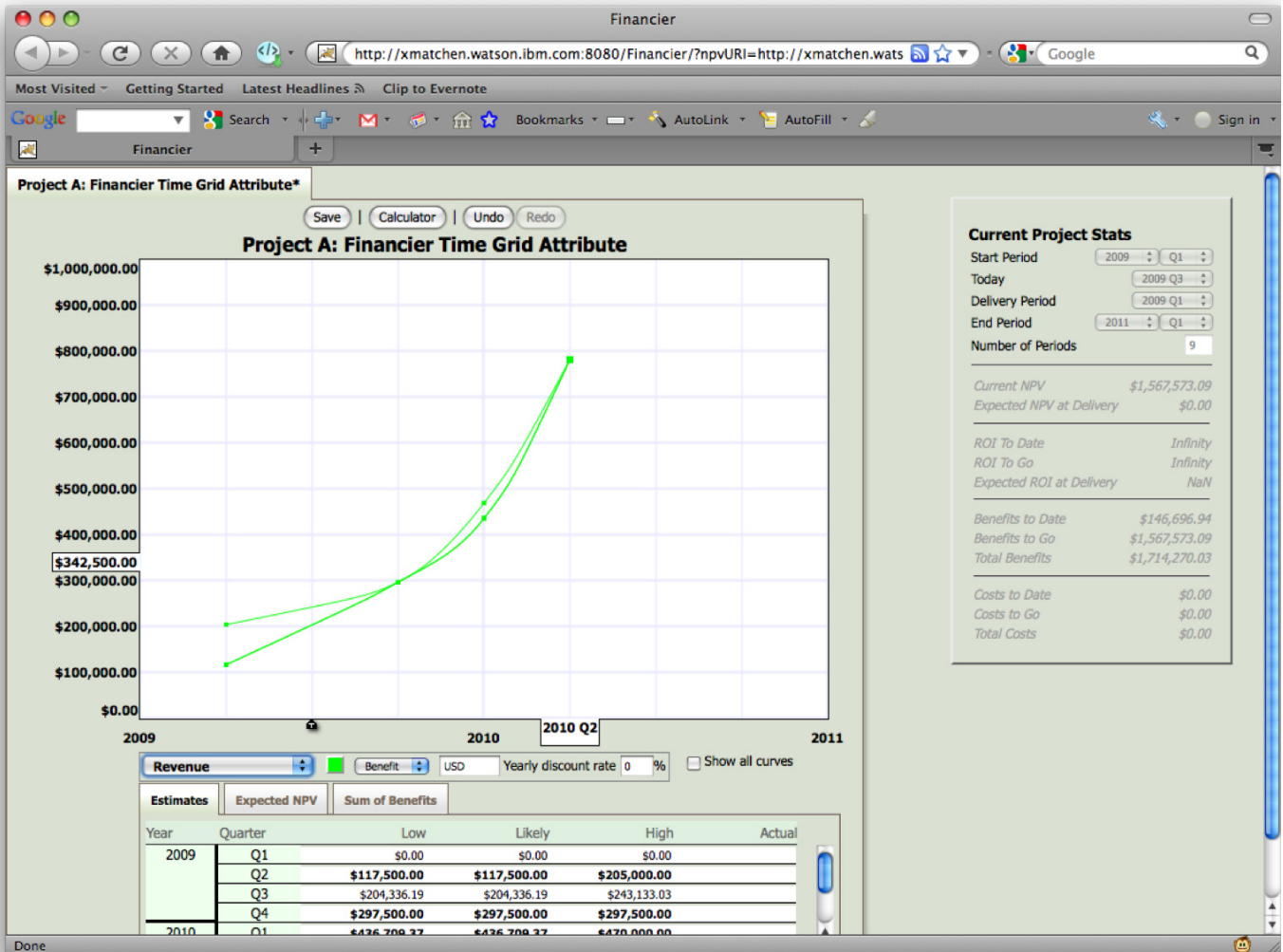


Figure 13 – Moving high, nominal, low data as a group.

Spreadsheet Data Entry

Spreadsheet data entry allows you to input data one value at a time in a more traditional approach (Fig. 14). Working directly in the Estimates tab below the graph paper grid, you enter values for specific time periods. To input an estimate, scroll the spreadsheet to the desired year and quarter and select the appropriate column for the data--low, likely, high. Type the value into the appropriate cell. To set the value, navigate out of the cell. To select a cell in the spreadsheet view, use the up and down arrow keys to move up or down one row. Use the tab or Shift-tab key to move to the next or previous column. You can also use the mouse to click directly on the desired cell. If you only enter one value for a given quarter, Financier will automatically set the remaining values to match your entered estimate.

To enter the next point, navigate to the next desired period and enter a value in any of the columns--low, likely, high. Once you navigate out of the second cell, Financier draws a line between your two IBM Research Financier

explicit inputs and interpolates where needed. Continue in this fashion. When more than two time periods have data, Financier draws a smooth curve among your entered points and interpolates the values along the curve to determine any unspecified estimates (Fig. 15).

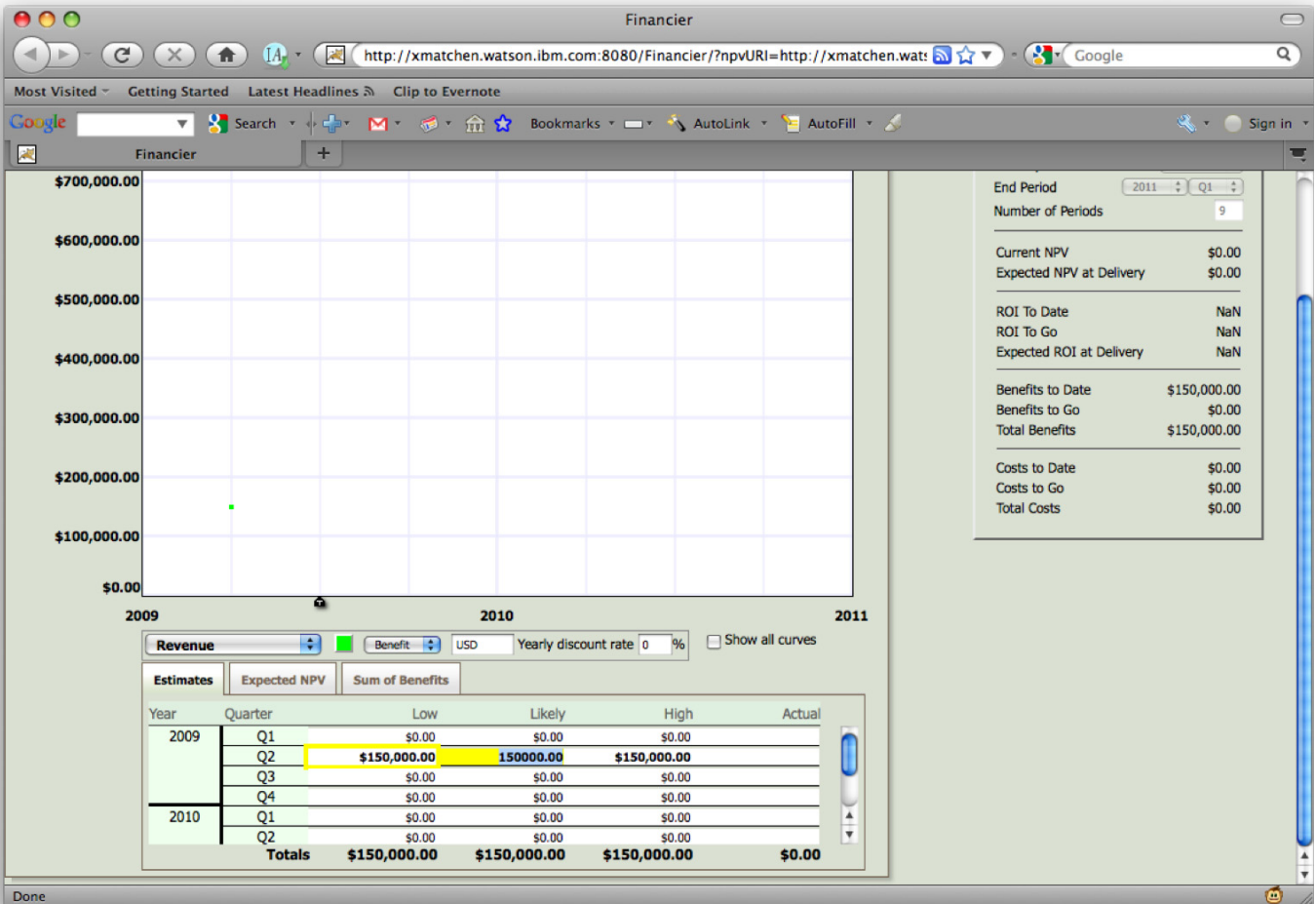


Figure 14 – Spreadsheet data entry.

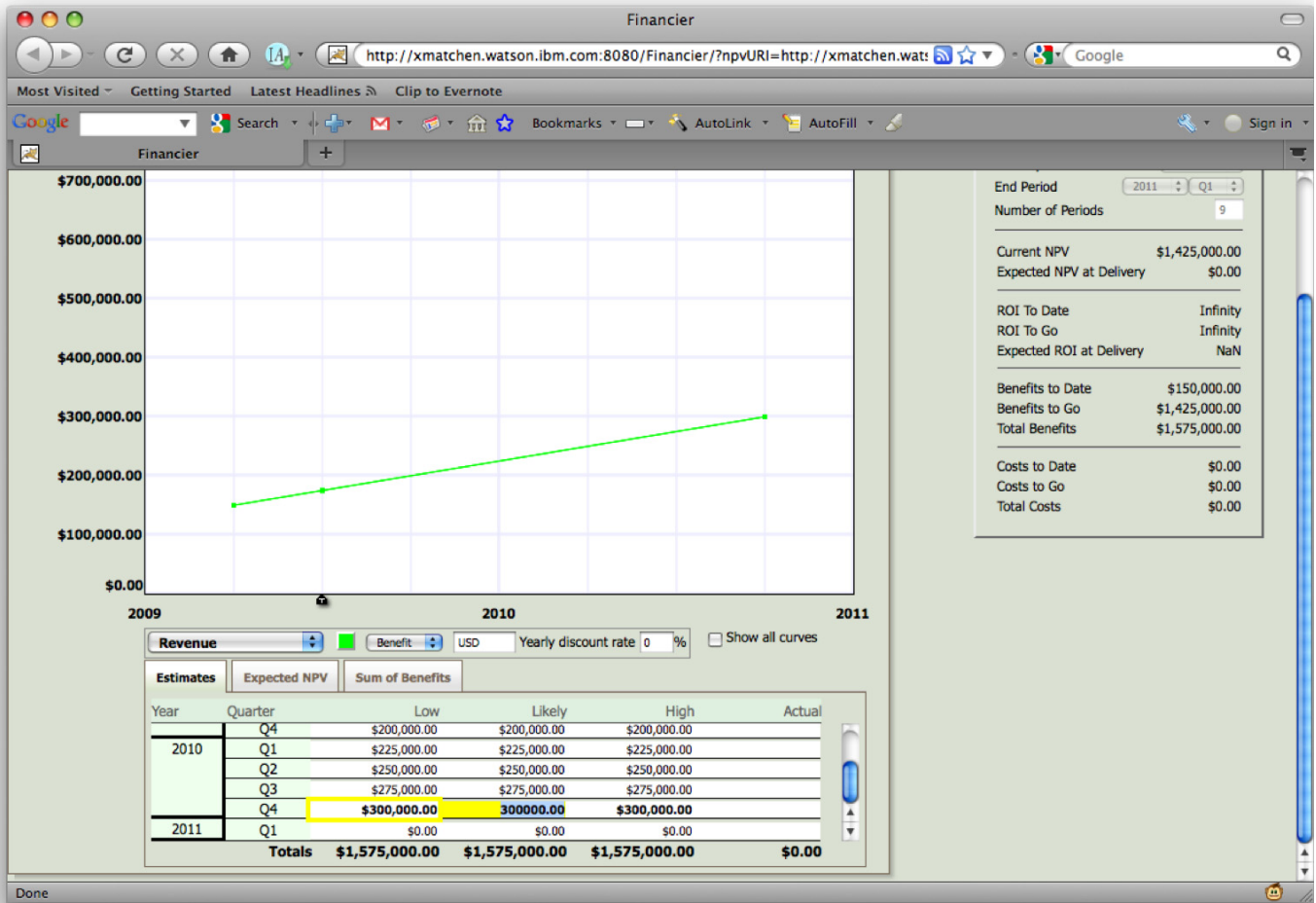


Figure 15 – Adding data with the spreadsheet.

Random Variable Calculator and Data Entry

Random Variable Calculator data entry allows you to input data based on complex calculations. Working in the calculator interface, you enter algebraic equations for your model and can then simulate low, likely and high values for each time period in a financial model. In this way, the calculator allows you to experiment with random variable arithmetic.

Accessing and managing multiple calculators

To access the Random Variable Calculator, click the calculator icon above the project title. You can create and destroy calculator models by using the New, Save, Duplicate and Delete buttons at the top of the calculator. You can retrieve saved models by name from the pull-down list also at the top of the calculator. To name and describe your models, edit the default title "New Calculator Tape" and input text in the area "Click here to enter a description..."

Inputing data

Once the calculator is open, you can make your inputs in either of the command line or the "paper tape" graphical user interface (Fig. 16). In the command line, you enter algebraic equations as two equal expressions. On the left-hand-side, you will enter either a variable or a constant. On the right-hand-side, you will enter a fixed value, a formula, or a distribution type. Named variables are of type Formula, Triangle or Normal. Named constants are of type Fixed.

Some examples:

At the command line type

$x = 100$ <enter>

$y = 10$ <enter>

$z = x*y$ <enter>

Or, in the graphical interface, click the + button and use the Name, Type and Value columns for your inputs.

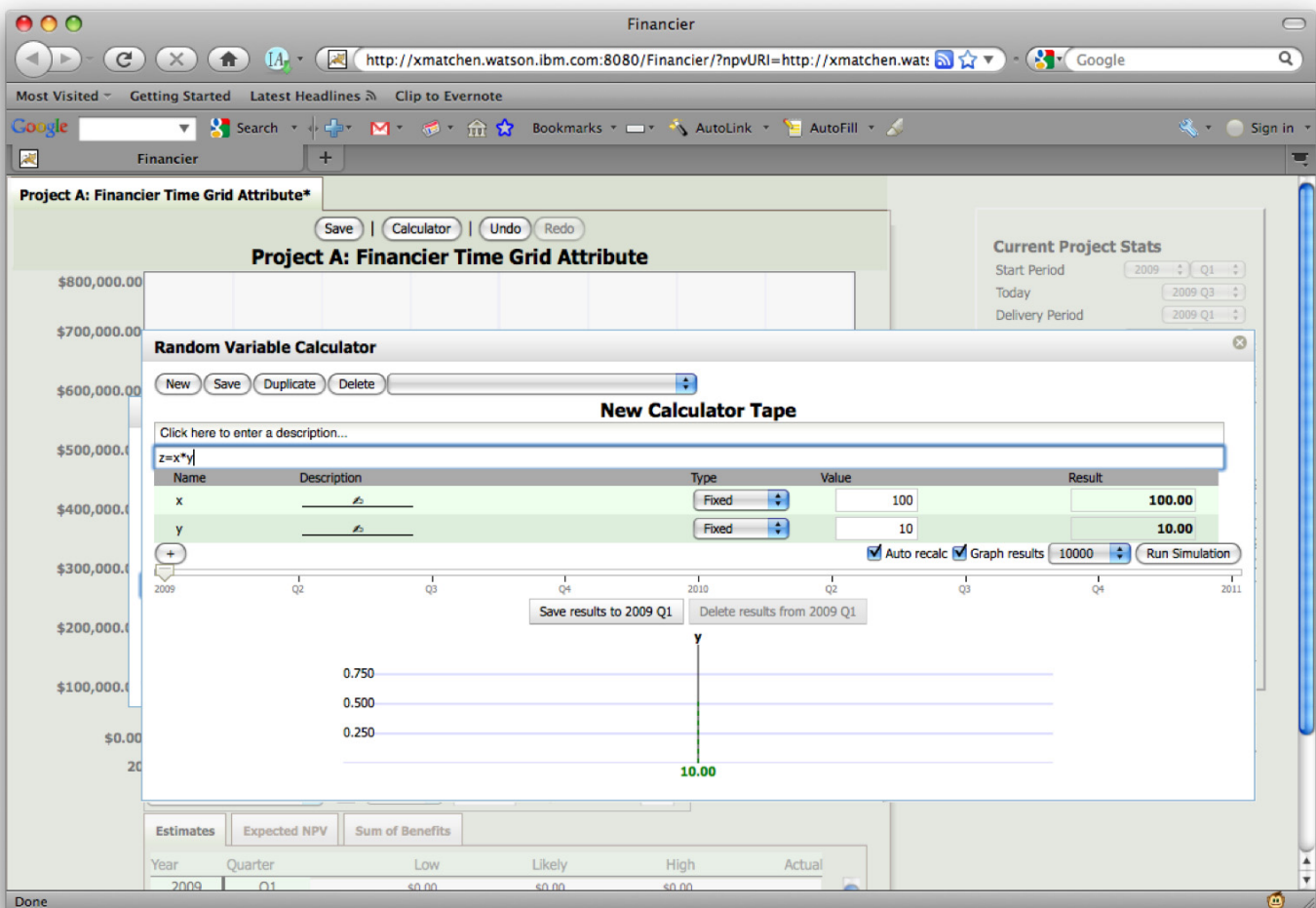


Figure 16 – Random variable calculator interface.

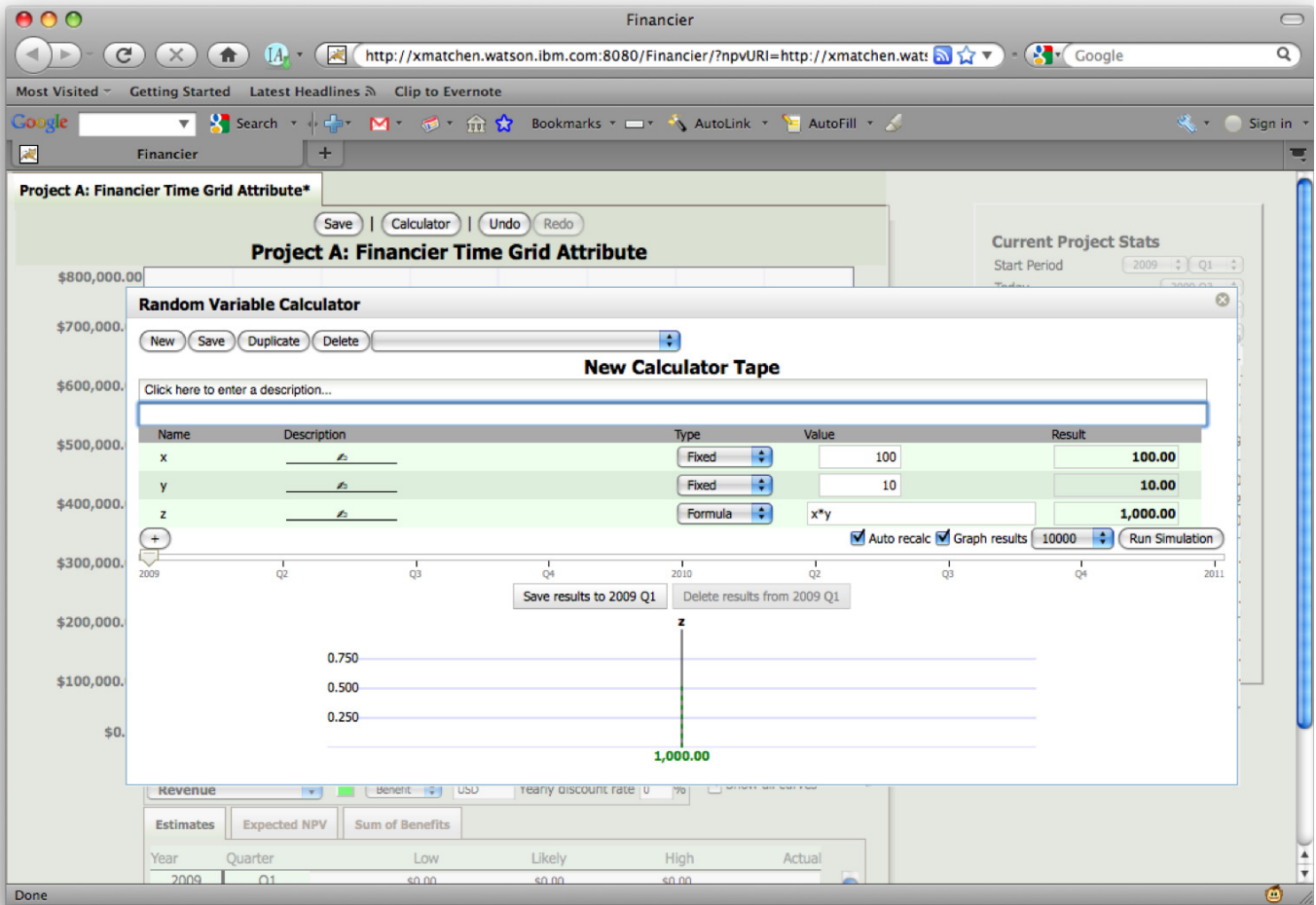


Figure 17 – Random variable calculator entries.

The calculator currently supports triangular and normal, or Gaussian, distribution types (Fig. 18). At the command line, you enter triangular distributions in the form $T(\text{low}, \text{likely}, \text{high})$ for e.g., $\text{numUsers} = T(4500, 6500, 8500)$ while in the graphical user interface you select Triangular from the pull-down in the Type column and input the low, likely, high data in the Value column fields. At the command line, you enter normal distributions in the form $N(\text{mean}, \text{standard deviation})$ for e.g. $\text{costPerUser} = N(100, 10)$

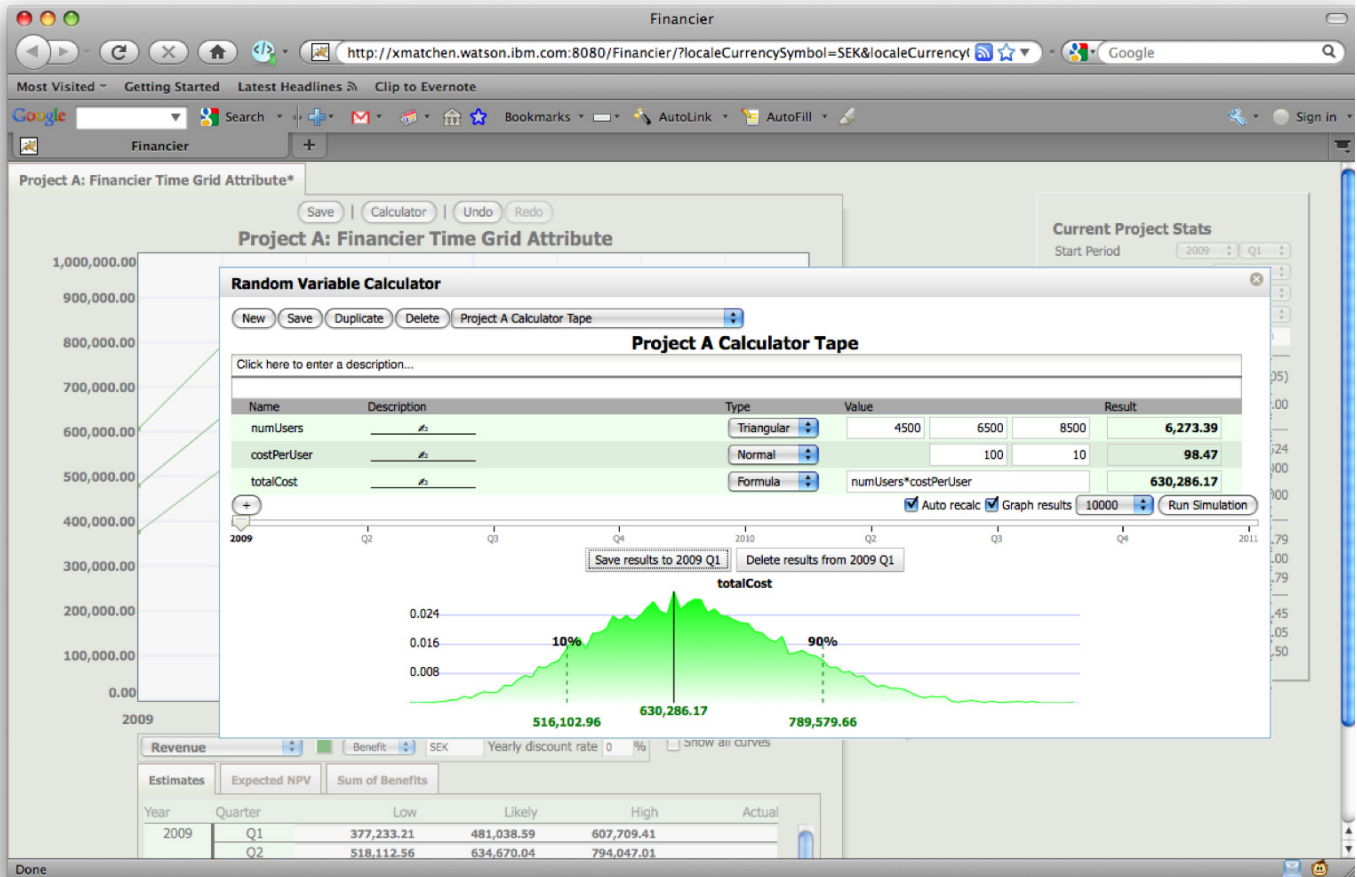


Figure 18 – Saving simulation results to a specific time period

while in the graphical user interface you select Normal from the pull-down in the Type column and input the mean, standard deviation data in the Value column fields. In defining your formulas, the calculator currently supports the four basic algebraic operations: addition, subtraction, multiplication, division, variables. In future, the calculator may also support powers and roots. Entry descriptions are supported in the graphical user interface only. Entering a named variable or constant with a name that is already in use results in a complete replacement of the previously named definition.

Expression execution order and editing

The calculator uses the paradigm of a "paper tape." Financier adds new inputs at the bottom of the tape and executes from top to bottom.

To delete an item from the paper tape, hover your mouse to the left of the variable name you want to delete. When you see the (x), click it to delete the line from the calculator

To change the position of a line in the paper tape, hover your mouse to the right of the result and click either the up or down widget to move the line up or down a row in the tape.

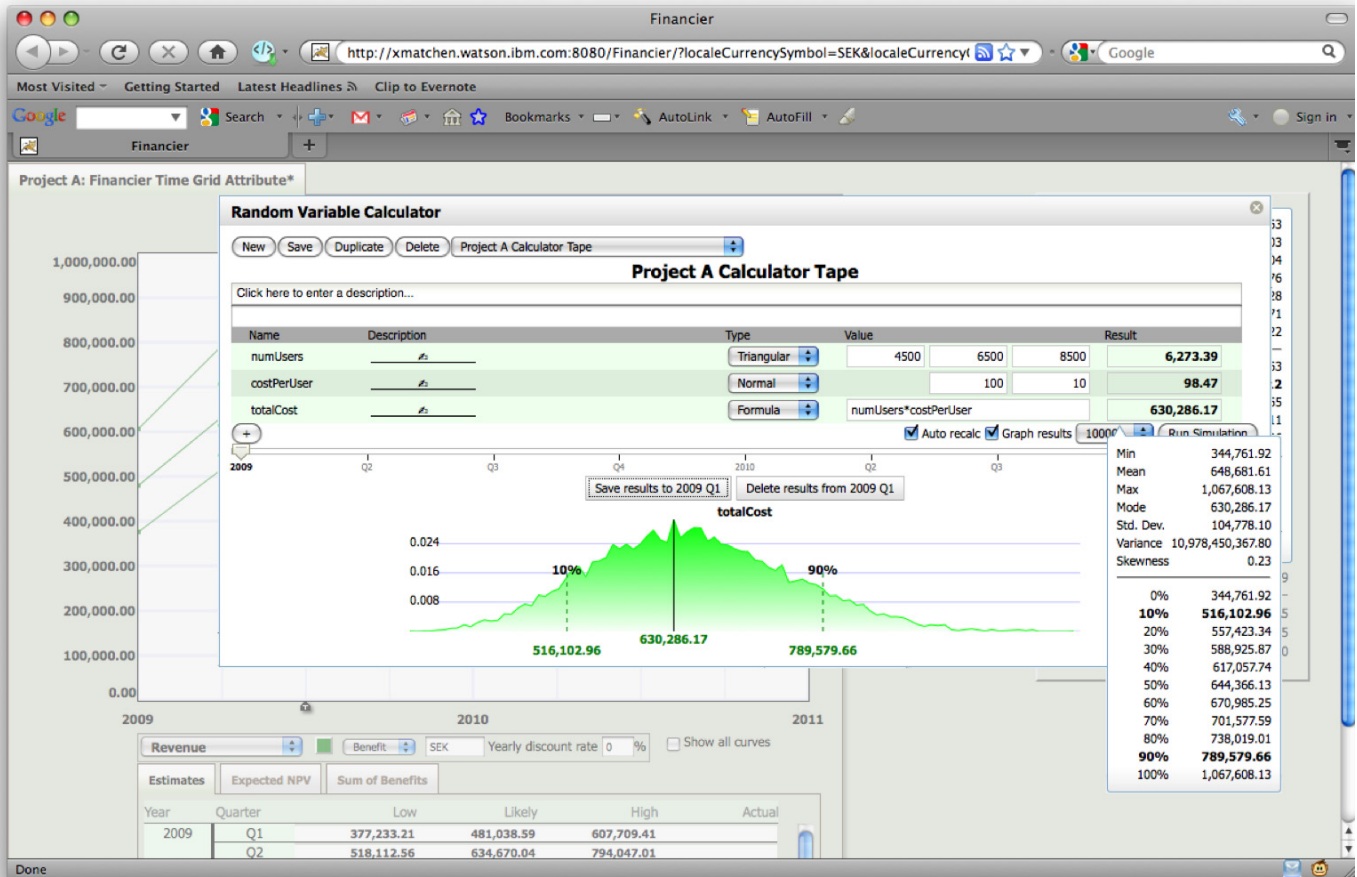


Figure 19 – Viewing the simulation results.

Financier uses the 10% bucket/mode/90% bucket result of the last line in the calculator paper tape as input to the model. Hover your mouse over the result value in the paper tape to see all values (Fig. 19).

By default, the calculator will auto recalc simulation values and graph NPV results for 10,000 samples in near real-time as you edit the calculator and if there are no errors in the paper tape. Select larger sample sizes from the pulldown for a smoother NPV curve. Toggle on/off the auto recalc or graph results check box options to control database access frequency.

Time periods and project model data management

When a Financier project is open, the Random Variable Calculator serves as an input device for cost and benefit sheets allowing you to write directly to a time period of the open model. When the calculator first opens, you will see a new calculator model. You can build a model from scratch or retrieve one from the list of existing models using the pulldown at the top of the calculator. Once you have a model newly built or loaded into the calculator, the final line of the calculator tape--along with the model that built that result--can be stored in a given time period on the Financier model.

To save data for a specific time period, move the time slider to the desired time period, e.g. 2009 Q1, and click the "Save results to 2009 Q1" button (Fig. 18). To indicate that the model has been saved, the time period will appear bold and black. You can retrieve the model for a previously saved model by moving the time slider to the relevant time period. The same model may be used in multiple time periods on the same cost or benefit sheet with different parameters. This functionality allows you to model changing inputs and requirements over the course of the project. To model changing inputs, edit the model parameters, choose a new time period and click the ""Save results to YYYY QX" button. If an existing result is already stored in that time period, the results and model will be overwritten by the new results and model.

Once you have saved the calculator results to a cost or benefit sheet, the data are regular input in Financier. You can override the calculator input values by using either the graphical or spreadsheet entry methods. Regardless, the underlying model is still saved for the given points. If you return to the calculator, you can re-run the simulation and save the new results back to the cost or benefit sheet. Notice that if you completely remove a data point from either of the graphical or spreadsheet view, the calculator model associated with that point will be removed as well.

Errors and feedback

The calculator displays a red "i" near the Result field when there are parse errors or when the simulation fails due to undefined variables. Use your mouse to hover the "i" to get more details about the error or the nature of the failure.

Adjusting model parameters

You can adjust a number of model parameters.

Cost and revenue scale

The vertical axis on the grid represents the dollar value scale for cost and revenue. The default range is \$0-\$1,000,000. To change this range, enter a new value in the text field at the top of the vertical axis (Fig. 20). If this value is too small to scale the existing model, then Financier will reset to the smallest value that fits the existing model.

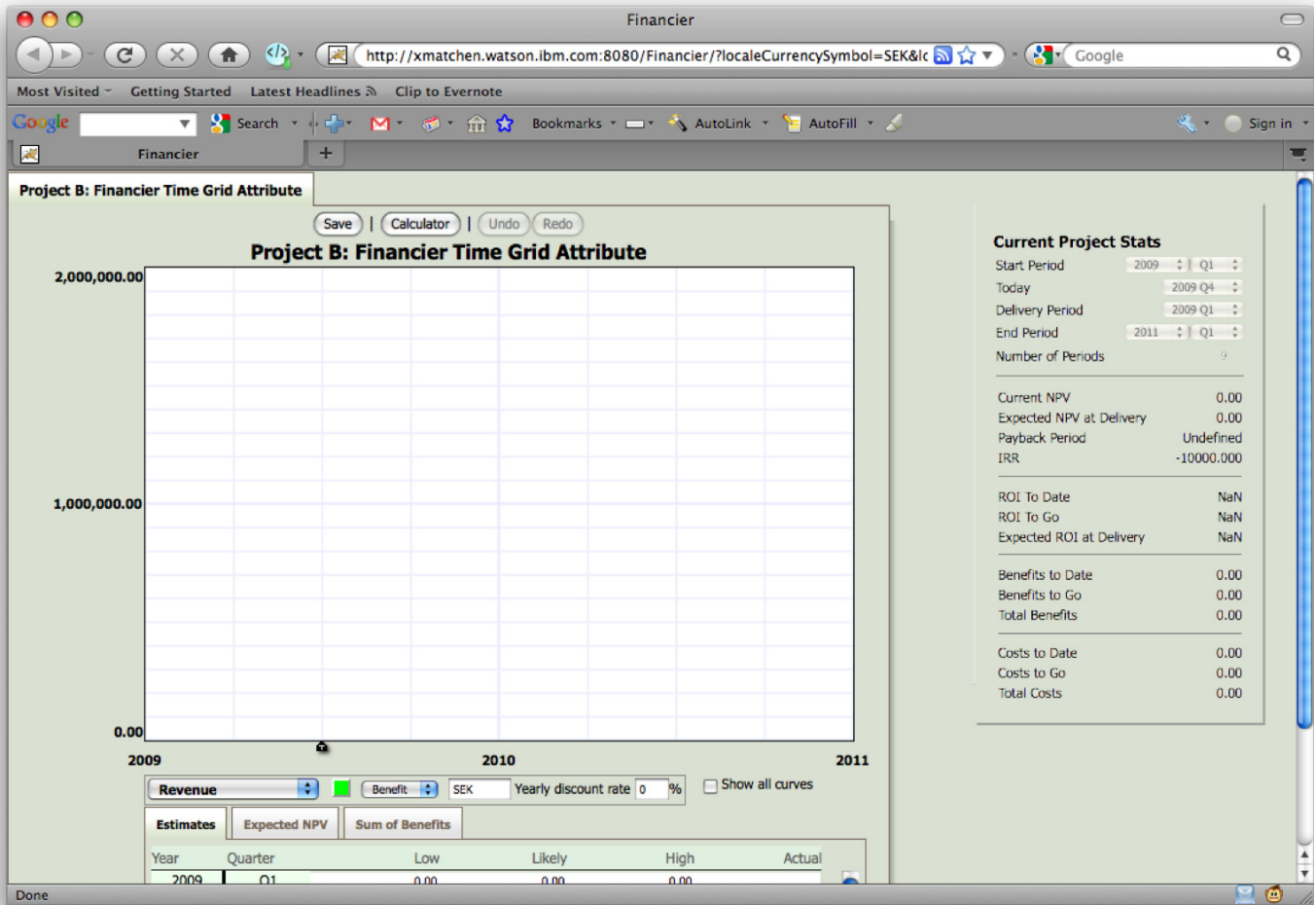


Figure 20 – Changing the vertical axis scale.

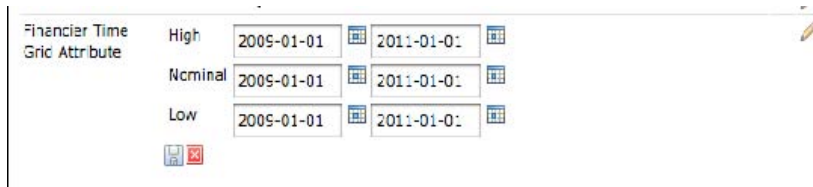
Show all curves

Financier displays only the currently selected cost or revenue curve by default. Select the Show all curves checkbox to display all of the cost and revenue curves on the grid at the same time. You will still only be able to adjust the values for the currently selected cost or revenue curve, but others will be shown on the grid at the same time.

Start and end dates

Financier models are time sensitive. The project default starts on 2009-01-01 and ends on 2011-01-01 using a quarterly time scale. From Financier, you can view the dates and periods in the Current Project Stats panel. Use Focal Point to edit the dates in Financier Time Grid Attribute of the project.

In Focal Point, select the project for which you want to change the date range. Select the pencil icon next to the Financier Time Grid Attribute and edit the date for each of High, Nominal and Low. Save the new date by clicking the floppy disk icon just below the grid.



⚠ The time grid start and end dates must be exactly the same for each of the High, Nominal and Low data inputs.

Cost and benefit sheets

In addition to the default cost and benefit sheets, you can add custom sheets to your projects from Focal Point. In Focal Point, select Configure and then Attributes from the left navigation window. From the center frame under the heading “Click the module that contains the attributes you want to configure” click Financier Projects and then Financier Time Grid Attribute. Scroll down to the Rows section and click the button Add Row. In the empty field, type the name for your new sheet and use the check box to define the sheet as a Benefit or Cost.

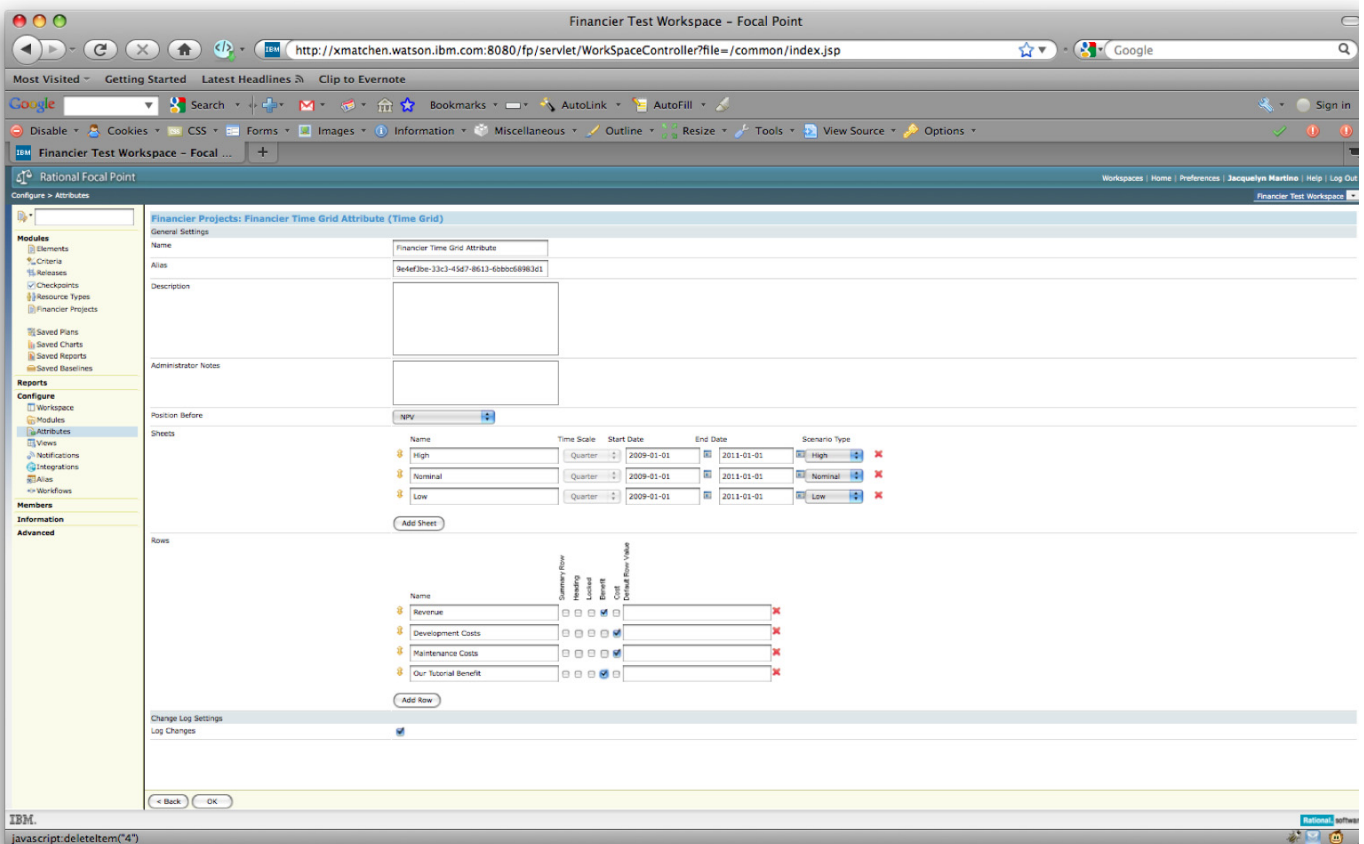


Figure 21 – Adding sheets in Focal Point.

Saving Financier Data and Using in Focal Point

Saving your Financier project model also reports your updates back to Focal Point. To view these changes in Focal Point, return to the Focal Point window and click on the project name to refresh the view.

Reporting

Focal Point supports extensive reporting capabilities. See Focal Point documentation for details. Financier calculates a number of values based on the model or models loaded.

Expected Net Present Value (NPV)

Financier continuously computes an expected net present value probability distribution for the current project and presents this as input in the Expected NPV tab (Fig. 22). The curve shows the low, median and high values for NPV on a probability distribution. The vertical green line in the middle of the curve is the median NPV. If the curve is red, then the expected NPV is negative. A green curve represents a positive expected NPV.



If the model does not contain high or low estimates, the expected NPV is a point rather than a probability distribution.

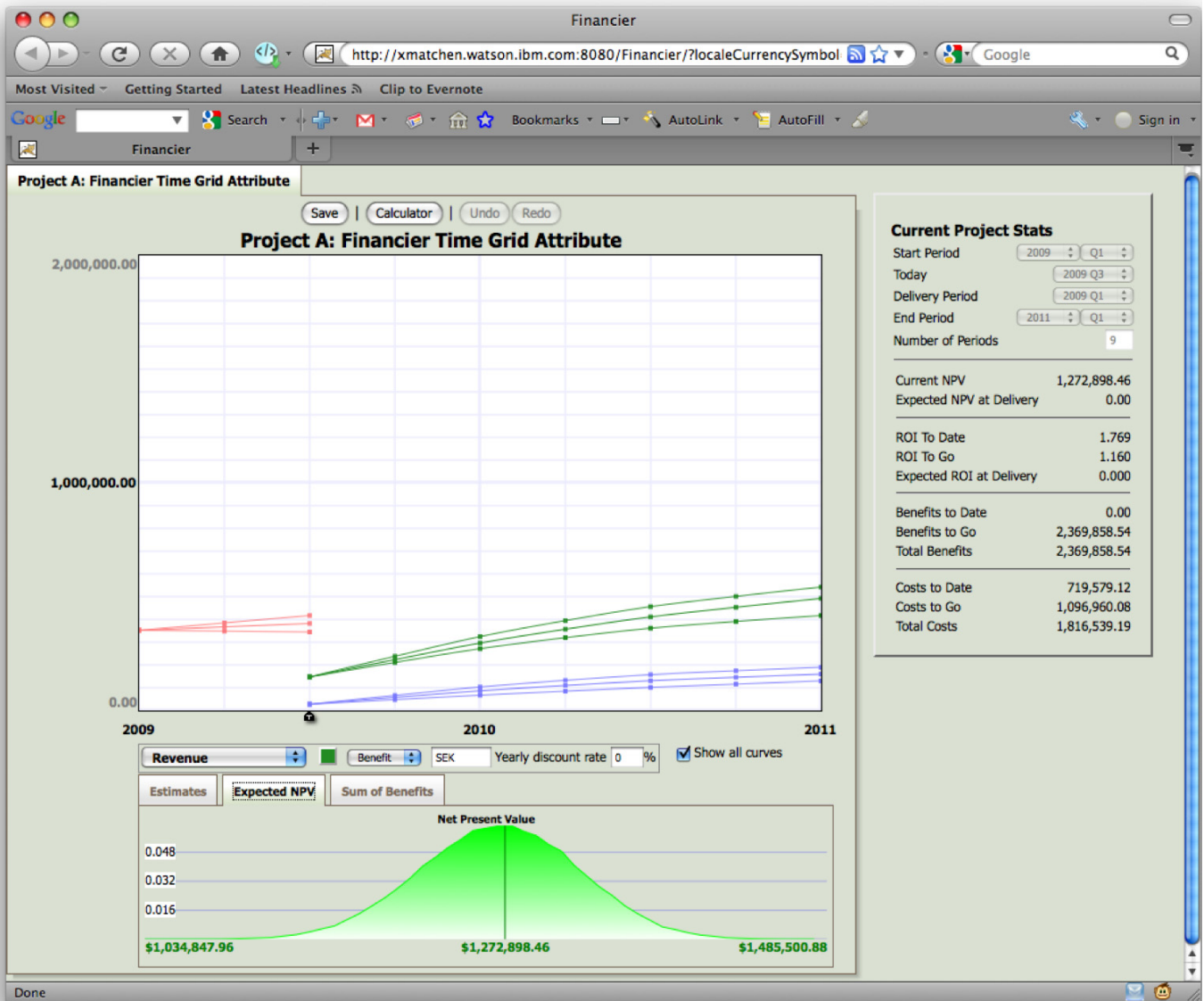


Figure 22 – Viewing the expected NPV curve.

Current Project Stats

The Current Project Stats window contains a set of continuously computed values for the current project. Whenever a parameter or estimate is changed for the current project, Financier recomputes these values within a few seconds.

NPV

The sum of discounted benefits from today to project end minus the sum of discounted costs from today to project end.

Expected NPV at Delivery

The sum of discounted benefits from delivery to project end minus the sum of discounted costs from

delivery to project end.

Payback Period

Displays the time period when discounted costs will balance discounted benefits.

ROI to Date

The Net Present Value of the project from project start to today over the sum of discounted costs from project start to yesterday.

ROI to Go

The Net Present Value of the project over the sum of discounted costs from today to project end.

Expected ROI at Delivery

The Expected NPV at Delivery over the sum of discounted costs from project start to delivery.

Benefits to Date

The sum of benefits from project start to yesterday.

Benefits to Go

The sum of benefits from today to project end.

Total Benefits

The sum of benefits from project start to project end.

Costs to Date

The sum of discounted costs from project start to yesterday.

Costs to Go

The sum of discounted costs from today to project end.

Total Costs

The sum of discounted costs from project start to project end.

Formulas Explained In Greater Detail

Net Present Value (NPV) is the sum of discounted value streams minus the sum of discounted cost streams. In the standard Financier model, there is one value stream (Revenue (R)) and two cost streams (Development Cost (D) and Maintenance Cost (M)). For this model

$$NPV = \sum_{i=1}^n \frac{R_i}{(1+r_R)^i} - \sum_{i=1}^n \frac{D_i}{(1+r_D)^i} - \sum_{i=1}^n \frac{M_i}{(1+r_M)^i}$$

Internal Rate of Return (IRR) is the rate for which NPV would equal 0. For the example above, IRR found by solving the following equation for r.

$$\sum_{i=1}^n \frac{R_i}{(1+r)^i} - \sum_{i=1}^n \frac{D_i}{(1+r)^i} - \sum_{i=1}^n \frac{M_i}{(1+r)^i} = 0$$

Note that this equation generally has no closed form solution, so the appropriate value of r is approximated using numerical techniques.

Return on Investment (ROI) is the gain from and investment minus the cost of the investment, divided by the cost of the investment. For the project above, the ROI from start to finish is defined as

$$ROI = \frac{\sum_{i=1}^n \frac{R_i}{(1+r_R)^i} - \sum_{i=1}^n \frac{D_i}{(1+r_D)^i} - \sum_{i=1}^n \frac{M_i}{(1+r_M)^i}}{\sum_{i=1}^n \frac{D_i}{(1+r_D)^i} - \sum_{i=1}^n \frac{M_i}{(1+r_M)^i}}$$

Note that this ROI takes into account discounting, as does the ROI in Financier.

Payback Period is the time period in which the benefits first exceed the costs for the project. For our example, if it took j time periods before the sum of benefits exceeded the sum of the costs, that payback period would be j. Specifically,

$$\sum_{i=1}^j \frac{R_i}{(1+r_R)^i} - \sum_{i=1}^j \frac{D_i}{(1+r_D)^i} - \sum_{i=1}^j \frac{M_i}{(1+r_M)^i} \geq 0, \text{ for } 1 \leq j \leq n$$

Note that Financier takes discounting in to account when computing payback period.

Financier also computes special versions of many of these values (e.g. ROI To Date, ROI To Go). The specialized version of definitions for these can be found by hovering over the name of the specific financial measure.

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