Hands-on: Optimization

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Optimization

- Finding the best solution to a problem which has many solutions
- Adjusting allocations to arrive at the best arrangement, calculated by an objective function
- Stochastic v. deterministic conditions
- Variation and “noise”

About Evolver

- Adds Genetic Algorithm Optimization to Excel
- What Evolver accomplishes:
  - Optimizes unknowns for a given decision
  - Deterministic Optimization
- How Evolver accomplishes this:
  - Specify desired outcome (max, min, target)
  - Specify constraints you know exist for key inputs
  - Identify solving method

About RISKOptimizer

- Adds Genetic Algorithm Optimization to Monte Carlo simulation to Excel

- What RISKO accomplishes:
  - Optimizes under uncertainty for a given decision
  - Stochastic optimization

- How RISKO accomplishes this:
  - Specify desired outcome (max, min, target)
  - Specify variation you know exist for key inputs
  - Identify solving method

Using RISKOptimizer: The Steps

- Begin with an @RISK type Model
- Define the Bottom-Line
- Identify and Quantify the Adjustable Cells
- Add Constraints
- Set Up the Software to Run
- Run the Optimization
- Review Results

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RISKOptimizer: Interface

- Toolbar
- Menu
- Define Model
- Simulation Settings
- Optimization Settings
- Run-time Window
- Results

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Toolbar in Excel 2003

- Model
- Optimization Settings
- Start Optimization
- Reports
- Utilities
- Help

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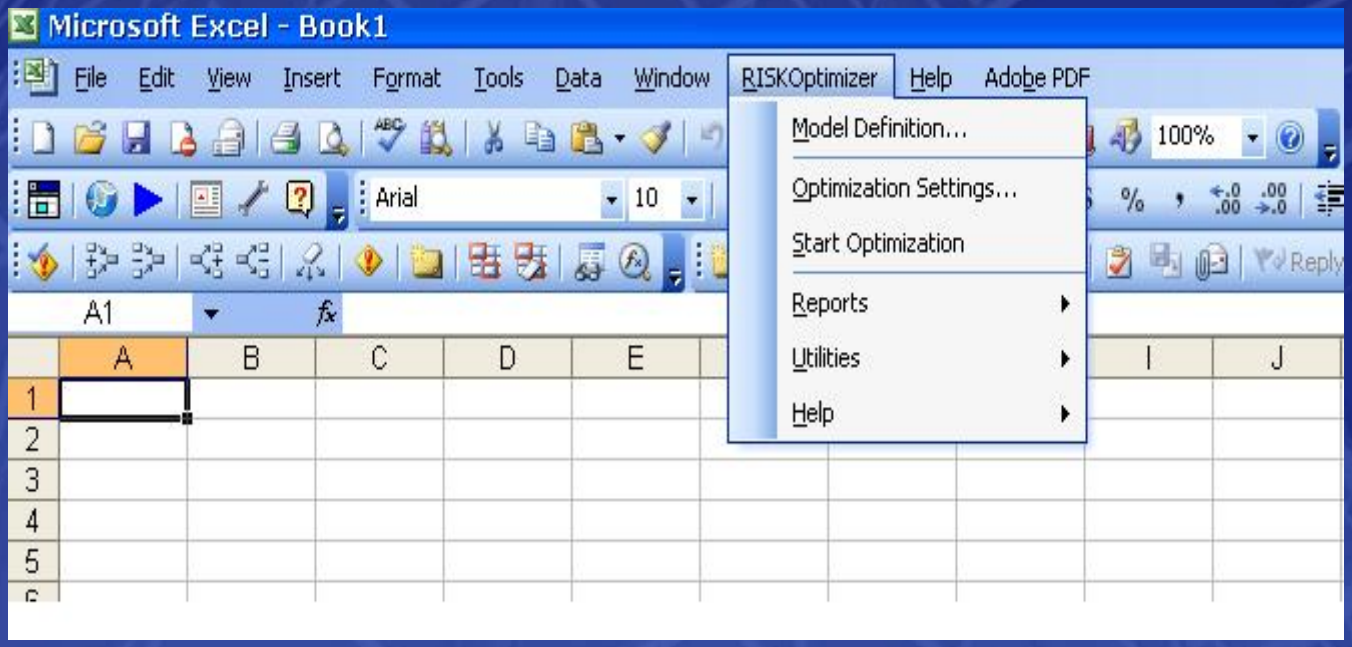
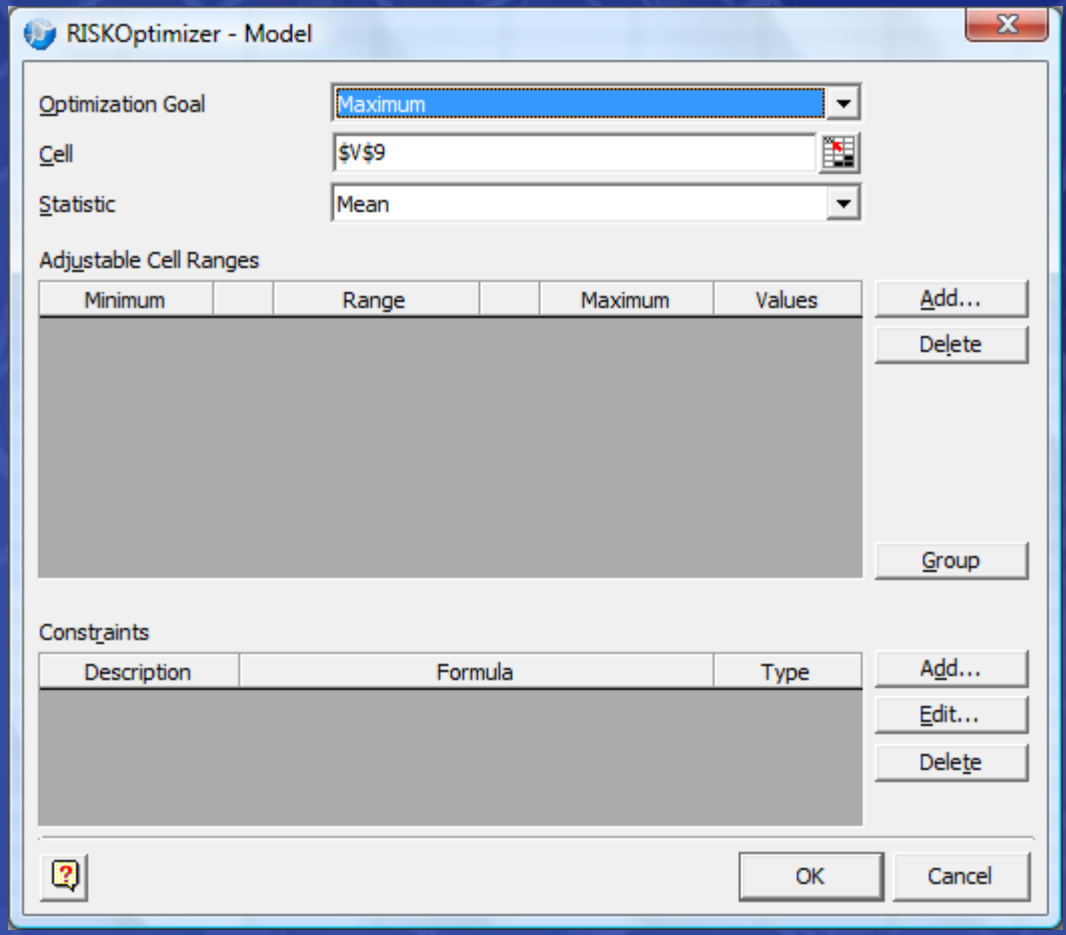
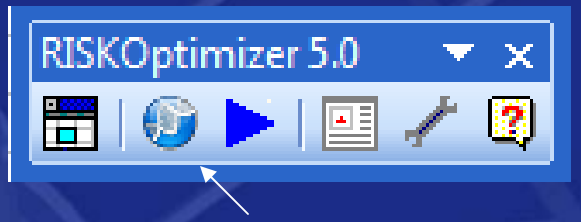
Menu in Excel

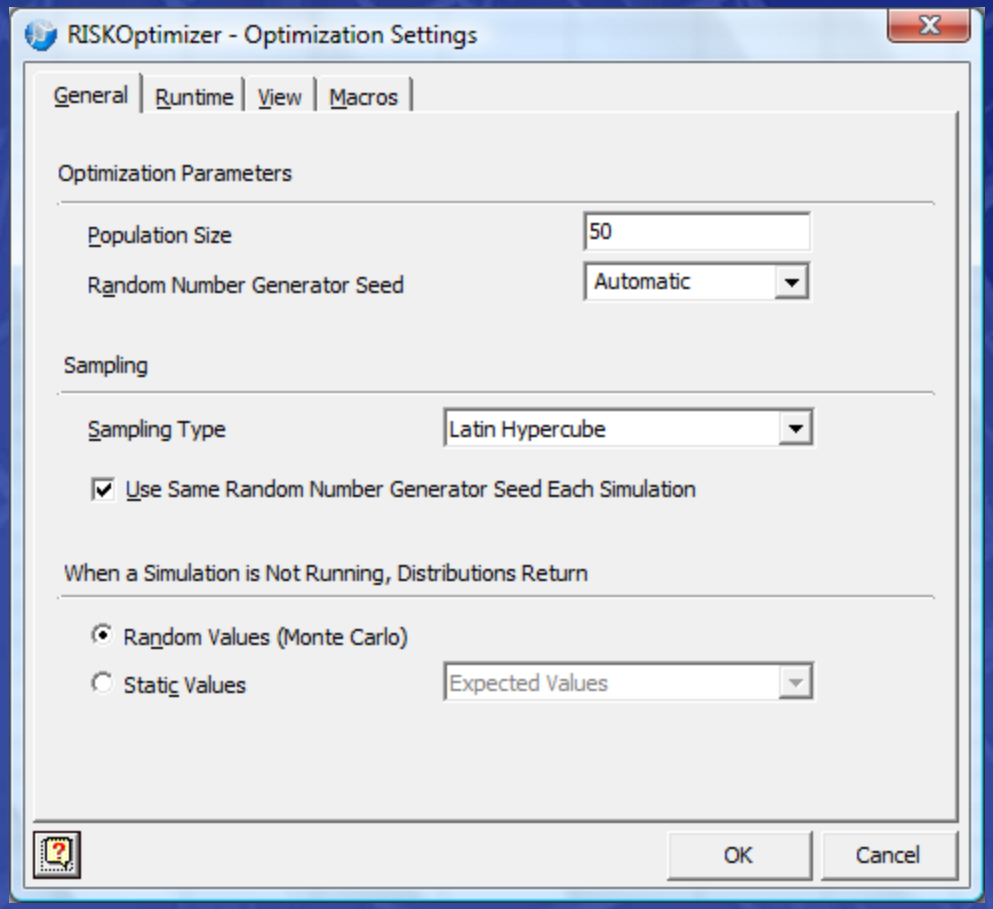


RISKO Model



RISKO Settings





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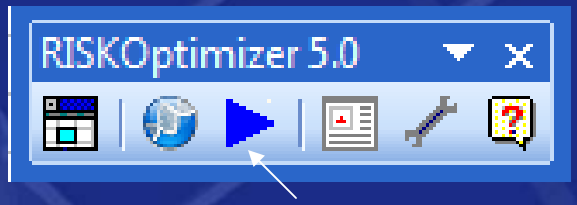
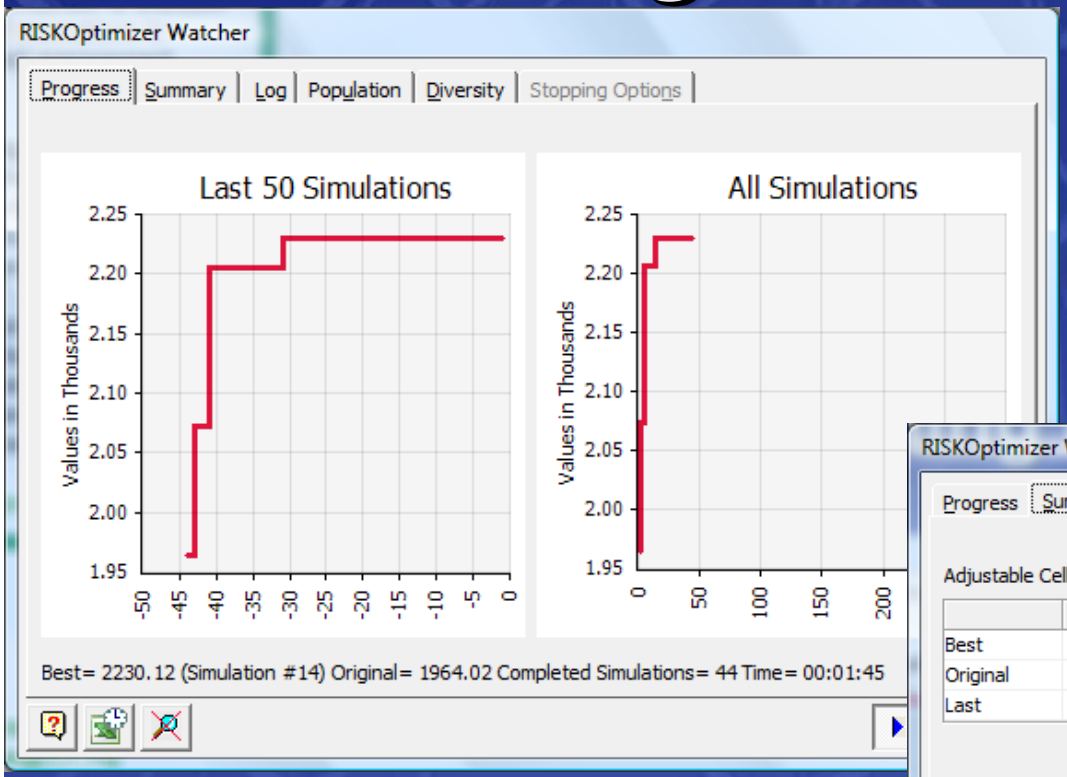
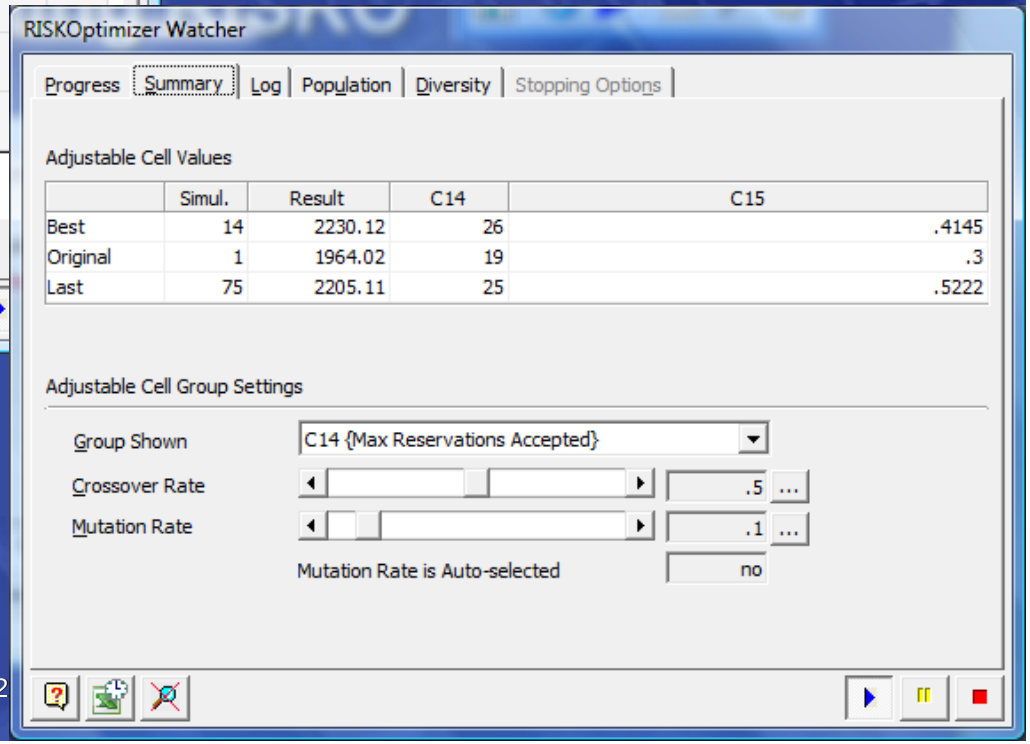
Running RISKO







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Optimization Applications

- Supply chain management
- Pricing strategy
- Marketing strategy
- Capital planning
- Transportation
- Site location
- Quality management
- Personnel management
- Operating structure

Solving Methods in RISKOptimizer

- Recipe – independently adjusted inputs
  - Budget – subject to the constraint of a constant total
- Order – sequence modeling
  - Project – with precedence
- Grouping – categories of variables
  - Schedule – by time blocks

RISKOptimizer Results

- Summary sheet
  - Original values and best values
  - Characteristics of optimization
- Log of simulation solutions
  - Statistics of simulations
  - Target value of optimization objective

Exercise: Portfolio Selection

- Find ideal investment mix given history
- Maximize mean return
- Reduce volatility
- Considerations:
  - Correlation
  - Fitted distributions
  - Constraints

Sources of help

- On-line tutorials
- Help menu within the software
- Software manuals (PDF)
- Palisade web-site www.palisade.com
- Helpdesk: http://helpdesk.palisade.com/
- Forum: http://forums.palisade.com/
- Web encyclopedia www.wikipedia.com
- Your Regional Sales Manager(s)
- Palisade Training and Consulting Services