

Scenario Modelling for Better Forecasting in Excel

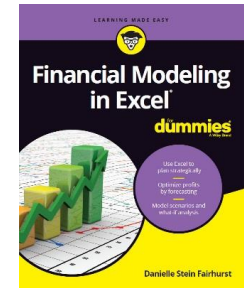
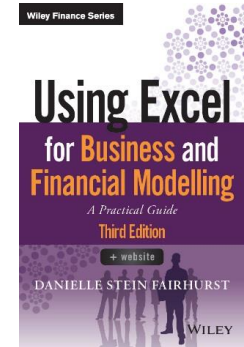
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Plum Solutions

Danielle Stein Fairhurst



- Microsoft Excel MVP 2021
- Founded Modellers' Meetups (now virtual)
- Author of “Using Excel for Business & Financial Modelling” and “Financial Modeling in Excel for Dummies”
- Judge for the 2021 Financial Modelling Awards
- ATP & Advisory Board Member for Financial Modeling Institute (FMI)



Scenario Modelling for Better Forecasting in Excel

- **Scenarios, Sensitivities & What-if Analysis
What's the difference?**
- **Technical methods of scenario analysis in
Excel+ demo**
- **Key advantages and disadvantages of each
method**

What is a Financial Model?



“A tool (typically built in Excel) that displays possible solutions to a real-world financial problem”

“Financial Modeling in Excel for Dummies”, Chap1, p8

Is it a spreadsheet or a financial model?

‘Spreadsheet’ is a catchall term – it could be anything containing data. A financial model is:

- **More structured.** Assumptions, inputs, outputs, calculations and scenarios.
- **Dynamic.** A model contains inputs and outputs but a spreadsheet is often a single purpose stand-alone report.
- **Uses relationships between variables.** Changing any input will affect the output.
- **Contains hypothetical outcomes.** Instead of just historical data, a financial model contains scenario and sensitivity analysis. What would happen if..... ?

What's the Difference?

- **Sensitivities** tweak one or two input variables
- **Scenarios** involve changing a large number of inputs with interdependencies
- **What-if analysis** refers to both

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Excel Scenario Tools

- 1. Manual Scenario selection**
 - Data validation dropdown
 - Combo box dropdown
- 2. Scenario Manager**
- 3. Data Tables**
- 4. Goal Seek (What-if Analysis)**
- 5. Monte Carlo (Stochastic Simulations)**

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Manual Scenario Analysis

- Use numbers, data validations, or form controls to drive scenarios

Advantages:

- Easy to build, easy to understand
- Can handle a large number of inputs and outputs

Disadvantages:

- Can only look at one scenario at a time
- Difficult to compare scenarios side by side

Data Tables

Advantages:

- Can look at multiple outcomes simultaneously
- Perfect for sensitivity analysis

Disadvantages:

- Uses array formulas, so tricky for beginners to build
- Inputs and outputs need to be on the same page
- Can only show one or two variables and only one output
- Slows down calculation

Remember

There can be only
one outcome and it
will be wrong!

So, according to our financial model, the annual profit by 2025 will be \$4,542,547.64. This means that our company is worth exactly \$20,382,847.16!



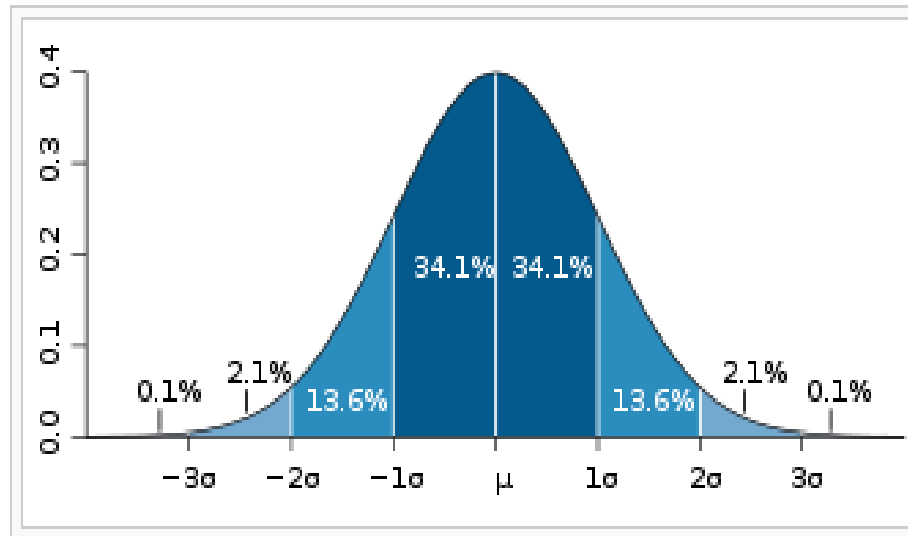
The Problem with Scenario Analysis

- Provides a “snap-shot” view
- Will always be wrong, so does that make them meaningless?
- Is the base case really the most likely? Often comes down to personality of the assumption-maker.
- Scenarios and sensitivities are “bottom up”

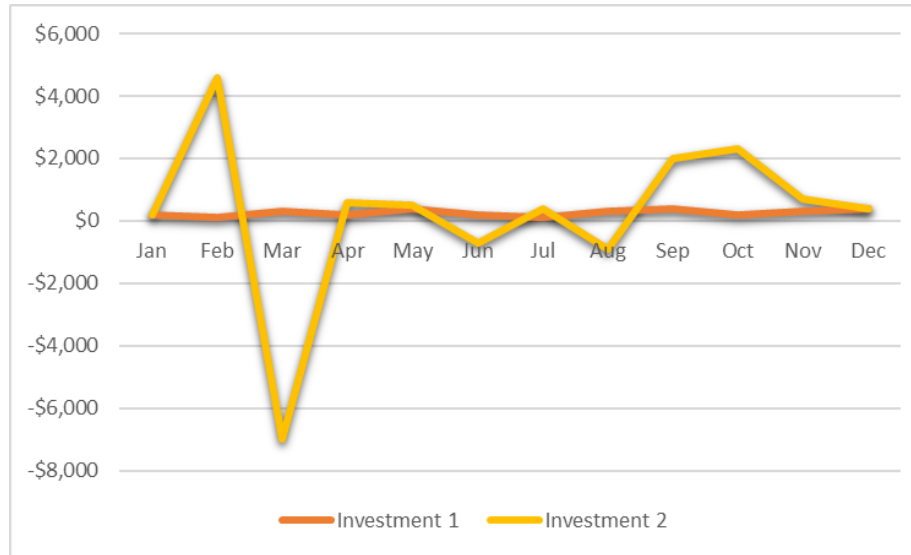
- **How useful are best/base/worst cases really? Obviously it's worth a lot if everything goes well, less if it goes badly.**
- **But it's helpful to see if under the worst case scenario, will it push us into default?**
- **Can help prepare for the worst (if we go ahead)**

Normal Distribution

- ~68% of results fall within one standard deviation of the mean
- ~95% fall within two standard deviations
- 99.7% are within three standard deviation



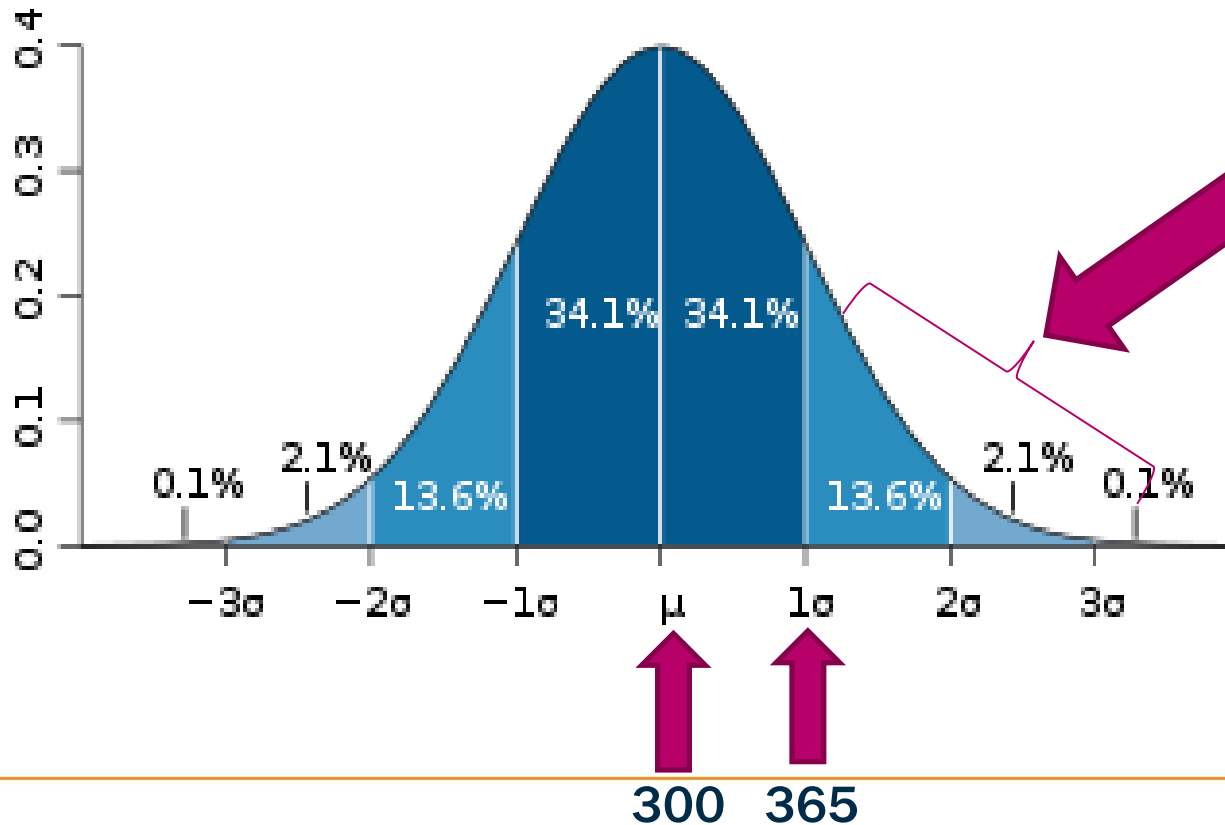
Standard Deviation



Which series of cash flows has the highest STDEV?

- If a lightbulb lasts on average 300 days, with a standard deviation of 65, given a normal distribution, what is the probability that the lightbulb you install today will last at least a year?





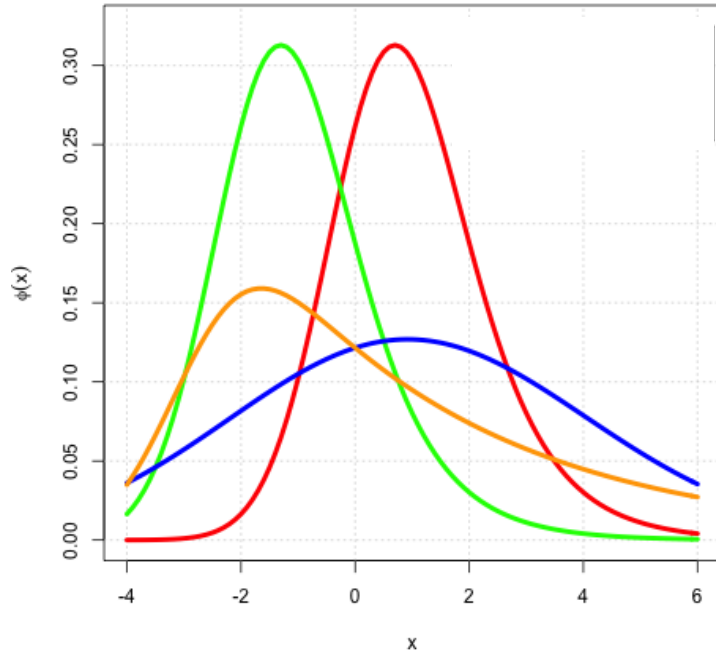
There is a 15.8% probability that the lightbulb will last more than a year

Determining Distribution and Standard Deviation

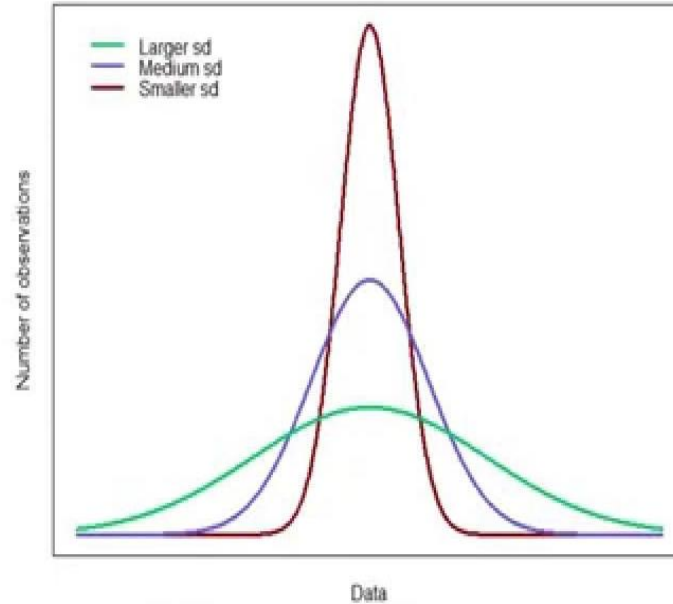
- Use historical data
- Compare benchmarks eg. Other similar products or ventures
- Select statistical distribution and parameters (i.e. pick one!)

Two Inputs Required for Simulations:

Distribution



Standard Deviation



What-if Analysis Case Study: Bob's Bird Cages



Stay in Touch

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