

RMS® CCRA® Training Program

Uncertainty Measures Exercise #1

ANSWER KEY

Learning Objectives:

After completing this exercise you will be able to:

1. Improve working knowledge of location and portfolio level uncertainty measures
2. Calculate portfolio level event standard deviation from location level information

Available Materials:

- Excel spreadsheet containing location statistics (Exercise 1 Uncertainty Measures.xls)

You are running a catastrophe risk model for a new regional market. Your task is to test and understand the peril analysis uncertainty measure results for a particular event for a portfolio of five risks. The spreadsheet "Exercise 1 Uncertainty Measures.xls" contains the location table for event 12345 shown below.

Event	Location	Mean Loss	Standard Deviation	Exposure Value
12345	1	20	100	120
12345	2	30	200	300
12345	3	40	150	200
12345	4	50	250	300
12345	5	60	200	300

- 1) The correlation weight for this peril and region is 20%. Calculate the event mean loss, standard deviation, and exposure value for the portfolio.

Answer:

$$\text{Mean Loss} = 20 + 30 + 40 + 50 + 60 = 200$$

$$\text{Std. Dev.} = 0.2 * (100 + 200 + 150 + 250 + 200) + (1 - 0.2) * \text{sqrt}(100^2 + 200^2 + 150^2 + 250^2 + 200^2) = 514.66$$

$$\text{Exposure Value} = 120 + 300 + 200 + 300 + 300 = 1220$$

- 2) OOPS! The correlation weight for this peril and region is not 20%, it's 10%. What is the correct event standard deviation for the portfolio? Explain the difference between this answer and the answer to Question 1.

Answer:

$$\text{Std. Dev.} = 0.1 * (100 + 200 + 150 + 250 + 200) + (1 - 0.1) * \text{sqrt}(100^2 + 200^2 + 150^2 + 250^2 + 200^2) = 466.50$$

The standard deviation is lower than the answer to question 1. This is because the lower correlation weight reflects greater diversification between the locations for this particular peril region.