

# Chapter 10: Correlation and Regression

## Chapter 13: Nonparametric Statistics

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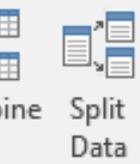
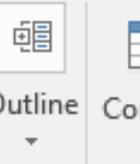
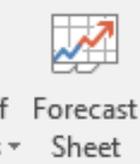
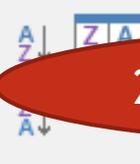
3. Run MegaStat

2. Click on "Data" tab

1. Input the data of x and y in two different columns.

4. Choose "Correlation / Regression"

5. Click on the required field



Get & Transform Data

Queries & Connections

Sort & Filter

Data Tools

Forecast

Kutools

Statistics

B7

1.5

	A	B	C	D	E	F
1	Cars	Revenue				
2	63	7				
3	29	3.9				
4	20.8	2.1				
5	19.1	2.8				
6	13.4	1.4				
7	8.5	1.5				
8						
9						
10						
11						
12						
13						
14						
15						
16						

**MegaStat**

- Descriptive Statistics...
- Frequency Distributions
- Probability
- Confidence Intervals/Sample Size
- Hypothesis Tests
- Analysis of Variance
- Correlation / Regression**
- Time Series / Forecasting
- Chi-square / Crosstab
- Nonparametric Tests
- Quality Control Process Charts...
- Random Number Generation...
- Utilities
- Help / Information

- Scatterplot**
- Correlation Matrix
- Regression

# 10 - 1 Scatter Plots and Correlation (Scatter Plot)

The image shows the MegaStat software interface. The main window displays a menu with 'Correlation / Regression' selected, and a sub-menu with 'Scatterplot' highlighted. A red callout bubble points to this 'Scatterplot' option with the text '1. Click on "Scatterplot"'. Below this, the 'Scatterplot' dialog box is open. It has four input fields: 'Input ranges:' with 'A1:A7' in the first field and 'B1:B7' in the second. A red callout bubble points to the first field with '2. Input x here.' and another points to the second with '3. Input y here.'. Below the input fields is a 'chart title' field. At the bottom, there is a checkbox for 'plot linear regression line' which is unchecked. A red callout bubble points to this checkbox with the text '4. Uncheck this box if you do not want to add a fitted regression line and click OK'. The 'Display:' section at the bottom has 'Markers' selected with a radio button. A large green arrow points from the right side of the dialog box towards the bottom right of the slide.

1. Click on "Scatterplot"

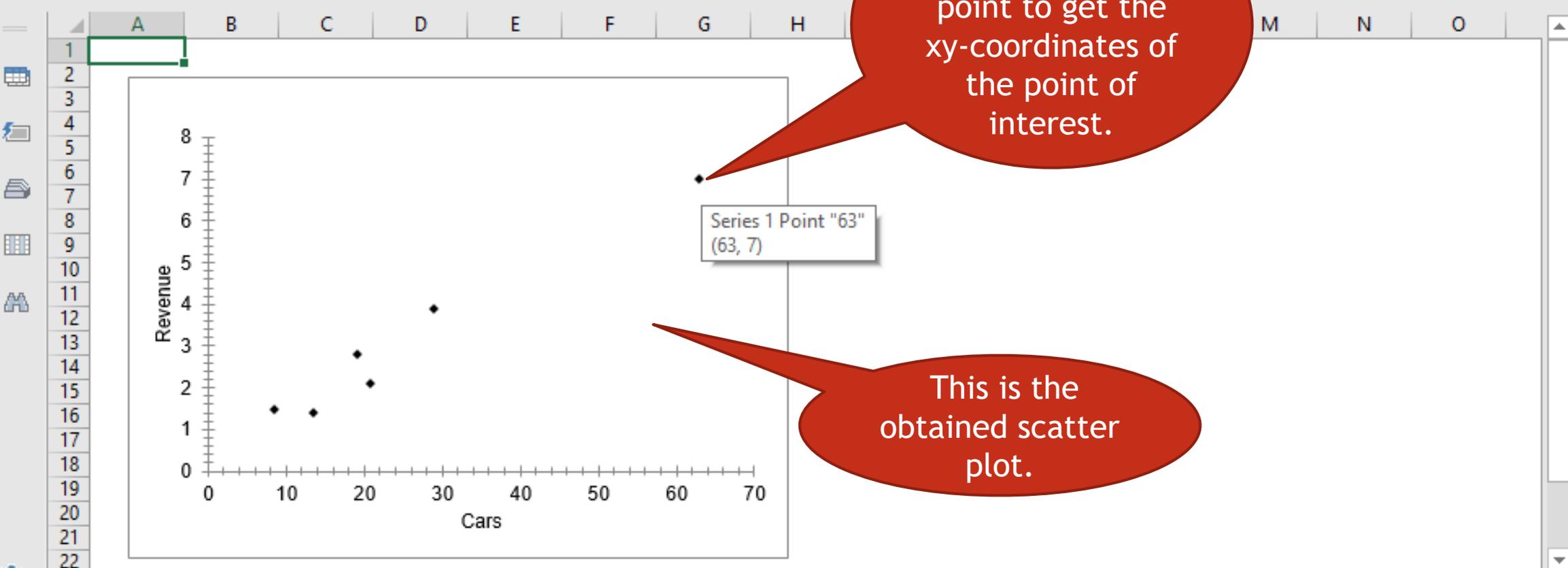
2. Input x here.

3. Input y here.

4. Uncheck this box if you do not want to add a fitted regression line and click OK

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A1 | fx



Move the mouse pointer to any point to get the xy-coordinates of the point of interest.

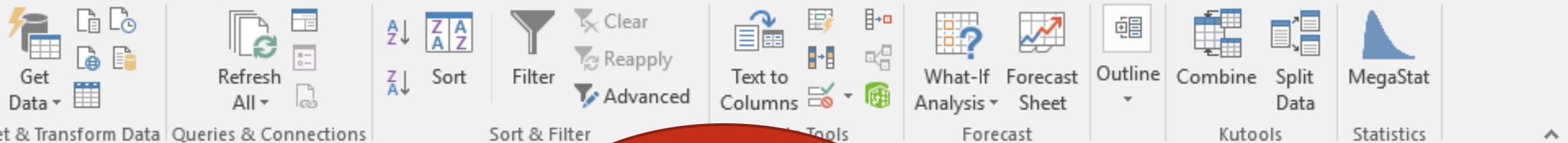
This is the obtained scatter plot.

# 10 - 1 Scatter Plots and Correlation (Correlation)

1. Click on “Correlation Matrix”

2. Input the data columns here, then press OK.

The image shows a screenshot of the MegaStat software interface. The main window is titled "Correlation Matrix" and contains an "Input range" field with the text "A1:B7". To the right of this field are four buttons: "OK", "Clear", "Cancel", and "Help". Above the main window, a smaller window titled "MegaStat" is open, showing a menu with the following options: "Descriptive Statistics...", "Frequency Distributions", "Probability", "Confidence Intervals/Sample Size...", "Hypothesis Tests", "Analysis of Variance", "Correlation / Regression" (which is highlighted), and "Time Series / Forecasting". Below the menu, there are three sub-options: "Scatterplot", "Correlation Matrix" (which is highlighted), and "Regression". A red speech bubble points to the "Correlation Matrix" option in the menu, and another red speech bubble points to the "Input range" field in the main dialog box. A green arrow points from the "Correlation Matrix" option in the menu to the "Correlation Matrix" dialog box.



This is the value of the linear correlation coefficient.

Correlation Matrix

	Cars	Revenue
Cars	1.000	
Revenue	.982	1.000

6 sample size

± .811 critical value of r .05 (two-tail)

± .917 critical value of r .01 (two-tail)

# 10 - 2 Regression

The image shows a screenshot of the MegaStat software interface. The main window displays the 'Regression Analysis' dialog box. The 'Input ranges' section has 'A1:A7' entered for the independent variable (x) and 'B1:B7' for the dependent variable (y). The 'Type in predictor values' dropdown menu is set to '20'. The 'Options' section shows a confidence level of 95% and several checkboxes for residual plots. The 'MegaStat' menu is open, with 'Regression' selected under the 'Correlation / Regression' submenu. A green arrow points from the 'Regression' menu item to the 'Type in predictor values' dropdown menu.

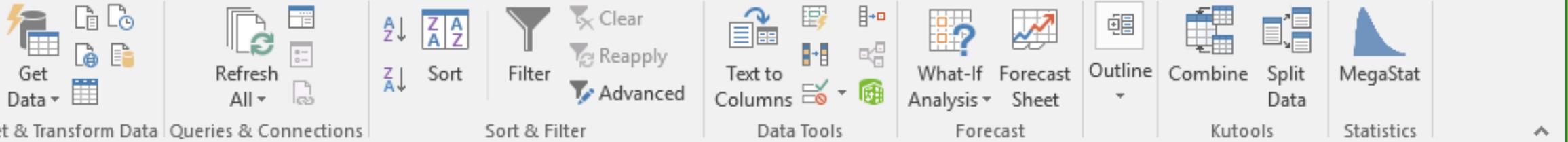
1. Click on "Regression"

2. Input x (Independent variable).

3. Input y (Dependent variable).

4a. To make a prediction of y given x, change the drop down menu value from "No predictions" to "Type in predictor values".

4b. Type the value of the predictor "x" in the given field, then OK.



A12

fx

## 13 Regression Analysis

14  
15  $r^2$  0.964 n 6  
16 r 0.982 k 1  
17 Std. Error 0.447 Dep. Var. Revenue  
18

This is the value of intercept (a).

This is the value of slope (b).

variables	coefficients	std. error	t (df=4)	p-value	95% lower	95% upper
Intercept	0.3963					
Cars	0.1061	0.0102	10.392	.0005	0.0778	0.1345

## 31 Predicted values for: Revenue

Cars	Predicted	95% Confidence Interval
		lower
20	2.5188	

This is the value of prediction y'.

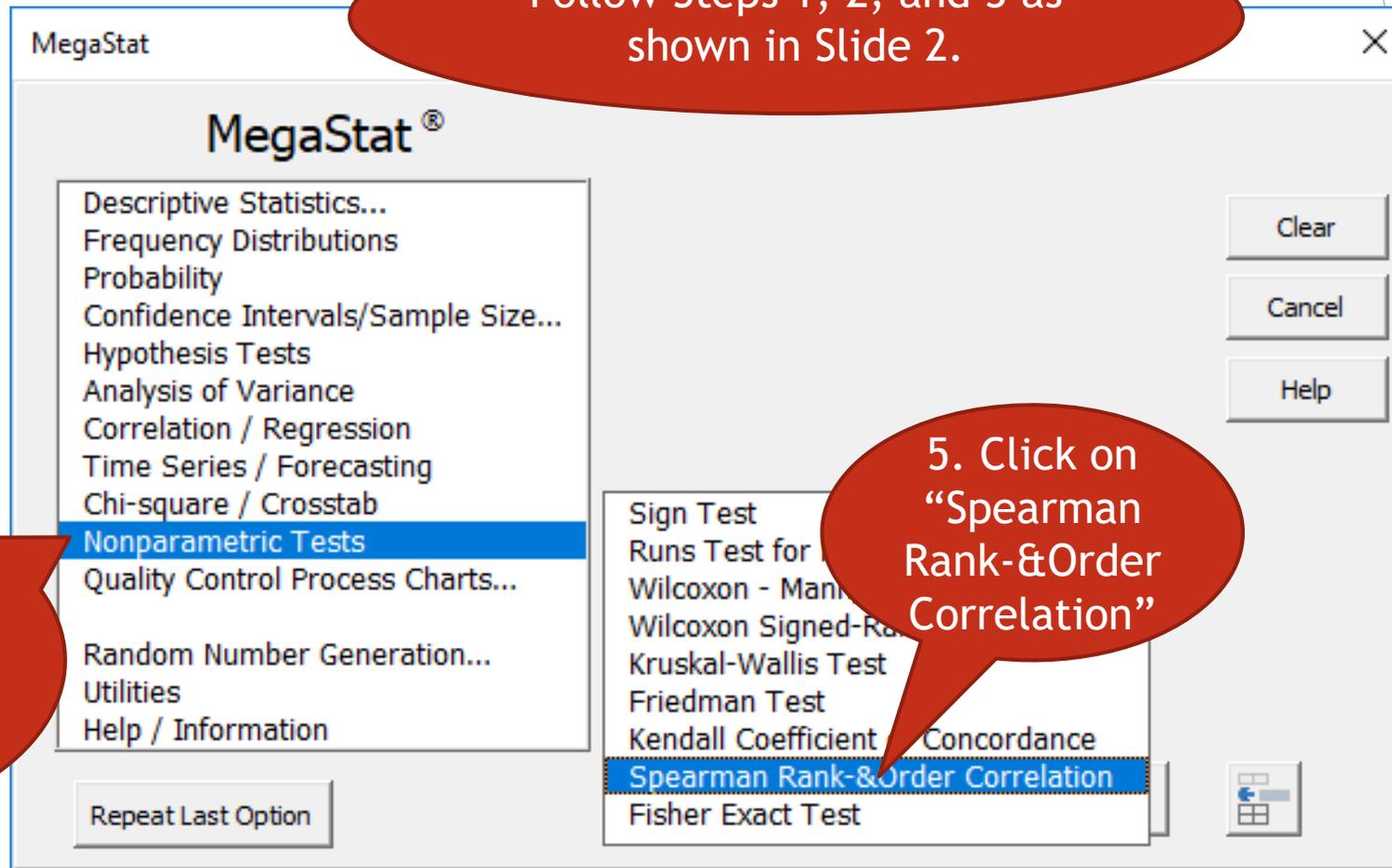
Output

Example 10-1

# 13 - 6 The Spearman Rank Correlation Coefficient

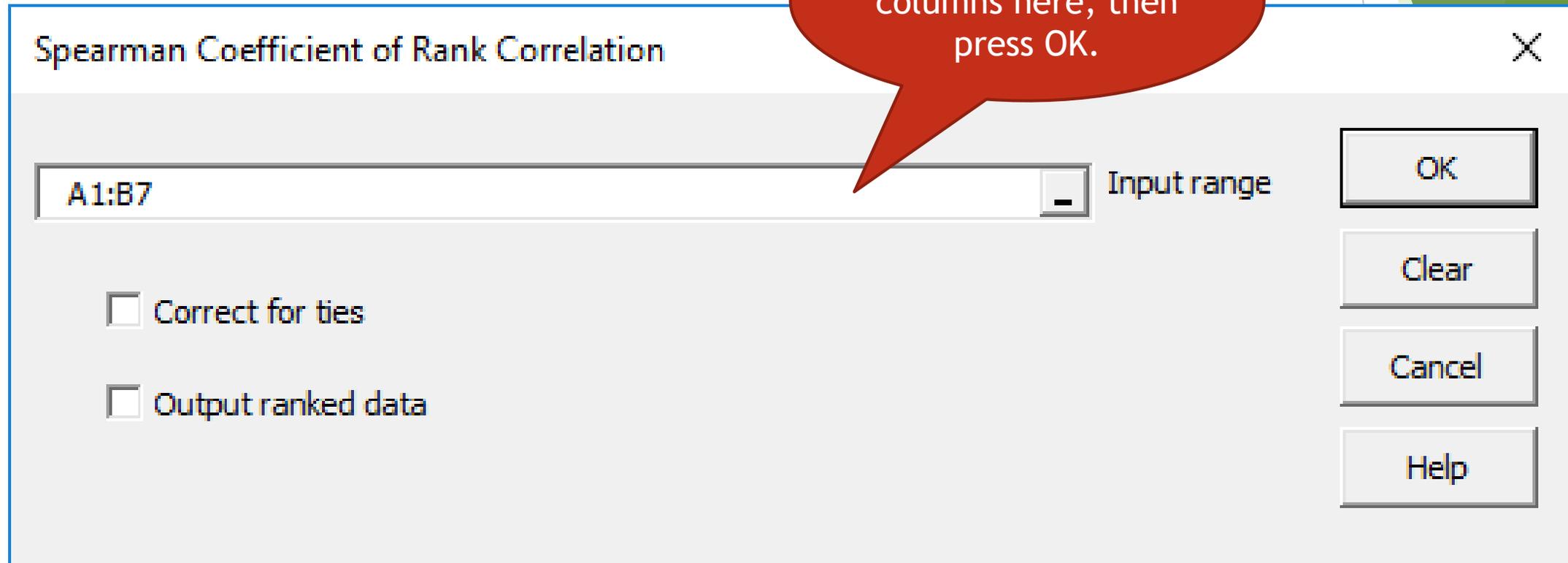
Follow Steps 1, 2, and 3 as shown in Slide 2.

4. Choose “Nonparametric Tests”



5. Click on “Spearman Rank-Order Correlation”

# 13 - 6 The Spearman Rank Correlation Coefficient



Spearman Coefficient of Rank Correlation

A1:B7

Input range

Correct for ties

Output ranked data

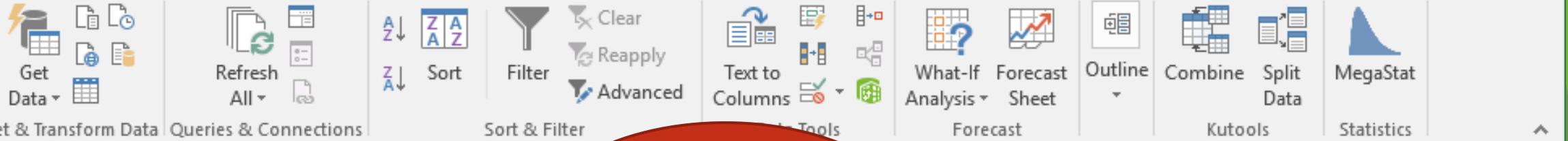
OK

Clear

Cancel

Help

Input the data columns here, then press OK.

C6 :  $f_x$  0.885714285714

This is the value of Spearman rank correlation coefficient.

### Spearman Coefficient of Rank Correlation

	Cars	Revenue
Cars	1.000	
Revenue	.886	1.000

6 sample size

- ± .811 critical value of r .05 (two-tail)
- ± .917 critical value of r .01 (two-tail)