

Regional Economics

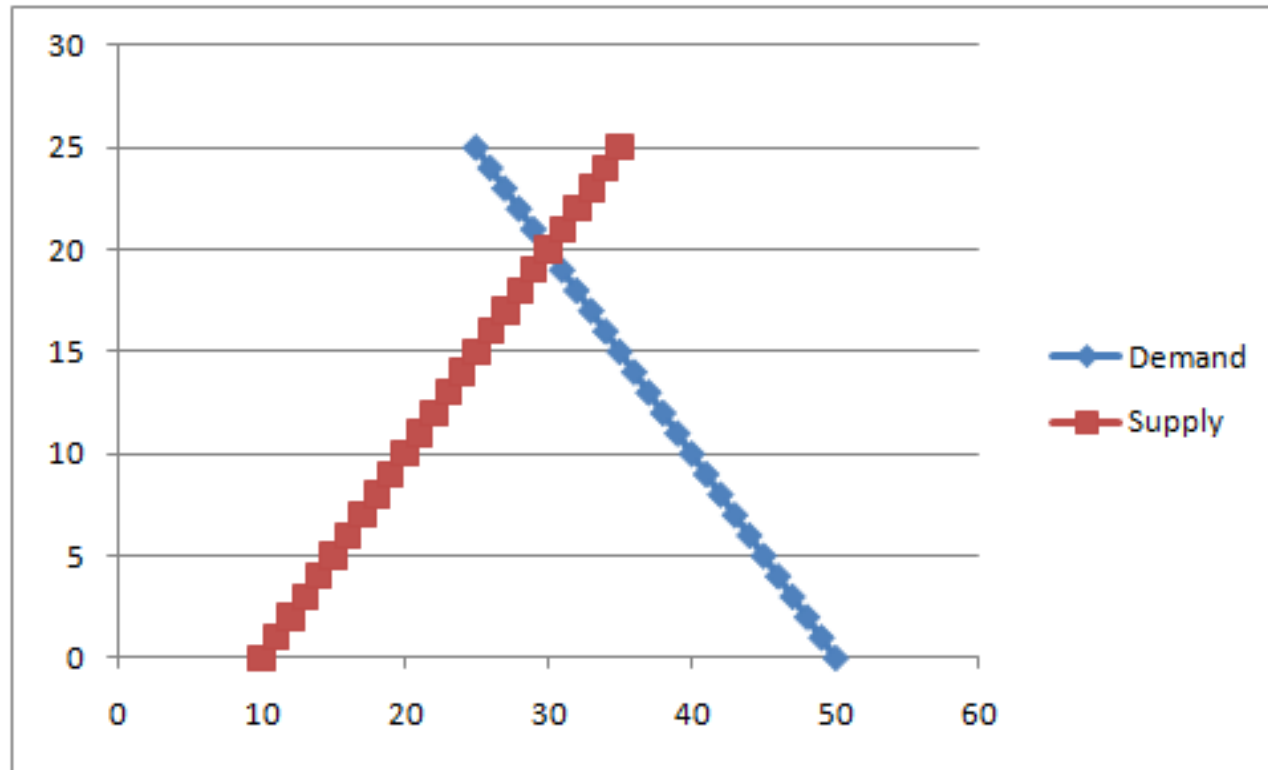
Lecture March 11, 2010

J. M. Pogodzinski

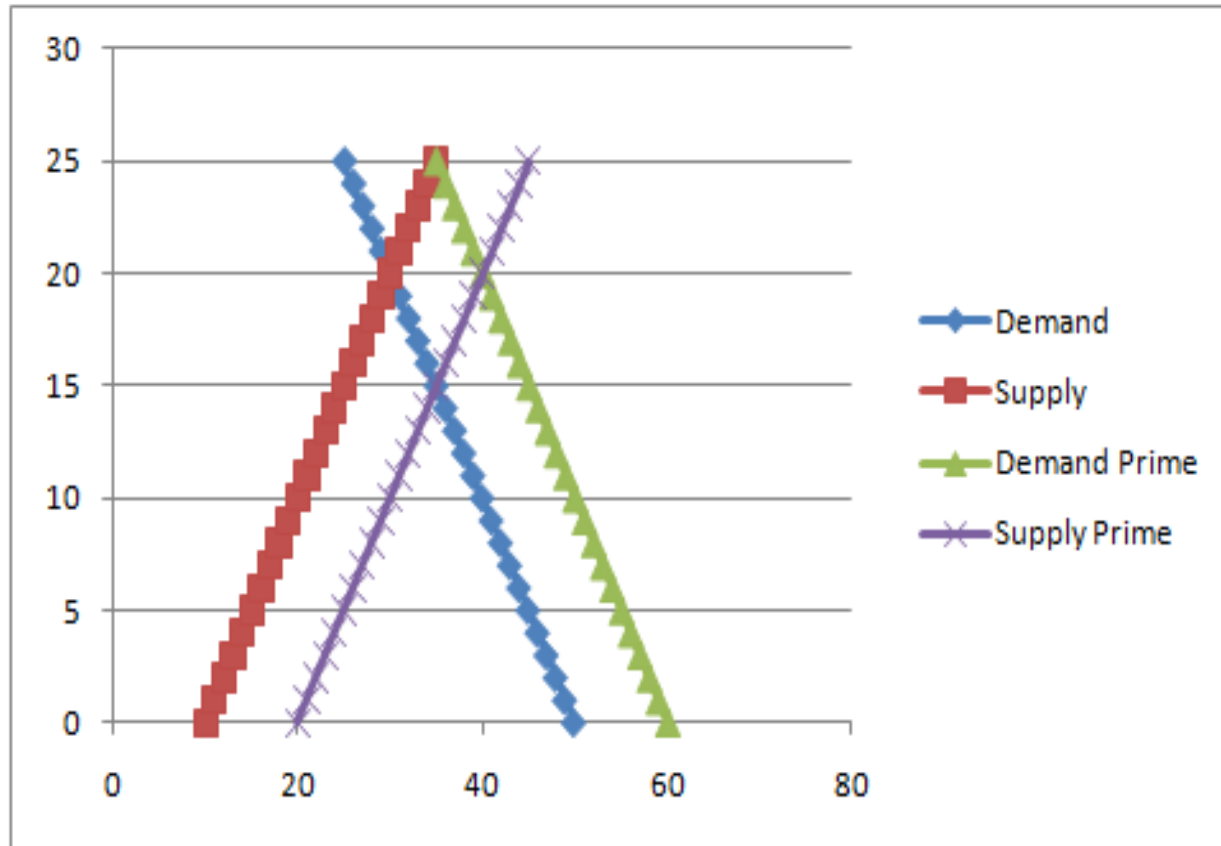
Markets in Action: Supply and Demand

- **Market Demand (definition):**
- a relationship between a good's own price and the quantity of that good consumers desire and can afford, given income, other prices, tastes and preferences, expectations, etc.
- **Market Supply (definition):**
- a relationship between a good's own price and the quantity of that good an industry consisting of profit-maximizing firms desires to produce and can produce, given technology, other prices, expectations, etc.

Supply and Demand



Supply and Demand: Markets in Action



Markets and Efficiency

- An efficient allocation of resources is an allocation such that there is no other feasible allocation that would make at least one person better off and all others no worse off.
- There are many efficient allocations (and also many allocations that are inefficient).
- First Welfare Theorem: markets sometimes achieve efficient allocations of resources.

Markets and Efficiency

- Markets sometimes fail to achieve an efficient allocation of resources – this is called “market failure.”
- Causes of market failure include (but are not limited to):
 - externalities (spillover effects)
 - asymmetric information
 - market power

Regression

Economic models are abstract representations of the relationships among variables.

For example, an economic model might suggest that variable y is determined by variables x_1 , x_2 , and x_3 . This is represented generally by saying that y is a function of x_1 , x_2 , and x_3 .

$$y=f(x_1,x_2,x_3)$$

Regression continued

Starting with $y=f(x_1, x_2, x_3)$ as a general description of the relationship between y (the dependent variable) and the x 's (the independent variables), we may adopt a particular functional form, for example, a straight line:

$$y=a_0+a_1x_1+a_2x_2+a_3x_3.$$

Analyzing the Linear Equation (Equation of a Hyperplane)

Regression addresses: **estimating coefficients**

dependent
variable

→ $y = a_0 + a_1x_1 + a_2x_2 + a_3x_3$

$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3$ ← independent variables

$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3$ ← coefficients

$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3$

Coefficients

$$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3$$

Coefficients measure the marginal impact of the corresponding independent variable upon the dependent variable.

That is a_1 measures the impact of an increase in x_1 on y holding constant x_2 and x_3 .

The idea of examining the effect of one variable on another holding constant other variables is expressed in the Latin phrase *ceteris paribus* (“other things equal” or “other things held constant”).

Data for Regression Analysis

Y	X_1	X_2	X_3
23	2	0.01	0
45	5	0.22	0
27	7	0.35	1
72	13	0.9	1
56	7	0.45	1
49	8	0.6	0
64	12	0.71	0
69	9	0.8	1
48	8	0.33	0
82	15	0.7	1

← dummy variable

“Best Practices”

Determine the Descriptive Statistics of the Data

Do preliminary reconnaissance of the data

Descriptive Statistics

The screenshot shows the Microsoft Excel interface with the following data table:

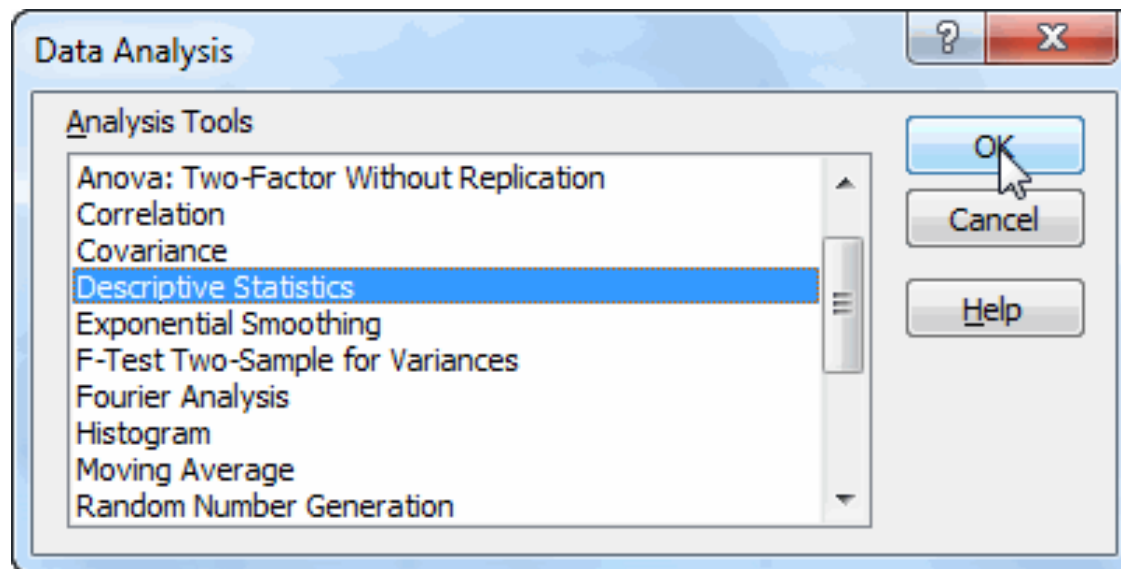
	A	B	C	D
1	y	x ₁	x ₂	x ₃
2	23	2	0.01	0
3	45	5	0.22	0
4	27	7	0.35	1
5	72	13	0.9	1
6	56	7	0.45	1
7	49	8	0.6	0
8	64	12	0.71	0
9	69	9	0.8	1
10	48	8	0.33	0
11	82	15	0.7	1

The Data Analysis Tools task pane is visible on the right side of the spreadsheet, containing the following text:

Data Analysis Tools
Tools for financial and scientific data analysis.
FUNCRES.XLAM
Press F1 for more help.

The status bar at the bottom of the Excel window displays the following statistics: Average: 15.77675, Count: 44, Sum: 631.07. The system tray at the bottom right shows the time as 4:23 AM on 1/13/2010.


Descriptive Statistics



Descriptive Statistics

Descriptive Statistics


Input

Input Range: 

Grouped By: Columns Rows

Labels in First Row

Output options

Output Range: 

New Worksheet Ply:

New Workbook

Summary statistics

Confidence Level for Mean: %

Kth Largest:

Kth Smallest:

OK Cancel Help

Descriptive Statistics

The image shows the 'Descriptive Statistics' dialog box in Microsoft Excel. The dialog is titled 'Descriptive Statistics' and has a standard Windows window border with a question mark and a close button (X) in the top right corner.

Input section:

- Input Range:** A text box containing '\$A\$1:\$D\$11' with a selection icon to its right.
- Grouped By:** Two radio buttons: 'Columns' (selected) and 'Rows'.
- Labels in First Row:** A checked checkbox.

Output options section:

- Output Range:** An empty text box with a selection icon.
- New Worksheet Ply:** A radio button (selected) with a text box containing 'DStat-data'.
- New Workbook:** A radio button.
- Summary statistics:** A checked checkbox.
- Confidence Level for Mean:** A checkbox (unchecked) with a text box containing '95' and a '%' symbol.
- Kth Largest:** A checkbox (unchecked) with a text box containing '1'.
- Kth Smallest:** A checkbox (unchecked) with a text box containing '1'.

Buttons: On the right side of the dialog, there are three buttons: 'OK' (with a mouse cursor over it), 'Cancel', and 'Help'.

Descriptive Statistics Results

<i>y</i>		<i>x1</i>		<i>x2</i>		<i>x3</i>	
Mean	53.5	Mean	8.6	Mean	0.507	Mean	0.5
Standard Error	6.024487	Standard Error	1.22202	Standard Error	0.089195	Standard Error	0.166667
Median	52.5	Median	8	Median	0.525	Median	0.5
Mode	#N/A	Mode	7	Mode	#N/A	Mode	0
Standard Deviation	19.0511	Standard Deviation	3.864367	Standard Deviation	0.282058	Standard Deviation	0.527046
Sample Variance	362.9444	Sample Variance	14.93333	Sample Variance	0.079557	Sample Variance	0.277778
Kurtosis	-0.67457	Kurtosis	-0.16515	Kurtosis	-0.76051	Kurtosis	-2.57143
Skewness	-0.27069	Skewness	0.105705	Skewness	-0.33295	Skewness	0
Range	59	Range	13	Range	0.89	Range	1
Minimum	23	Minimum	2	Minimum	0.01	Minimum	0
Maximum	82	Maximum	15	Maximum	0.9	Maximum	1
Sum	535	Sum	86	Sum	5.07	Sum	5
Count	10	Count	10	Count	10	Count	10

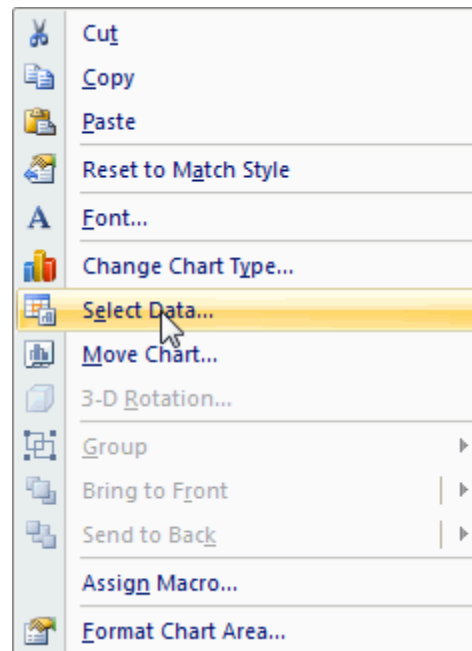
Preliminary Reconnaissance of the Data (Scatter Diagrams)

The screenshot shows the Microsoft Excel interface with a data set in columns A through D. A tooltip for the 'Scatter' chart option is displayed over the 'Charts' ribbon. The data set is as follows:

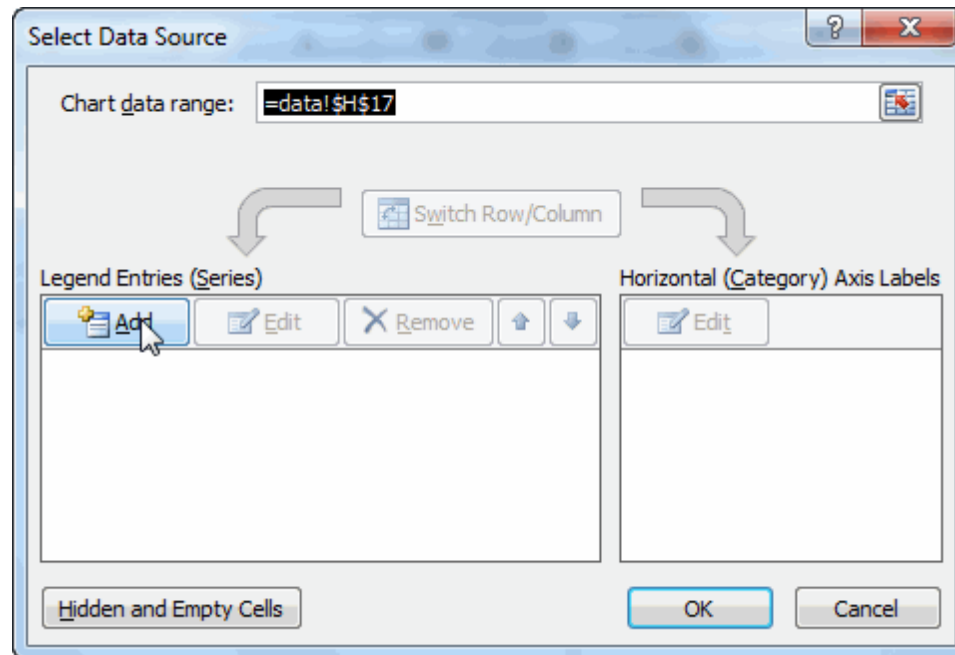
	A	B	C	D
1	y	x ₁	x ₂	x ₃
2	23	2	0.01	0
3	45	5	0.22	0
4	27	7	0.35	1
5	72	13	0.9	1
6	56	7	0.45	1
7	49	8	0.6	0
8	64	12	0.71	0
9	69	9	0.8	1
10	48	8	0.33	0
11	82	15	0.7	1

The tooltip text reads: "Scatter. Insert a Scatter chart, also known as an X Y chart. This type of chart compares pairs of values. Use it when the values being charted are not in X-axis order or when they represent separate measurements."

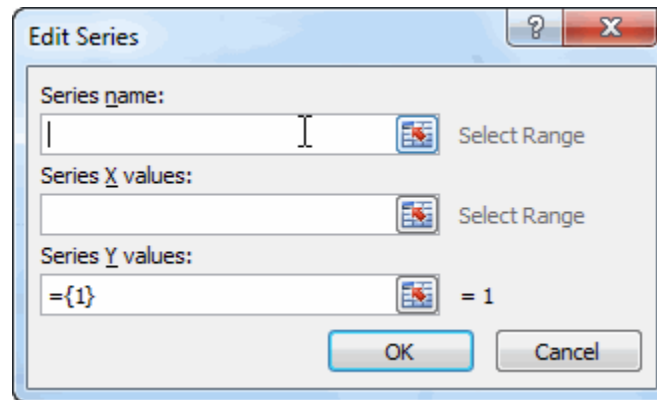
Scatter Diagrams



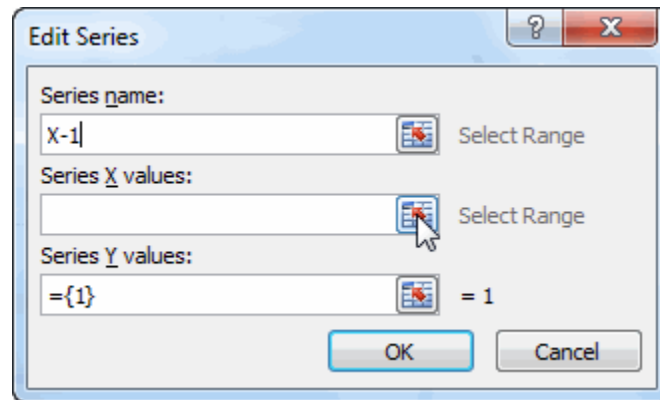
Scatter Diagrams



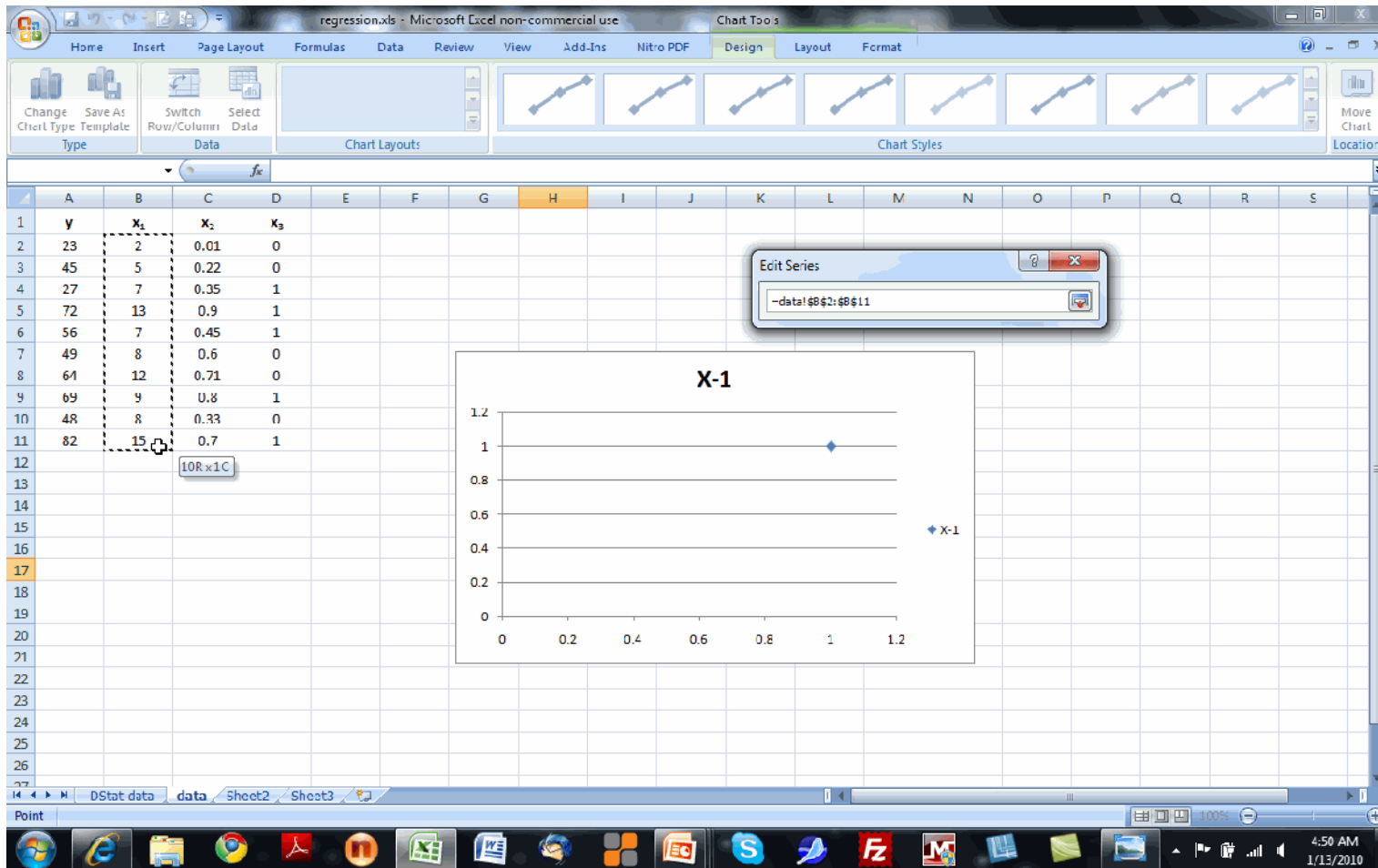
Scatter Diagrams



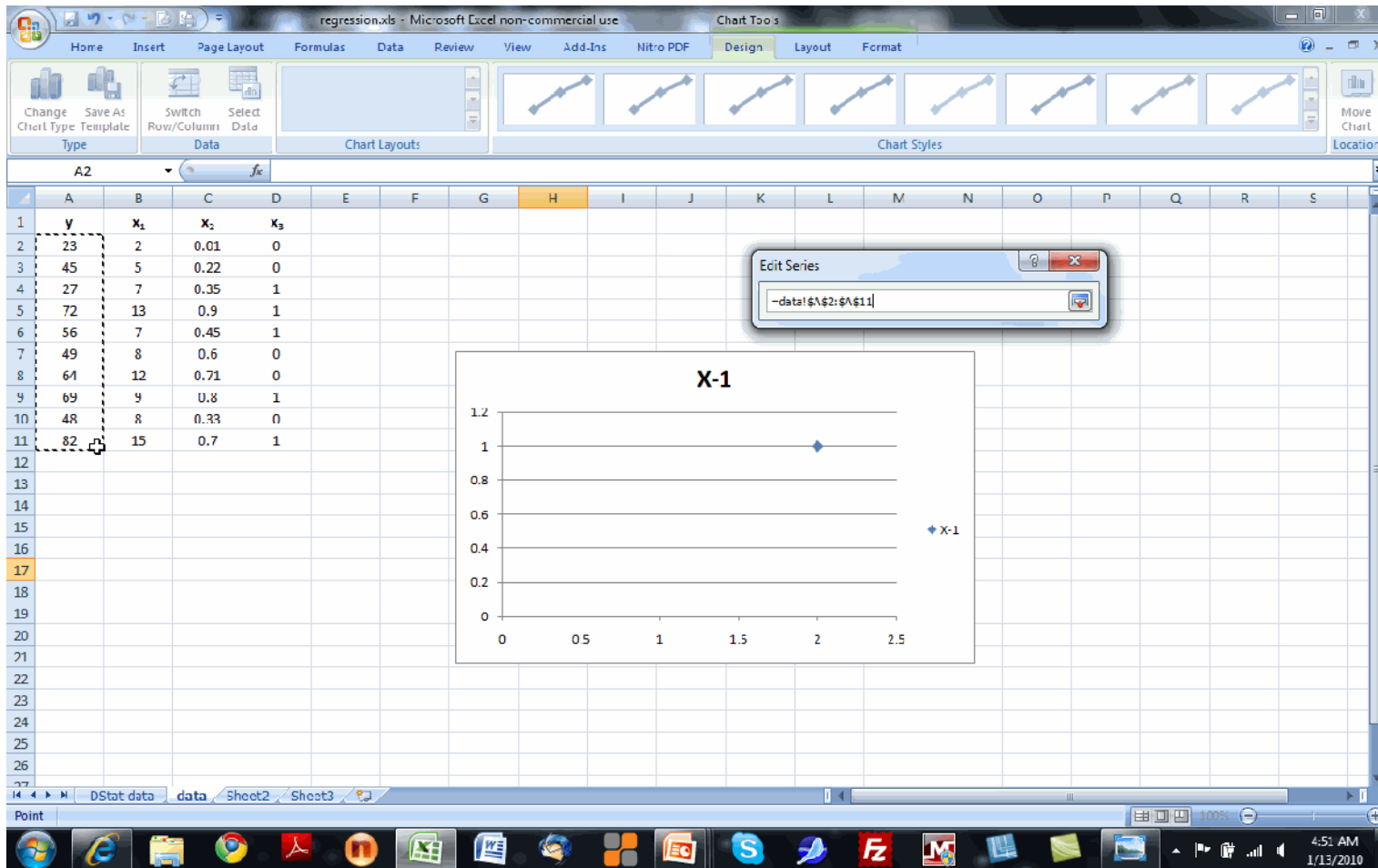
Scatter Diagrams



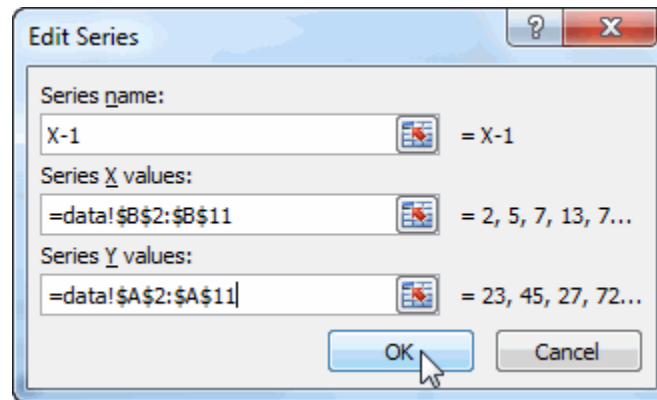
Scatter Diagrams



Scatter Diagrams



Scatter Diagrams



Scatter Diagrams Results

