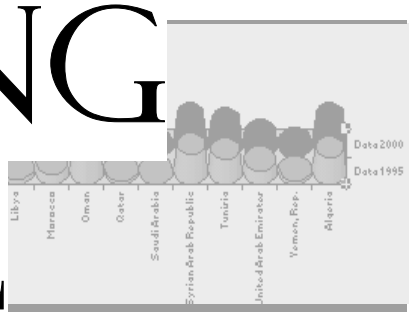
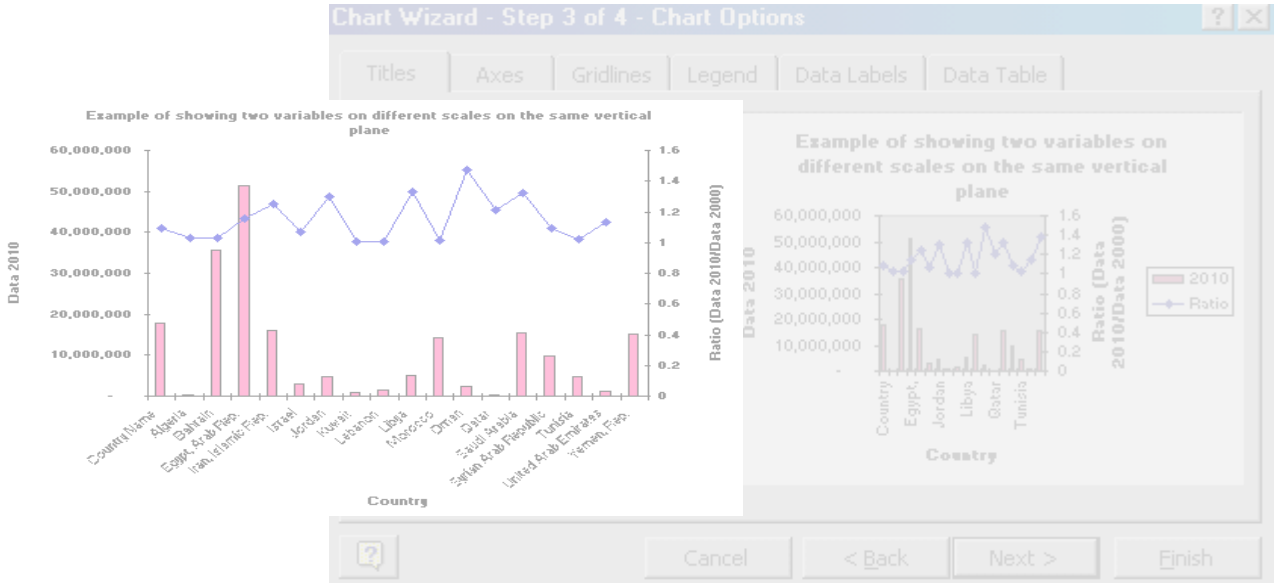
CHARTING IN EXCEL





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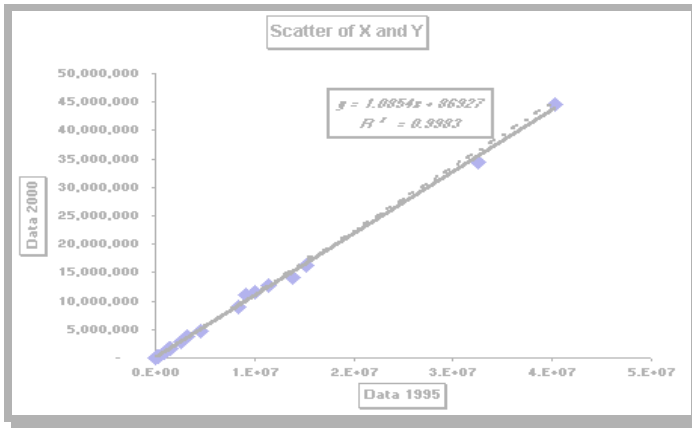

Charting in Excel

Volume 2 in the series **Excel for Professionals**

Volume 1: Excel For Beginners
Volume 2: Charting in Excel
Volume 3: Excel-- Beyond The Basics
Volume 4: Managing & Tabulating Data in Excel
Volume 5: Statistical Analysis with Excel
Volume 6: Financial Analysis using Excel

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ABOUT THE AUTHOR

Vijay Gupta has taught statistic, econometrics, and finance to institutions in the US and abroad, specializing in teaching technical material to professionals.

He has organized and held training workshops in the Middle East, Africa, India, and the US. The clients include government agencies, financial regulatory bodies, non-profit and private sector companies.

A Georgetown University graduate with a Masters degree in economics, he has a vision of making the tools of econometrics and statistics easily accessible to professionals and graduate students. His books on SPSS and Regression Analysis have received rave reviews for making statistics and SPSS so easy and "non-mathematical." The books are in use by over 150,000 users in more than 140 nations.

He is a member of the American Statistics Association and the Society for Risk Analysis.

In addition, he has assisted the World Bank and other organizations with econometric analysis, survey design, design of international investments, cost-benefit, and sensitivity analysis, development of risk management strategies, database development, information system design and implementation, and training and troubleshooting in several areas.

Vijay has worked on capital markets, labor policy design, oil research, trade, currency markets, and other topics.

VISION

Vijay has a vision for software tools for Office Productivity and Statistics. The current book is one of the first tools in stage one of his vision. We now list the stages in his vision.

Stage one: Books to *Teach* Existing Software

He is currently working on books on word-processing, and report production using Microsoft Word, and a booklet on Professional Presentations.

The writing of the books is the first stage envisaged by Vijay for improving efficiency and productivity across the world. This directly leads to the second stage of his vision for productivity improvement in offices worldwide.

Stage two: *Improving* on Existing Software

The next stage is the construction of software that will radically improve the usability of current Office software.

Vijay's first software is undergoing testing prior to its release in Jan 2003. The software — titled "Word Usability Enhancer" — will revolutionize the way users interact with Microsoft Word, providing users with a more intuitive interface, readily accessible tutorials, and numerous timesaving and annoyance-removing macros and utilities.

He plans to create a similar tool for Microsoft Excel, and, depending on resource constraints and demand, for PowerPoint, Star Office, etc.

Stage 3: *Construction* of the first "feedback-designed" Office and Statistics software

Vijay's **eventual goal** is the construction of productivity software that will provide stiff competition to Microsoft Office. His hope is that the success of the software tools and the books will convince financiers to provide enough capital so that a successful software development and marketing endeavor can take a chunk of the **multi-billion dollar** Office Suite market.

Prior to the construction of the Office software, Vijay plans to construct the "Definitive" statistics software. Years of working on and teaching the current statistical software has made Vijay a master at picking out the weaknesses, limitations, annoyances, and, sometimes, pure inaccessibility of existing software. This **1.5 billion dollar** market needs a new visionary tool, one that is appealing and inviting to users, and not forbidding, as are several of the current software. Mr. Gupta wants to create integrated software that will encompass the features of SPSS, STATA, LIMDEP, EViews, STATISTICA, MINITAB, etc.

Other

He has plans for writing books on the "learning process." The books will teach how to understand one's approach to problem solving and learning and provide methods for learning new techniques for self-learning.

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Mapping of menu options with sections of the book and in the series of books

You may be looking for a section that pertains to a particular menu option in Excel. I now briefly lay out where to find (in the series) a discussion of a specific menu option of Excel.

Table 1: Mapping of the options in the "FILE" menu

Menu Option	*Section that discusses the option*
OPEN SAVE SAVE AS	*Volume 1: Excel For Beginners*
SAVE AS WEB PAGE	*Volume 3: Excel– Beyond The Basics*
SAVE WORKSPACE	*Volume 3: Excel– Beyond The Basics*

Menu Option	*Section that discusses the option*
SEARCH	*Volume 1: Excel For Beginners*
PAGE SETUP	*Volume 1: Excel For Beginners* This Book
PRINT AREA	*Volume 1: Excel For Beginners*
PRINT PREVIEW	*Volume 1: Excel For Beginners*
PRINT	*Volume 1: Excel For Beginners*
PROPERTIES	*Volume 1: Excel For Beginners*

Table 2: Mapping of the options in the "EDIT" menu

Menu Option	*Section that discusses the option*
UNDO	*Volume 1: Excel For Beginners*
REDO	*Volume 1: Excel For Beginners*
CUT COPY PASTE	*Volume 1: Excel For Beginners*
OFFICE CLIPBOARD	*Volume 1: Excel For Beginners*
PASTE SPECIAL	*Volume 3: Excel– Beyond The Basics*
FILL	*Volume 4: Managing & Tabulating Data in Excel*
CLEAR	*Volume 1: Excel For Beginners*
DELETE SHEET	*Volume 1: Excel For Beginners*
MOVE OR COPY SHEET	*Volume 1: Excel For Beginners*
FIND	*Volume 1: Excel For Beginners*
REPLACE	*Volume 1: Excel For Beginners*
GO TO	*Volume 3: Excel– Beyond The Basics*
LINKS	*Volume 3: Excel– Beyond The Basics*

Menu Option	*Section that discusses the option*
OBJECT	*Volume 3: Excel– Beyond The Basics* *Volume 2: Charting in Excel*

Table 3: Mapping of the options in the "VIEW" menu

Menu Option	*Section that discusses the option*
NORMAL	*Volume 1: Excel For Beginners*
PAGE BREAK PREVIEW	*Volume 1: Excel For Beginners*
TASK PANE	*Volume 1: Excel For Beginners*
TOOLBARS	*Volume 1: Excel For Beginners* *Volume 3: Excel– Beyond The Basics*
FORMULA BAR	Leave it on (checked)
STATUS BAR	Leave it on (checked)
HEADER AND FOOTER	*Volume 1: Excel For Beginners*
COMMENTS	*Volume 3: Excel– Beyond The Basics*
FULL SCREEN	*Volume 1: Excel For Beginners*
ZOOM	*Volume 1: Excel For Beginners*

Table 4: Mapping of the options in the "INSERT" menu

Menu Option	*Section that discusses the option*
CELLS	*Volume 1: Excel For Beginners*
ROWS	*Volume 1: Excel For Beginners*
COLUMNS	*Volume 1: Excel For Beginners*
WORKSHEETS	*Volume 1: Excel For Beginners*
CHARTS	This Book
PAGE BREAK	*Volume 1: Excel For Beginners*
FUNCTION	*Volume 1: Excel For Beginners*

Menu Option	*Section that discusses the option*
FUNCTION/FINANCIAL	*Volume 6: Financial Analysis using Excel*
FUNCTION/STATISTICAL	*Volume 5: Statistical Analysis with Excel*
FUNCTION/LOGICAL	*Volume 3: Excel– Beyond The Basics*
FUNCTION/TEXT	*Volume 3: Excel– Beyond The Basics*
FUNCTION/INFORMATION	*Volume 3: Excel– Beyond The Basics*
FUNCTION/LOOKUP	*Volume 3: Excel– Beyond The Basics*
FUNCTION/MATH & TRIG	*Volume 3: Excel– Beyond The Basics*
FUNCTION/ENGINEERING	*Volume 3: Excel– Beyond The Basics*
FUNCTION/DATABASE	*Volume 3: Excel– Beyond The Basics*
FUNCTION/DATE & TIME	*Volume 3: Excel– Beyond The Basics*
NAME	*Volume 1: Excel For Beginners*
COMMENT	*Volume 3: Excel– Beyond The Basics*
PICTURE	*Volume 2: Charting in Excel*
DIAGRAM	*Volume 2: Charting in Excel*
OBJECT	*Volume 3: Excel– Beyond The Basics*
HYPERLINK	*Volume 3: Excel– Beyond The Basics*

Table 5: Mapping of the options inside the "FORMAT" menu

Menu Option	*Section that discusses the option*
CELLS	*Volume 1: Excel For Beginners*
ROW	*Volume 1: Excel For Beginners*
COLUMN	*Volume 1: Excel For Beginners*
SHEET	*Volume 1: Excel For Beginners*
AUTOFORMAT	*Volume 1: Excel For Beginners*
CONDITIONAL FORMATTING	*Volume 3: Excel– Beyond The Basics*

Menu Option	*Section that discusses the option*
STYLE	*Volume 1: Excel For Beginners*

Table 6: Mapping of the options inside the "TOOLS" menu

Menu Option	*Section that discusses the option*
SPELLING	*Volume 1: Excel For Beginners*
ERROR CHECKING	*Volume 3: Excel– Beyond The Basics*
SPEECH	*Volume 4: Managing & Tabulating Data in Excel*
SHARE WORKBOOK	*Volume 3: Excel– Beyond The Basics*
TRACK CHANGES	*Volume 3: Excel– Beyond The Basics*
PROTECTION	*Volume 3: Excel– Beyond The Basics*
ONLINE COLLABORATION	*Volume 3: Excel– Beyond The Basics*
GOAL SEEK	*Volume 6: Financial Analysis using Excel*
SCENARIOS	*Volume 6: Financial Analysis using Excel*
AUDITING	*Volume 3: Excel– Beyond The Basics*
TOOLS ON THE WEB	The option will take you to a Microsoft site that provides access to resources for Excel
MACROS	In upcoming book on "Macros for Microsoft Office"
ADD-INS	*Volume 6: Financial Analysis using Excel*
AUTOCORRECT	*Volume 1: Excel For Beginners* *Volume 4: Managing & Tabulating Data in Excel*
CUSTOMIZE	*Volume 3: Excel– Beyond The Basics*
OPTIONS	*Volume 1: Excel For Beginners*

Table 7: Mapping of the options inside the "DATA" menu

Menu Option	*Section that discusses the option*
SORT	*Volume 4: Managing & Tabulating Data in Excel*

Menu Option	*Section that discusses the option*
FILTER	*Volume 4: Managing & Tabulating Data in Excel*
FORM	*Volume 4: Managing & Tabulating Data in Excel*
SUBTOTALS	*Volume 4: Managing & Tabulating Data in Excel*
VALIDATION	*Volume 4: Managing & Tabulating Data in Excel*
TABLE	*Volume 6: Financial Analysis using Excel*
CONSOLIDATION	*Volume 6: Financial Analysis using Excel*
GROUP AND OUTLINE	*Volume 1: Excel For Beginners*
PIVOT REPORT	*Volume 4: Managing & Tabulating Data in Excel*
EXTERNAL DATA	*Volume 4: Managing & Tabulating Data in Excel*

Table 8: Mapping of the options inside the "WINDOW" menu

Menu Option	*Section that discusses the option*
HIDE	*Volume 3: Excel– Beyond The Basics*
SPLIT	*Volume 1: Excel For Beginners*
FREEZE PANES	*Volume 1: Excel For Beginners*

Table 9: Mapping of the options inside the "HELP" menu

Menu Option	*Section that discusses the option*
OFFICE ASSISTANT	*Volume 1: Excel For Beginners*
HELP	*Volume 1: Excel For Beginners*
WHAT'S THIS	*Volume 1: Excel For Beginners*

INTRODUCTION

Making charts

- Chapter 1 on page 21 provides a framework for categorizing chart types and sub-types, teaches how to make different types of charts and introduces the concept of the "parts of a chart" and the "object model." These concepts are essential to understanding how to edit and format charts.

- Chapter 2 on page 30 teaches demonstrates the four steps involved in making any chart, irrespective of the chart type. It uses the example of a Column chart.

- Chapter 3 on 64 teaches how to make a "Stacked" chart -- in which each column/bar represents "shares" of data series

- Chapter 4 on page 69 teaches how to make a Scatter chart. You also learn how to add a trend Line (Regression or other trend).

- Chapter 6 on page 90 teaches the most difficult chart type – "2 Y-Axis charts." In this chart type, one Y-axis represents one series and the other Y-axis another series that may use a different scale. Such charts are useful if, say, you want to show "Income Level (in dollars)" and "Income Growth Rate (in percentage)," both on the same chart.

- Chapter 7 on page 100 teaches the quick modification of an existing chart.

Formatting charts

- Chapter 8 on page 110 lays the basis for learning how to format charts using the "object approach."

- Chapter 9 on page 123 shows how to resize, move, and edit charting objects.

- Chapter 10 on page 130 is the first chapter in a sequence of "top to bottom" (or "largest to smallest") object-based "drill down" process of formatting a chart[1].

- Chapter 11 on page 157 teaches the formatting and scaling of an extremely important set of objects – the Axes. It is placed in its own chapter because of its "more than cosmetic" role in a chart.

- Chapter 12 on page 165 shows how to format the "Data Series" (for example, a line in a Line chart) object and a "Data Point" object.

These objects need special emphasis because:
(a) These are the ultimate "drilled down" objects. They represent the ultimate depiction of the data.
(b) These objects differ across chart types.
(c) When formatting these objects, you can create new "objects" – essentially, you can add very specific features that cannot be created any other way. (For example, "Error Bars" or "Leader Lines to connect a Pie slice to the label for the slice.")

- Chapter 13 on page 172 dwells further on the difference in the Data Series and Data Point objects across different chart types.

[1] The "drill down" starts from the largest object in a chart (the "Chart Area") to the smallest (each "Data Point" on the plot.) This approach will make you a master in learning any other object based graphical software like PowerPoint.

Time saving tools

- Chapter 14 on page 197 shows how to use customization and short cut menus to save time when working on charts.

- Chapter 15 on page 207 shows the use of two great tools for saving time in formatting charts – the Redo feature and the "Format Painter."

- Chapter 16 on 212 provides summary tables that you can use as quick reference guides.

Sample data

All the data files are included in the zipped file.

CHAPTER 1

UNDERSTANDING CHART TYPES

> This book presents a radically different perspective on understanding the charting facility in Excel. You will learn to see a chart as an "object" made up of several "Sub-objects." The trick to making, editing, and formatting charts is to be able to identify and work on each object within the chart. Open the sample file "Charts File1.xls."

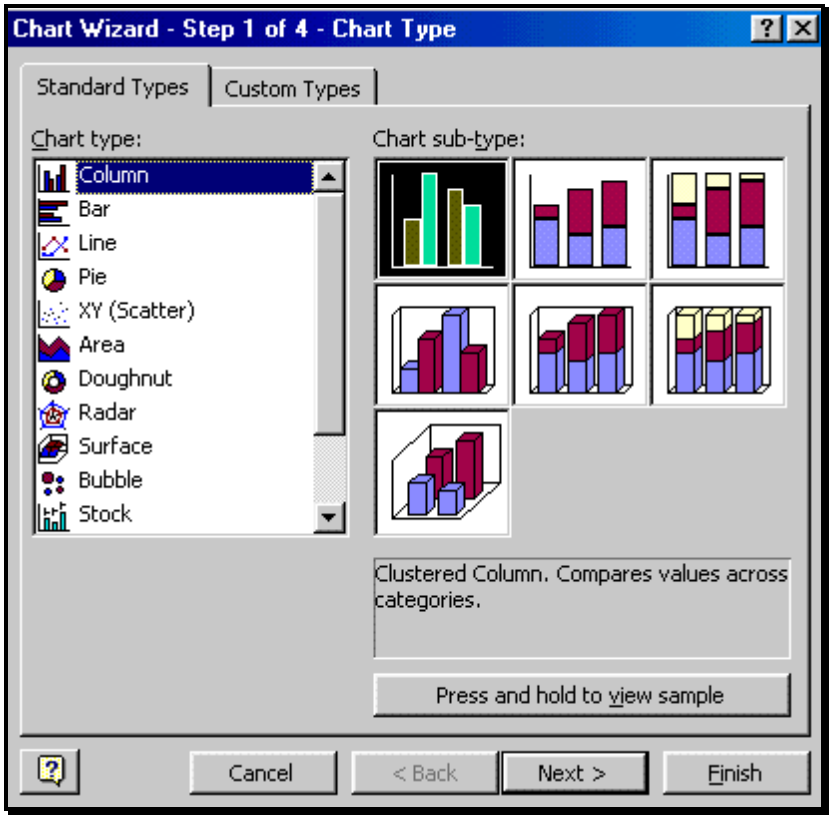
This chapter provides a framework for categorizing chart types and sub-types, teaches how to make different types of charts and introduces the concept of the "parts of a chart" and the "object model." These concepts are essential to understanding how to edit and format charts.

Section 1.1 on page 22 provides a framework for categorizing the many chart types[2] into four main categories. Once you learn how to make a chart within one category, it will be easy to make other charts that are part of the same category. (For example, once you learn how to make a Column chart you will find it easy to make Bar, Cylinder, Cone, and Area charts.) If you look at the left half of the dialog shown in the next figure, you will view many different chart types. I will reclassify them within a few categories.

[2] A chart "type" identifies the way data is shown by the chart and the markers used for showing the data. An Excel chart shows data in four main ways. Different markers may be used to show data in one way. For example, the Pie and Doughnut chart types use different markers – Pie Slices and Doughnut Slices – to show the "percent share of each value of the sum of values of the series."

Within this Chapter, you will learn how to resolve some often-encountered problems with defining the correct data series for a chart. Section 2.3.a on page 44 shows the way around an exasperating problem– when Excel does not pick up the X-axis series (or any other series) while making a chart.

Figure 1: The "Chart Wizard"



1.1 CHART CATEGORIES – DECIDING WHAT CHART TYPE TO USE

In Excel, you can make several types of charts. In terms of functionality, these charts can be broken down into four basic groups[3]. Within each

[3] Strictly speaking, one may argue that there are more than six main categories. I concentrate on the six categories that are used often.

group, the different chart types depict information using different markers and formats.

Once you learn how to make charts of one type within a group, you can easily make other chart types within that group. I now define each of these six basic groups, show an example of a chart from each group, and list the chart types that correspond to each group.

1.1.A THE "BASE" TRENDS / LEVELS COMPARISON CHARTS

These chart types depict and compare the differences in values across series and trends in series. One can further divide this category into two–

1. The "Bar-type" charts for comparing individual data points. These include chart types like Column, Bar, Cylinder, Cone, Pyramid, Tubes, etc. The next figure shows this type of a chart.

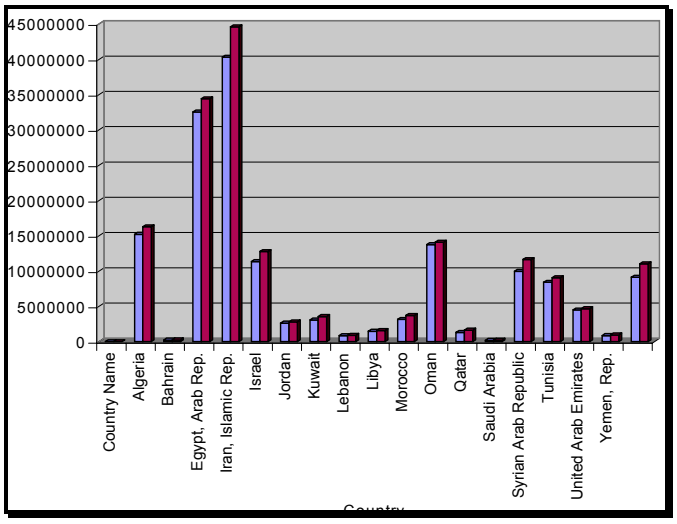
2. The "Line-type" charts for comparing trends in different series. These include charts like Line, Area, etc.

Open the sample file –"Charts File1.xls." You will view examples of several of basic charts–

- Chart "Basic Column"
- Chart "Basic Bar"
- Chart "Basic Line"
- Chart "Basic Area"

A column chart is reproduced in the next figure -- Chapter 2 teaches how to make this type of a chart.

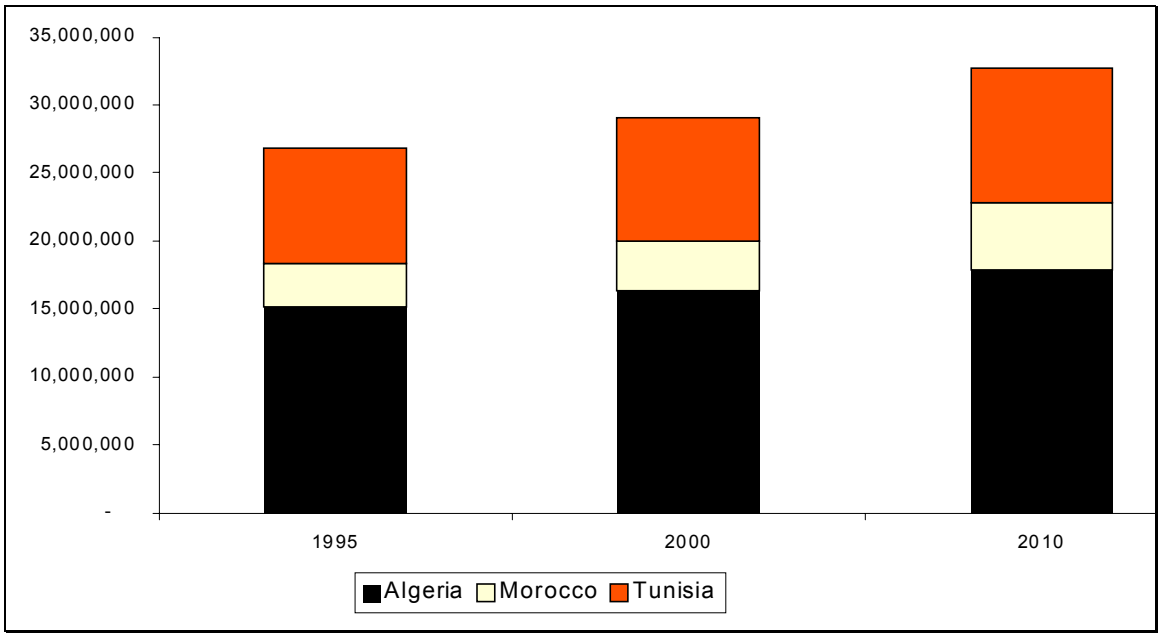
Figure 2: A Column chart



1.1.B STACKED COMPARISON CHARTS

Charts showing data for each values of a series "Stacked" in a single Column – a "Stacked" Column, Bar, Line or Area chart –Chapter 3 on page 64 teaches how to make this type of a chart.

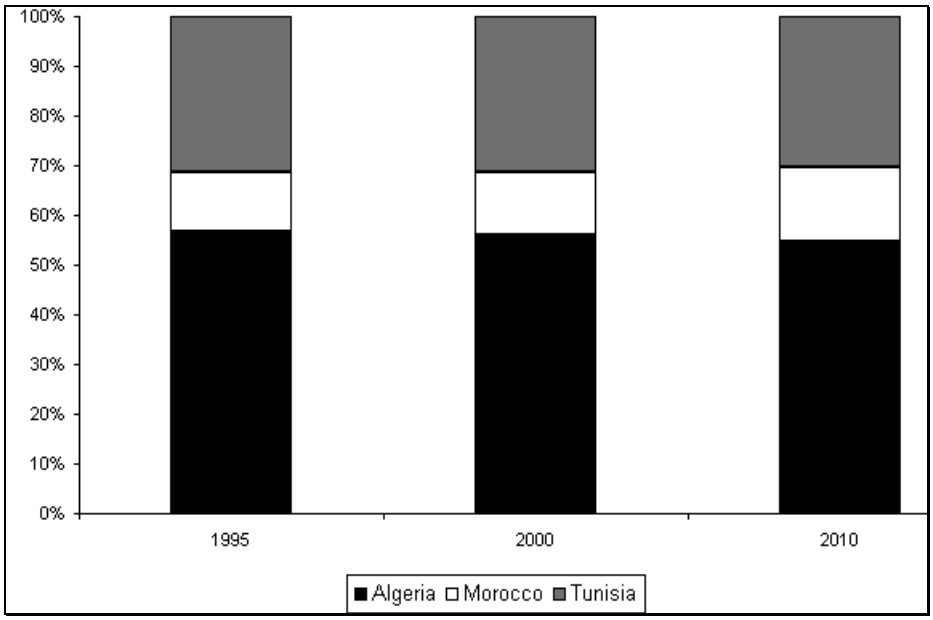
Figure 3: A "Stacked" Column chart



1.1.C "100% STACKED" COMPARISON OF PERCENT SHARES CHART

Section 3.2 teaches how to make this type of a chart.

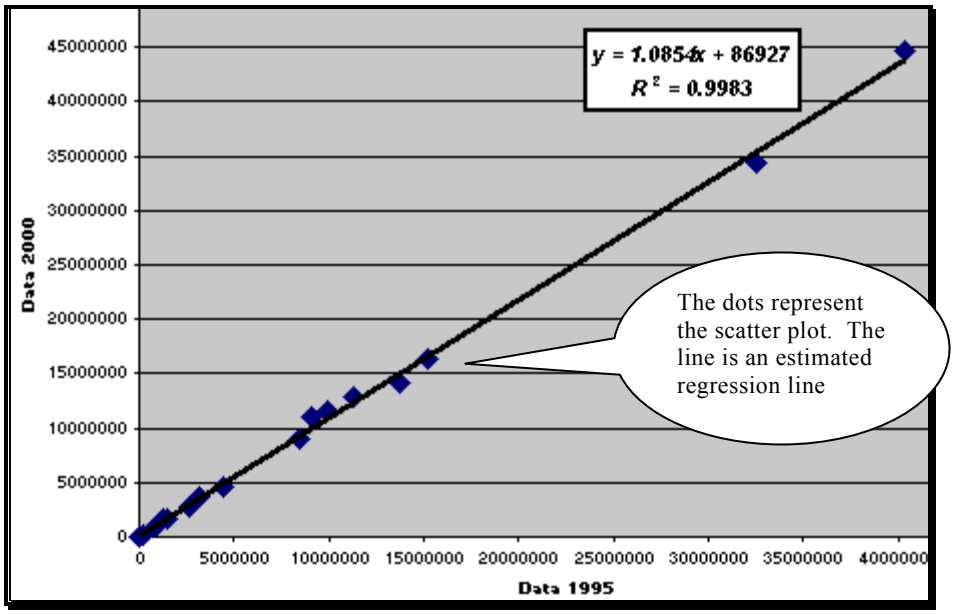
Figure 4: A "100% Stacked" Column chart. Each of the columns has a height of 100%.



1.1.D SCATTER CHARTS

These charts capture the relation between variables. The charts under this category include XY (Scatter), Bubble, and Surface. The next figure shows this type of a chart-- Chapter 4 on page 69 discusses how to make this type of chart.

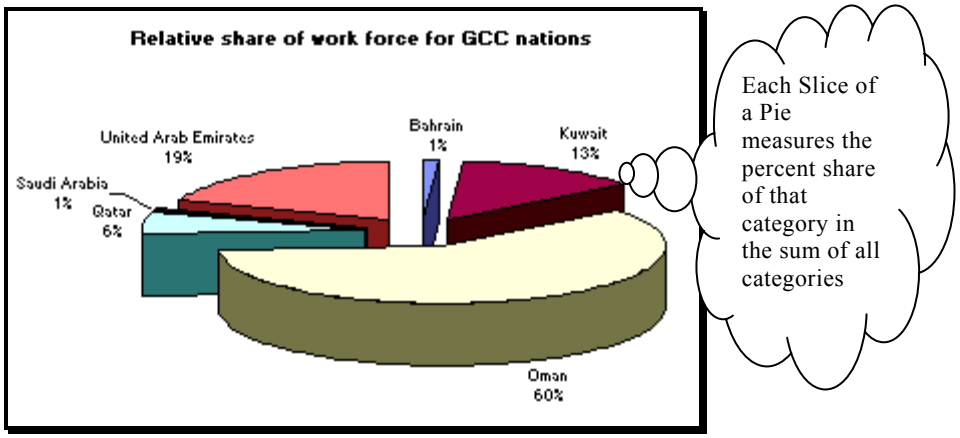
Figure 5: A Scatter Chart



1.1.E CHARTS THAT DEPICT THE "% SHARE OF EACH CATEGORY WITHIN A SERIES" – PIE AND DOUGHNUT CHARTS

The charts under this category include Pie and Doughnut charts. The next figure shows an example of a chart under this category-- Chapter 5 on page 79 discusses how to make this type of chart.

Figure 6: A Pie Chart

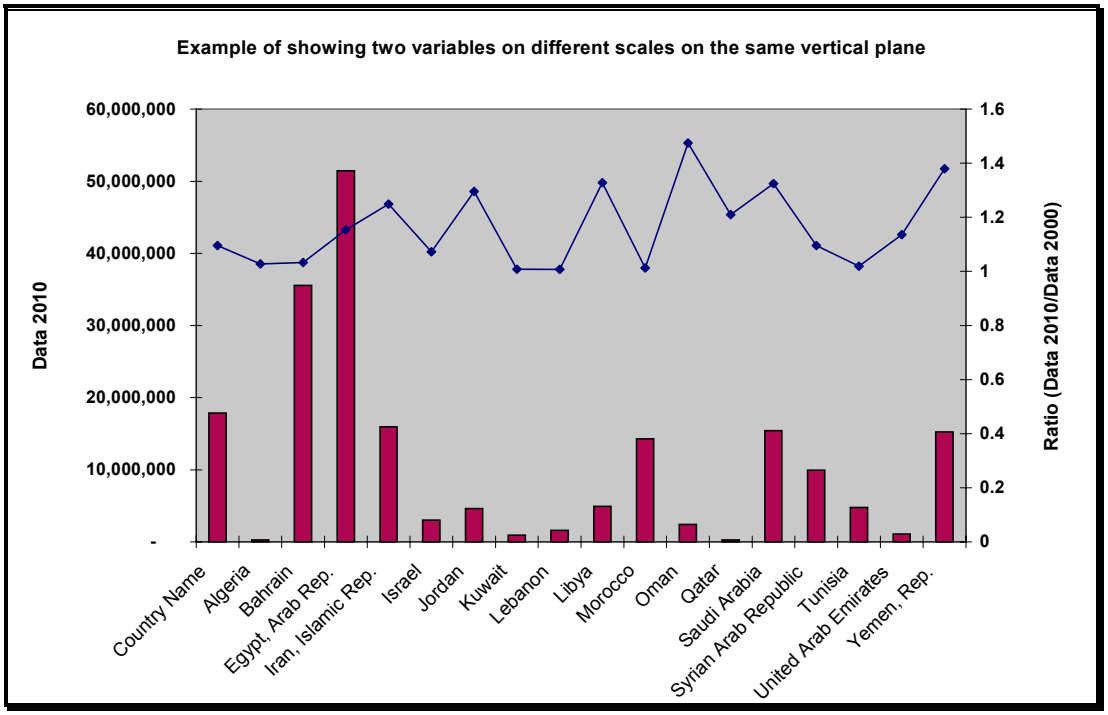


1.1.F THE "2-Y AXIS" CHARTS FOR COMPARING TRENDS IN TWO SERIES THAT HAVE WIDELY DIFFERENT SCALES OF MEASUREMENT

These include "Lines on 2-axis" and "Line-Column on 2-axis." Section on page 90 discusses how to make this type of charts. The next figure shows this type of a chart.

> If you decide to change the chart type after making the chart, you can do it quickly. This feature is taught in Chapter 7 on page 100.

Figure 7: A 2 Y-axis chart

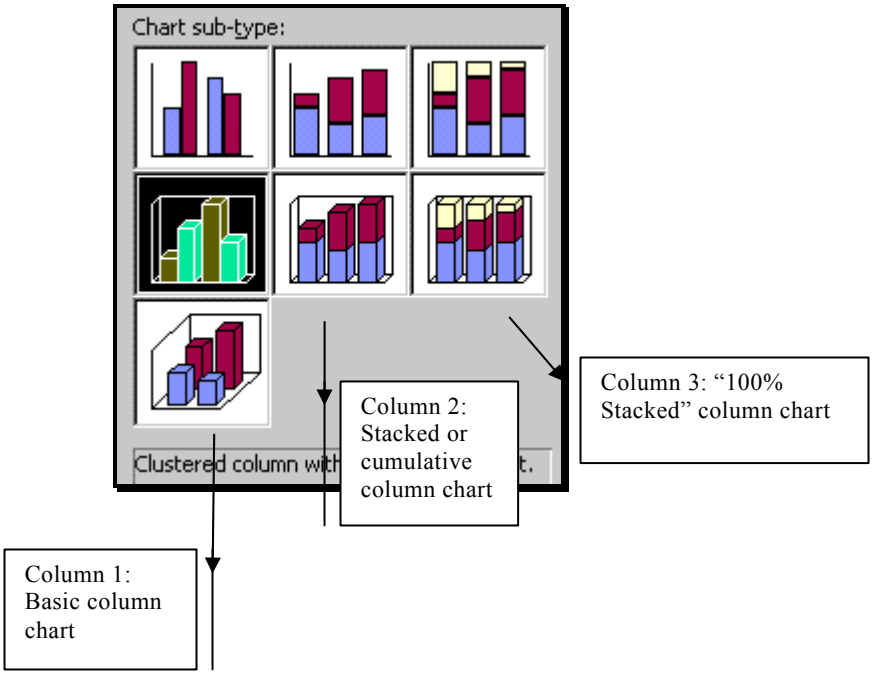


1.2 THE THREE "COLUMNS" OF SUB-TYPES

1. Basic
2. Stacked

3. 100% Stacked

Figure 8: Understanding the sub-types of a Column chart



Page for notes

CHAPTER 2

A "BASE" CHART (COLUMNS, BARS, LINES OR AREAS)

Open the sample file "Charts File1.xls."

Assume you want a chart that captures the levels and trends across countries and years for the data in cells B1 to D19. To make this type of a chart, select the data cells B1 to D19 – *Figure 9* shows this range. (Column B has the labels for the X-axis; Columns C and D have the data for the two sets of Columns.)

Figure 9: The sample data

B	C	D	E
Country Name	**1995**	**2000**	**2010**
Algeria	15,218,000	16,284,000	17,846,000
Bahrain	234,000	254,000	261,000
Egypt, Arab Rep.	32,543,000	34,420,000	35,543,000
Iran, Islamic Rep.	40,309,000	44,610,000	51,449,000
Iraq	11,348,000	12,779,000	15,959,000
Israel	2,641,000	2,814,000	3,018,000
Jordan	3,078,000	3,561,000	4,613,000
Kuwait	857,000	909,000	916,000
Lebanon	1,484,000	1,583,000	1,595,000
Libya	3,162,000	3,717,000	4,937,000
Morocco	13,761,000	14,097,000	14,280,000
Oman	1,309,000	1,635,000	2,411,000
Qatar	192,000	214,000	259,000

Then choose the menu option INSERT / CHART (as shown in the next figure) or click on the chart icon shown in *Figure 11*.

Figure 10: The "Chart" menu option

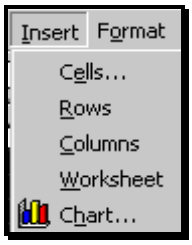


Figure 11: The INSERT / CHART icon

Excel launches the "Chart Wizard." (Figure 12 shows the first dialog within the wizard.) This wizard has four steps / dialogs.

> A "**Wizard**," within the context of software, is a series of dialogs used for processes that need multiple dialogs. A wizard typically has the buttons "Next," "Back," and "Finish." These buttons allow you to move to the next dialog, the previous dialog and to finish the process, respectively. You should be able to separate out the four steps in the chart wizard by the end of this Chapter.

2.1 STEP ONE– CHOOSING THE CHART TYPE AND SUB-TYPE

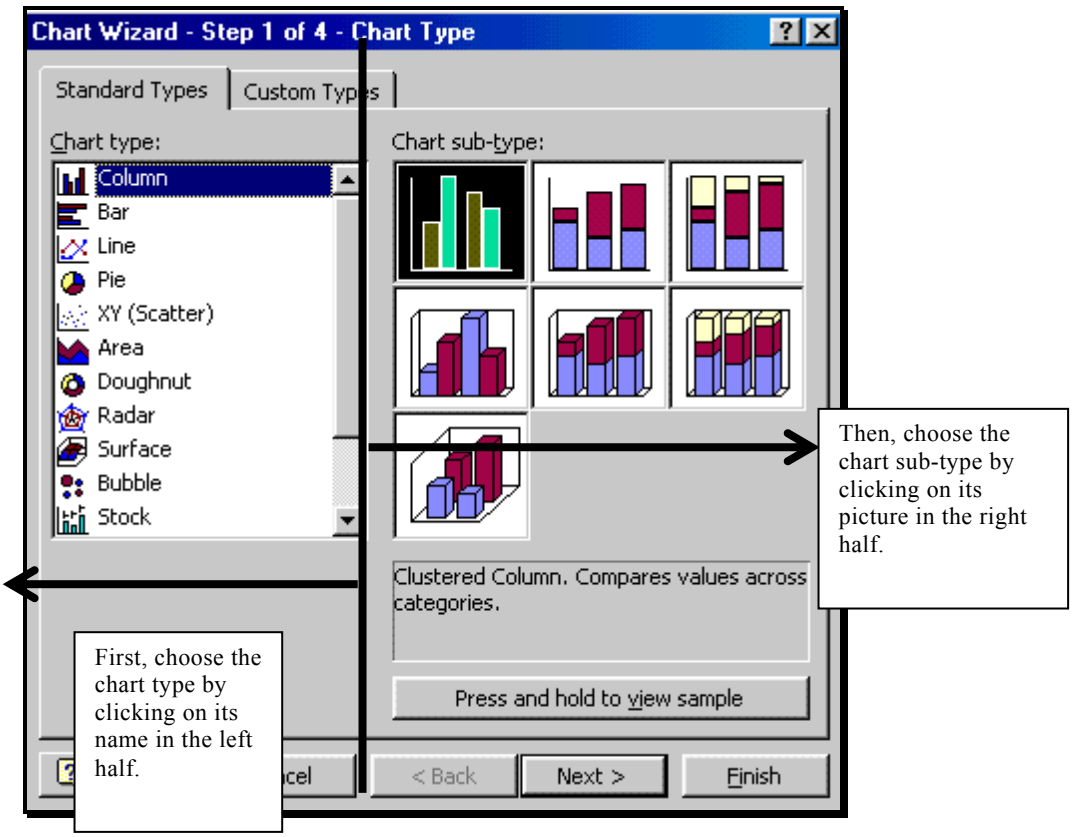
In the first step (shown in *Figure 12* to *Figure 13*), you select the type and sub-type of chart[4]. The left half of the dialog lists the chart types (as "Column," "Bar," "Line," etc). Within each type of chart, you can select from one of the sub-types shown in the right half of the dialog.

To choose a chart type and sub-type, first click on the name of a chart type on the left hand side of the dialog shown in *Figure 12*. Then, click on the picture of a chart sub-type on the right half of the same dialog. I chose

[4] Note: "Custom Types" charts do not have any sub-types.

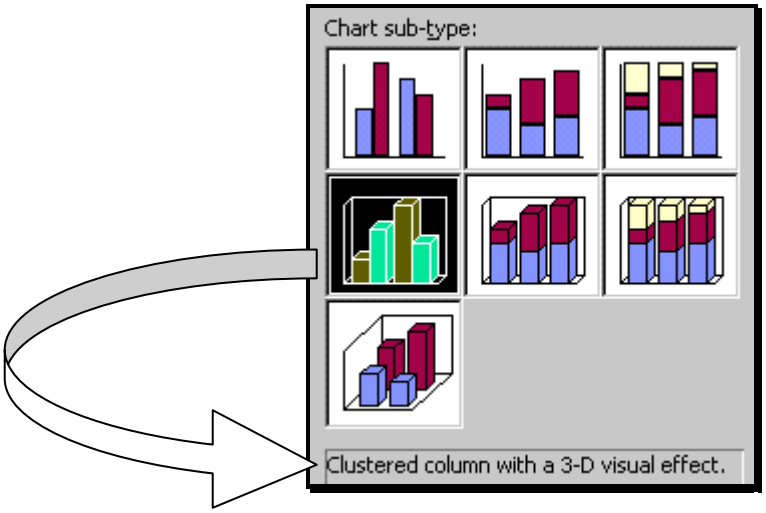
the type "Column" as shown in the next figure[5]. I then moved my mouse over the area "Chart sub-type" and chose the sub-type highlighted in *Figure 13*.

Figure 12: The two steps to choosing a chart type and sub-type



[5] In Chapter 7, I show how to quickly change the chart type and / or sub-type even after the chart has been made.

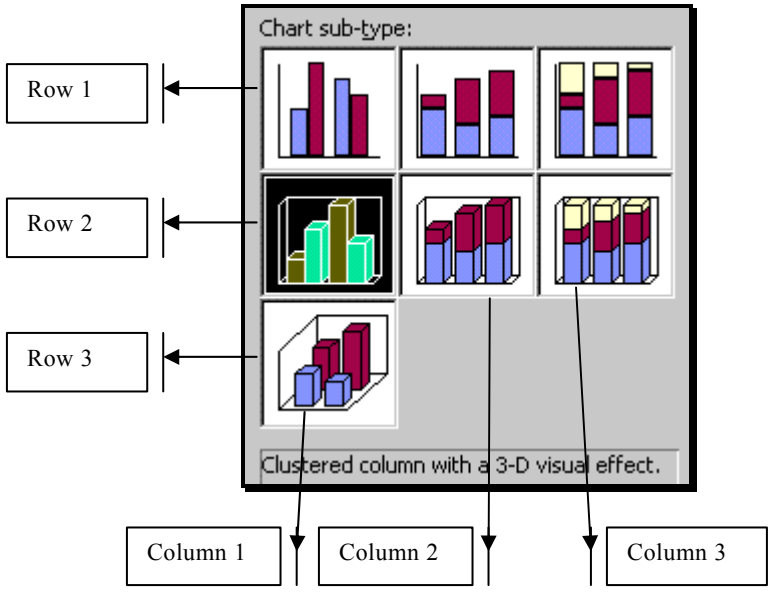
Figure 13: Selecting a sub-type. Note that Excel displays a short description of the currently selected sub-type.



2.1.A CHOOSING A CHART SUB-TYPE

Let us dwell a bit further on the sub-types of a "Column" chart. Imagine the sub-types as cells in a table with each row and Column constituting one property. See *Figure 13* and mentally partition the sub-types into three "rows" and three "Columns" as shown in the next figure.

Figure 14: Categorizing the sub-types by using the grid method

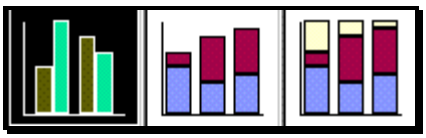


View the sub-types. You should see similarities across all the sub-types in one row or Column. I briefly list the similarities below.

2.1.B THE "ROWS" IN THE GRID

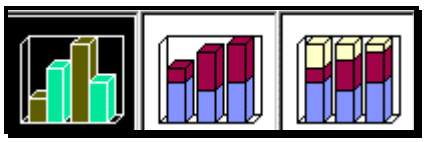
Row 1 sub-types (shown in the next figure) are all 2-Dimensional. Such charts are shown in Figure 21, Figure 23, and Figure 25.

Figure 15: 2-Dimensional sub-types



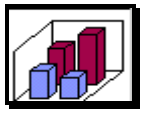
Row 2 sub-types (shown in the next figure) are all 3-Dimensional but they all show the data series next to each other unlike in row 3 sub-type. Such charts are shown in Figure 22 and Figure 24,

Figure 16: 3-Dimensional sub-types with data series placed next to each other



Row 3 sub-type (shown in the next figure) is 3-Dimensional with the different data series plotted in 3-dimensions (the series are placed one behind the other). Such a chart is shown in Figure 26.

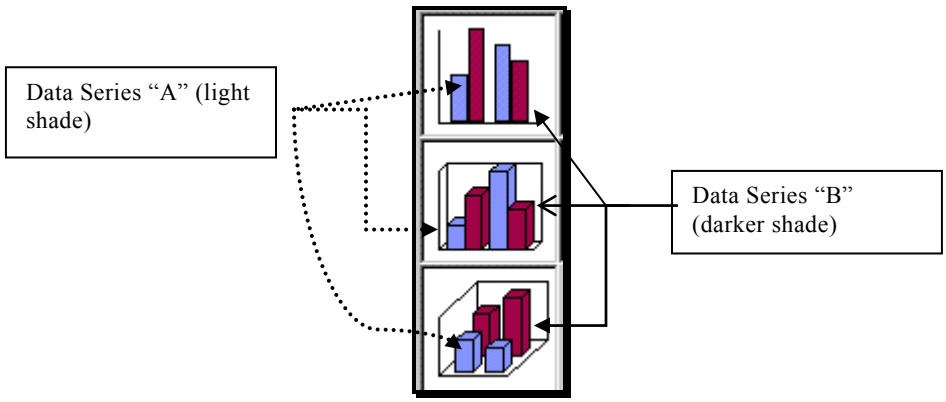
Figure 17: 3-Dimensional sub-type with data series placed one behind the other



2.1.C THE COLUMNS IN THE GRID

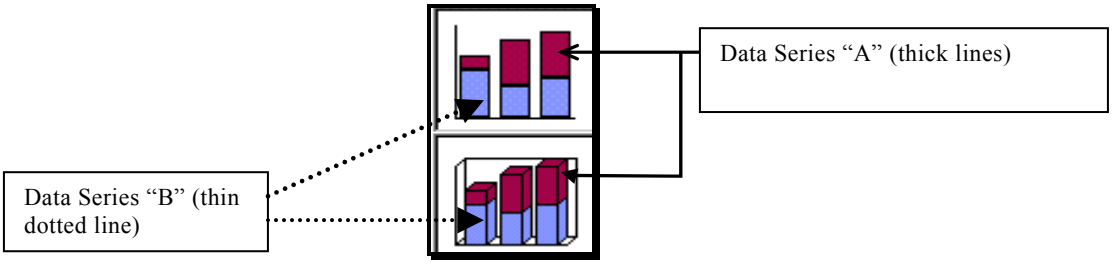
Column 1 sub-types (shown in the next figure) show the raw data for series next to each other (or one behind the other for row 3). Such charts are shown in Figure 21, Figure 22, and Figure 26.

Figure 18: The column for "basic" charts



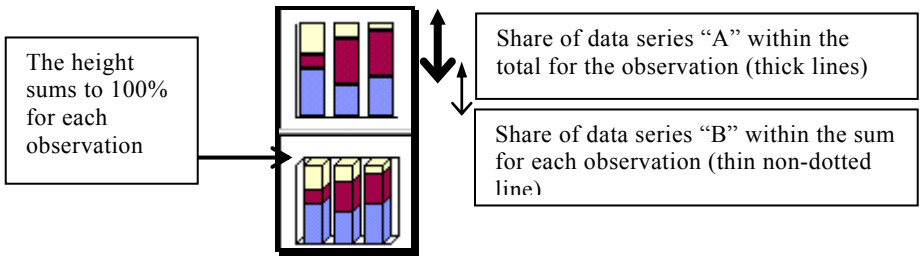
Column 2 sub-types (shown in the next figure) are "Stacked." For any one case (in this specific example, any country) the different values are Stacked up, one over the other. Such a depiction is important when you want to [a] compare the sum of all the series at an X category, and [b] compare the relative shares of each series in the "total" value of the "stack" of Columns for each X category. Such charts are shown in Figure 23, Figure 24, and Chapter 3.

Figure 19: The column for "Stacked" chart sub-type. The height of each column is the Sum of data Series "A" and "B" .



Column 3 sub-types (shown in the next figure) show the percentage shares of each series[6] to the aggregate [sum] of the cases in a row. Such charts are shown in Figure 24 and Chapter 3.

Figure 20: The column for "100% Stacked" chart sub-type



2.2 UNDERSTANDING THE SUB-TYPES USING THE GRID METHOD

Tips on the rows and Columns within the grid

For most chart types, the rows differ mainly in the visual marker used to show each data point and the visual 3-Dimensional effect. Essentially, the differences across the rows allow for a different look, but not a different way of depicting the data

For most chart types–

[6] A Pie chart shows the percentage break-up only for only one series. If you want to show the percentage break-up separately for several series, then use this sub-type of a column-type chart instead of a Pie chart.

- The first row shows the data using 2-Dimensional markers while the second and third rows use three-Dimensional markers.

- The Columns differ mainly in the way in which the chart compares across data series.

- The first Column shows the data "as it is."

- The second Column shows the data for the different series "Stacked" on top of each other for each X-axis observation.

- The third Column shows the percentage share, for each data series, of each data point's value of the number obtained if the data for one X-axis observation were added across all series.

Understand the sub-types by using this grid method. Then choose which type suits your needs the best. If after you have made a chart, you want to change the type / subtype, it is very easy (as shown Chapter 7 on page 100).

"If I make a mistake in choosing a chart type, then do I have to remake the chart from scratch?"

No. (See Chapter 7 on page 100.)

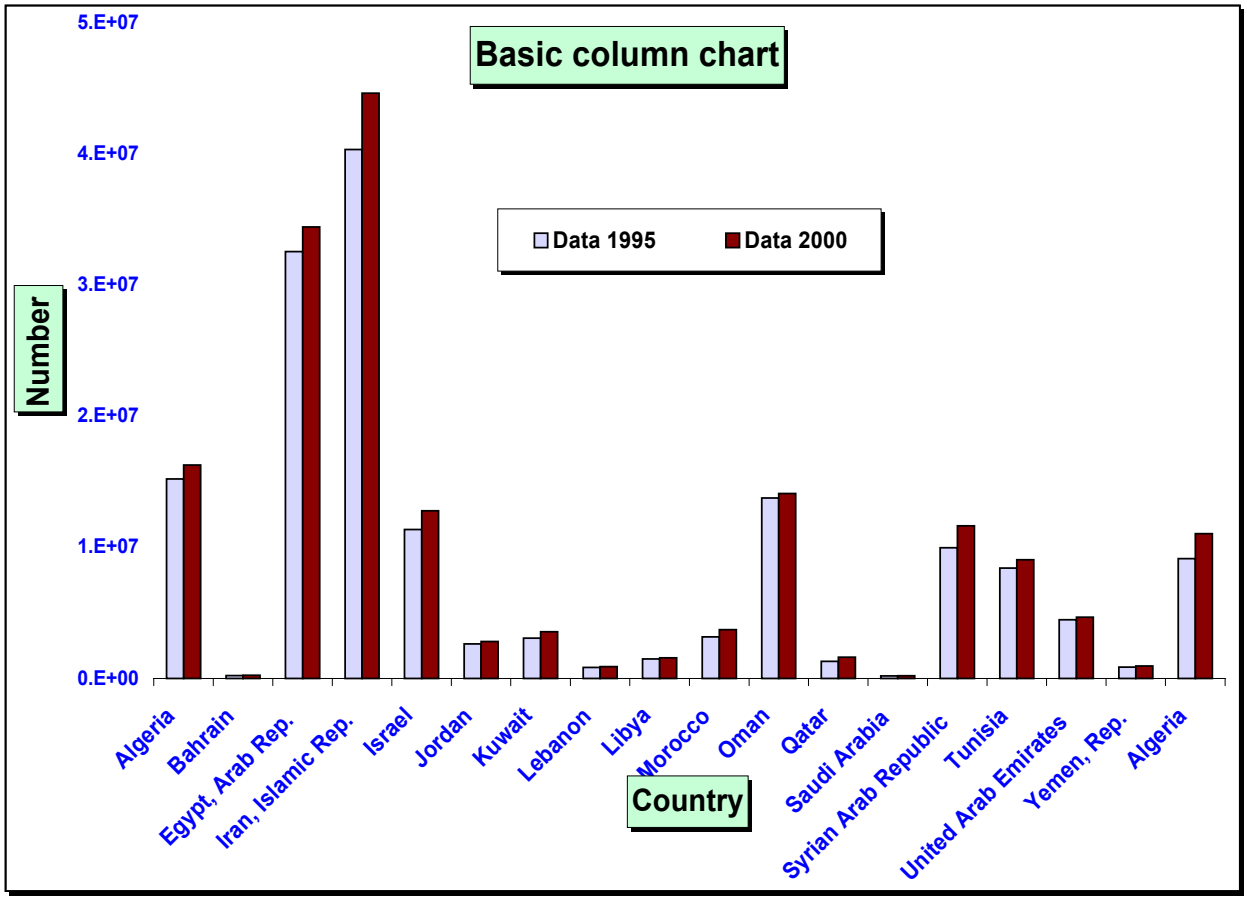
"I want to change the chart type for many charts I made earlier. Is there a quick method for achieving this change?

Yes. You can change the chart type and sub-type using the CHART / CHART TYPE menu option. (See Chapter 7 on page 100.) The charts of the different sub-types are shown in sample file "Charts File1b Chart Sub Categories.xls."

Using the "grid"

- Row 1 implies 2-dimensional chart
- Column 1 implies a simple trend comparison

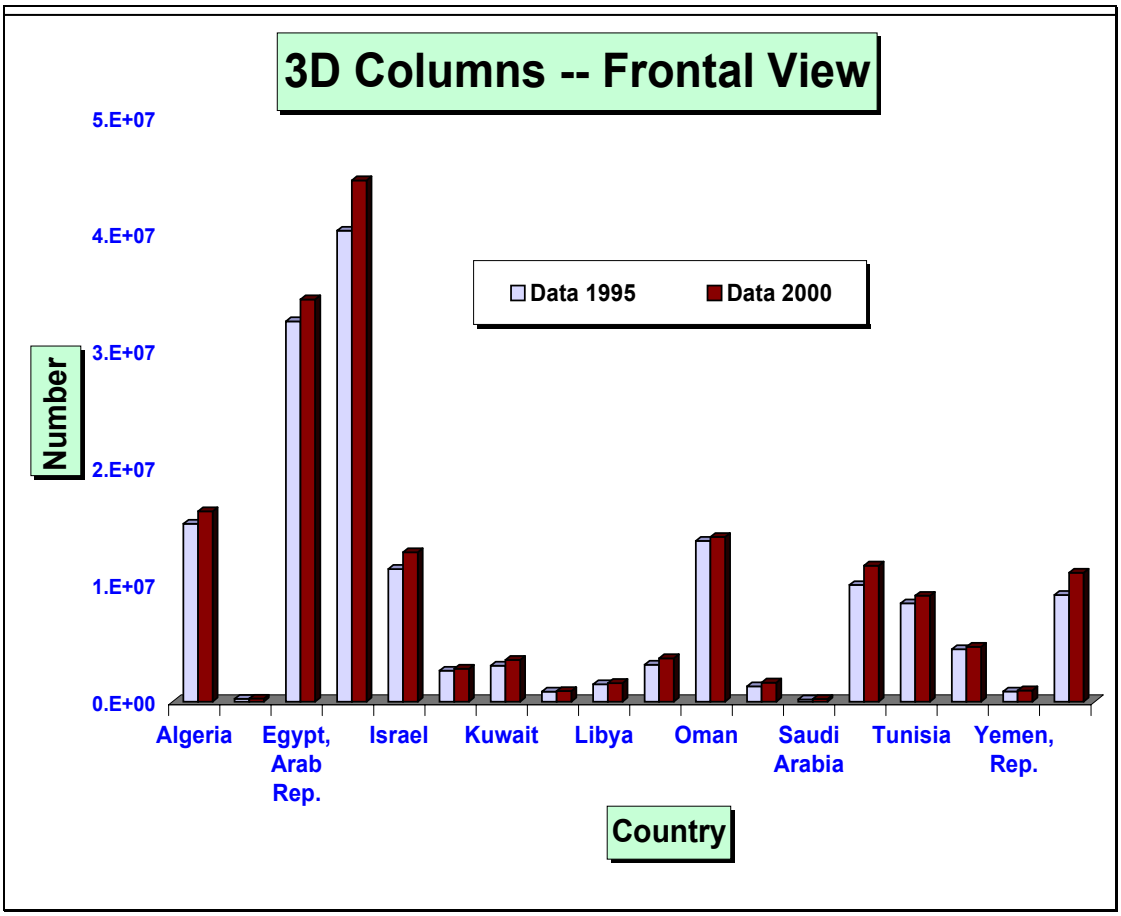
Figure 21: The grid – example of a chart of sub-type (Row 1, Column 1)



Using the "grid"

- Row 2 implies a 3-dimensional chart
- Column 1 implies simple trend comparison

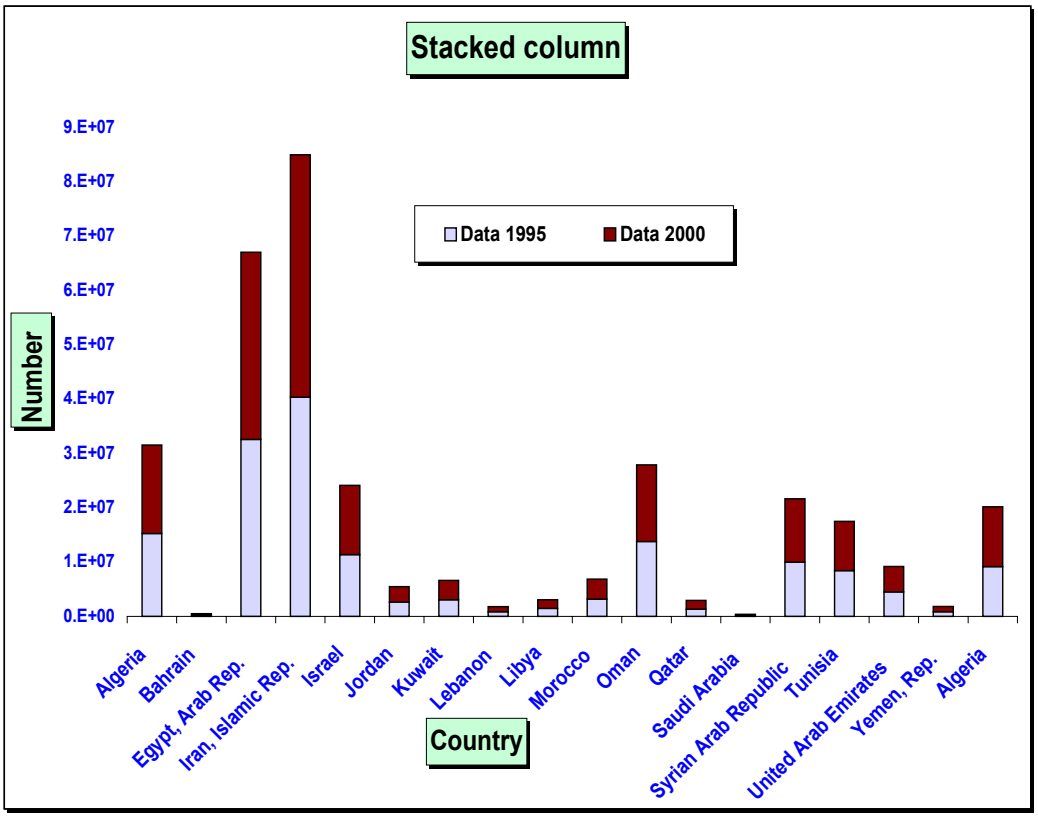
Figure 22: The grid – example of a chart of sub-type Row 2, Column 1



Using the "grid"

- Row 1 implies a 2-dimensional chart
- Column 2 implies a "Stacked" chart

Figure 23: The grid – example of a chart of sub-type Row 1, Column 2



Using the "grid"

- Row 2 implies a 3-dimensional chart
- Column 2 implies a "Stacked" chart

Figure 24: The grid – example of a chart of sub-type Row 2, Column 2

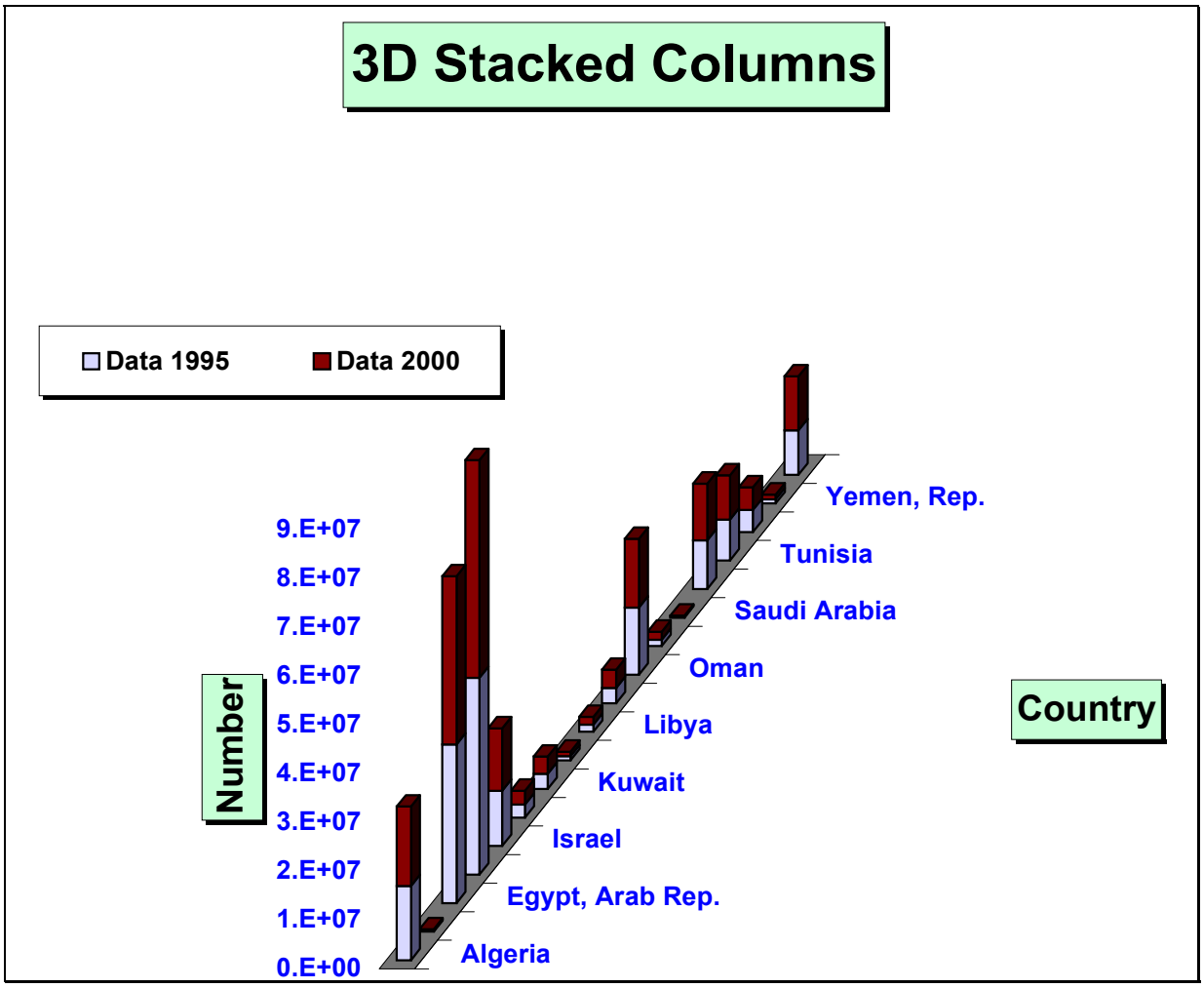


Figure 25: The grid – example of a chart of sub-type Row 1, Column 3

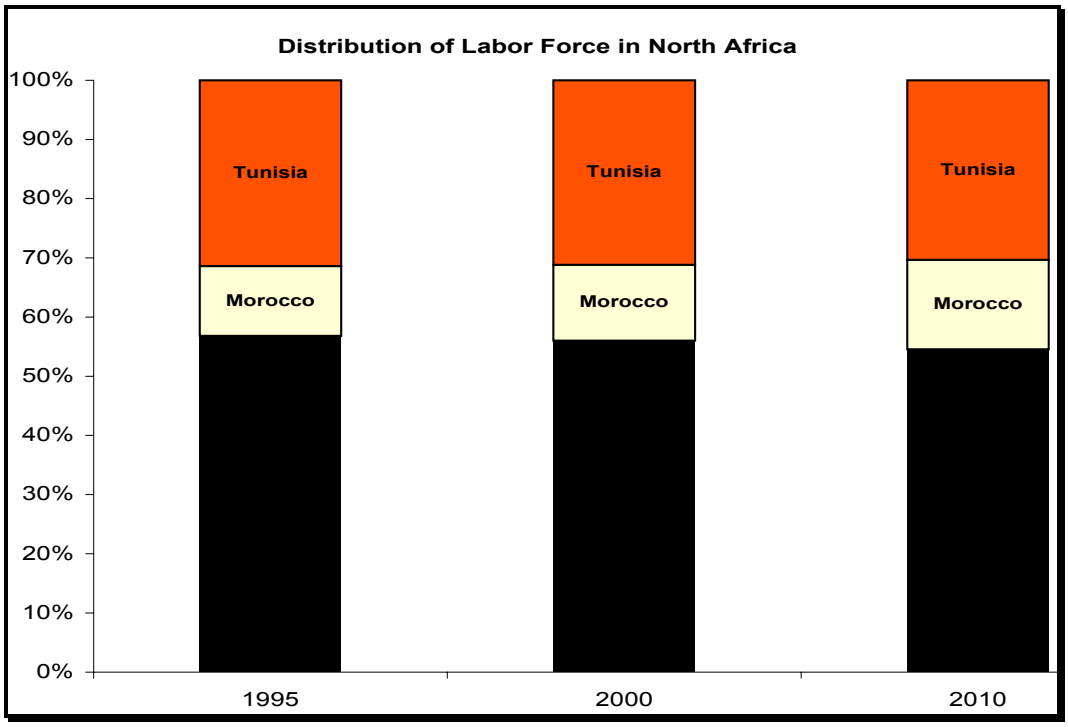
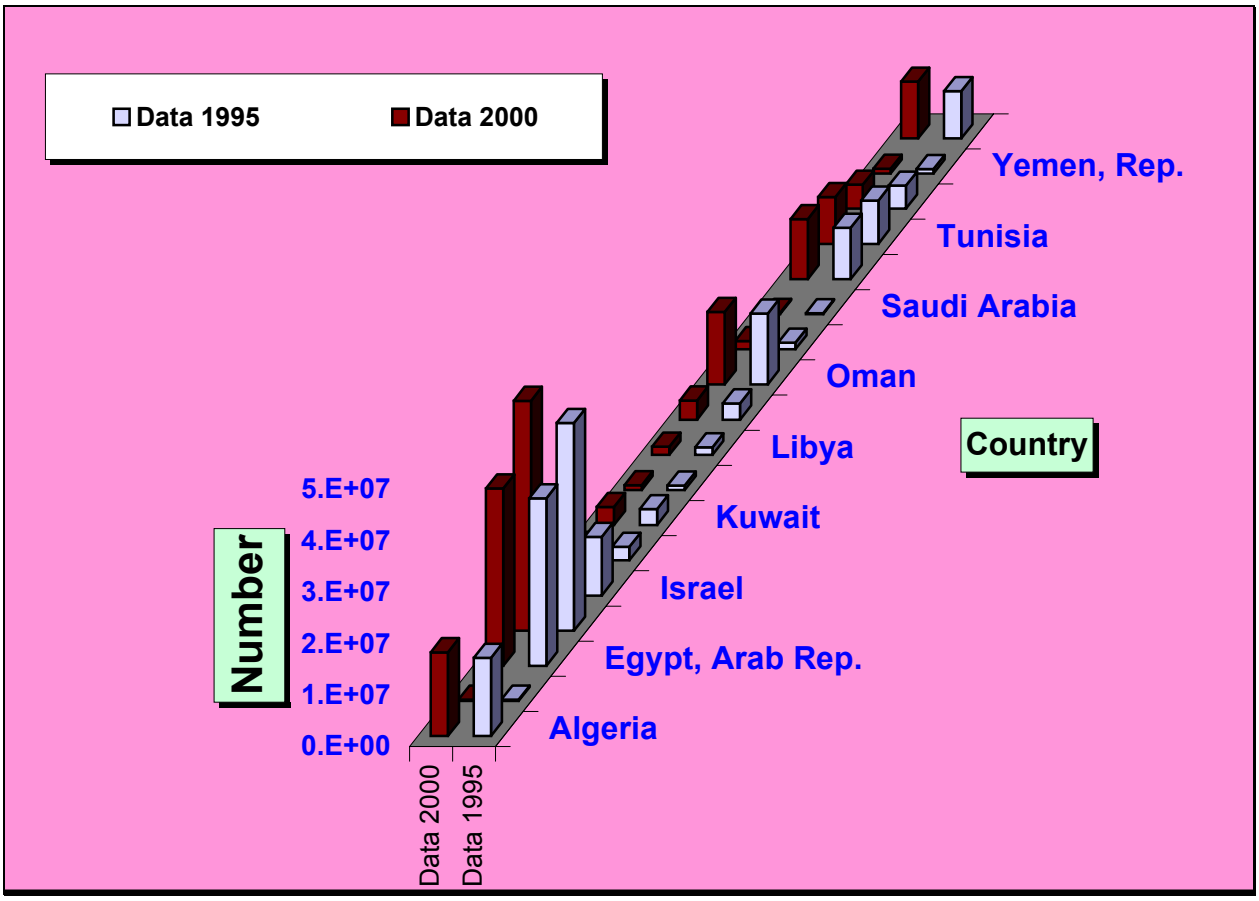


Figure 26: The grid – example of a chart of sub-type Row 3, Column 1



Using the "grid"

- Row 3 implies a 3-dimensional "building block" chart
- Column 1 implies simple trend comparison

Let me leave this digression and continue where I left off (refer to *Figure 13* on page 33)

After choosing the type of chart "Column" and the sub-type ("Row 2, Column 1" or "3-Dimensional Clustered"), click on "Next" (refer to *Figure 12* and *Figure 13* on page 33).

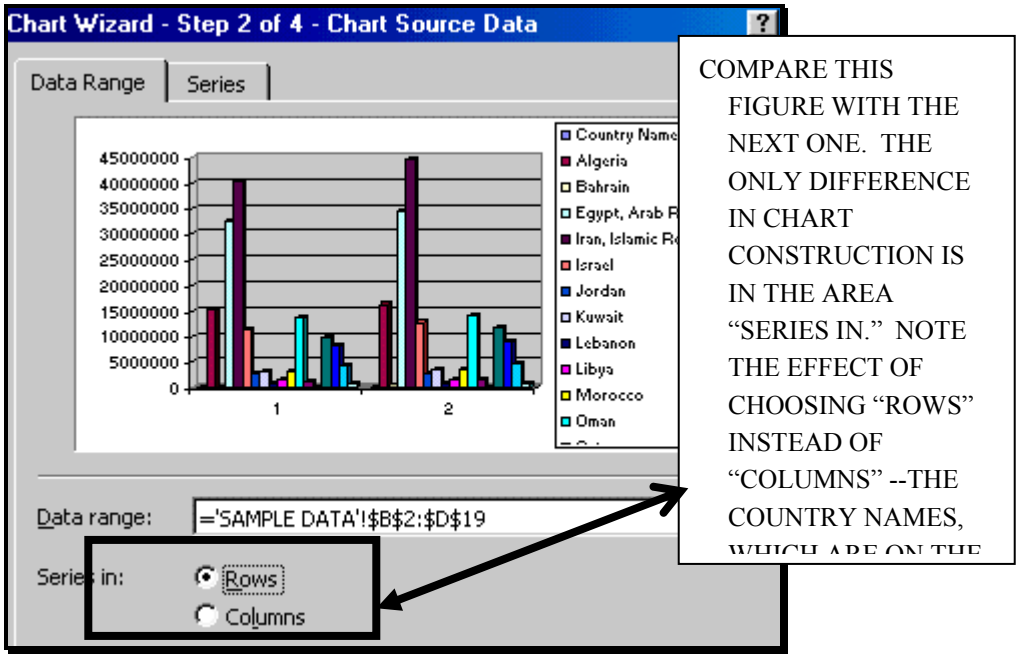
2.3 STEP TWO– EDITING / CHOOSING THE DATA USED IN THE CHART

The second dialog of the "Chart Wizard" will open. The dialog contains a sample preview of the chart. The "Data range" box has a reference to the data you selected for this chart. (This is shown in the next figure.)

2.3.A SOLUTION TO THE PROBLEM OF EXCEL CHOOSING THE CELL REFERENCES (THE DATA FOR THE CHART) INCORRECTLY

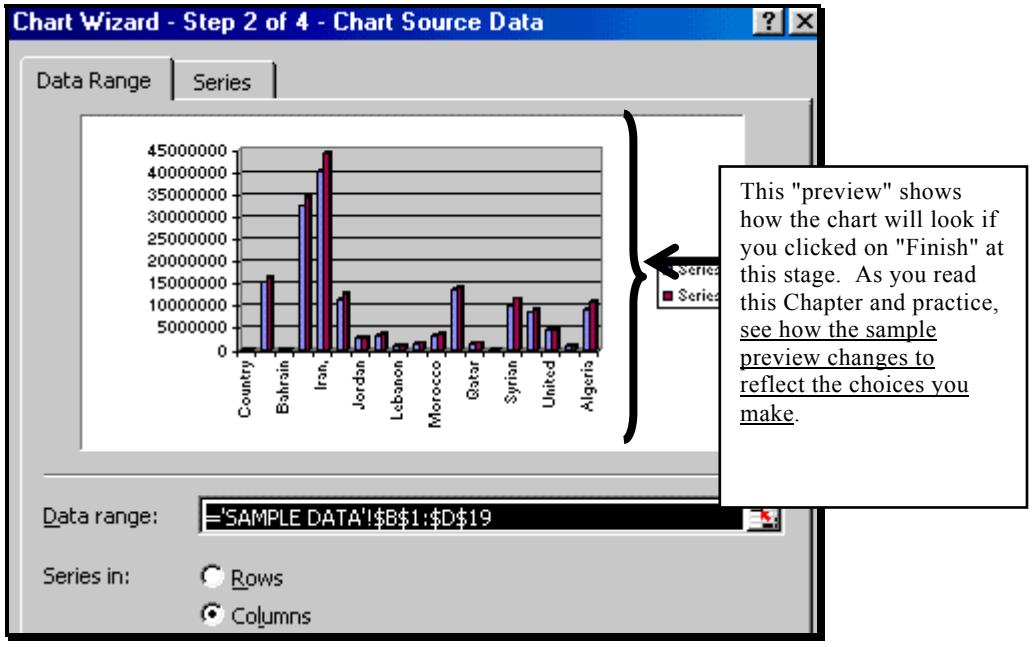
In the area "Series in," Excel has *automatically* "sensed" that the series is in rows. That is, the first row has the X-axis labels and the other rows have the data for each series. Each Bar in the chart represents one of the series in the rows "Data 1995" or "Data 2000." However, we want the country names on the X-axis.

Figure 27: Excel may incorrectly "sense" that the series are in rows when they might actually be in columns



To make this change- that is, to show that each Bar representing one of the Columns and not one of the rows, simply change the selection of "Series in" to "Columns" as shown in the next figure.

Figure 28: The corrected definition of the sequence in which the data is to be broken into data series for charting



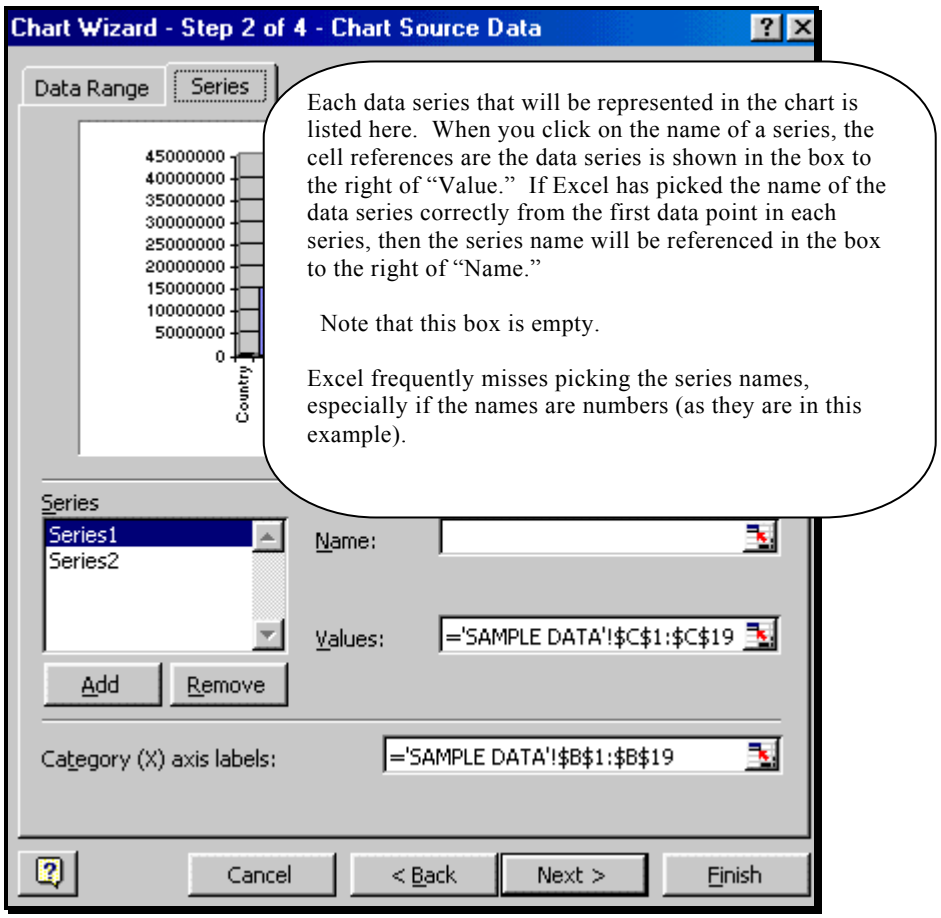
Click on the tab "Series" at the top of the dialog. The options in here (the dialog is reproduced in the next figure) are the source of major problems in making charts. Therefore, I will go through them carefully.

Focus on the area within the superimposed dark rectangle. Each name in the box "Series" defines one of the data series in the chart; furthermore, the data series is defined itself by the entries in the boxes "Name" and "Values." Click on the name "Series1[7]" in the box "Series."

[7] Excel should have picked up the names automatically but it failed; this happens often. In this Chapter, I try to mimic some of the common problems encountered in making charts in Excel.

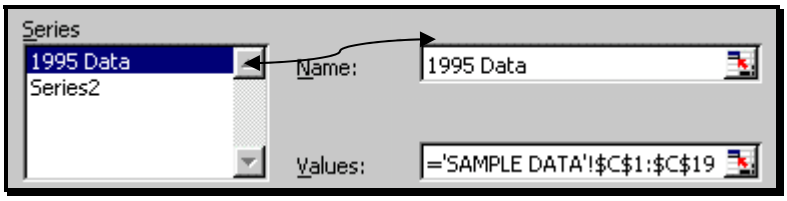
You can click on the "Name" box, go back to the data, and click on the cell that has the series name, write in the name into the box "name," or ignore the issue. Repeat this process for each data series.

Figure 29: Understanding the "Chart Source Data" dialog of the chart wizard



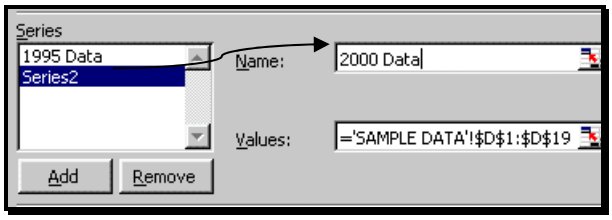
If Excel has not picked up the name of a series from the first cell of the series (or if your series does not have labels in the first cell) then you can type the names manually. (These names provide the labels for the Legend that identifies each data series on the chart.) On the right side, type in a name for the series - say "1995 Data." Leave the "Values" box as it is. The name of the data series will change from "Series1" to "1995 data" as shown in the next figure.

Figure 30: Manually typing in the label for a data series



Following a similar process, define the name for "Series2."

Figure 31: Manually typing in the label for another data series

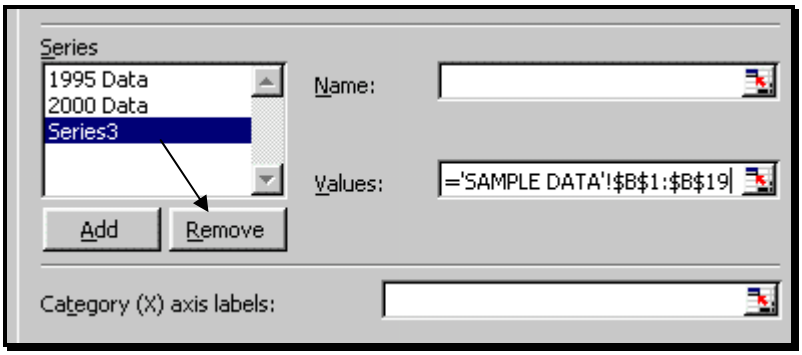


2.3.B OTHER COMMONLY ENCOUNTERED PROBLEMS WITH DEFINING SERIES

Excel may not understand that the first Column in the data range for the chart is the series for the X-axis labels. Instead, Excel may pick up the X-axis series as a data series (that is, a Y-axis series) and not have any references for the X-axis.

In this example, "Series3" is not a data series. However, Excel has mistakenly "sensed" that it is a data series. Instead of being in the "Series" box, "Series3" should define the X-axis category labels. The cell references for "Series3" should be in the box "Category (X) axis labels."

Figure 32: Removing a series from the "Chart Data Source" dialog



Let us correct this frequently encountered mistake by Excel. "Series3" first has to be removed from the list of data series. To do this, click on the series name "Series3" and then click on the button "Remove."

Now, manually define the cell references for "Series3" as the list that will fill the X-axis. Click on the right edge of the box "Category (X) axis labels."

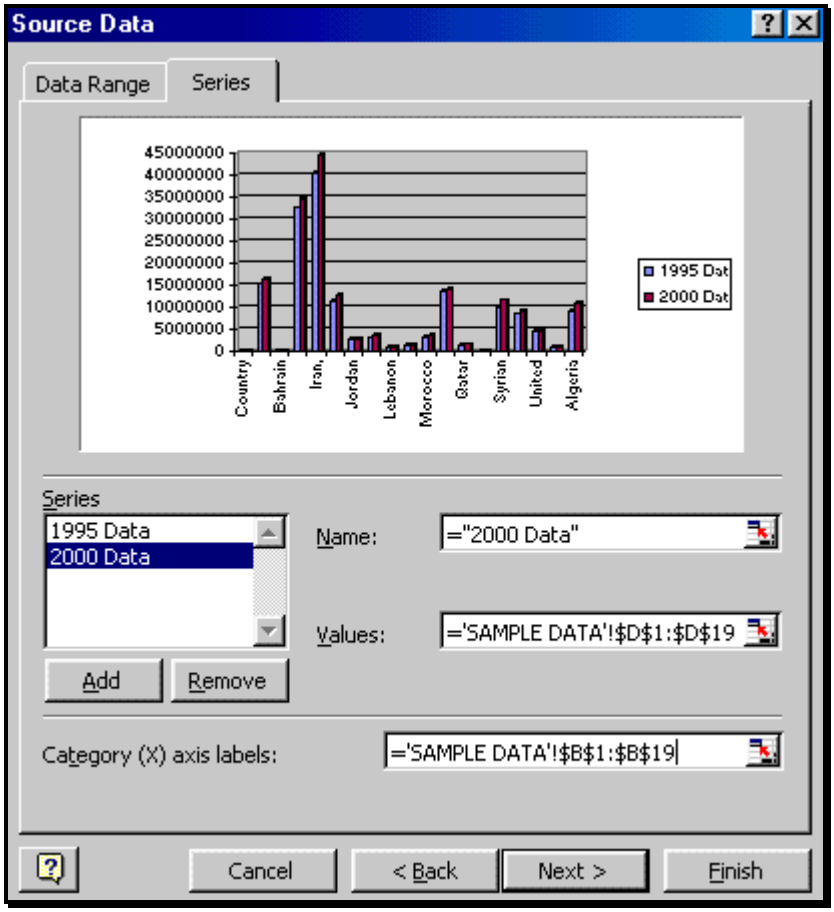
Figure 33: Adding a reference to the cells that have the title and labels for the X-axes

Enter the range for the X-axis labels. You can type the range, or, after clicking on the edge of the box, go to the sheet with the data series and highlight the data. The "Category(X) axis labels" box will contain the cell references for the X series. (An example is shown in the next figure.) Click on the right edge of the box and Excel will return you to the main dialog for step two of the charting process.

Figure 34: Example of the reference for the title and labels for the X-axis

Now the chart reads the X-axis and Y-axis series correctly as shown in the next figure. Let us get back from this digression. The series definitions are correct (as shown in the next figure). Click on the button "Next."

Figure 35: The "Chart Source Data" dialog has been filled correctly

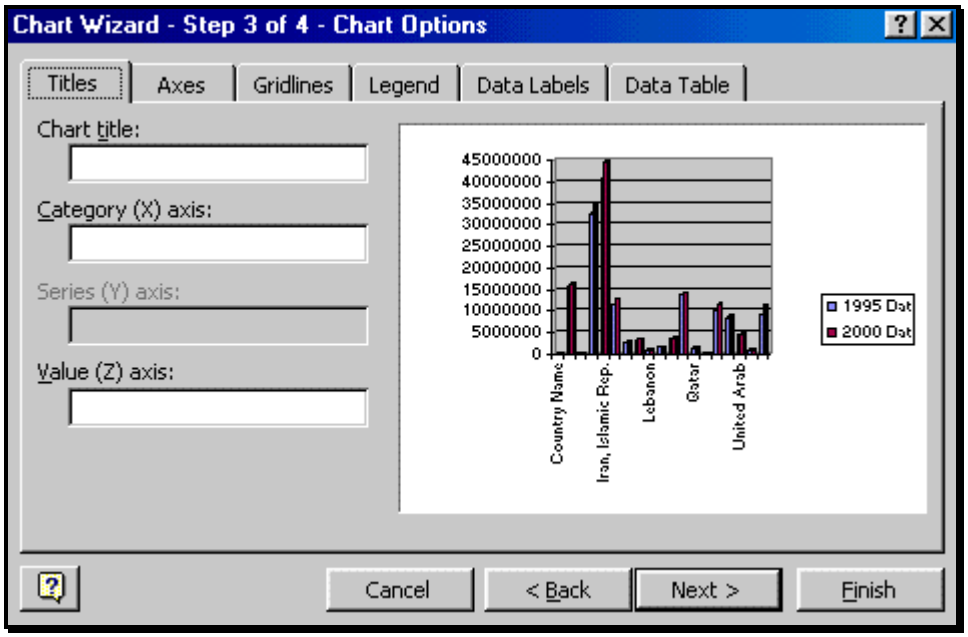


2.4 STEP THREE– SETTING DETAILED OPTIONS IN A CHART – TITLES, AXIS, LEGEND, GRIDLINES, DATA LABELS AND MORE

The third dialog of the chart wizard opens. .This is a multi-tabbed dialog (as is shown in the next figure) and permits the writing of Titles (for the chart and each axis), choosing to place / remove / position Legends and data labels, Gridline options, etc.

The options differ widely depending upon the type of chart you are making. This will become apparent when I teach how to make Scatter, Pie and 2-axis charts.

Figure 36: The third step in the chart wizard – the "Chart Options" dialog



2.4.A TITLES

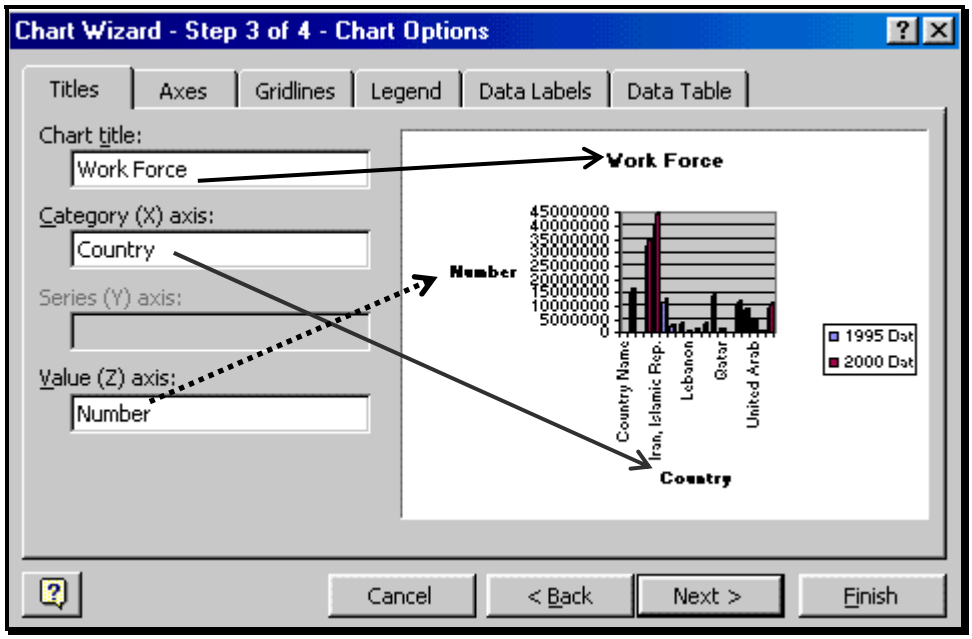
Click on the tab "Titles." *If you desire*[8], type in the text for "Chart Title" and / or a Title for the "Category (X) Axis" and / or one for the "Value (Z) Axis." The next figure provides an illustration.

Note that once you have entered the text for the Titles, the sample preview of the chart will change on the right half of the dialog. (Look at the next figure-- notice that the Titles have been added in the sample

[8] All the options in step 3 of the wizard are at your discretion. Excel will create some defaults for some of the options, but for many other options, like the titles, Excel will not create the object (in this case, each object is an axis title or the chart title) until you type some text into the relevant text boxes.

preview.) The thick arrows trace the Title text you enter into the preview of the chart.)

Figure 37: Adding the Chart & Axes titles



Differences in the "Titles" dialog across chart types and sub-types

- Chart Title is available for all chart types and sub-types
- Category (X) axis Title is not available for Pie and related chart types
- Series (Y) axis Title is available for most chart types (except Pie and related chart types) if the chart sub-type is two-Dimensional
- Value (Z) axis Title is only available for three-dimensional sub-types (except for 3-Dimensional Pie and related chart types)

The Titles option in other chart types

- Scatter chart "Titles" options are shown in *Figure 54* on page 73.
- Pie chart "Titles" options are shown in Chapter 5.
- 2-Y axis chart "Titles" options are shown in Chapter 6. The options include a "Secondary" Category (X) axis Title and a "Secondary" Value (Y) axis Title.

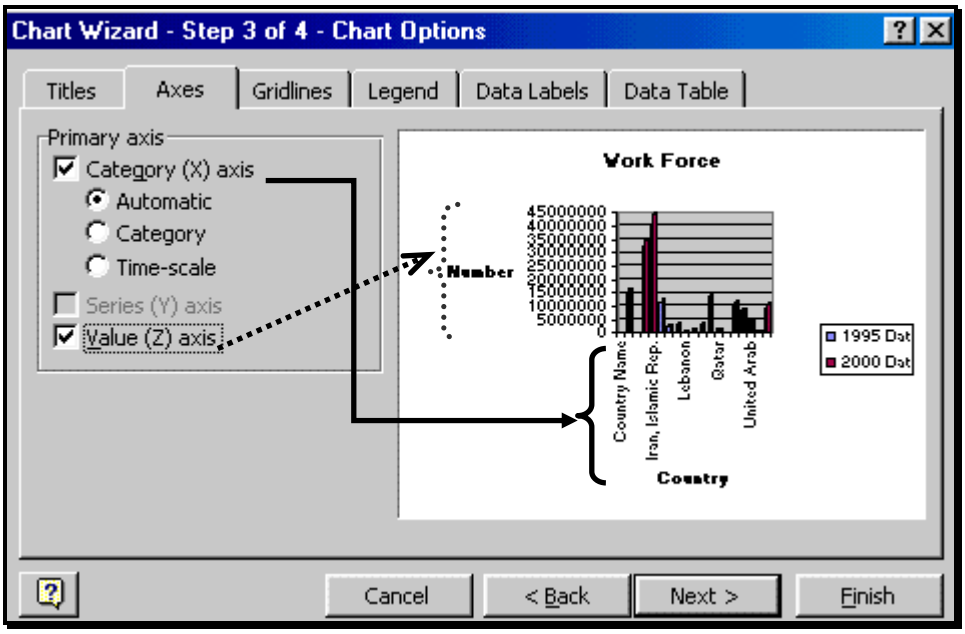
2.4.B AXES

Click on the tab "Axes." Figure 32 shows the dialog that opens. (Depending on the type of chart you are making, the options shown may differ, or there may not even be a tab "Axes" as in the case of a Pie chart – a Pie chart depicts only one series, and, hence, does not need an "Axes.")

Excel chooses the default axis; usually, you do not need to make any changes. The recommended choices are shown in *Figure 38*.

You may want to play around with the options just to see what happens when you choose other options. (The sample preview will show the impact of each such change you make.)

Figure 38: Choosing the axes to display on the chart



Differences in the "Axes" dialog across chart types and sub-types

- Category (X) axis is not available for Pie and related chart types

- Series (Y) axis is available for most chart types (except Pie and related chart types) if the chart sub-type is two-Dimensional

- Value (Z) axis is only available for three-dimensional sub-types (except for 3-Dimensional Pie and related chart types)

The "axis" option in other chart types

- In Scatter charts, each axis is a value axis. Therefore, both the axis have formatting options that are equivalent to Y-axis in a Column chart.

- Pie charts do *not* have an "Axes" option

- 2-Y axis chart "Axes" options include a "Secondary" Category (X) axis and a "Secondary" Value (Y) axis.

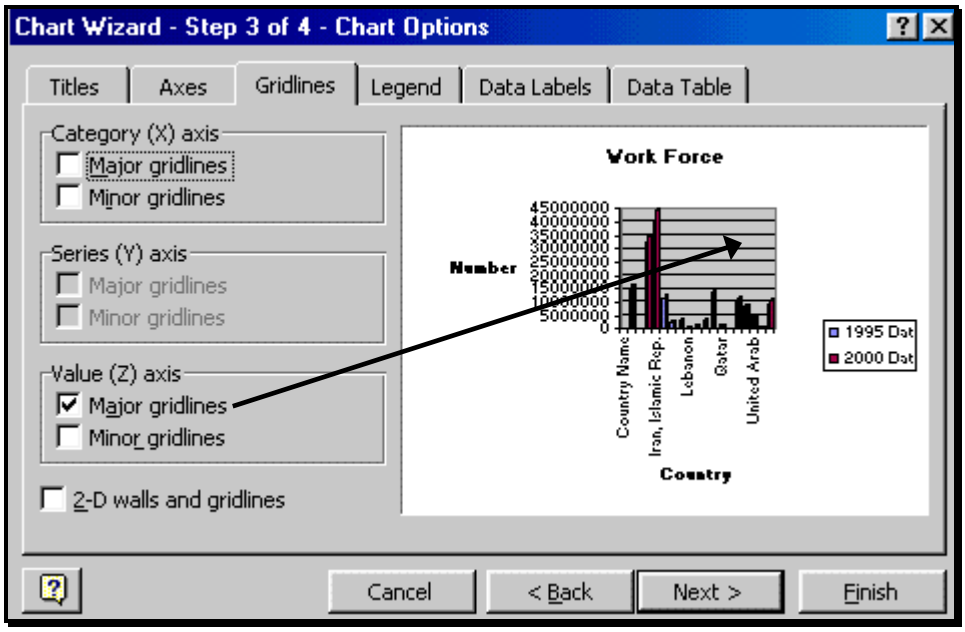
2.4.C GRIDLINES

Click on the tab "Gridlines." The dialog shown in *Figure 39* will open. (Depending on the type of chart you are making, the "Gridlines" tab may not exist.)

In this example, the default settings include only the "Value (Z) axis Major Gridlines." (Depending on the chart type and sub-type, the default Gridlines may differ.)

Experiment with the other options and see what happens. Usually too many Gridlines can make a chart difficult to read. Therefore, I advise minimizing on using Gridlines.

Figure 39: Choosing gridlines



Differences in the "Gridlines" dialog across chart types and sub-types

- Series (Y) Gridlines are available for most chart types (except Pie and related chart types) if the chart sub-type is two-Dimensional

- Value (Z) Gridlines are only available for three-dimensional sub-types (except for 3-Dimensional Pie and related chart types)

The "Gridlines" option in other chart types

- Pie charts do *not* have a "Gridlines" option

- 2-Y axis chart "Gridlines" – the options include a "Secondary" Category (X) axis and a "Secondary" Value (Y) axis.

2.4.D LEGEND

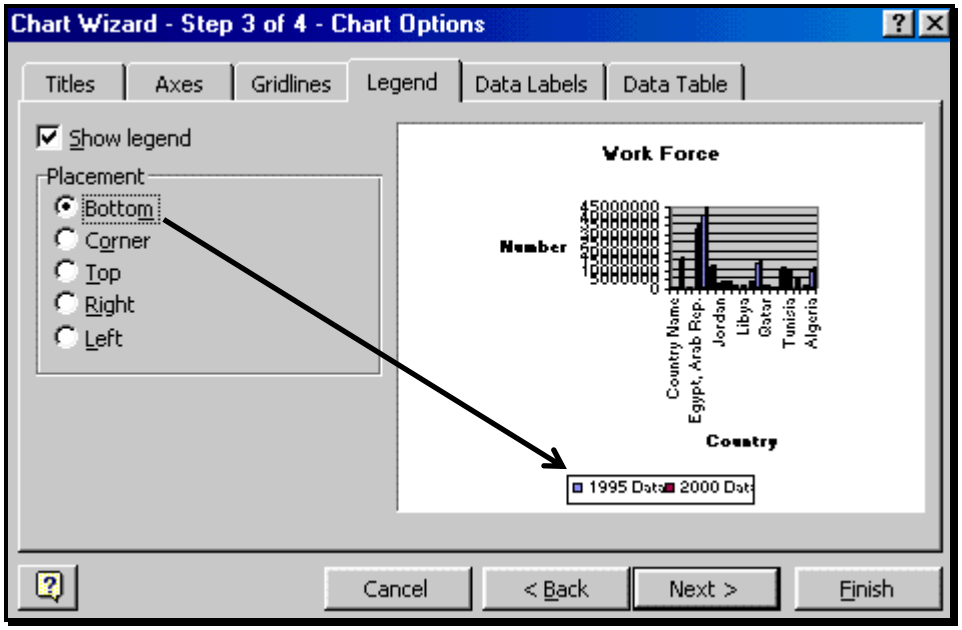
Click on the tab "Legend." The dialog shown in the next figure opens. You have two options– selecting or deselecting the box next to "Show Legend."

Legends are essential in Column, Line, and similar charts (if the chart depicts more than one series on the Y and / or Z-axis). In (two variable) Scatters, Pie and some other chart types, Legends are superfluous.

If you want to keep the Legend, then choose the placement (within the chart) of the box that contains the Legend keys. In the area "Placement," choose one of the options. I show the result from choosing the placement option "Bottom." Compare the sample previews– notice that the Legend is placed in different parts of the chart.

Once the chart is completed, you can use the mouse to click-and-drag the Legend to any place on the chart. One good option is to click-and-drag to an empty area within the plot itself. This saves on space

Figure 40: The best place to show the legend is the "Bottom" of the chart



Differences in the "Legend" dialog across chart types and sub-types

The Legend option *is available* for all chart types and sub-types

- The dialog is the same for all chart types and sub-types
- As mentioned earlier, in Pie, two-variable Scatters, and some other chart types, Legends are redundant.

2.4.E DATA LABELS

Click on the tab "Data Labels." Depending on the chart type, you will see different options of what kinds of labels can be chosen. If you choose

"Show Value," the chart will display the value of each Column in the chart! There are 38 Columns in this chart. Therefore, choosing "Show Values" may make the chart very cluttered as is shown in the sample preview (see the right half of the dialog shown in the next figure.

Typically, you will not want any labels in this type of a chart. (As you will see later, such labels are essential for chart types like Pie.)

"Show Label" places the X-axis label (the country name in this example) on each Column. Try it out.

Figure 41: Choosing to see labels and/or values for each data point

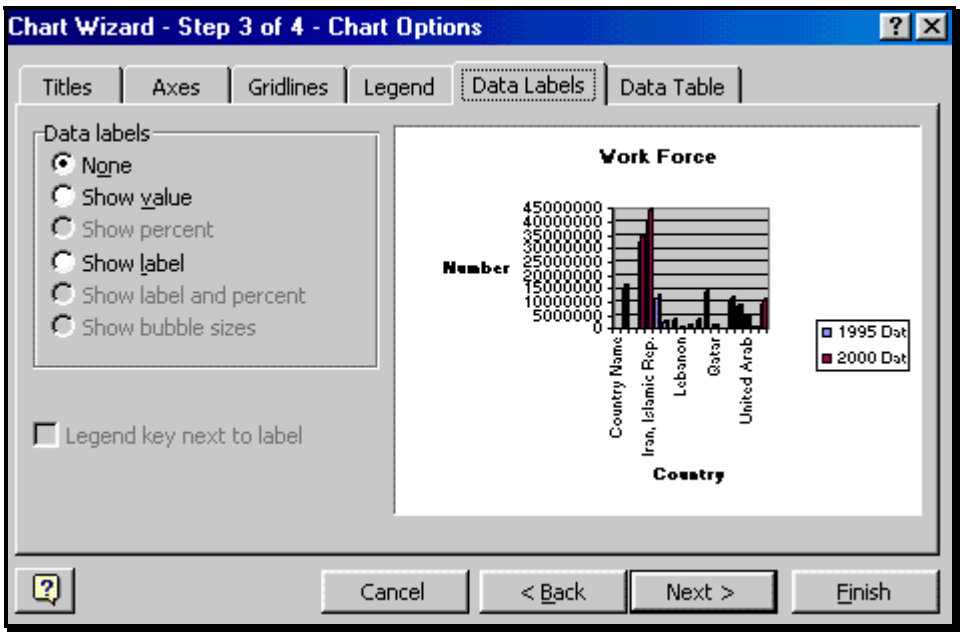
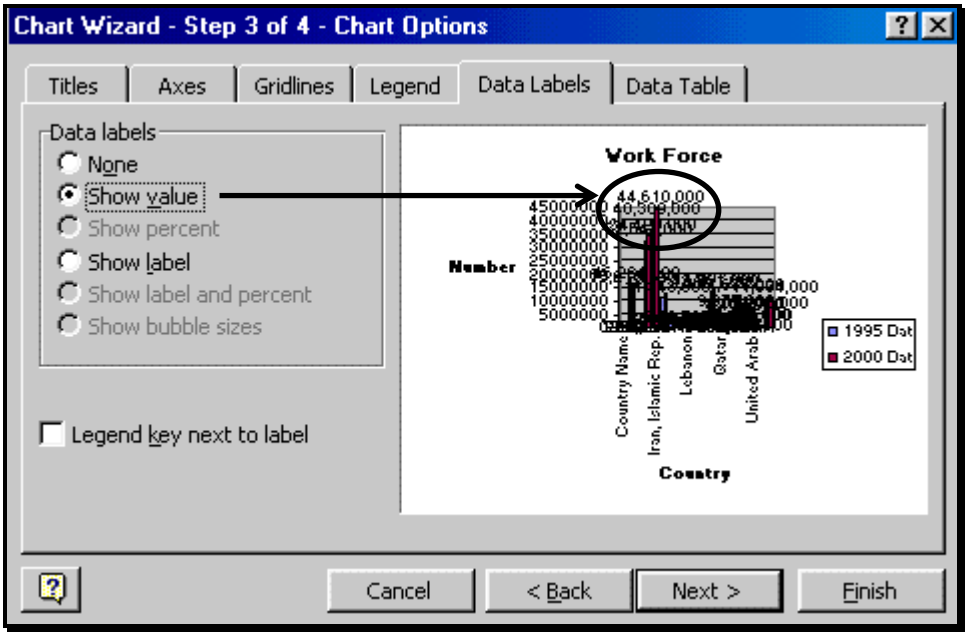


Figure 42: The problem in choosing to see data labels if the chart has more than a few data points



Unless you have very few data points, choose the option "None."

Differences in the "Data labels" dialog across chart types and sub-types

Data labels are available for all chart types and sub-types but are of use in only certain chart types (like the Pie) or only when the number of data points and series is small.

The "Data labels" option in other chart types

Click on the right edge of the box and Excel will return you to the main dialog for chart types.

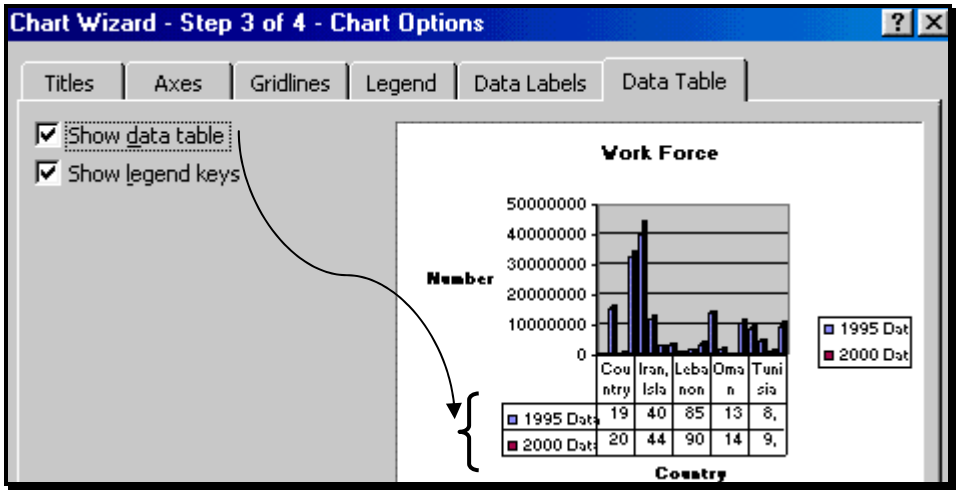
Pie charts have the maximum options within the "Data labels" dialog. They provide the option of placing percentage values in the data labels – an extremely useful option because Pie and related chart types are typically used to compare the percent shares from a total.

2.4.F DATA TABLE

Click on the tab "Show Data Table." If you choose "Show data table" then the data used in the chart will be placed in table format below the chart (as is shown the next figure).

This can be an excellent way to make the charts more informative and to remove the need for making a table and a chart separately in your report.

Figure 43: Choosing whether to include a table with the data used in the chart

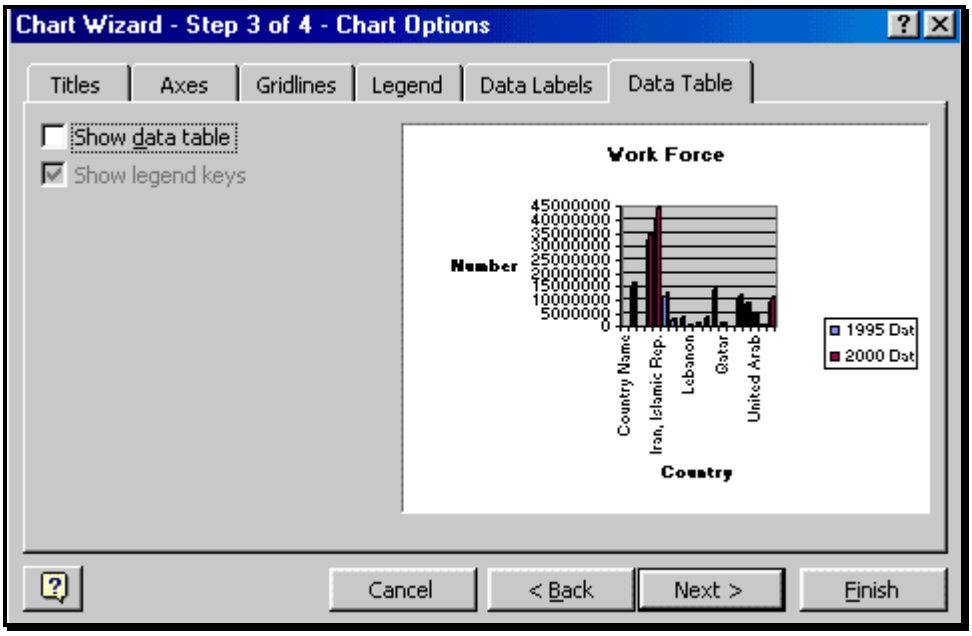


Usually you will not want the show the data table. So, deselect it (as shown in the next figure) and Execute this part of the wizard and move to the next step by clicking on the button "Next."

Differences in the "Data table" dialog across chart types and sub-types

The data table option is not available for Pie, Scatter, and related chart types

Figure 44: The third step in the chart making process is complete



2.5 STEP FOUR: CHOOSING THE LOCATION WHERE THE CHART SHOULD BE PLACED

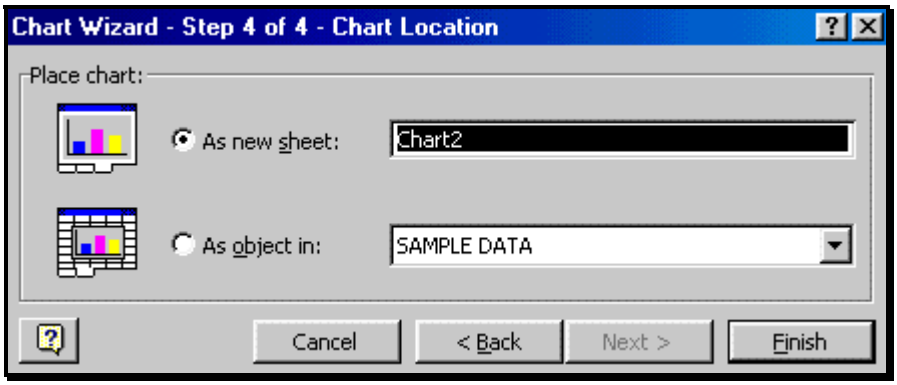
At this point, you are at the last step / dialog of the chart wizard. You have to choose where to place the chart you are making.

I prefer to place it on its own sheet[9] and therefore recommend choosing the option "as New Sheet" as shown in the next figure.

All the steps in the wizard have been completed.

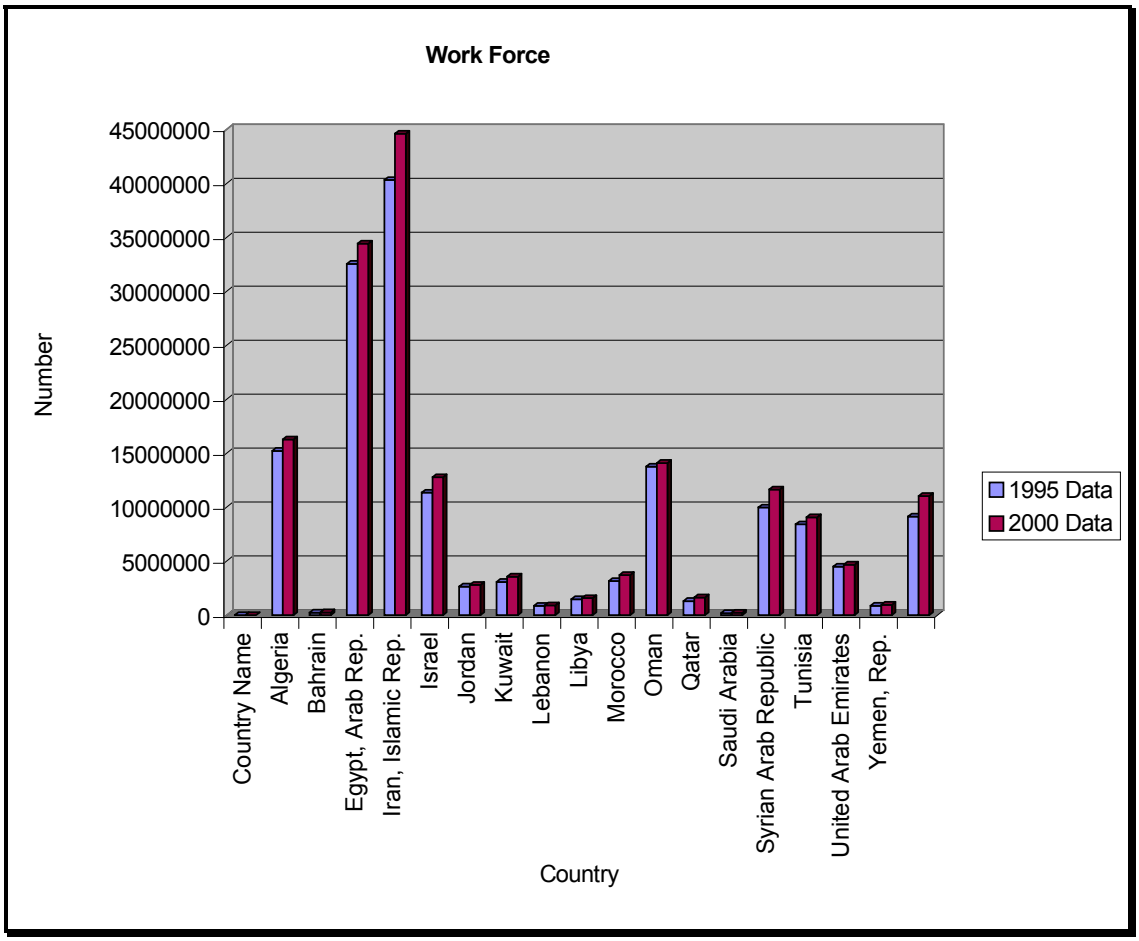
[9] This has at least four advantages compared to the option "As object in":
(a) formatting is easier;
(b) you see the chart as it will look when printed,
(c) other drawing tools can be added with ease.
(d) After formatting and refining the chart, you can always copy and paste the chart from its own sheet on to another sheet.

Figure 45: Choosing the location (within the Excel file) for the completed chart



Execute the wizard by clicking on "Finish." The chart is made. It is shown in *Figure 46*.

Figure 46: The chart is constructed



2.6 'STEP 5'– INTRODUCING NEW FEATURES SPECIFIC TO EACH DATA SERIES

Refer to Chapter 12 on page 165.

Page for notes

CHAPTER 3

"STACKED" & "100% STACKED" CHARTS

3.1 STACKED CHARTS

The process is the same as for a basic Column chart (see previous chapter) apart from the choice of the "Stacked" sub-category in step one. In the third step of the chart wizard, you can choose the option "Series Lines" to connect each data series.

Figure 47: Difference in step three "options" dialog for a basic versus Stacked Column chart

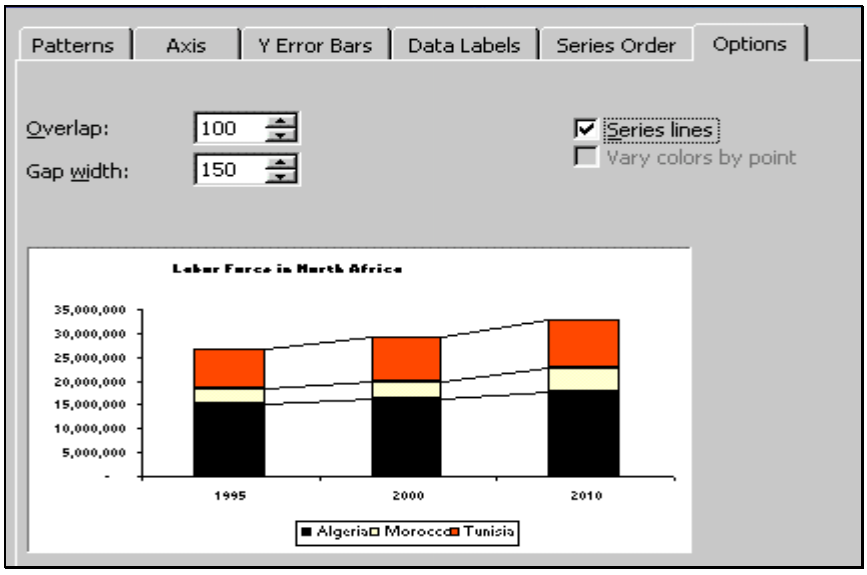
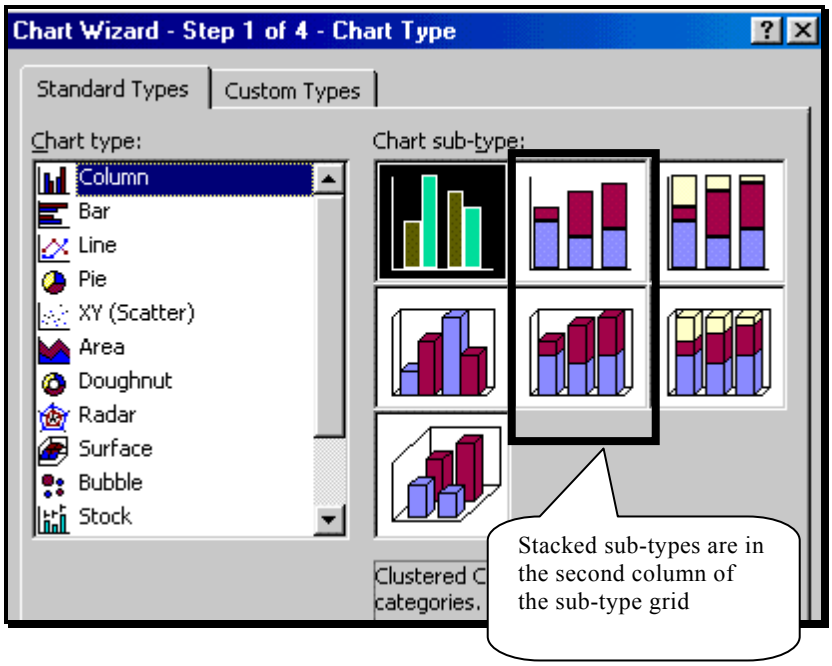
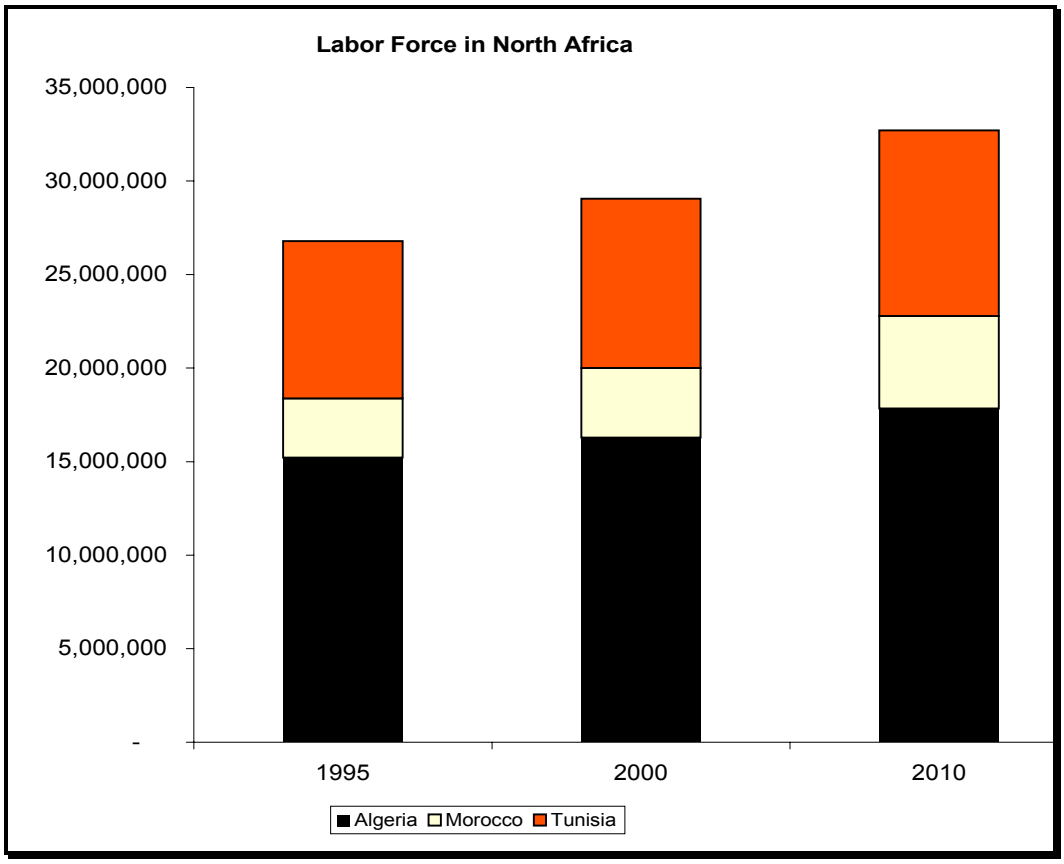


Figure 48: Choosing one of the Stacked sub-types of a Column Chart type



A Stacked Column chart is shown in the next figure. This is a reproduction of chart "Stacked Column" in the sample file "Stacked Charts.xls."

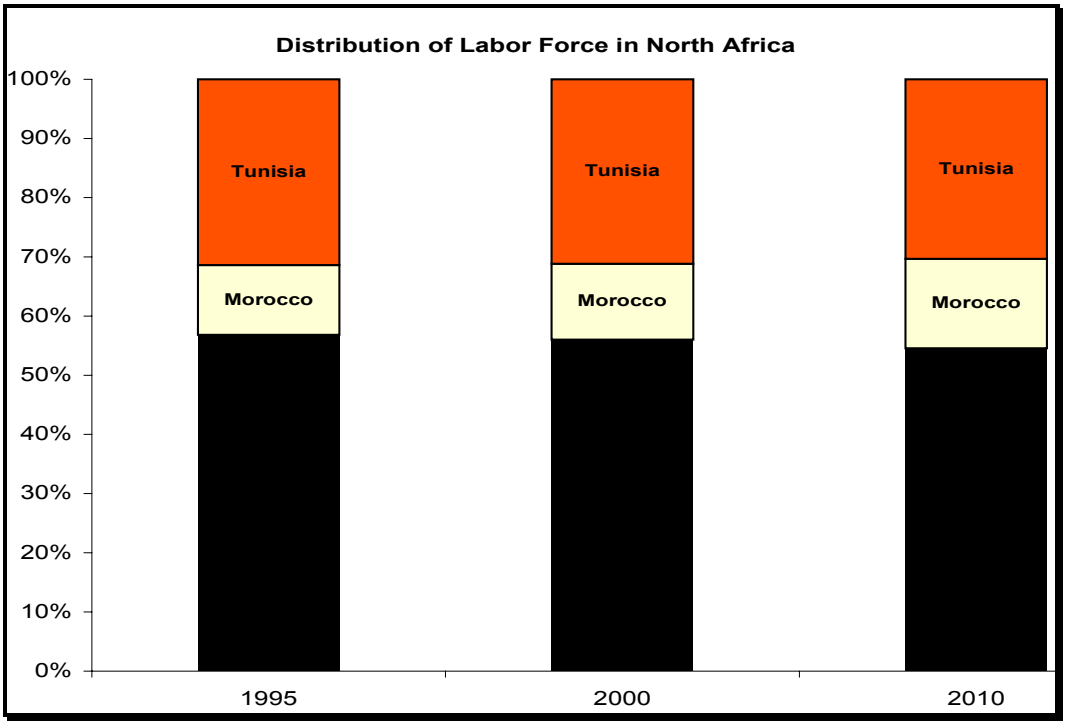
Figure 49: A Stacked Column chart



3.2 "100% STACKED" CHARTS

The process is the same as a Column chart (see previous chapter) apart from the choice of the "100% Stacked" sub-category in step one.

Figure 50: Reproduced from chart "100% Stacked Column" in file "Stacked Charts"



Page for notes

CHAPTER 4

SCATTER CHARTS

A Scatter chart shows the relation, if any, between two variables.

4.1 STEP ONE: SELECTING CHAT TYPE & SUB-TYPE

Choose the data range C1 to D19. (In Scatter charts, one typically uses a larger data sample then shown in the example here.)

Choose the menu option INSERT / CHART (or click on the chart icon). The "Chart Wizard" opens. In the "Chart Type" dialog, choose the chart type and sub-type10 as shown in the next figure.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

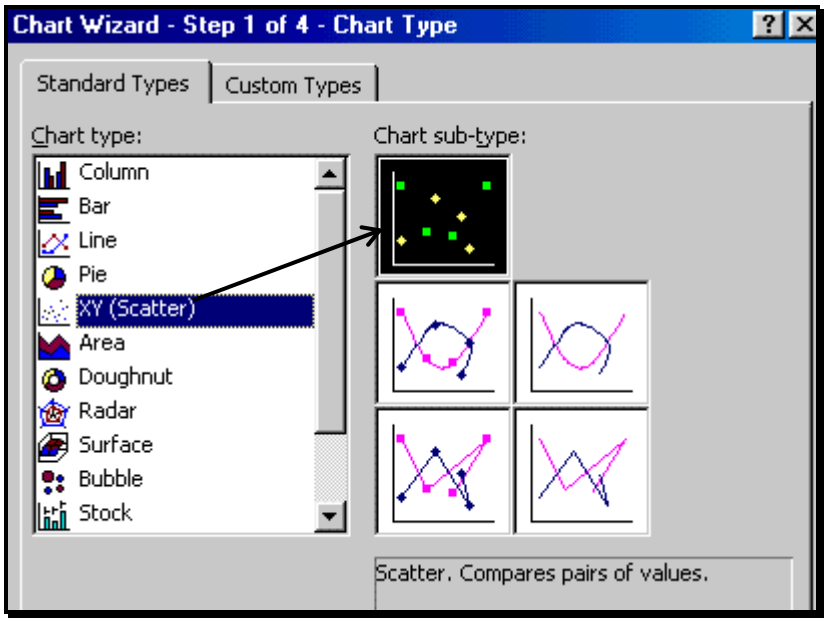
---

[10] In 2.1.a , I showed a system of mentally categorizing the sub-types. Try the similar process here. The answers are:

- Row 1 – no lines to connect the data points;
- Row 2 – smoothed (curved) lines to connect the data points
- Row 3 – straight lines to connect the data points
- Thus, the rows offer different ways to connect the data points.
- Column 1 – markers (dots) to show individual data points
- Column 2 – no markers for individual data points

Thus, the columns give options on markers to show data points.

Figure 51: Choosing the Scatter chart type and the sub-type in grid location (column 1, row 1)



4.2 STEP TWO: SELECTING THE SOURCE DATA

In the "Source data" dialog that opens (this dialog is reproduced in Figure 52), check if Excel picked up the source data correctly. The two series needed for the Scatter chart are the "X" and "Y" values.

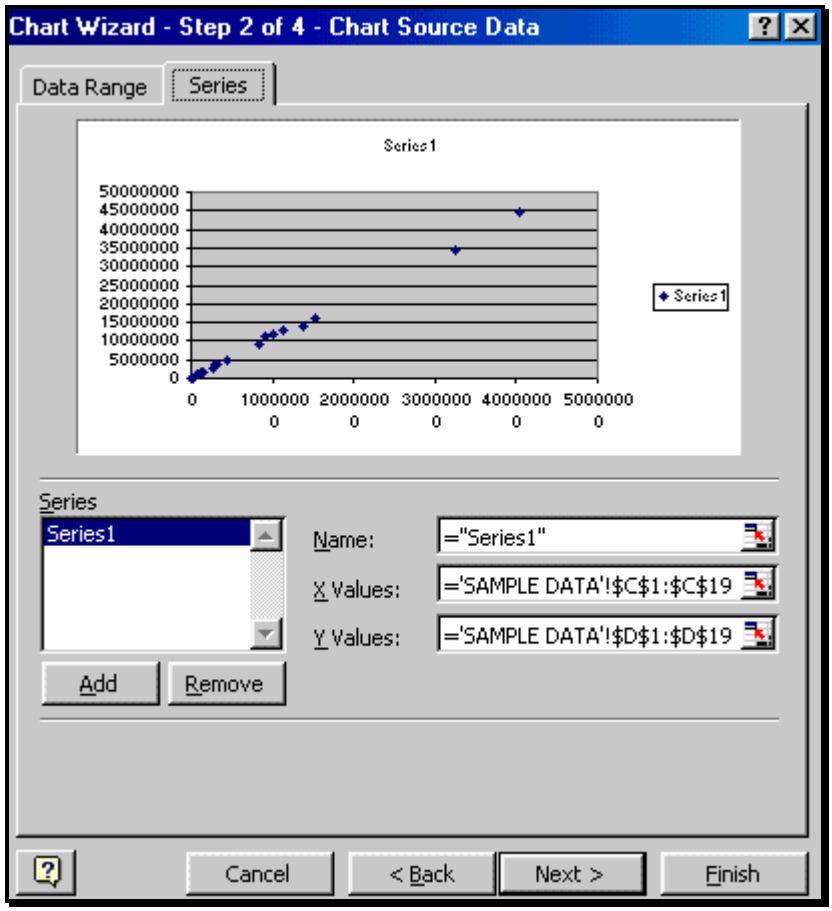
4.2.A COMPARING THE PROCEDURAL STEPS FOR THIS CHART TYPE TO THE ANALOGOUS STEPS FOR MAKING A COLUMN CHART

Note that the dialog looks a bit different from the one for Column charts. (Compare the dialog for Scatter charts shown in *Figure 52* with the one for Column charts.

Once Excel knows the type and sub-type of chart you want to make, it opens a dialog with options that are relevant only to the chosen chart type and chart sub-type.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

Figure 52: The "Chart Source Data" dialog for a Scatter chart



4.3 STEP THREE: SETTING OPTIONS

The "Chart Options" dialog opens as shown in the next figure.

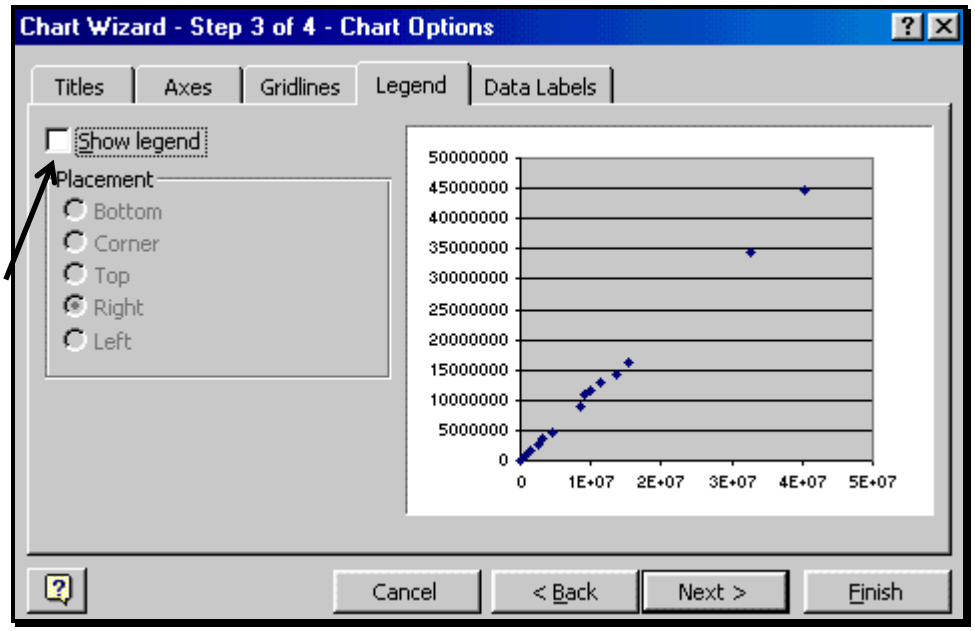
4.3.A LEGEND

The Legend makes no sense in a Scatter chart – it only has one data series on the Y-axis. Therefore, I chose to exclude the topic.

Digression: Comparing the procedural steps for this chart type to the analogous steps for making a Column chart

Note that the dialog looks a bit different from the one for Column charts. (Compare the dialog for Scatter charts shown in *Figure 53* with the one for Column charts. Once Excel knows the type and sub-type of chart you want to make, it opens a dialog with options that are relevant to the chosen chart type and chart sub-type. The tabbed dialog "Data Table" is not relevant for Scatter charts so Excel does not include it here.

Figure 53: The "Chart Options" dialog for a Scatter chart



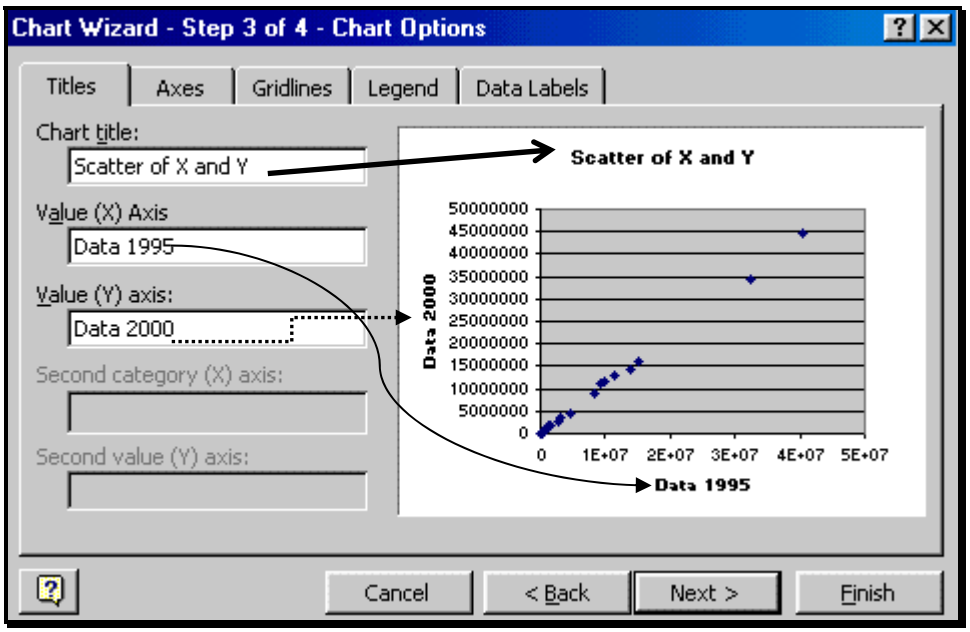
In addition, the specific options inside each of the tabbed dialogs for a Scatter chart may differ compared with the options inside the equivalent dialogs for a Column chart.

4.3.B TITLES

Click on the tab "Titles" and enter the relevant Titles –as shown in the next figure.

Click on the other tabs and choose appropriate options. When done, execute this part of the wizard and move to the next step by clicking on the button "Next."

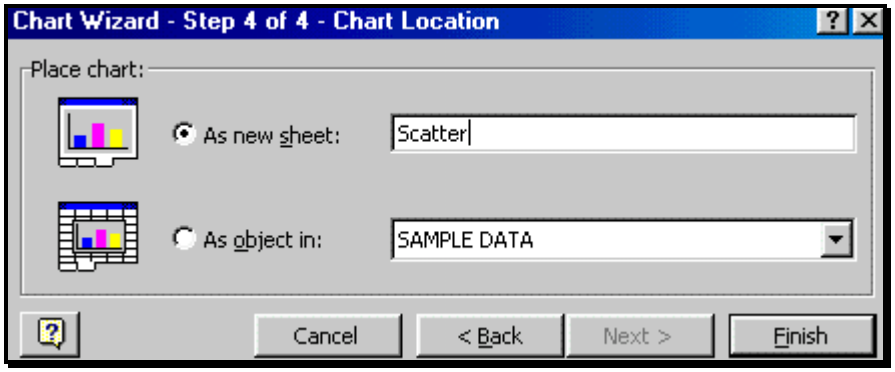
Figure 54: Defining the titles for the chart and each axis



4.4 STEP FOUR: LOCATION

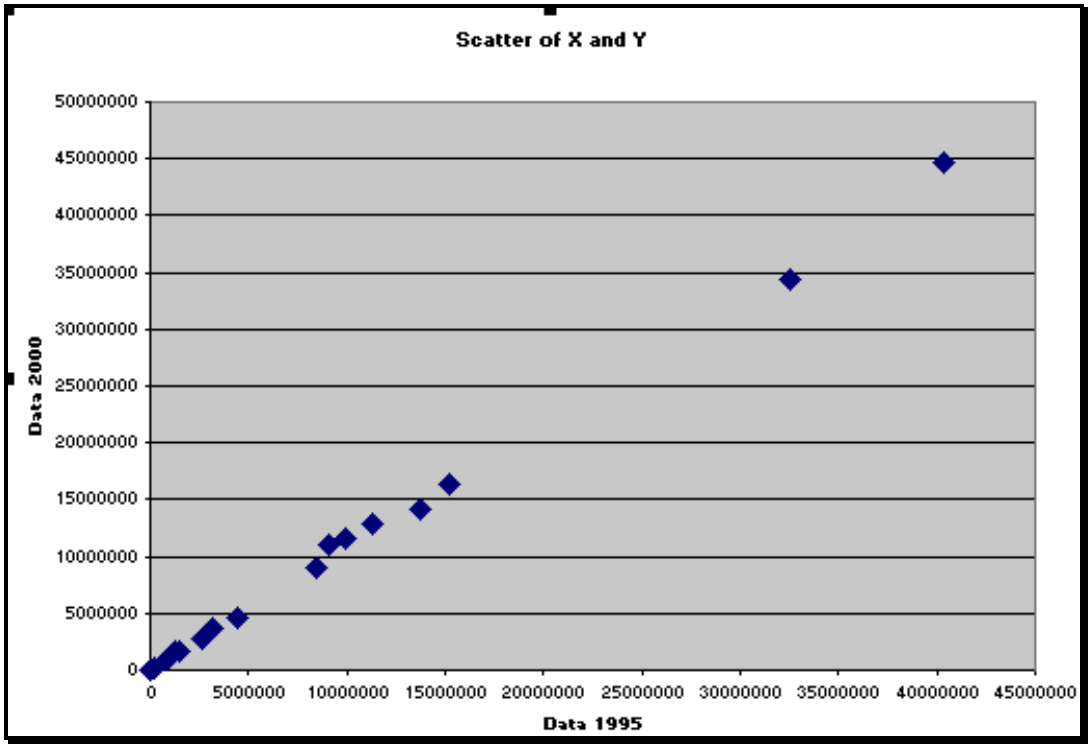
The last dialog of the chart wizard opens. Choose the options as shown (of course, you can enter any name for the new sheet).

Figure 55: Choosing the location of the new Scatter chart



All the steps in the wizard have been completed. Execute the wizard by clicking on "Finish." The Scatter chart is made.

Figure 56: Sample Scatter chart

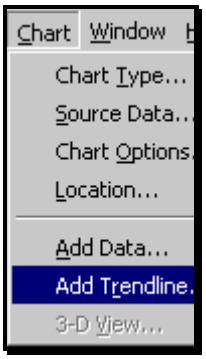


4.5 AN EXTRA STEP– ADDING A TREND LINE

A Regression-based trend Line can be added for every data series in several types of charts– Column, Line, Area, Scatter, etc. In all but Scatter charts, the trend Line shows the trend between the data in a series and the categories / values of the variable that defines the X-axis. In a Scatter chart, the Regression Line depicts the result of a two-variable Regression.

Click on the Scatter chart you made in the previous section. Choose the menu option CHART / ADD TREND LINE as shown in the next figure.

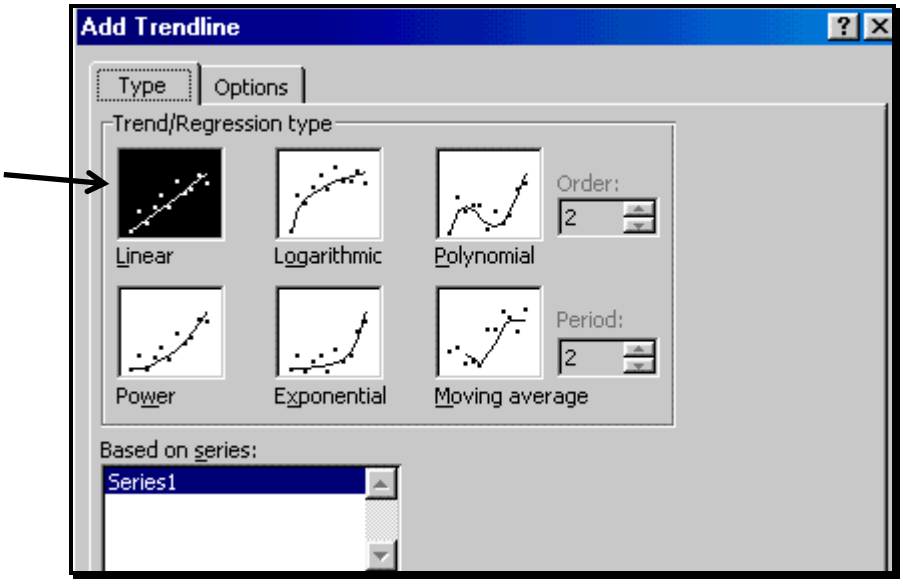
Figure 57: The menu option for "Add Trendline"



The "Add Trend Line" dialog opens. Excel can use a range of algorithms / techniques to create the Trend Line.

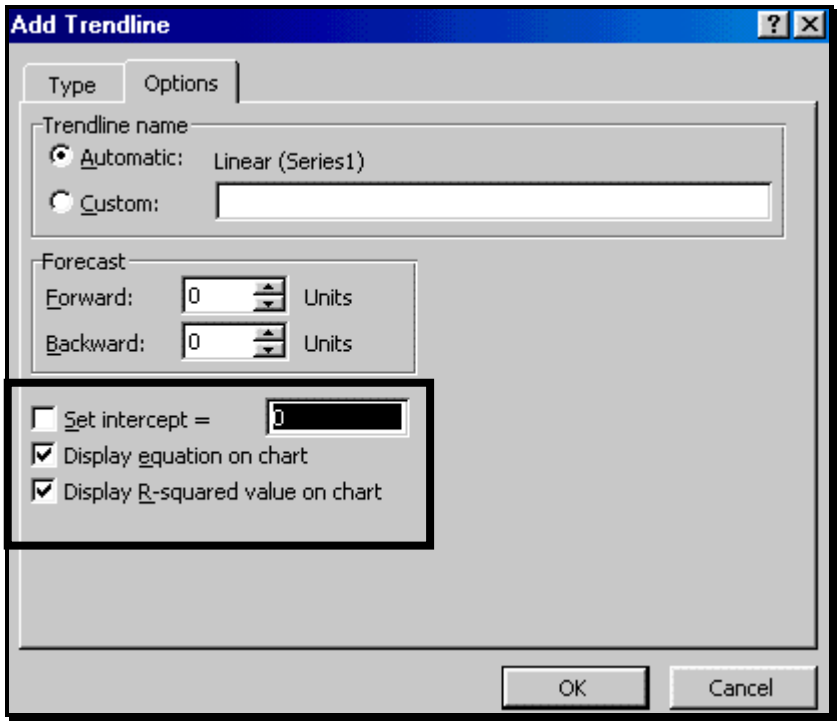
I choose the simple "Linear" option. (A demonstration of the other techniques is beyond the scope of this book.)

Figure 58: All the available mathematical techniques for creating the Trend Line



Click on the tab "Options" and choose the options as shown in the next figure.

Figure 59: Setting the options for the Trend (Regression) Line

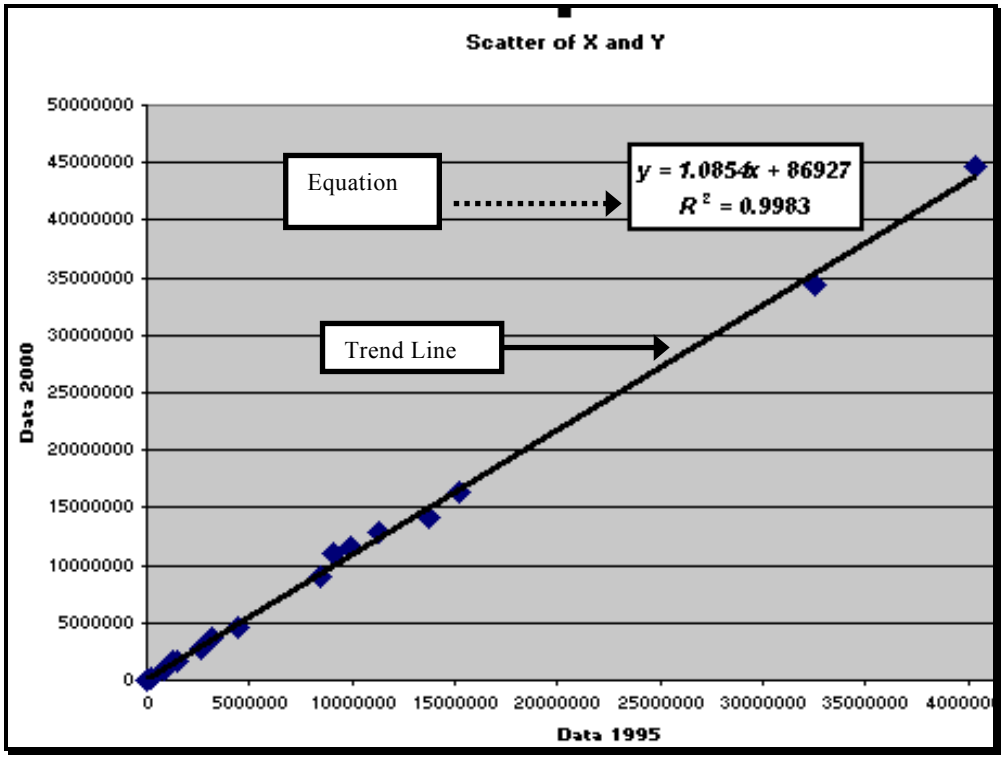


Execute the dialog by clicking on the button “OK.”

The Regression “trend Line“ is added to the chart.

In addition, the Regression equation is also shown (this is reproduced in the next figure).

Figure 60: A Trend Line in a Scatter Chart



Page for notes

CHAPTER 5

PIE AND DOUGHNUT CHARTS

Pie and Doughnut charts are used to show the share of each categories value (called "Slices") in the aggregate value of one series. Say, you want to find out the share of each of the Gulf Cooperation Council[11] (GCC) nations in the total workforce of the GCC for the first age category in the sample data. (That is, within the data range of rows 2 to 19.)

5.1 STEP ONE–SELECTING THE DATA SERIES

Select the data. For a Pie chart, the data can only include two series– one for the category labels, the other for the data.

5.1.A DIGRESSION: SELECTING DATA FROM NON-ADJACENT ROWS / COLUMNS

This issue is not specific to a Pie chart but I have placed the above heading in the Table of Contents so that someone looking for this exact skill can know where to look.

Because the data are in non-adjacent cells, the procedure you need to follow is:

[11] The GCC is composed of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

- Select the cells for one row (say for "Bahrain").

- Press the CTRL key, and, keeping it pressed, select the cells you need in the next (non-adjacent or adjacent) relevant row. And so on….

Figure 61: Selecting data from non-adjacent rows

	B	C
1	Country Name	1995
2	Algeria	15,218,000
3	Bahrain	234,000
4	Egypt, Arab Rep.	32,543,000
5	Iran, Islamic Rep.	40,309,000
6	Israel	11,348,000
7	Jordan	2,641,000
8	Kuwait	3,078,000
9	Lebanon	857,000
10	Libya	1,484,000
11	Morocco	3,162,000
12	Oman	13,761,000
13	Qatar	1,309,000
14	Saudi Arabia	192,000
15	Syrian Arab Republic	9,977,000
16	Tunisia	8,407,000
17	United Arab Emirates	4,489,000

- Once the data has been selected (as shown in the next figure), choose the menu option INSERT / CHART or click on the chart icon.

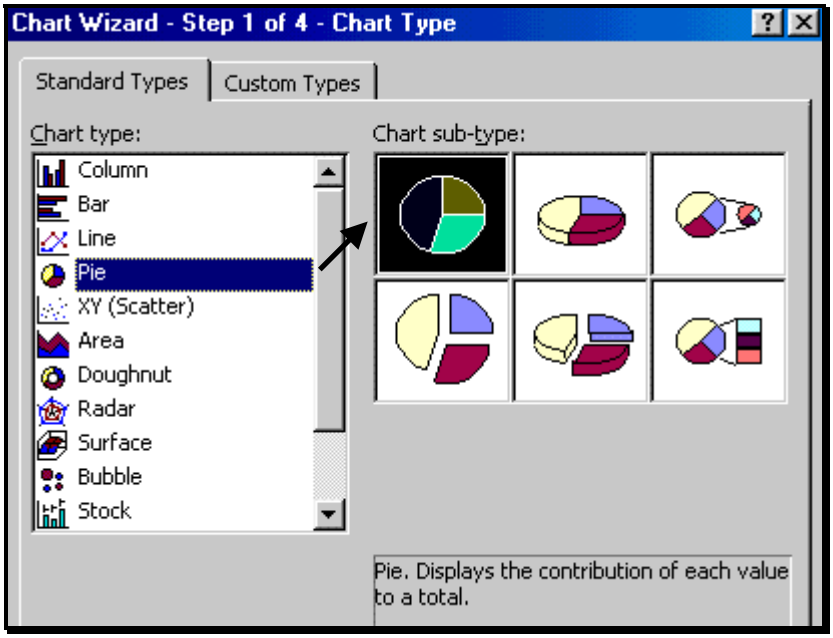
Excel launches the Chart Wizard. I chose the chart type Pie and a simple 2-Dimensional sub-type[12].

[12] In chapters 1-2, I showed a system of mentally categorizing the sub-types. Try the similar process here. The answers are:

- Row 1 – the Slices are fused together
- Row 2 – the Slices are "exploded"
- Column 1 – two-Dimensional
- Column 2 – three-Dimensional
- Column 3 – "percent share breakdown of one of the Slices of the Pie"

Execute this part of the wizard and move to the next step by clicking on the button "Next."

Figure 62: Choosing the Pie chart type

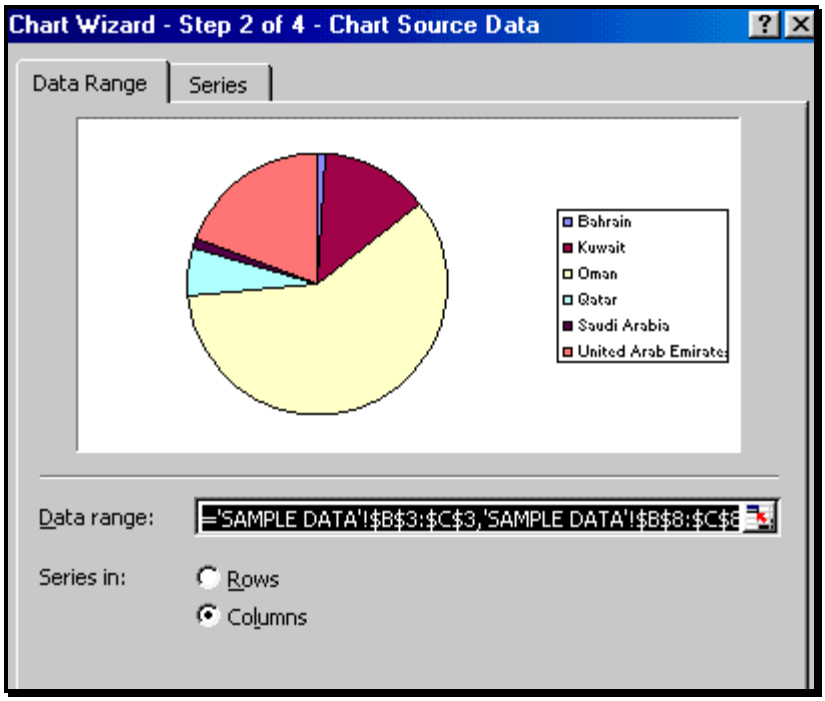


5.2 STEP TWO: DATA SOURCE

The second dialog of the wizard opens as shown in the next figure.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

Figure 63: Checking the Data Source for the Pie chart

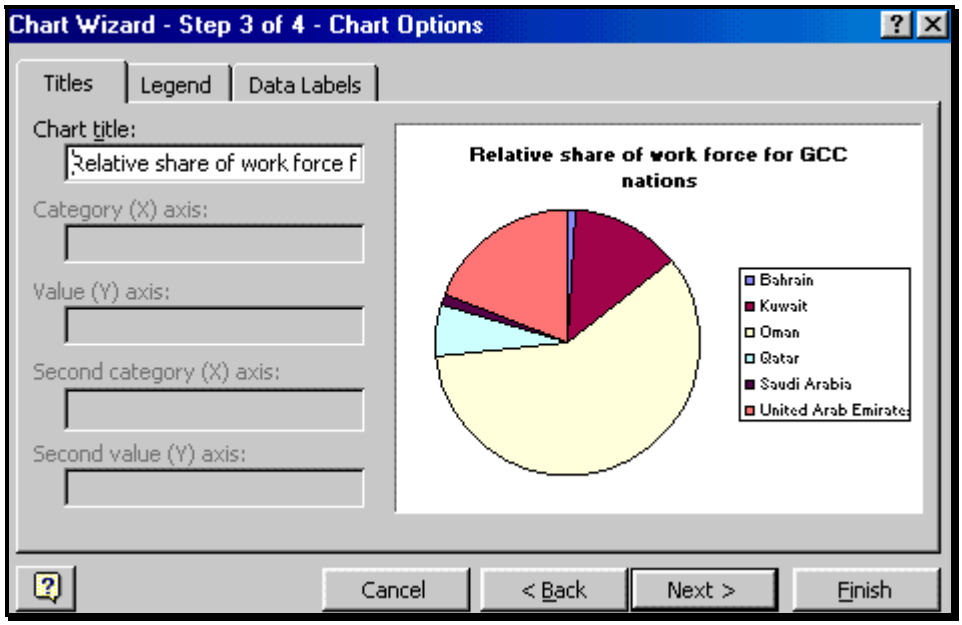


5.3 STEP THREE- THE LIMITED OPTIONS FOR A PIE CHART

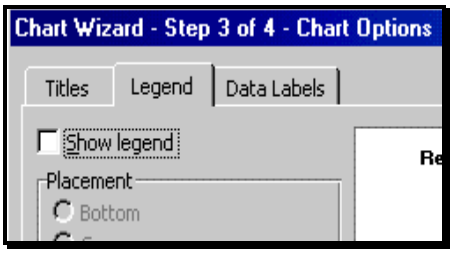
Enter a Title for the chart as shown in the next figure. There are only three tabs for setting the options for these charts. The reason: the other tabs are not relevant for a Pie chart.

Note also that the options for Titles for the X and Y-axis are grayed out– this is because a Pie chart does not have an X or a Y-axis.

Figure 64: Choosing the options for a Pie chart



Click on the tab "Legend" and deselect the option "Show Legend" as shown in the next figure. (Data Labels provide a better tool – relative to a Legend – for linking Slices to categories.)

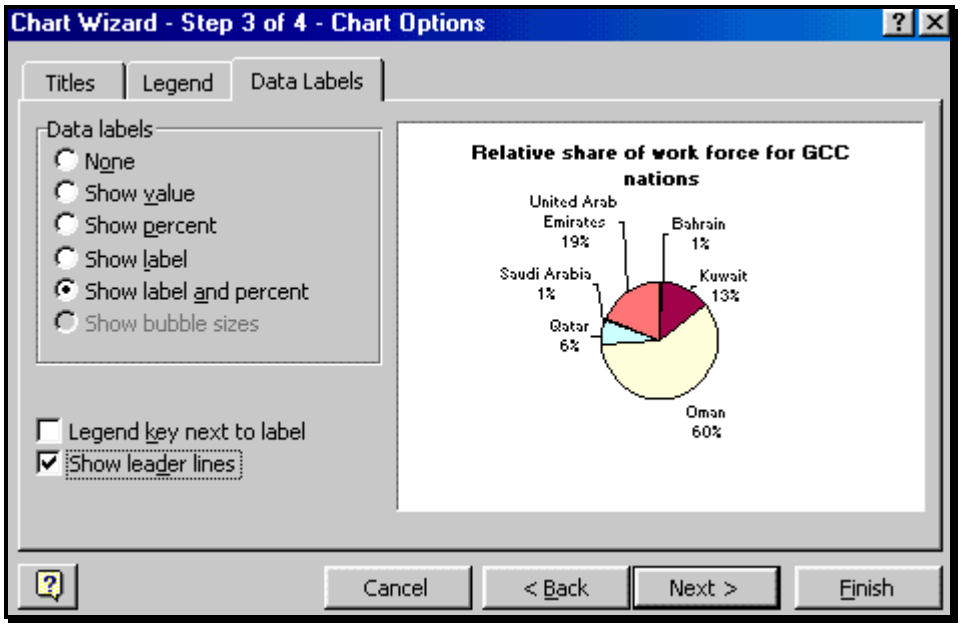


5.4 DATA LABELS: SHOWING THE PERCENT SHARE OF EACH SLICE

Click on the tab "Data Labels" and choose to see "label and percent" as shown in the next figure. The aim of using a Pie chart is to show the difference in the percent share of each category; data labels add specific information on such percent shares. In addition, in a Pie, the smaller number of data points make the use of labels feasible, aesthetic, and informative.

You may want to select the option “Show Leader Lines” so that each data label is connected (by a “Leader Line“) to the Slice to which the label is referring. This reduces the chance of error or confusion in reading the Pie chart. I chose not to have Leader Lines.
Execute this part of the wizard and move to the next step by clicking on the button “Next.”

Figure 65: Use of the “Data Labels“ option to see the label and percent share of each category



5.5 STEP FOUR

The last dialog of the wizard opens. Choose the location (I recommend choosing “As new sheet“) and / or name you desire and all the steps in the wizard have been completed.

Execute the wizard by clicking on “Finish.”

Figure 66: Selecting the location for the Pie chart

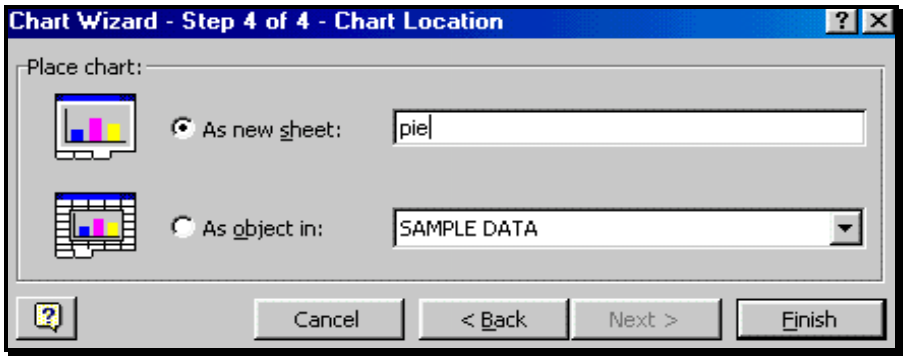
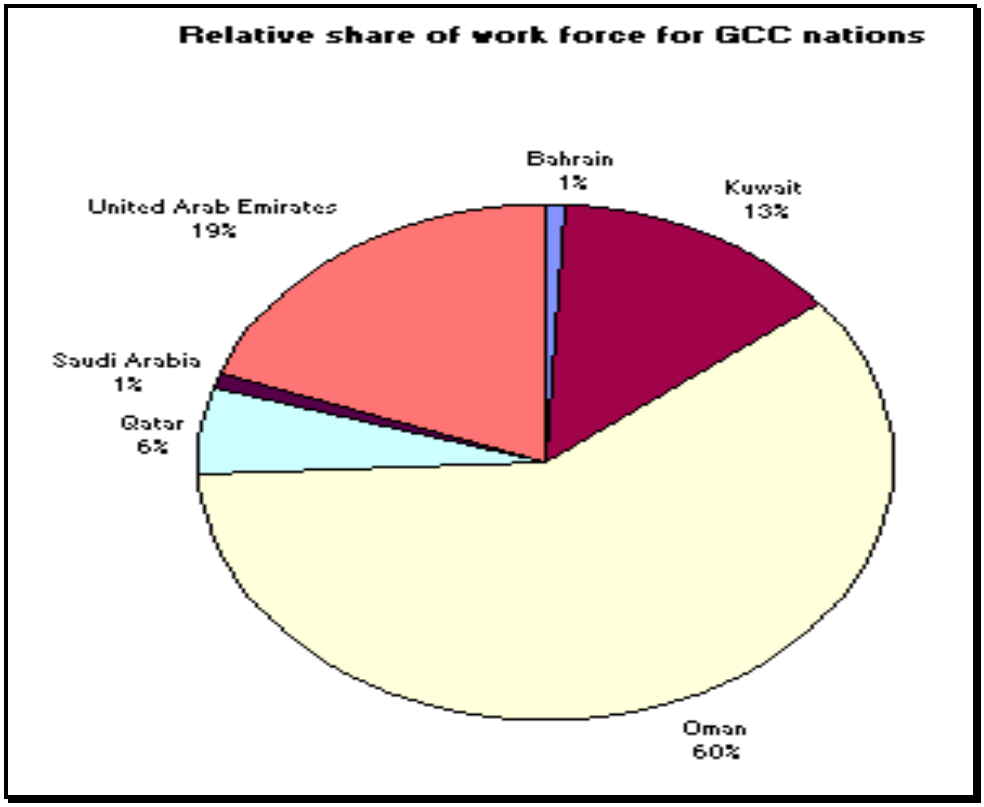


Figure 67: The resulting Pie chart



5.6 CONVERTING A 2-DIMENSIONAL PIE INTO A 3-DIMENSIONAL PIE

Click on the chart you made. Choose the menu option CHART / CHART TYPE and choose the Pie sub-type "3-Dimensional and exploded."

Execute the dialog by clicking on the button "OK." The chart is now a 3-Dimensional chart.

Figure 68: Modifying a 2-D Pie chart to a 3-D Pie chart

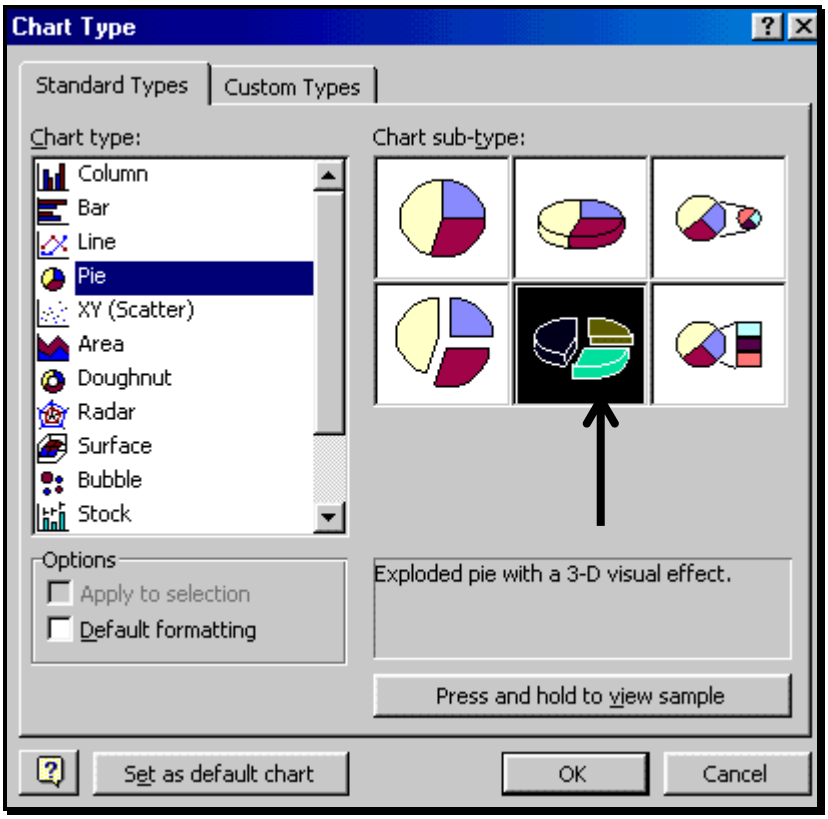
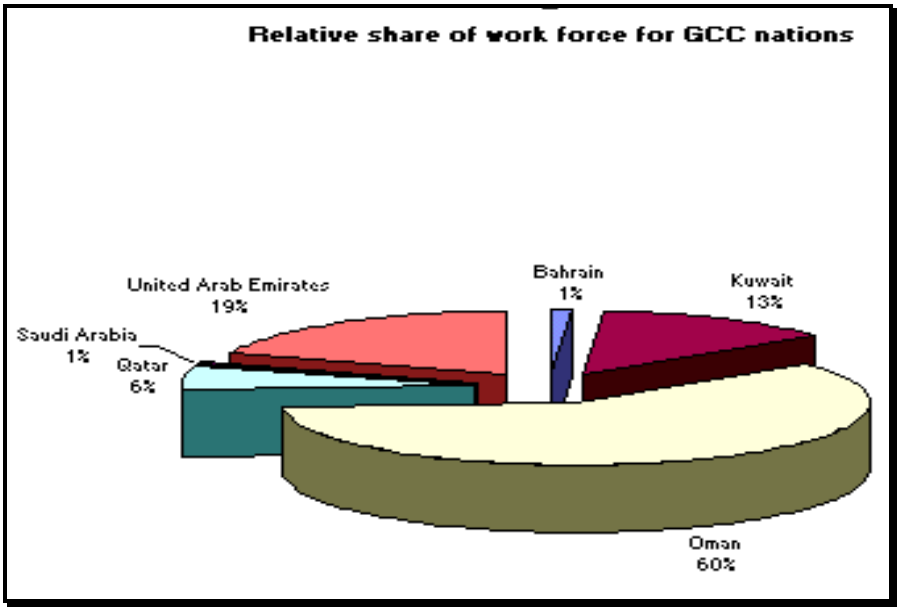


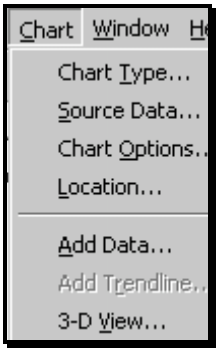
Figure 69: A "3-D Exploded" pie chart



5.7 CHANGING THE 3-DIMENSIONAL VIEW

You can customize the 3-Dimensional settings by going to CHART / 3-D VIEW.

Figure 70: The menu option for accessing the "3-D View" dialog



The "3-Dimensional View" dialog opens. It is shown in the next figure.

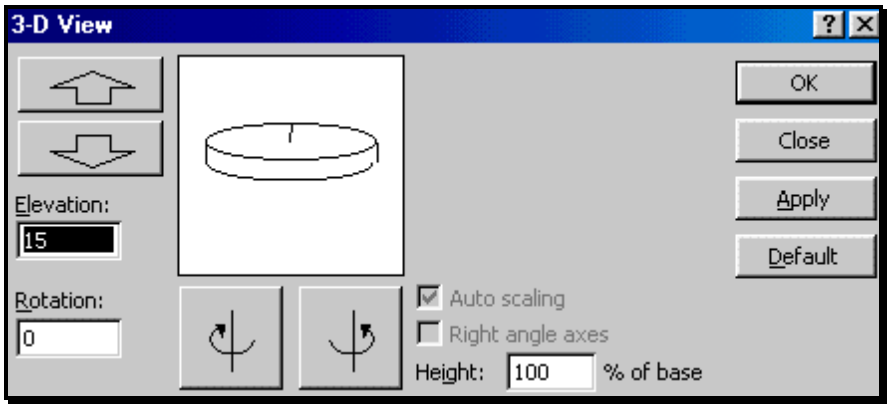
Play around with the three options:

- Elevation
- Rotation
- Height to base ratio

If you mess up, use EDIT / UNDO or click on the button "Default."

If you like the changes, click on the button "Apply" and then on the button "OK."

Figure 71: The “3-D View” dialog



Page for notes

CHAPTER 6

"2 Y-AXES" CHARTS – CHARTING VARIABLES MEASURED ON DIFFERENT SCALES

Open the sample file "2 Y Axes.xls."

Note that the values in the series in Column E lie in the range of (approximately) 250,000 to 51 million, but the values in the series in Column F lie in the range of (approximately) 1 to 1.5.

Although the two series have values in very different ranges, I will chart both of these series against the same X-axis variable. Excel has chart types that can depict two variables that are measured on very dissimilar scales on one chart.

6.1 STEP ONE: CHOOSING THE DATA

Choose the cells E1 to F19 (Ideally, you should also choose the cells B1 to B19.) Nevertheless, I am making this error on purpose to show you how to add a new data series or X-axis series in step 2 of the chart wizard.

Figure 72: The sample data

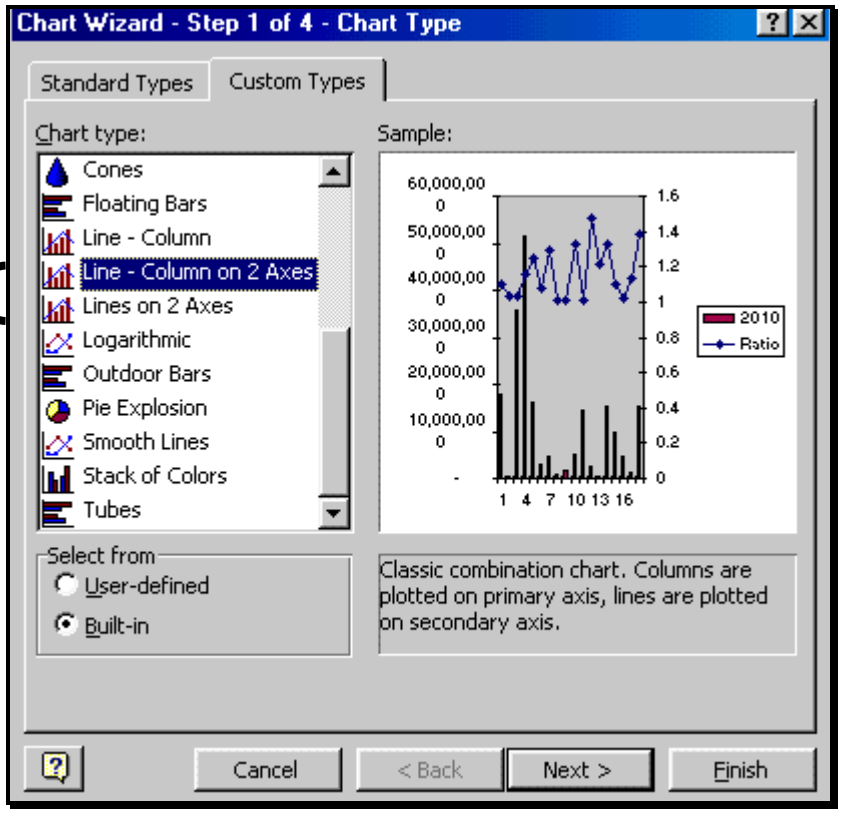
E	F
2010	Ratio
17,846,000	1.09592238
261,000	1.02755906
35,543,000	1.03262638
51,449,000	1.15330643
15,959,000	1.24884576
3,018,000	1.07249467
4,613,000	1.29542263
916,000	1.00770077
1,595,000	1.00758054
4,937,000	1.32822168
14,280,000	1.01298149
2,411,000	1.47461774
259,000	1.21028037
15,415,000	1.32476796
9,925,000	1.09571649
4,773,000	1.01965392
1,087,000	1.13584117
15,223,000	1.37964473

Choose the menu option INSERT / CHART (or click on the chart icon). Click on the tab "Custom Types" and choose the type "Line-Column on 2 Axis."

> In "Custom Types," there are no chart sub-types.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

Figure 73: Choosing to make a “Line – Column on 2 Axes“ chart

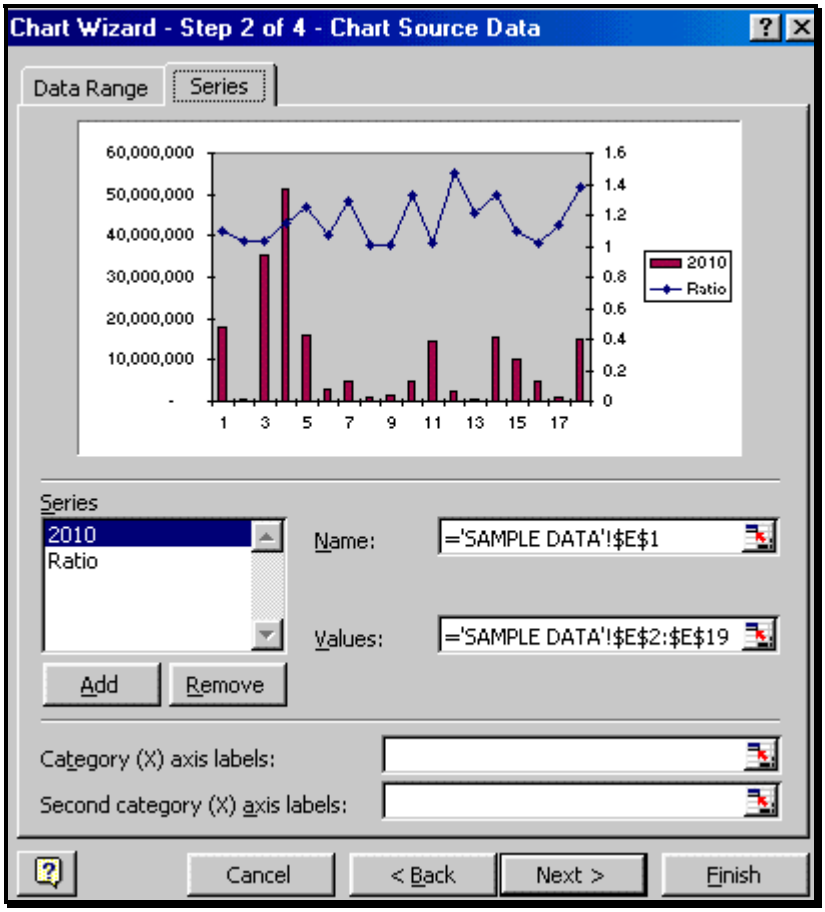


6.2 STEP TWO: SETTING THE CELL/DATA REFERENCES FOR EACH Y-AXIS

The dialog shown in *Figure 74* opens.

Click on the tab “Series.”

Figure 74: The "Chart Source Data" dialog for a 2- Y axes chart needs two series fro the Y axes and up to two series for labeling the X axes



6.2.A SOLVING A COMMON PROBLEM – "EXCEL HAS FAILED TO PICK ANY SERIES OR THE CORRECT SERIES FOR DEFINING THE X AXIS CATEGORIES ON THE CHART"

As you can observe in *Figure 74*, the sample preview does not show the country names on its X-axis and the box "Category (X) axis labels" is empty. I made this error on purpose. In the first step of the charting process, I did not choose the series for the "Category (X) axis labels."

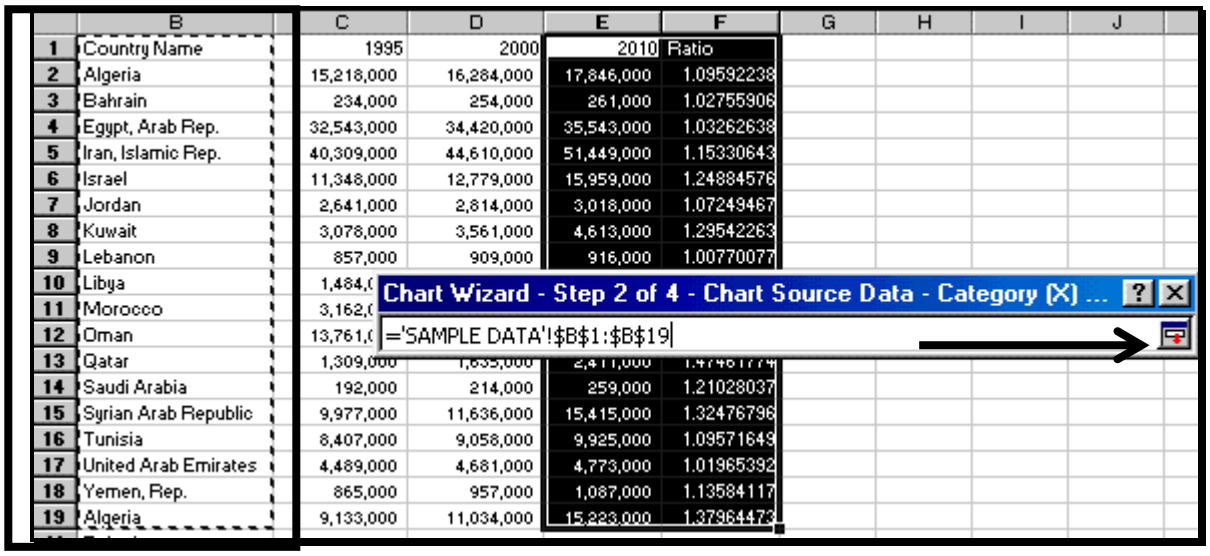
The reason I did this was to familiarize you with a problem that often occurs while selecting data for making charts— Excel makes mistakes in reading the X-axis series. It either mistakenly takes the series to be a Y-

axis series (this is shown in 2.3.b on page 47) or it does not pick up the data range. The latter problem is tackled in this sub-section.

Let us correct the error. Click at the right edge of the box "Category (X) axis labels." (The dialog is reproduced in *Figure 74*.)

Then choose the menu option the sheet with the data and choose the cells that have the data for the X-axis categories. (This process is shown in *Figure 75*.)

Figure 75: Picking the series for the X-axis if Excel has failed to pick the series



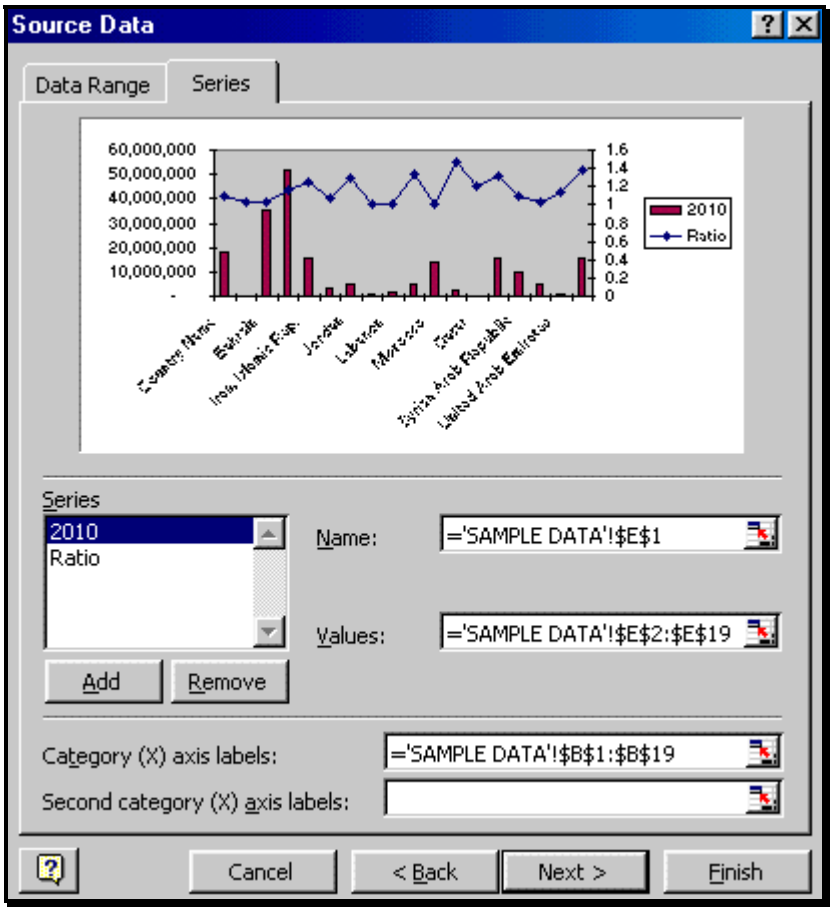
	B	C	D	E	F
1	Country Name	1995	2000	2010	Ratio
2	Algeria	15,218,000	16,284,000	17,846,000	1.09592238
3	Bahrain	234,000	254,000	261,000	1.02755906
4	Egypt, Arab Rep.	32,543,000	34,420,000	35,543,000	1.03262638
5	Iran, Islamic Rep.	40,309,000	44,610,000	51,449,000	1.15330643
6	Israel	11,348,000	12,779,000	15,959,000	1.24884576
7	Jordan	2,641,000	2,814,000	3,018,000	1.07249467
8	Kuwait	3,078,000	3,561,000	4,613,000	1.29542263
9	Lebanon	857,000	909,000	916,000	1.00770077
10	Libya	1,484,(			
11	Morocco	3,162,(			
12	Oman	13,761,(			
13	Qatar	1,309,000	1,635,000	2,411,000	1.47461774
14	Saudi Arabia	192,000	214,000	259,000	1.21028037
15	Syrian Arab Republic	9,977,000	11,636,000	15,415,000	1.32476796
16	Tunisia	8,407,000	9,058,000	9,925,000	1.09571649
17	United Arab Emirates	4,489,000	4,681,000	4,773,000	1.01965392
18	Yemen, Rep.	865,000	957,000	1,087,000	1.13584117
19	Algeria	9,133,000	11,034,000	15,223,000	1.37964473

Click again on the edge of the box and you will be back to the dialog. At this point, the X-axis categories have been defined as can be seen in *Figure 76*.

> Note that the sample preview shows the country names on its X-axis and the box "Category (X) axis labels" has the correct references.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

Figure 76: The completed "Source Data" dialog



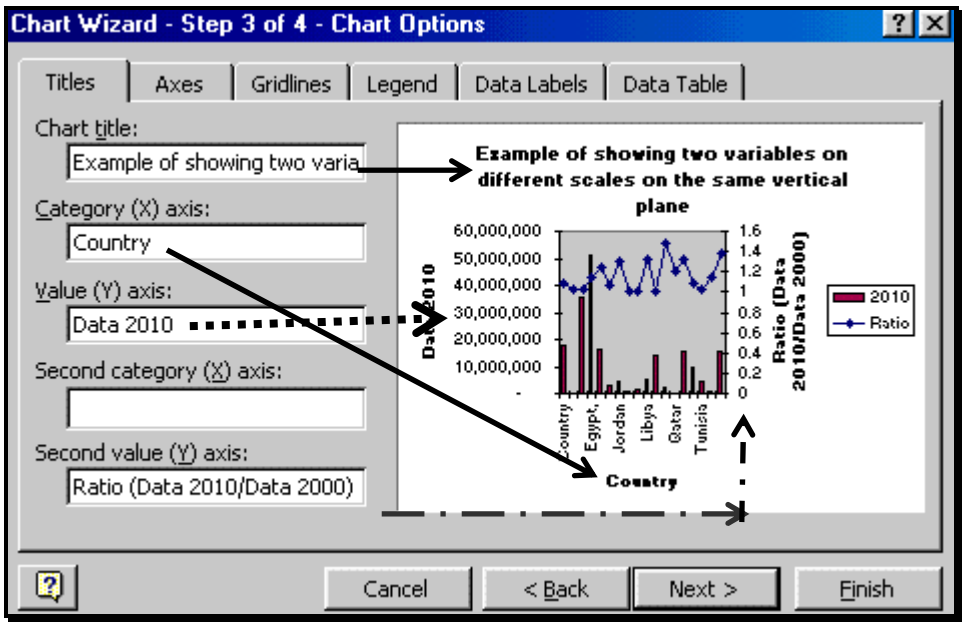
6.3 STEP THREE: THE OPTIONS FOR THE "SECONDARY Y-AXIS"

The "Chart Options" dialog opens. It is shown in the next figure. This type of chart has two Y-axis-- each measured on a different scale. Consequently, the options in Titles and axis will contain options for a "Secondary" Y (and X) axis.

6.3.A TITLES

Enter the Titles for the chart, category (X) axis, value (Y) axis (measured on the left Y-axis on a scale of 0 to 60,000,000), and the second value (Y) axis (measured on the right axis on a scale of 0 to 1.6).

Figure 77: The "Titles" choices for a 2-Y axes chart

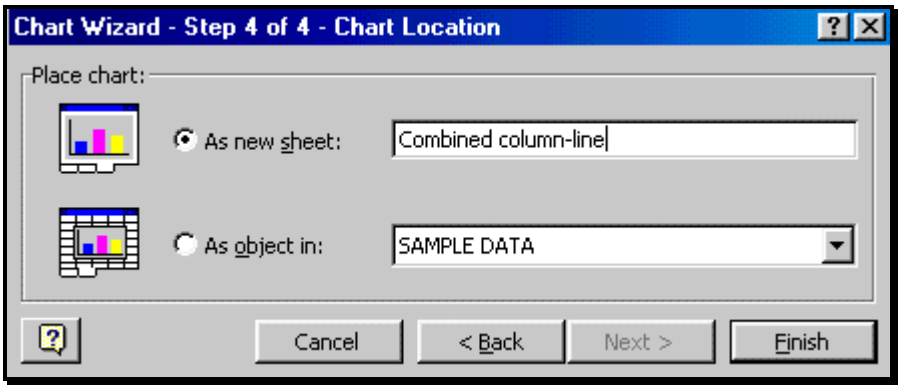


Go through the different tabs and choose the options you desire. The options are similar to those for a Column chart.

Execute this part of the wizard and move to the next step by clicking on the button "Next."

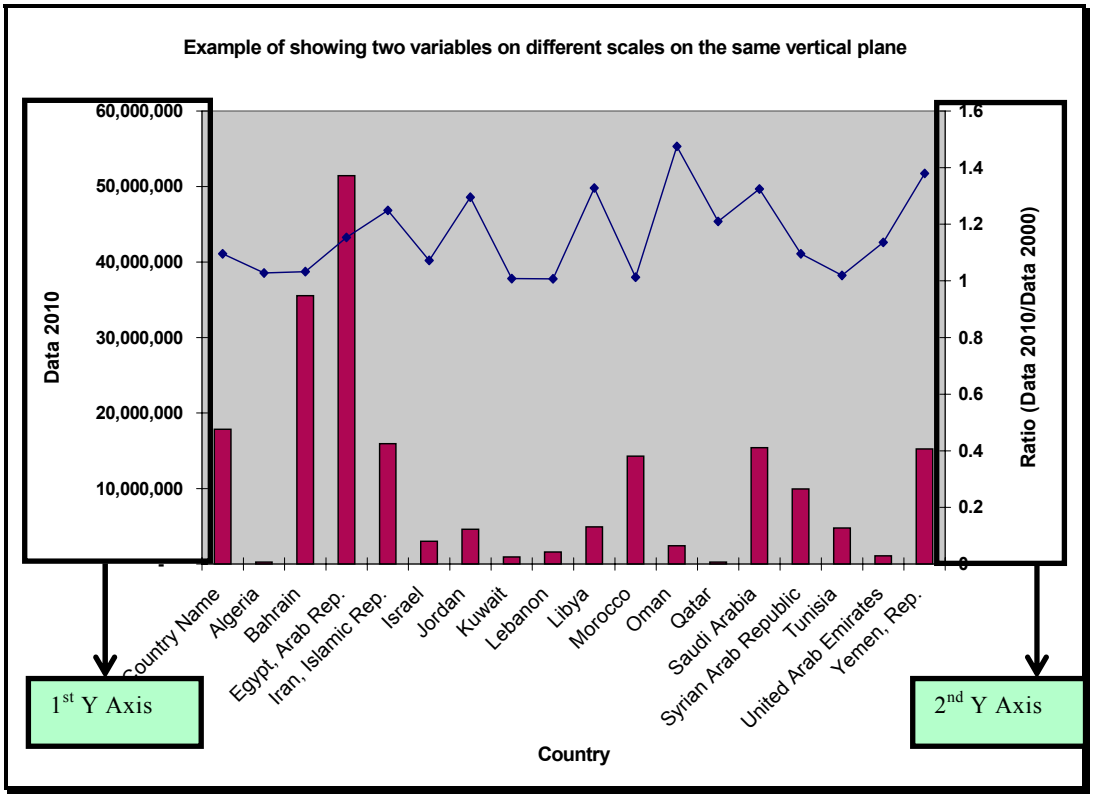
Choose to make a new sheet with this chart. All the steps in the wizard have been completed. Execute the wizard by clicking on "Finish."

Figure 78: selecting the location for the new chart



The chart is shown in the next figure.

Figure 79: The completed "2 Y Axes" chart



The scale on the left Y-axis is for the variable "Data 2010." The scale on the right Y-axis is for the variable "ratio." You read the value of a point off the Y-axis to which it is related. In our example, the Column values are on the left Y-axis.

6.4 THE "2 Y AXES" LINE CHART

Another chart type to make a similar chart is "Lines on 2 Axes." Choose the menu option CHART / CHART TYPE and choose the type "Lines on 2 axes" as shown in the next figure.

Figure 80: Choosing to create a "2 Y Axes" chart using "Lines on 2 Axes" instead of "Line-Column on 2 Axis"

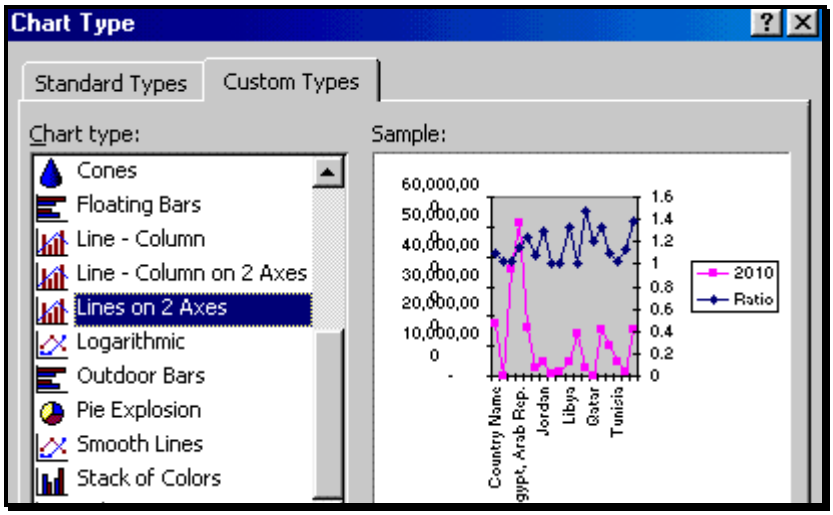
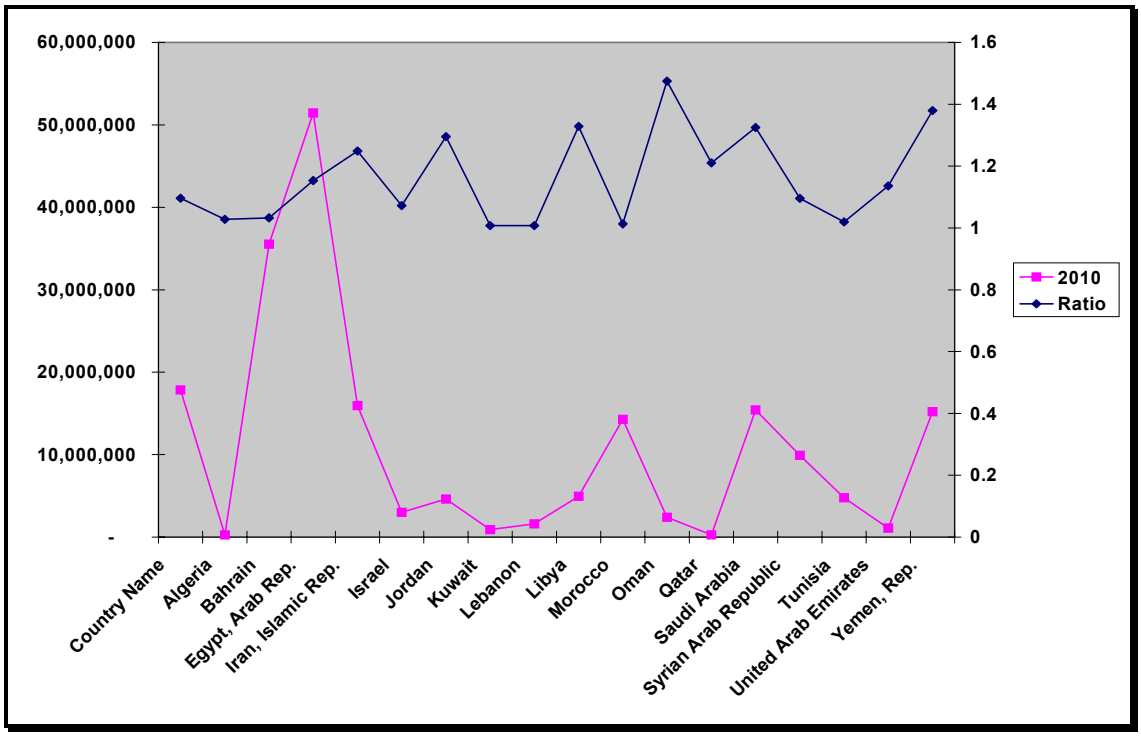


Figure 81: A "2 Y Axes" chart using lines to depict both series



Page for notes

CHAPTER 7

CHANGING A CHART

After a chart has been made, you can make all kinds of changes. In fact, you can reconstruct each aspect of the chart, from the choice of chart type and sub-type (step 1), data source (step 2), chart options (step 3), and location (step 4).

After a chart has been made, you can make all kinds of changes. In fact, you can reconstruct each aspect of the chart, from the choice of chart type and sub-type (step 1), data source (step 2), chart options (step 3), and location (step 4).

Click on the chart you want to edit. Choose the menu CHART (shown in the next figure. The first four sub-menus correspond to the four steps in the chart making process.

Figure 82: Options in the CHART menu

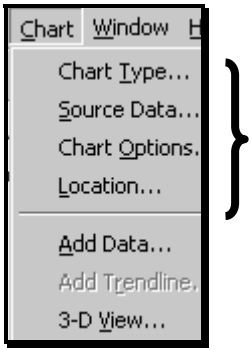


Table 10: Options in the CHART menu

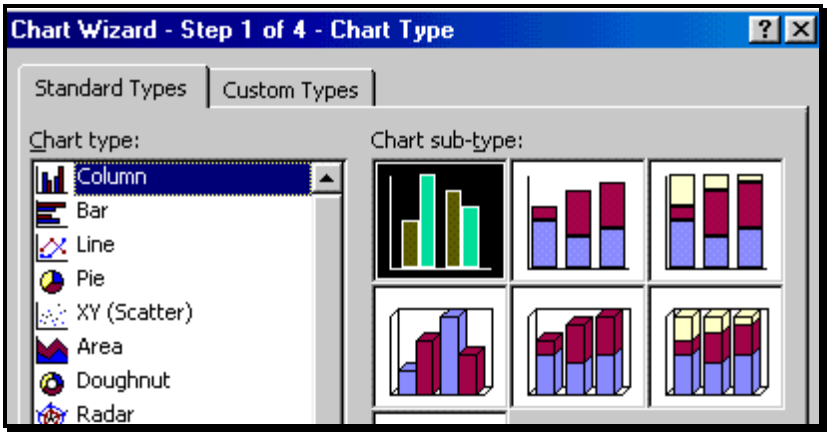
Menu option	*Corresponds to …*	*On page…*
CHART / CHART TYPE	Step one: choosing the chart type and sub-type	31
CHART / SOURCE DATA	Step two: source data	44
CHART / CHART OPTIONS	Step three: chart options	49
CHART / LOCATION	Step four: choosing the location where the chart should be placed	49

Experiment and try out these four options. You will be amazed at how much your understanding of chart making will improve.

7.1 CHANGING THE CHART TYPE

Click on the chart you want to edit. Choose the menu option CHART / CHART TYPE. The first dialog of the chart wizard will open. It is reproduced below.

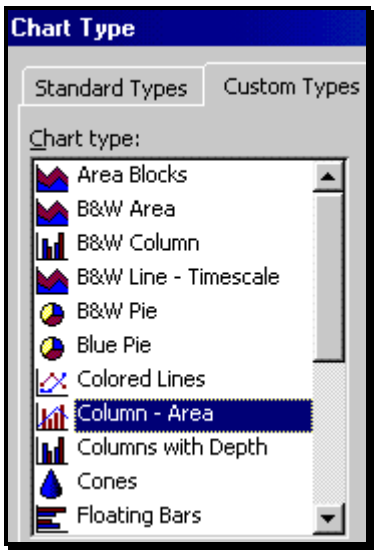
Figure 83: Changing the chart type and sub-type



If you choose a new type and / or sub-type of a chart then the chart will change from a Column chart to the new type you choose.

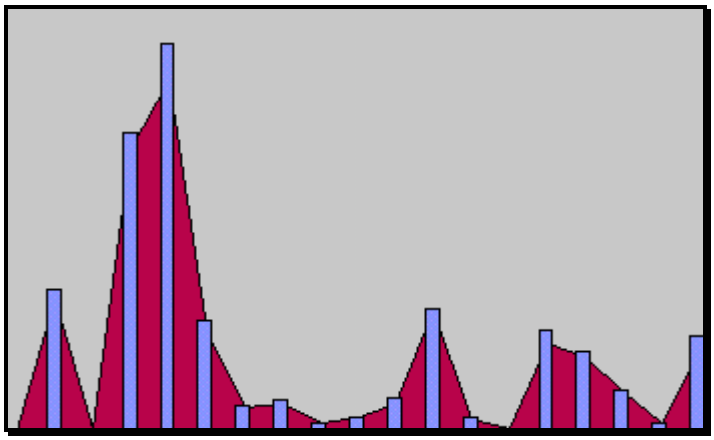
I chose the type "Column-Area." I then clicked on "Finish" – there is no need to repeat the other steps of the chart wizard. .

Figure 84: Choosing the new chart type and sub-type



The Column chart changed to the "Column-Area" chart shown in the next figure.

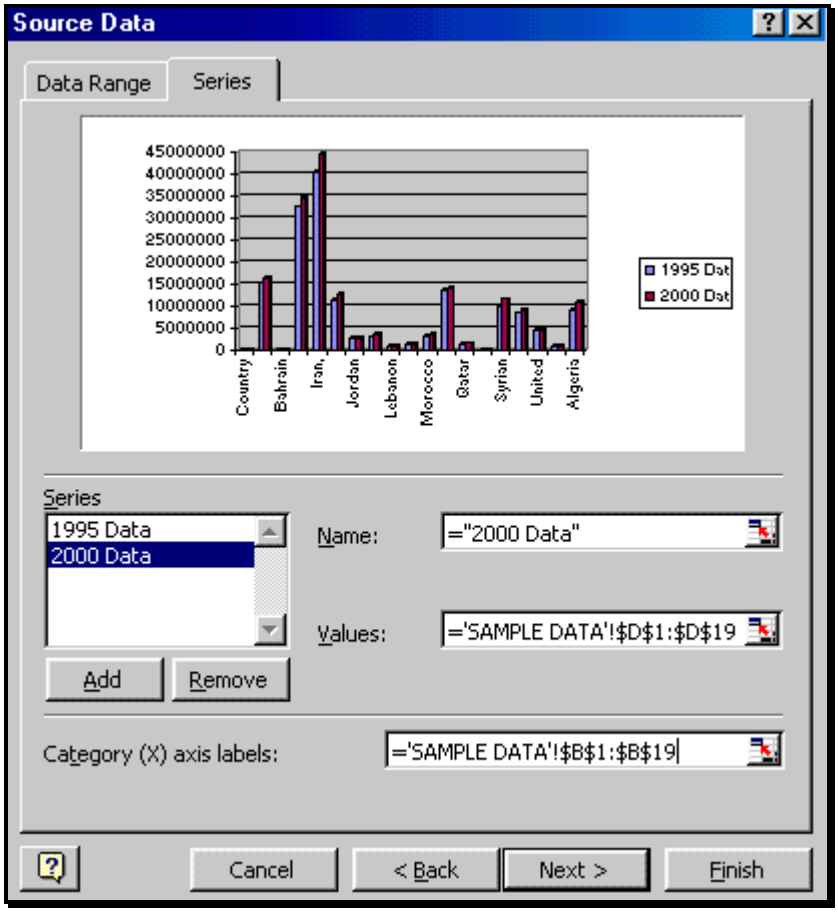
Figure 85: Compare with Figure 46 on page 61



7.2 CHANGING THE SOURCE DATA

Click on the chart you want to edit. Choose the menu option CHART / SOURCE DATA. The second dialog of the chart wizard will open. It is reproduced in the next figure. Make the changes you desire. All the steps in the wizard have been completed. Execute the wizard by clicking on "Finish."

Figure 86: Changing the source data

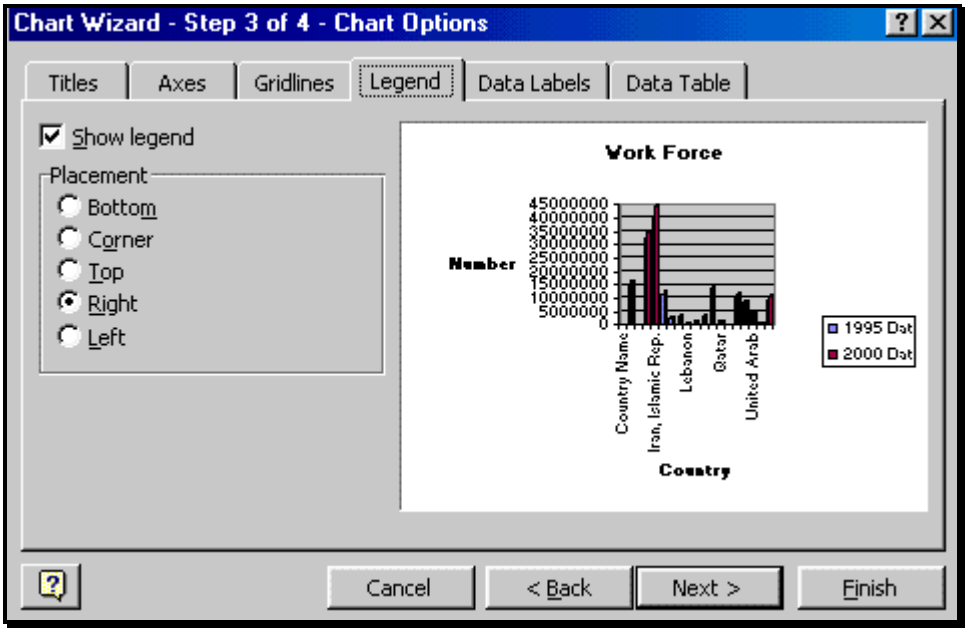


7.3 CHANGING CHART OPTIONS

Click on the chart you want to edit. Choose the menu option CHART / CHART OPTIONS. The third dialog of the chart wizard will open. It is reproduced in the next figure. Make the changes you desire. All the steps

in the wizard have been completed. Execute the wizard by clicking on "Finish."

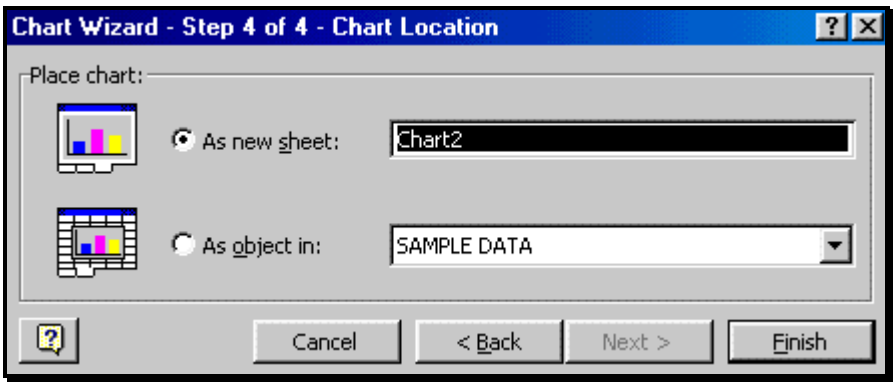
Figure 87: Changing chart options



7.4 CHANGING CHART LOCATION

Click on the chart you want to edit. Choose the menu option CHART / LOCATION. The fourth dialog of the chart wizard will open. Make the changes you desire. All the steps in the wizard have been completed. Execute the wizard by clicking on "Finish."

Figure 88: Changing chart location



In order to fine-tune the new skills you have learnt, experiment with using the CHART menu.

7.5 FORMATTING THE CHART

Formatting is taught in Chapter 8 -- Chapter 13.

If you are making several charts of the same type and want a uniform formatting in these charts, learn how to use the "format painter." This topic is taught in Chapter 15.

The F4 key (discussed in *Volume 1: Excel For Beginners*) can save time in formatting charts.

The formatting of margins, insertion of headers / footers and other page setup features are discussed in the book "Excel for Professionals."

7.6 HOW EACH STEP IN CHART CREATION CREATES AND / OR DEFINES "OBJECTS"

As you shall learn in the next Chapter, a chart is made up of several objects. When you make a chart, you also (sometimes not by your choosing) create several other objects that reside within the chart. Think of each step you do in the chart-making process as the **creation of** an "object"

> **A chart is nothing but a combination of several distinct objects.**
> (More on the "object" approach in Chapter 8 -- Chapter 13.)

When you choose the option (add-) "Gridlines for the X - Axes" you have made the choice of adding the object "Gridline X Axes." Each data series you choose is an object (or, more accurately, its graphical representation is an object). So are the Titles, Legend, outcall you need to do is to understand this concept vaguely – one day, its implication will hit you as an epiphany. Thereafter, working with charts will become very easy!

In the table below, I list the linkage between each step and object creation. (These objects form the basis of the next Chapter.)

Figure 89: The sample chart

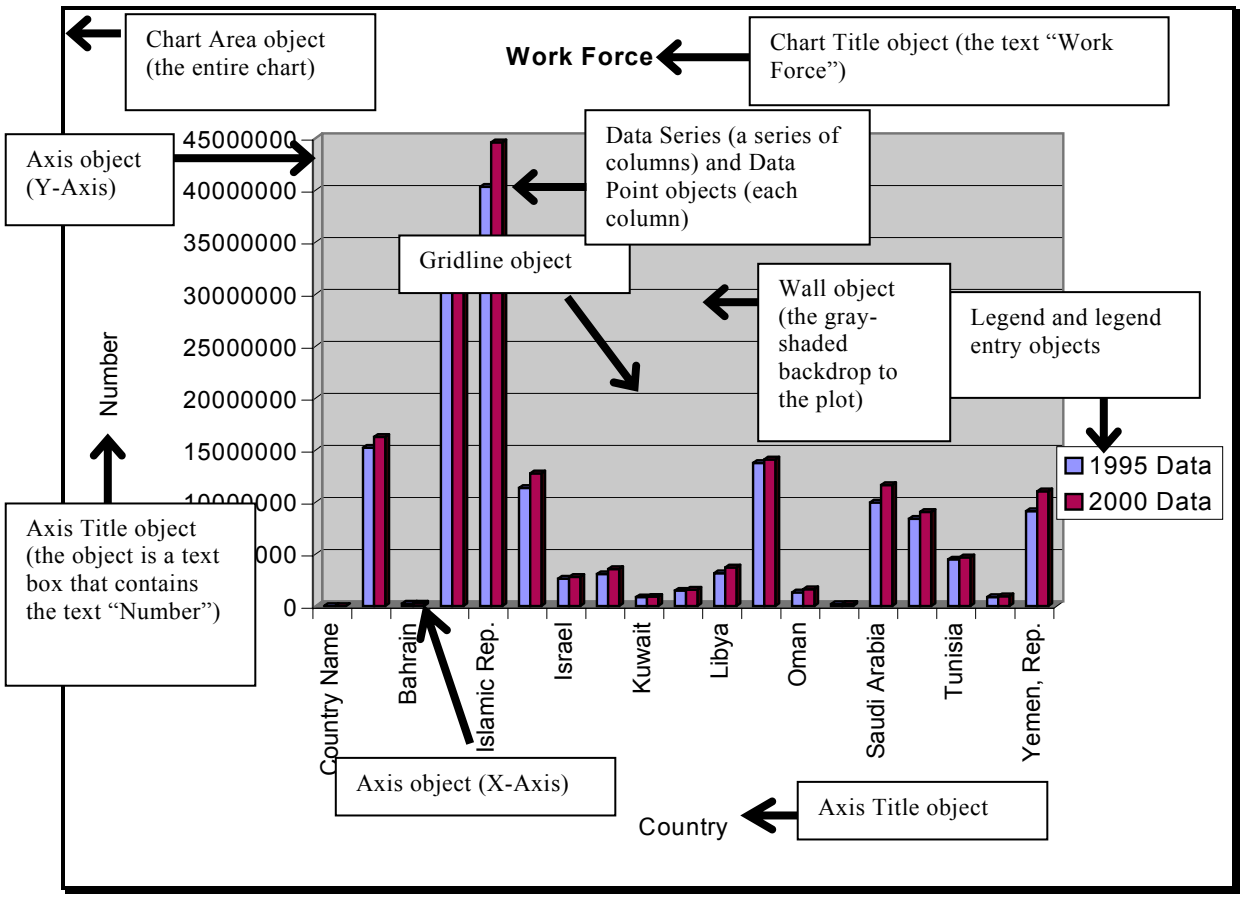


Table 11: Link between each step and object creation

Step in the charting process	On page	Objects that are created or that can be created
Step one: choosing chart type	31	Chart • Chart Area • Plot Area The choice of chart type and sub-type defines the range of objects that are relevant to the chart. For example, the "X-Axis" object or the "Wall" object is not relevant if you choose to make a Pie chart. Some objects (like the Floor and Wall) are created only if you choose to make a 3-Dimensional chart:
Step two: choosing the data series	44	• Data series (as many objects as there are series) • Data points (for each unique data point within each series) • X-Axis
Step three: Setting options The range of available objects depends upon the chart type. For example, the "X-Axis" object is not relevant if you choose to make a Pie chart.	49	Many objects can be created. Their creation is your choice. In general the objects created / defined are: <u>Axis</u> • X-Axis • Y-axis • Z-axis (if 3-Dimensional chart with three axis) • Secondary Y axis (if a two-Y axis chart) <u>Titles</u> • Chart Title • X-axis Title • Title for each other axis (Y, Z) <u>Gridlines</u> • X axis, Y-axis, Z-axis (for 3-Dimensional charts). For each axis, you can choose to have both, one, or none of the two options: major Gridlines, minor Gridlines. (Later in this Chapter, you will learn how to define "major" and "minor." <u>Legend</u>

Step in the charting process	On page	Objects that are created or that can be created
		• Legend entry Data Labels • Data series labels (for each data series in the chart) • Data point labels for each individual data point) Other objects are specific to chart types or options chosen, for example, Leader Lines (for Pie charts).
Step four: choosing the chart location	49	Defines the location and name of the chart object. You can choose the location and name.

Page for notes

CHAPTER 8

FORMATTING CHARTS USING THE "OBJECT" MODEL APPROACH

How do some people work with such felicity in formatting charts? The answer is simple: these people understand and use the chart "object" model. Instead of looking at the chart as one indivisible entity, they look at a chart as a collection of objects. Once you learn to see charts using the "object" approach, you too will become a wizard in charting.

I have highlighted the objects contained within a chart. I first show the "object-oriented" way of looking at charts and then discuss the objects within typical charts. The next section links these objects to the four steps in the chart making process (which was taught in the previous Chapter).

In Figure 93, I mark each object in a typical 3-Dimensional Column chart. The secret to formatting this chart is to work on each object separately, starting from the out side (the "Chart Area" object) and working inwards until you reach the data point object.

8.1 THE "OBJECT MODEL" OF A CHART – THE BEST WAY TO UNDERSTAND A CHART

A chart is actually comprised of several objects, one inside the other. Understanding that charts are made up of individual objects will make your understanding of Excel (and, for that matter, any software that

makes charts / drawings / slides) much better. I will work through all the "objects" in a (3-Dimensional) Column chart. In the figure, I have marked out the different objects in this chart. (You will find the chart in the sample file "Charts File1.xls" which is included in the zipped file you downloaded.)

> Do not worry if the different objects marked in the figure do not make sense at this time. As you go through the rest of the Chapter, I will show you how to work on each object of the chart. For each object created by you[13], the easy way to format it is by first choosing the object, then double clicking on it to open the formatting dialog[14].

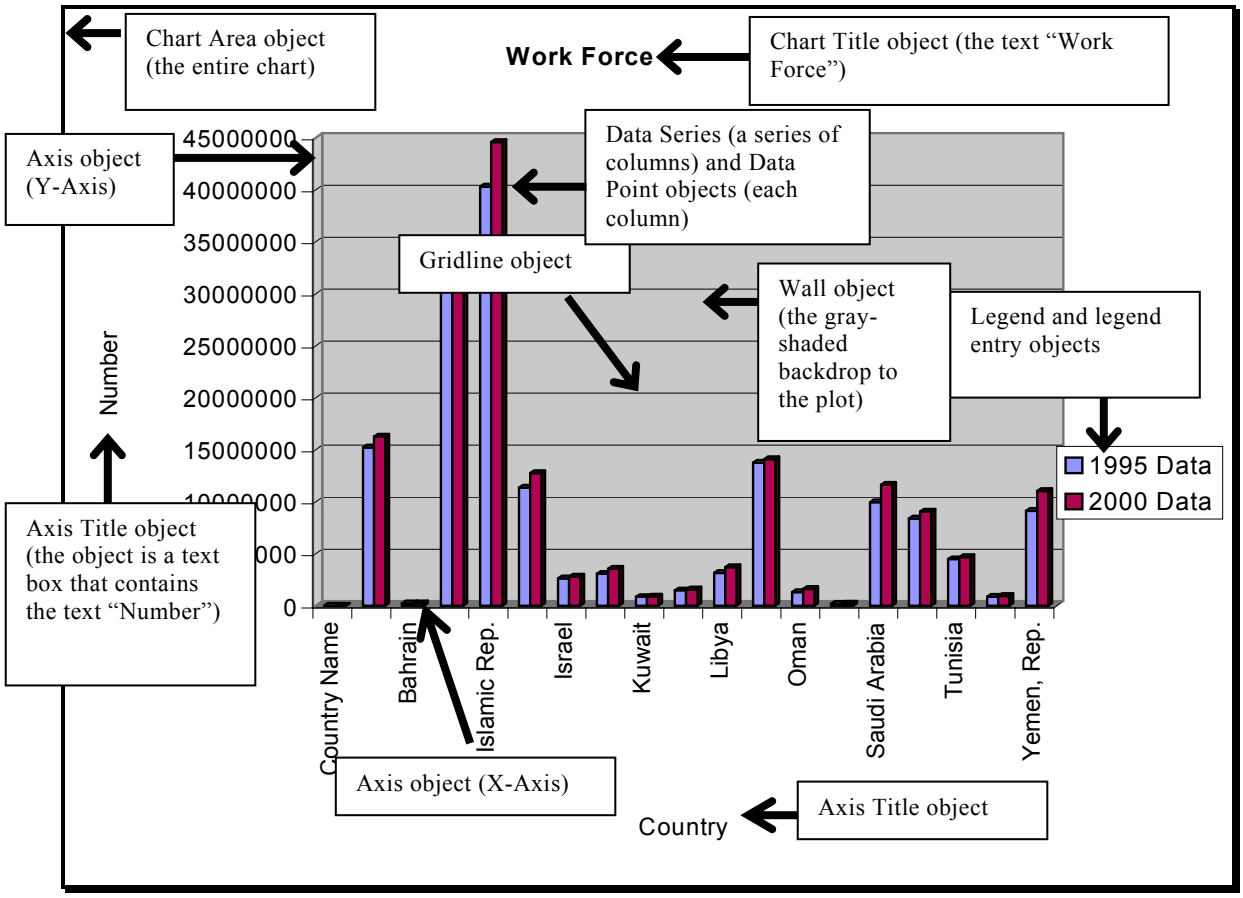
The "object approach" involves three steps:

(1) Identifying an object.
(2) Selecting it (by clicking on it).
(3) Double clicking to format the object or right clicking to obtain a short-cut menu that shows the main options for editing / defining the object and its properties.

[13] In this context, an object is any line, bar, text box, etc.

[14] Note: double clicking does not work for formatting cells, rows, and columns. The reason is that the cells, rows, and columns are not drawing objects that you create

Figure 90: The sample chart



Tips

- Move the mouse over the different objects shown in the figure above. You will see a small text box pop up with the name of the object the mouse is over which the cursor is currently placed.

- Move from the outside to the inside. This will get you into the habit of using the "drill down" approach to working with charts / drawings / slides that contain "objects within objects."

- As you move the mouse over the chart, see and 'sense' where an objects boundary begins.

- Some objects are easy to locate with the mouse – for example, the "Chart Title" object. Others are difficult to locate because of their smaller size (like the thin "Axis" objects) or their proximity to other objects (for example, in the chart shown above, the "Floor" and X-"Axis" objects).

> Do not fret if it takes some time to become proficient in identifying and working on objects. Once you learn this "drill down object" approach, you will never forget it. Furthermore, you will find it easy to apply in other applications like PowerPoint.

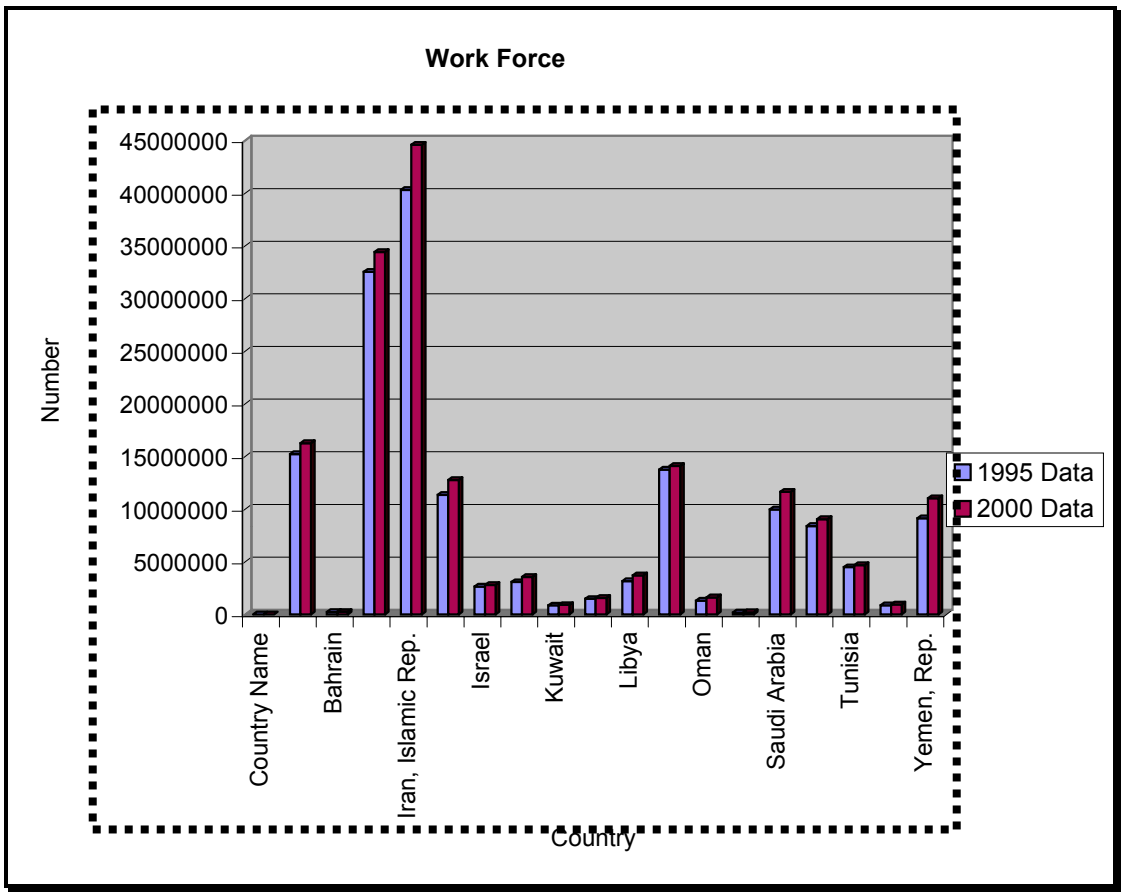
The Chart Area is the largest object and it contains the Titles, Legend, and the Plot Area.

The "Chart Area" object is, basically, the entire chart. This object is the "container" that contains the other objects. Therefore, (some) formatting changes you make to the chart area are automatically applied to the objects contained within the chart area. (Keep reading on; the hierarchy of objects will become clear as you read further in this Chapter.)

The "Plot Area" object is an object that contains the actual contents of a plot. The area lies inside the "Chart Area" and includes all objects within and including the axis. Therefore, it does not contain the Titles, Legend, and the area surrounding the Titles and Legends.

> Do not confuse the "Chart" and "Plot" areas. In later sections, you will learn how to identify and work on each object separately. When working on the chart area, you can change (apart from other stuff you will learn later) the type of chart that is plotted (that is, from a Column to a Line plot) and the presence and formats of the Titles; these cannot be changed when working on the plot area.

Figure 91: The dotted rectangle represents the "Plot" area. The "Chart" area includes all the area inside the figure. When you select the Plot area object correctly with the mouse, a dotted line will show to demarcate the boundaries of the Plot area. [15]



- 'Chart Area' = 'Plot Area' plus 'Titles' plus 'Legend'

- Titles: the chart has a "Title" box that can contain text. In addition, each axis has an "Axis Title" object.

- Each axis also has an "Axis" object. This object consists of the Line that defines the axis, the markers for points on the axis, etc.

[15] You can move the location of the plot Area inside the chart Area (by using click-drag-and-drop with the mouse). In addition, you can resize the plot Area. (See chapter 9 to learn how to resize/move an object.) When you move / resize the plot Area, all the graphical objects within the plot Area are also moved / resized proportionately to the overall move / resize.

- Plot background objects – the "Wall" and "Floor" objects. The "Wall" object is made up of the background of the plot. The "Floor" object is the floor on which each Bar of the chart sits. This object is only available in a 3-Dimensional chart.

- The "Gridline" object assists in linking the axis scale to the plot area.

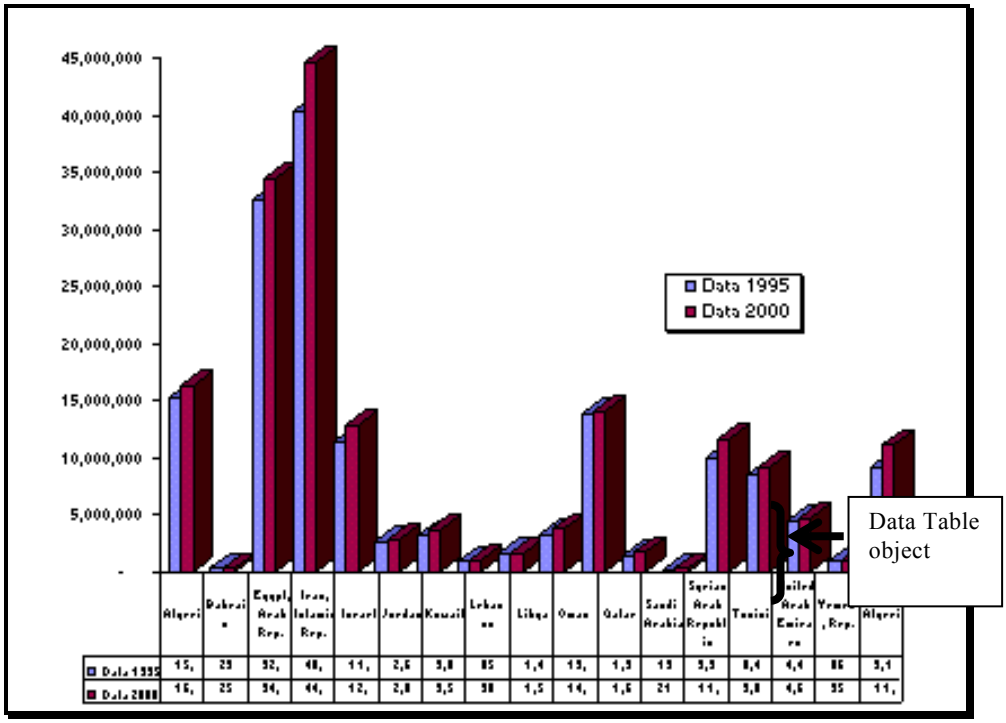
- Each series of Bars (that is, those in one shade / color and representing one data series) is one "Data Series" object (refer to 10.1.c on page 140.) Therefore, this chart has two "Data Series" objects. Each single Bar is an object by itself – a "Data Point" object (refer to 13.7 on page 190.) Therefore, this chart has 36 "Data Point" objects, 18 from each data series. When you click on a data series, the location of the underlying data series is shown in the formula Bar at above the chart.

- The "Legend" object consists of several "Legend Entry" objects. Each of these "Legend Entry" objects shows the label for one series and a small representation of the color and style of the Bar that represents it.

- To learn when you created each object within a chart, see page 66. However, I advise you first read the rest of this section until page.

- Some charts have a "Data Table" object – if you chose to include a "Data Table" in your chart in step three of the chart making process. (This step is in the previous chapter.) One of the charts in the sample file has a data table; the chart is reproduced below. (See chart "Data table" in the file "Charts File1.xls.")

Figure 92: A chart that has a data table object (in addition to the typical objects shown in the previous figure)



Specific chart types (Line, Area, Scatter, Bar, etc) contain objects that are specific to them. Some examples are shown in the next few figures.

- Advanced topic:
  The "Data Series" object is very important. A marker represents each data series (that is each "row" or "Column" that defines one of the series defined by a set of Bars with the same color). The marker may be
  –a Bar / Column (as in Column and Bar charts),
  –a Line (as in Line charts),
  –a Line whose height is shaded (as in Line Area charts),
  –dots (as in Scatter charts),
  –and Slices (as in Pie and Doughnut charts), or
  –other shapes like Cones, Pyramids, and Cylinders. In a 3-Dimensional chart, these markers have the added dimension of depth (so, they have width and height like does a 2-Dimensional Column chart, and, in addition, width). Further, the angle at

which one views the depth can be changed thereby changing the 3-Dimensional orientation of the data series.

- Some other objects are used to define the data series objects. The "Data Label" objects show the values or other information about each data point in a data series. The "Leader Line" objects (only available in Pie charts) connect the labels to the data point to which they refer. The "Legend" objects provide the mapping of "Data series in a worksheet → data series represented by a series of Bars / Line / etc."

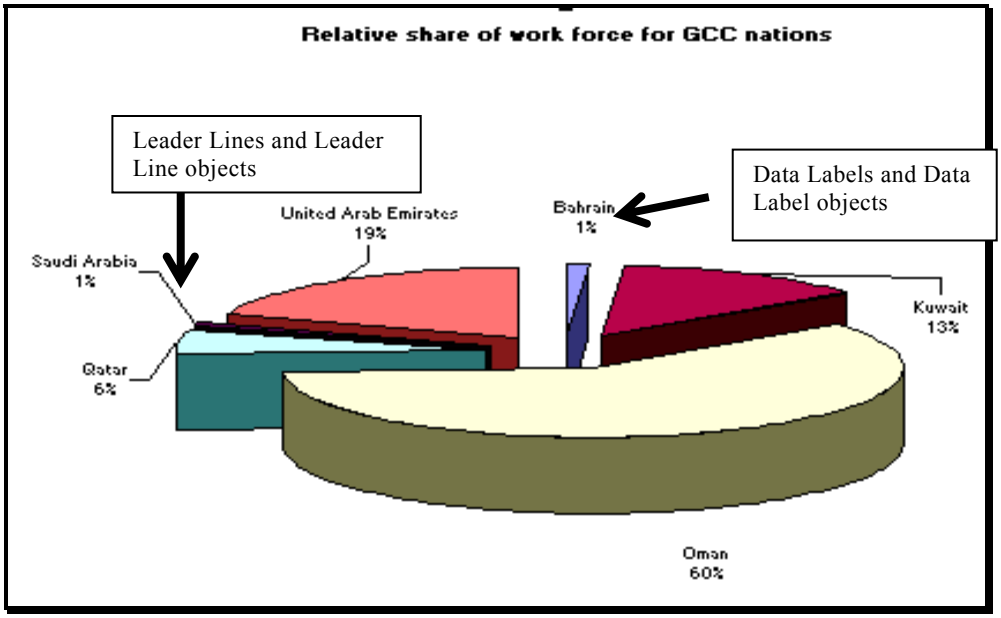
- Data series objects enable the creation of new objects that are specific to each data series. The formatting options and object creation possibilities available for a data series varies considerably across chart types. (Keep in mind the reason why a Line chart may be more useful than a Column chart for a specific reporting purpose. The difference in the information provision / presentation across these types is reflected in the differences in the options available for the data series.) As you will see the next Chapter, you can create "Y-Error Bars" for a data series (in Line, Scatter, Column, and some other chart types), "X-Error Bars" in Scatter chart, "Drop," or Lines to connect a marker to the X-axis (in a Line and some other chart types), etc. You will learn about the process of making these objects and their usefulness in the next Chapter.

Pie chart

Different chart types have some different objects. The Pie chart has some objects that Column charts do not have (for example, "Leader Lines"). On

the other hand, the Pie chart does not have many of the objects a Column chart has, like an axis Title. One of the charts in the sample file is a Pie chart; the chart is reproduced below. (See chart "Pie" in the file "Charts File1.xls" or any of the charts in the file "Pie.xls.")

Figure 93: A sample Pie chart



8.2 WHEN DID YOU MAKE ALL OF THESE OBJECTS?

When you make a chart, you also (sometimes not by your explicit choice) create several other objects that reside within the chart. In the table below, I list the linkage between each step of the chart-creation process and object creation.

8.3 OBJECTS CREATED WHEN FORMATTING A DATA SERIES

Additional options on data series formatting; these are created done after finishing the chart. Apart from making a Trend Line, this step was not taught in the Chapter on making charts. The step essentially creates

objects when formatting a data series. Therefore, the formatting of a data series can create objects…(more on this in the next Chapter)

In addition, many of the objects created in step three of the chart making process can be changed / deleted / added after the chart is made.

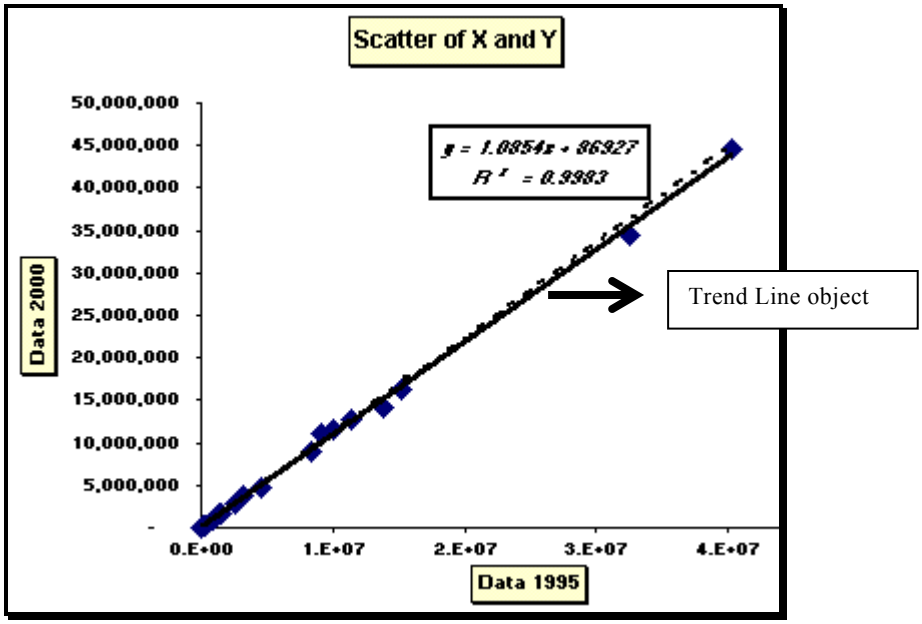
Objects that are created or that can be created after the chart is made (that is, after steps 1 –4 of the chart making process)

- Trend Line (only in Scatter, Line, Area and Bar charts; see 13.9)
- Y-Error Bar (only in Line and Scatter chart types; See page 184)
- X-Error-Bar (only for a Scatter chart; See page 192.)
- High-low Lines, up-down Lines, drop Lines (only in 2-Dimensional Line charts)

8.4 OBJECTS CREATED AFTER THE CHART IS MADE: "TREND LINE"

The "Trend Line" object is available in Scatter charts, Line, Column, and some other charts only. One of the charts in the sample file is a Scatter chart; the chart is reproduced below. (See chart "Trend Line" in the file "Charts File1.xls" or in "Scatter.xls.")

Figure 94: The "Trend Line" object is available in Scatter charts, Line, Column, and some other charts only

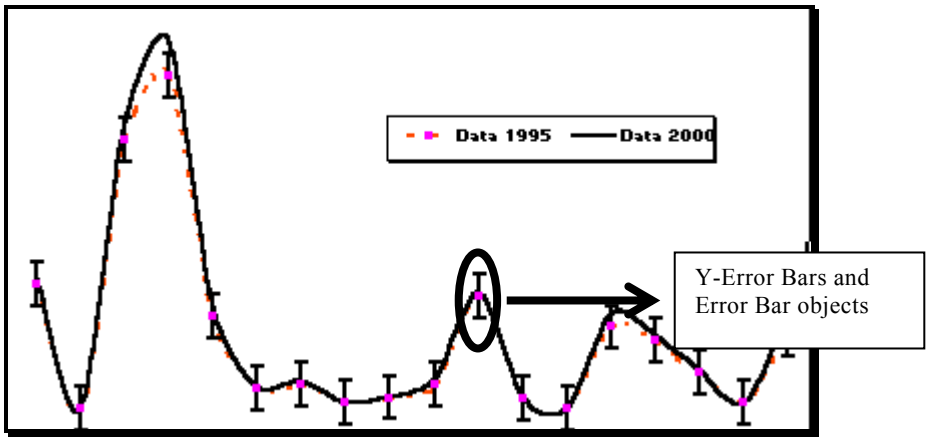


8.5 DATA SERIES SPECIFIC OBJECTS CREATED AFTER THE CHART IS MADE: ERROR BARS

The "Y-Error Bar**s**" object (and the sub-objects that constitute one Y-Error Bars – the Y-Error Bar objects, one for each Error Bar) objects is only available in some chart types (more about "Y-Error Bars" in a later Chapter). Open the file "Scatter.xls." The chart is reproduced in the next figure. I have added Y – Error Bars to the chart. The entire set of Error Bars make one "Y-Error Bars object." Each Error Bar is an object by itself – the "Y-Error Bar" object.

The "X – Error Bar" object is only available in a Scatter chart. Section 13.9 on page 194 shows how to make and use this object.

Figure 95: “Error Bars“ object



Page for notes

CHAPTER 9

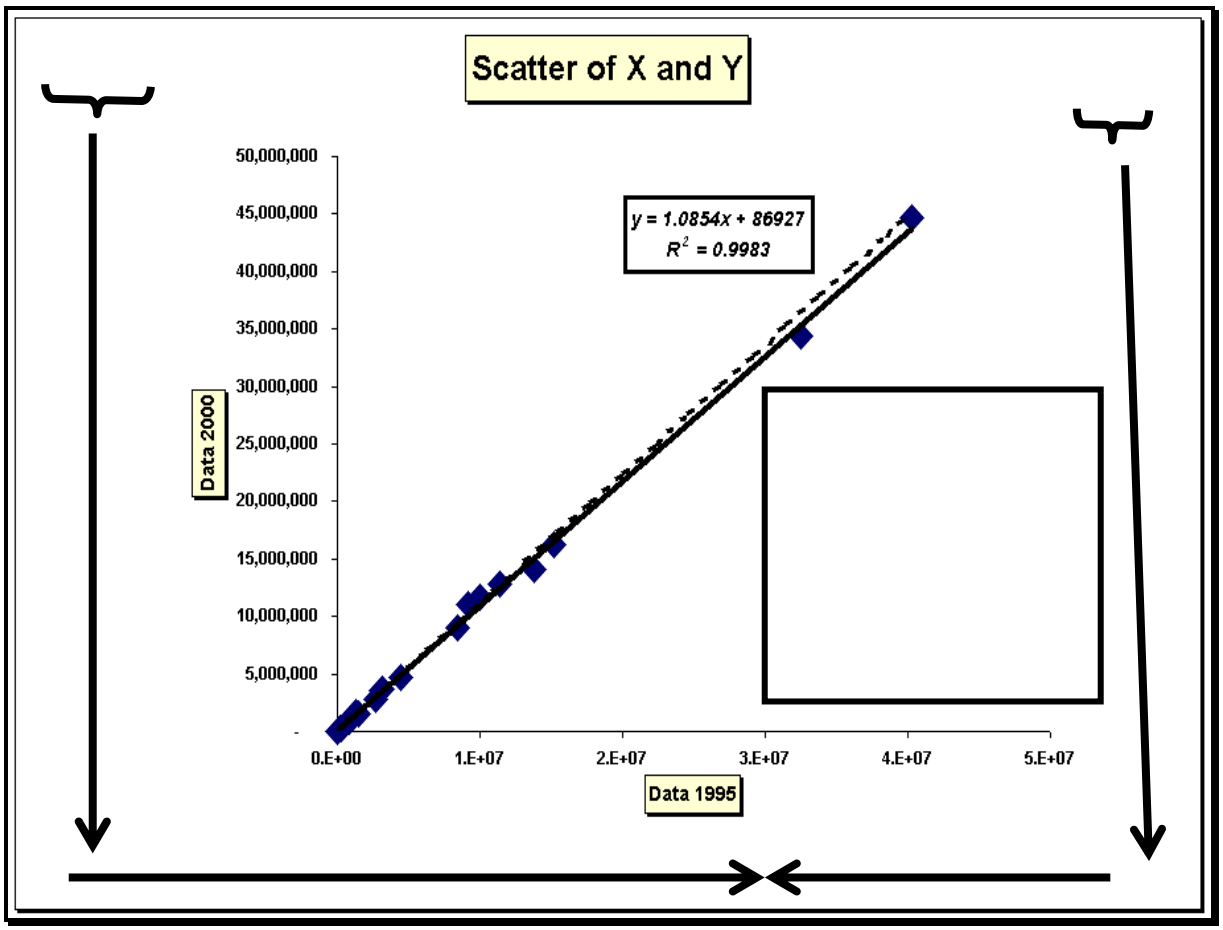
RESIZING, MOVING AND DELETING OBJECTS

9.1 CHANGING THE SIZE OF AN OBJECT

The objects whose size can be changed include Plot Area, all Titles (chart; X, Y and Z-axis), Legend, Legend entries, individual data labels, and the data series (or, more specifically, the size of the Columns / Lines / Slices that identify data series and points). In this section, I show how to resize the plot area. Typically, the reason for doing this is to use the space inside the chart more effectively.

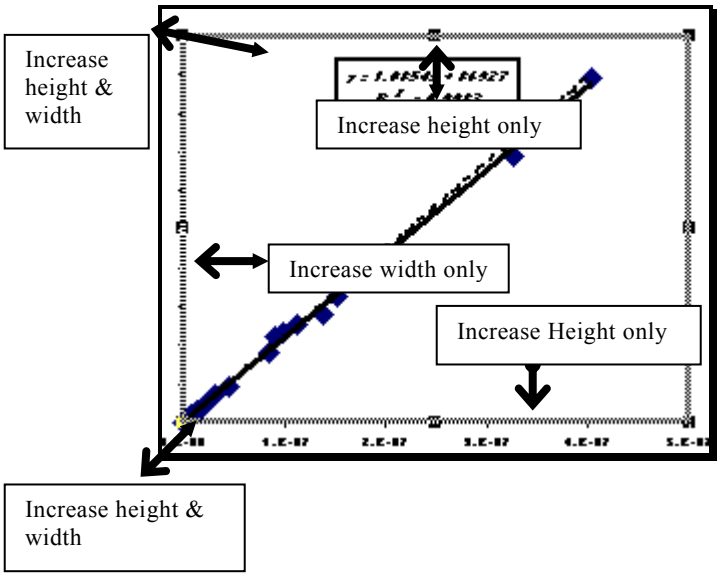
- Space may be wasted in the chart you constructed. In order to eliminate this waste, single-click on the "Plot Area," and use the mouse to make the Plot Area larger. This eliminates the wasted space between the plot and the edge of the chart. I use the example of the Scatter chart from the sample file. (See chart "Trend Line" in the file "Charts File1.xls.")

Figure 96: Sample of chart with wasted space – the dark arrows and rectangles cover the wasted space.



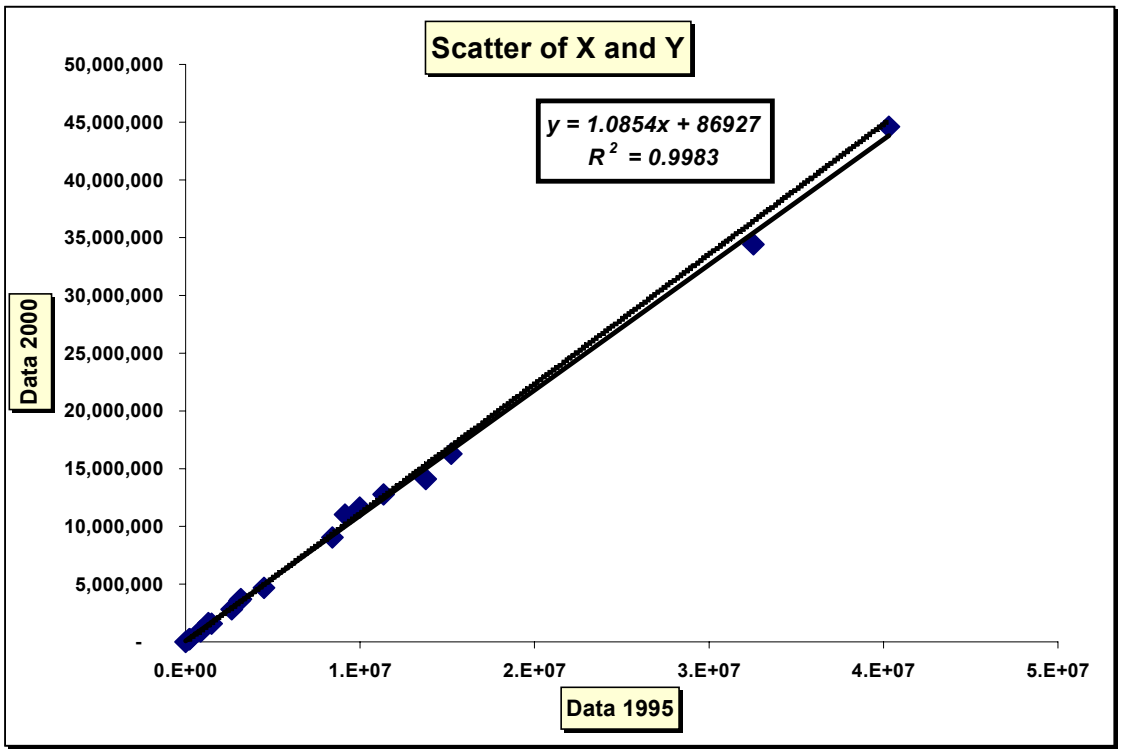
Move the mouse over the edge of the plot area. At certain points, arrows will show on the screen. The arrows will point in one of the eight directions shown in *Figure 97*. If you click at that point and drag the plot area using the mouse, the plot area will change size as you drag it. Leave the mouse after you have attained the desired size.

Figure 97: Expanding the Plot Area (relative to the Chart Area)



I have increased the height and width by dragging at the point where the arrow faces southwest. The result is shown in *Figure 98*.

Figure 98: The chart does not have wasted space on each corner



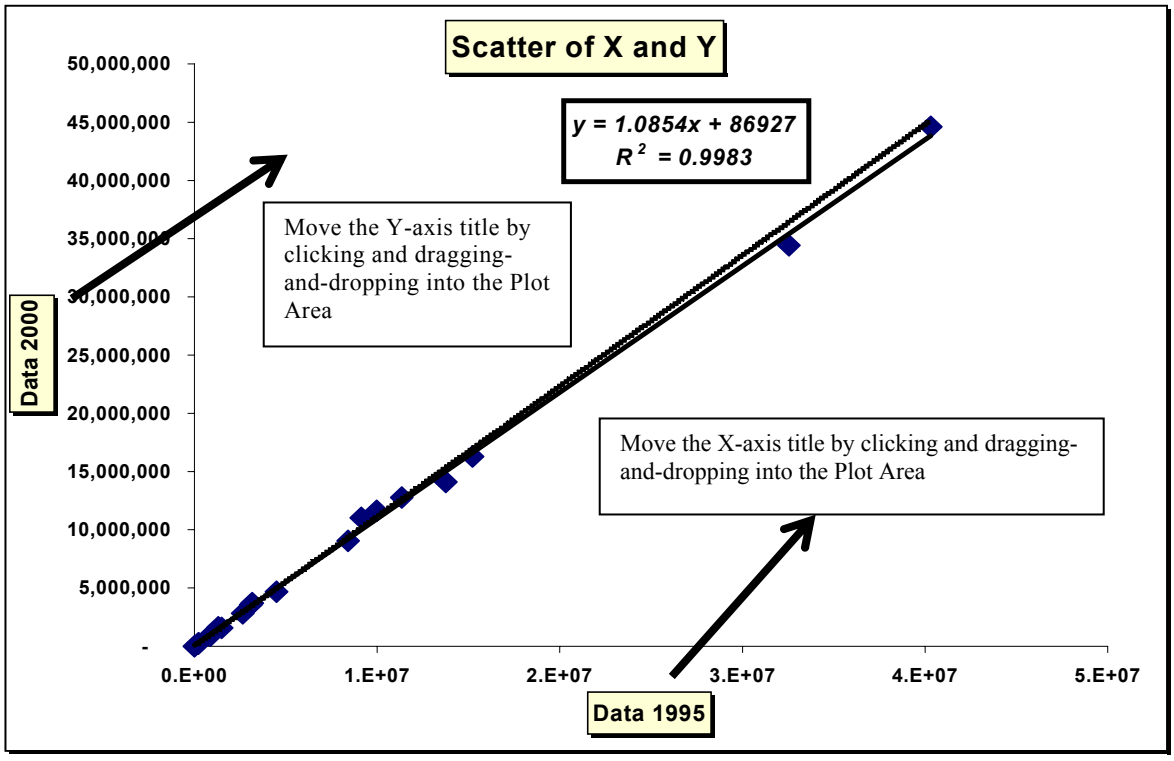
Compare the Plot Area in this figure with the one in *Figure 96*. The space that was wasted on the left, right, and bottom of the chart has been eliminated.

9.2 MOVING OBJECTS

Most of the objects can be moved to a different location within the chart by using drag-and-drop. The objects you can move include the Titles (chart Title; X, Y, Z-axis Titles), the Legend, and individual data labels. Below, I show an example of moving the X and Y-axis Titles. The moving of the Legend is shown in *Figure 131*. The moving of a data label is shown in *Figure 99* and the paragraph below it.

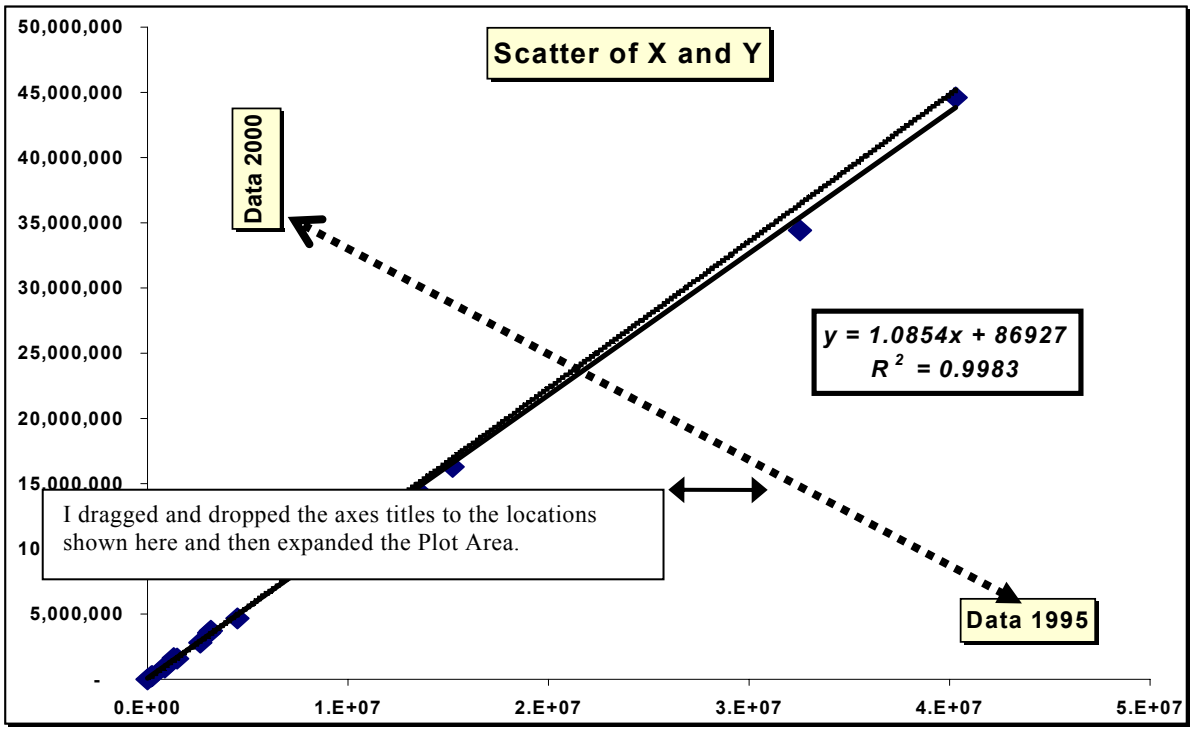
Open the chart "Trend Line" in the file "Charts File1.xls."

Figure 100: Moving the X and Y-axis Titles



The result is shown in the next figure.

Figure 101: The axis titles have been moved with the mouse thereby enabling a further expansion of the Plot Area



9.3 DELETING OBJECTS

Select the object and then click on the "delete" key will delete the object.

To delete multiple objects select multiple objects by pressing the SHIFT key and clicking on the edge of each object.

If you delete a "Broad" area object – like the "Plot Area" – then all objects within it (like the data series, axes, etc) are also deleted.

If you make a mistake, undo the delete by using "EDIT / UNDO."

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CHAPTER 10

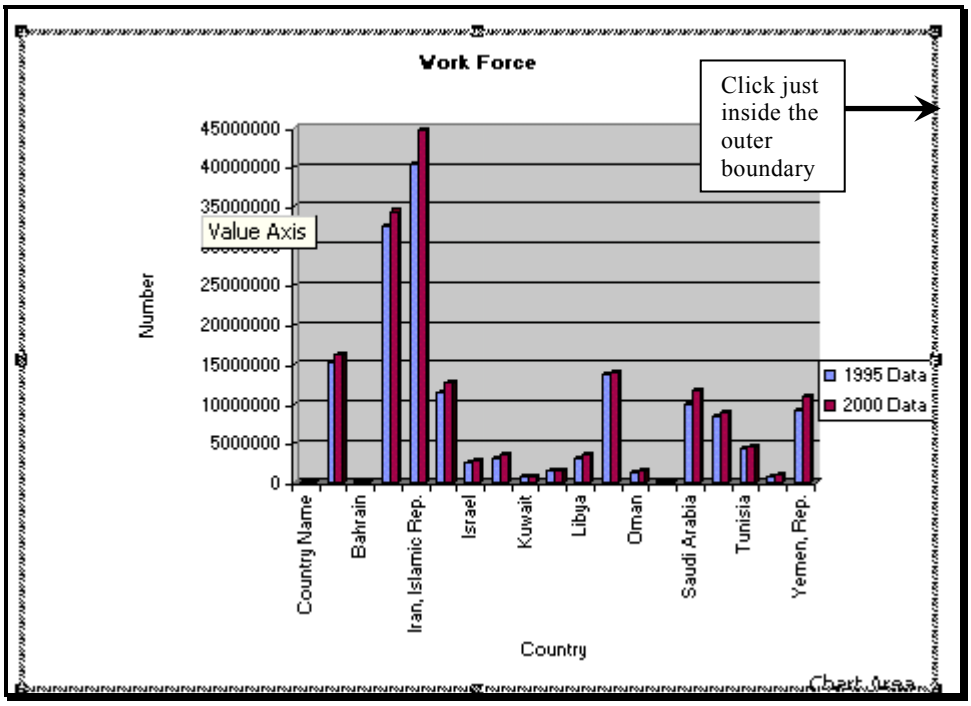
"DRILL DOWN" FORMATTING APPROACH –LARGER TO SMALLER OBJECTS

10.1 THE BROAD "AREA" OBJECTS ("CHART" AND "PLOT" AREA)

10.1.A CHART AREA OBJECT

Open the sample file "Charts File1.xls" and select the chart "Basic Column." Choose the entire chart by clicking on the edge of the chart. (In *Figure 102*, see the highlighted border around the entire chart and the label "Chart Area." This indicates that the entire chart is the 'active' or 'selected' object.)

Figure 102: The "Chart Area" object



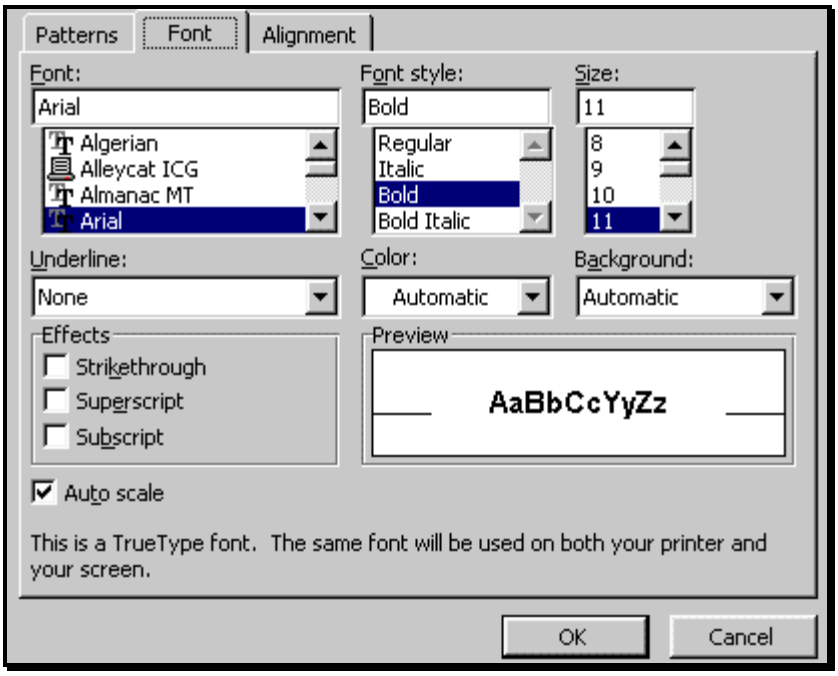
At this point, double click on the edge of the boundary. The dialog for formatting the entire chart area is shown[16] in the next figure.

The "Chart Area" object is the "container" that contains the other objects. Several of the formatting changes (especially in the font dialog) you make to the chart area are automatically applied to the objects contained within the chart. The font type and style you choose will be applied to the font of all objects within the chart. This includes the Title, axis Titles, axis (labels), Legend, data labels, data table, etc.

> Note: If you master the use of the "Font" tab for <u>one</u> object, then you will have mastered the use of the "Font" tab for all objects. On the other hand, the pattern tab can be very different for different objects. Therefore, you will need to learn it anew for some objects.

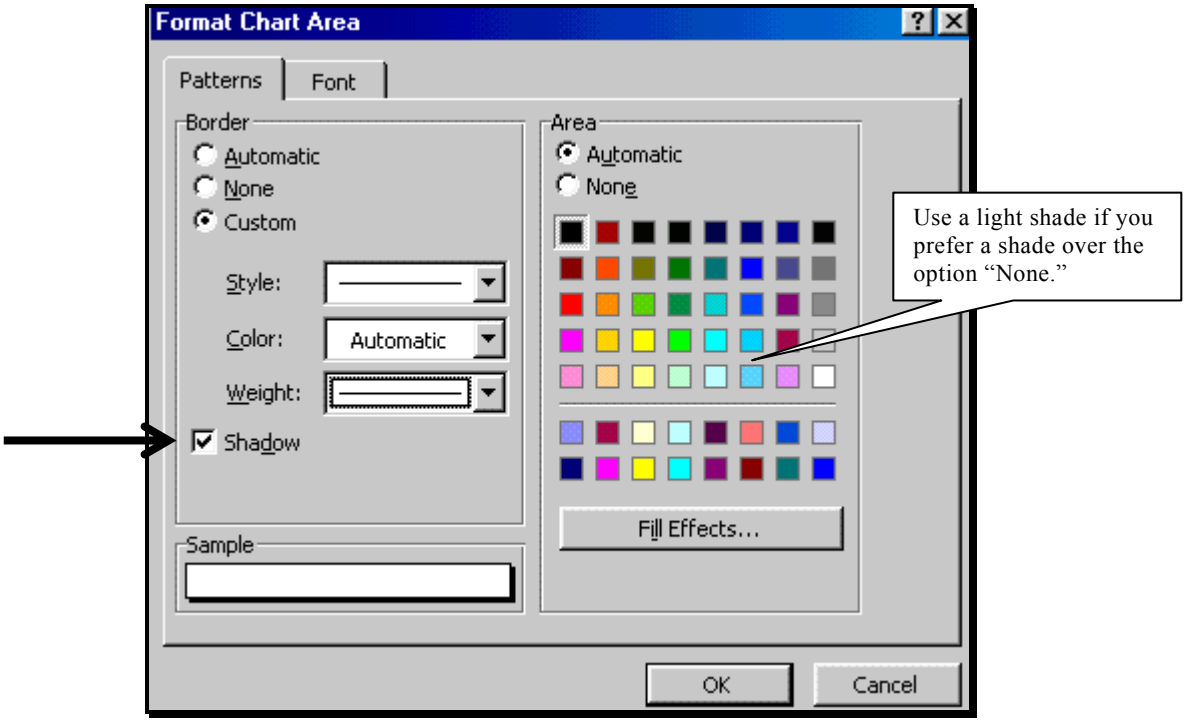
[16] If it does not show or some other dialog opens, then you have made an error in selecting the "Chart Area" object or in double-clicking. Try again.

Figure 103: The dialog for formatting the Chart Area



Click on the tab “Patterns.”

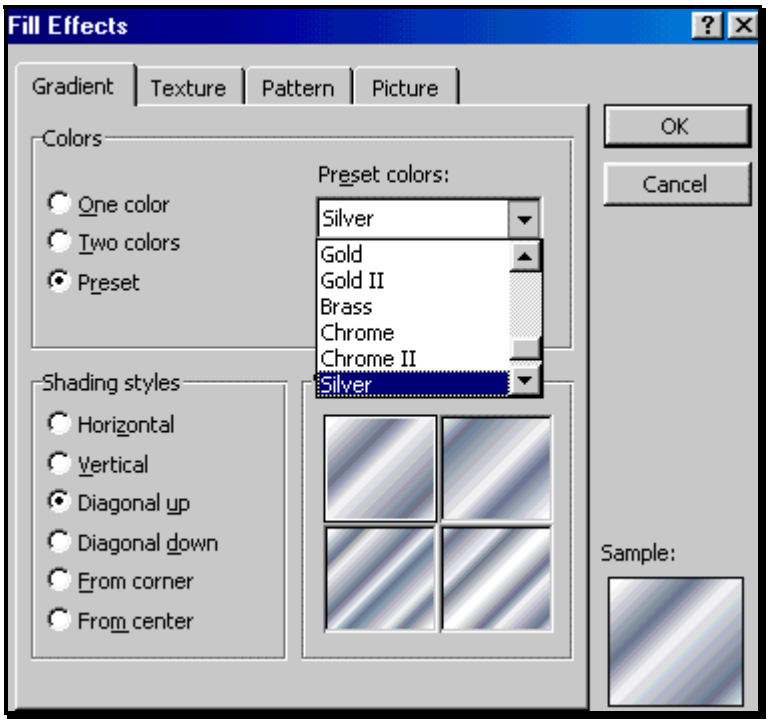
Figure 104: Formatting background patterns



In the area "Border," choose the option "Shadow" and a medium-thick Line "Weight." This gives a good "framed" look to the chart. (Especially useful if the chart is copied and pasted into a file in other software like Word.) In the right half of the tabbed dialog "Patterns," you set the background shade for the entire chart. I recommend choosing "None" or a light shade.

If you want to use a more hip background, click on the button "Fill Effects." The dialog shown in the next figure opens.

Figure 105: The "Gradient" fill/background choices



Several options are available. I list them below briefly[17]:

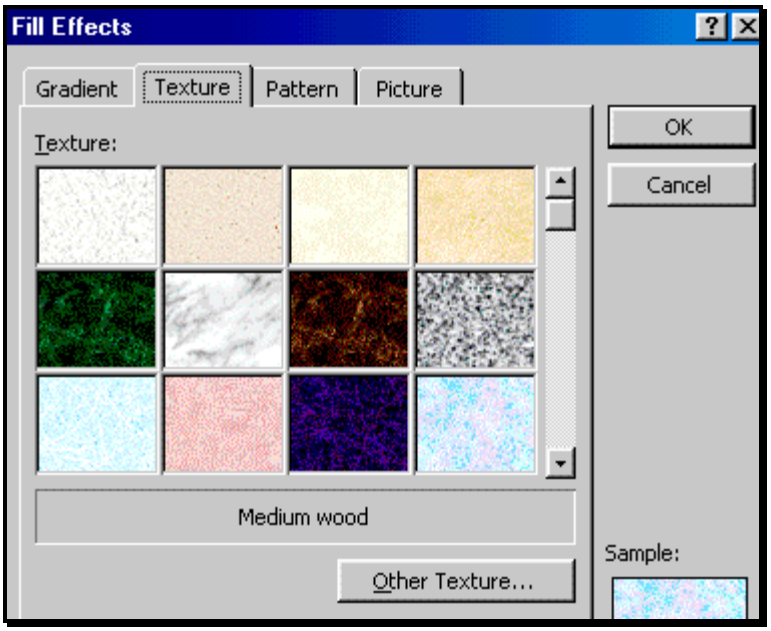
- You can choose a multi-colored gradient shade. Click on the tab "Gradient." (The dialog is shown in the previous figure.)

[17] Do not get too fancy if you are printing the chart in black and white.

- You can use one or two colors for the Fill Effect "color."
- The direction in which the fill shading and color gradient changes can be chosen using "Shading Styles."
- Experiment with the different options and see how the chart area background changes.
- I recommend choosing a light shade unless you are printing in color.

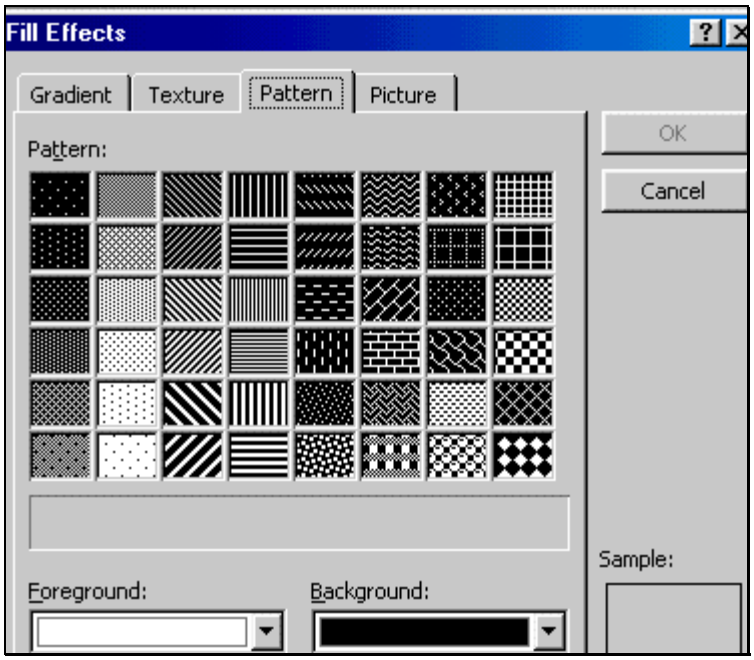
You can choose from several "textures" – as if you were at Home Depot (an American housing-ware store) shopping for tiles! Click on the tab "Texture" and choose from one of the options shown in the next figure. The textures take their inspiration from standard textures of wood tiles, stone tiles, etc.

Figure 106: The "texture" fill/background choices



Experiment with using the tabs "Pattern" (the dialog is shown in the next figure) and "Picture." The latter allows you to use a picture (such as a letterhead or logo) as the background pattern.

Figure 107: The "pattern" fill/background choices



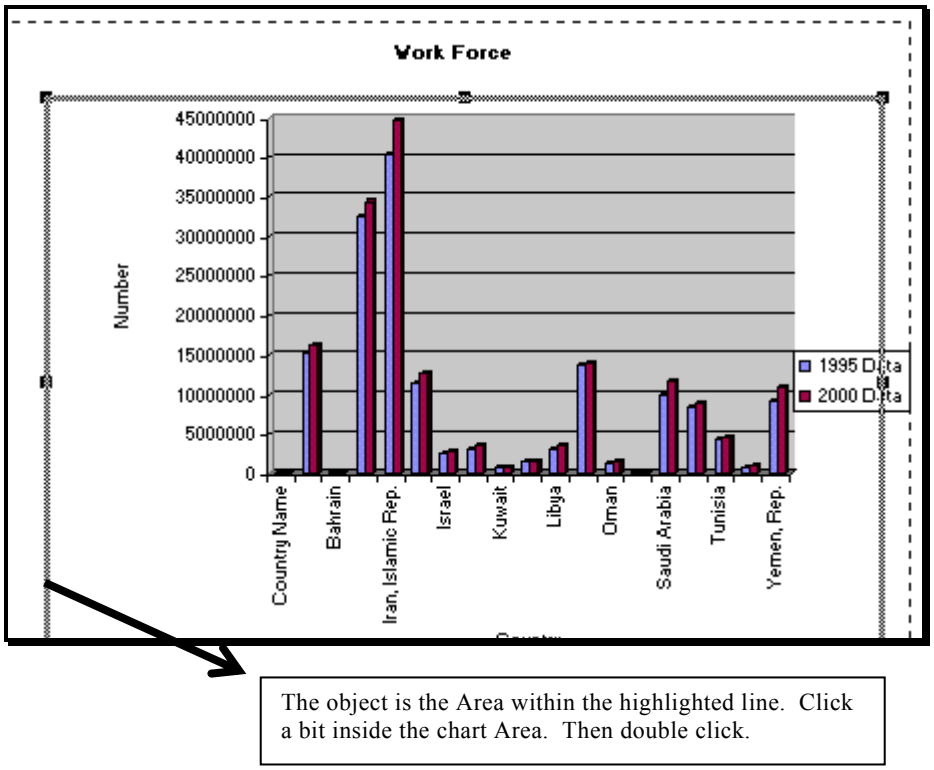
I will not repeat these background-shading options when showing how to format the "Patterns" of other objects because the options for shading are similar if not the same across objects.

10.1.A PLOT AREA OBJECT

Open the sample file "Charts File1.xls" and select the chart "Basic Column."

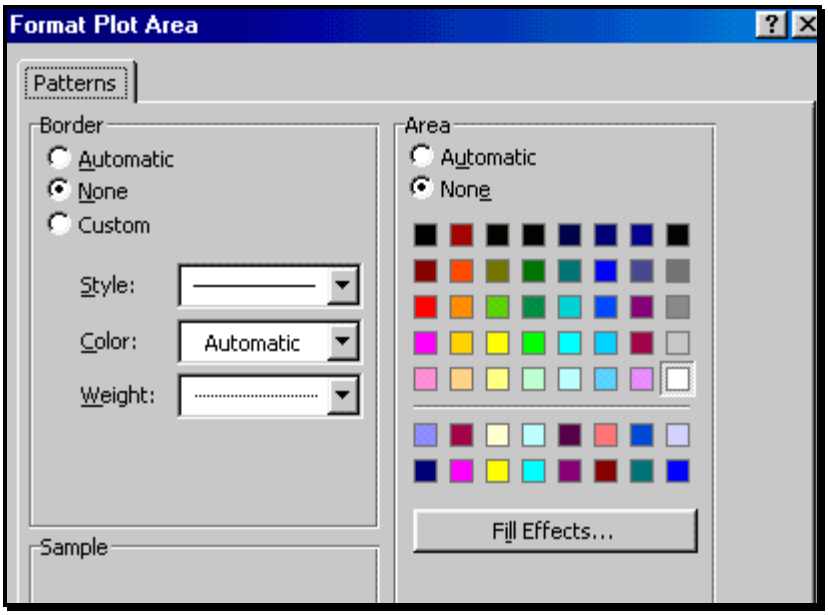
Choose the "Plot Area" by clicking a bit beyond the end of the actual plot as shown in Figure 108 but a bit above the actual plot and Axis Titles.

Figure 108 the "Plot Area" object



Double clicking on the highlighted boundary of the plot area will expose the "Format Plot Area" dialog shown in the next figure.

Figure 109: The dialog for formatting the Plot Area



If the dialog shown in the next figure does not open or some other dialog opens, then you have made an error in selecting the "Chart Area" object or in double-clicking. Try again. Note that the "Plot Area" lies within the "Chart Area." You may need to click several times before you choose the Plot Area correctly.

The "Format Plot Area" dialog has only one tab – "Patterns." Reasons: {a] The "Font" dialog is irrelevant to the object "Plot Area," and [b] the objects within the plot area have their own wide range of formatting options as you shall see in the rest of this Chapter and in the next Chapter.

For more on formatting the "Patterns" see the discussion on formatting the "Patterns" for the Chart Area.

I like to choose the "None" option for both, the "Area" border and the "Area" shading. Any pattern you apply for the plot area will overwrite the pattern you had applied to the whole chart using the "Chart Area" object within the plot area only.

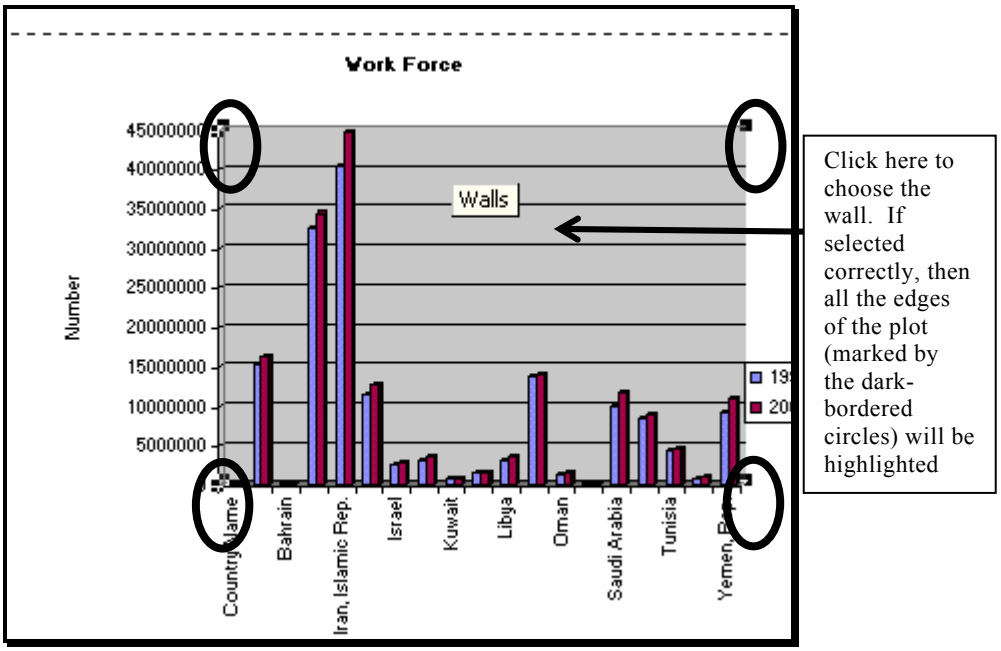
10.1 THE BACKGROUND OBJECTS – "WALL," "FLOOR" AND "GRIDLINES"

10.1.A WALL OBJECT

This object can be confused with the plot area object. The wall object is just one area inside the plot area. The plot area object includes the wall object and all the axes and their labels, the data series, Gridlines, and other objects linked to data series, and the floor of the plot.

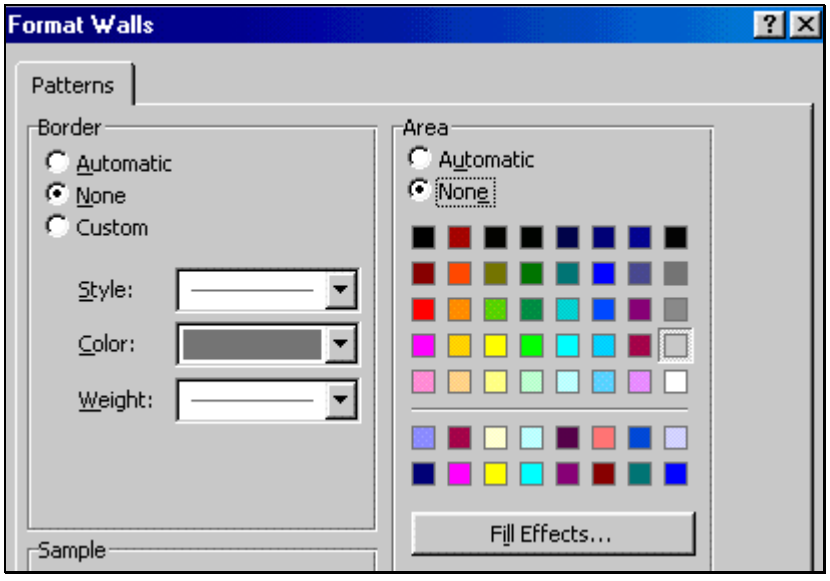
Open the sample file "Charts File1.xls" and select the chart "Basic Column."

Figure 110: Choosing the "Wall" object



Then double-click on the edge of the object. The "Format Walls" dialog shown in the next figure opens.

Figure 111: The "Format Walls" dialog



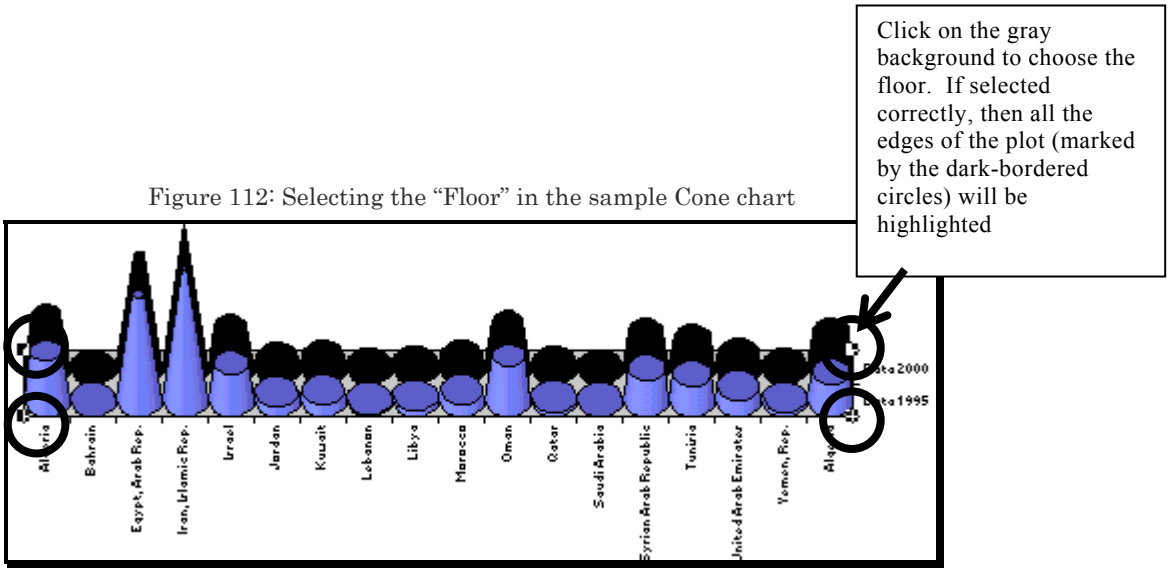
Tips for formatting the "Wall" object

I like to choose the "None" option or a very light shade for the border and area.

10.1.B FLOOR OBJECT

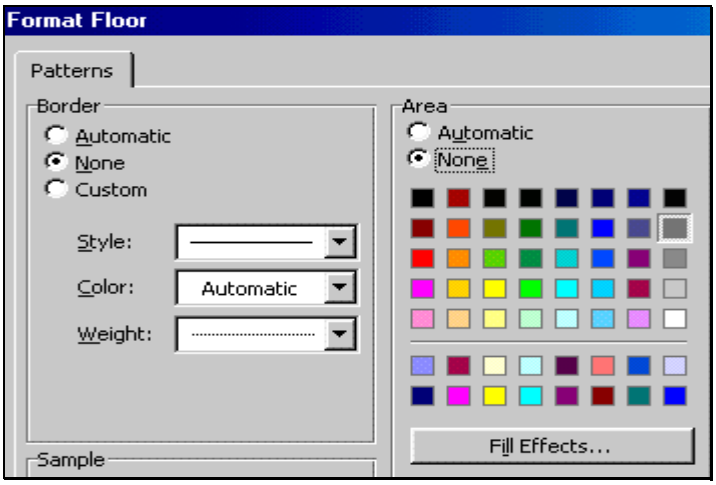
The floor object is only available for 3-Dimensional charts. Open the sample file "Charts File1d Custom Chart Types.xls" and select the chart "to Custom Cones."

Figure 112: Selecting the "Floor" in the sample Cone chart



When you double click, the dialog shown in *Figure 113* will open.

Figure 113: The "Format Floor" dialog

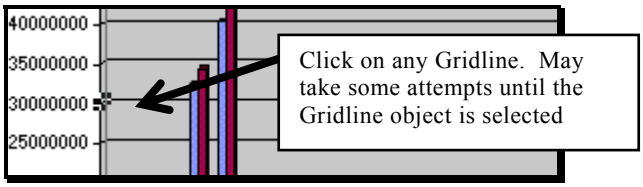


I like to choose the "None" option for the border and area. You may choose a light shade if printing in Black & White or a bright color if printing in color.

10.1.C GRIDLINES OBJECT

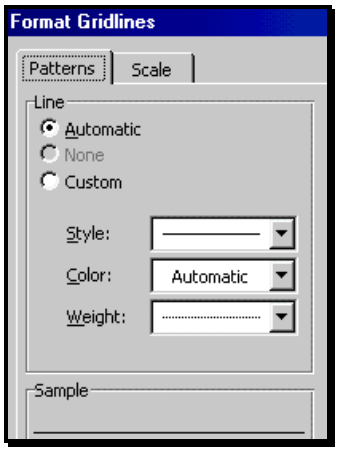
Open the sample file "Charts File1.xls" and select the chart "Basic Column." Click on any one of the Gridlines as shown in the next figure. Double-click on the highlighted Gridline.

Figure 114: Selecting the "Gridline" object



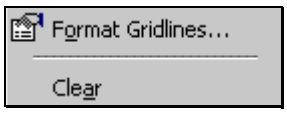
The "Format Gridlines" dialog is shown in *Figure 115*. It has two one tabbed dialogs—"Patterns" and "Scale." The options inside the "Patterns" dialog are simple and straightforward—the basic attributes of each Gridline.

Figure 115: The "Format Gridlines" dialog



I prefer to remove the Gridlines. To do that, click on any Gridline. Then click on the right half of the mouse and choose the option "Clear" as shown in the next figure.

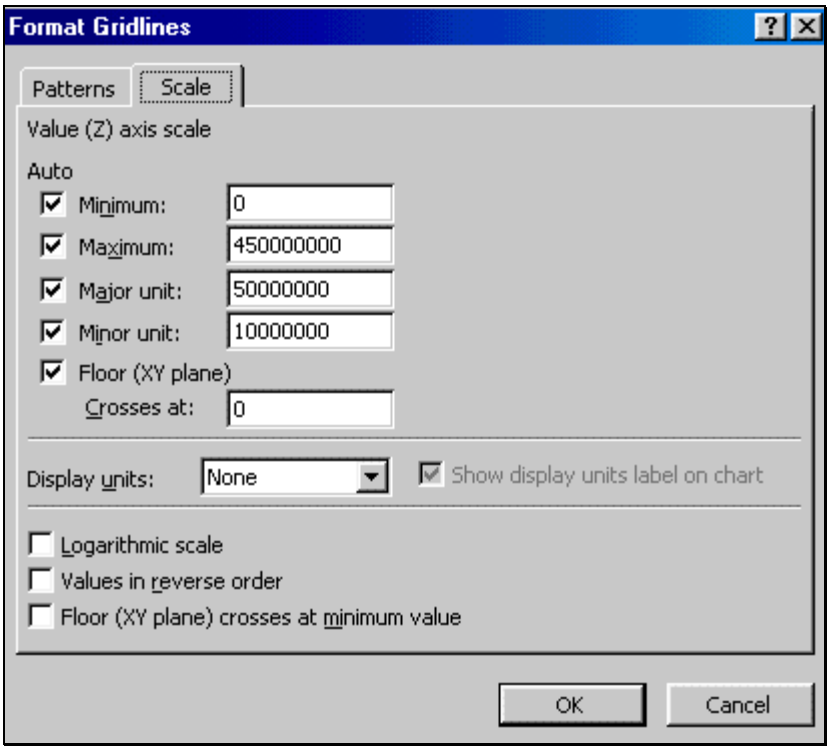
Figure 116: Deleting Gridlines



The tabbed dialog "Scale" is similar to the "Scale" tab in the "Format Axis" dialogs.

The dialogs are different for the X and Y-axis. Similarly, the "Scale" dialogs are different for X-axis Gridlines (Vertical) and Y-Axes Gridlines (horizontal), with each the same as the dialog in the format dialog of its axis. I will teach the use of these options in Chapter 11 on page 157.

Figure 117: The "Scale" options for the Gridlines object. Refer to the sections on the Axis objects to understand these options.



10.1 THE "TITLE" OBJECTS (TEXT BOXES)

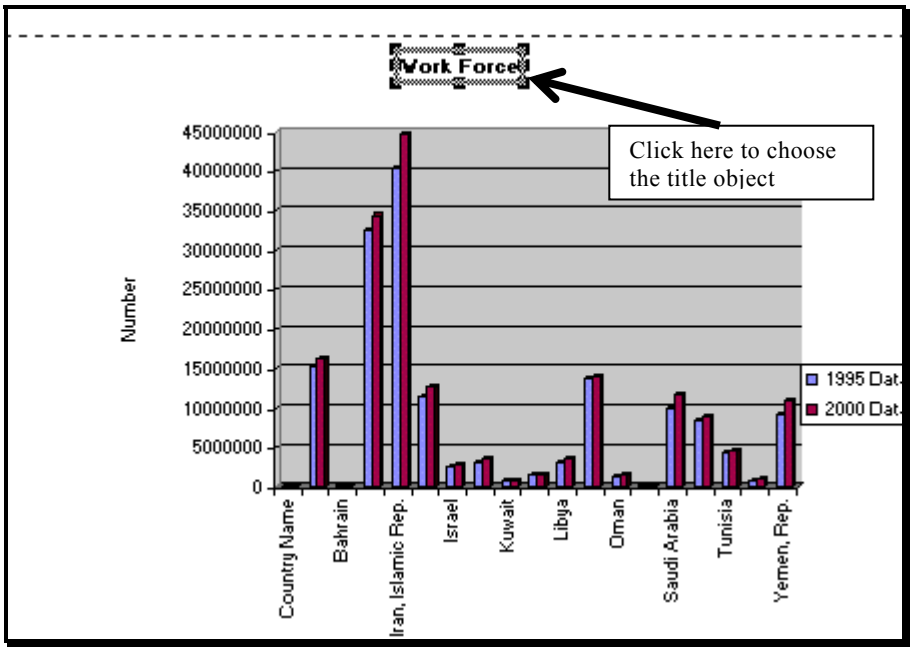
10.1.A CHART TITLE OBJECT

Open the sample file "Charts File1.xls" and select the chart "Basic Column."

Select the Title box "Work Force" by clicking just next to the Title text until you see a highlighted box around the Title text. (As shown in the next figure.) The highlighted box demarcates the area of the object "Title."

Now double click at the edge of the box around the Title text[18]. The dialog "Format Chart Title" opens; it is shown in *Figure 119*.

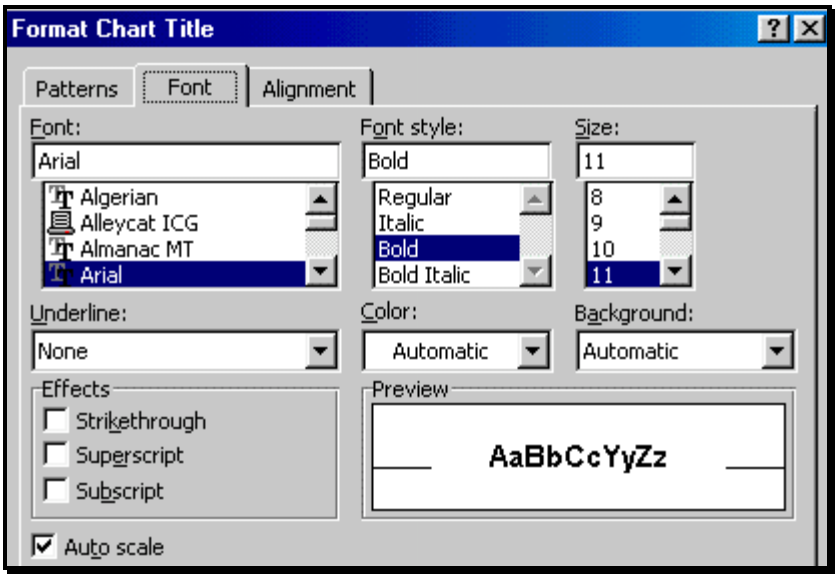
Figure 118: The "Chart Title" object



Excel has opened a dialog with tabs that are relevant for formatting the object selected. This dialog is different from the one that opened up when you double clicked on the chart area. It has tabs of relevance to the Title; the dialog for formatting the chart area had tabs relevant to the formatting of the chart area.

[18] If you want to change the text of the title, then single click inside the highlighted Area.

Figure 119: The “Format Chart Title“ dialog



I recommend a large font size, possibly in bold style.

Click on the tab “Patterns“ and choose a light colored background (that is different from the background of the rest of the chart) and a border with shadow. For more on choosing the options in “Patterns” see section 10.1.a on page 135and the accompanying discussion.

Figure 120: The "patterns" tab in the "Format Chart Title" dialog

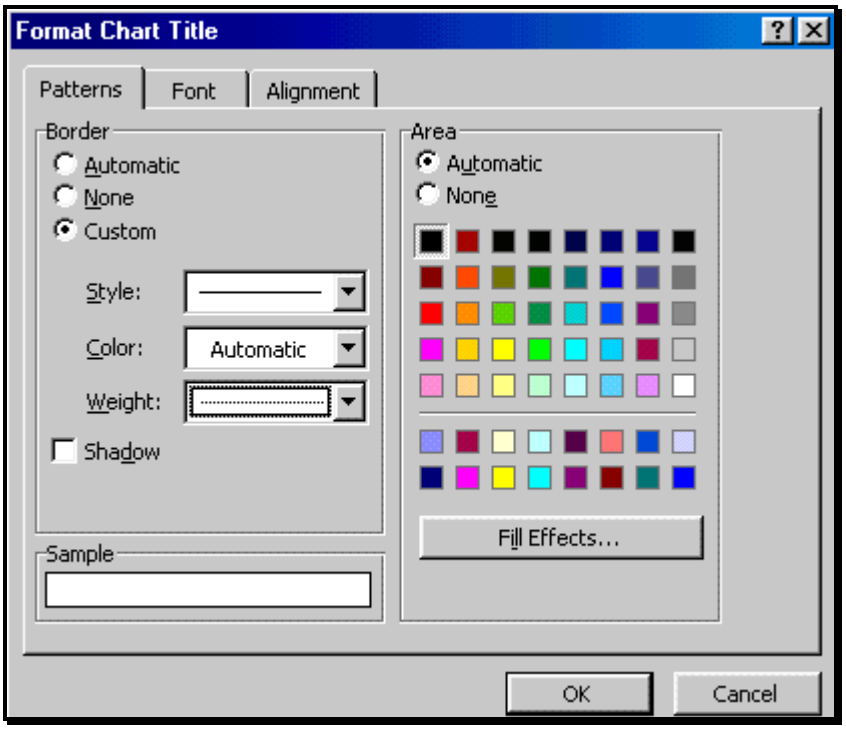


Figure 121: Choosing the border size and the shadow option for a title box

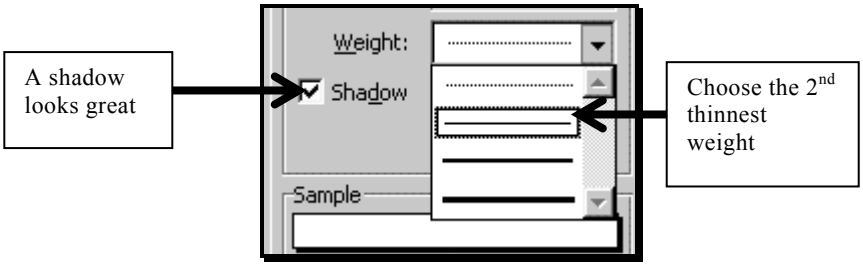
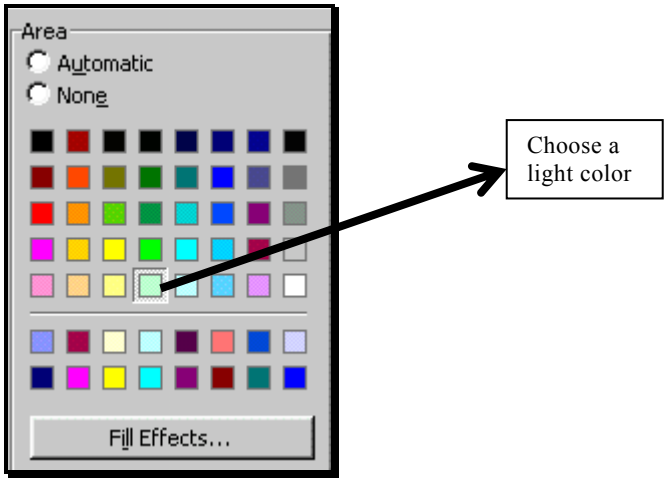


Figure 122: Choosing the background/fill for a title box

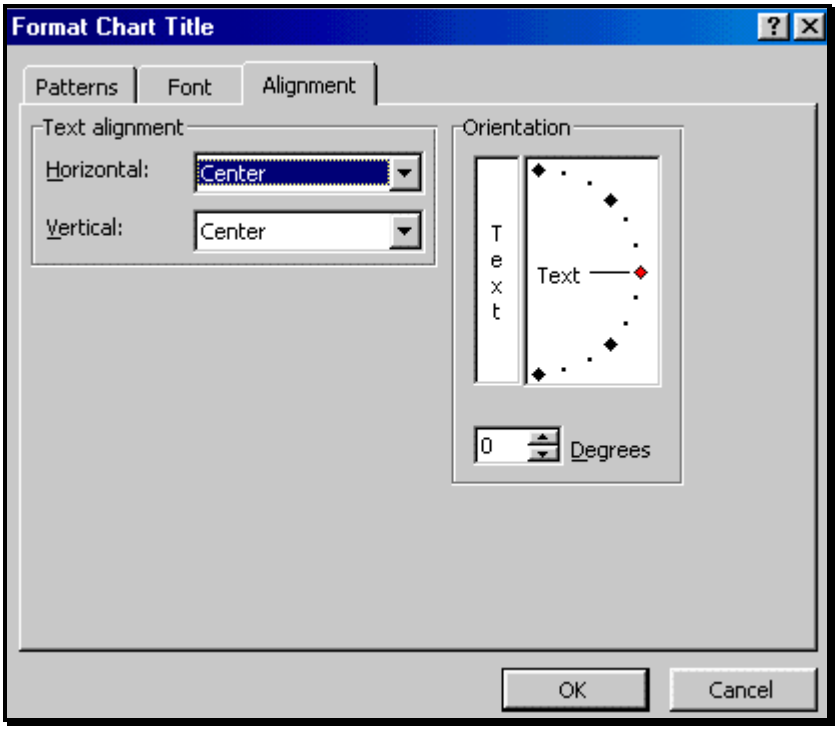


Click on the tab “Alignment” and choose the two aspects of alignment:

In the area “Text Alignment,” choose the horizontal and vertical alignments of the text. The alignment is with reference to the box that contains the text. The three options for vertical alignment are top, center, and bottom. The options for horizontal alignment are left, center, and right. If the vertical alignment option is set to “top” then the text will be attached to the roof of the box. If you have a box that is larger than needed for just fitting the text, then the bottom of the box will have empty space while the top will not have any empty space.

Try out different settings and see which one(s) you like. I recommend using the alignment option “Center” (for horizontal and vertical alignment) because this gives the box symmetry around the text.

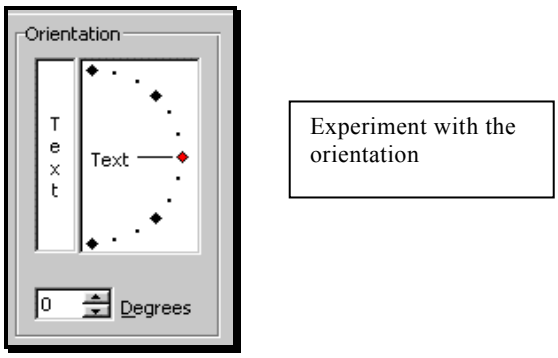
Figure 123: Choosing the “Alignment” of text within the title box



[2] Setting the ‘angular’ orientation of the Title text box. The text box can be placed at any angle between 0 and 180. You can make the change by

either clicking on & dragging the Line marked in the area Orientation or by changing the degrees in the box "Degrees." I recommend sticking with the default.

Figure 124: The "Orientation" of the text within the title box



Click on the button "OK." The Title text object will be formatted. The result is shown in the next figure.

Figure 125: The formatted title box

10.1.A AXIS TITLE OBJECT

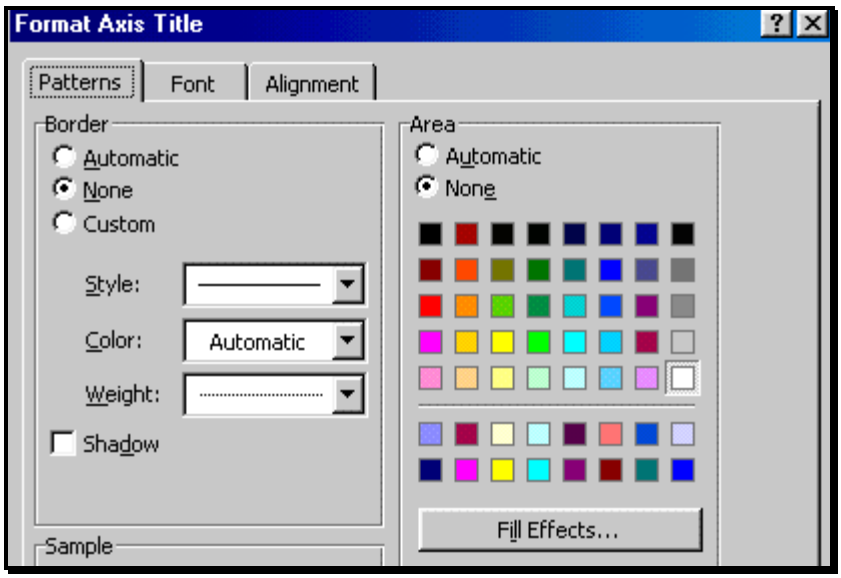
Open the sample file "Charts File1.xls" and select the chart "Basic Column." Click at the edge of the Y-axis Title object as shown the next figure.

If you master all dialog tabs for one Title object, then you have learned them for all Title objects!

Figure 126: The title box for the vertical Y-axis

The Format "Axis Title" dialog opens. It is identical to the chart Title object discussed in the previous section. Follow the steps learnt in the previous section.

Figure 127: The "Format Axis Title" dialog



10.2 USING THE F4 KEY TO SAVE TIME AND REPLICATE FORMATS

After formatting the Chart Title object, just click on the Axis Title object and press F4. Choose the menu option the X Axis Title object and again press F4… The format of the Chart Title box will be replicated on the two Axis Title objects! (Usually, you will not want to replicate the entire format, especially the font size.

The way I do it: I click on the Title text box, format the patterns (border and shading), and Execute the dialog by clicking on the button "OK." Then I choose the menu option the first Axis Title object, select it, and press F4. Only the patterns are replicated; the font is not.

I then choose the menu option the next Axis Title object, select it, and press F4. Then I format the font of this Axis Title, click on the button "OK," and choose the menu option the other Axis tile, select it and click on F4.

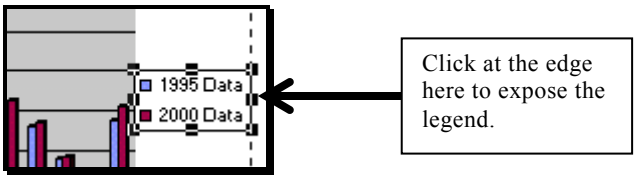
> Using the F4 key saves a lot of time. If you want the same pattern for the Plot Area object, the Chart Title object, and the Axis Title object, you only need to format the pattern for one of them. Then just select the others, one by one, and press F4.

10.3 THE "LEGEND" OBJECTS

10.3.A LEGEND OBJECT

Open the sample file "Charts File1.xls" and select the chart "Basic Column." Select the Legend object by clicking at its edge. You have selected correctly if the edges of the Legend are highlighted as shown in the next figure.

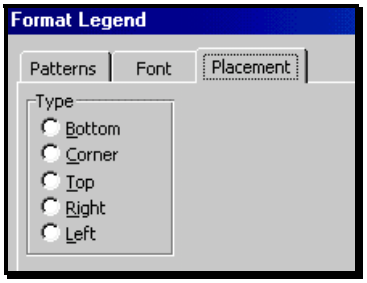
Figure 128: Choosing the "Legend"



Double clicking on the Legend will expose the "Format Legend" dialog shown in the next figure. This dialog has a tabbed dialog that is unique among al the objects in the chart—"Placement." As shown in the next figure, you can choose to place the Legend at different parts of the chart. (If you change the placement to, say, bottom, then Excel will move up the other objects that are currently at the bottom (like the X-Axis Title object and the X-Axis object itself), reduce the height of the plot area but make it

wider to use the space created by the moving of the Legend object from the right corner.

Figure 129: The "Format Legend" dialog



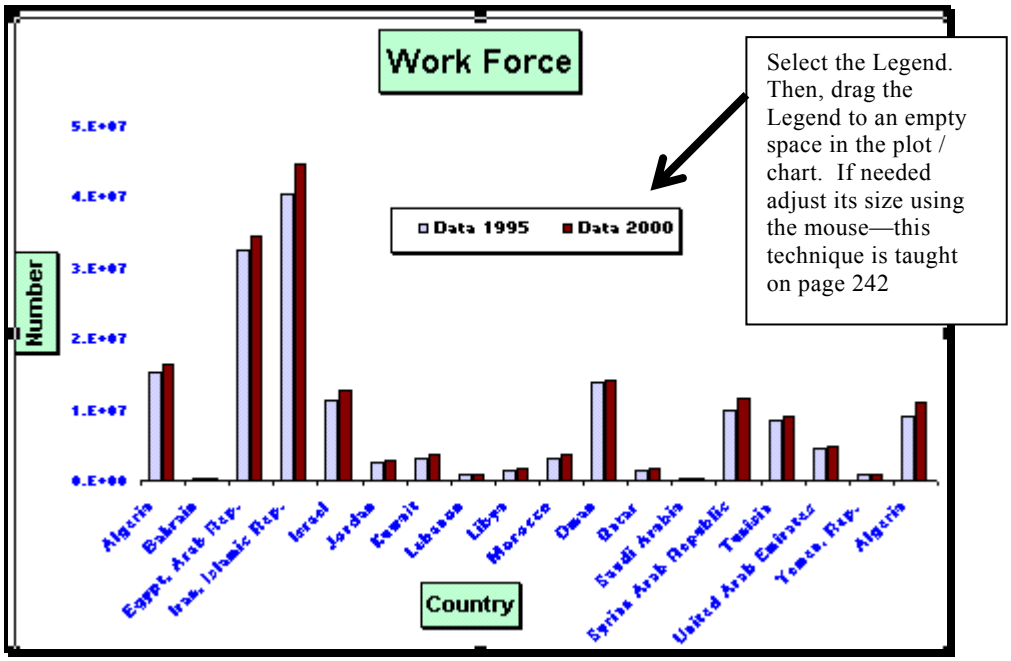
Tips

Increase the font size and make it bold. This may clutter up the Legend object as each Legend entry object has expanded but the Legend box has not. Use the mouse to expand the size of the Legend box. See page 123 for the instructions on resizing an object.

Figure 130: A "Legend" in need of resizing…

Choose the placement and size of the Legend box by using the mouse. After clicking once on the Legend, drag it with the mouse and place it in a location you like. A good location is any empty space on the plot itself. (The reclaimed wasted space can be used to enlarge the plot area.)

Figure 131: Using the mouse to place the Legend onto an empty place on the plot



10.3.B LEGEND ENTRY OBJECT

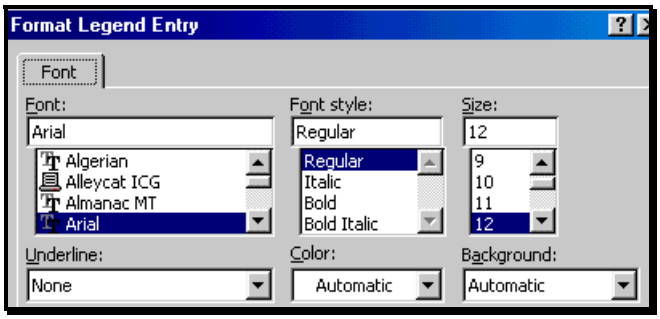
Open the sample file "Charts File1.xls" and select the chart "Basic Column."

After clicking and selecting the Legend, click on one of the Legend entries. Only one entry will be selected as shown in the next figure

Figure 132: Selecting an individual "Legend Entry" object

Double clicking on the object will open the "Format Legend Entry" dialog. The dialog has only one tab – "Font." Experiment and see if you prefer a different font type, size, color, etc.

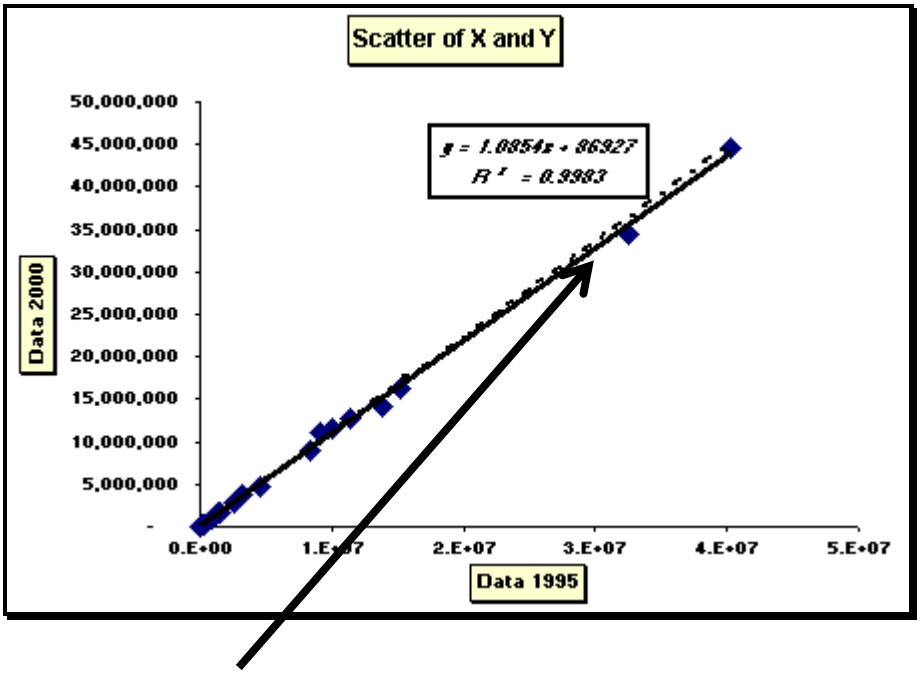
Figure 133: The "Format Legend Entry" dialog



10.1 TREND LINE OBJECT (WITHIN A SCATTER, LINE, BAR OR COLUMN CHART)

Open the sample file "Scatter.xls."

Figure 134: The Trend Line object

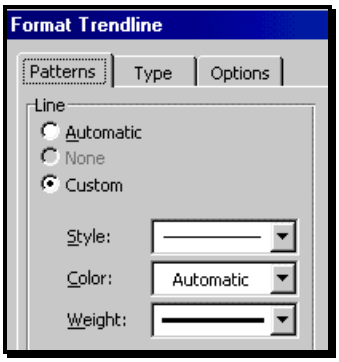


Click on the line. Then double click.

The formatting dialog has three tabbed dialogs. The "Patterns" dialog can be used to format the Line representing the trend. (This is more important if there are several trend Lines on, say, a Line chart. You want each trend Line to have a different look / color / width for easy identification.)

The other two tabs bring back the options in the "Make Trend Line" dialog. These are not formatting options; instead, they are the technical options for trend estimation. (Already discussed when showing how to make a Trend Line on page 62.)

Figure 135: The "Format Trendline" dialog



10.2 TABLE OPTION: (DATA) TABLE OBJECT

In step 3 of the chart-making wizard, you can select to create a table containing the data used for the chart. (This option may not be available for certain chart types.)

An example is provided in sample file "Charts File1.xls." Select the chart "Data table." (The chart is reproduced in the next figure.)

Figure 136: A chart with a “Data Table“ object

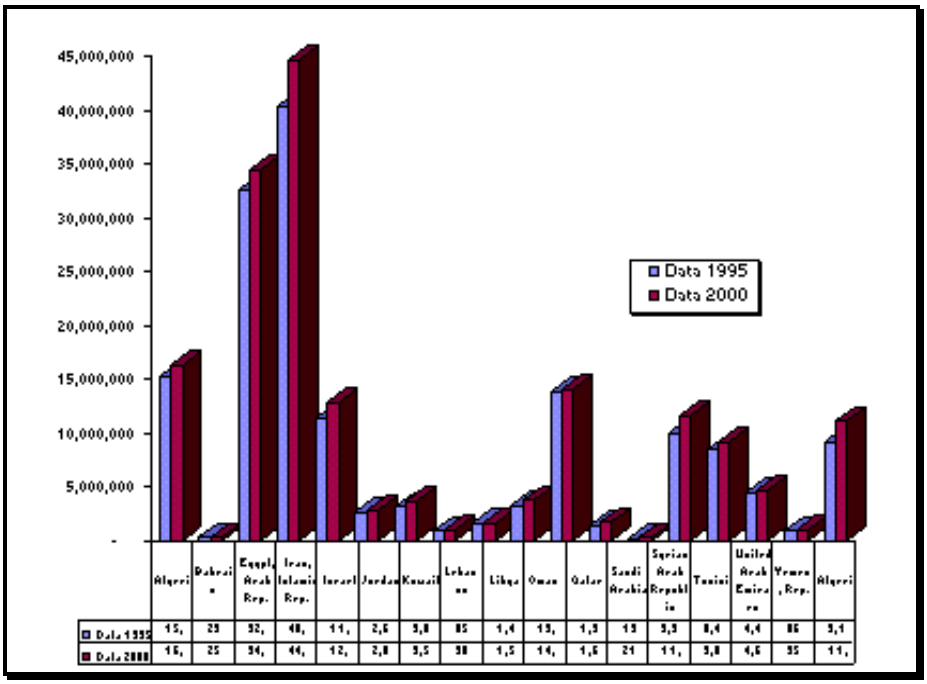
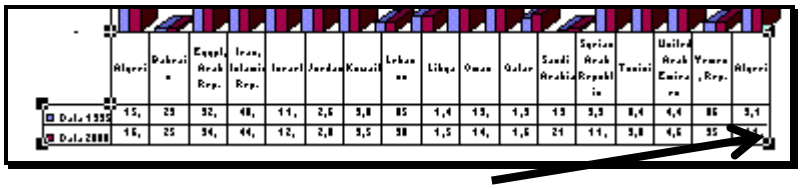


Figure 137: Selecting the “data Table”

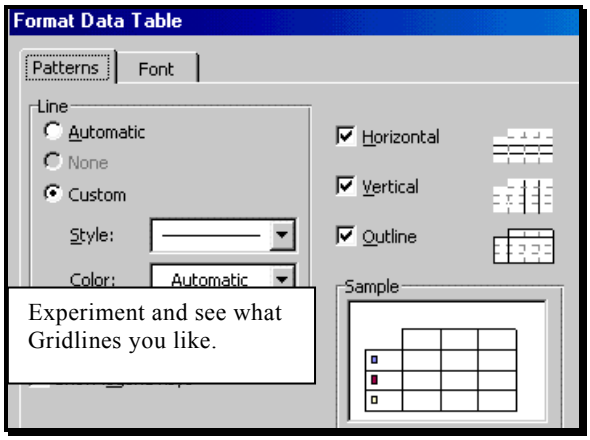


Click on the edge of the table. Then double click.

The “Patterns“ dialog tab is different from that for the other objects. The dialog is shown in the next figure. The Data Table object is a table; the objects encountered before were either text boxes or drawing objects. Use the patterns dialog here to set the style (the three available styles are inside the dark rectangle) and the style, color and thickness (“Weight”) of the table cell borders.

Execute the dialog by clicking on the button “OK.”

Figure 138: Setting the line patterns for the gridlines of the Data Table object



Page for notes

CHAPTER 11

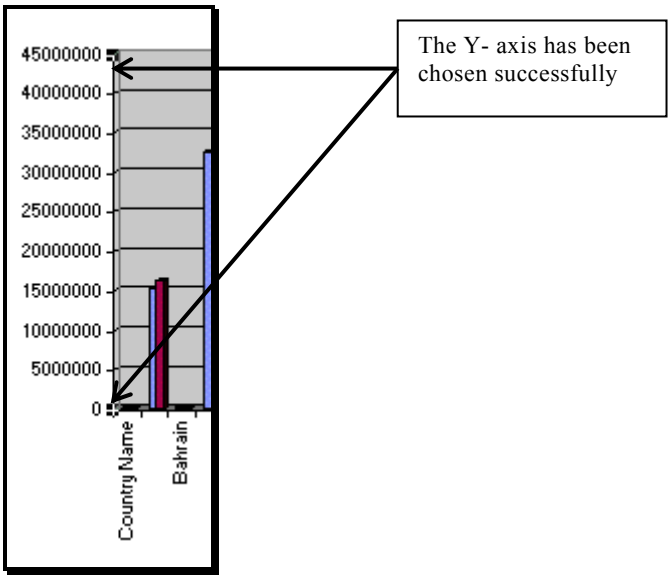
THE "AXIS" OBJECTS ATTACHED TO EACH AXES

11.1 AXIS OBJECT (Y-AXIS OR VALUE-AXIS)

Formatting the axis is probably the most important aspect of formatting a chart. To choose an axis, click on it until the axis Line is highlighted– see the next figure. (You may have to single-click several times on an axis Line until the axis is correctly chosen.) Open the sample file "Charts File1.xls" and select the chart "Basic Column."

The "Format Axis" dialog is shown in Figure 140. Click on the tab "Patterns."

Figure 139: Selecting an axis



11.1.A PATTERNS

Figure 140: The "Format Axis" dialog for the Y-axis

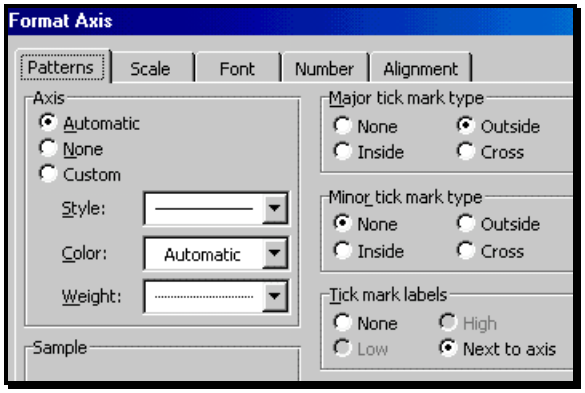


Figure 141: Choosing the "tick mark types" to 'notch' the Y-axis, and selecting the position where the labels are placed

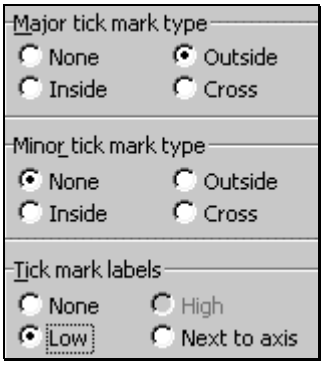
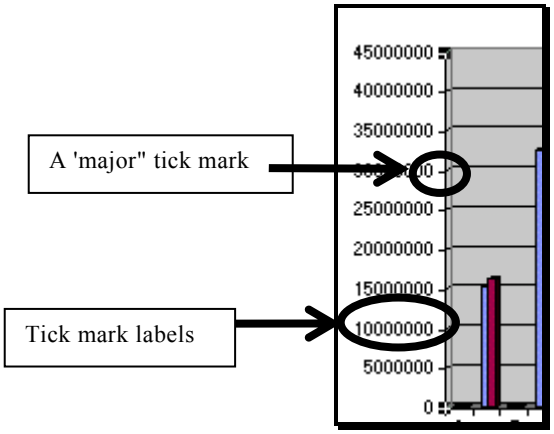


Figure 142 : The "Axis" object



11.1.B SCALE

Click on the tab "Scale." This is the most important part of the "format axis" dialog. (See *Figure 143*.) Note that the options shown will depend on your chart type and the axis chosen.)

- Minimum: change this if a large part of the plot area is empty (for example, if the lowest data point is at 20000000.

- Maximum: you may want to increase this if too many data points are clustered at the top.

- Note that, the maximum always has to be greater than the minimum.

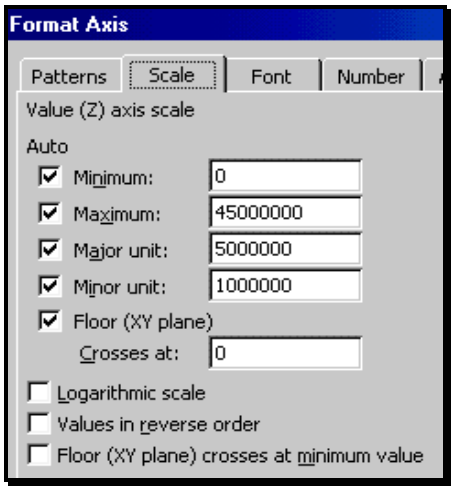
- The "Major unit" defines (a) the height at which a new "major" tick mark is created (as well as its accompanying tick mark label), and, (b) the height at which each "Major" Gridline is created (if you choose to use such Gridlines.)

- The "Minor unit" defines (a) the height at which a new "minor" tick mark is created (between each of the major tick marks), and, (b) the height at which each "Minor" Gridline is created between each of the "Major" Gridlines (if you choose to use such Gridlines.)

- The major unit has to be a multiple of the minor unit. Typically, you will not want to use "minor" tick marks or Gridlines; so, the choice of the minor unit is not so important.

- "Floor (XY plane) crosses at" – this option allows you to customize the Y-Axis value at which the X-axis intersects the Y Axis. The default is zero. Sometimes your chart may be more illustrative if you use a different intersection point.

Figure 143: The "Scaling" options for the Y or other value axis

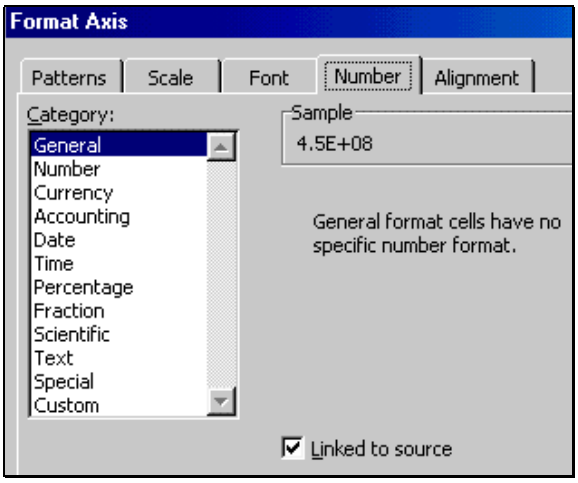


- If the Y-Axis minimum is non-zero, and you want the X Axis to intersect at this minimum and not at Zero, then you can choose the option "Floor (XY plane) crosses at Minimum." (You define the minimum in the first text box of this dialog.)

- The "Logarithmic Scale" option re-bases the Y-Axis values to the log of 10. That is, each Y – Axis value is now a power of 10. A detailed description of this feature is beyond the scope of this book.

- The "Values in reverse order" option switches the ordering of the Y – Axis values. The minimum is now at the top of the plot and the maximum at the bottom. The X-Axis is not affected.

Figure 144: Choosing the numeric format for displaying values on the axis



11.2 AXIS OBJECT (X-AXIS OR CATEGORY-AXIS)

Open the sample file "Charts File1.xls" and select the chart "Basic Column."

11.2.A PATTERNS

The options are similar to those for the Y-axis. Refer to section 11.1.a on page 158.

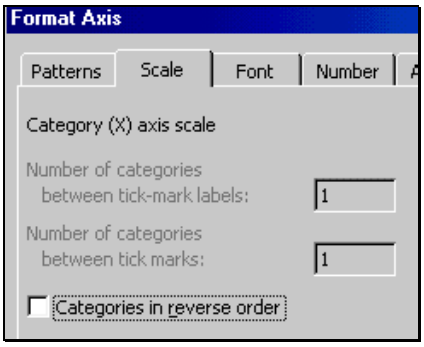
11.2.B SCALE

The category axis defines the location of each of the categories of the X variable. Because the axis contains categories (and not values), the options for "Scale" for the X-axes differ from those for the Y or Value axis. (See previous section – 11.1.b on page 159 for the options for scaling the Value Axis object).

In the example chart I am using, only one option is available under "Scale." The option "Categories in reverse order" does just that – it reverses the order

of the categories, as displayed left to right. The X-Axis or Category Axis options are more useful if the category axis is a logical series like "years" or "income levels." Then left to right can be "earliest to latest" for "years" (or "lowest to highest" for "income levels") or, using the option "Categories in reverse order," "latest to earliest" in "years" or "highest to lowest" in "income levels." The "reverse" order may provide a better graphical depiction of the issue at hand.

Figure 145: The "Scaling" options for the X or category axis



If the number of categories is large (say, for example, the years from 1930 to 2000), then you may not want to display all the category tick marks and labels. Doing so may create too much clutter. You may prefer to choose (for example) "10" in the box "Categories between labels" and (for example) "5" in the box "Categories between tick marks." The axis will then display tick marks for every 5th year and the labels for every 10th year. The axis will look like:

Figure 146: Reducing the number of categories displayed on the chart

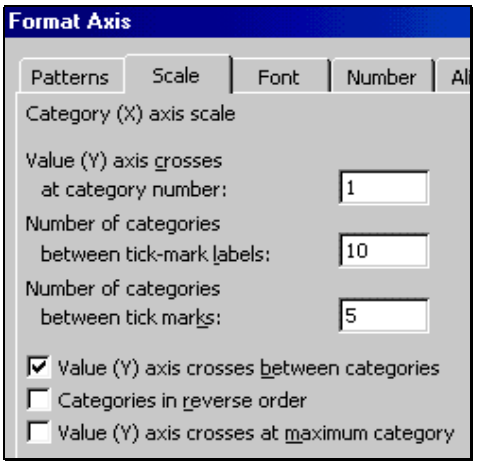


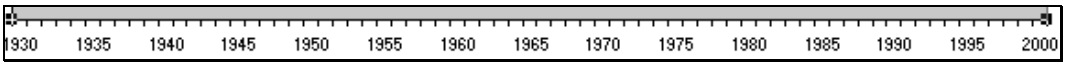
Figure 147: Scaling with a large number of categories between labels

Compare to the clutter in the next figure.

Figure 148: Scaling with a few number of categories between labels – makes the chart cluttered

Another option: choosing the options "5" categories between "Tick mark labels" and "1" between "Tick marks" gives:

Figure 149: Another option for scaling



Page for notes

CHAPTER 12

FORMATTING THE DATA SERIES AND DATA POINT OBJECTS

The data series and data point objects differ widely across chart types. Apart from "Patterns" and "Data labels," the options differ across chart types.

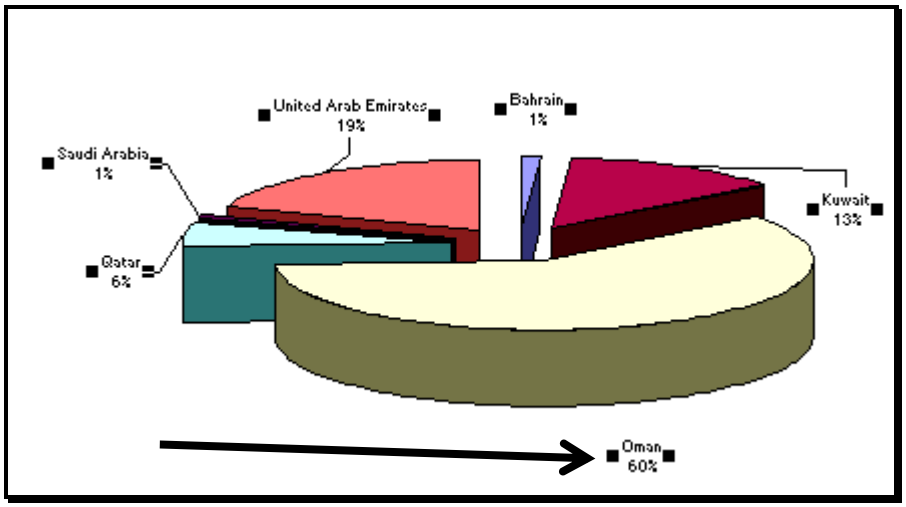
12.1 LABELING THE DATA POINTS: THE "DATA POINTS" AND "DATA POINT" LABELS AND LEADER LINES

Data Labels Object for a data series (using the example of a Pie)

I prefer to use a Pie chart here because data labels are usually used only with Pie and similar chart types. They are only used with Column and similar chart types if the number of data points is very small; but this is rarely the situation with this type of charts.

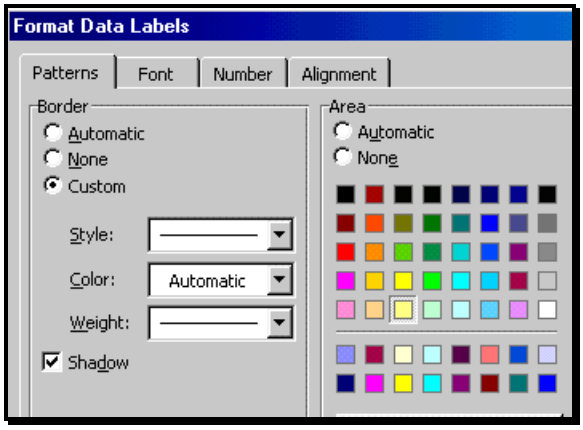
Open the sample file "Pie.xls." To choose the labels for one data series, click on the label of any one data point. (In a Pie, there is only one data series). If the labels are selected, you will see black "square dots" around each label as shown in the next figure.

Figure 150: Choosing the "Data Labels" object



Click on any of the labels. Double click to open the "Format Data Labels" dialog shown in the next figure.

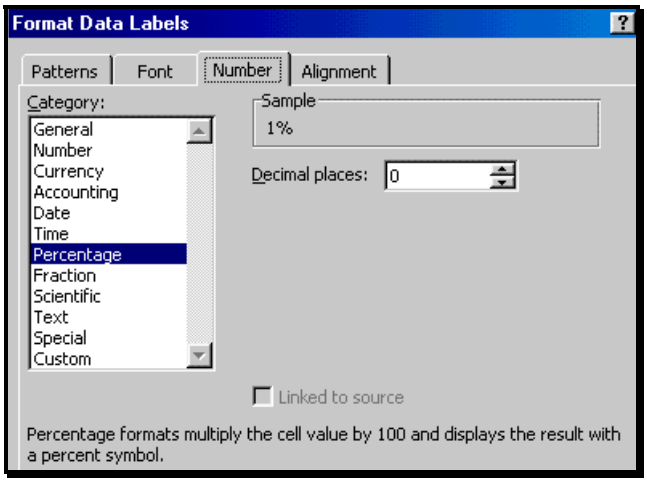
Figure 151: The "Format Data Labels" dialog



A shadow and very light pattern looks great!

The dialog that is unique to labels and axis is "Number." It is shown in the next figure.

Figure 152: Customizing the number format used to display numeric values in the labels

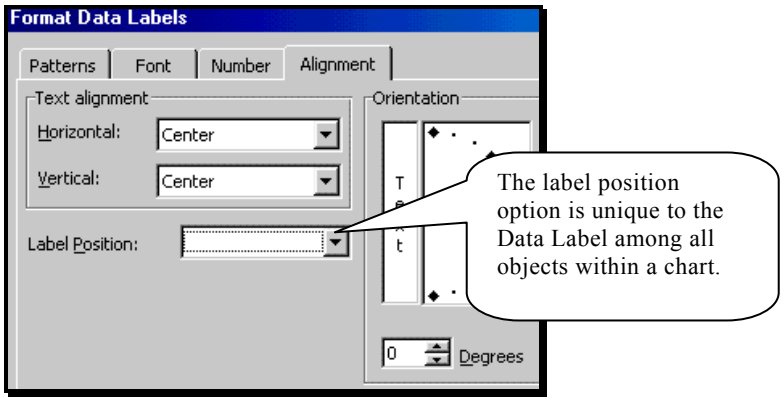


Use it to format the way a number is displayed on the Pie chart. (Typically, one would use percentages, but fractions, or whole numbers can be used.)

In particular, pay heed to the number of decimal places you want to show. (See next figure.)

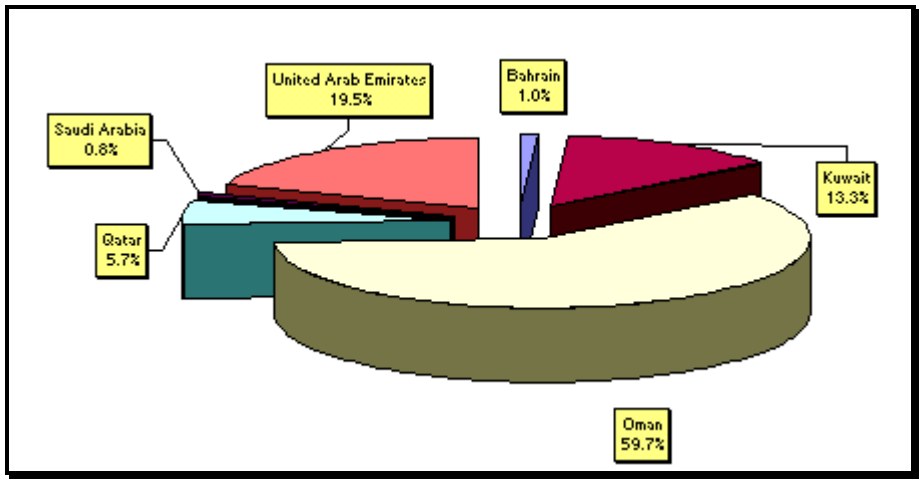
Figure 153: Setting the number of post-decimal numbers displayed

Figure 154: Setting the Alignment of Data Labels



Execute the dialog by clicking on the button "OK." The data labels have been formatted as shown in the next figure.

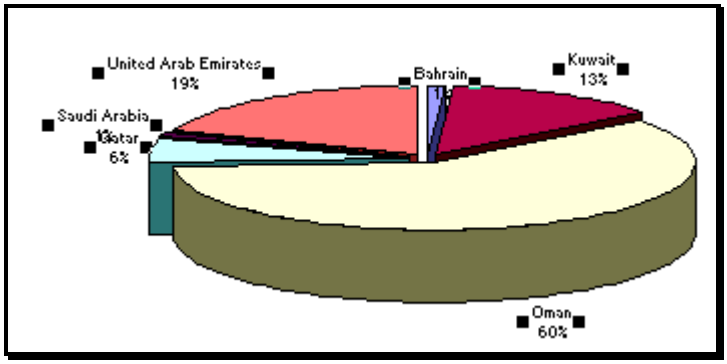
Figure 155: The reformatted Data Labels



Data Label Object for each data point (using the example of a Pie)

To choose the labels for one data point within a series, first click on the label of any one data point within that series. (In a Pie, there is only one data series). Highlights around the labels show that the data series labels have been selected.

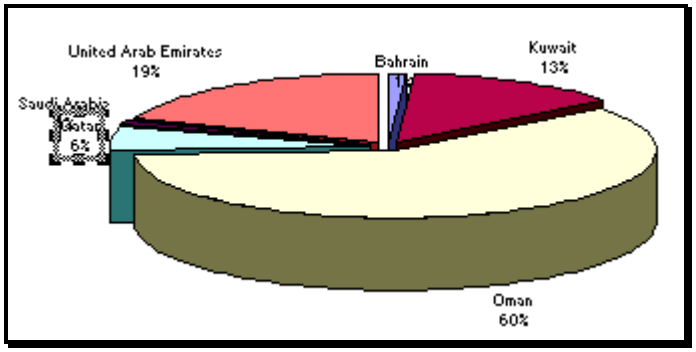
Figure 156: For selecting a "Data Point Label" object, first select the "Data Labels" object



To select the label for one specific data point, click on that data point. A highlighted box will be seen around the label. Now you can format that

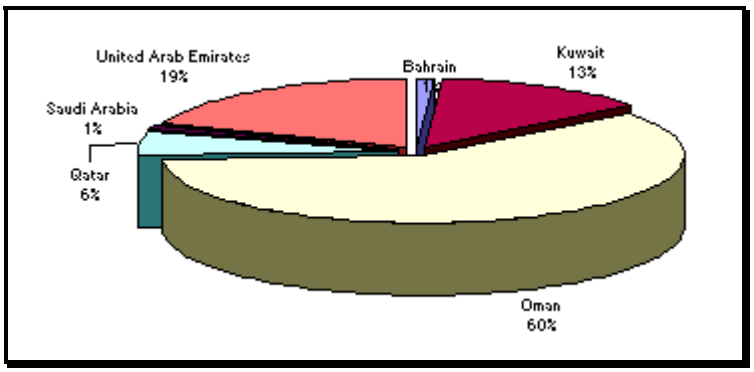
specific data label by double clicking and using the "Format Data Labels" dialog. (The process and options are the same as in the section on "Formatting the data labels for a data series" on page 160 – so, I do not repeat the steps. Instead, I show the main editing I do to labels for single data points – moving them so that the chart is easier to read. In the Pie chart shown in the figure above and below, the labels for Saudi Arabia and Qatar are overlaid on each other making both difficult to read. I want to move the label for Qatar away from the label for "Saudi Arabia."

Figure 157: Selecting one "Data Point Label"



I first select this label. Then, I drag down the highlighted "box" around the label and place it away from the other labels. The result is shown in the next figure.

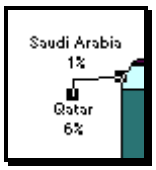
Figure 158: Using the mouse to move a Data Point Label



Leader Lines and Leader Line object

The Leader Line objects are available in some chart types including the Pie. Select the Leader Lines by clicking on any one of them. After selection, its two ends should be highlighted as shown in the next figure.

Figure 159: Selecting the "Leader Lines" object



Double-click to open the "Format Leader Lines" dialog. This is probably the simplest dialog of all the formatting dialogs!

Figure 160: The "Format Leader Lines" dialog

Page for notes

CHAPTER 13

DATA SERIES SPECIFICS ACROSS CHART TYPES AND SUB-TYPES

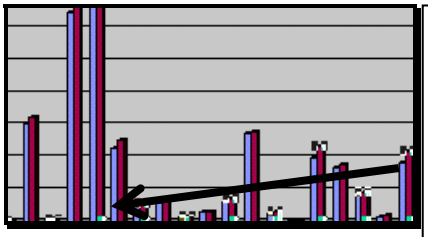
13.1 3-DIMENSIONAL COLUMN CHARTS

Open the sample file "Charts File1.xls" and select the chart "Basic Column." I choose an individual series (that is one series of Bars) by clicking once on any one of the Bars as shown in the next figure.

Double click on any one of the highlighted Bars and you will get the "Format Data Series" dialog shown in *Figure 162*.

The "format data series" dialog has several tabbed worksheets. These are shown in *Figure 162* to *Figure 165*.

Figure 161: Choosing the "Data series[19]" object



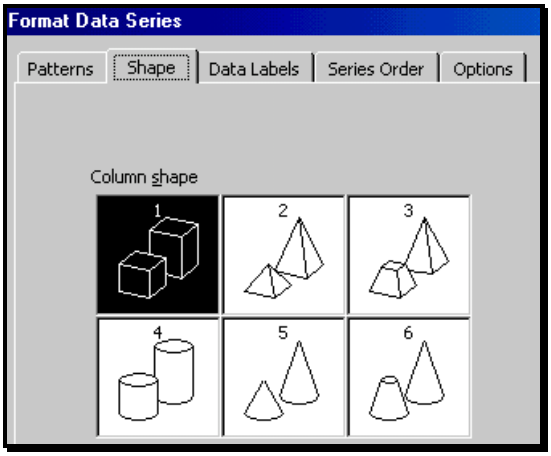
[19] To choose a series, you click on any one of the bars that represents data from that series. Similarly, if you are using a graph type that does not have bars (like a line graph, Area graph, etc) just click on any one point on the line / Area / other that represents the data from the series.

13.1.A SHAPE (ONLY FOR 3-DIMENSIONAL COLUMN / BAR)

Open the sample file "Charts File1.xls" and select the chart "Basic Column." Click on the tab "Shape." You can change the "Column shape." This dialog illustrates another point I have made in this book— several chart types can be bunched together as "Column" type charts.

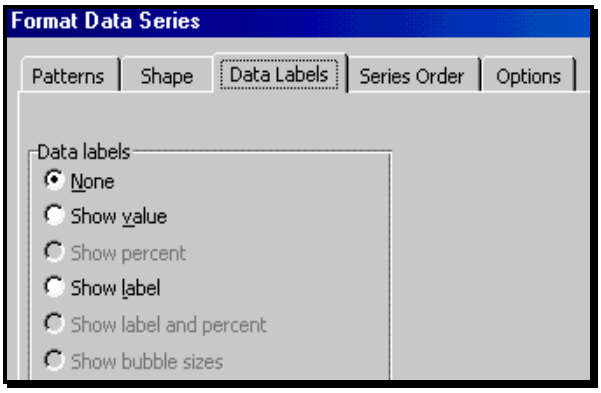
The choice of the shape you choose in Figure 162 determines if the data series is represented by a Column, Pyramid, Cylinder, or Cone. You can make one of the data series into a 'Pyramid" shape—the result will be an interesting "mixed" chart.

Figure 162: The options under the "Shape" tab of the "Format Data Series" dialog for charts types that use "blocks" (columns, rows, etc) as markers



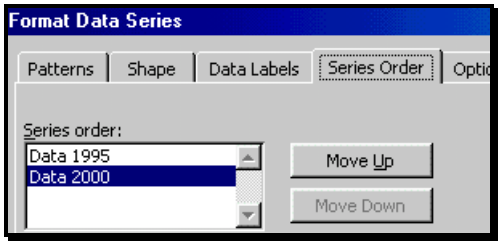
For data series with only a few data points, you may want to show value / labels next to each data point. I recommend choosing "None."

Figure 163: Data Labels



Click on the tab "Series Order." You can move the order in which the series (that is, the Bars that represent the series) are displayed on the chart by (a) clicking on a series name in the area "Series order" and then clicking on the button "Move up" or "Move down." Try it out.

Figure 164: Changing the "Series Order"

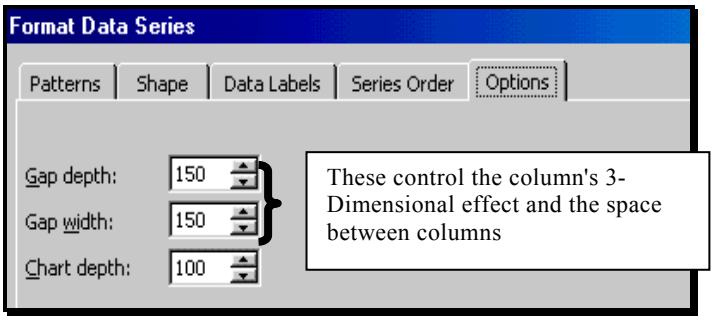


13.1.B CHART DEPTH

Open the sample file "Charts File1.xls" and select the chart "Basic Column."

Gap depth and chart depth option available only in 3-Dimensional charts of the following types– Bar, Cylinder, Cone, Pyramid charts, Line, and Area.

Figure 165: Experiment with the formatting features – you will feel more "in command"



The same options are shown in 3-Dimensional Bar, Cylinder, Cone, Line, Area, and Pyramid charts. Note that –apart from the "Patterns" dialog – all the dialogs are the same for all 3-Dimensional charts of the type Column Bar, Cylinder, Cone, and Pyramid. All these chart types, except Line and Area charts have the dialog "Shape."

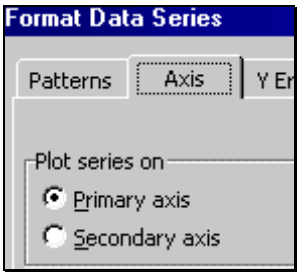
13.1 2-DIMENSIONAL COLUMN CHART

Compared to a 3-Dimensional Column chart, the "Options" tab has limited options. There is no "Shapes" dialog. There are two additional dialogs– "Axes" and "Y-Error Bars."

Figure 166: "Overlap" and "Gap Width" options

The Overlap option is available only in 2-Dimensional Bar and Column charts

Figure 167: The "Secondary" axis



If you choose the option "Secondary axis" then the chart becomes a "2-Y Axes" chart. (See page 90 to learn about this type of charts.)

If you choose the option "Secondary axis" then the chart becomes a "2-Y Axes" chart. (See page 90 to learn about this type of charts.)

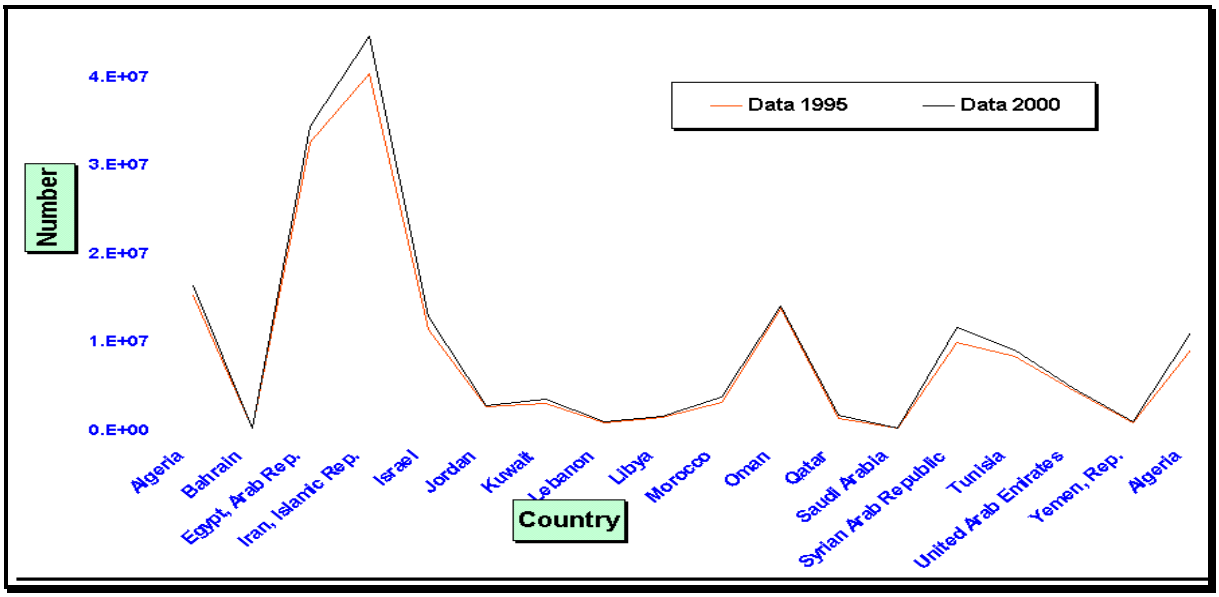
The use of the "Y-Error Bars" is shown in the context of a 2-Dimensional Line chart. (See page 184.)

Note that –apart from the "Patterns" and "Options" dialogs – all the dialogs are exactly the same for all 2-Dimensional charts of the type Column, Line, Bar and Area charts (and any combination charts) excluding the 2-Y axis charts.

13.2 2-DIMENSIONAL LINE CHART

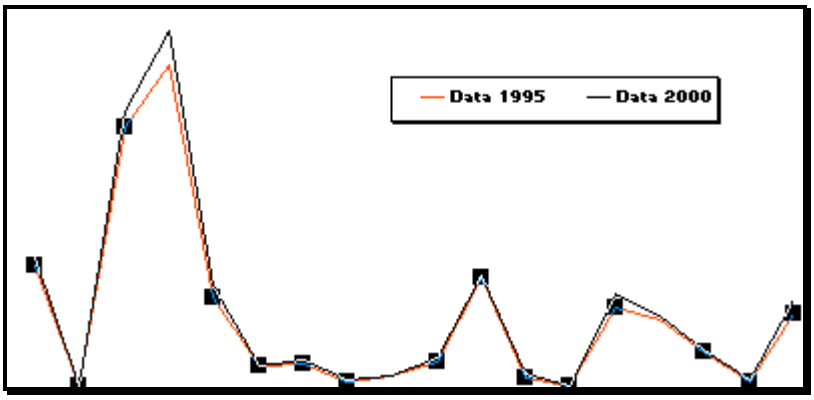
For a Line chart, the "Format Data Series" is slightly different. Open the Line chart in the sample file "2D Line.xls."

Figure 168: Sample Line chart



Click here until the entire Line is highlighted. Double click on the chosen Line / series.

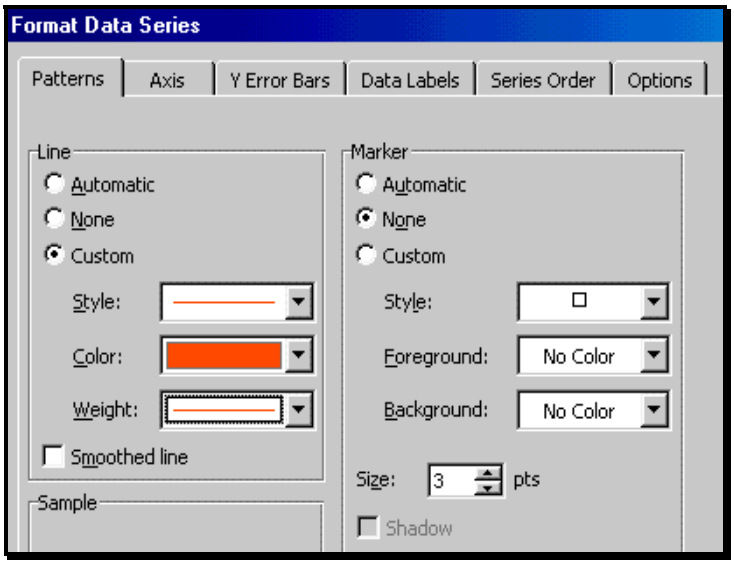
Figure 169: Selecting a Line Data Series



Line pattern

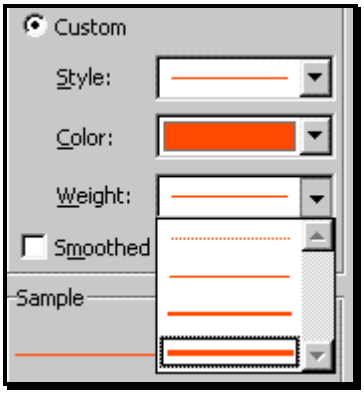
The "Patterns" dialog differs a lot from those for Column charts and for other objects within the chart. You need to learn the use of the two Areas within this dialog – "Line" and "Marker."

Figure 170: The "Format Data Series" dialog for a Line chart



Focus on the option "Custom" in the area that is labeled "Line" – it is reproduced in the next figure.

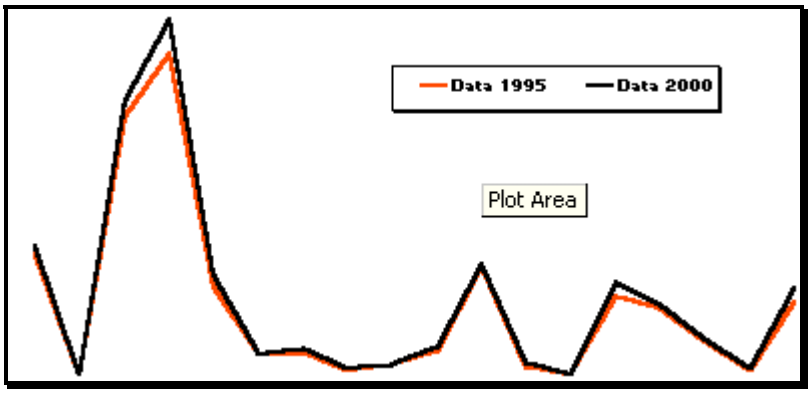
Figure 171: Selecting the style options for a Line in a line chart



In the area "Weight," choose a weight for the Line. Usually you will want a higher thickness then the default thickness created by Excel.

Do the same for the other series. Both Lines are thicker as can be seen in the next figure.

Figure 172: The Lines are thicker than in the original chart



The Line "smoothing" option

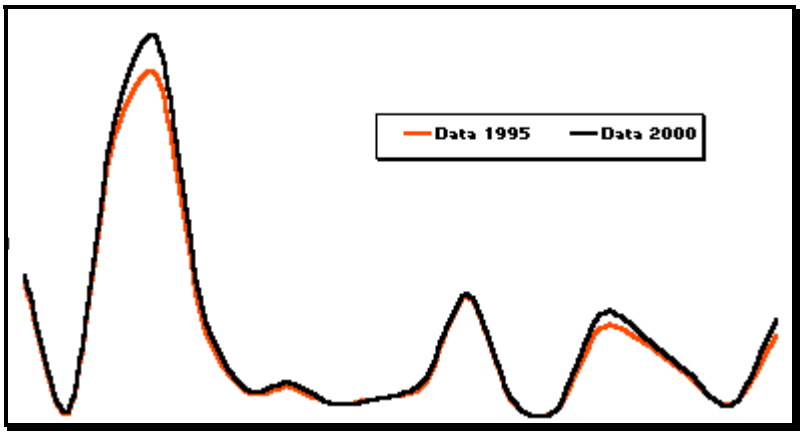
Open the sample line chart "2D Line.xls."

You may prefer the option of a smoothed Line—so that the Lines trends are curved and not kinked. To smoothen a line, choose the option "Smoothed Line."

Figure 173: "Smoothed" Line option

The result is shown in the next figure.

Figure *174*: The "Smoothed" Line



Dotted Lines

You may want to change the style of one (or more) of the Lines, so they can be visually segmented easily. To do that, click on the option "style" in the area "Line" of the patterns dialog and choose the style you desire. The optional styles are shown in *Figure 175*. The resulting Line style can be seen in the next figure.

Figure 175: Choosing a "dotted" Line style

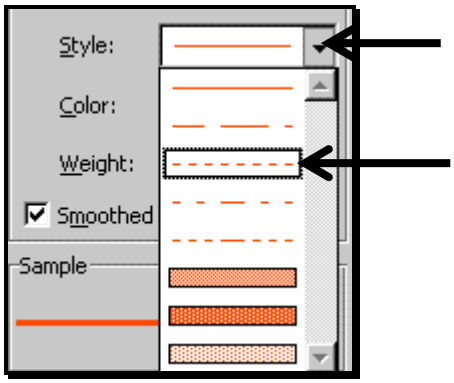
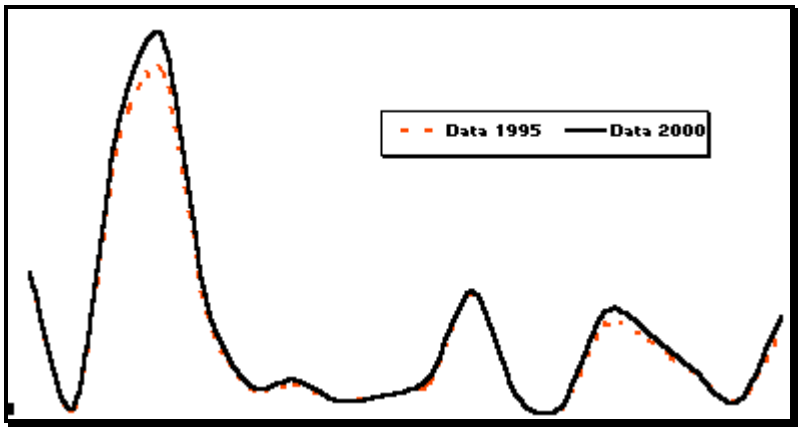


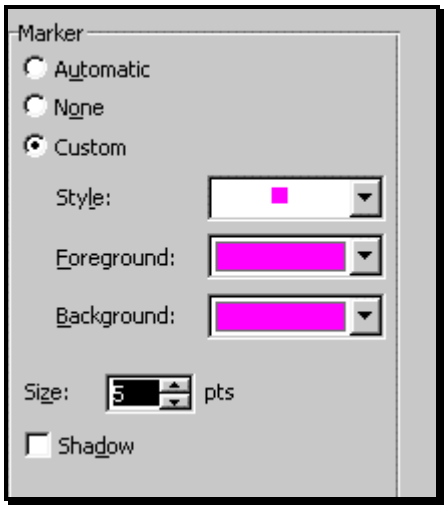
Figure 176: One of the lines is "Dotted"



Markers

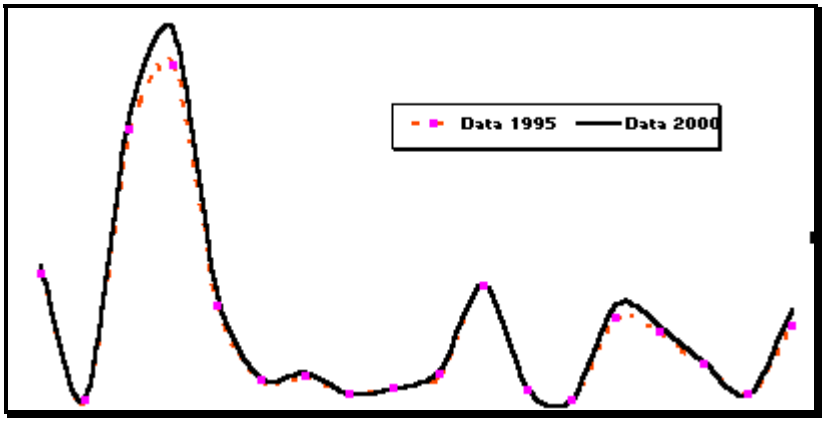
Markers are used to mark individual data points on each Line and to differentiate between Lines. Look at the area "Marker" within the patterns dialog. This area is reproduced in the next figure. Click on the option "Custom" and choose the style, foreground color, and background color for the marker.

Figure 177: Selecting a marker for identifying the data points on a Line chart



The result is shown in the next figure.

Figure *178*: The series with a marker



The markers are too small compared to the thickness of the Line. You may want to increase the size of the markers as I have done below.

Figure *179*: Increasing the size of Markers.

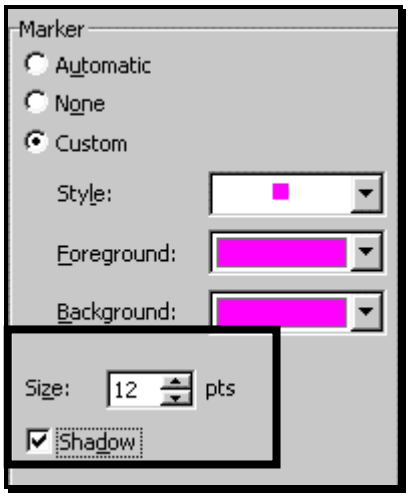
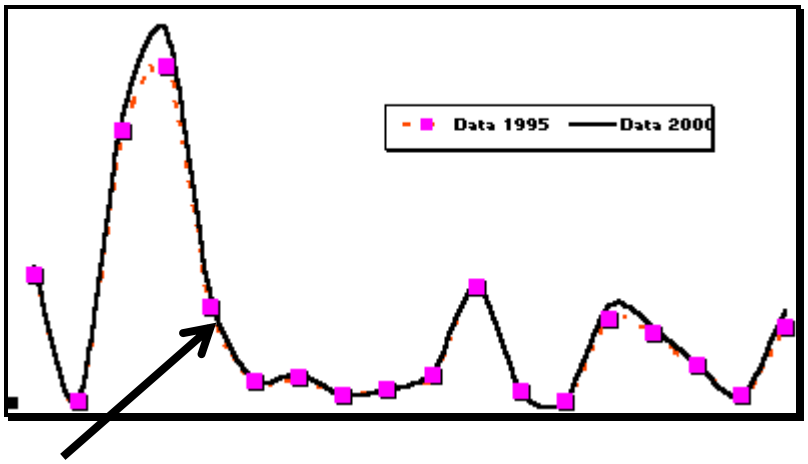


Figure *180*: The series with resized markers

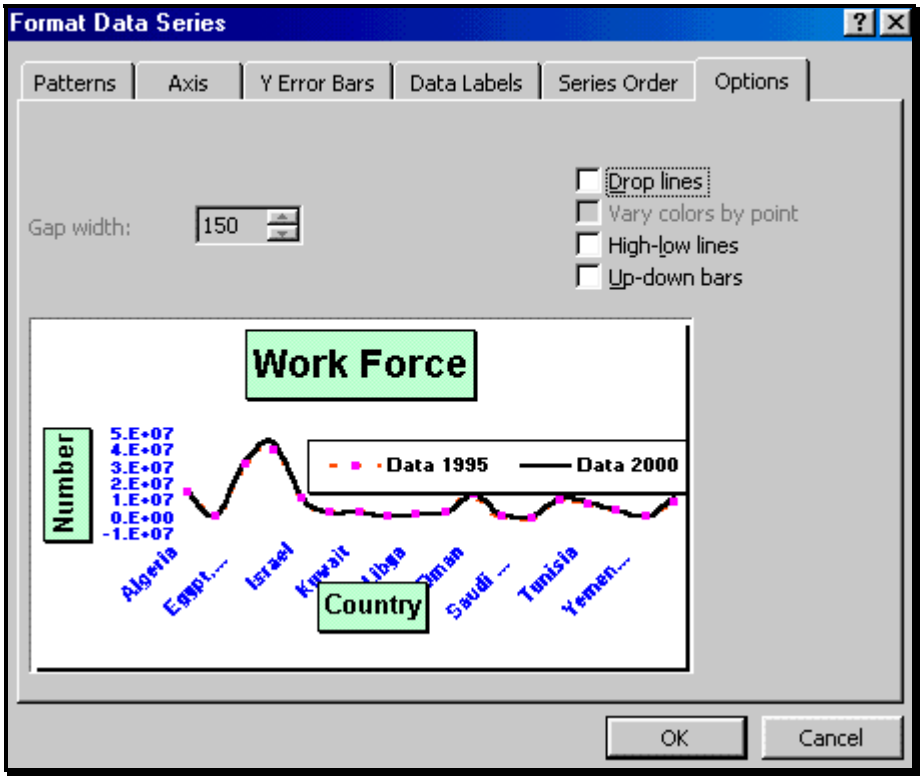


You can see the marker now easily.

13.2.A DROP LINES: AVAILABLE IN ALL LINE AND AREA CHARTS (BUT NOT IN OTHER CHART TYPES)

Open a sample line chart and experiment with "Drop Lines."

Figure 181: Drop Lines



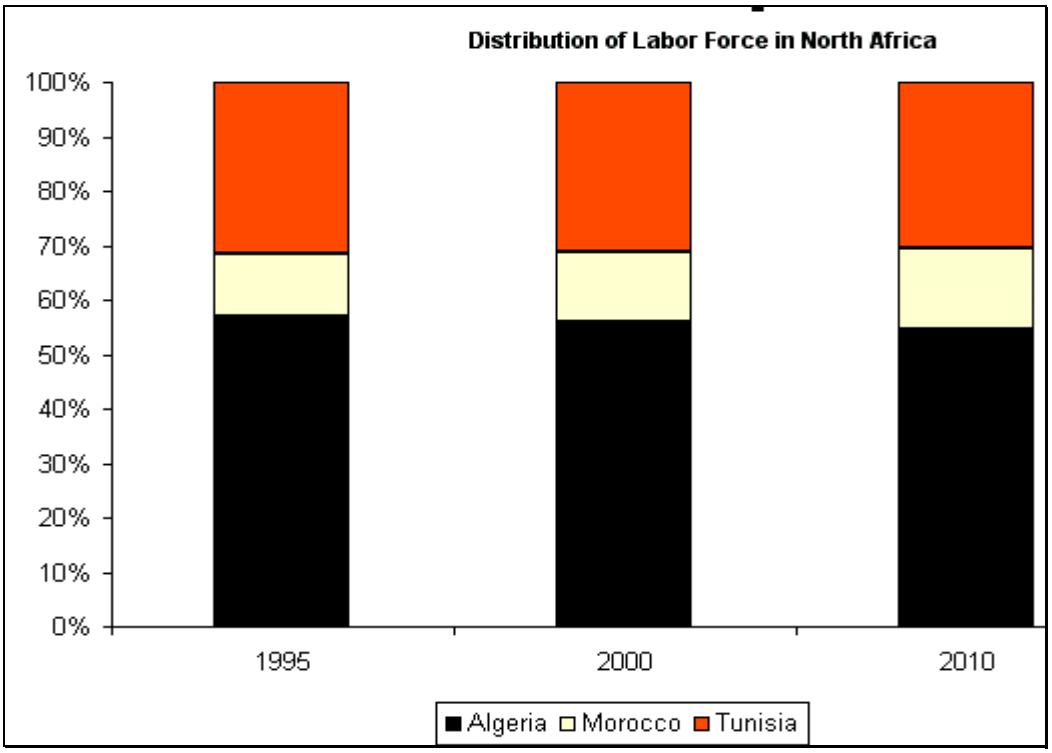
13.2.B HIGH-LOW LINES AND UP-DOWN BARS (ONLY IN A 2-DIMENSIONAL LINE CHART)

"High–low Lines" and "Up-down Bars" typically used with stock market data. They are beyond the scope of this book.

13.3 STACKED CHARTS: OPTIONS TO STAGGER THE 'BLOCKS' AND TO HAVE A "SERIES LINE"

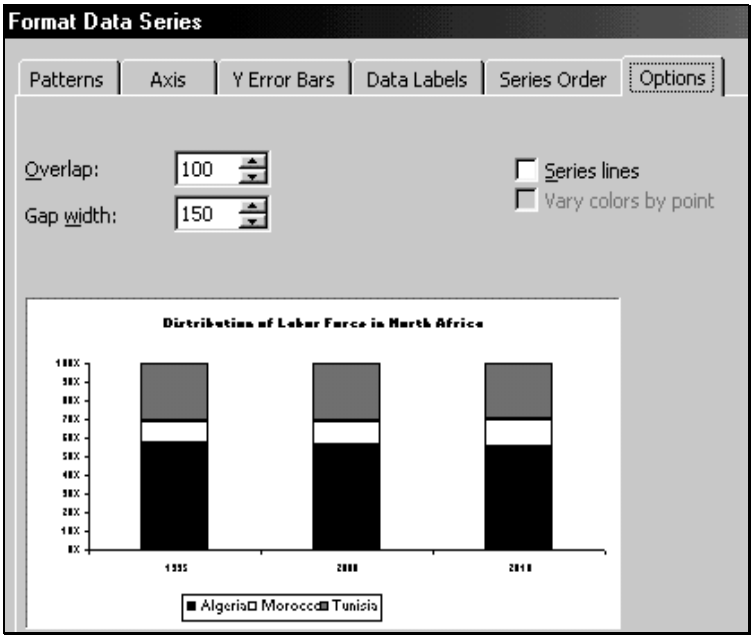
Open the sample file "Stacked.xls."

Figure 182: A "100% Stacked" chart



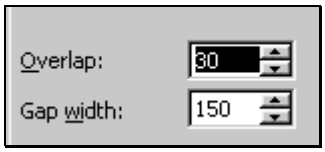
Click on any one of the 'blocks' in a 'stack'. The data series is selected if all blocks with the same color are selected. Click on the right mouse and choose the option "Format Data Series."

Figure 183: "Format Data Series" options for any data series in a Stacked chart



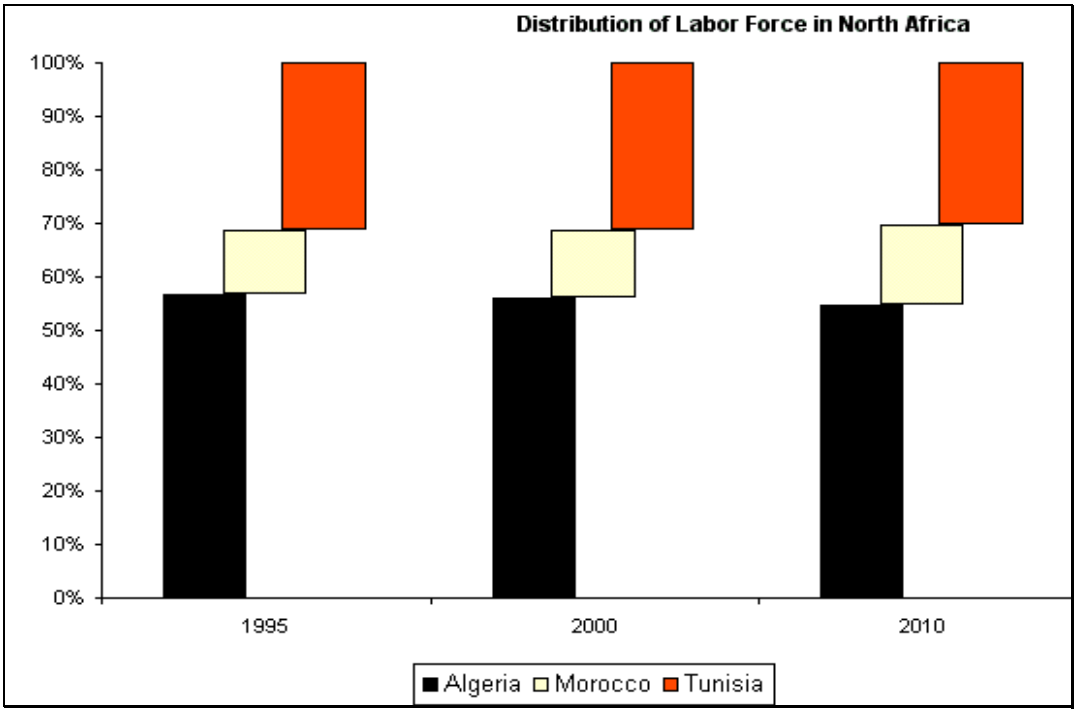
13.3.A STAGGERING THE BLOCKS

Figure 184: Changing the "Overlap" and "Gap Width" of the' blocks' that make up one 'stack' of a stacked chart



The result is shown in the next figure.

Figure 185: A Stacked chart with "staggered" blocks



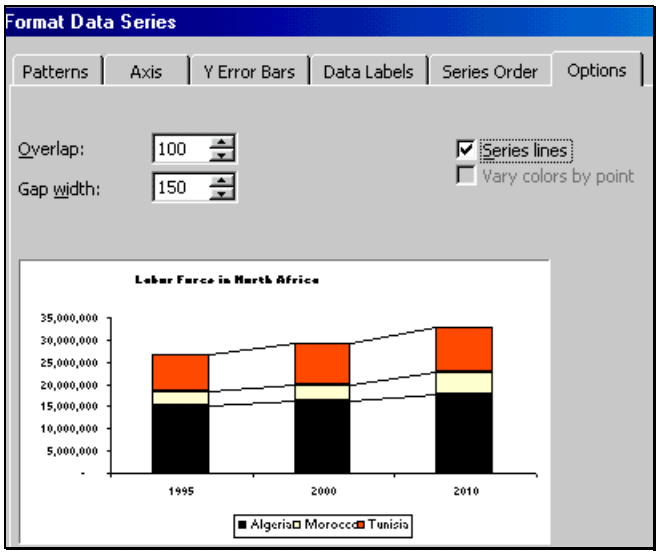
13.3.B ADDING A "SERIES LINE" OBJECT TO A DATA SERIES IN A STACKED CHART

Open the sample chart "Stacked.xls."

Click on any one of the 'blocks' in a 'stack'. The data series is selected if all blocks with the same color are selected. Click on the right mouse and choose

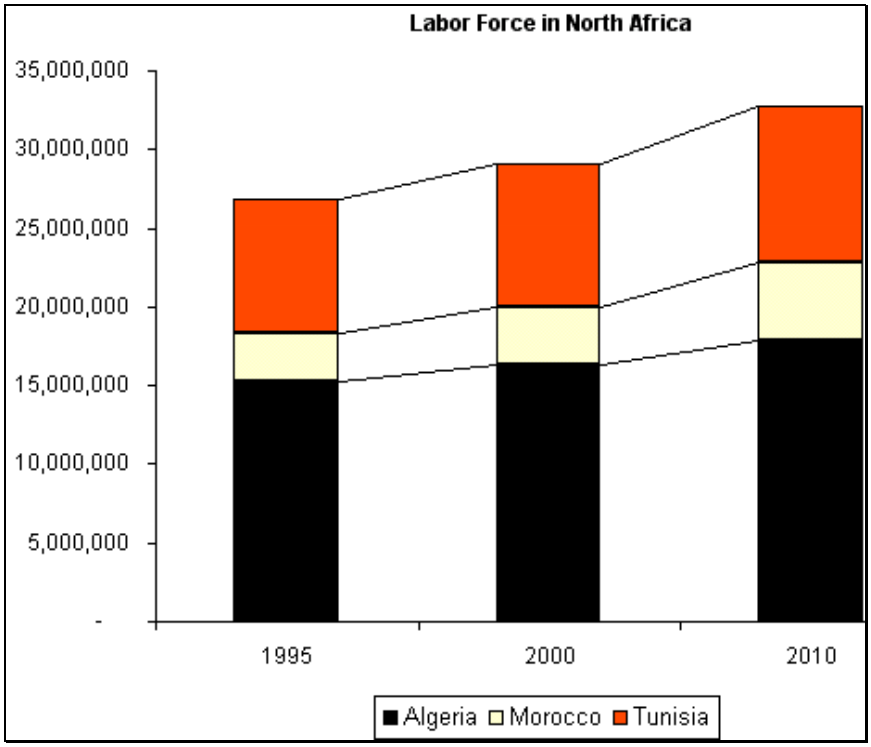
the option “Format Data Series.” Choose the tab “options” and select the checkbox “Series Line“

Figure 186: The additional object of “Series Lines” can be created for Stacked charts



The result is shown in the next figure

Figure 187: The new object “Series line“



Note that the "Series Line" set is a new object created when you created the Series line. This object has its own properties and formatting options. Click on any one of the lines. Click on the right mouse and choose the option "Format Series Line." Select the line pattern you desire.

Figure 188: The dialog for formatting the "Series Lines" object.

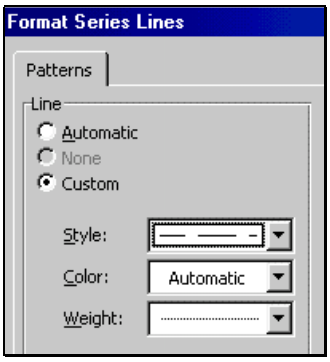
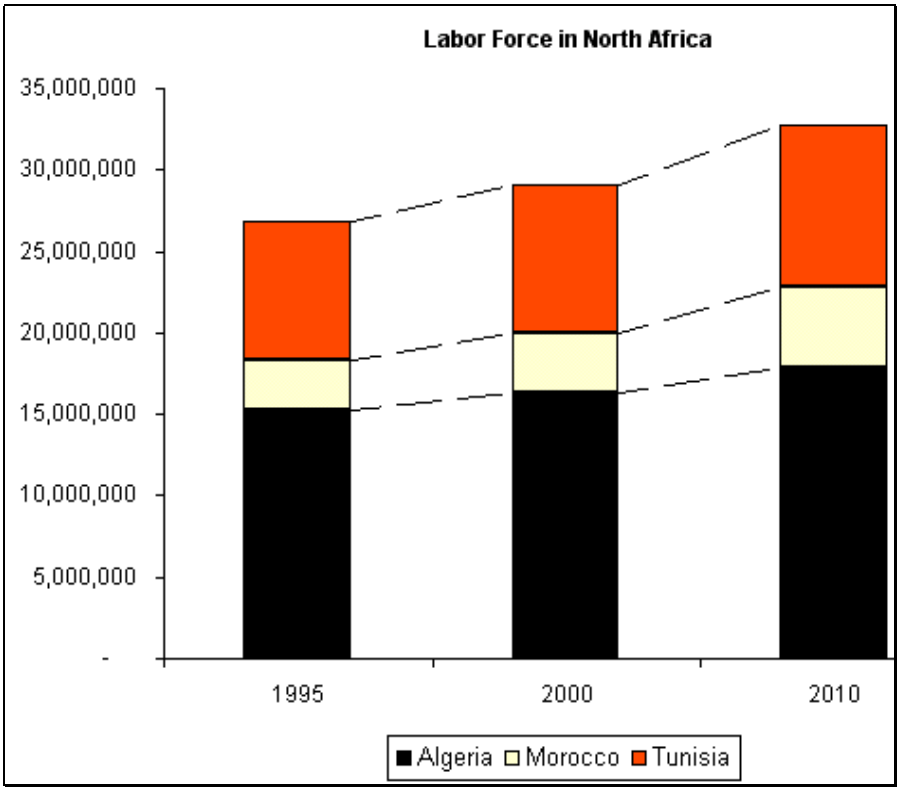


Figure 189: The new format for the object "Series Line"



13.4 VARYING COLORS BY DATA POINT

Open the sample chart "2 Y Axes.xls."

The Line series in a 2 (Y-) – axis Line-Column or Line-Line chart (difference from a Line chart)

Figure 190: A "2 Y axes" chart

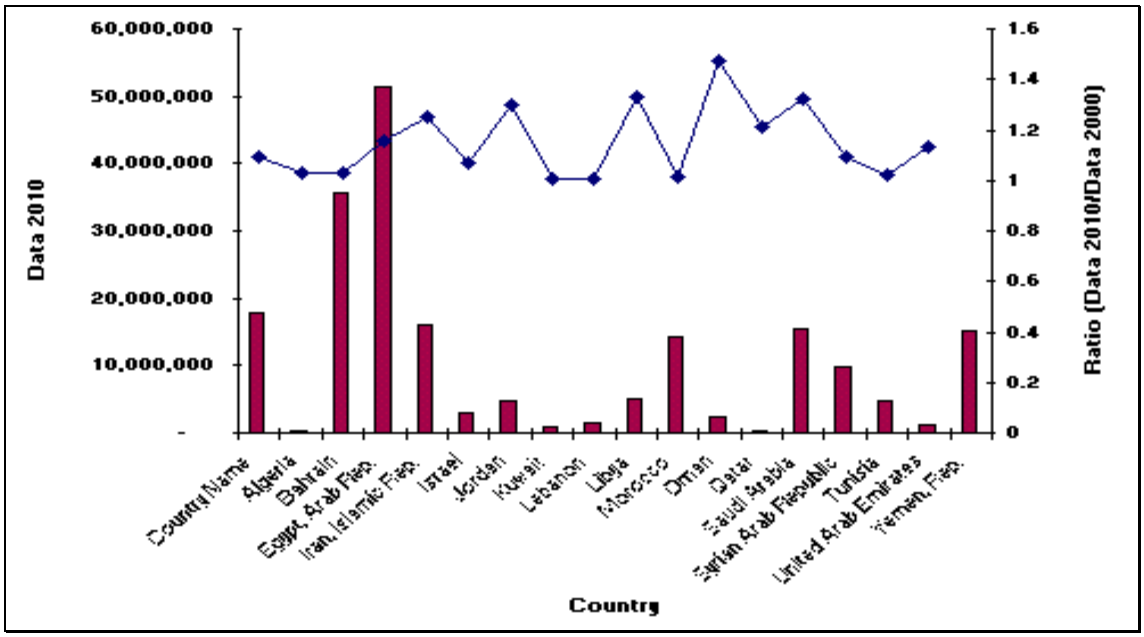


Figure 191: The "Format Data Series" options for any one of the two Y – axes series

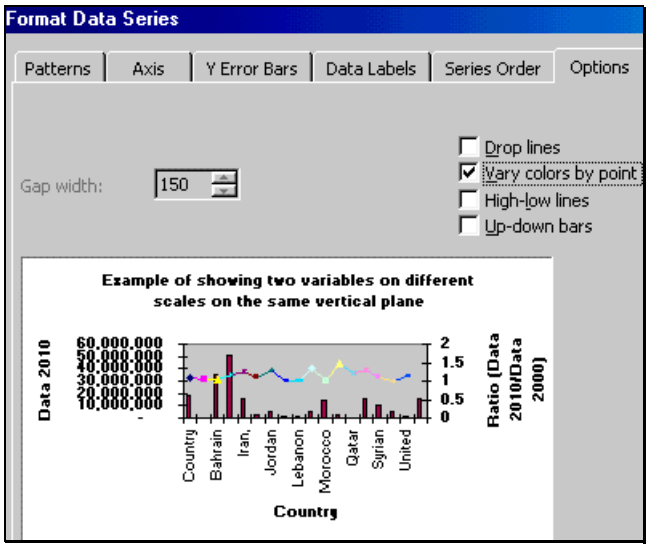
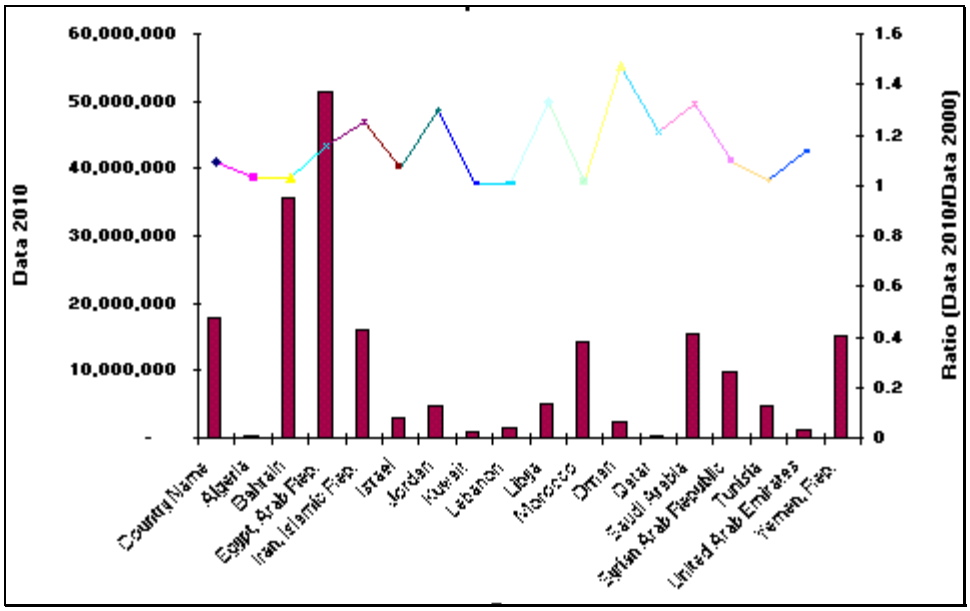


Figure 192: The result of varying the color representing each data point in one data series

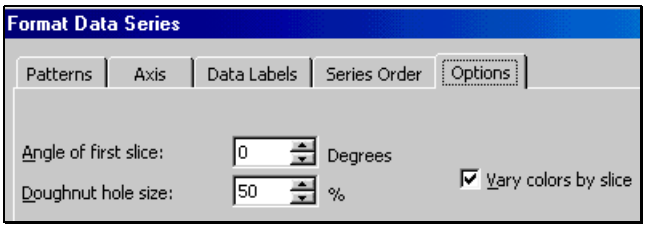


The Column series in a 2 (Y-) – axis Line-Column chart (difference from a Column chart)

13.5 DOUGHNUT HOLE SIZE

A Doughnut chart can do a multiple-Pie. Each Doughnut ring represents the Pie (that is, the percent break down) of the categories of one data series. The tabs "Axis" and "Series Order" are only available for charts with multiple series.

Figure 193: The "Format Data Series" dialog for one data series in a Doughnut chart



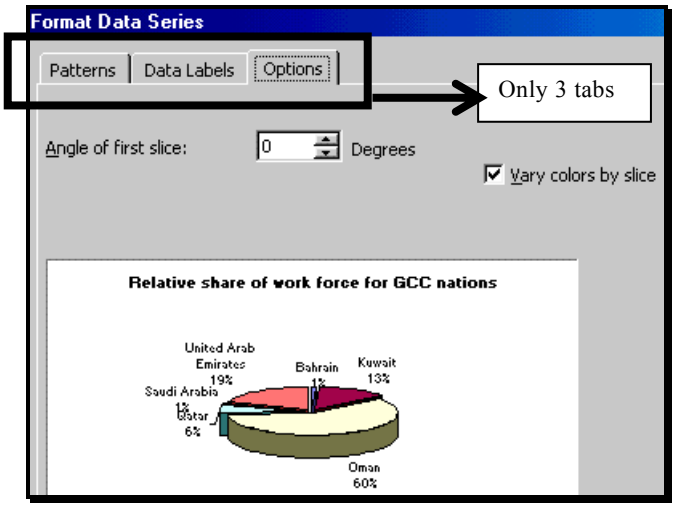
13.6 3-DIMENSIONAL PIE CHART

In Pie charts, the options for formatting are limited relative to the other chart types.

Open the chart "3D Pie" in the sample chart "Pie.xls." Click on the tab "Options." You can rotate the Pie by changing the "Angle of first Slice."

Note: I prefer changing the tilt using the mouse. .

Figure 194: The "Format Data Series" dialog for the only series in a Pie chart



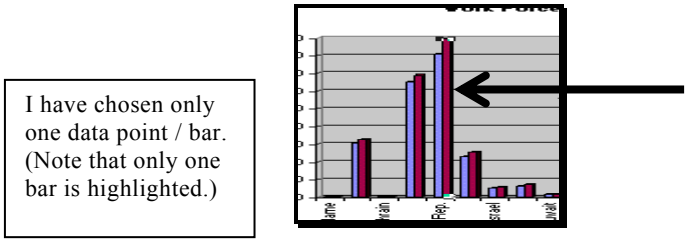
13.7 THE ULTIMATE DRILL-DOWN OBJECT: DATA POINT OBJECT

You can even format one data point in a series (that is, "One Bar" within the set of Bars that represent a data series.) To choose a single data point / Bar:

Open the sample file "Column.xls." First, click on the data series as you did in the last example. Then, once the data series is chosen (to verify that it has been chosen, look for the highlight marks around each bar)

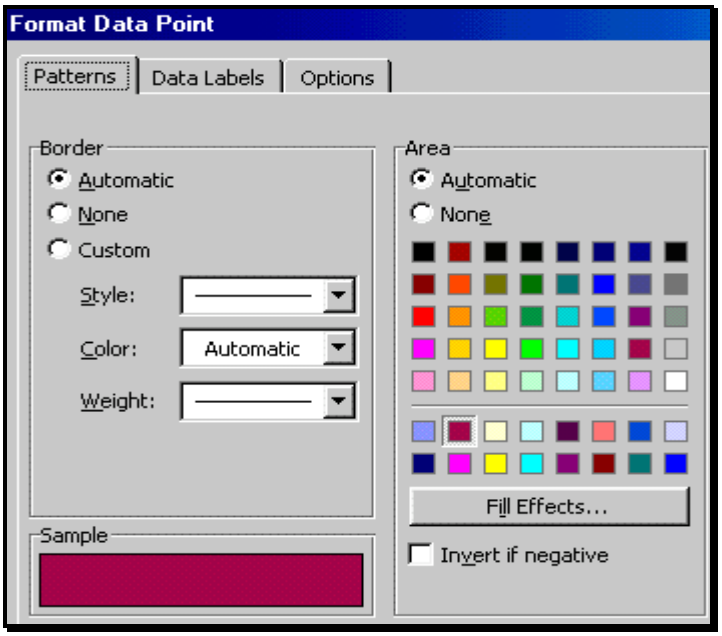
click on the specific data point (that is, the individual Bar) you want to format. (See the next figure.)

Figure 195 : Selecting the "Data point" object



Double-click to expose the "format data point" dialog. (The dialog is shown in the next figure.)

Figure 196: The "Format Data Point" options for any one data point are always a subset of the "Format Data Series" options for the data series that contains the active data point



The dialog has a subset of the tabbed dialogs in the "Format Data Series" chart of the same type, for all charts. Therefore, I do not go into the details of formatting individual data points.

13.8 Y-ERROR BARS

Open the sample line chart "2D Line.xls." Select a data series in any chart type (except for a pie category chart), click on the right mouse, and choose the option "Format Data Series." In the dialog that opens, select the tab "Y Error Bars."

A new object is created! It is called "Y-Error Bars."

Figure 197: Options for "Y Error Bars"

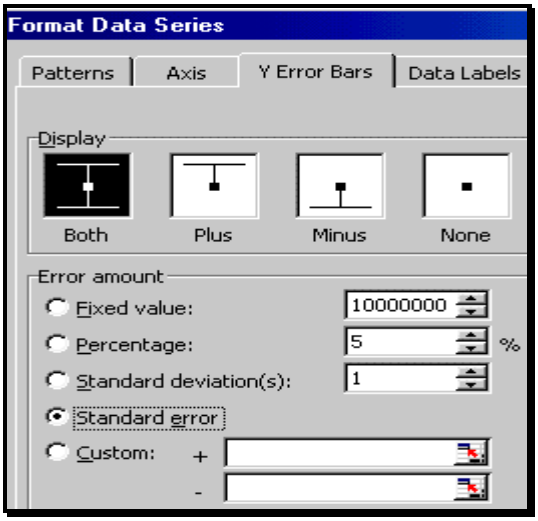


Figure 198: "Y-Error Bars" for the series "Data 2000"

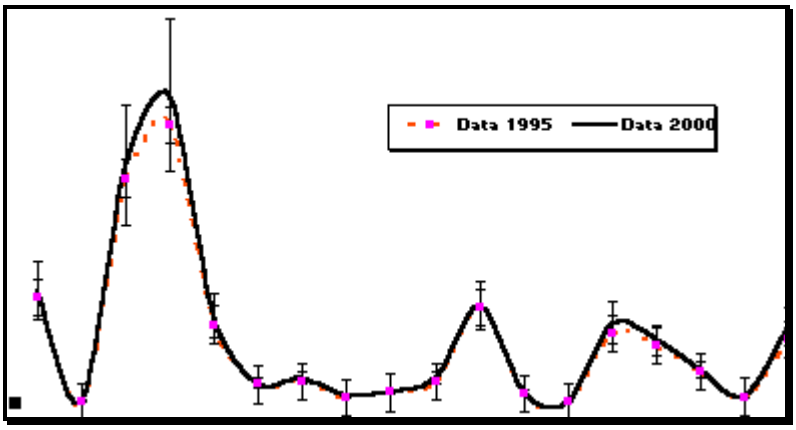
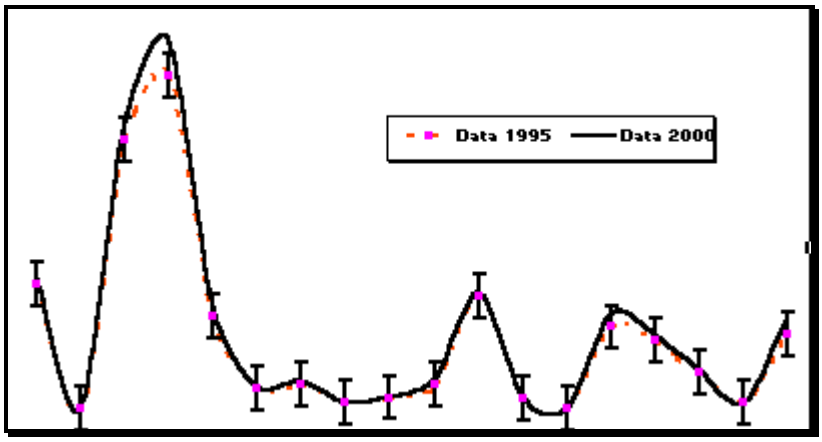


Figure 199: "Y-Error Bars" for the series "Data 1995"



You have created another new object! You can choose the marker to depict the start / end of the Error Bars and the format of the Line.

Figure 200: Formatting "Y-Error Bars"

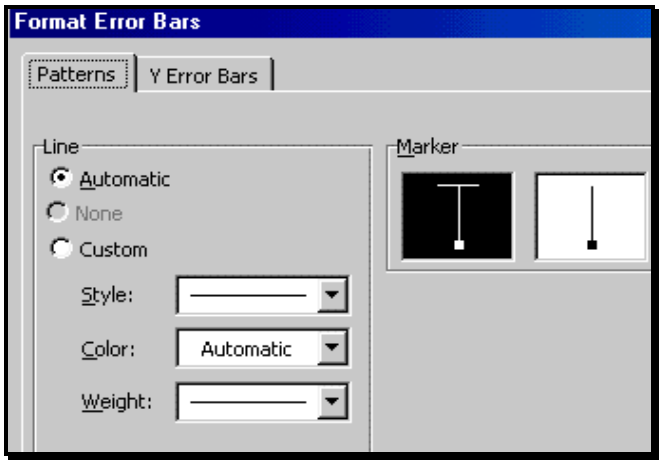
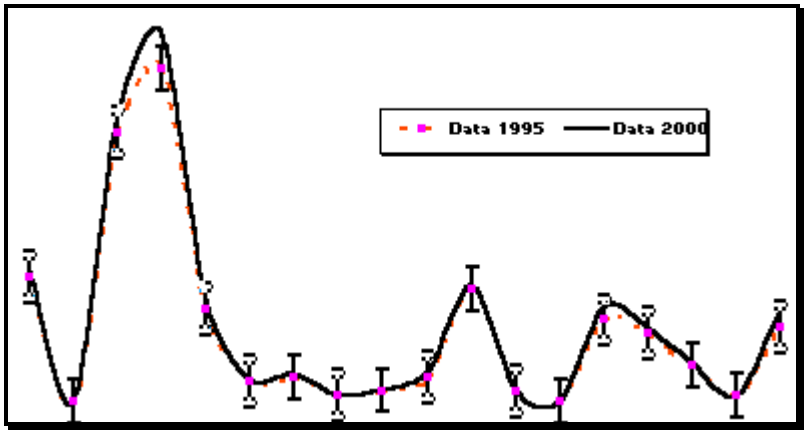


Figure 201: The reformatted "Y-Error Bars"



13.9 X-ERROR BARS (UNIQUE TO SCATTER CHARTS)

X-Error Bars are unique to the Scatter (and to the related Bubble) chart type. Open the chart "Trend Line" in the file "Scatter.xls."

Figure 202: Scatter Chart Formatting

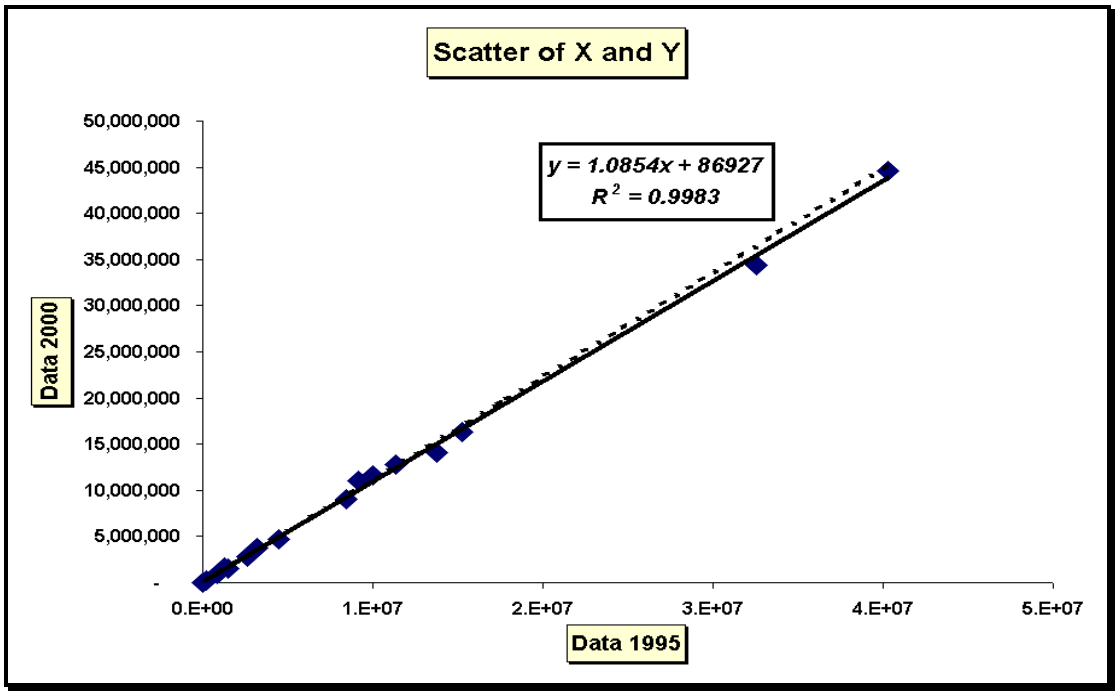
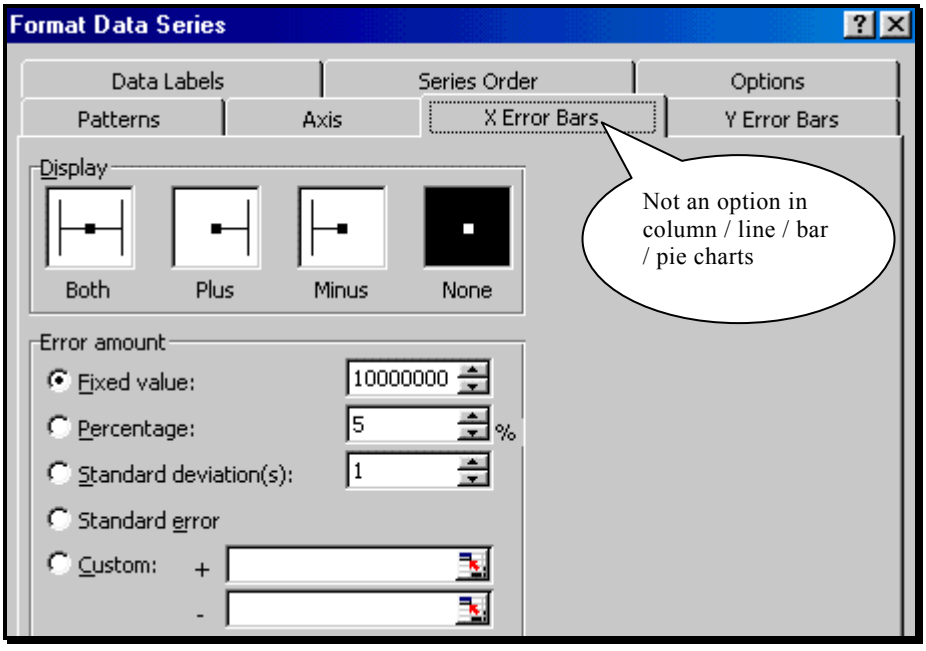


Figure 203: Choosing the "X-Error Bar" option



X-Error Bars are similar to Y-Error Bars. The only difference is the axis from which the data is being measured. See page 140 for a discussion on making and using Y-Error Bars (and, thereby, X-Error Bars).

Page for notes

CHAPTER 14

TIME SAVERS

14.1 THE SHORTCUT MENU (USING A RIGHT CLICK ON THE MOUSE)

The most used menu options are available when you right-click the mouse. The options that open when you click on the mouse are called "short-cut menus." An additional feature makes these short-cut menus very useful – they are "dynamic" in the sense that they give different options depending on what the currently active object is in Excel. Therefore, if you choose the "Chart Area" object and then click on the right mouse, the options you will see are different then when you right click after selecting the "Chart Title" object.

The short-cut menus are especially useful when working on charts, showing different options for different parts of a chart depending on the relevance of the option for the currently selected part of the chart. In the remaining portion of this section, I show pictures of the short-cut menus for different parts of the chart. See the previous section to learn how to select a part of the chart. Right-click to get the short-menu. (Double-click on the left mouse to get the formatting options). Please experiment on the sample files.

Figure 204: Right clicking after selecting the Chart Area

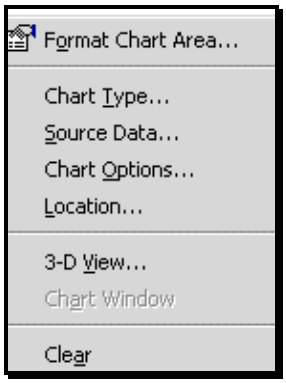
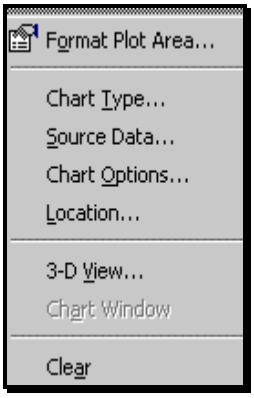


Figure 205: Right clicking after selecting the Plot Area



The option “Chart Type” enables the changing of the chart from one type to another. The option “Source Data” enables the change of the data used for the chart. The option “Chart Options” permits the change (or enhancement) of the features of the chart.

The short-cut menus for some other objects are shown in the next few figures.

Figure 206: Right clicking after selecting the chart Title

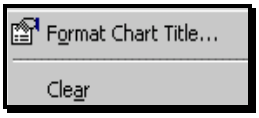


Figure 207: Right clicking after selecting one data series

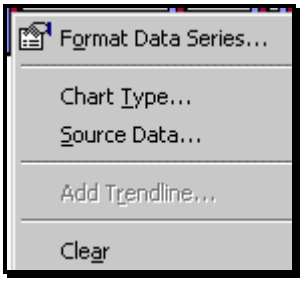
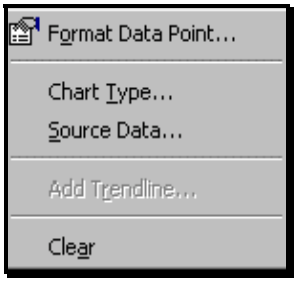


Figure 208: Right clicking after selecting one data point within a data series



14.2 CUSTOMIZING THE SHORT-CUT "BUTTONS" OR "ICONS" IN THE TOOLBAR

14.2.A WHAT IS A TOOLBAR?

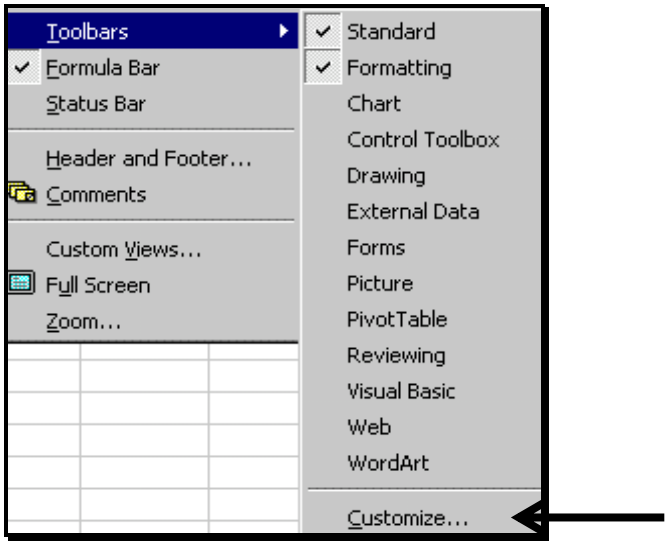
The entire set of icons that are visible is called the "Toolbar." (A typical toolbar is shown in *Figure 209*). You can customize the toolbar so that the icons you need to use often are displayed and the ones you do not need are removed.

Figure 209: The Standard Toolbar

14.2.B CHOOSING A COLLECTION OF ICONS THAT PERFORM SIMILAR FUNCTIONS (FOR EXAMPLE, FORMATTING)

Choose the menu option VIEW / TOOLBARS (see *Figure 210*). Choose the option "Customize." You will see a list of toolbars. Each represents a collection of icons that perform similar tasks. The check marks next to "Standard" and "Formatting" imply that these have been chosen and are displayed at the top of the Excel application. You can choose to add (or remove[20]) other toolbars. If you choose a toolbar, then all the icons in it will be displayed at the top.

Figure 210: The Toolbars menu option



The other toolbars that are automatically displayed (or if not, then they should be chosen only when needed) when you take any action within their context are: "Control Toolbox ," "External Data ," "Forms," "Picture," "Pivot Table ," "Reviewing ," "Visual Basic," and "Web." (The utilization of these toolbars is taught in the relevant chapters in Volumes 1, 3 and 4.)

[20] The problem with displaying too many toolbars is that too much of the screen Area is taken up by the icons.

14.2.C UNDERSTANDING "DYNAMIC" TOOLBARS

Luckily, in Excel, you do not *usually* need to choose any toolbars apart from "Standard" or "Formatting" because the toolbar display is Excel is dynamic. Excel 'senses' which toolbar you need for the current operation and automatically adds the relevant toolbars. For example, when you draw a chart, the "Chart" toolbar is *often* (but not always) automatically added to the screen (or it may be "floating" in the middle of the screen).

Chart

Figure 211: The dynamic chart toolbar that opens automatically when you are working on a chart

Drawing and INSERT / PICTURE

Figure 212: The dynamic "Drawing (and INSERT / PICTURE)" toolbar that opens automatically when you are working on any drawing object

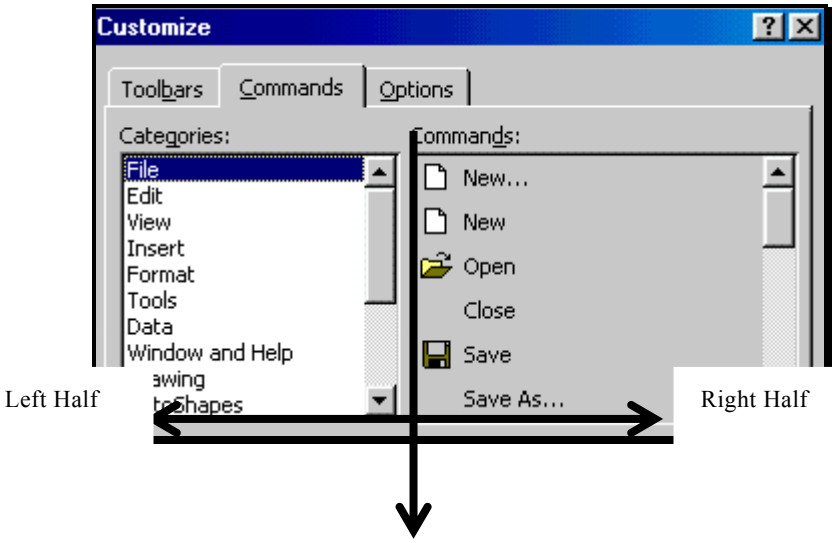
14.2.D PLACING / REMOVING INDIVIDUAL ICONS ON / FROM THE TOOLBAR

You may want to add / remove individual icons. Choose the menu option VIEW / TOOLBARS / CUSTOMIZE (or to TOOLS / CUSTOMIZE). Click on the tab "Commands," as shown in the next figure.

14.2.E FINDING AND SELECTING AN ICON

By clicking on a category on the left half of this dialog, the icons available under the category can be seen on the right half of the dialog. Scroll down the list on the right half. To learn what a particular icon does, click on the icons name and then on the button "Description" as shown in *Figure 214*.

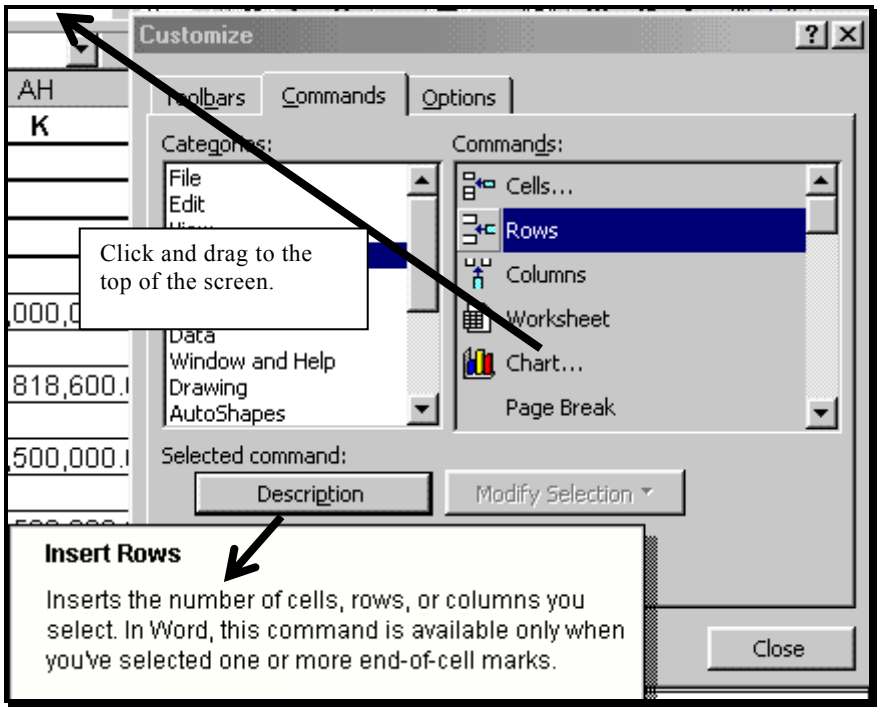
Figure 213: Viewing the individual icons available for placement at the top of the screen



14.2.F ADDING THE SELECTED ICON ONTO THE TOOLBAR

Click on the icon (in the right half of the dialog) and drag it to the top of the screen (where the other icons are). In the next figure, I show how to select and add to the toolbar the icon for the command "Insert Rows" (within the left half category "Insert").

Figure 214: Placing the icon onto the toolbar



14.2.G INDIVIDUAL ICONS FOR BROAD CHARTING FEATURES

Figure 215: List of icons for charting

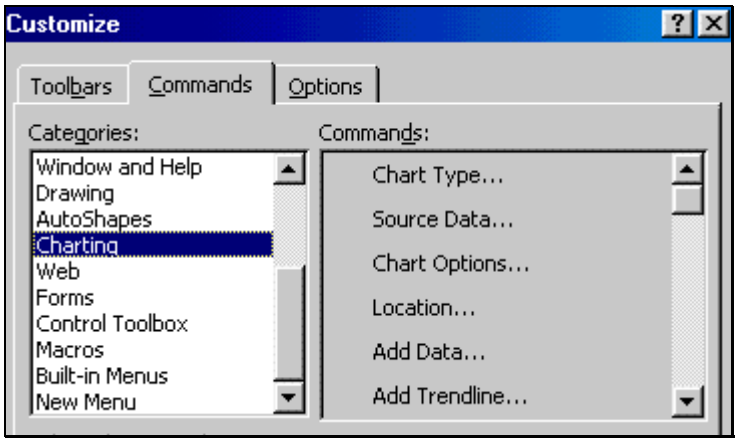


Figure 216: List of icons for selecting a charting window or changing the viewing options

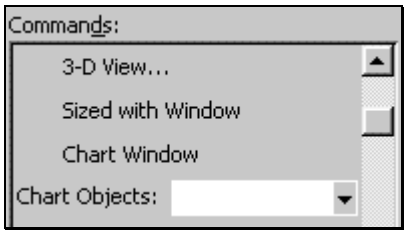
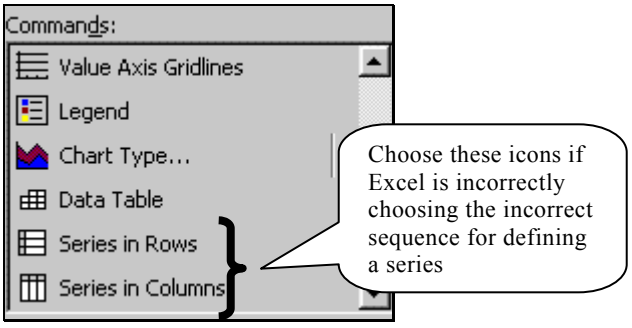


Chart options icons

Figure 217: Icons for chart options



Individual icons for creating a new chart

The icons in the next three figures can be used to make a new chart or to change an existing chart to the type shown on the icon.

Figure 218: Icons for individual chart types - basic chart types

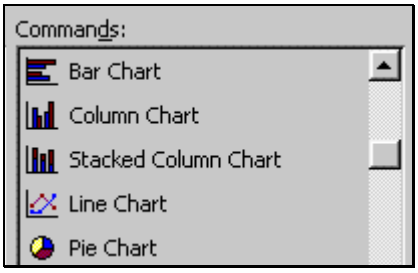


Figure 219: Icons for basic 3-D charts

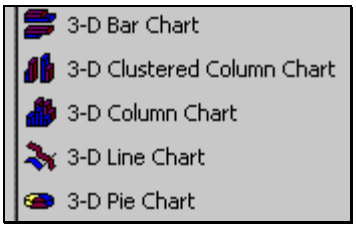
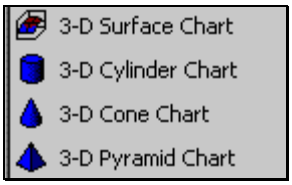


Figure 220: Icon for Scatter charts

Figure 221: Icons for 3-D charts that use specific markers like Cones



Page for notes

CHAPTER 15

FORMAT ONE CHART AND MAKE EXCEL APPLY THIS FORMAT TO OTHER CHARTS

F4 repeats the last action. Use the "format painter" icon to achieve such format replication.

15.1 CHOOSING THE RANGE WHOSE FORMAT IS DESIRED AS THE "MODEL"

Choose the "model" range whose format you want to use as the role model. The range could be a cell, a collection of cells, rows, Columns, the entire sheet, drawing objects (like arrows, text boxes), etc[21].

15.2 ACTIVATING THE FORMAT PAINTER

Click on the "Format Painter" icon (see *Figure 222*) twice in quick succession.

[21] Choose a range that has a distinctive format. (For example, a background color of blue and bold font.) (Alternatively, format a range in such a way and then use it as the model range.)

Figure 222: The "Format Painter" icon

You can copy and paste the formatting of one chart on to another[22].

- Format a "model" chart to perfection.
- Choose the "model" chart by clicking on its edge. Choose the menu option EDIT / COPY.

Choose the "painted-on" chart[23]. Choose the menu option EDIT / PASTE SPECIAL / FORMAT.

Repeat on other "painted on" charts. You can save time on the repeat by using the "F4" key. Just choose the chart area and click on F4.

Try This

In the sample file "Format Painter.xls," go through all the worksheets[24] that have names that start with "Chart." I have made several charts. Each chart contains the data for one case for one series (for example, of "age 15-19 yrs"), all countries, and three data series ("1995," "2000 and 2010").

[22] The usefulness of this feature -- say you have made 10 bar charts. Format the first one (see to learn how to save on time in formatting one chart); then copy the format of this chart onto the others.

[23] The chart could be in the same or a different file from the one that has the "model" chart.

[24] A quick way to navigate worksheets-- click on the name of the first worksheet / chart; to choose the menu option the next worksheet / chart, click on the "Page Down" key while keeping the "CTRL" key pressed.

Thus, the second chart shows the population, by country and year, for one value –namely, 'aged between 15 and 19' -of the series that measures age of respondents.

Note that while most of the charts are 2-Dimensional Column charts, I also have some other types of charts– Bar, Line, 3-Dimensional Column, and Cylinder.

I only made an effort to format one chart - "age 0-19 and over 64." In the other charts, I do not have a Legend, Title, etc.

Assume you want to give all the other charts the formatting and Titles of the one chart I have formatted. Choose this chart (I call it the "host" chart) – "0-19 and over 64 yrs." Choose the "Chart Area" by clicking just before the edge of the entire chart[25]. Choose the menu option EDIT / COPY.

Choose the chart area of a "target" chart[26] – that is, whose formatting you want to change into the formatting of the "host" chart. Again, choose the "Chart Area" by clicking just below the edge of the chart.

Choose the menu option EDIT / PASTE SPECIAL / FORMATS. See how the chart changes.

[25] See Figure 102 on page 131 and the text before the figure to understand how to choose specific parts of a chart. To know whether you have selected the "Chart Area," double-click on the mouse and verify that the "Format Chart Area" dialog appears.

[26] Try the chart "Chart 15-19 yrs."

Choose the next “target” chart[27] and, again, choose the chart area and select the menu option EDIT / PASTE SPECIAL / FORMATS (or, even easier, press the F4 key!)

If you have to make several similar charts, only format one of them thoroughly. Then format paint the format of this chart onto the other charts.

[27] Try the chart "Chart 20-24 yrs.”

CHAPTER 16

SUMMARY TABLES

Table 12: Mapping– purpose to chart type

Purpose	**Type of charts in Excel that are used to fulfill this purpose**
Comparing values of a series or trends across series	Column, Bar, Line, Area, Cylinder, Cone, Pyramid, Surface, Stacks of Color, Tubes, Floating Bars, Smooth Lines, B &W Area, B &W Column, Area Blocks, Colored Lines, Columns with Depth, Cone
Comparing how the totals cumulate for each data series and across data series	*Stacked* sub-types (in column two of the sub-types matrix) of the types – Column, Bar, Line, Area
Showing the percent share of each category to the overall sum of a data series	*100% Stacked* sub-types (in column three of the sub-types matrix) of the types – Column, Bar, Line, Area
Scatter plots of two or more series	Scatter, Bubble

Purpose	**Type of charts in Excel that are used to fulfill this purpose**
Percent shares as Slices	Pie, Doughnut, Pie Explosion, B & W Pie, Blue Pie
Showing in one 2 (Y-) –axis chart the data for two series measured on very different scales	Line – Column on 2 Axes, Lines on 2 - Axes

Table 13: Mapping– Chart type to purpose

Type (as defined by Excel)	Sub-type	Location in column of sub-types	Good for…					
			Trend, Few Observations[28]	Trend, Many Observations[29]	Trend, Ordered X [30]	Cross-Series comparing at individual observations [31]	Influence of each series on the total value all data series at an X observation [32]	Affect of each series (measured as percent share) on the total value of all data series at an X observation [33].
Column	Basic/ Clustered	1	✓			✓		
Column	Stacked	2					✓	
Column	100% Stacked	3						✓
Bar	Basic / Clustered	1	✓			✓		
Bar	Stacked	2					✓	
Bar	100%	3						✓

[28] Seeing trends in a series for a few X categories.

[29] Seeing trends in a series for many X categories.

[30] Showing trends across time if the X-axis shows periods in chronological order.

[31] For each observation, comparing the values of all series.

[32] For each observation, cumulatively stacking up the contribution of each series for that observation (the series have to be measured on the same scale and number of series are few).

[33] For each observation, cumulatively stacking up the contribution (as a % share) of each series value for that observation (the series have to be measured on the same scale and number of series are few). The total value on the Y –axes is always 100%.

Type (as defined by Excel)	Sub-type	Location in column of sub-types	Good for…					
			Trend, Few Observations[28]	Trend, Many Observations[29]	Trend, Ordered X [30]	Cross-Series comparing at individual observations [31]	Influence of each series on the total value all data series at an X observation [32]	Affect of each series (measured as percent share) on the total value of all data series at an X observation [33].
	Stacked							
Line	Basic / Clustered	1		✓	✓			
Line	Stacked	2					✓	
Line	100% Stacked	3						✓
Area	Basic / Clustered			✓	✓	✓		
Area	Stacked	2					✓	
Area	100% Stacked	3						✓

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