

## Building Charts

There are many ways to display data on an Excel worksheet but perhaps the most valuable tool when presenting your data is the chart. We use the term *chart* to refer to any one of the many ways of displaying data in a graphical format. The older term *graph* is now usually restricted to line charts.

### Prepare the Data

Data that is to be charted should be arranged logically on the worksheet in a block of rows and columns, both of which should have headings. Try to avoid including completely empty rows or columns. The example illustrated (*Fig.1*) shows the projected annual sales for a company for various different regions (*Europe, North America* etc.) for a 10 year period (shown as *Year 1, Year 2* etc.). It does not matter if the data is arranged in rows or columns because you can make decisions about how it will appear when you are building the chart.

	A	B	C	D	E	F	G
1	Projected Sales at 5% growth						
2							
3		Europe	North America	Middle East	Far East	Asia	Australasia
4	Year 1	10,000	15,000	60,000	80,000	75,000	40,000
5	Year 2	10,500	15,750	63,000	84,000	78,750	42,000
6	Year 3	11,025	16,538	66,150	88,200	82,688	44,100
7	Year 4	11,576	17,364	69,458	92,610	86,822	46,305
8	Year 5	12,155	18,233	72,930	97,241	91,163	48,620
9	Year 6	12,763	19,144	76,577	102,103	95,721	51,051
10	Year 7	13,401	20,101	80,406	107,208	100,507	53,604
11	Year 8	14,071	21,107	84,426	112,568	105,533	56,284
12	Year 9	14,775	22,162	88,647	118,196	110,809	59,098
13	Year 10	15,513	23,270	93,080	124,106	116,350	62,053
14							

*Fig.1 A sample of data to be charted.*

### Select the Data to be Charted

Select the block of data that you want to appear in the chart, remembering to include the row and column headings (*Fig.2*). Excel will allow you to change the range of data shown when you have finished building the chart.

	A	B	C	D	E	F	G
1	Projected Sales at 5% growth						
2							
3		Europe	North America	Middle East	Far East	Asia	Australasia
4	Year 1	10,000	15,000	60,000	80,000	75,000	40,000
5	Year 2	10,500	15,750	63,000	84,000	78,750	42,000
6	Year 3	11,025	16,538	66,150	88,200	82,688	44,100
7	Year 4	11,576	17,364	69,458	92,610	86,822	46,305
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12	Year 9	14,775	22,162	88,647	118,196	110,809	59,098
13	Year 10	15,513	23,270	93,080	124,106	116,350	62,053
14							

*Fig.2 Select the data to be charted.*

If you do not want to chart the entire range of data then select only that which you want to see charted. If you want to chart various sections of the data that do not form a continuous block you can make a non-contiguous selection by selecting one block with the mouse, then holding down the **[Control]** key whilst selecting another block, remembering always to include the cells containing the headings (*Fig.3* and *Fig.4*).

	A	B	C	D	E	F	G
1	Projected Sales at 5% growth						
2							
3		Europe	North America	Middle East	Far East	Asia	Australasia
4	Year 1	10,000	15,000	60,000	80,000	75,000	40,000
5	Year 2	10,500	15,750	63,000	84,000	78,750	42,000
6	Year 3	11,025	16,538	66,150	88,200	82,688	44,100
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12	Year 9	14,775	22,162	88,647	118,196	110,809	59,098
13	Year 10	15,513	23,270	93,080	124,106	116,350	62,053
14							

Fig.3 Selecting non-contiguous columns.

	A	B	C	D	E	F	G
1	Projected Sales at 5% growth						
2							
3		Europe	North America	Middle East	Far East	Asia	Australasia
4	Year 1	10,000	15,000	60,000	80,000	75,000	40,000
5	Year 2	10,500	15,750	63,000	84,000	78,750	42,000
6	Year 3	11,025	16,538	66,150	88,200	82,688	44,100
7	Year 4	11,576	17,364	69,458	92,610	86,822	46,305
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12	Year 9	14,775	22,162	88,647	118,196	110,809	59,098
13	Year 10	15,513	23,270	93,080	124,106	116,350	62,053
14							

Fig.4 Selecting non-contiguous rows.

When making a multiple selection, select the data in a logical order starting with the row or column headings. This helps Excel decide how the data should be arranged on the chart. When you create the chart, if the data is not arranged as you intended, you will be able to make changes to specify exactly how it should appear.

### Create the Basic Chart

Earlier versions of Excel included a *Chart Wizard* tool to guide you through the steps of creating a chart. Excel 2007 does not use this wizard and instead provides all the tools you need on the Ribbon. Having selected the data to be charted go to the **Insert** tab of the Ribbon where you will find a section devoted to charts (*Fig.5*).



Fig.5 The Charts section of the Ribbon.

You can either choose one of the basic chart types illustrated on the Ribbon or click the small arrow below one of the icons to display a palette of variations on that type of chart (*Fig.6*). Alternatively click the small arrow button in the lower-right corner of the **Charts** section of the ribbon to display the **Insert Chart** dialog box in which all the available chart types are displayed in one place (*Fig.7*).

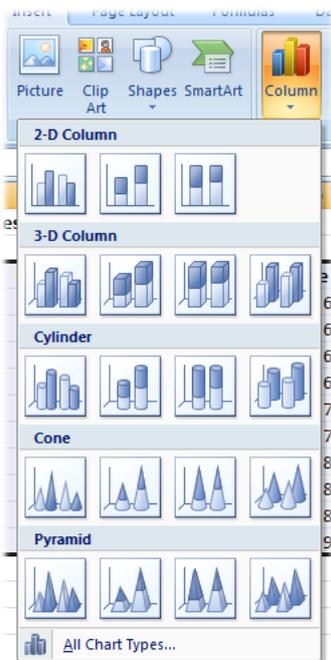


Fig.6 The available variants of a chosen chart type.

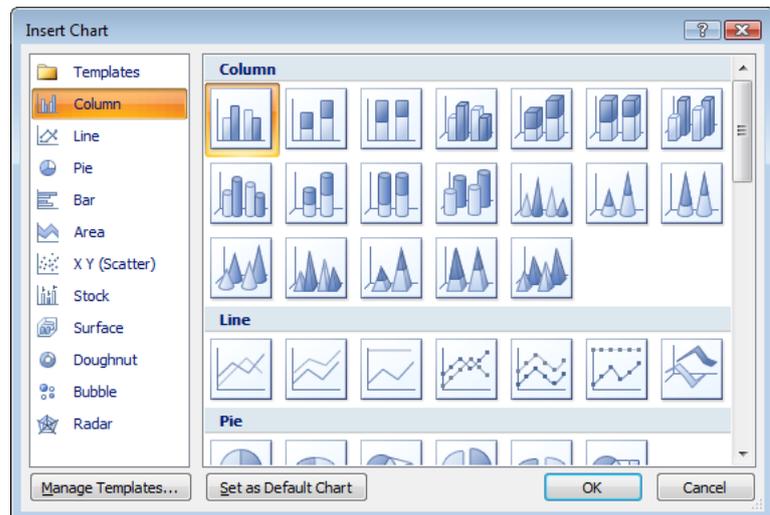


Fig.7 The Insert Chart dialog shows all available chart types.

When you make your choice a chart appears on the worksheet. The chart is created as a floating object (a *Shape*) on the worksheet and can be moved and resized in the usual way.

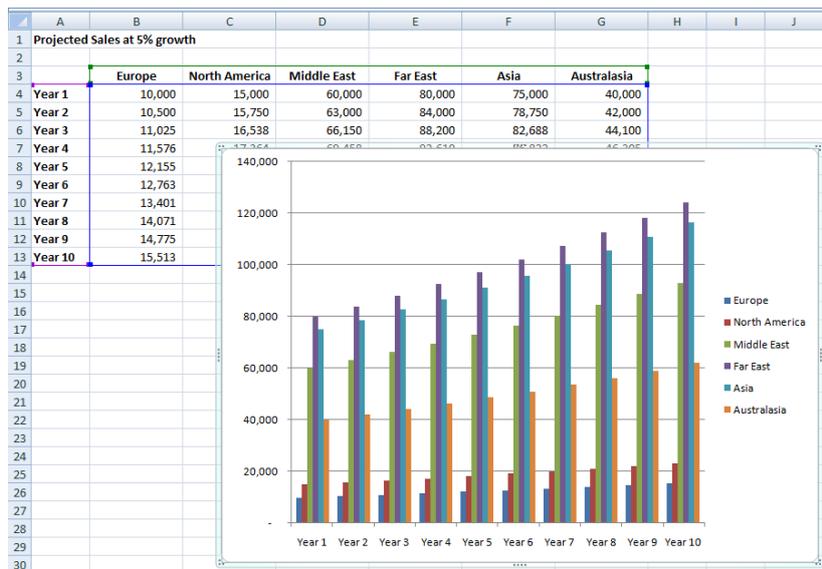


Fig.8 The basic chart created by the Chart Wizard.

Notice that when the chart object is selected (so that you can see its transparent border and dotted resizing handles around its edge) the data represented in the chart is outlined on the worksheet with coloured rectangles in the same way that the component ranges of a formula are displayed in different colours (Fig.8). You can resize these coloured rectangles to change the range of data displayed by the chart.

Note also that when the chart is selected Excel displays three new tabs on the Ribbon, grouped under the heading **Chart Tools**. These are:

- **Design** – providing Type, Data, Chart Layouts, Chart Styles and Location tools.
- **Layout** – providing Current Selection, Insert, labels, Axes, Background, Analysis and Properties tools.
- **Format** – providing Current Selection, Shape Styles, Word Art Styles, Arrange and Size tools.

### Choosing the Right Type of Chart

It is important to choose the right type of chart to best display your data. What might look attractive may not necessarily show your data in a format that is easy to read and understand. In the example above (Fig.8) a *Clustered Column* chart was chosen which does not display the data in a way that is easy to compare the different regions. A simple *Line* chart makes it much easier to see and compare the trends in the data (Fig.9).

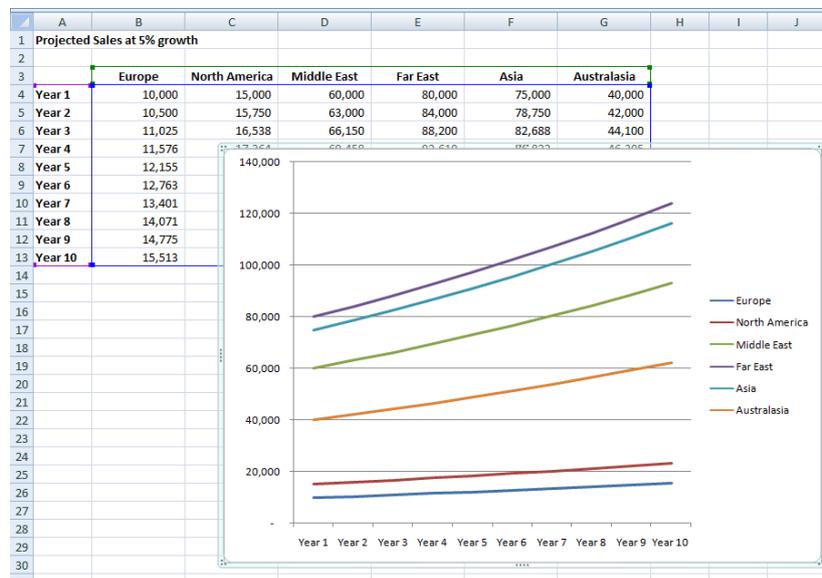


Fig.9 The same data displayed as a Line Chart.

It is easy to change the chart type. Simply click on the chart to select it and on the **Design** tab of the Ribbon click the **Change Chart Type** button to display the **Change Chart Type** dialog box (similar in appearance to the **Insert Chart** dialog (Fig.7)) then make a choice and click **OK**.

### How the Series are Arranged

Excel guesses how to display your data according to how you have arranged it on the worksheet and, when you make a multiple selection, the order in which the different sections of data were selected. In this example a multiple selection was made to include the headings and the data for *Year 1, Year 5 and Year 10* for all the regions. Excel has guessed what I require and has plotted *Region* (on the x-axis) against the numerical data (on the y-axis) with each year as a separate series (Fig.10 left) but I wanted to see *Year* on the x-axis with each region as a separate series (Fig.10 right).

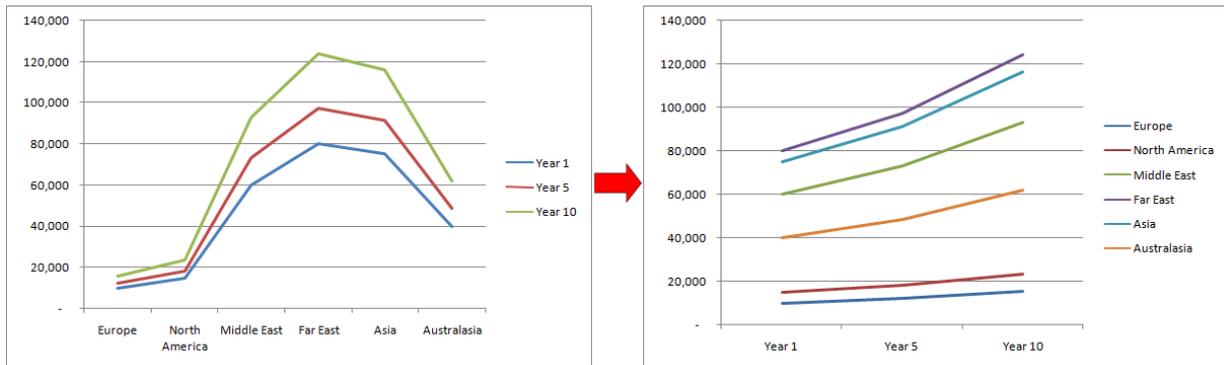


Fig.10 Choosing how the series are arranged.

Changing the arrangement of data on your chart is a simple matter. Select the chart and on the **Design** tab of the Ribbon click the **Switch Row/Column** button. If this does not achieve the arrangement you require try the **Select Data** button, also on the **Design** tab which gives even greater control. The **Select Data Source** tool also allows you to add, edit or remove *Legend Entries* and their associated series, and *Horizontal Axis Labels* and their associated categories. This makes it easy to specify which data to plot in a way that might be easier than creating a multiple selection. The illustration below (Fig.11) shows the result of removing two of the regions from the original multiple selection using this method.

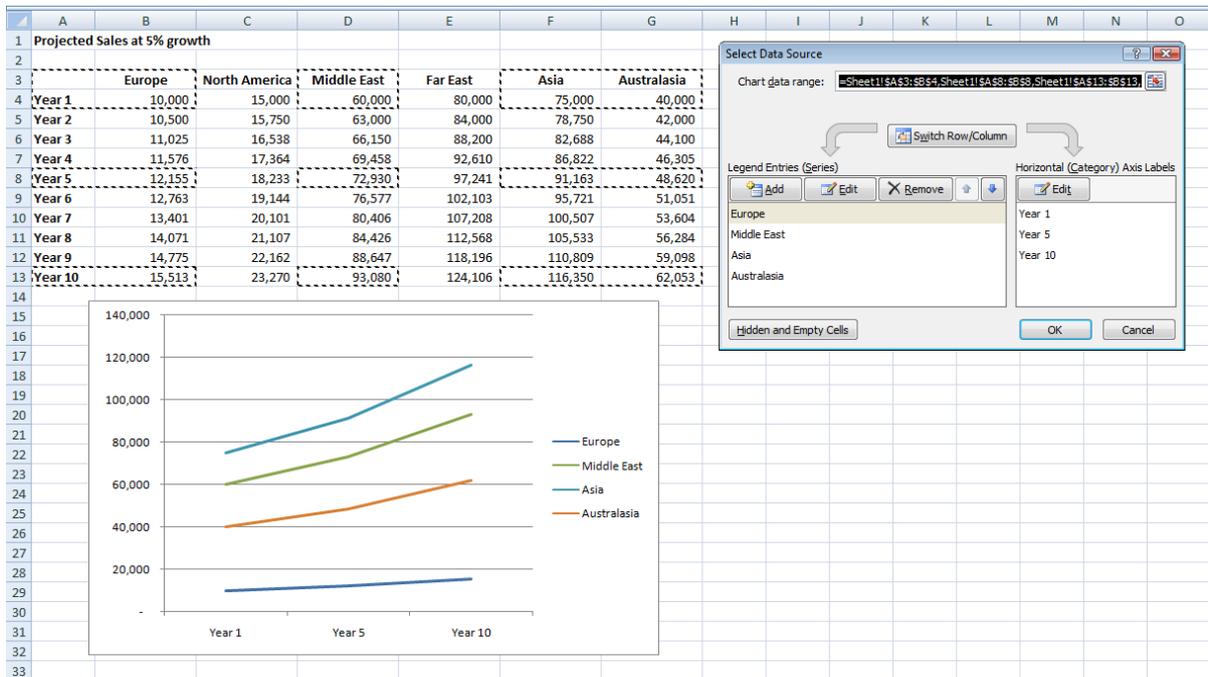
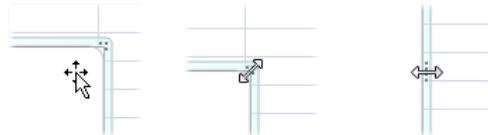


Fig.11 Defining the plotted data using the Select data Source dialog.

## Moving and Resizing the Chart

The size and shape of the chart that Excel creates for you might not be just right for the purpose you have in mind. Will it be viewed on screen, printed out either on its own or together with its spreadsheet data, or maybe you plan to paste it into a report in Microsoft Word or include it in a Microsoft PowerPoint slideshow. Since the chart is created as an object floating on the worksheet it can be moved and resized in the same way as you would change a drawing or picture.

The mouse pointer shows when you can move or resize an object (*Fig. 12*). To move the chart select it and point at an empty section of the *Chart Area* so that the mouse pointer displays a four-headed arrow then drag the chart to the desired location on the worksheet. To change the size of the chart by pointing at the dotted resizing handles located at the corners and along the sides of the chart border until the mouse pointer displays a diagonal or horizontal double-headed arrow then drag the border to alter the size.



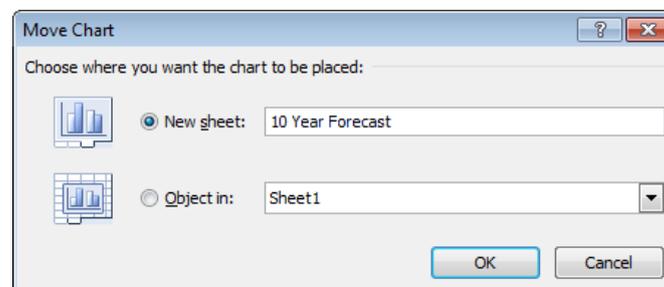
*Fig. 12 The mouse pointer indicates that the chart can be moved or resized.*

If you want to be precise the **Format** tab of the Ribbon includes a **Size** section where you can specify the exact dimensions of the chart object.

## Changing the Chart Location

As described so far, the chart is an object on the same worksheet as the data it displays (like this it is called an *embedded chart*). This is useful because it allows you to see the data and the chart at the same time and it allows you to easily modify the size of the range charted. But it isn't always desirable to do this so, if you prefer, Excel can display the chart on a sheet of its own (called a *chart sheet*).

Right-click anywhere on the chart and choose **Move Chart**. In the *Move Chart* dialog box select **New sheet** and enter a suitable name in the textbox (*Fig.13*). When you click the **OK** button the chart is moved to a new sheet of its own.



*Fig.13 Placing a chart on its own sheet.*

If at any time you want to return the chart to its original worksheet, or place it on a different worksheet (a chart does not have to be embedded on the same sheet as its data), right-click on the chart and enter your choices into the dialog box.

## Formatting the Chart

A chart is made up of many different elements, each of which can be formatted in a wide variety of ways so that you can make your chart look almost any way you wish.

For major changes of colour scheme check the **Chart Styles** section of the Ribbon's **Design** tab (*Fig.14*) from where you can apply one of many different schemes designed for your particular kind of chart. First click on the chart to select it then click on your chosen scheme to apply it to the chart. Choose an option from the **Chart Layouts** section to specify whether or not you want your chart to include a *Legend*, *Title* or *Data Table* and where you want them located.



Fig.14 The Chart Design tab.

For more control, go to the **Layout** tab (Fig.15) of the Ribbon where you can fine-tune each of these options.



Fig.15 The Chart Layout tab.

For complete control select the specific part of the chart you want to change and apply your chosen format. Excel makes it easy to do this. When you hover the mouse pointer over a specific part of the chart a tooltip appears next to it giving the name of the part. To select it just click the mouse and apply your chosen format from the appropriate tab on the Ribbon. Alternatively, right click the chart item and choose **Format [name of item]** (e.g. **Format Gridlines**) from the menu to open a dialog box with all the available formatting options listed.

In the upper left corner of the **Layout** and **Format** (Fig.16) tabs is a section labelled **Current Selection**. It contains a drop-down list of all the chart elements. You can choose an item from this list to select it on the chart then click the **Format Selection** button just below it to open the **Format** dialog box.



Fig.16 The Chart Format tab.

## Making the Most of Your Chart

In business many would agree that the presentation of data is just as important as the data itself. With Excel's powerful charting tool the possibilities are endless. A chart that looks good and is clear and easy to understand is a great asset. A chart's design should be simple and clear. Don't include things that aren't necessary but make sure that everything is present that is needed to understand what is being displayed. Here are some suggestions..

Whilst Excel's chart tools can very easily create a good-looking chart, don't always be satisfied with what the program gives you. This example (Fig.17) illustrates how making a few small changes can substantially improve the appearance of a basic chart. The most obvious change results from moving the *Legend* which in the default position to the right of the plot area takes up a great deal of space, partly due to the long series names. It has been moved to an empty area in the upper left section of the plot area and also condensed by placing the individual legend items closer together (simply by changing the size of the legend box). This allows the important part of the chart, the plot area itself, to occupy a much larger space.

The horizontal gridlines made the plot area cluttered so they have been deleted and the axis line colour changed from grey to black to make them more prominent. In addition the vertical axis number format has been changed to *Currency*. Finally, a *Chart Title* has been added. Never assume that the person viewing your chart knows what it represents. Every chart should have a title that clearly states what is being shown.



Fig.17 Making a few simple improvements to the basic chart.

The chart shown in the illustration below (Fig.18) is plotting a single series of data so is ideally suited to a *column chart*. The legend is unnecessary and has been deleted. A more stylish 3-D fill has been chosen for the vertical bars and the gap between them has been reduced to 10%. Data labels have been added in a contrasting colour to show the exact value of each data point. The columns are the same colour because they all belong to the same series and there was no need to make them different. This would only have confused the view, although you might want to change the colour of a single data point if it had a special significance.

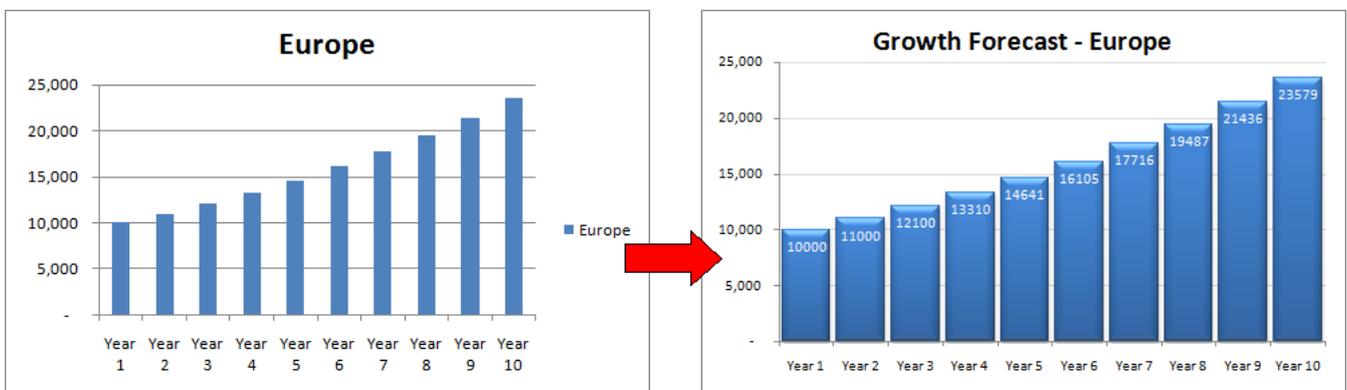


Fig.18 A single series column chart.

Single series charts can also be suitable for displaying as a *pie chart*. Pie charts are often used when it is required to show each data point as a percentage of the total (Fig.19). Each "slice" of the pie represents a single data point and the slices are usually coloured differently. Whilst you can display a legend with a pie chart individual data labels are a better choice and Excel offers a range of options. If the pie slices are too small to accommodate the label text the labels can be placed around the perimeter of the pie with optional *leader lines* to clearly indicate which slice each label refers to.

In the next example (Fig.19) the legend has been replaced by data labels showing the *Category Name* and *Percentage* value of each slice; the *Chart Title* has been edited to be more meaningful and the *3-D Rotation* of the chart has been adjusted to bring the smaller slices to the front. For emphasis one slice has also been dragged a little way out of the pie.

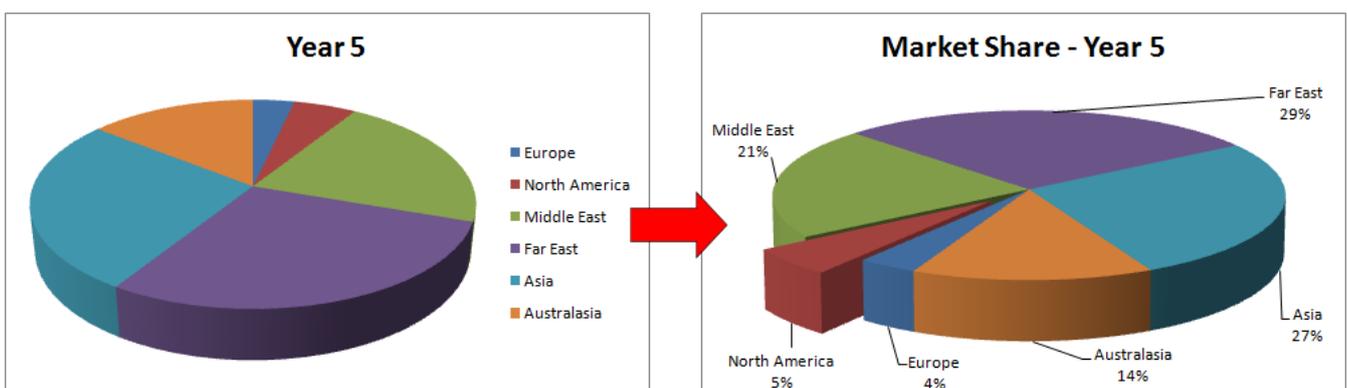


Fig.19 A single series pie chart.