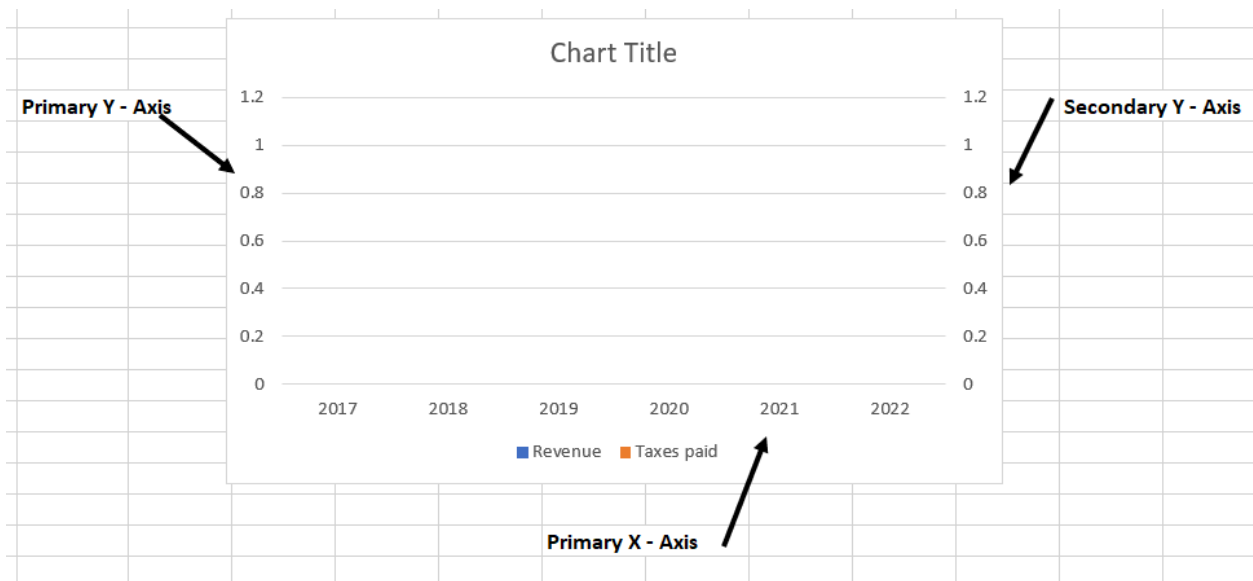


Secondary Axis

A secondary axis is an additional axis on an Excel graph. It helps to visualize data in another dimension. A secondary Y-axis runs along the right side of the graph, while a secondary X-axis runs along the top.

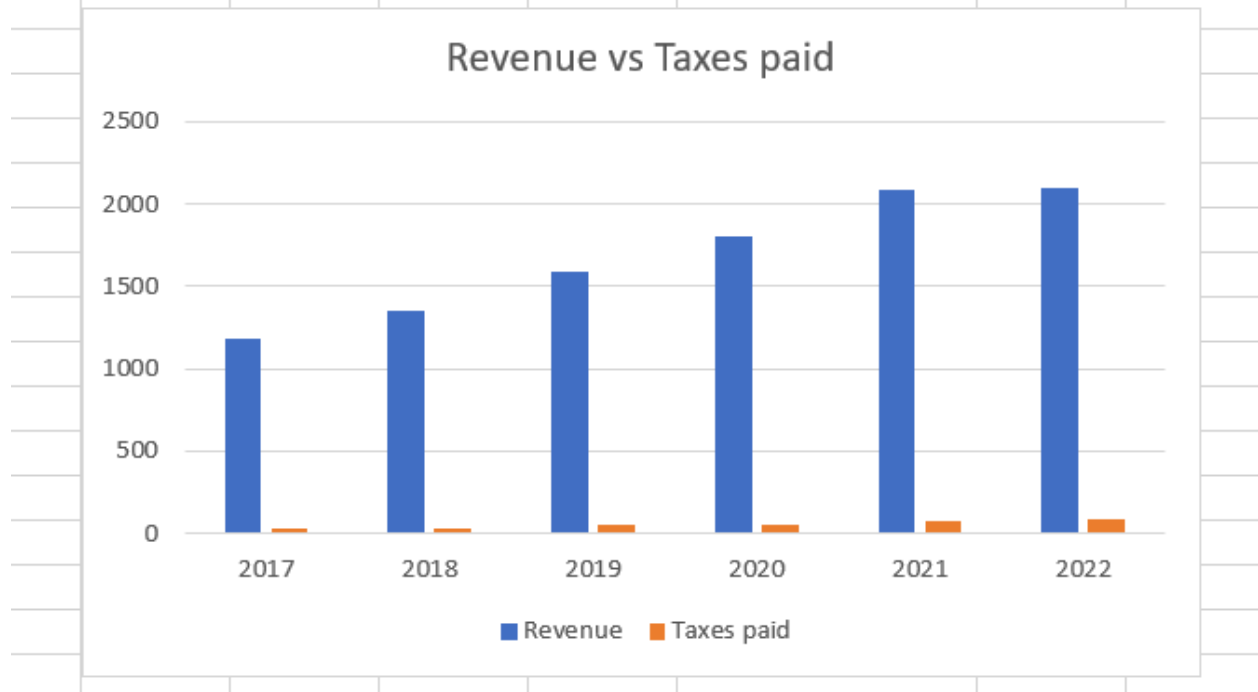


A secondary axis allows a user to plot multiple data sources on the same graph without the need for additional charts or graphs. This is an efficient use of space and turning data into information in financial modeling.

Secondary axes are useful when two data series are related but cannot be compared on a single primary Y-axis. It allows you to present related information in a single graph when you otherwise would need two charts to present the same data.

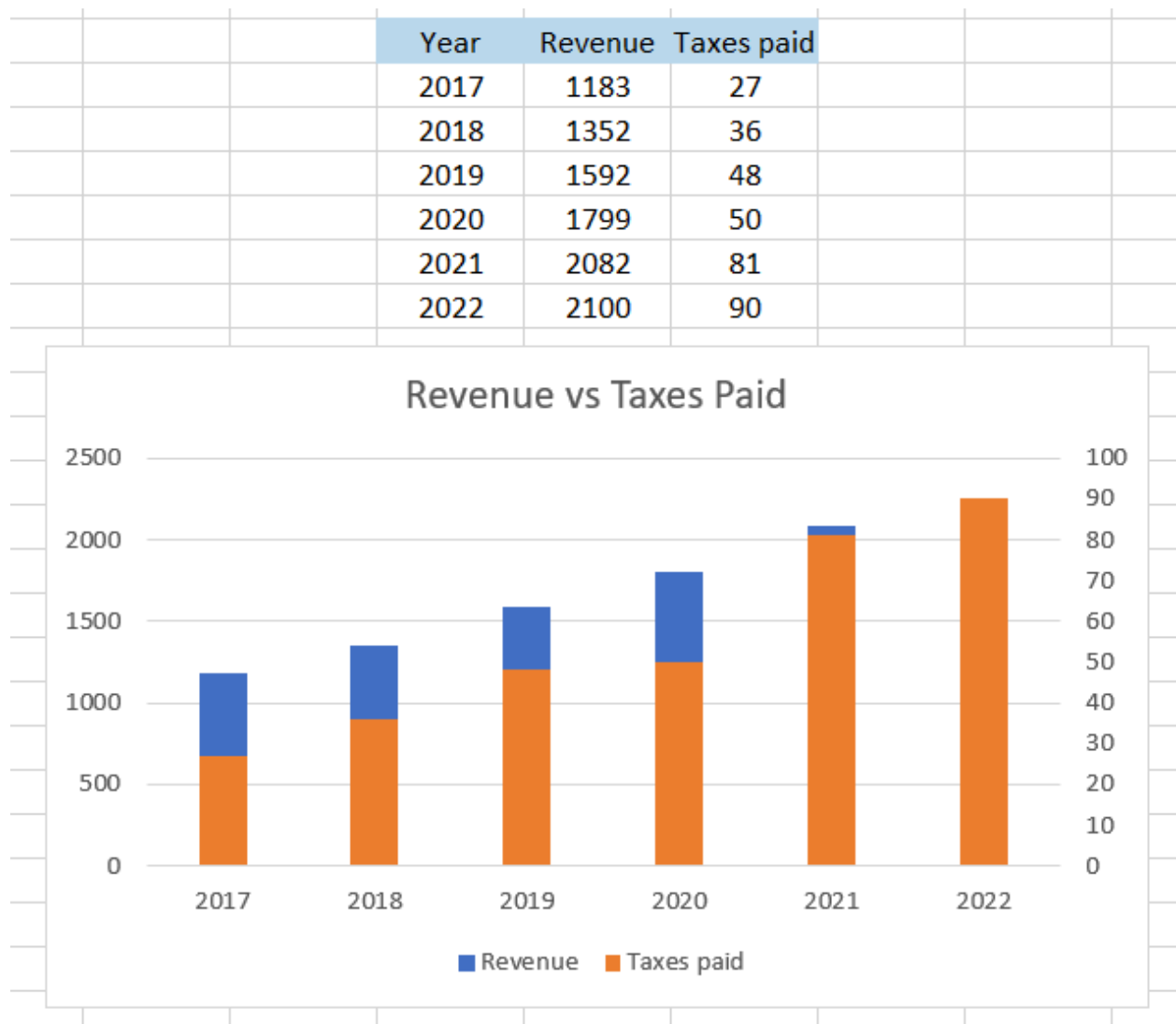
For example, assume that you are plotting revenue for the last five years on the chart along with [taxes](#) paid each year.

Year	Revenue	Taxes paid	Tax as % of Revenue
2017	1183	27	2.28
2018	1352	36	2.66
2019	1592	48	3.02
2020	1799	50	2.78
2021	2082	81	3.89
2022	2100	90	4.29



Looking at the example chart above, taxes paid are hardly visible on the bar graph. Imagine if we had wanted to better display taxes as a percentage of revenue. This would also look a little wonky using the current axes. But with a secondary axis, we can more effectively

communicate this information to the observer.



Here the chart shows two different Y axes - the one on the left (default) and other on the right (secondary axis).

The left axis portrays the revenue for each year with a range from \$0 to \$2500 million dollars while the other shows the taxes paid ranging from \$0 to \$100 million dollars. Even though both the values are measured in US dollars, the difference in the magnitude of the values is quite large.

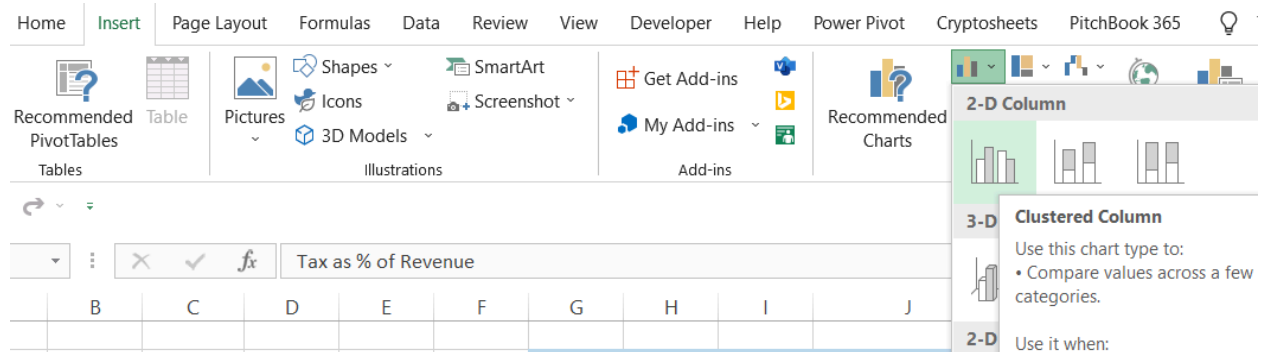
How to Add a Secondary Axis

Here is the data for revenue earned by company ABC from 2017-2022 along with the taxes paid and taxes as a percentage of revenue.

Year	Revenue	Taxes paid	Tax as % of Revenue
2017	1183	27	2.28
2018	1352	36	2.66
2019	1592	48	3.02
2020	1799	50	2.78
2021	2082	81	3.89
2022	2100	90	4.29

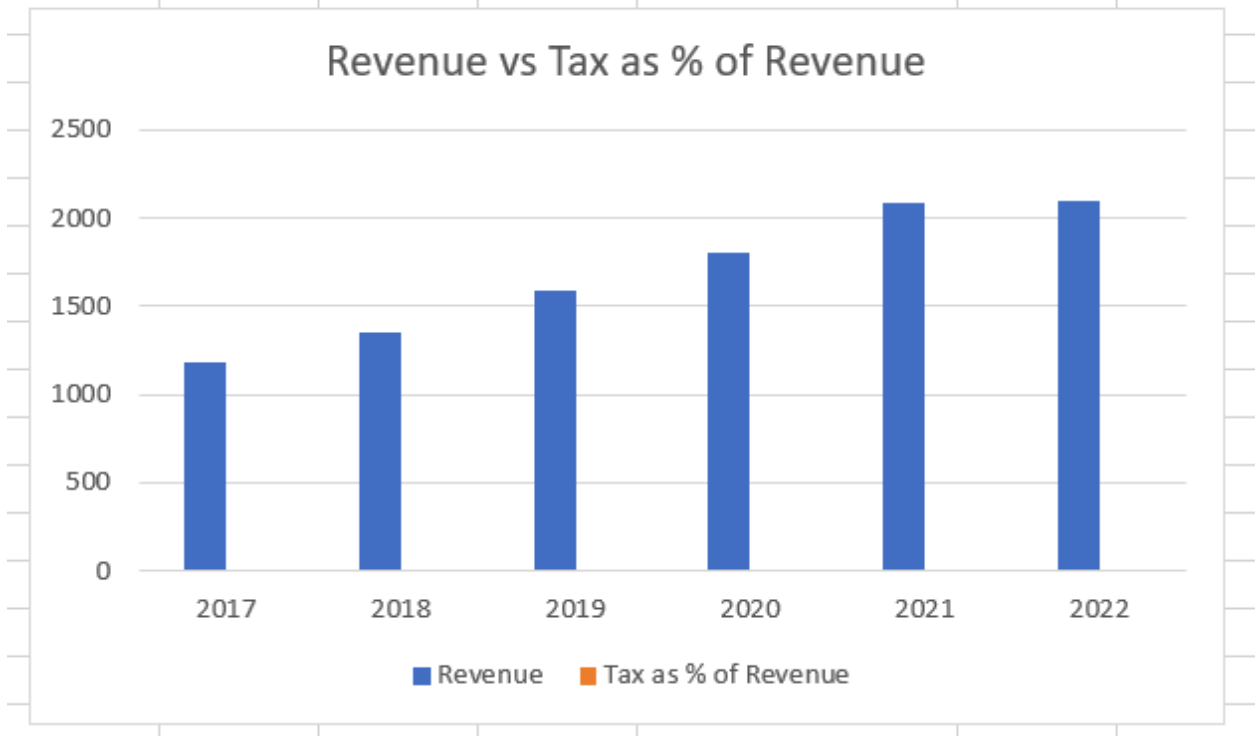
The steps to add the secondary axis is:

- Firstly, select the data then go into Insert and then into the charts section to select the 2-D Clustered Column chart. You can also use the keyboard shortcut of Alt + N + C after selecting the data.



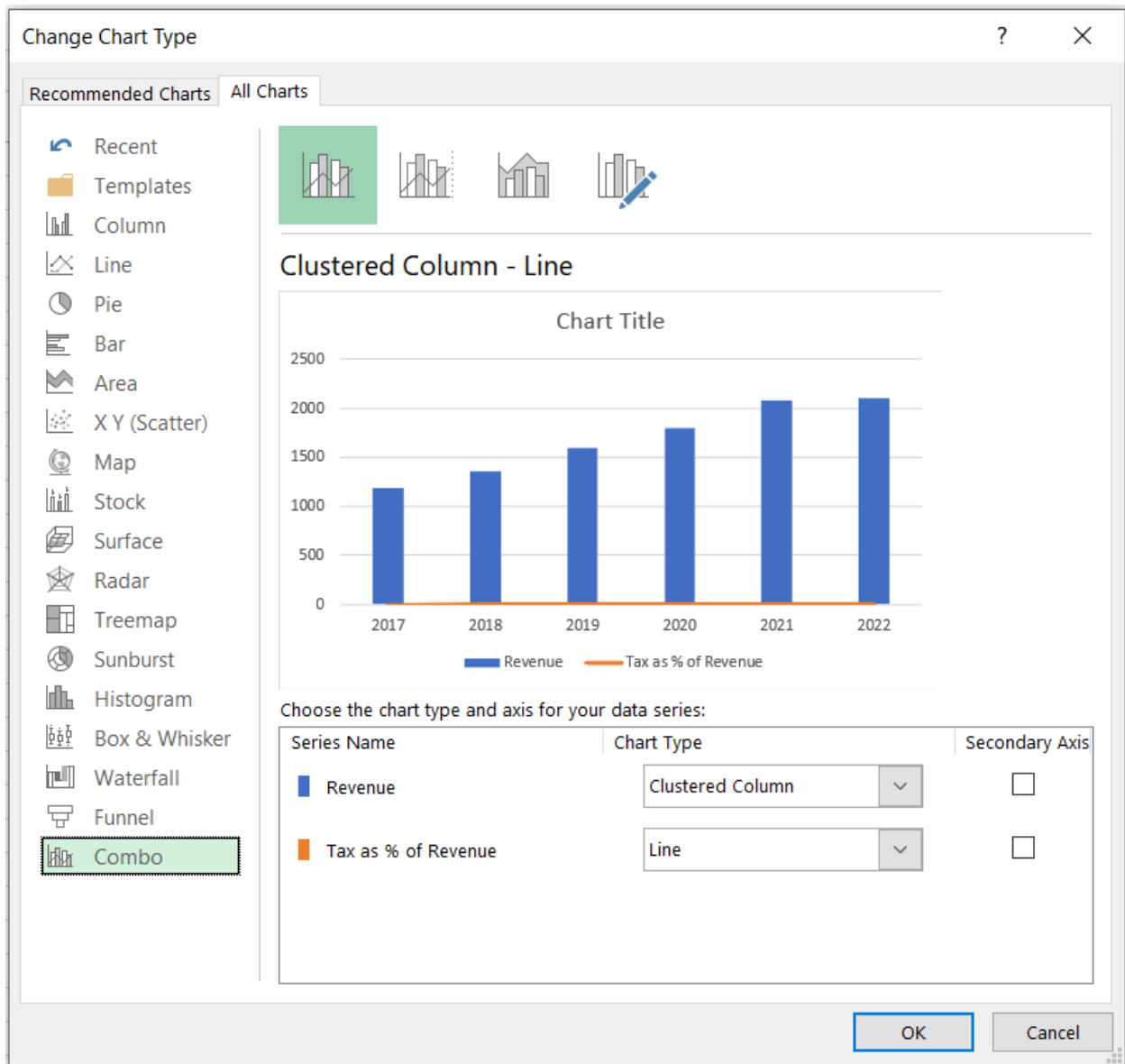
- Initially your chart will look as illustrated below:

Year	Revenue	Taxes paid	Tax as % of Revenue
2017	1183	27	2.28
2018	1352	36	2.66
2019	1592	48	3.02
2020	1799	50	2.78
2021	2082	81	3.89
2022	2100	90	4.29



we only have a single primary axis on the left side.

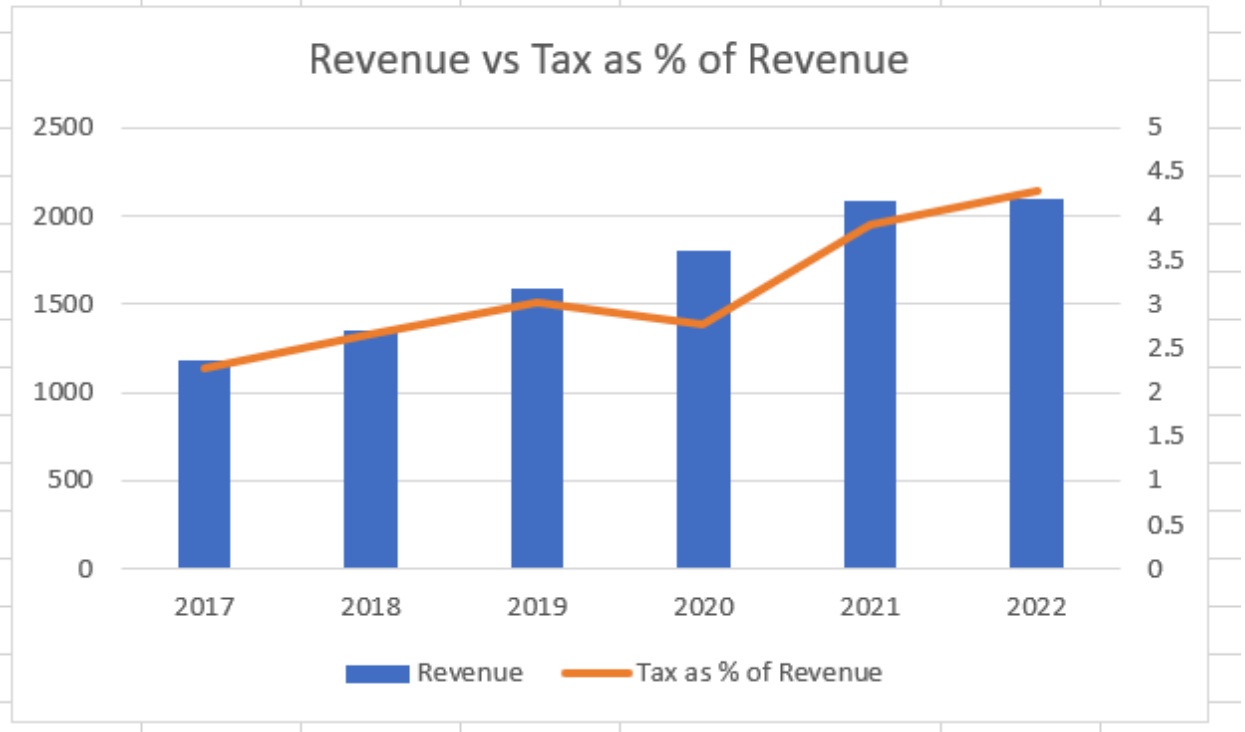
- Next, we will select on the chart and change the chart type to a combo chart:



Here, you can keep the Revenue series as 'Clustered Column' chart type while you can change the Tax as % of Revenue as 'Line' chart.

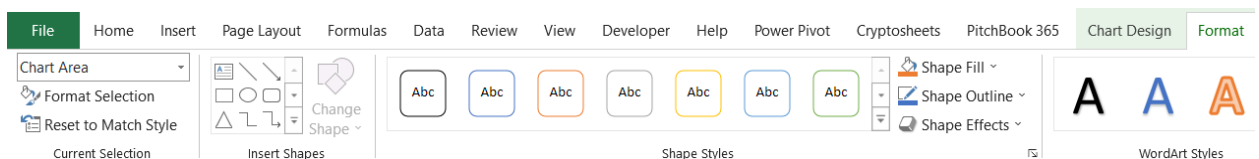
- The tick box besides lets you add the secondary axis to your chart. Tick the box for 'Tax as % of Revenue' and then click on Ok.
- After adding the secondary axis, our chart will now look as:

Year	Revenue	Taxes paid	Tax as % of Revenue
2017	1183	27	2.28
2018	1352	36	2.66
2019	1592	48	3.02
2020	1799	50	2.78
2021	2082	81	3.89
2022	2100	90	4.29

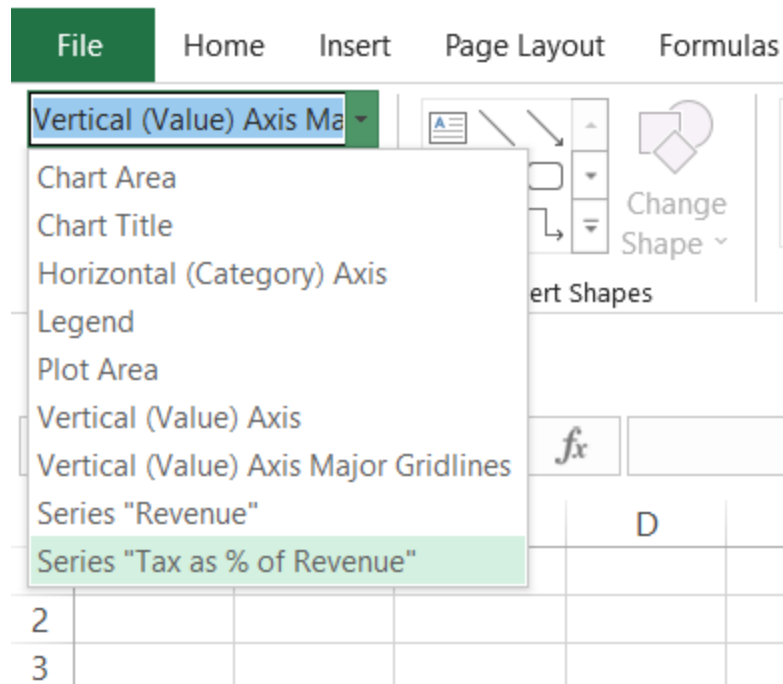


The scale for both the axes match the respective magnitude of data that is being represented in our chart.

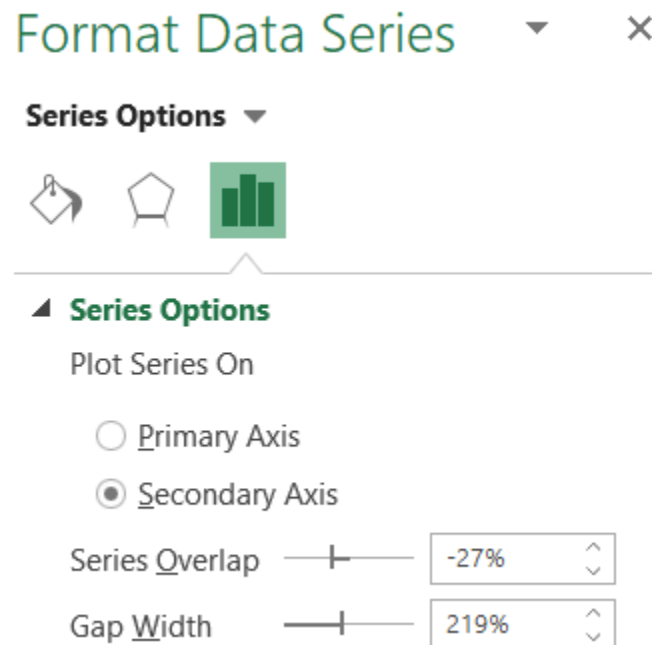
- Since you know that Excel can perform the same task in different ways, there is another way to add a secondary axis without changing the chart type for the data.
- Click on the chart and then on the format menu that you will see in the menu tab.



- Next click on the drop down menu above the 'Format Selection' and select 'Series "Tax as % of Revenue"'. Whatever data series that you need to represent on the secondary axis, will be selected here in case of multiple data series.

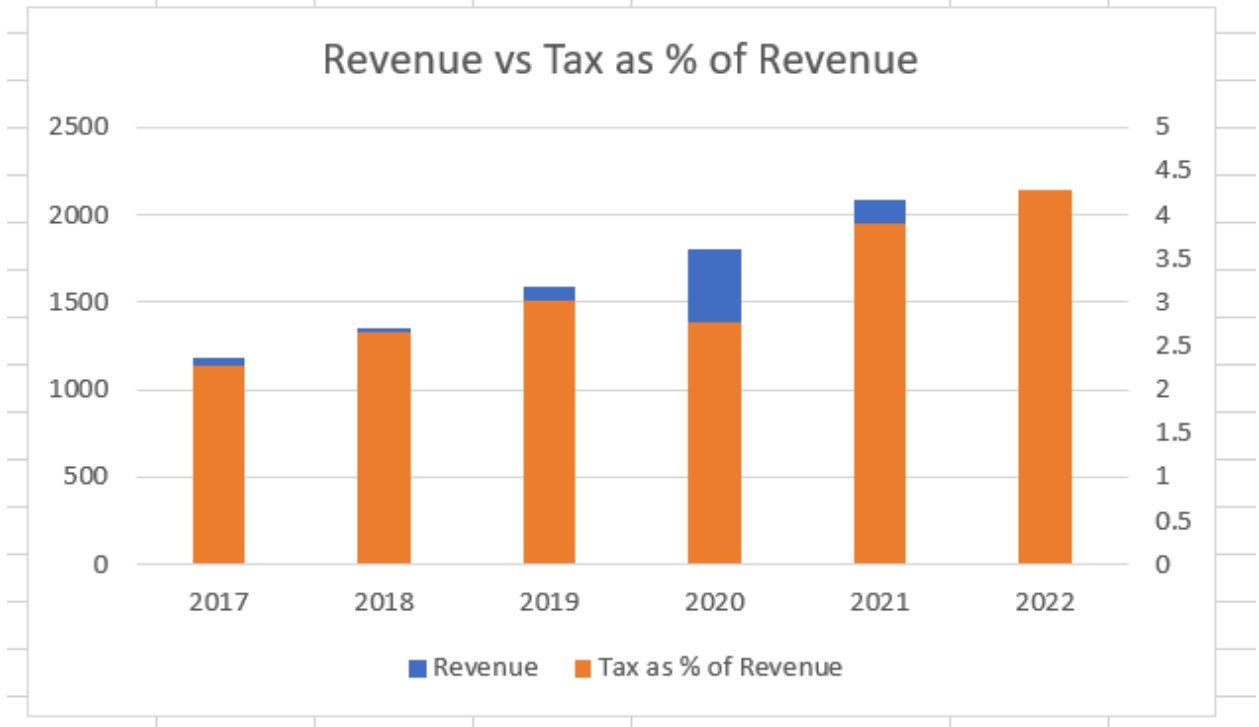


- To the right side of Excel, you will find the Format Data Series option where you just need to select the radio box for 'Secondary Axis'



- After you make the changes, the chart will look like this:

Year	Revenue	Taxes paid	Tax as % of Revenue
2017	1183	27	2.28
2018	1352	36	2.66
2019	1592	48	3.02
2020	1799	50	2.78
2021	2082	81	3.89
2022	2100	90	4.29

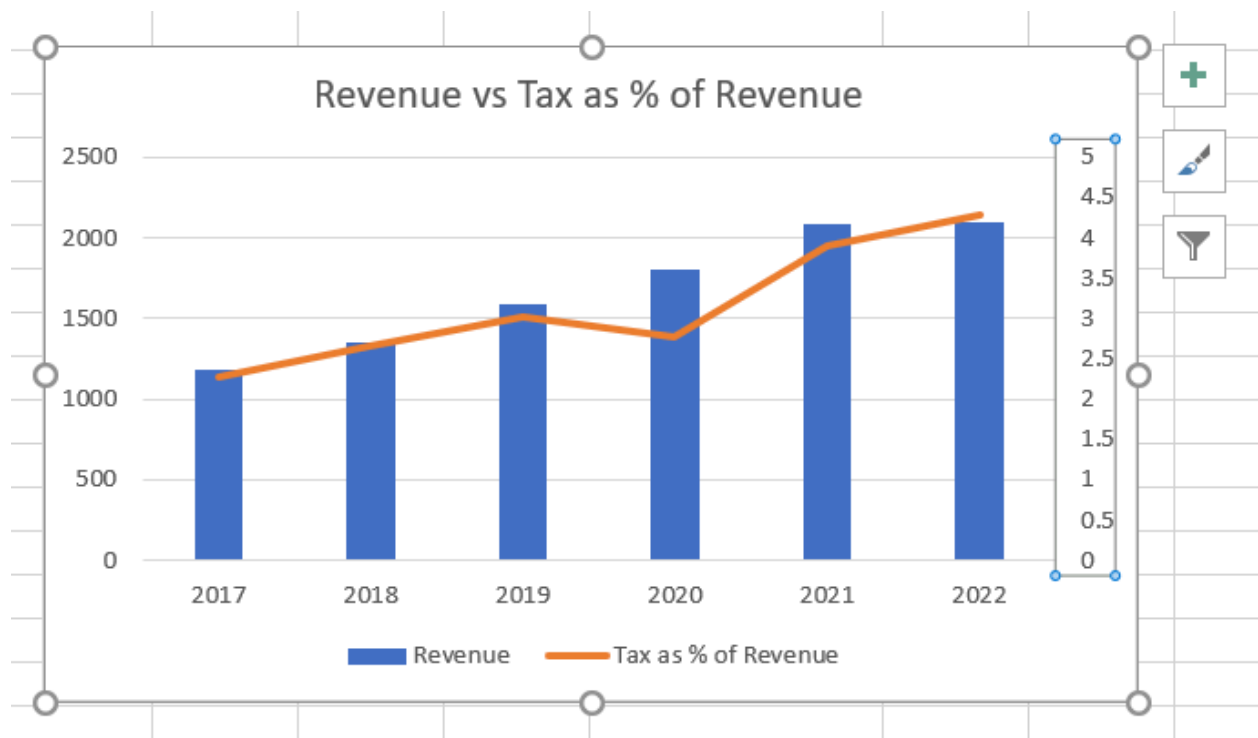


We get the same result, the only difference being our chart for the 'Tax as % of Revenue' is 2-D 'Clustered Column' as well. What method you use to add the secondary axis is really up to you and the preference for the chart selection that you use for different data Series.

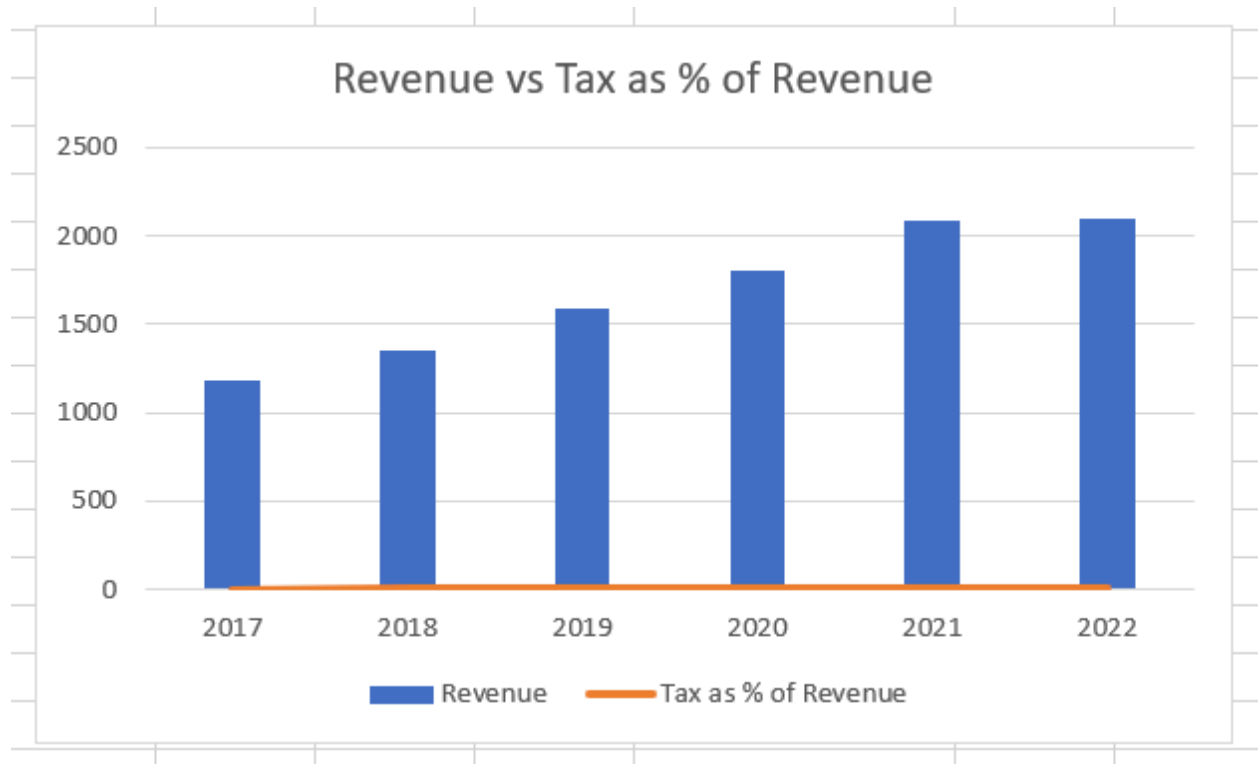
[Add: Free excel crash course]

Removing the secondary axis

Sometimes, you might just not need the secondary axis after a change of thought after initially adding it. So how do you remove it from your chart? Well, it's really as simple as just using the delete button. But first, you need to select the secondary axis on the chart.



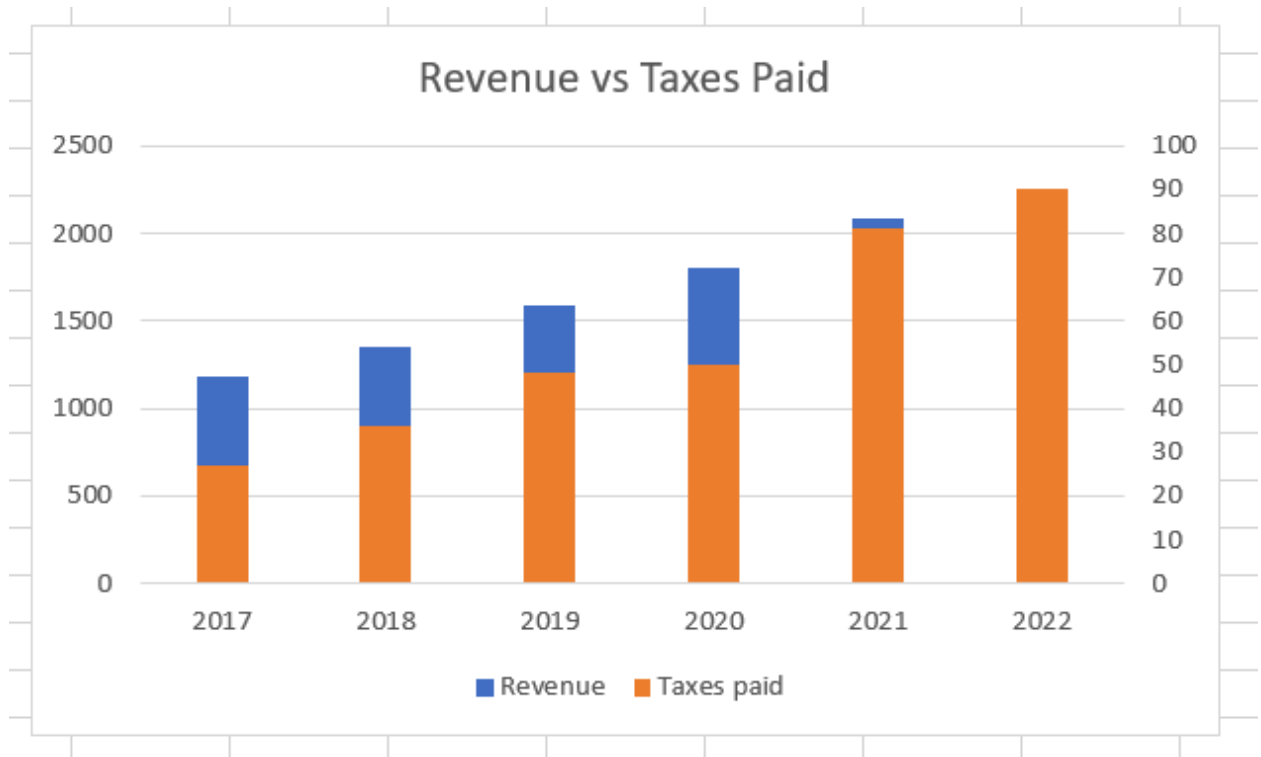
Now, press either Delete or the Backspace key on the keyboard. Voila! The chart changes back to its default mode having a single primary axis.



Adding a secondary horizontal axis

We have already discussed how we can add a secondary Y- axis in our charts. Can we do the same for the secondary X axis as well? Let's see! The steps that you will be following to add a secondary horizontal axis in your chart are:

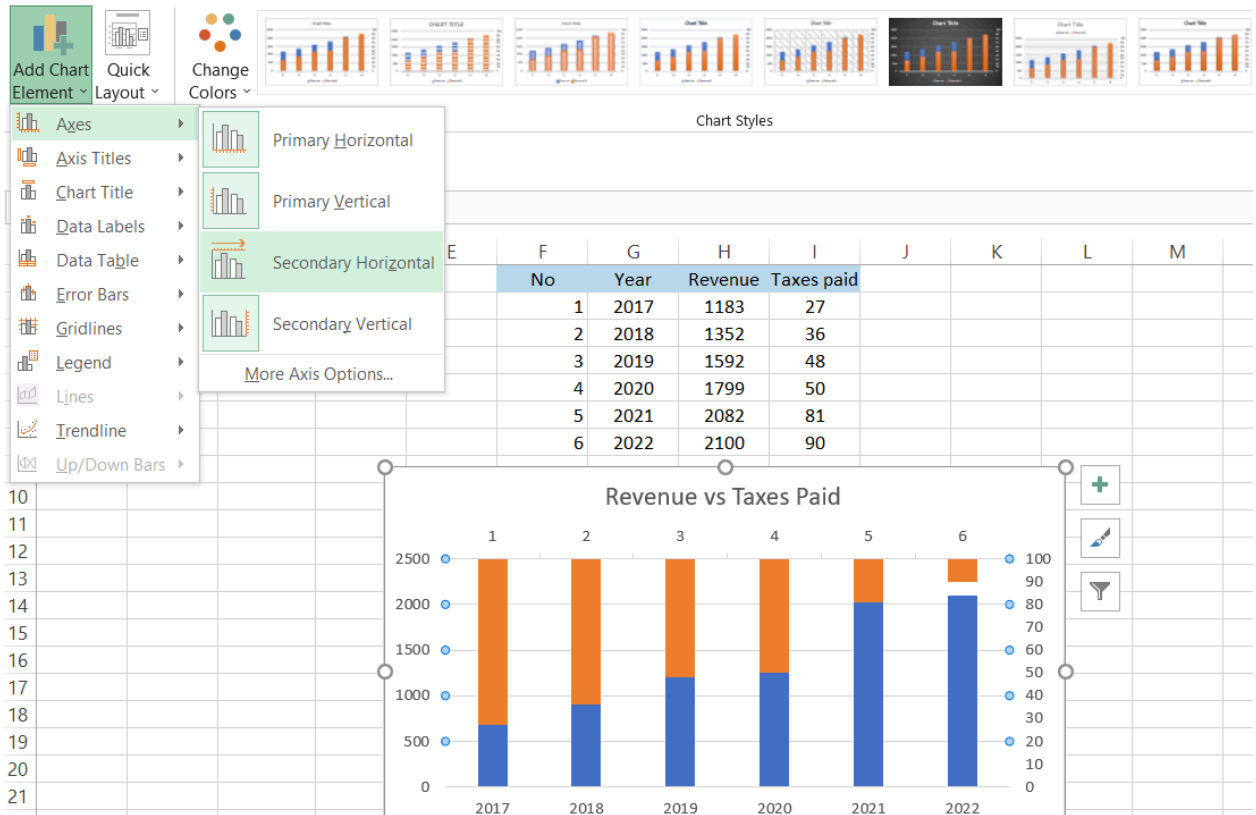
- First & foremost, the most important rule to adding a secondary horizontal axis is that you must have already added a vertical secondary axis (Y- axis) in your chart.



- Now, select the chart and click on 'Chart Design' in the Menu tab to find the 'Add Chart Element' in the Charts Layouts section.



- After clicking on 'Add Chart Element', navigate through the drop down menu and click on 'Secondary Horizontal' in 'Axes' to add a horizontal axis on the top of the chart.



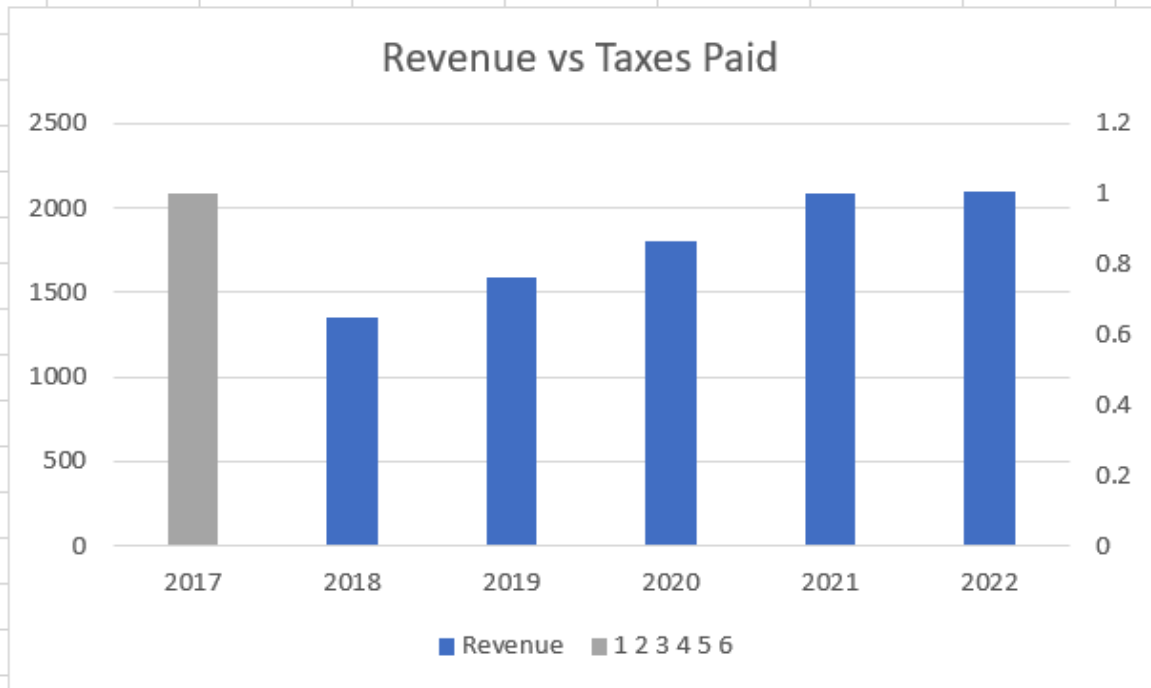
- This way, you can add a vertical axis on either side (Y-axis) and horizontal axis on either top or bottom(X-axis).

Changing the chart data

Sometimes the chart might take in wrong data for either X or Y axes which can cause issues for data analysis and visualization.

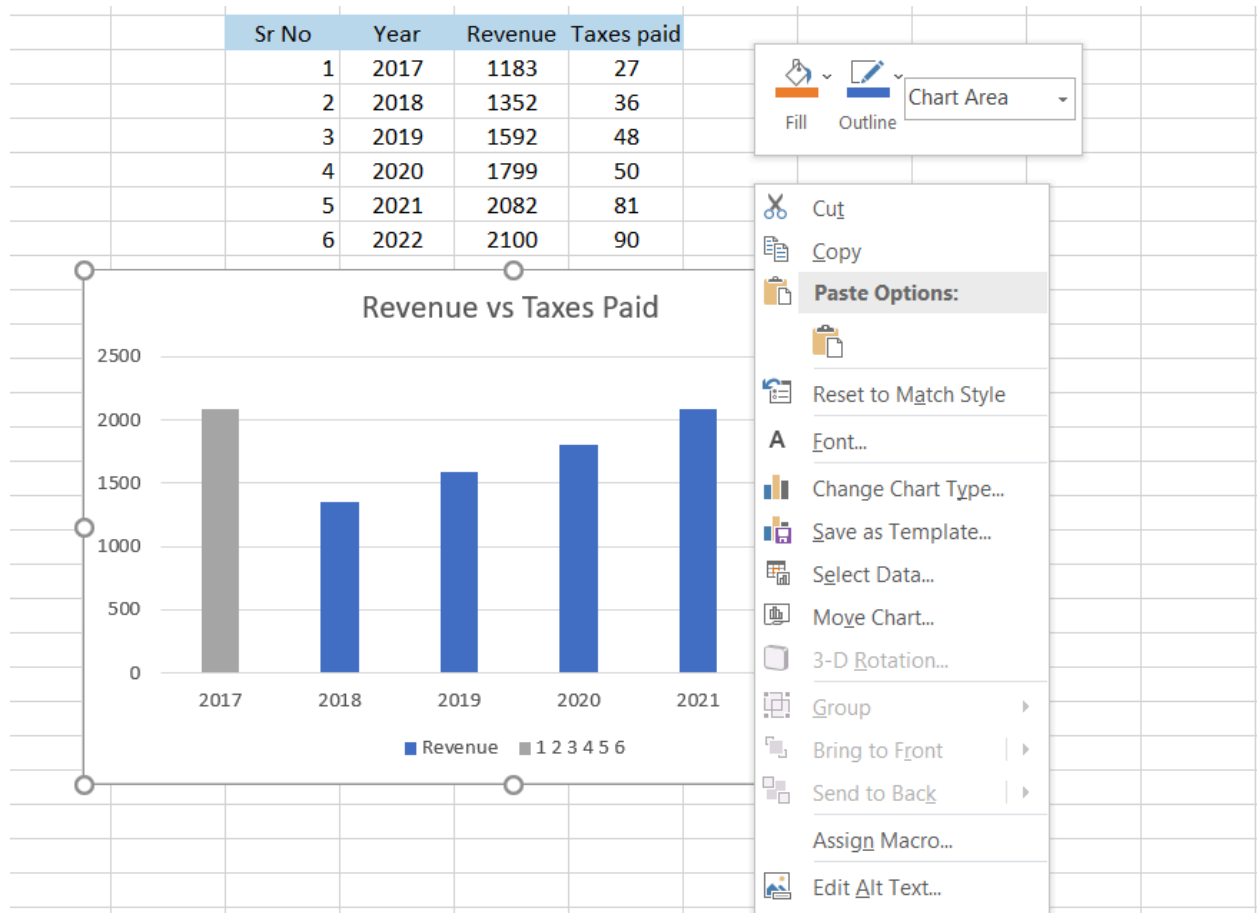
The easiest solution is to change the data rather than adding the charts all over again. Assume that the chart represents serial numbers instead of the taxes paid.

Sr No	Year	Revenue	Taxes paid
1	2017	1183	27
2	2018	1352	36
3	2019	1592	48
4	2020	1799	50
5	2021	2082	81
6	2022	2100	90

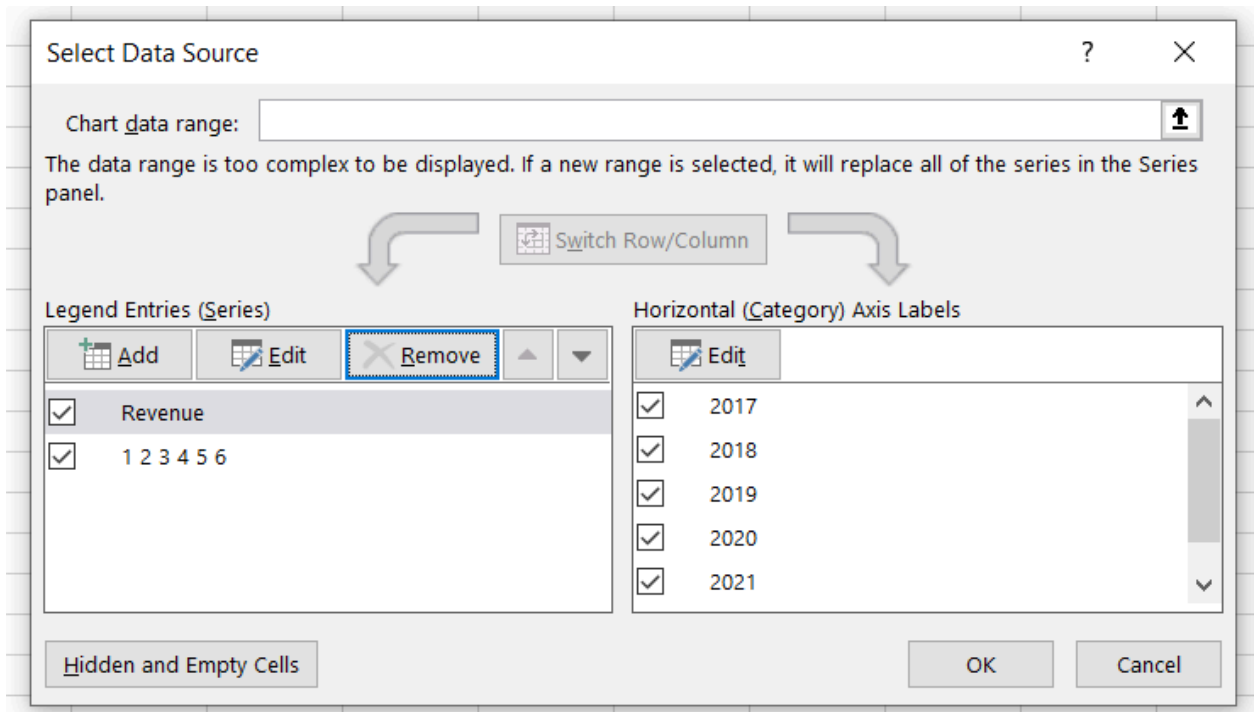


To change this, you can follow the below steps:

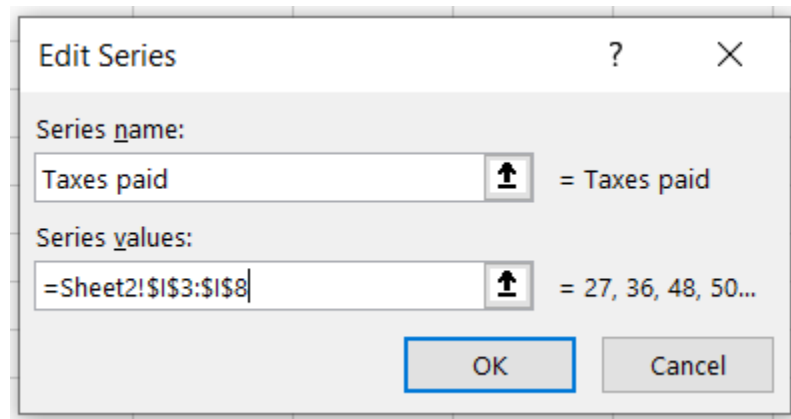
- Select the chart & right click on it to open the menu where you need to click on 'Select Data'.



- It will open the 'Select Data Source' dialog box where you can manually add data series as per your data analysis requirement.



- Next, you will remove the check from the second 'Legend Entries' and add a new entry instead by clicking on the 'Add' button.
- This opens up a dialog box that asks you to input the series name and values respectively from the table. After you have selected appropriate values, click OK.



- Now the data source dialog box will show the series under the 'Legend Entries'. Additionally you can remove the unnecessary data series from the chart. Once done, click on OK.

Select Data Source

Chart data range:

The data range is too complex to be displayed. If a new range is selected, it will replace all of the series in the Series panel.

Switch Row/Column

Legend Entries (Series)

Add Edit Remove

- ☒ Revenue
- ☒ Taxes paid

Horizontal (Category) Axis Labels

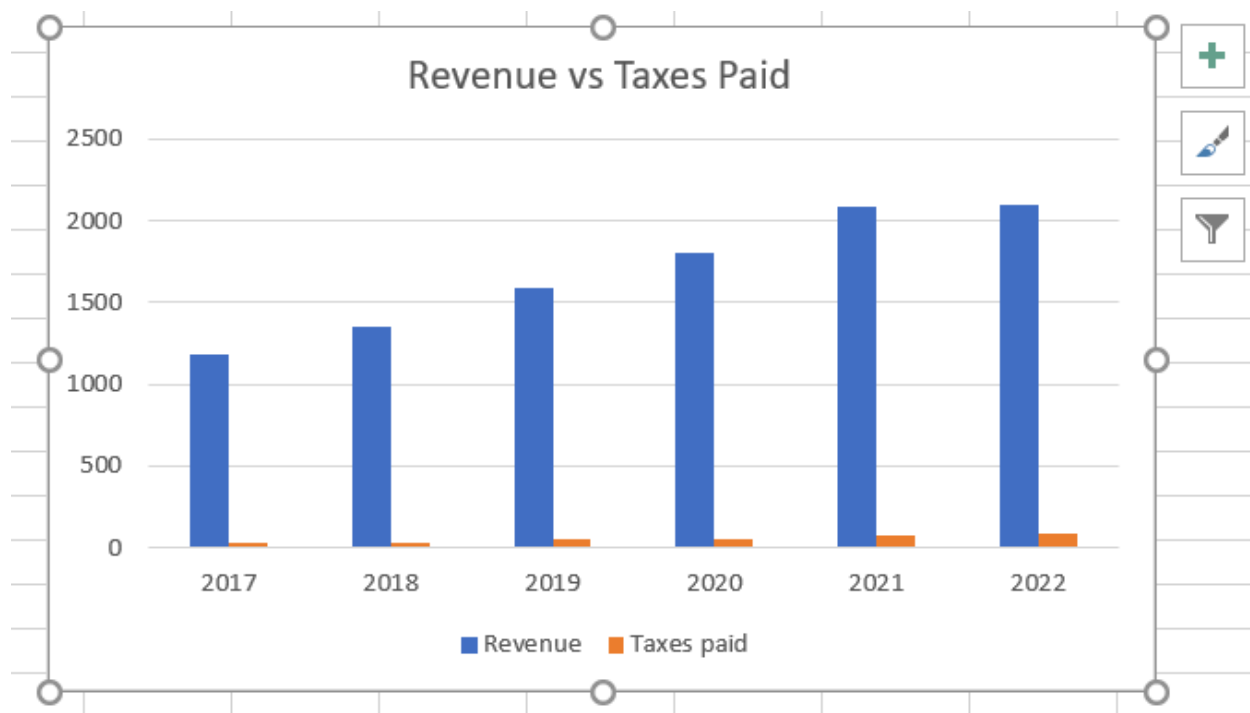
Edit

- ☒ 1
- ☒ 2
- ☒ 3
- ☒ 4
- ☒ 5

Hidden and Empty Cells

OK Cancel

- Finally, your chart will look as illustrated below. You can make further changes to the chart by addition of secondary vertical and horizontal axes!

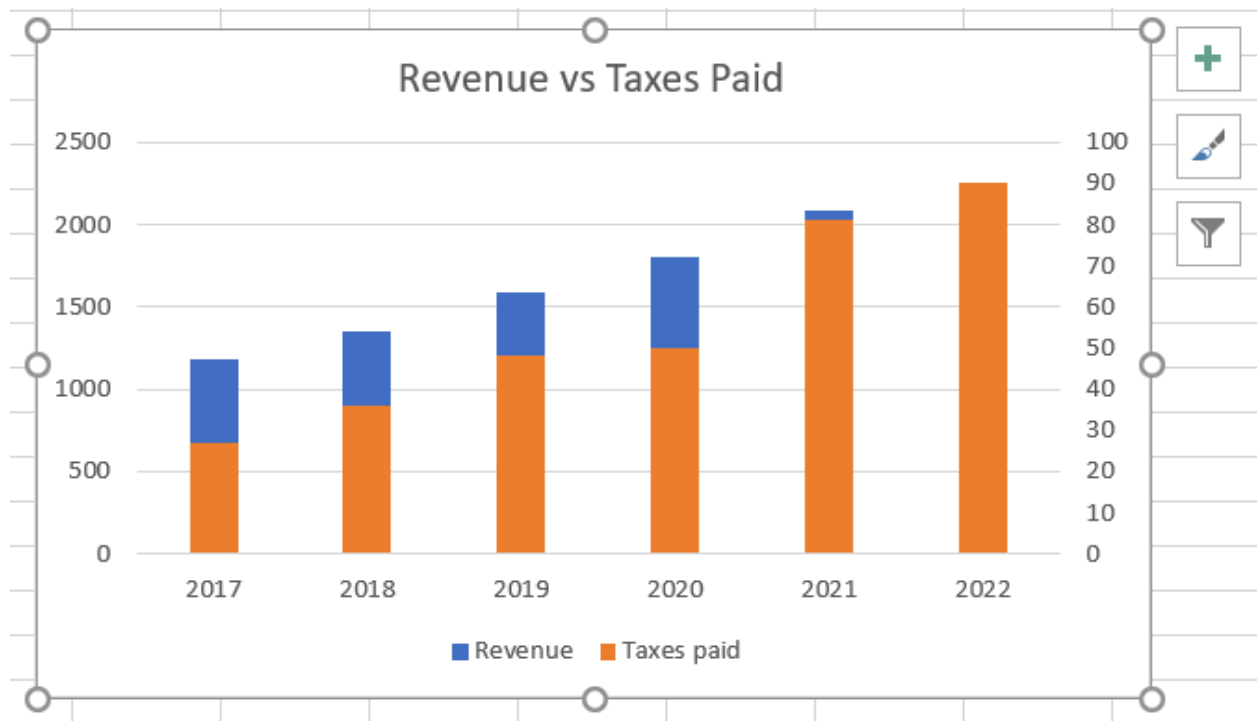


Why not use the secondary axis?

Just as every coin has two sides, there are pros and cons to using the secondary axis in Excel.

The most important problem of including multiple X or Y axes in your chart is that the scale which they are represented are arbitrarily and probably mislead people about the relation of the two different data series.

For example, assume the chart we had plotted for Revenue vs Taxes Paid for company XYZ since 2017.



Even though the chart looks normal, the scale for Y axis is ≥ 500 while for the secondary Y axis it is ≥ 10 . There is clearly a humongous difference in the magnitude of both the data series even if both are represented in US dollars.

For the year 2022, we see that the orange coloured column has completely covered the 'Revenue' column, but is it actually true that revenue in 2022 is equal to taxes paid in 2022? Absolutely not!

Someone who is not aware about the knowledge of using the secondary axis in the chart might confuse themselves and make wrong decisions based on chart data visualization techniques.

To conclude, the Secondary axis is an additional axis that you can input on the graph for two different data sources.

The easiest method to add a secondary axis in Excel is with the help of combo charts from 'Chart Types' where you just need to tick the check box and press on Ok. If you need to remove the axis, all you need to do is press the delete key.

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