Tableau Public introduction guide

Contents

In these exercises, we will visualise data in Tableau Public. This is an introductory guide, not experience is needed.

Tableau public can be downloaded from: https://public.tableau.com/en-us/s/download

1. Visualising International data

1.1 Introduction

In this exercise, we will visualise World Bank data concerning military expenditure in Tableau Public. Tableau Public allows you to create interactive visualisations.

1.2 Data preparation

Data can be structured in different ways, and sometimes the structure is not suitable for certain packages, or limits choices.
- You can download the **military.xlsx** data file from: http://geoconvert.ukdataservice.ac.uk/vis/ , and save this to a location of your choice.

For this exercise I have downloaded World Bank - World Development Indicators data from the UKDS.Stat interface (stats.ukdataservice.ac.uk). I have chosen two series concerning military expenditure, all countries, and years from 2000 onwards. In UKDS.Stat it is possible to change the layout prior to downloading. I changed the Subject dimension to be displayed as columns, and the Time and Location dimensions as rows.
I've tidied the data a little, to make it easier for Tableau to understand. Below you can see the before and after:
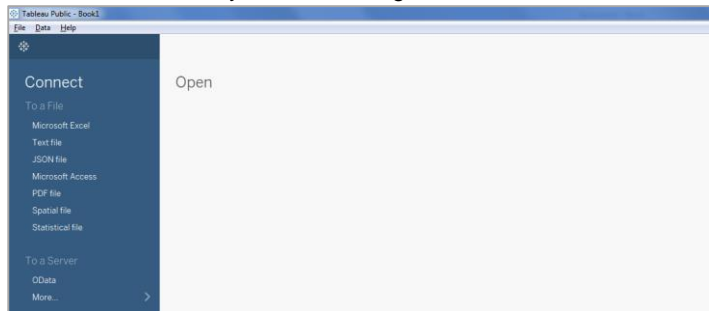

1.3 Data preparation in Tableau public
- Open up Tableau Public

- Select the sort of file you will be using, which is Excel

- Locate and open the military.xlsx file
- As there is only one worksheet in this file it will open automatically (if you had more than one worksheet – you would need to drag the appropriate worksheet to the main screen)
- You can see a preview of the dataset, it doesn't look quite right so we will need to make some modifications:
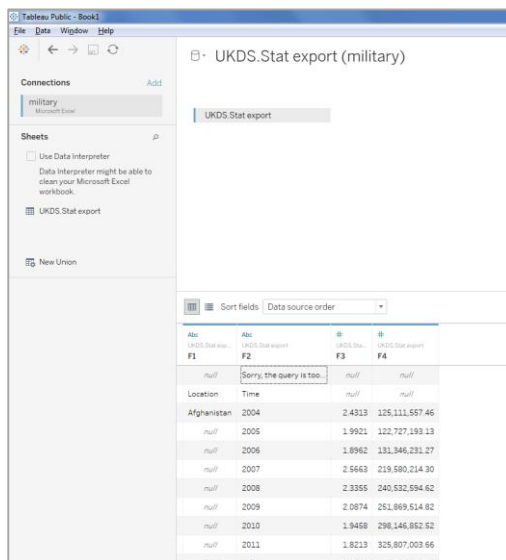
  o Click **Use Data Interpreter**, in the left of the screen. Tableau has now cleaned up the data, check that it looks correct:
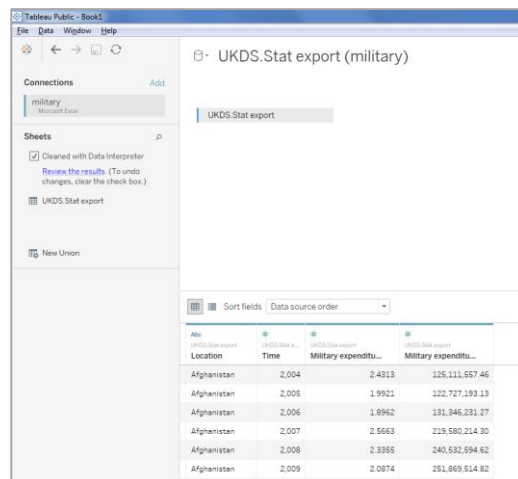
o I'm going to make some edits. By double clicking on the column headings, you can change the labels (or right clicking and selecting Rename). I'll change *Location* to *Country*, and *Time* to *Year*. You can use different terms if you prefer though.

o Notice that the Year values have a comma, this looks odd.
o Clicking on the green **#** symbol, and change to *Date* and then back to *Number(Whole)* seems to solve this issue
o Notice that *Country* has **Abc** above it. Abc means String, but we need Tableau to recognise that this column is a location. So click *ABC* > *Geographic Role* > *Country / Region*.
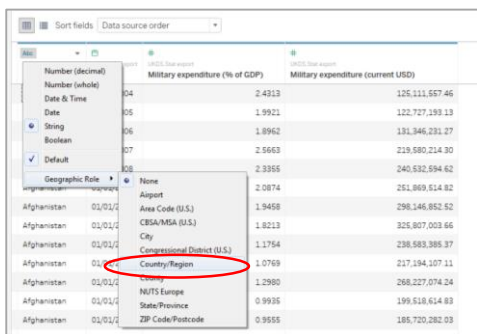
1.4 Create a map

o We can now open a worksheet at the to create a visualisation, click *Sheet 1* at the bottom of the screen

o On the left of the screen we have our dimensions Country and Year, and towards the bottom our variables
o Let's drag *Country* to the screen
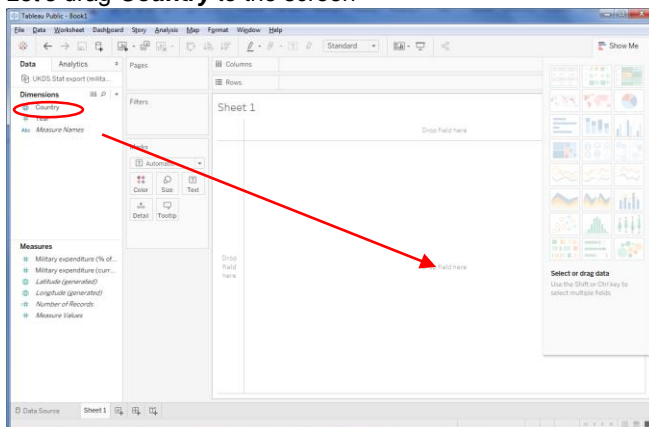
o A map will appear:
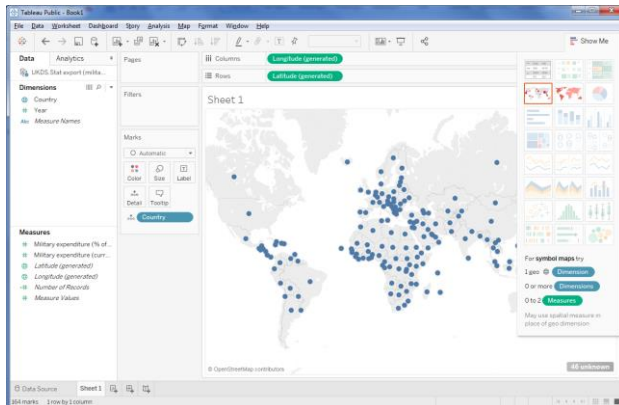
o   Each dot represents a country
o   Now if you drag **Military Expenditure (% of GDP)** to the canvas, you can see the dots have changed size
o   Hover over a country to see the value

o   Notice above that Oman is giving a figure of 214.8% - that seems odd, as it's a percentage
o   Remember we have data for the year 2000 onwards, so Tableau is adding up all of the years to give a total figure. We can change this though
o   On the left click on **SUM(Military…)** > *Measure* (Sum) > **Average**, this should give more meaningful figures
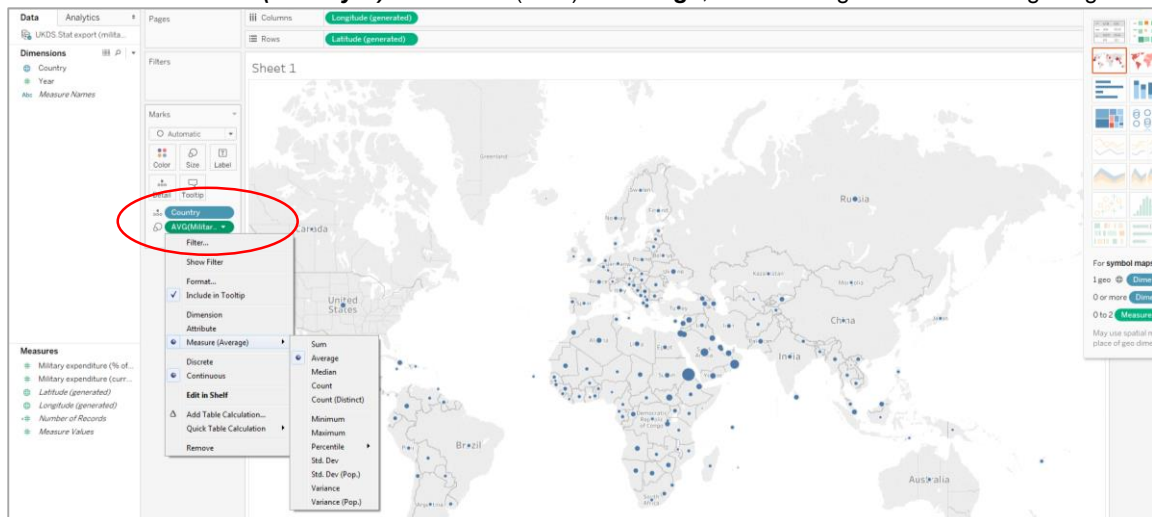
o   We can add colour, by dragging Military Expenditure (% of GDP) to the colour box
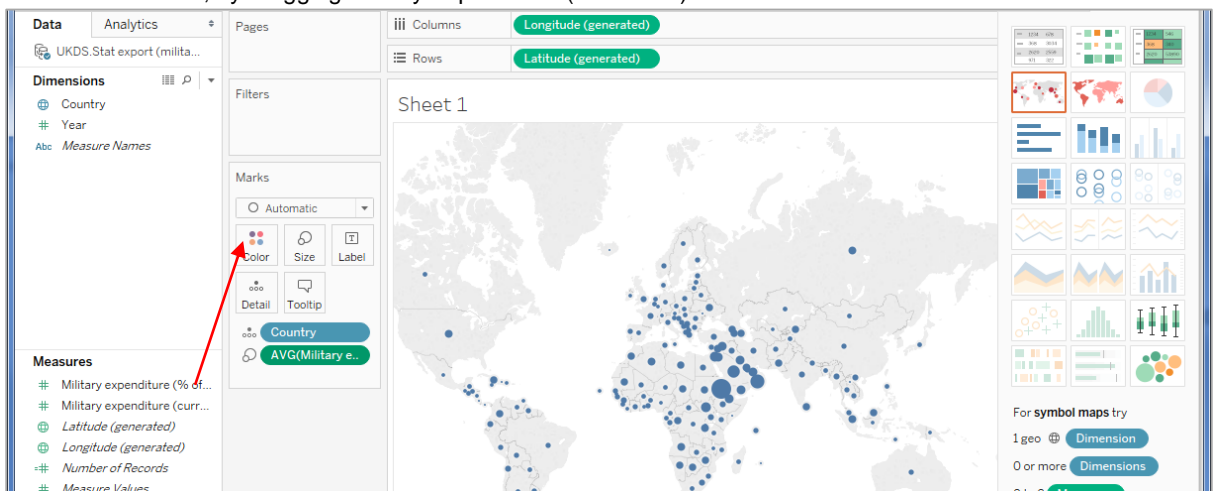
o   Like earlier will need to change Sum to Average
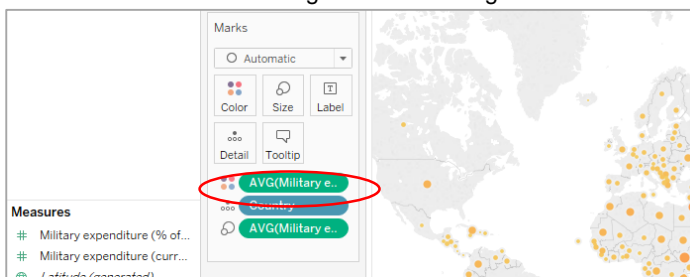
o   If you click *Color*, you can change the colours and opacity. I've chosen Red to Gold
o   Take a look at the other options in the color box, you can reverse the colours, and change the mid point.
o   If you click on size you change the size of the dots

o It's also a good idea to go to **Map** > **Edit Locations** to see if there are any issues
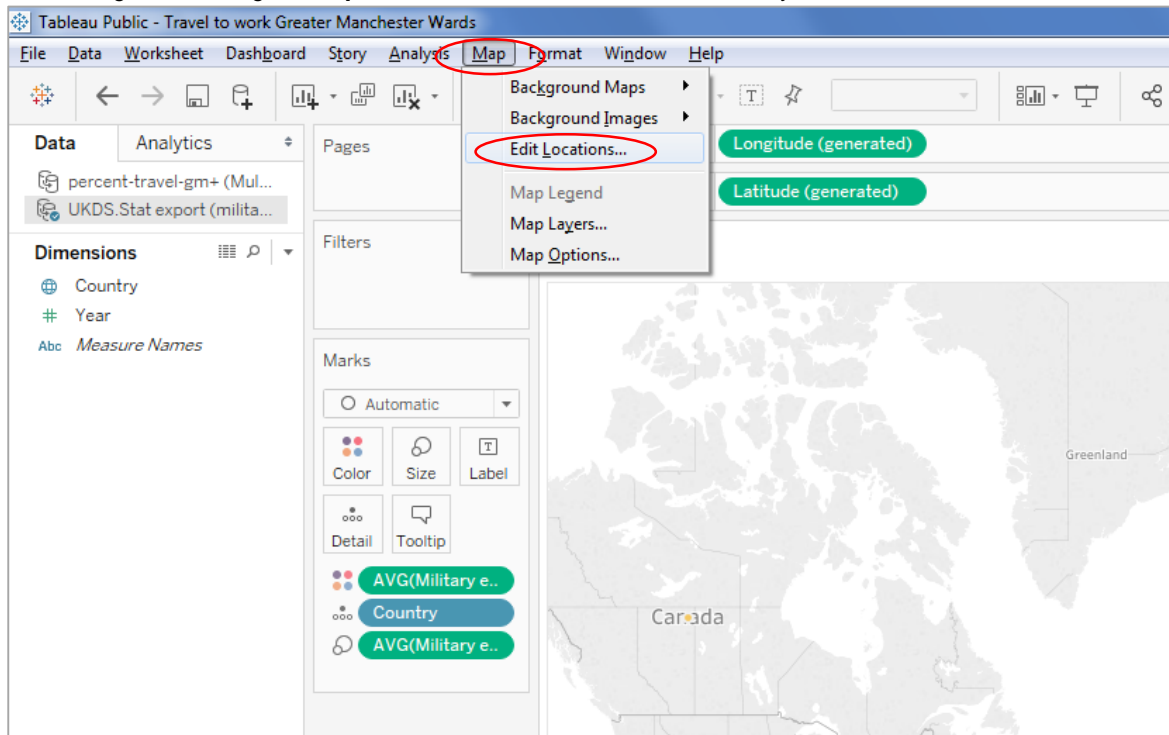
o We can see a number of Regions which are not recognised, this is fine for our purposes, as we are only interested in countries. But, I can see a country that has not been recognised:

- **Korea** , change this to **South Korea**

o We can rename the sheet by double clicking the "Sheet 1" name at the bottom, I'm going to rename it is as "Military map", so I can easily find it later

1.5 Create a line chart

Lets open a new sheet, by clicking the "New worksheet" icon at the bottom of the screen
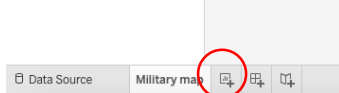
o We can add the same series to this sheet, double click **Military Expenditure (% of GDP)**
o Now double click **Year**
o Now drag **Country** to the Marks box
o You should now have a chart that looks like the following (if it doesn't look the same, look at what fields are in the row, columns and marks box, and adjust accordingly)
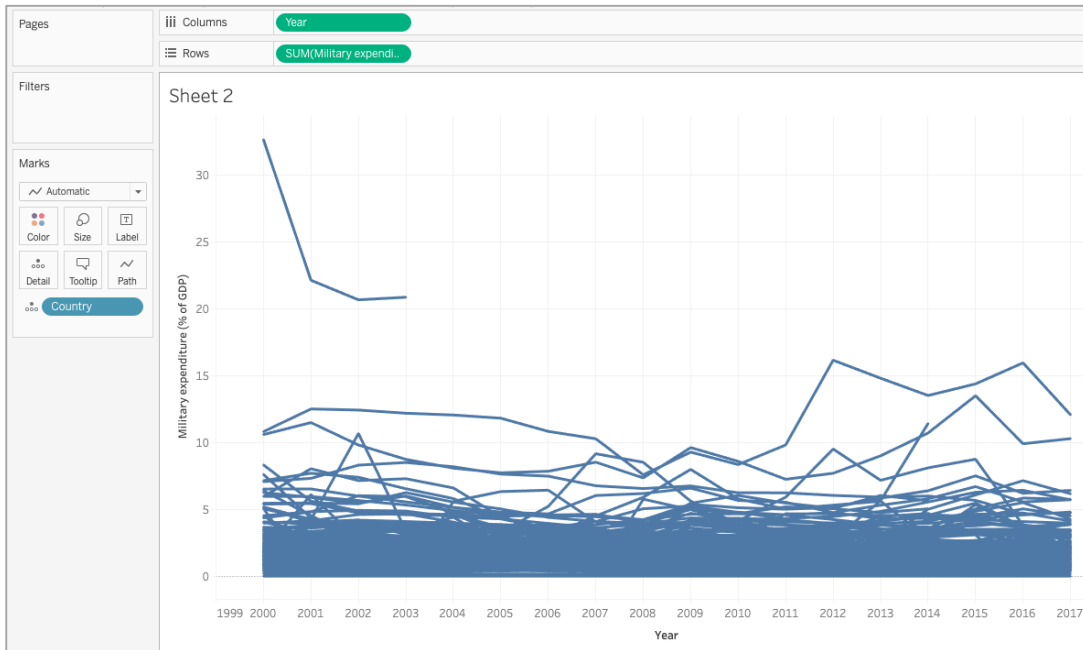
- o Notice the outlier country Eritrea, it's an interesting how much larger spending was, but we only have these data for a few years, and it makes it harder to see trends for other countries.
- o I'm not going to do this, but you could remove Eritrea by clicking on each point and selecting **Exclude** from the sub menu. And have a separate chart to illustrate Eritrea.
- o For consistency, lets give this chart some colour too. Drag "Military Expenditure (% of GDP)" to color, and change the colour to Red-Gold again
- o Lets give this sheet a name, I've given it "Military Expenditure (% of GDP) over time

1.6 Creating a dashboard

- o To create a dashboard, click the dashboard icon at the bottom of the screen
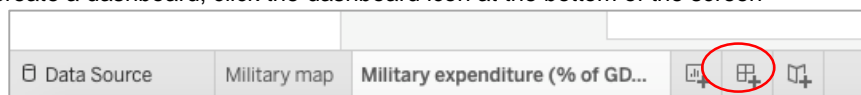
o   You can drag the two sheets we have created in the left hand menu, drag them both to the canvas.
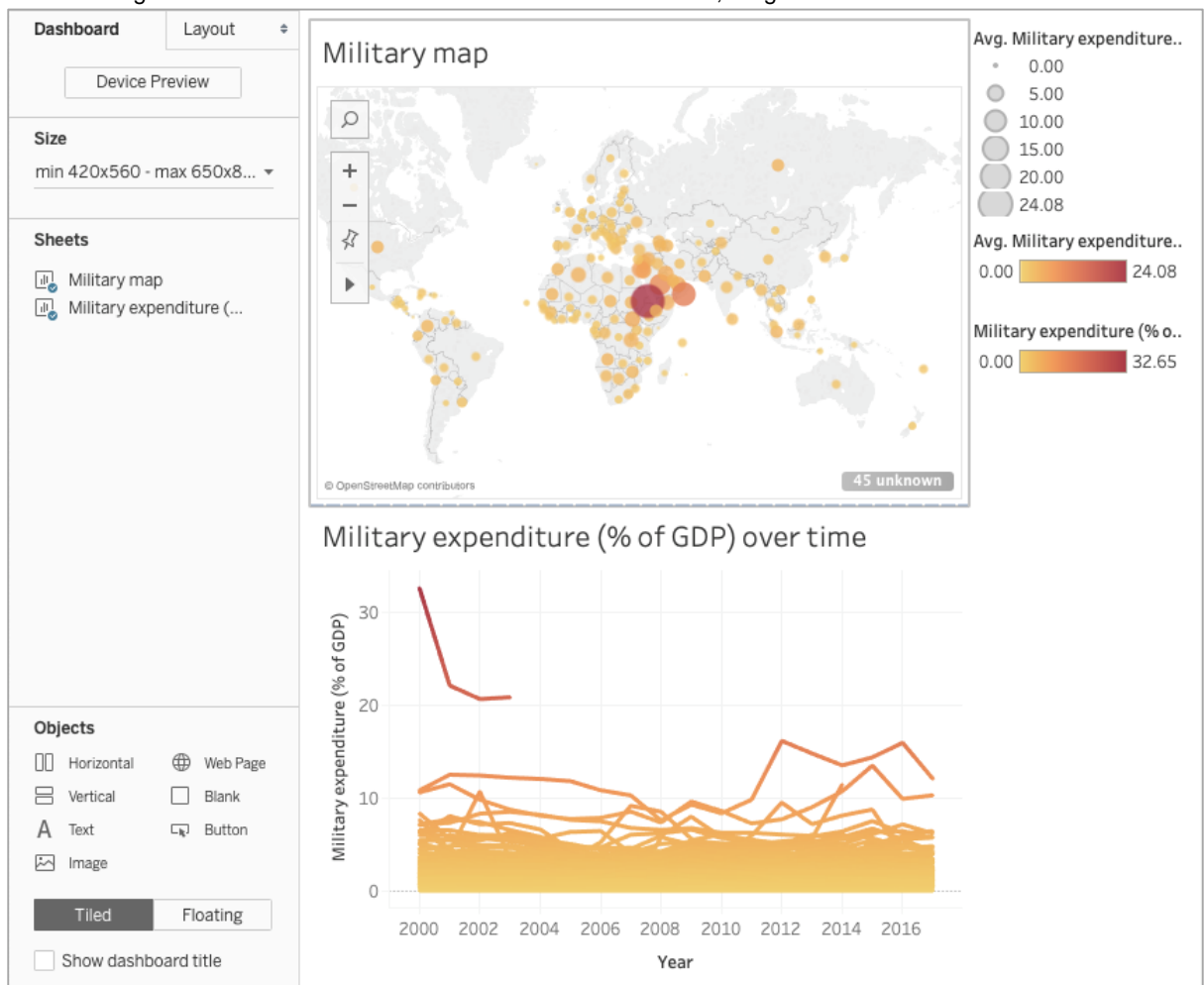
o   Use can use the map to filter the line chart below, by clicking on the filter symbol towards the top right of the map.
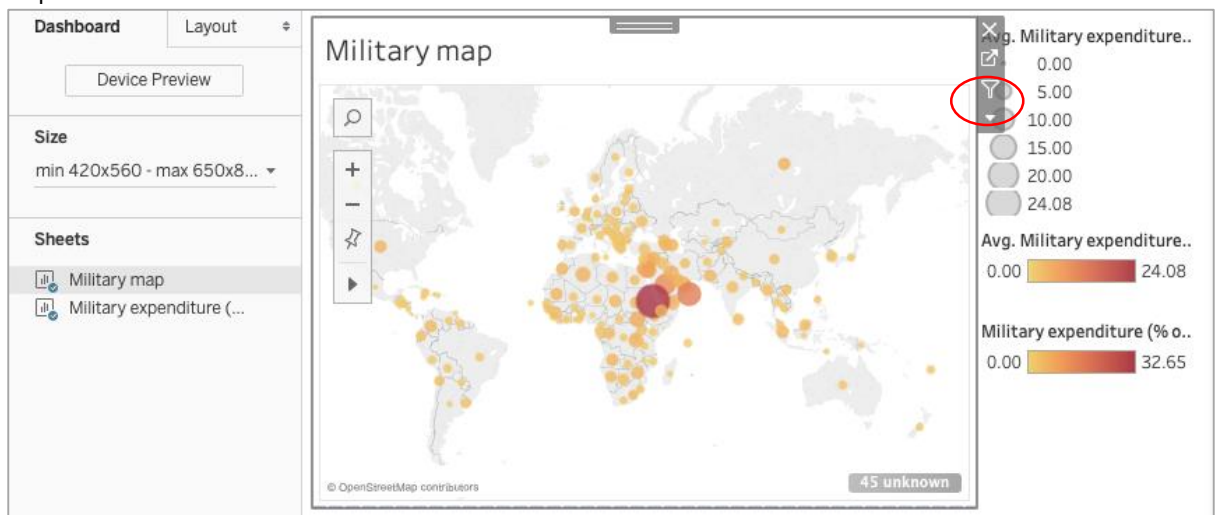
o   Now you can click on a country to see the Military expenditure time line for an individual country. If you click CTRL and another country you can see two countries side by side.
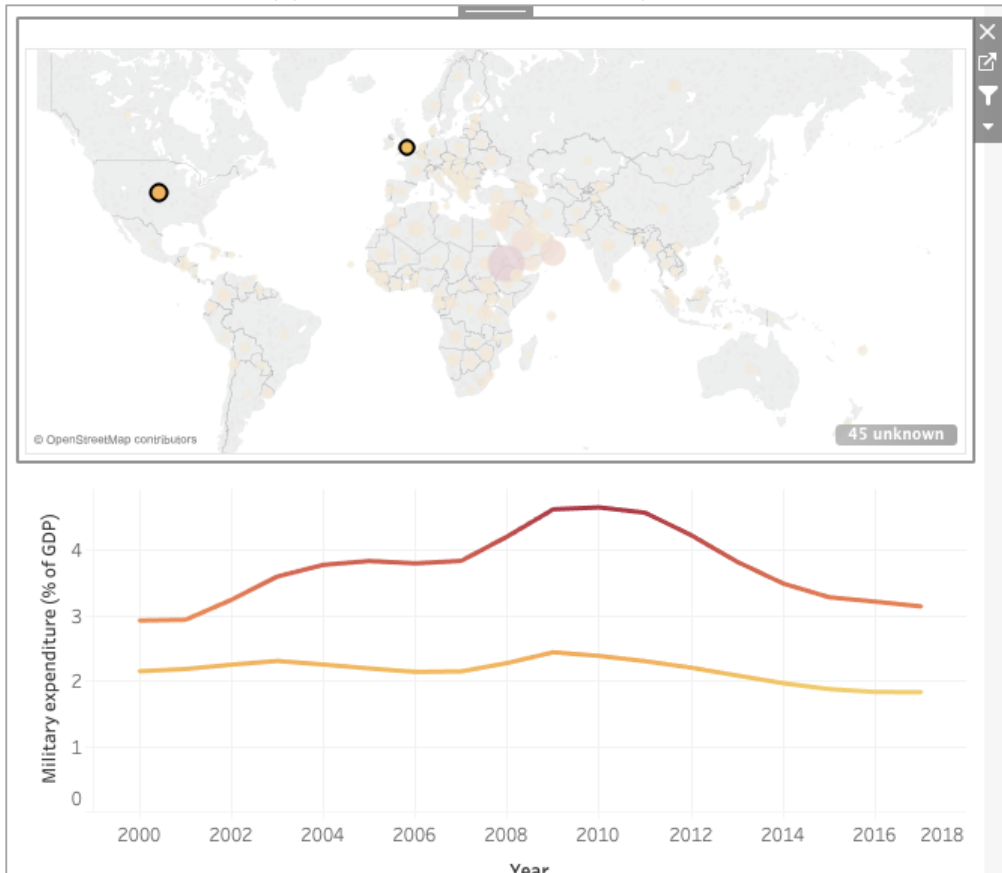
o   You will notice that the Military Expenditure axis resizes itself, depending on which countries have been selected. If you want to change that to a fixed axis, you can. By right clicking the axis, click **Edit Axis** and click **Fixed**.
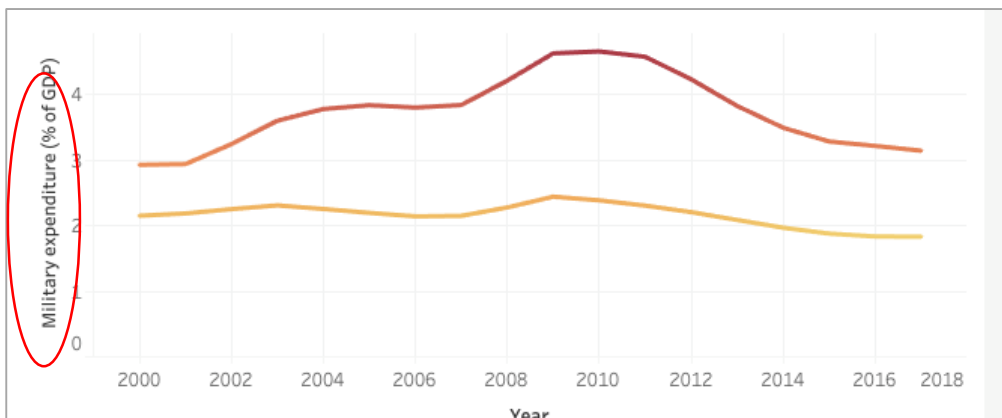
o   You can adjust the size of the chart on the left hand side, and remove or move the legends which are displayed by default on the right
o   I'm going to remove the legends, and the individual sheet titles, and drag a new piece of text from the left and add a title for the whole dashboard
o   I'll also drag a piece of text to the bottom and add a citation for the data:
    World Bank: World Development Indicators. UK Data Service. https://doi.org/10.5257/wb/wdi/2019-02

o You can't save your work locally, but you can upload it to Tableau Public, obviously ensure you have the rights to upload any data, and that the data is not disclosive. You will need to create a Tableau account to do this.

o However it is possible to export as Powerpoint, or take a screendump – if you do not need the interactivity

o The data we are using for this exercise is all open data from the World Bank, so there are few restrictions. However, you should always cite the source of your data

2. Visualising Census data

In this exercise we will map some 2011 Census aggregate data, showing travel to work data for Wards in Greater Manchester. It covers some of the same ground as the previous exercise. However, this time we will need to upload our own boundaries. As Tableau will not have these boundaries. We will be using the Ward boundaries used in the 2011 Census.

2.1 Downloading boundary data

This part is optional, if you do not want to do this task, you can jump to section 2.2, and download a pre-prepared boundary data file

Boundary files can be very large, but the level of detail is not always necessary, and the size of the files can cause issues with some online systems.

Download the **Wards and Electoral Divisions** > **ArcGIS SHAPE** file from:

- http://infuse.ukdataservice.ac.uk/help/definitions/2011geographies/

It's 166.6MB – so is very large
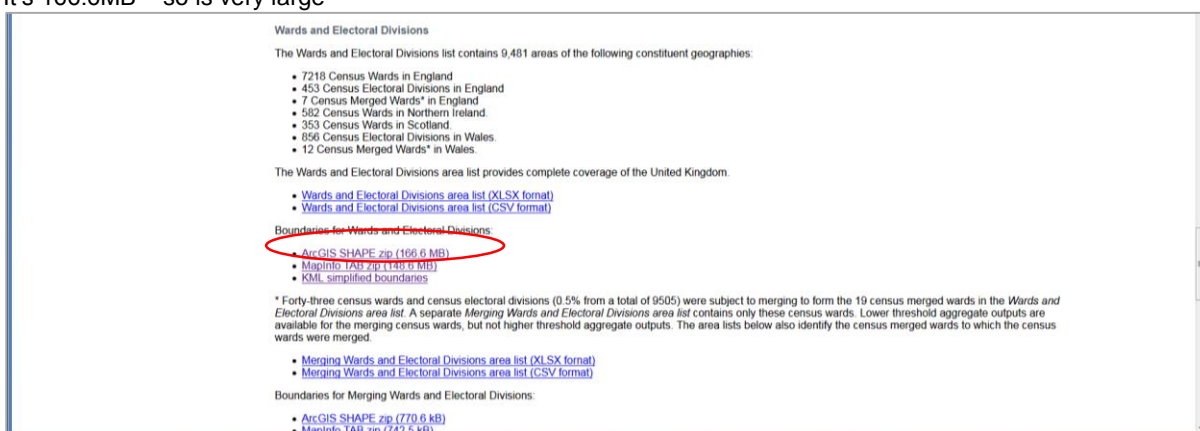
- It will be saved as "infuse_ward_lyr_2011_clipped.zip"
- Go to https://mapshaper.org/
- And drag the zip file you just saved to the screen
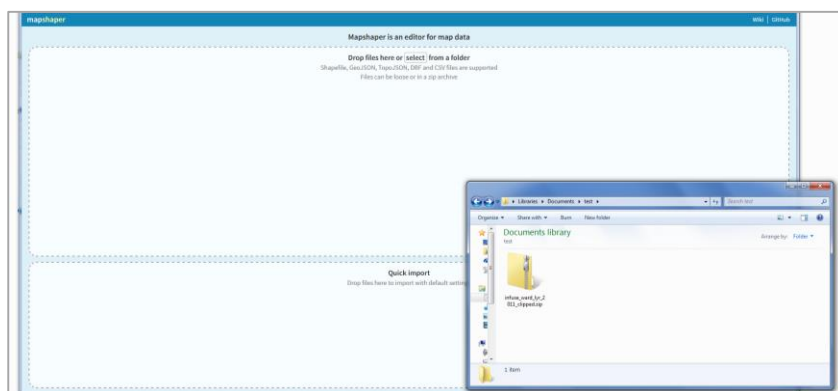
And click Import
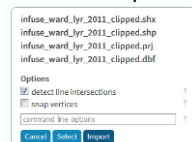
The red lines indicate some area which overlap. We can ignore these for now.
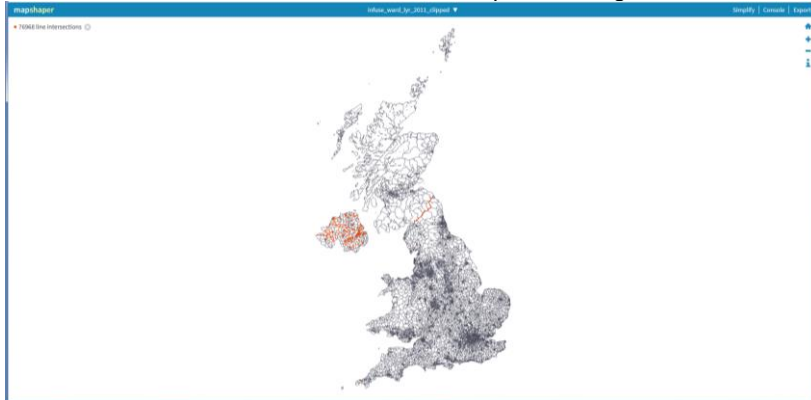
Click **Simplify**, and the bar at the top to decide how much to simplify
You can zoom in to see the affect:
10%
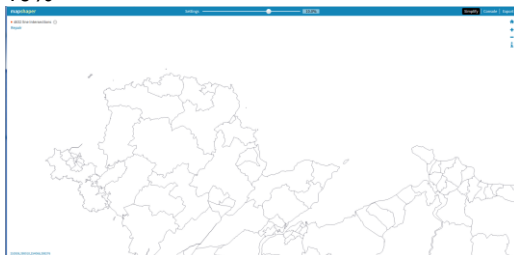
This is 1%
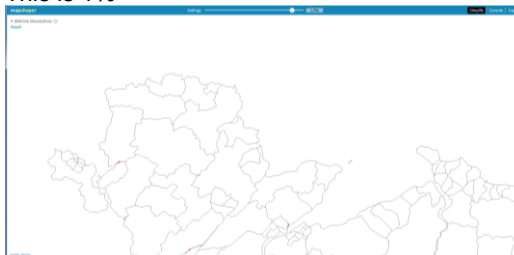
- Now click Repair towards the top of the screen, this will sort out some of the overlapping
- I decided on 3.7%. Once happy, you can download, by clicking Export
- It's a good idea to give it another time indicating that you have reduced the size, and preserving your original file.
- The map is now 8.24MB, as opposed to the original of 166.6MB
- You will then need to unzip the file

2.2 Download files

You will need the following files, which you can download from: http://geoconvert.ukdataservice.ac.uk/vis/
- Travel-gm.xlsx
- GM-wards-simplified.zip (if you completed 2.1 – you will already have this file)

I've converted the data into percentages – it's also possible to do this within Tableau, but I found it easier to do in Excel.

2.3 Data preparation in Tableau
- Open tableau, and open the Excel file, now drag **percent-travel-gm** to the canvas

- All of the travelling methods are as columns, but rearranging the data in Tableau will give us more flexibility.
- Lets pivot the data, as this will give us some other options later. You need to select all of the travel columns.
- Click on the first travel column **Work mainly at or from home**, and scroll to the left, with the Shift key pressed, click the last column **Not in employment.**
- You will now have all of the columns selected.
- With the columns selected, click the small arrow above the last column, and click Pivot.

			Show aliases	Show hidden fields	215 → rows
#	#	#	#	#	▼
percent·travel·gm	percent·travel·...	percent·travel·...	percent·travel·gm		
Passenger in a car ...	**Bicycle**	**On foot**	**Other method of**	Rename	
4.16625	0.52826	5.3324	0.2	Copy Values	
3.40636	0.43332	3.0212	0.1	Hide	
4.73247	0.69923	5.4317	0.3	Create Calculated Field...	
3.39539	0.47265	3.5883	0.1	Pivot	
4.61315	0.63567	7.8460	0.390483	Merge Mismatched Fields	43.4617

- This puts all of the methods of travel into a single column.

Abc	Abc	Abc	Abc	#
percent·travel·gm	percent·travel·gm	percent·trave...	Pivot	Pivot
Geo Code	**Geo Label**	**LA**	**Pivot Field Names**	**Pivot Field Values**
E05000650	Astley Bridge	Bolton	Bicycle	0.5283
E05000651	Bradshaw	Bolton	Bicycle	0.4333
E05000652	Breightmet	Bolton	Bicycle	0.6992
E05000653	Bromley Cross	Bolton	Bicycle	0.4727
E05000654	Crompton	Bolton	Bicycle	0.6357
E05000655	Farnworth	Bolton	Bicycle	0.9545
E05000656	Great Lever	Bolton	Bicycle	0.4908

- Like before you might want to rename the columns to make them more meaningful.

Abc	Abc	Abc	Abc	#
percent-travel-gm	percent-travel-gm	percent-travel-gm	Pivot	Pivot
Geo Code	**Ward**	**Local Authority**	**Travel to work met...**	**% of people**
E05000650	Astley Bridge	Bolton	Bicycle	0.5283
E05000651	Bradshaw	Bolton	Bicycle	0.4333
E05000652	Breightmet	Bolton	Bicycle	0.6992

2.4 Adding boundaries

If you haven't already done so, unzip the boundary data file you downloaded in 1.2, GM-wards-simplified.zip
Click **Add**, and select Spatial file, and locate the above boundary file
e.g.: GM-wards-simplified > infuse_ward_lyr_2011_clipped.shp
(or if you completed section 1.2, it is likely to be named: infuse_ward_lyr_2011_clipped.zip > infuse_ward_lyr_2011_clipped.shp)
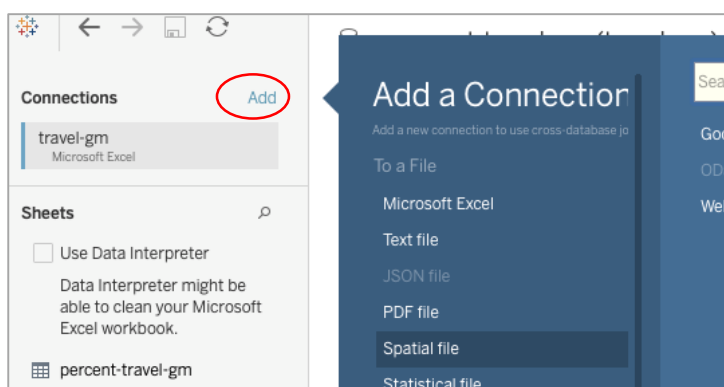
You now need to join the two files. I have chosen **Geo Code** for the source and **Geo Code 1** for the boundary file. This lets Tableau know which shape boundary belongs to the values in the spreadsheet.
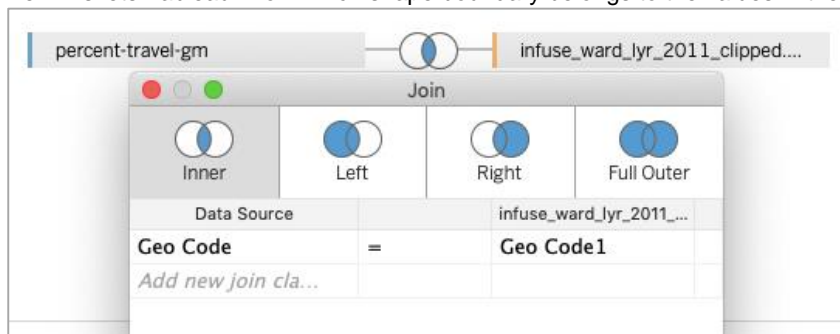
The type of join basically tells Tableau what to do when data does not appear in both tables (an inner join means that Tableau will ignore data that does not appear in both tables). That is fine, so I'll leave it as the default.

If all goes well, you should be able to see both the boundary and data that came from Excel together in one big table. You can hide any columns that you will not need. For example below there is a column called *Geo Labelw* – this is for place names in Welsh. As we are only using data from England it is not needed. Hover over the column heading and you will see a little arrow, click that then click hide to hide the column.

| Abc	Abc	Abc	⊕	Abc	Abc	Abc	Abc	#
infuse_ward_lyr_2011_c...	infuse_ward_lyr_2011...	infuse_ward_lyr_2011_...	infuse_ward_lyr_2011...	percent-travel-gm	percent-travel-gm	percent-travel-gm	Pivot	Pivot
Geo Labelw	**Geo Label**	**Geo Code1**	**Geometry**	**Geo Code**	**Ward**	**Local Authority**	**Travel to work met...**	**% of people**
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Work mainly at or fro...	1.3377
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Tram	0.1723
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Train	1.3174
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Taxi	1.1046
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Passenger in a car or ...	4.7325
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Other method of trav...	0.3141
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	On foot	5.4317
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Not in employment	42.3186
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Motorcycle	0.5067
null	Breightmet	E05000652	POLYGON	E05000652	Breightmet	Bolton	Driving a car or van	37.0896

2.5 Create a table

- Lets create a simple table. Click on Sheet1.
- Drag **Travel to work** to Column.
- Drag the **Local Authority** and **Wards** to Rows.
- Double click **% of people**, so it will appear in the Marks area.
- Give the sheet a name, and now create a new sheet.


2.6 Create a bar chart

- We can create a new sheet and create a bar chart too.
- I've placed **% of people** in columns, and **Ward** in rows, and moved **Travel to work** to Color on the marks card.
- It looks ok, initially, but scroll down, there are a few wards that look strange.
- All of our data are percentages, so there should be a wards with a bigger row that 100. Why do you think this has happened?
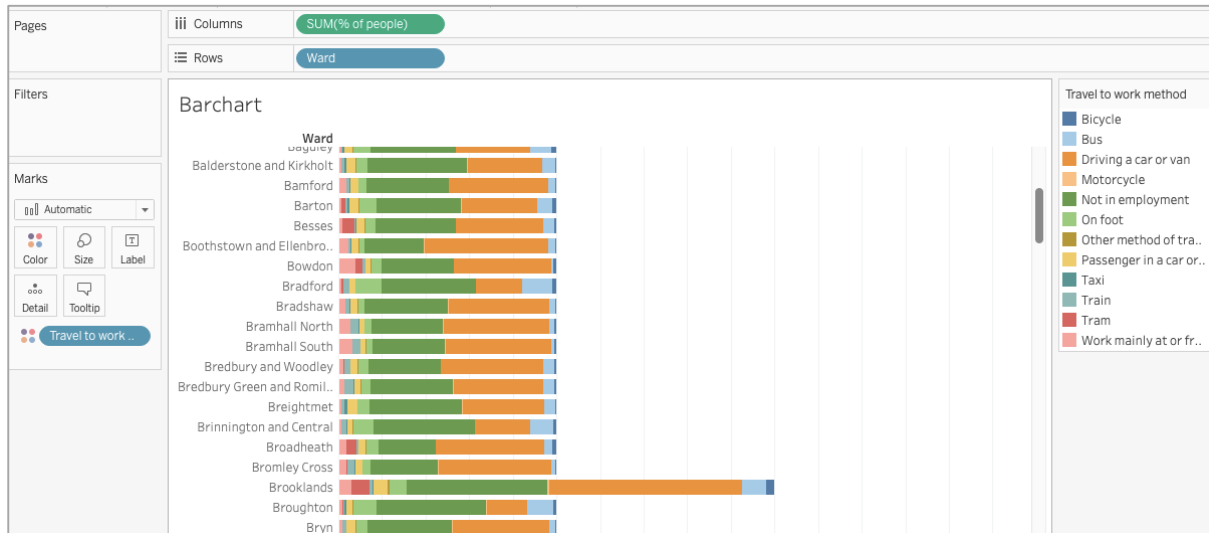
Above you can see Brooklands is bigger, because there are more than one ward called Brooklands in Greater Manchester.

It is always good to check your visualisations for these oddities, and then try to figure out why they have occurred.

You can rectify this issue by dragging either Geo Code or Local Authority to the row column, before Ward, like this:
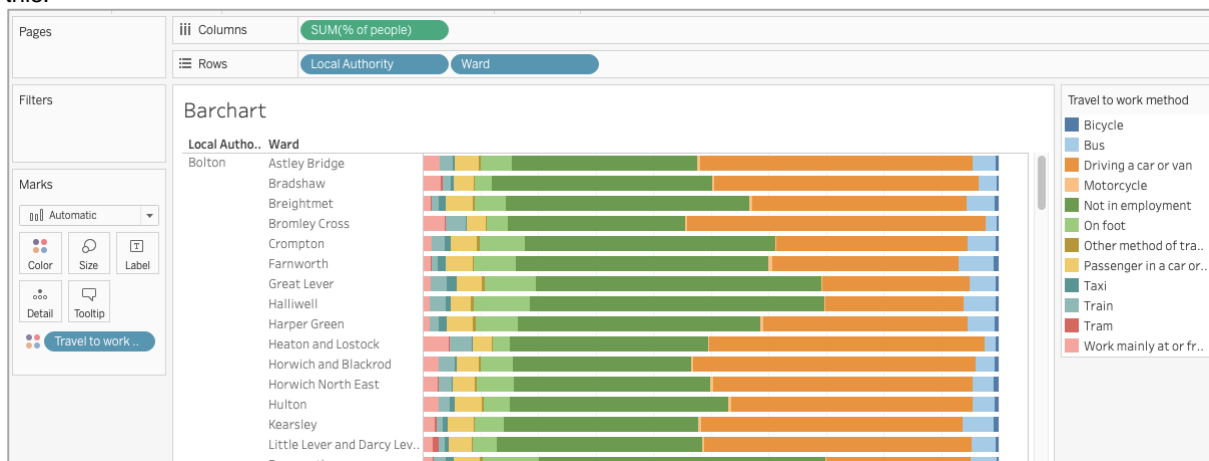
2.7 Create map

- Create a new sheet, and double click Geometry, which can be found under Measures

- If you hover over the map, you don't see the individual area names.
- You can fix this by dragging Ward to Detail in the Marks area.
- But again, there is some strangeness going on. When you hover over St Marys - 3 different areas are highlighted.
- If you also drag Local Authority to Detail it will fix this. We could drag Geo code as well if we want to give more information.
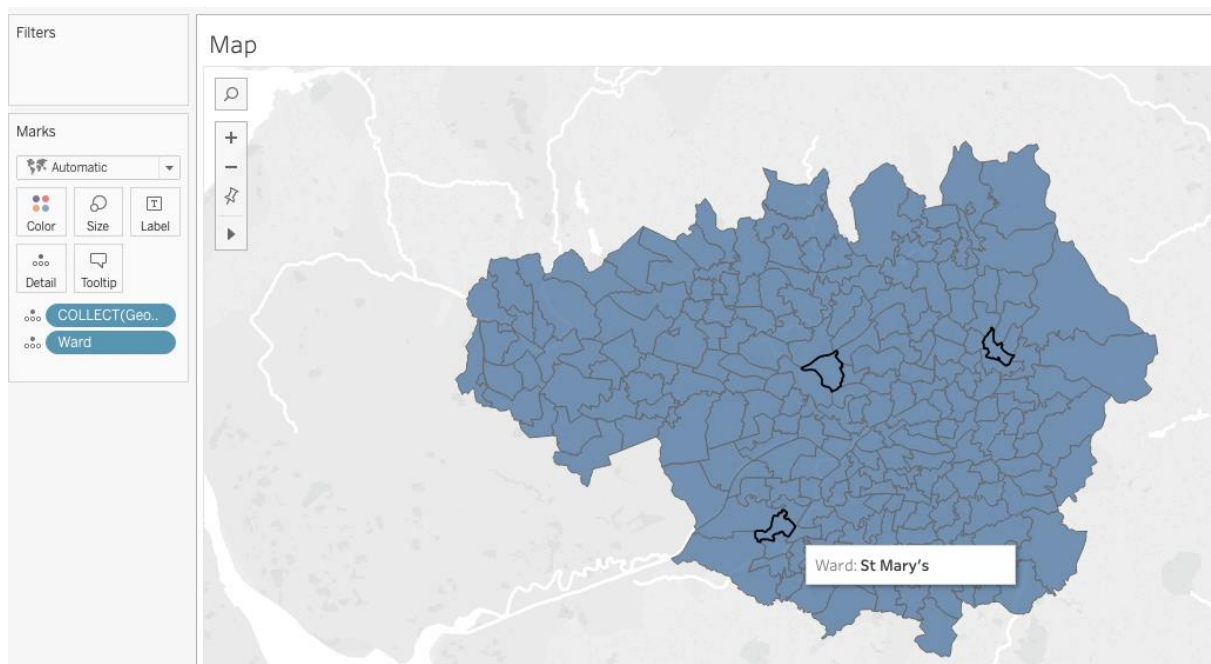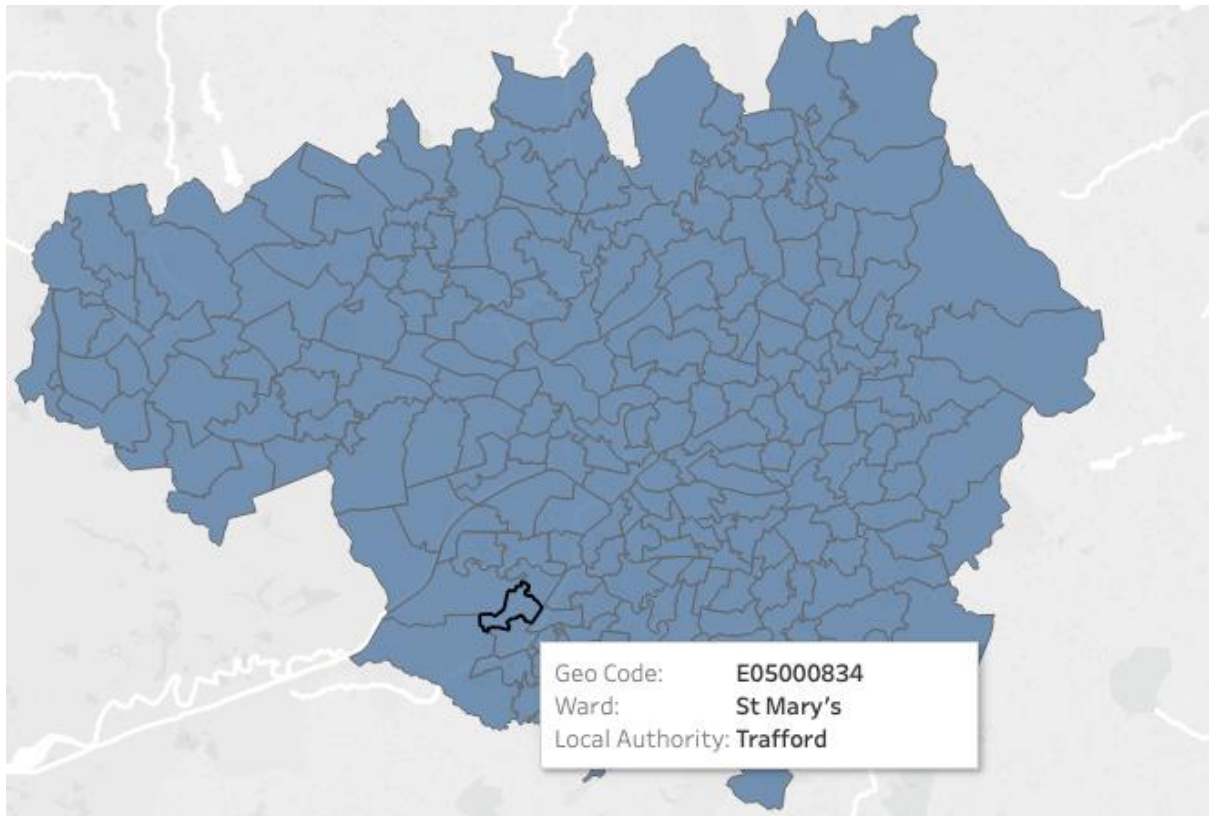
2.8 Create a Dashboard

- Using what you have learned from the earlier example create a dashboard. refer to the earlier workbook if you need help.

- You might need to make the canvas bigger, tidy up the headings, add a data citation. Maybe add a filter on the map to filter by Local Authority.
- You can also go back to your sheets and make changes. For example, I'm not sure about how the bar chart looks on the dashboard, so you could change it like this:
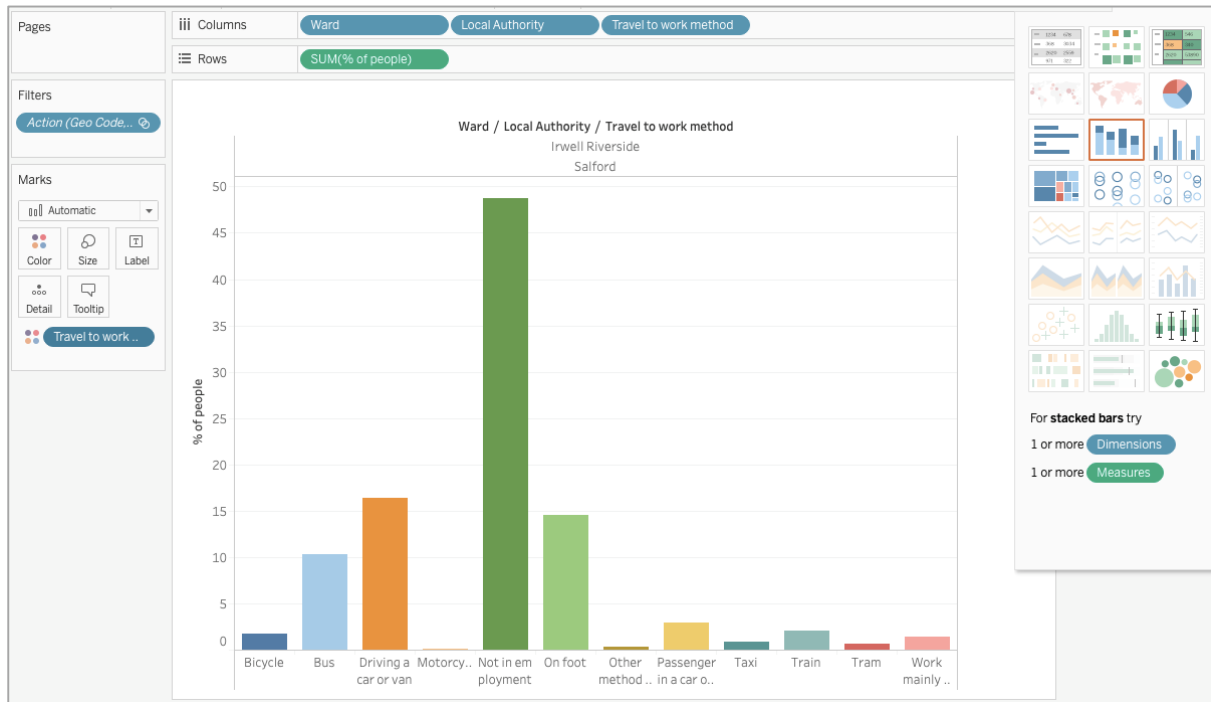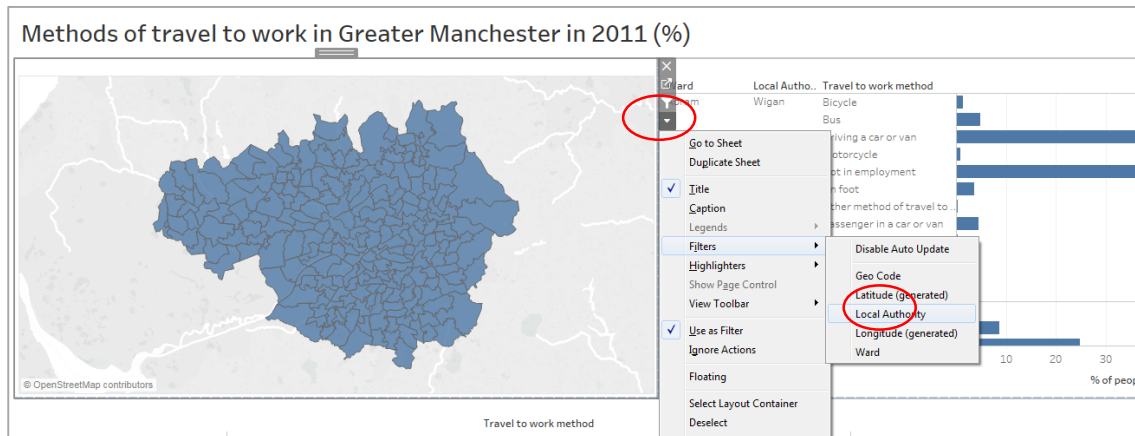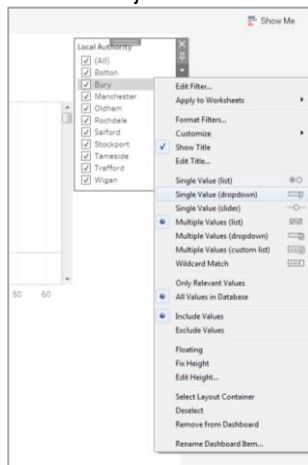

- Or like this:
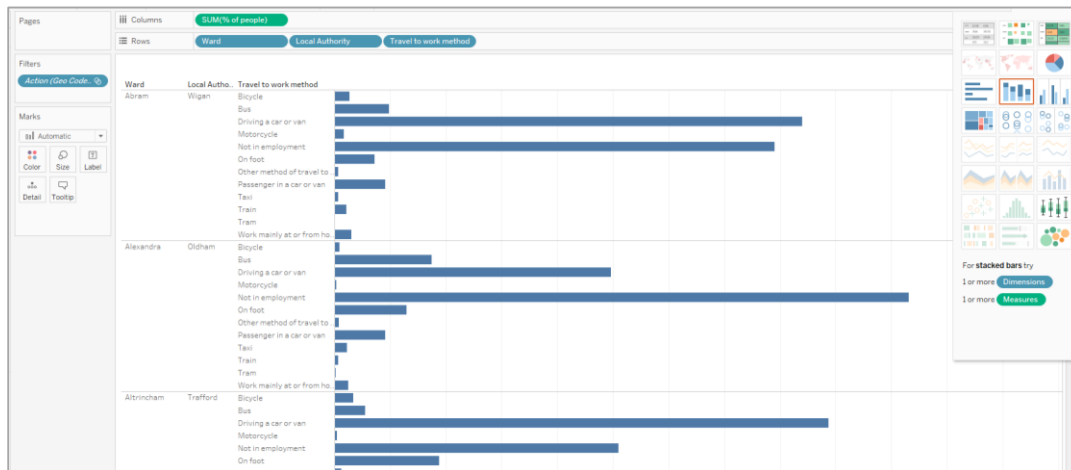
- I've then made some changes to the dashboard, so it now looks like this, and added in a data citation for 2011 Census from: http://infuse.ukdataservice.ac.uk/help/citing.html
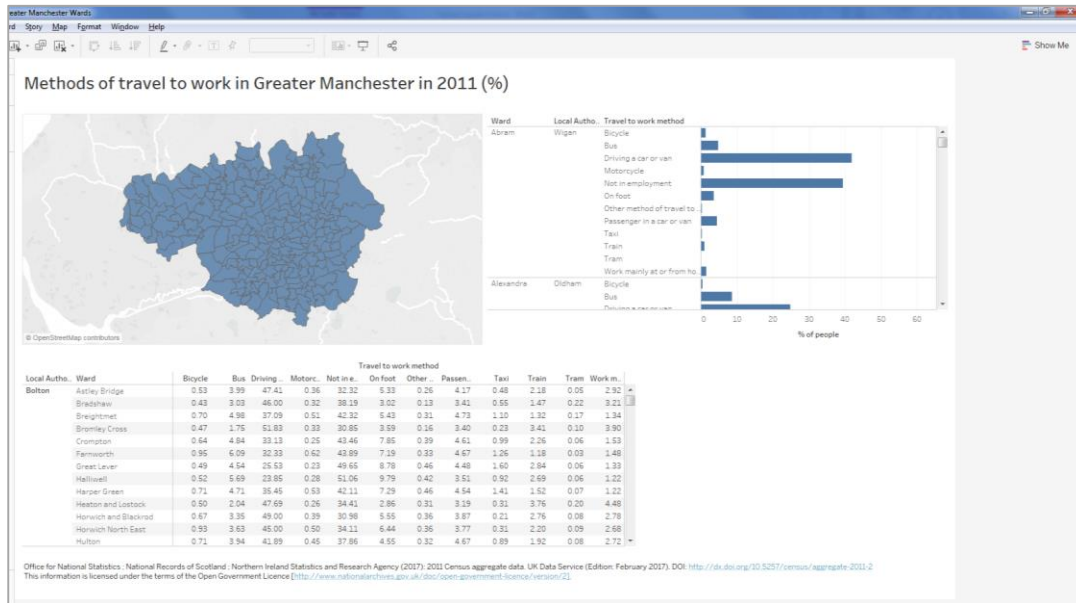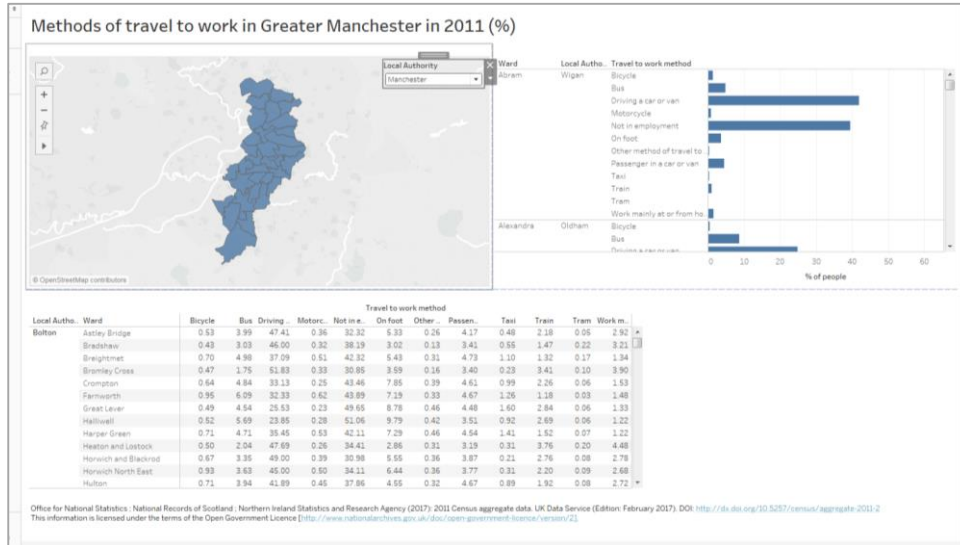
- Lastly, I'm going to add a filter, so we can filter by Local Authority

And then adjust the filter to a dropdown

Have a play around with the options
That brings us to the end of the Tableau exercises