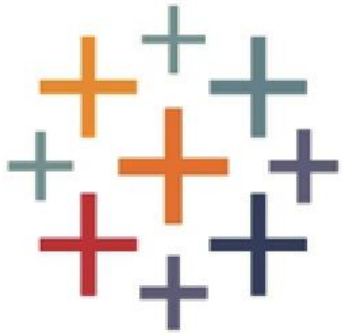


Tableau Tutorial

AT84.02 Business Intelligence and Analytics

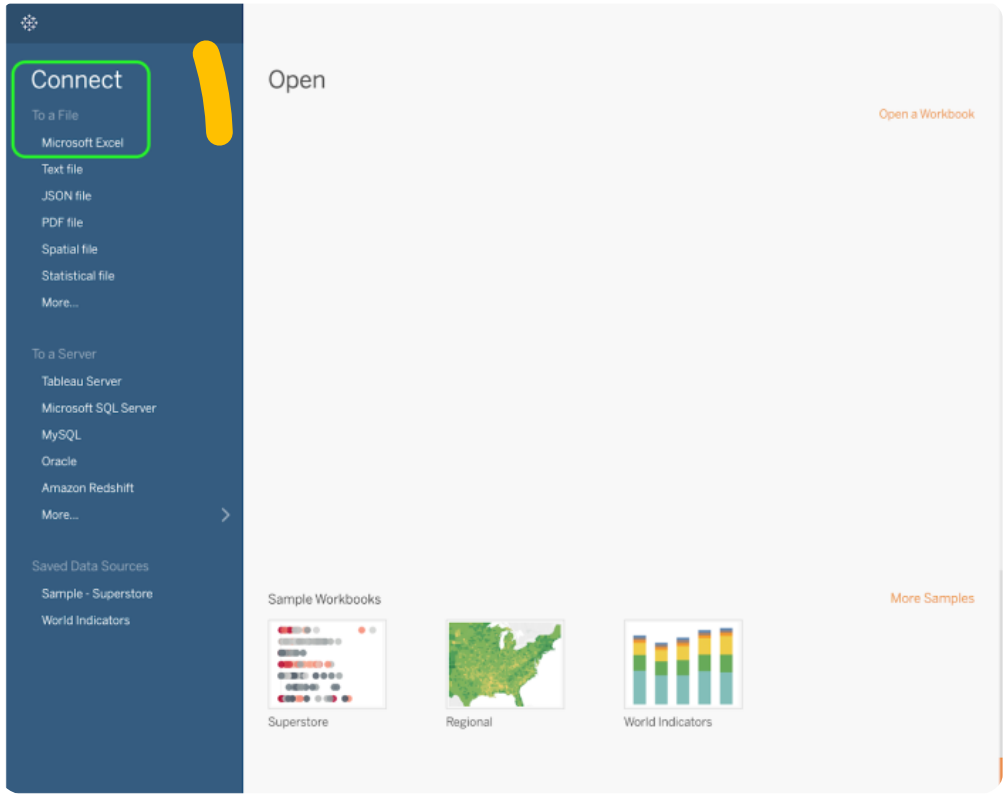
January 2023 Semester

Analysis for order management and order prediction

1.1 Connect the dataset

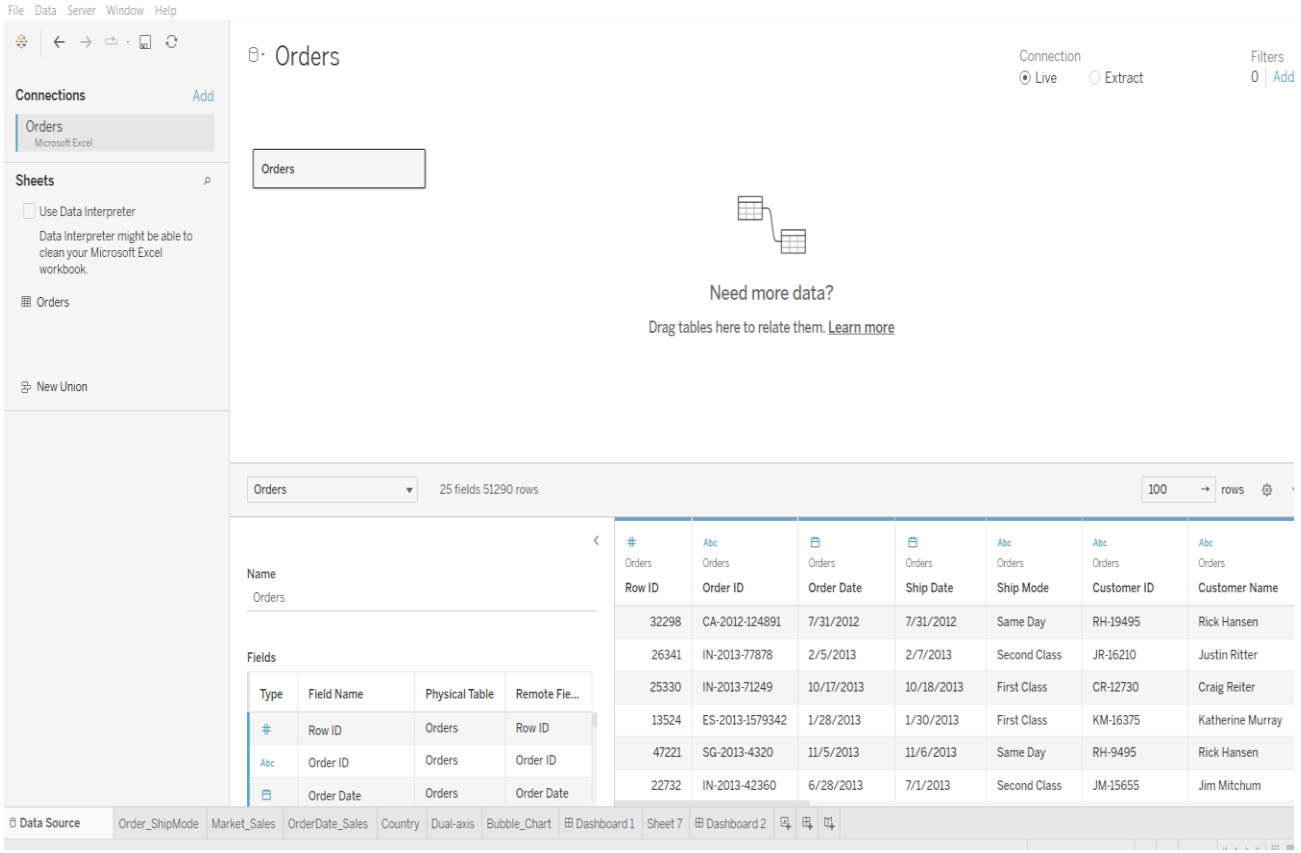
- Upload the **‘Orders’** dataset in the workspace. (I have already provided the dataset in the google classroom).

- Once you have access to Tableau Desktop, the first step is to connect Tableau to the **‘Orders’.** One can do so by using the Connect tab (located on the left of the start page) and by selecting Microsoft Excel as a connector. Once the connection is made, a new worksheet will automatically open.



1.2. Orders sheet

- The bottom half of the interface presents a preview of the dataset; each column is labeled with a symbol, representing the type of data (e.g., number, date, string).

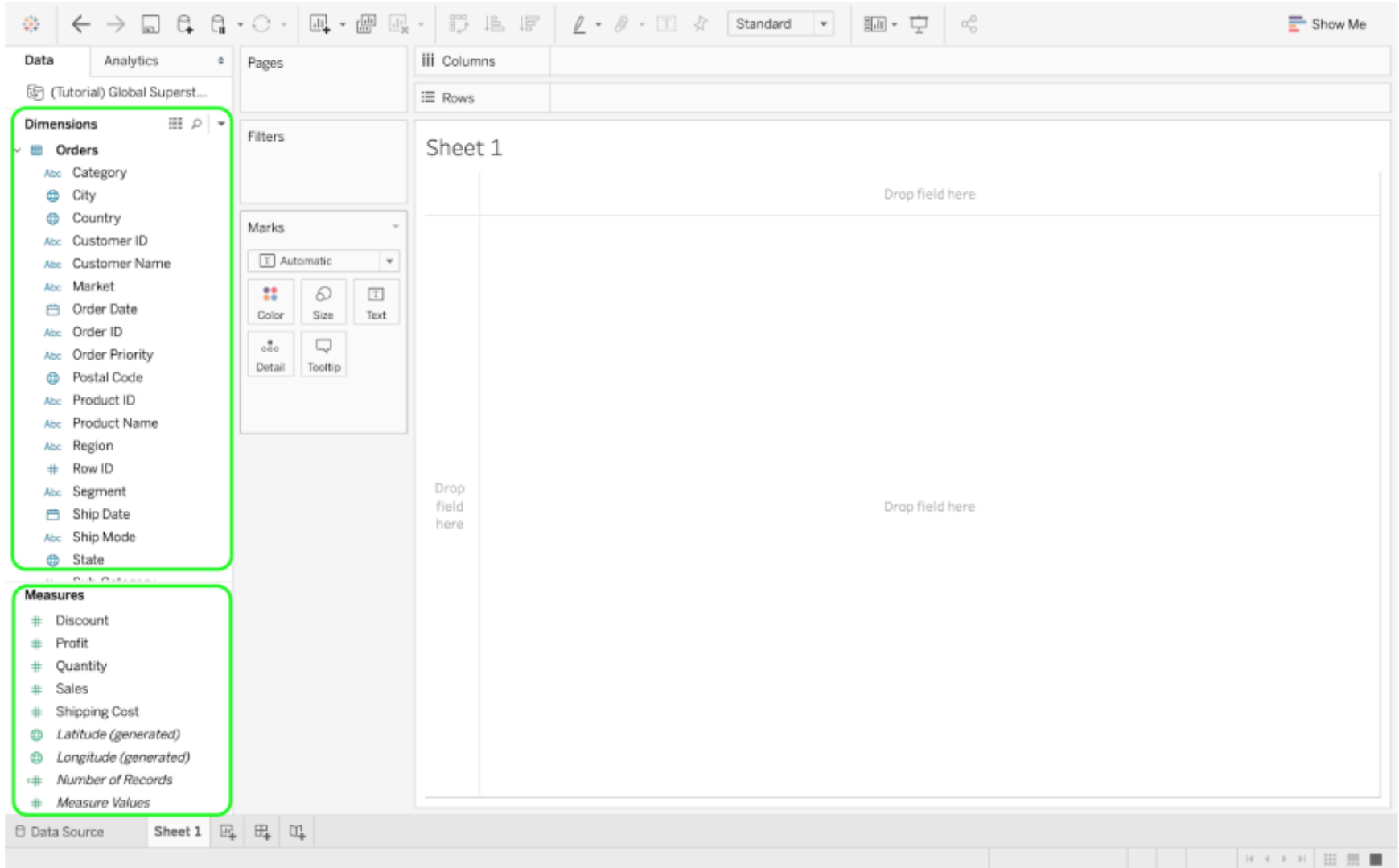


2.1 Visualization: Order Priority and Ship Mode

Click on Sheet 1 at the bottom left of the screen to access Tableau's main interface. On the left side, you will find Dimensions and Measures, displayed in blue and green respectively. You can think of dimensions as qualitative data, usually containing qualitative and categorical information.

Measures, on the other hand, represent quantitative numerical data and can be aggregated based on a specific dimension.

- Dimensions and Measures.



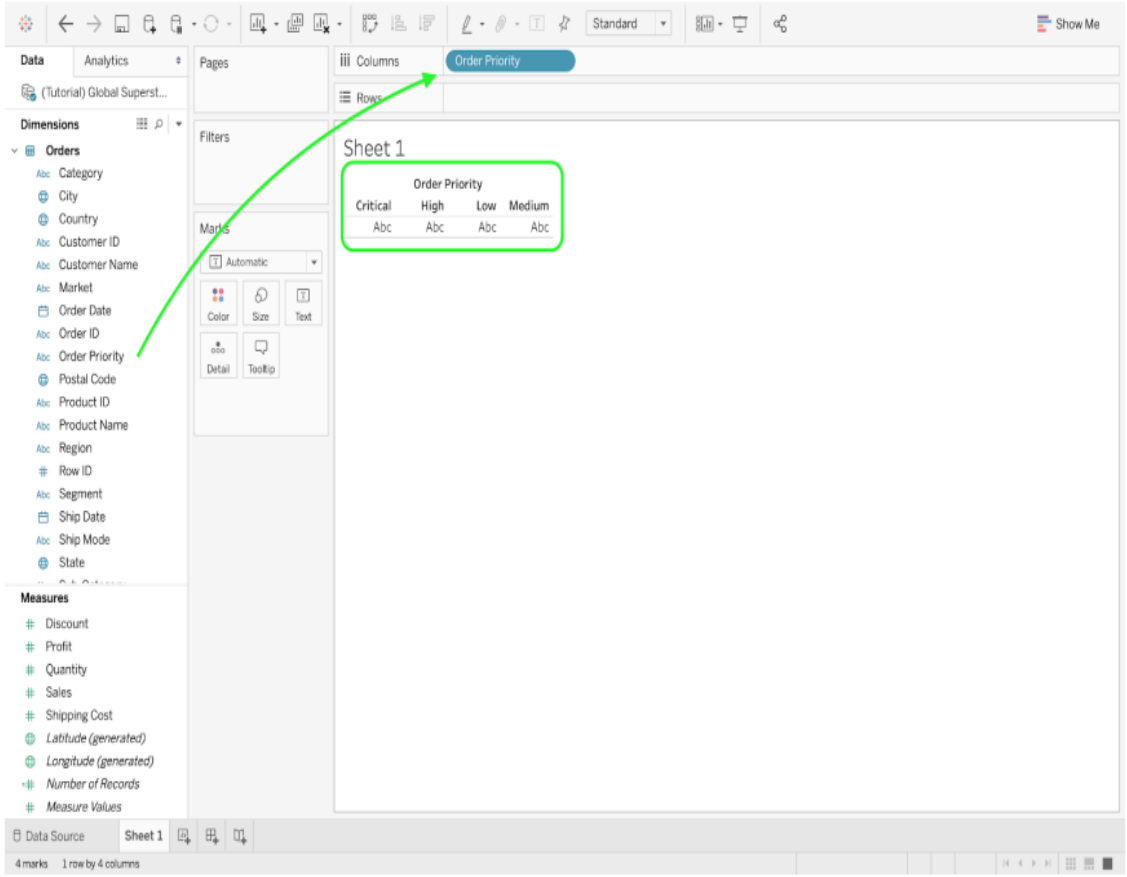
2.1 (cont..)

Drag the **Order Priority** (from Dimensions) to the Columns pane. The column headers that represent the four dimensions of Order Priority (Critical, High, Medium, and Low) will then appear on the sheet. Continue by dragging **Ship Mode** to the Rows pane—a crosstab will appear. At this point, you can see that some of the cells are labeled as “Abc,” whereas others are blank (see the figure below). “Abc” is a generic placeholder text used by Tableau.

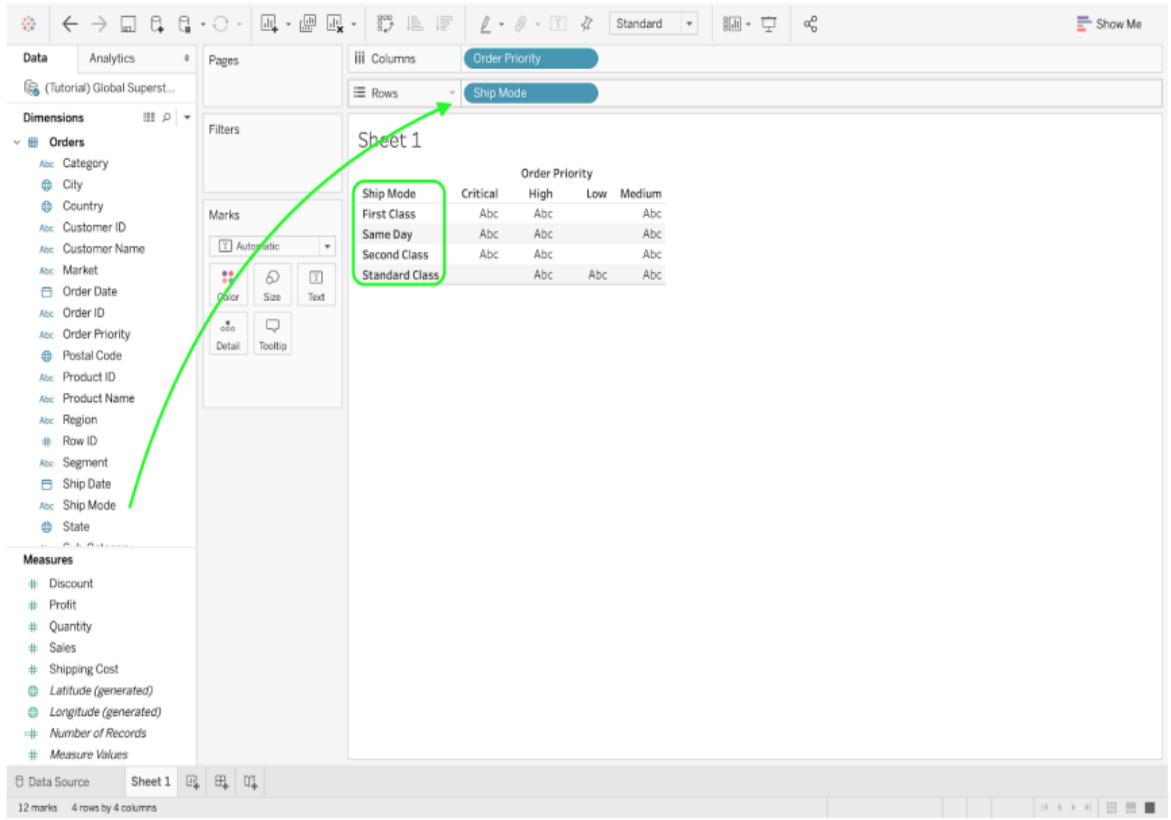
To address this issue, you need to add a measure. Specifically, you can add the **Number of Records (or Order Counts),** which is a measure automatically generated by Tableau, that counts the number of rows (i.e., the number of order items). Drag this measure to the Text mark, located in the Marks pane. This will replace the “Abc” placeholder text by the number of records for each combination. You can now compare the frequency of the different shipping modes across the different order priorities.

2.1 (cont…)

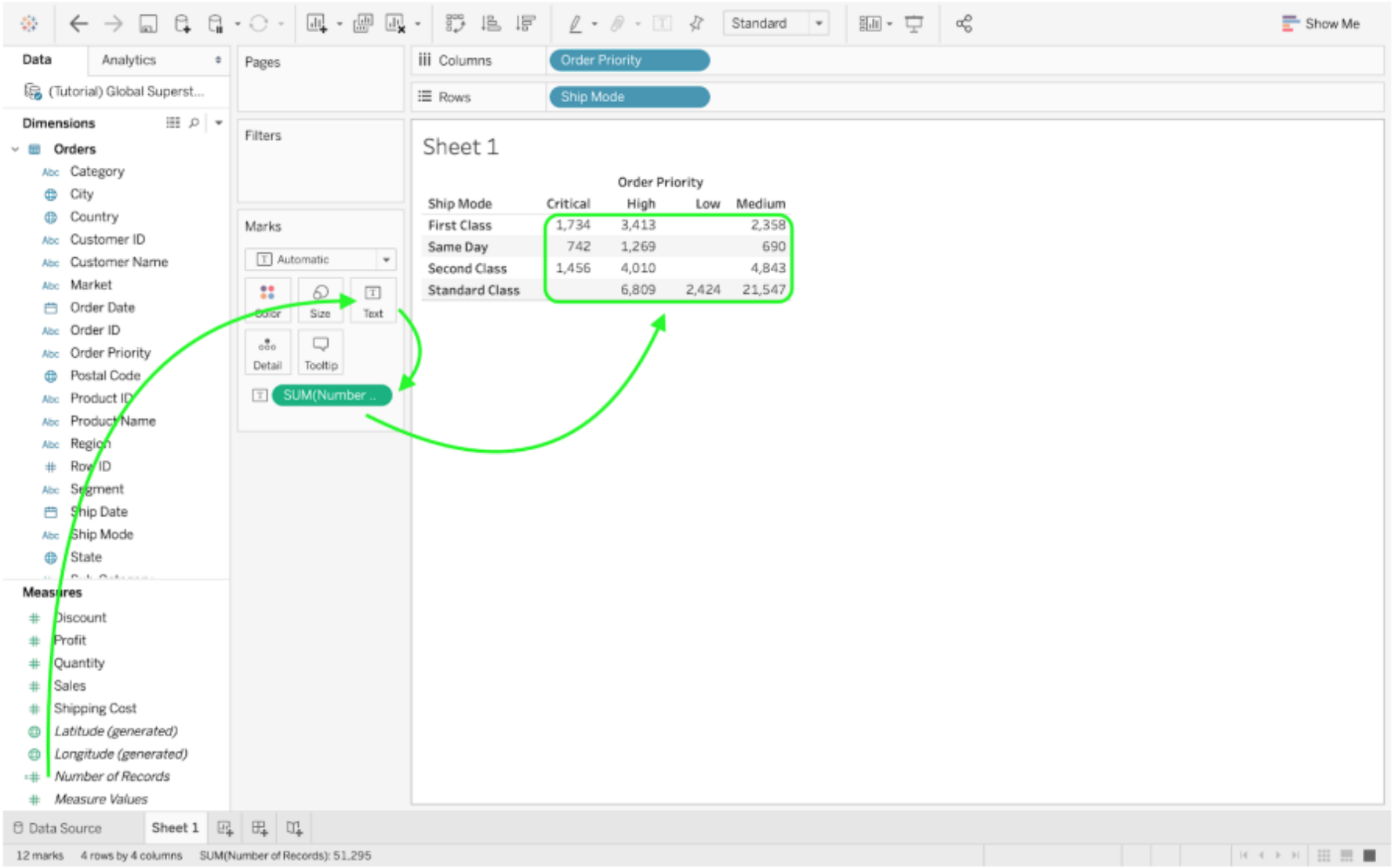
- Drag Order Priority to Columns.



- Drag Ship Mode to Rows.

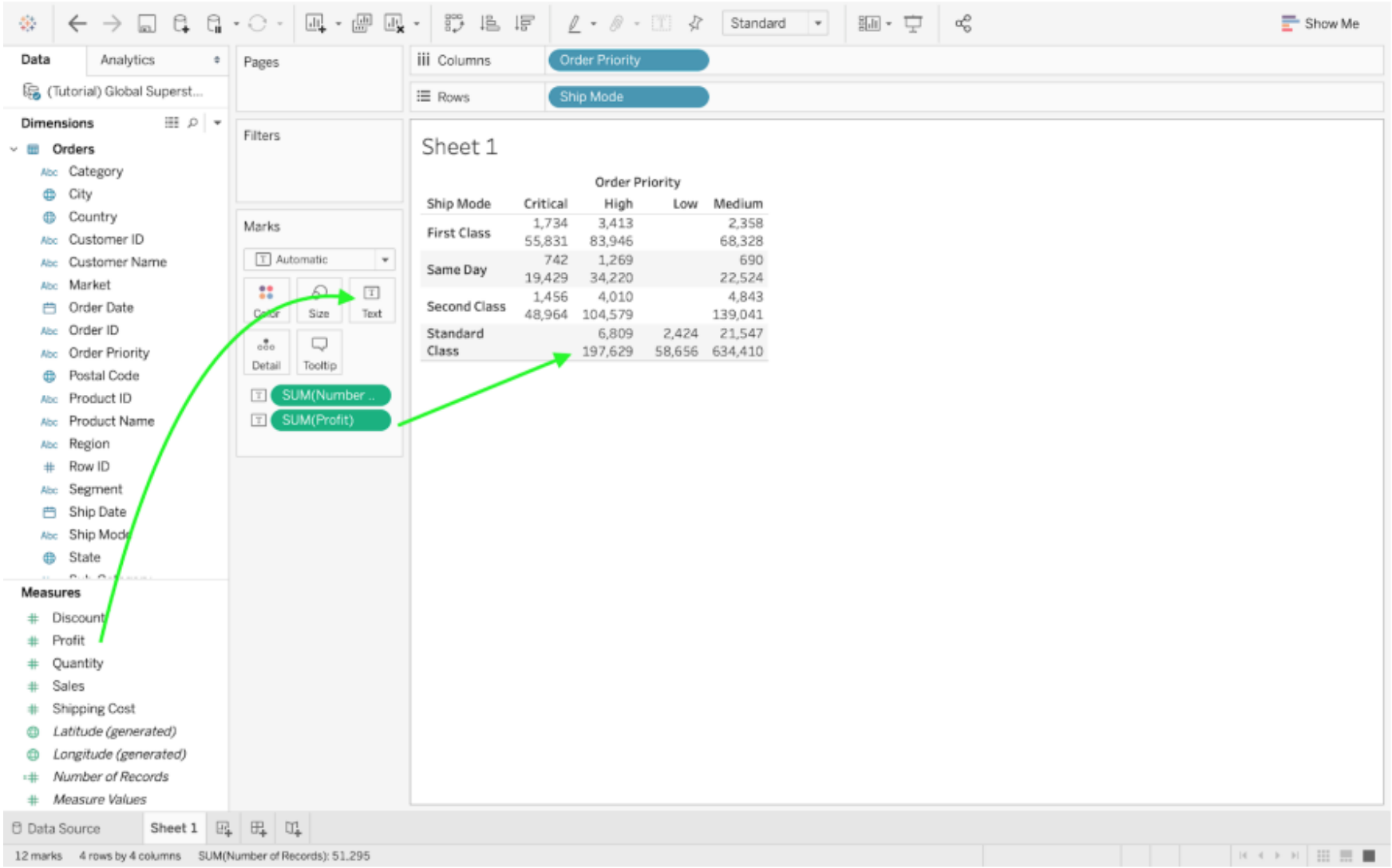


- Drag Number of Records to Text.

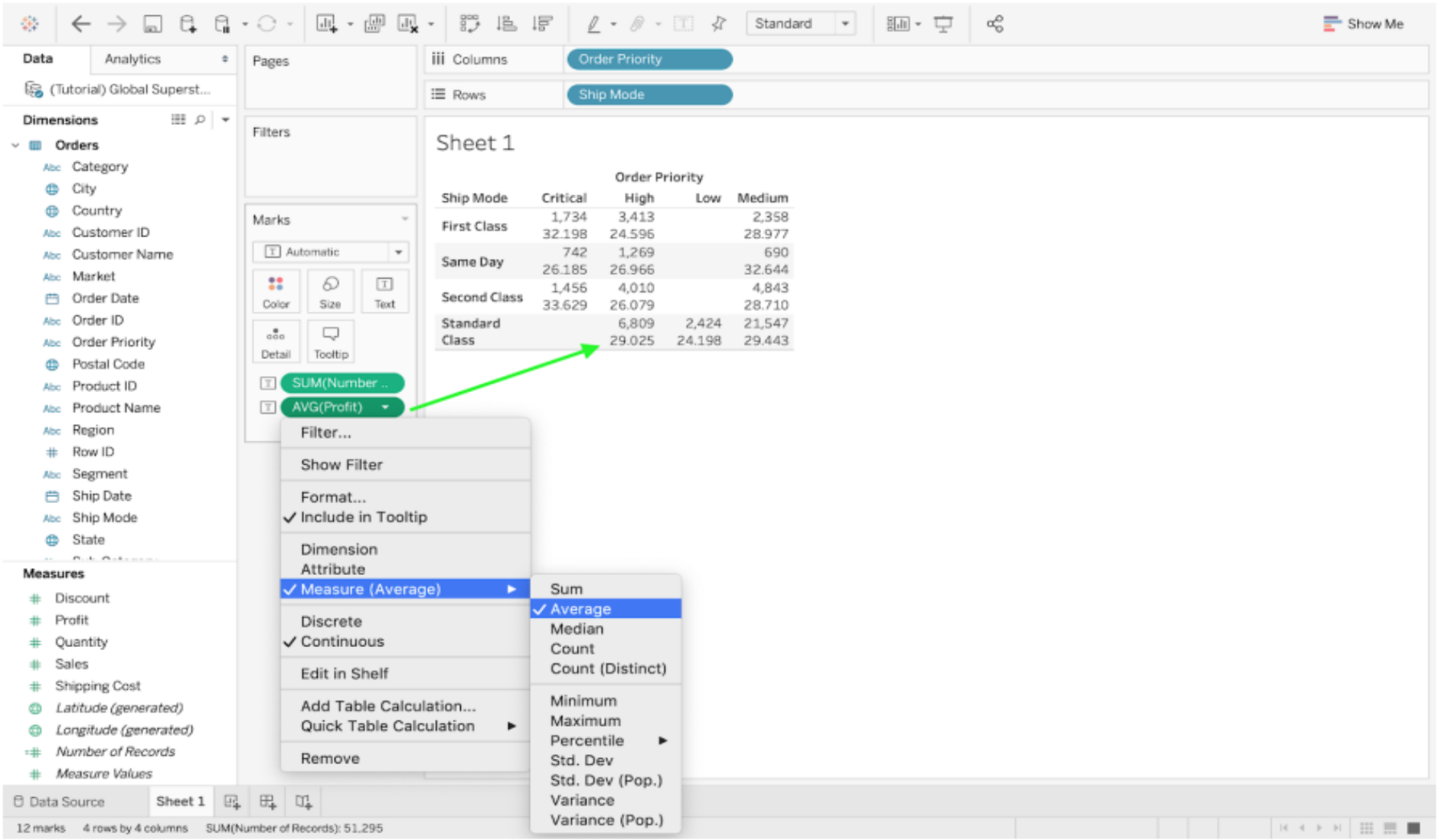


You can then drag the **Profit** measure to the text mark and see the sum of profits appear below the number of records. You may also want to look at specific statistics of the profits, such as average, median, maximum, and minimum. For this example, open the drag-down menu and set the Measure to Average. You can then drag the Average of Profits to the Color Mark and see how the table evolves. Adding filters can also be done by dragging dimensions or measures to Filters. You also have the option to focus on specific markets (e.g., U.S.) by only selecting those markets when you design your filter.

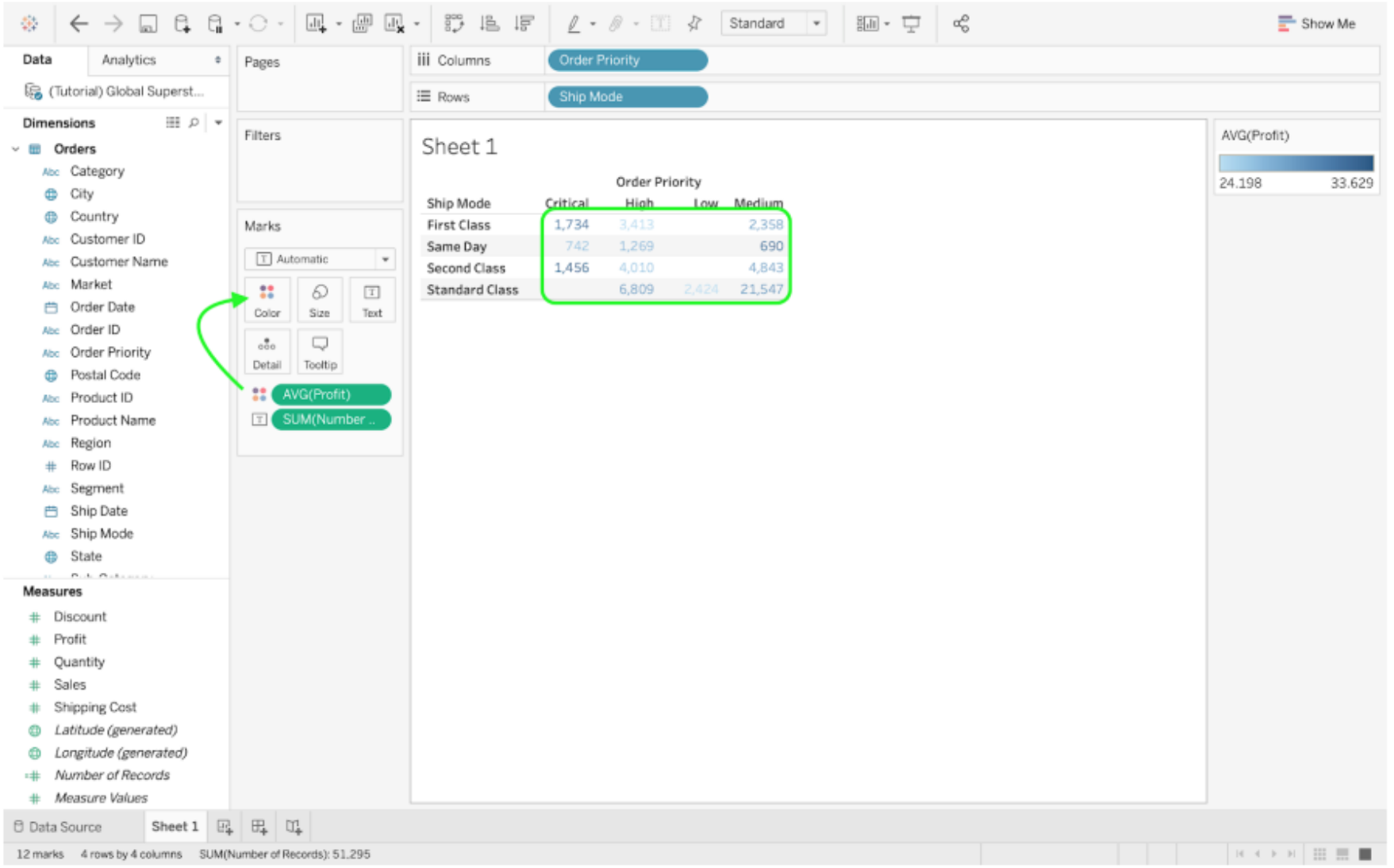
- Profits as a text mark.

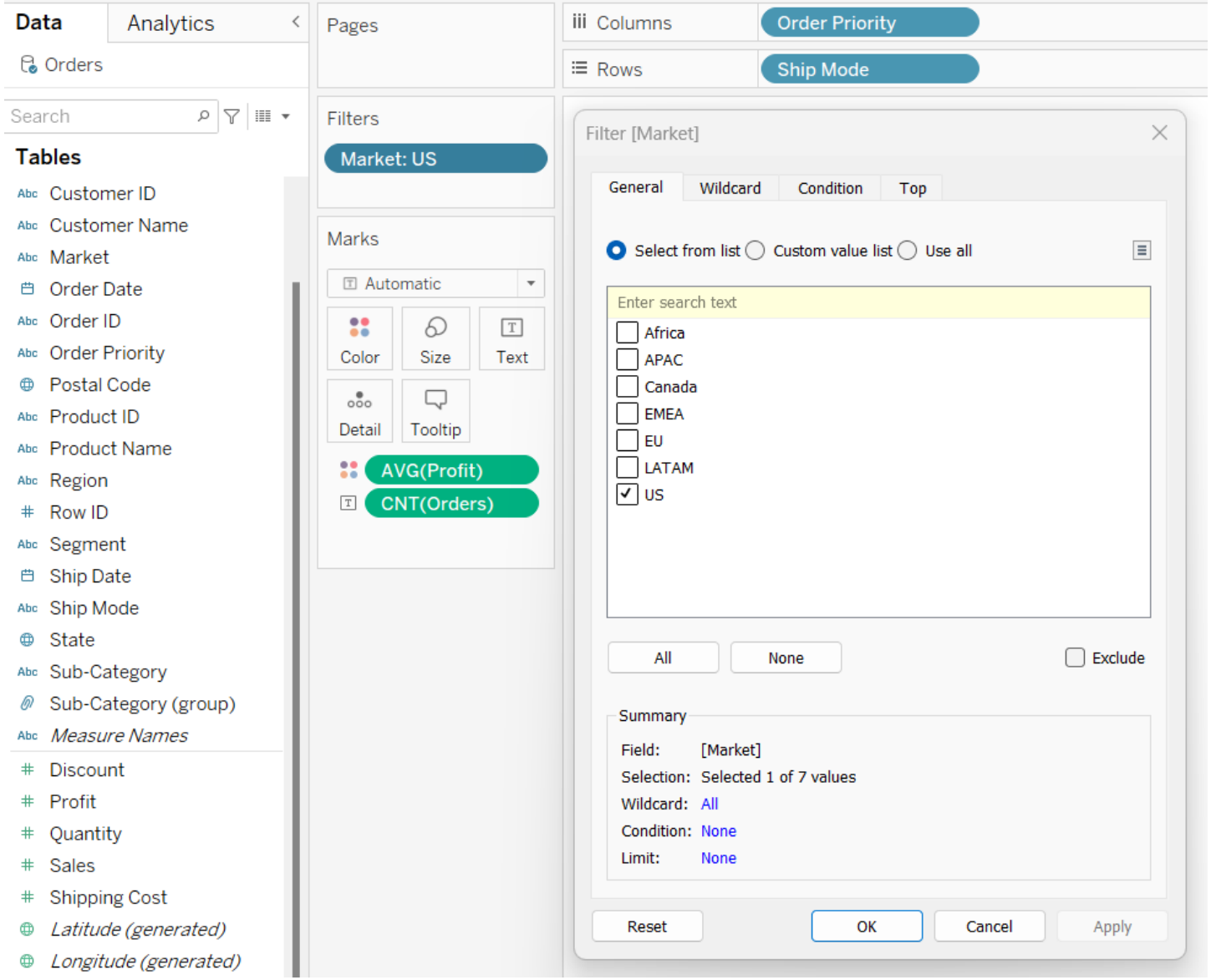


- Average Profit as a text mark.



- Average Profit as a color mark.




Data
Analytics
Orders
Search
Tables
Customer ID
Customer Name
Market
Order Date
Order ID
Order Priority
Postal Code
Product ID
Product Name
Region
Row ID
Segment
Ship Date
Ship Mode
State
Sub-Category
Sub-Category (group)
Measure Names
Discount
Profit
Quantity
Sales
Shipping Cost
Latitude (generated)
Longitude (generated)
Pages
Filters
Market: US
Marks
Automatic
Color
Size
Text
Detail
Tooltip
AVG(Profit)
CNT(Orders)
Columns
Order Priority
Rows
Ship Mode
Filter [Market]
General
Wildcard
Condition
Top
Select from list
Custom value list
Use all
Enter search text
Africa
APAC
Canada
EMEA
EU
LATAM
US
All
None
Exclude
Summary
Field: [Market]
Selection: Selected 1 of 7 values
Wildcard: All
Condition: None
Limit: None
Reset
OK
Cancel
Apply

2.2: Visualization (Market and Sales)

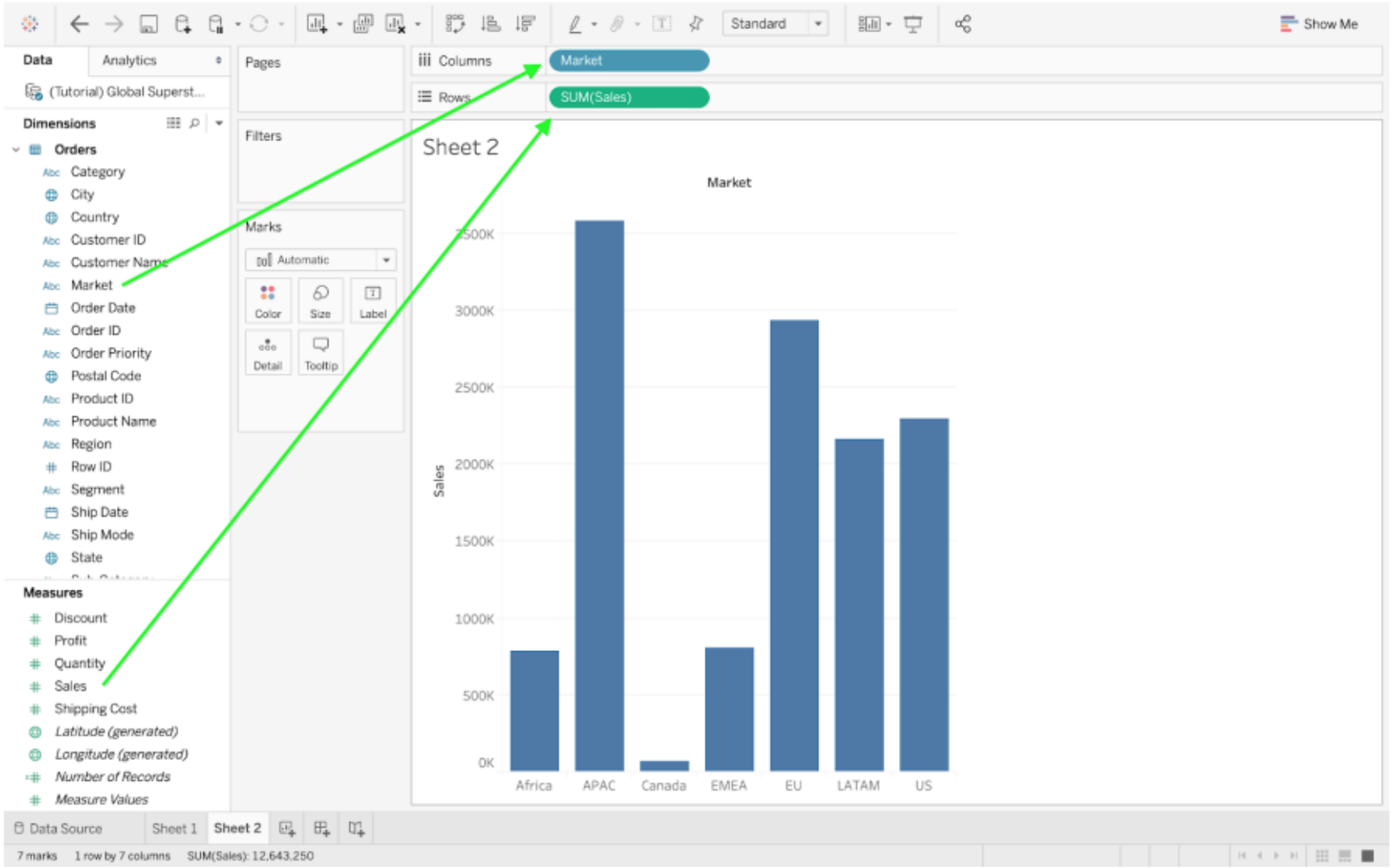
On a new sheet, drag the dimension **Market** to the Columns pane. Drag also the **Sales** measure but drop it in the Rows pane. Tableau will automatically generate a bar chart, where you can easily spot the markets with the highest sales. For example, Asia Pacific seems to drive more sales than Canada. While the Bar Chart format has been selected by Tableau, you can choose to visualize the data differently. For example by opening the drop-down menu in the Marks pane, you can select Area instead of Bars.

To further refine your Area chart, you can add colors (and add another dimension at the same time). For instance, drag the dimension **Segment** and drop it in the Color mark; you will get a better understanding of which segment accounts for the most sales in the different markets. By adding a dimension such as **Order Date** to Pages (located above the Filters pane), you can add a chronological aspect to your visualization.

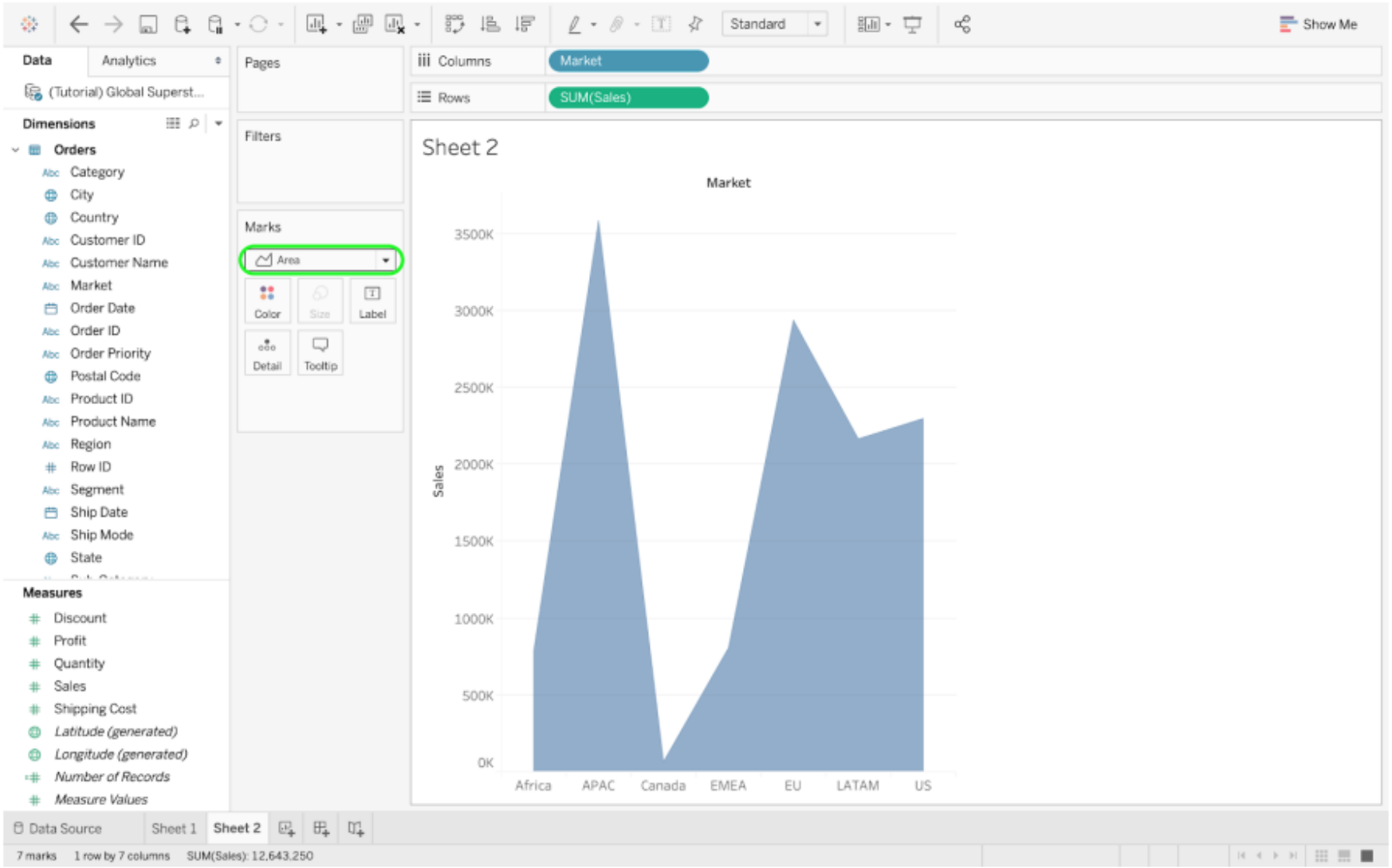
2.2: Visualization (Market and Sales) cont…

Choose between years, quarters, and months as well as several other options by clicking on the drop-down menu associated with the dimension you dragged to the Pages pane. You will quickly notice that for some options, such as quarters, Tableau provides multiple ways to visualize your data. For instance, you may opt to browse through each quarter available in the dataset (e.g., 2011's Q1, Q2, Q3 & Q4; 2012's Q1, Q2, Q3 & Q4) or you can select an aggregated view (i.e., "Q1" would combine the Q1 data across all years).

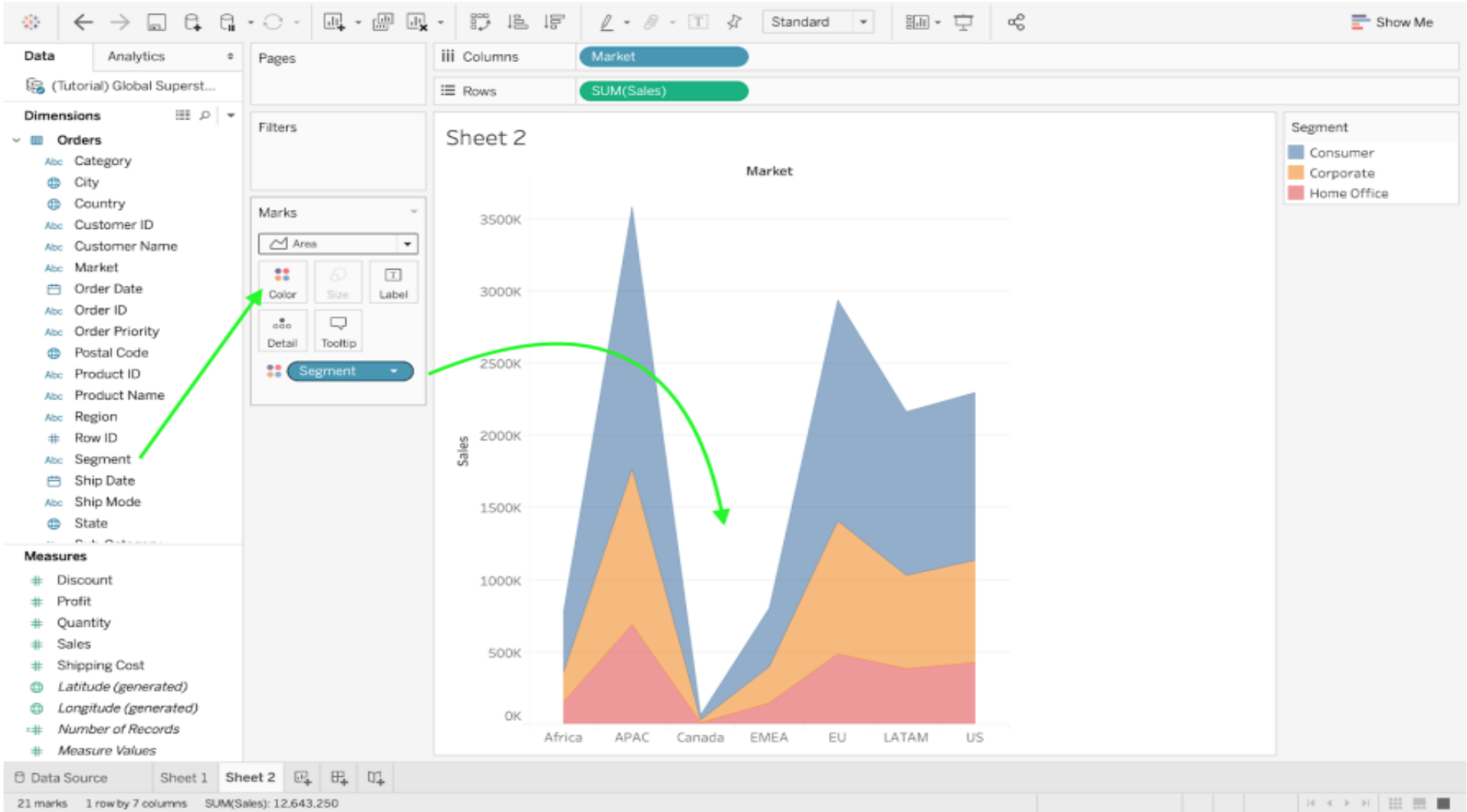
- Drag Market (Dimension) and Sales (Measures).



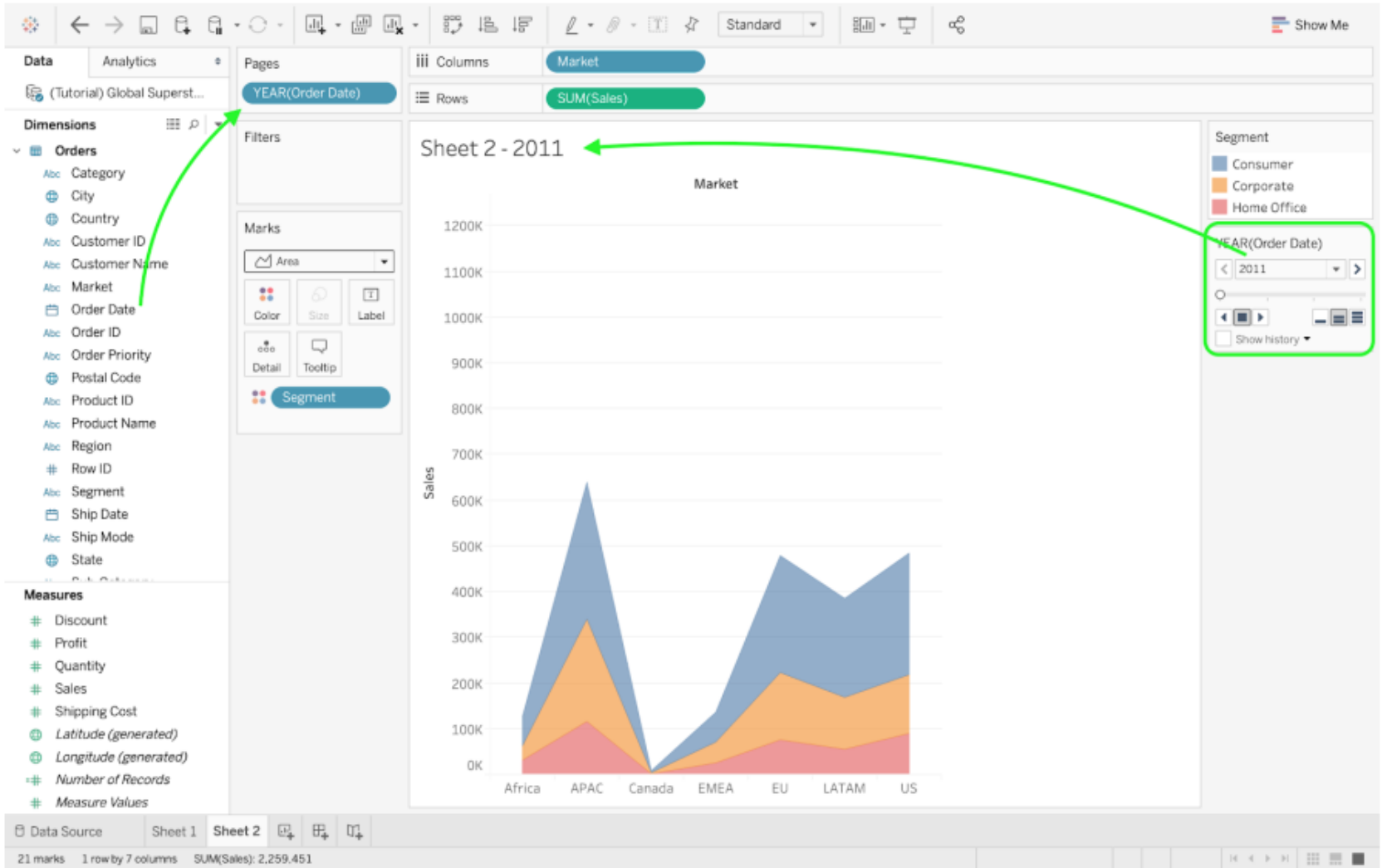
- Switch to an Area chart.



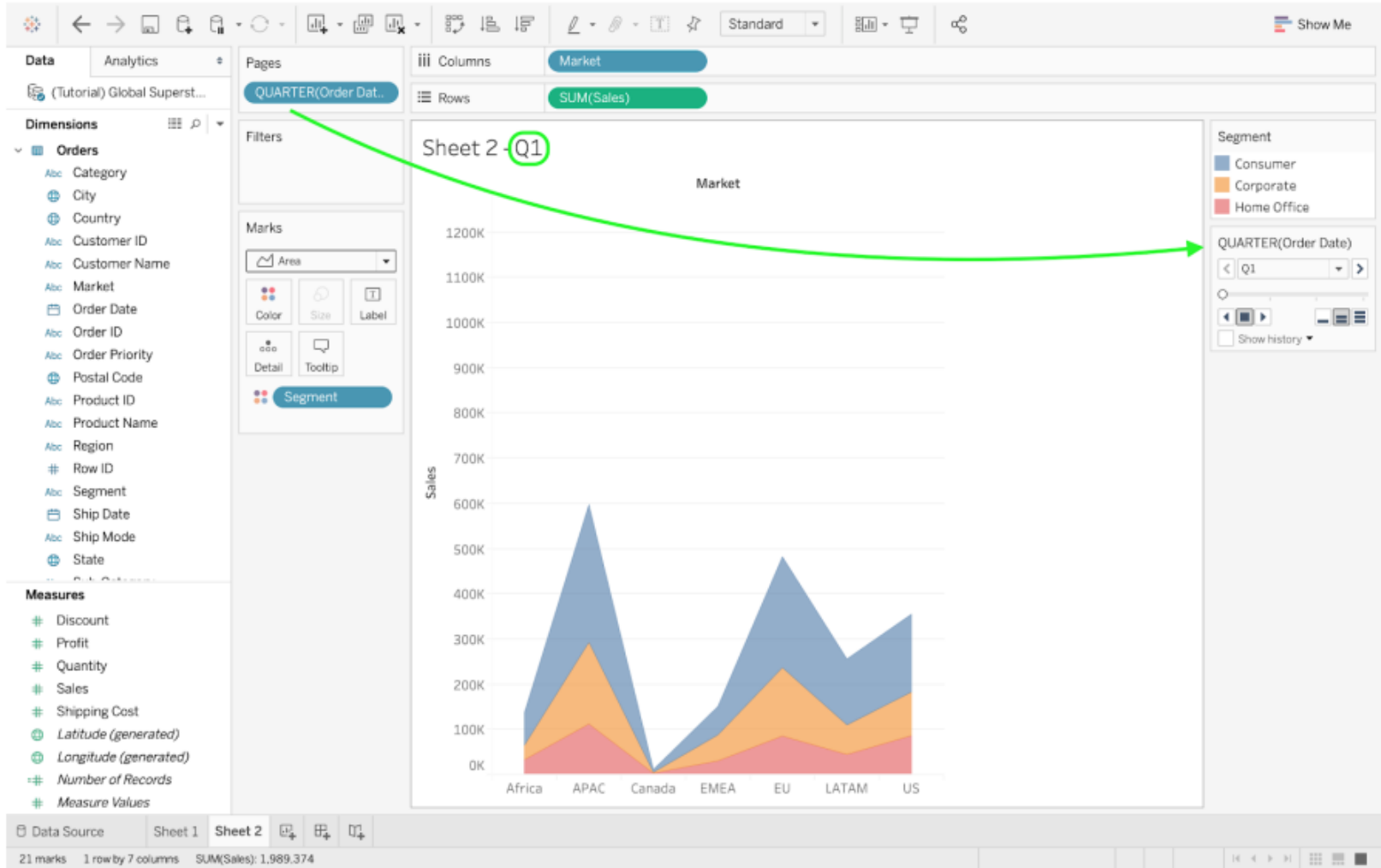
- Drag Segment to the Color Mark.



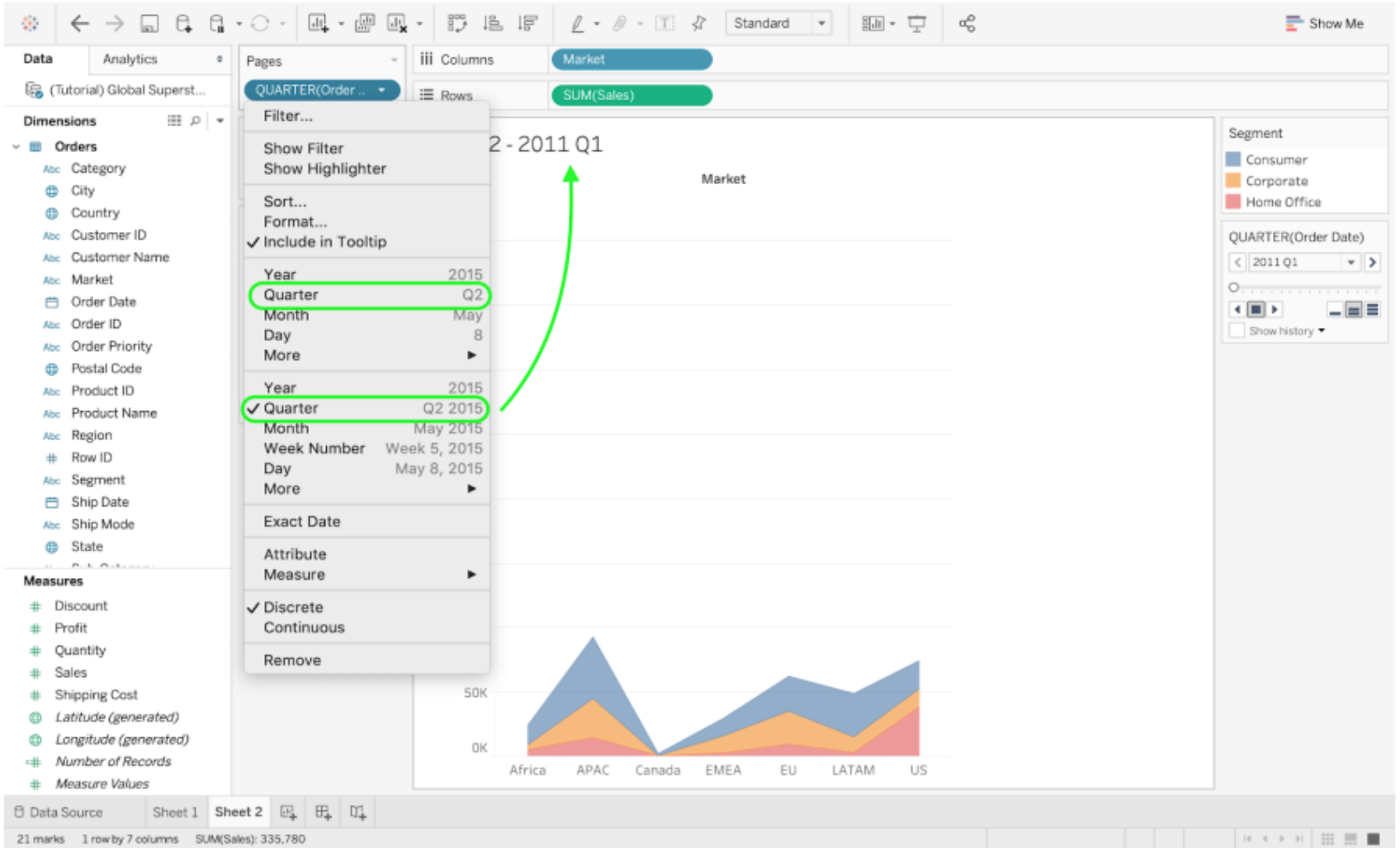
- Drag Order Date to Pages.



- Switch from Years to Quarter.



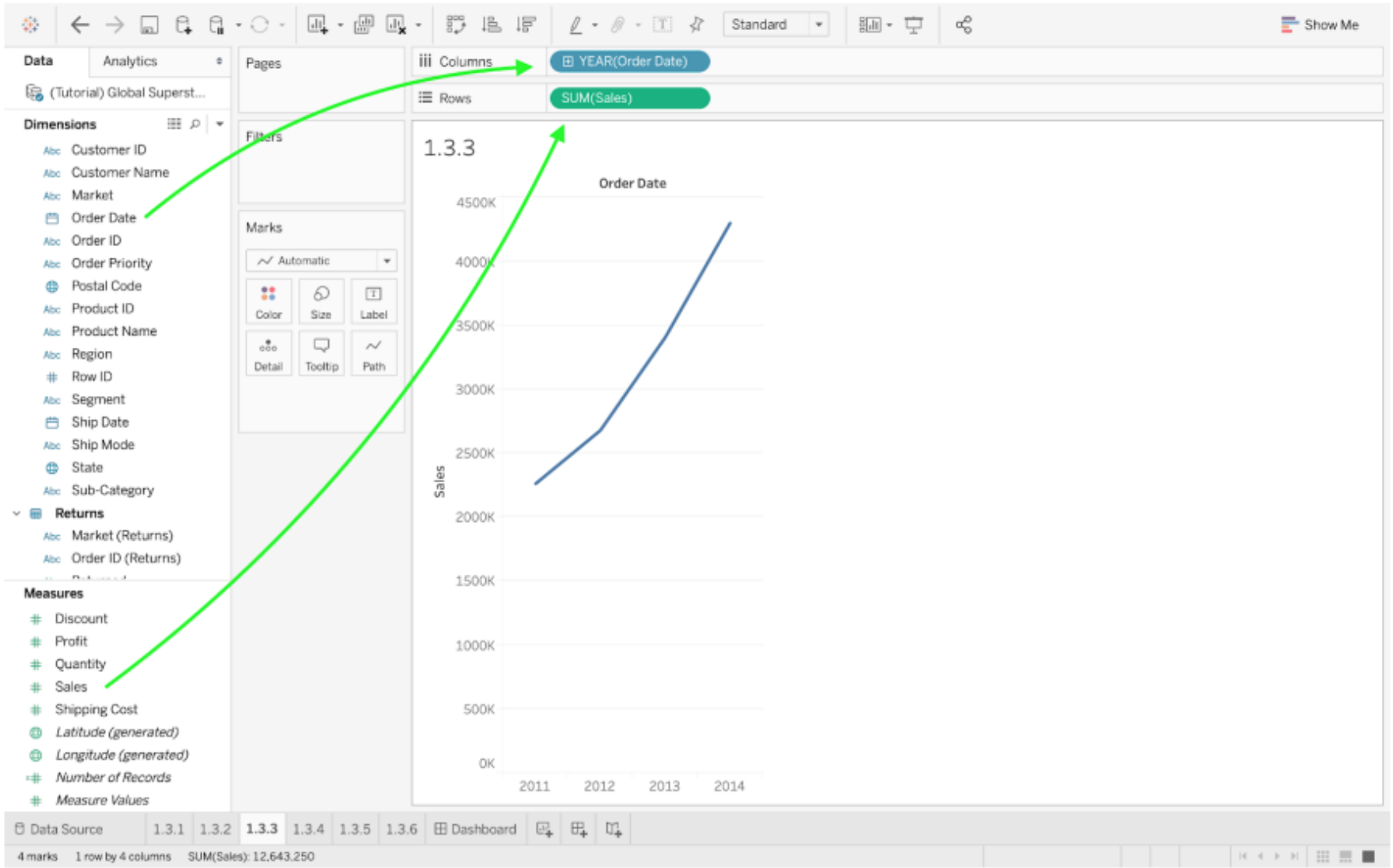
- Switch from Aggregated Quarters to Quarter per year (e.g., Q1 vs. Q1 2015).



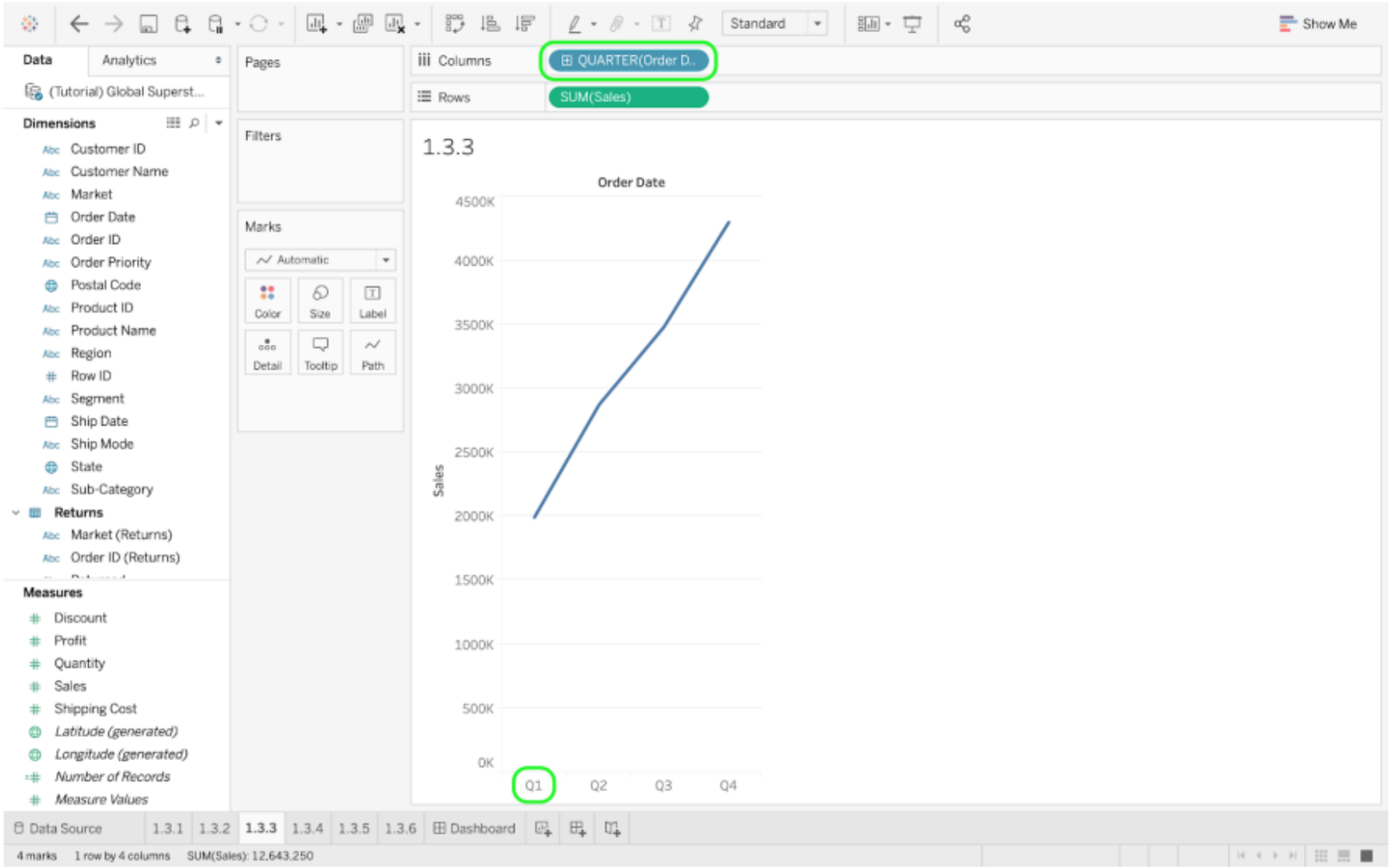
2.3: Visualization (Sales and Order Date)

On a new sheet, drag the dimension **Order Date** to the Columns pane and the measure **Sales** to the Rows pane. A line will appear, showing the trend in sales as a function of the year. By clicking on the drag-down menu on the Order Date dimension, you can select Quarter. Notice that there are two versions of Quarter: the first is labeled as Quarter Q2, whereas the second is Quarter Q2 2015.

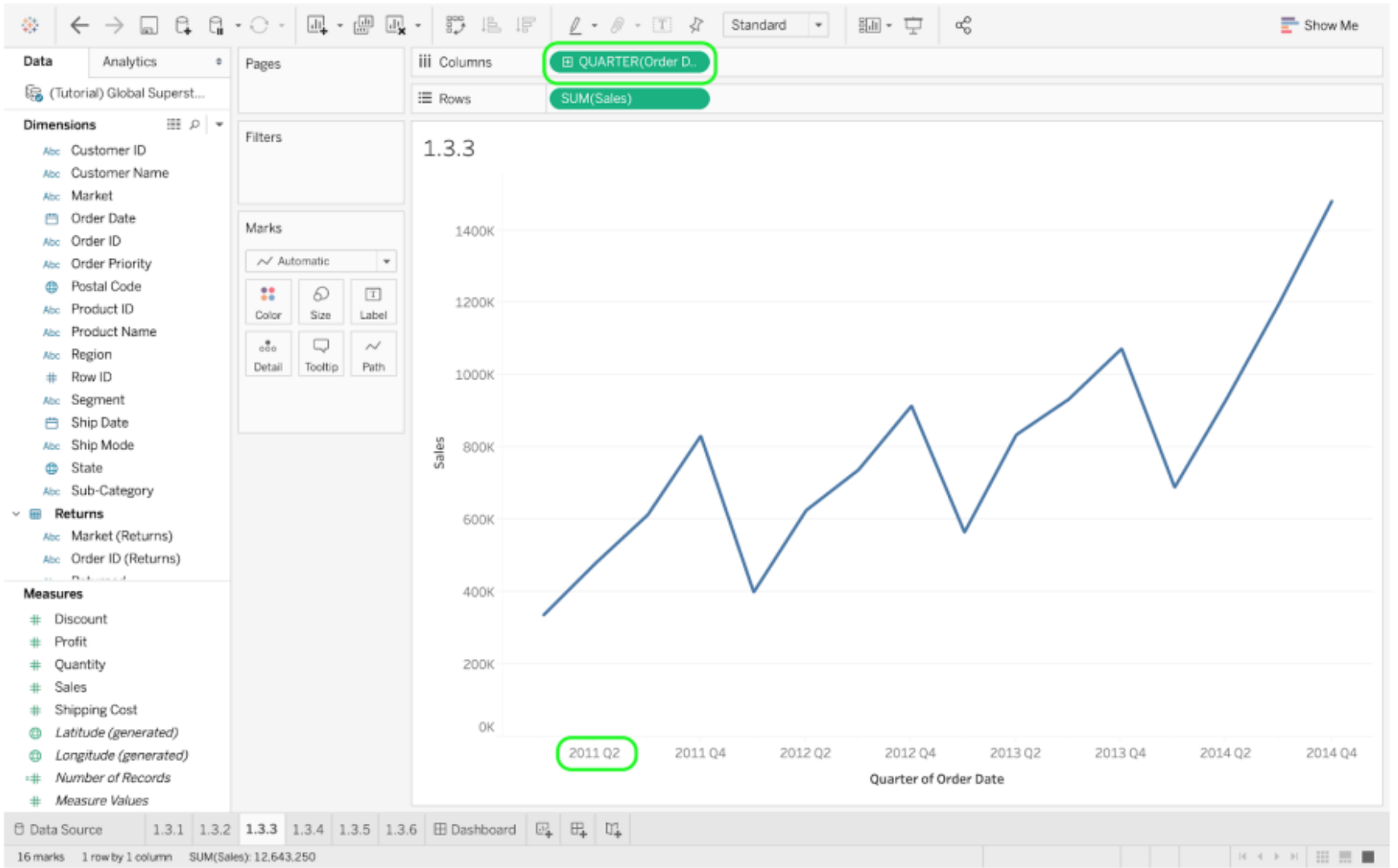
- Order Date & Sales.



- Order Date by Aggregated Quarter.



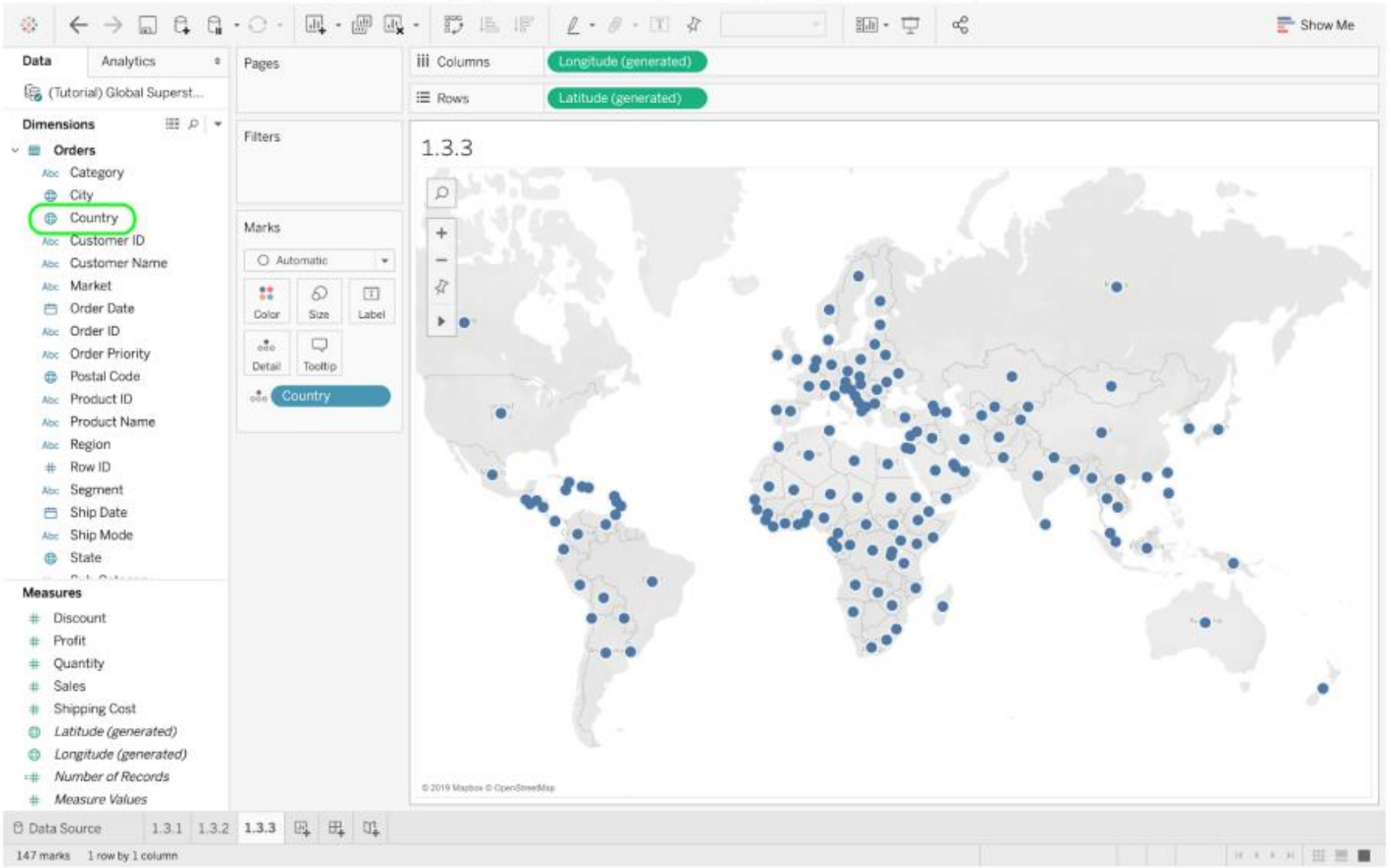
- Order Date by Quarter.



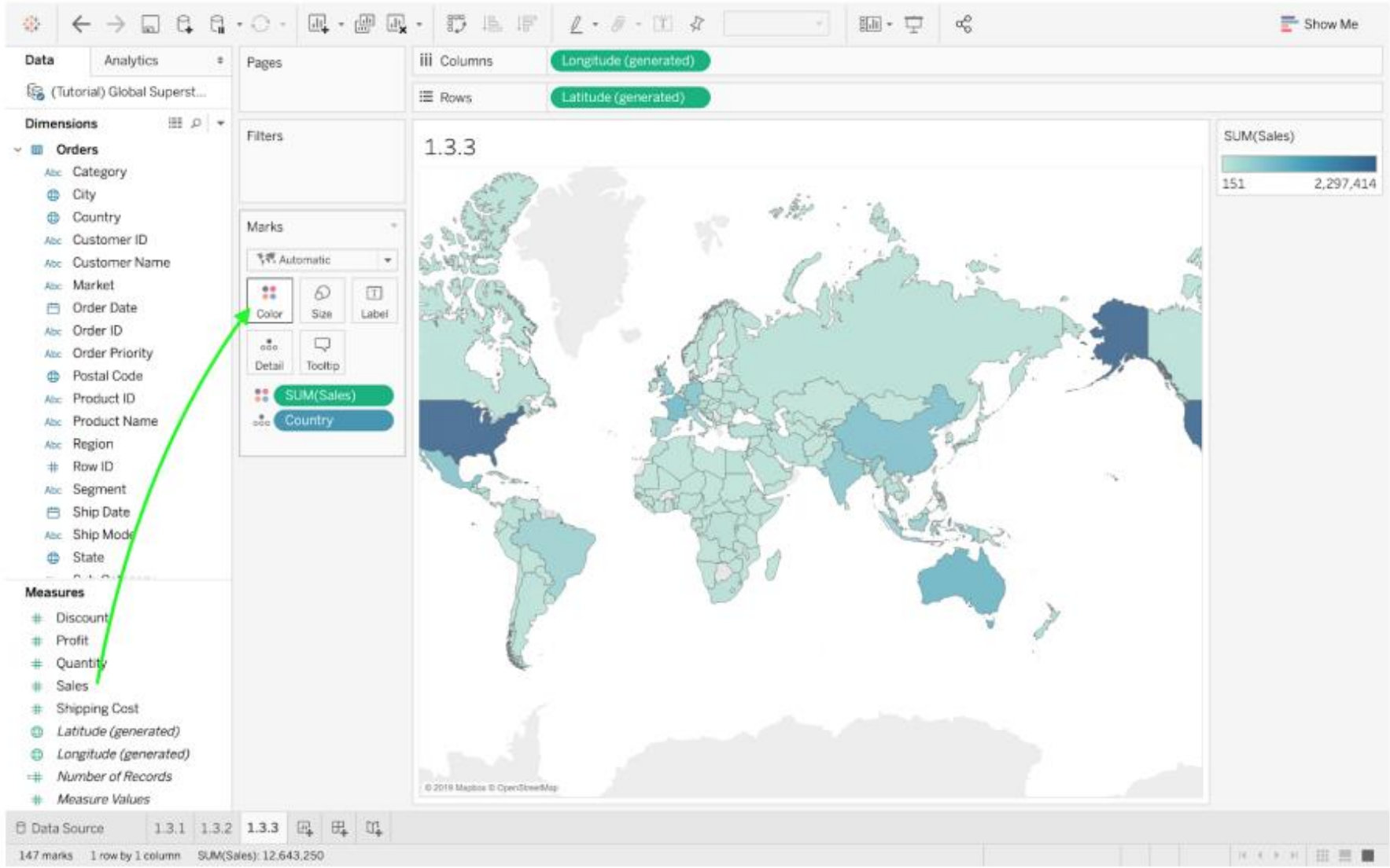
2.4: Visualization (Map)

On a new sheet, double-click on the dimension **Country**. It will automatically generate the measures Longitude and Latitude in the Columns and Rows panes respectively. A map will subsequently appear. The blue dots correspond to the countries where Superstore have customers. To make the map more meaningful, you can drag a measure such as **Sales** in the different marks. The following screenshots showcase the sales represented by either (i) color (darker hues correspond to higher values) or (ii) dot size.

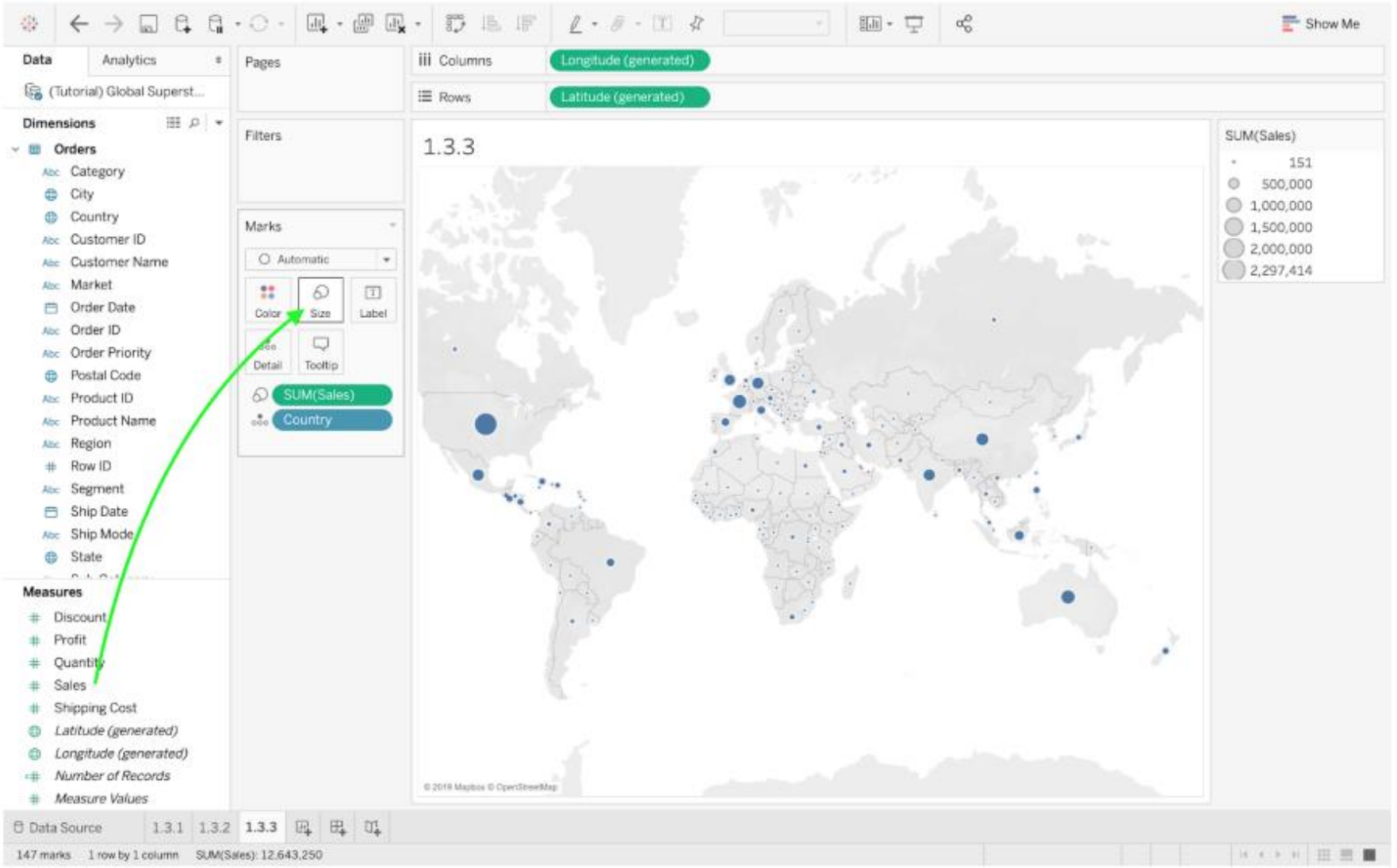
- Double-click on Country (Dimensions) and generate a map.



- Drag a measure such as Sales to the Color mark.



- Perhaps you prefer the Size option.



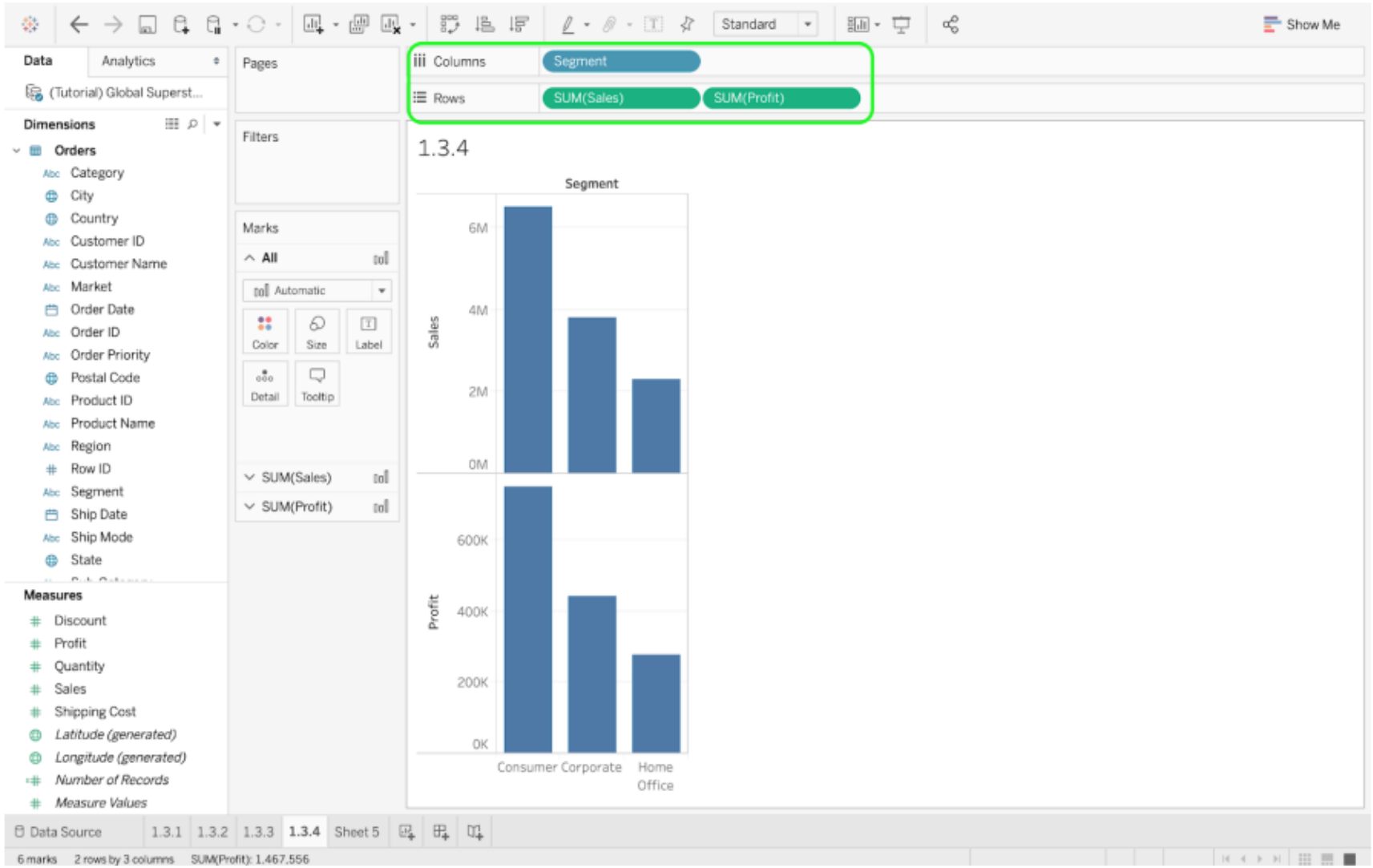
2.5: Visualization (Bar charts)

In a new sheet, drag the **Segments** dimension to the Columns pane and drag both **Sales** and **Profit** to the Rows pane. It will create two bar charts. These bar charts show how the sales (and profits) are split between three different segments (Consumer, Corporate, and Home Office). To display the data on a dual axis (instead of two separate charts), you can right-click on **Profit** and select the Dual-Axis view. This will allow you to easily compare several measures. After selecting the Dual-Axis view, you will notice that the bars disappeared and were automatically replaced by circles. To revert back to a bar chart, you can select the bar option in the drop-down menu located in the Marks pane (you need to select this option for both measures).

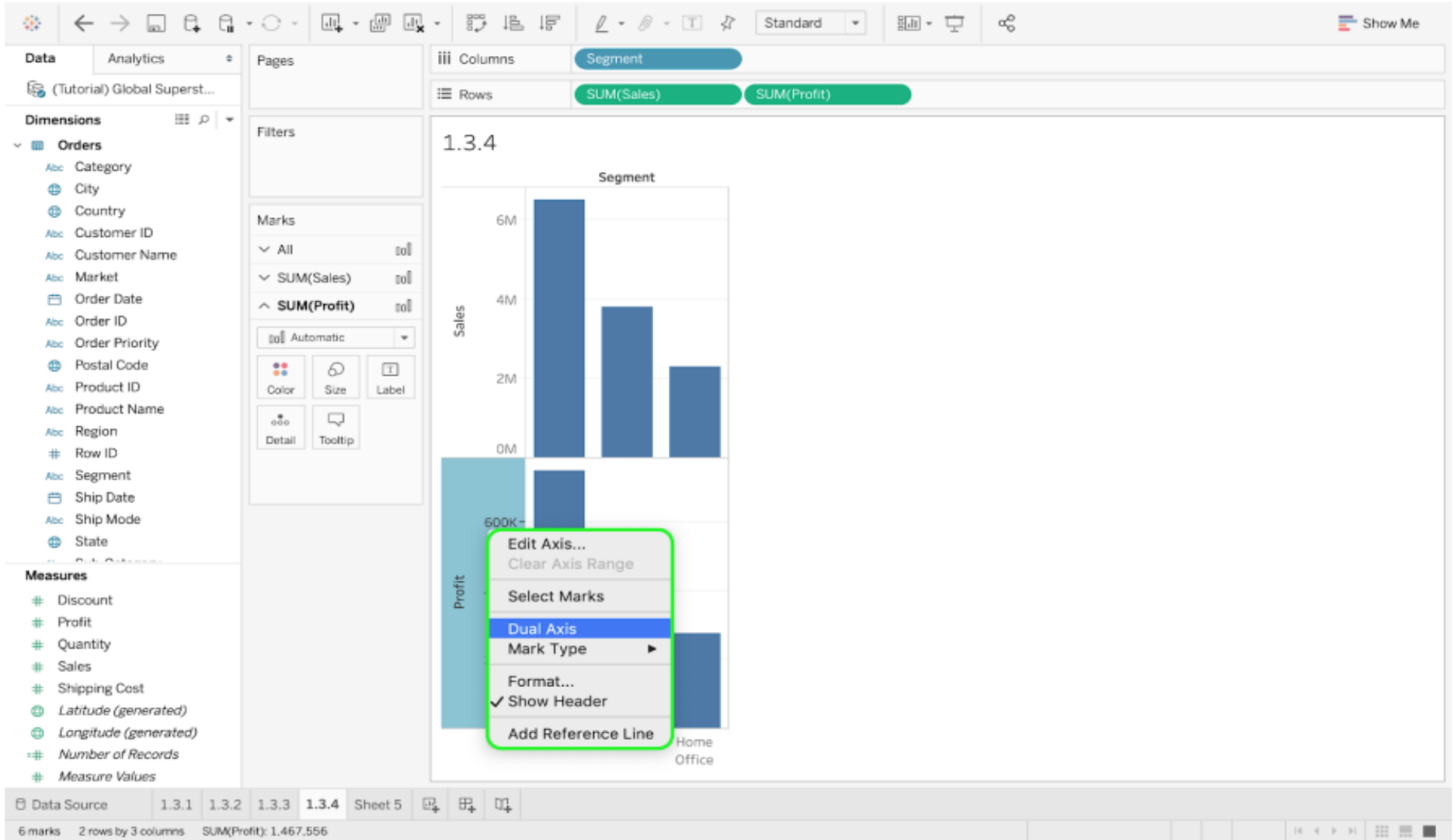
2.5: Visualization (Bar charts) cont…

At this point, you may want to improve the format of the chart. Specifically, to fully exploit the Dual-Axis view, you can click on the dimension **Measure Names** (located at the end of the list) and drag it next to **Segment** in the Columns pane. Then, the sum of sales and the sum of profits for each segment will now be displayed side by side. If you want to separate the sales from the profits, you can do so by swapping the order of the dimensions in the Dimensions pane.

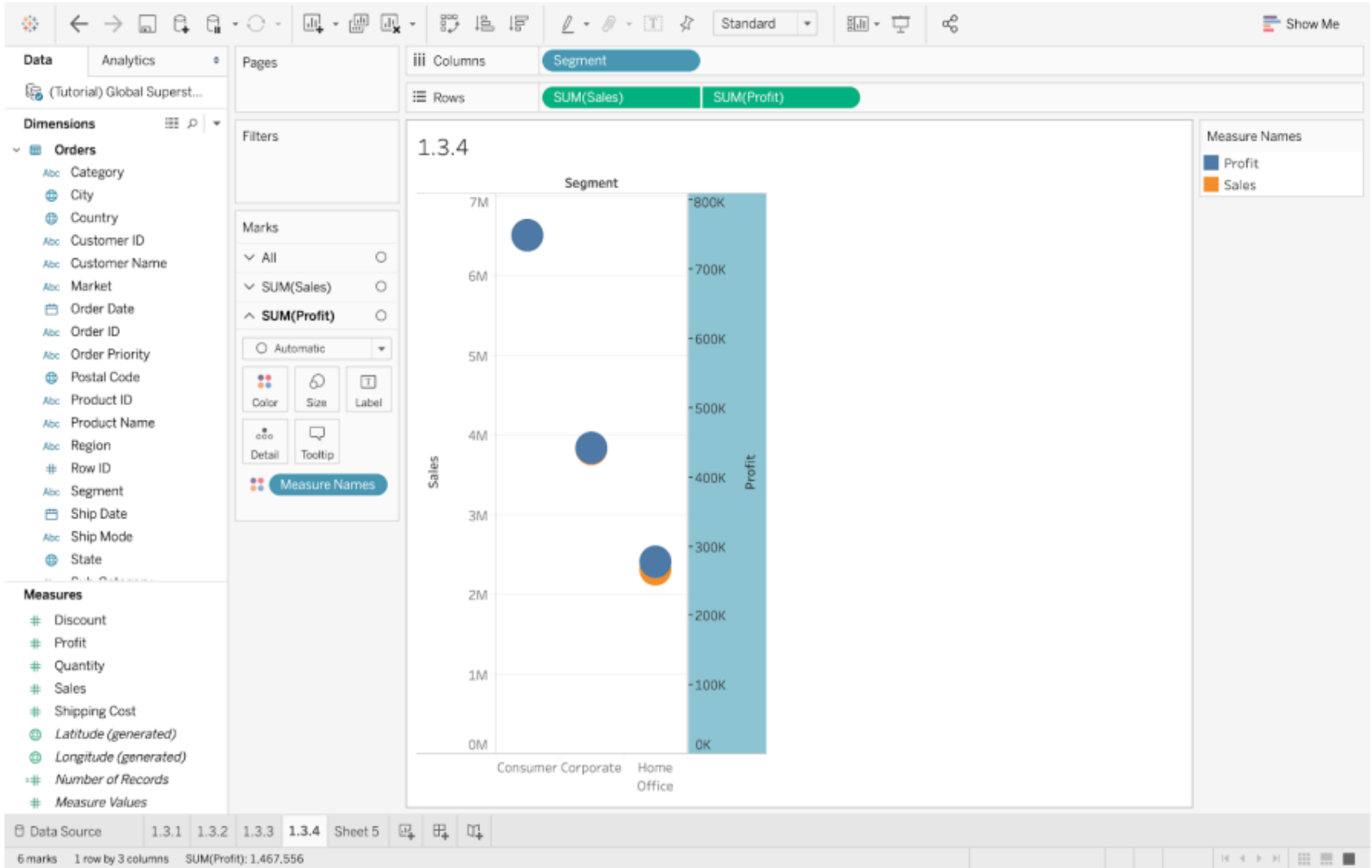
- One Dimension, two Measures.



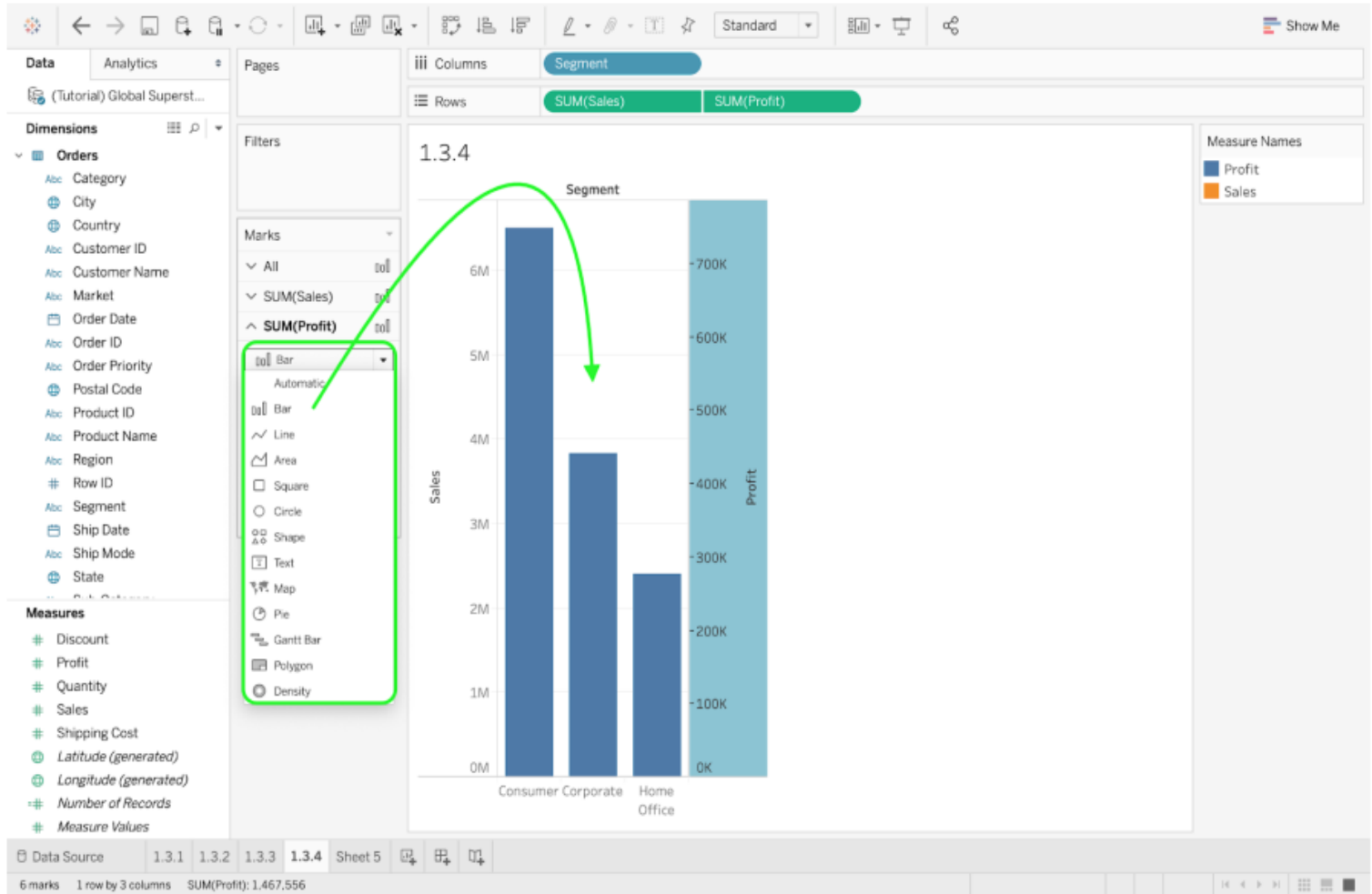
- Select the Dual Axis option.



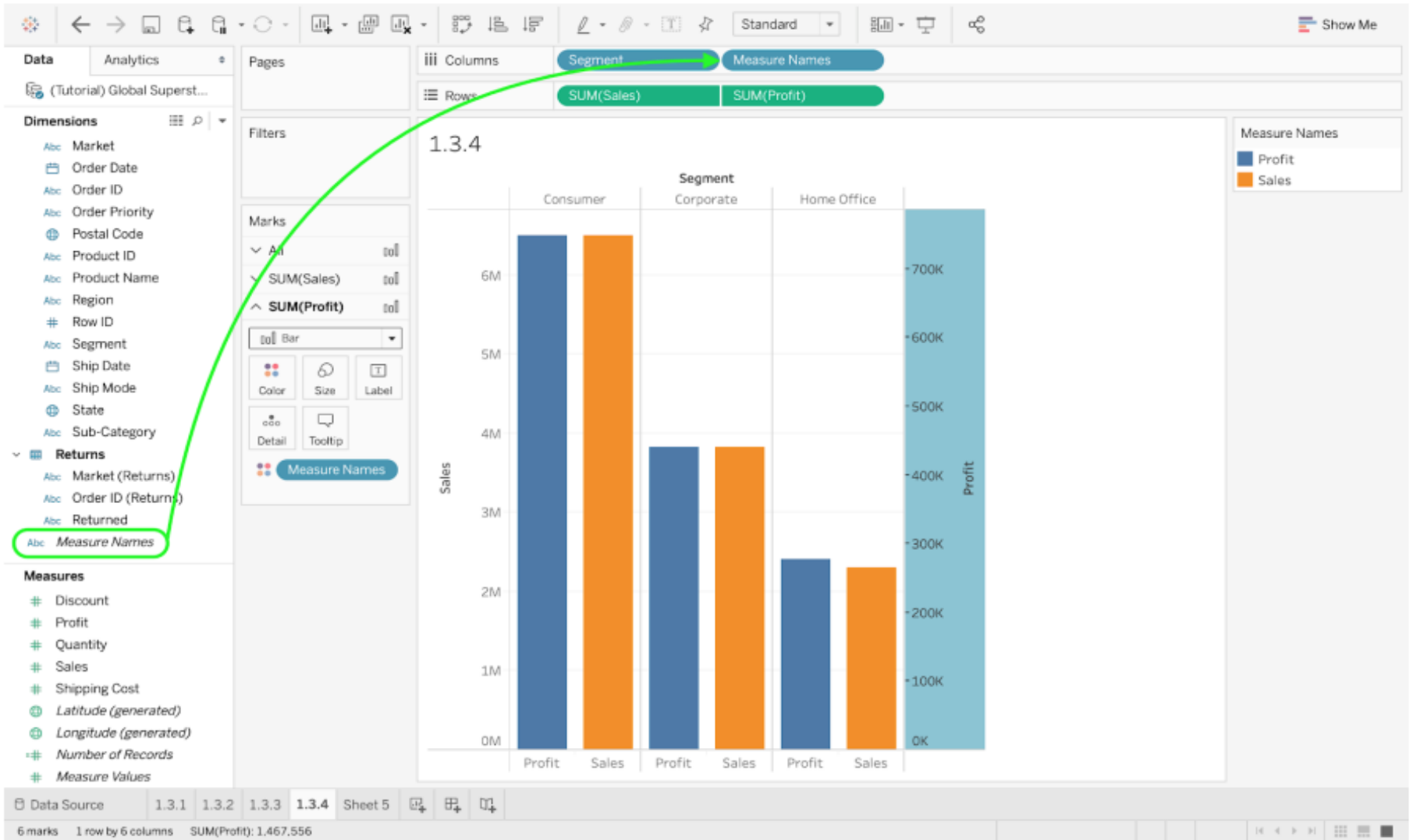
- A Dual Axis with a circle chart.



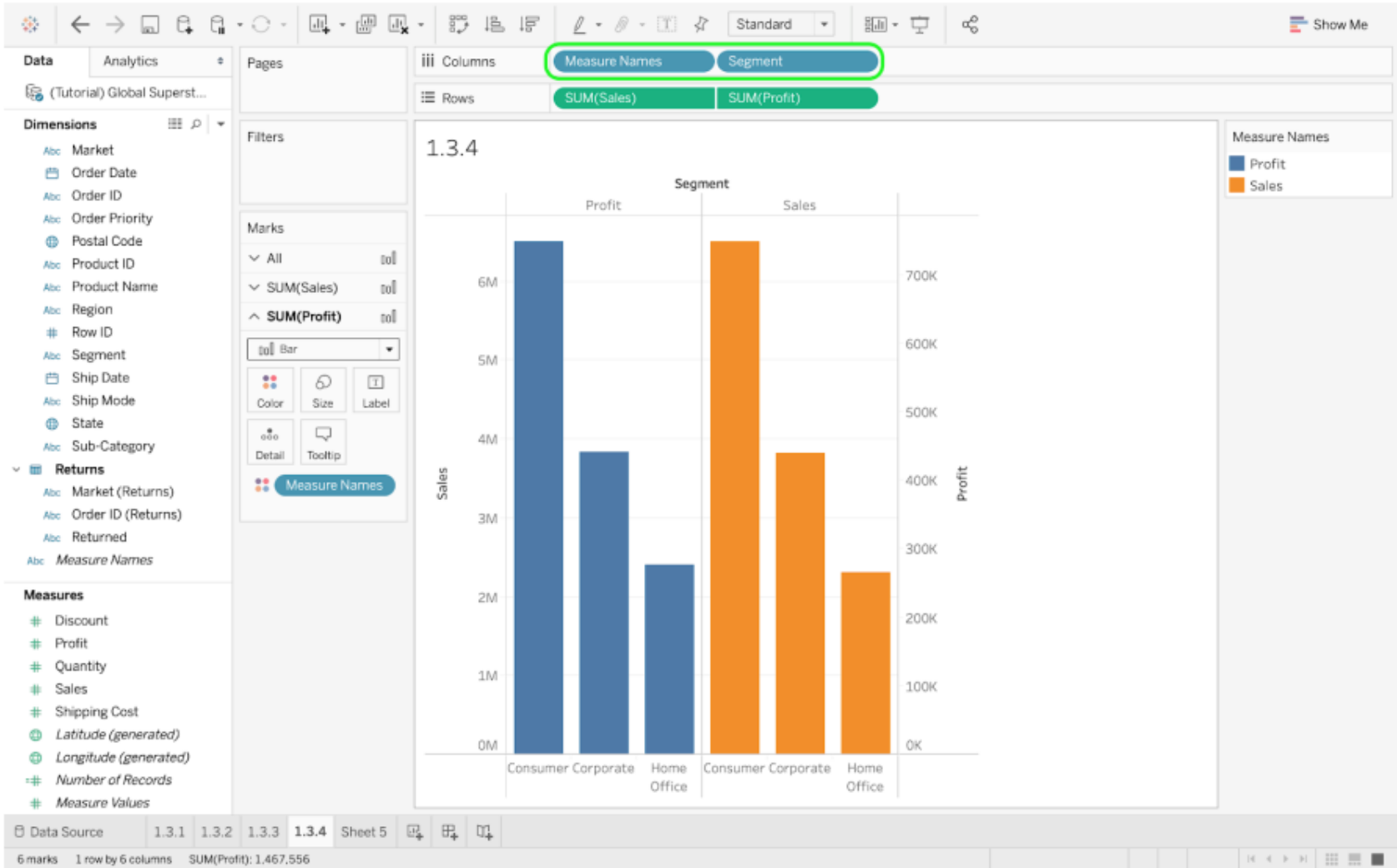
- Switch from Circle (default) to Bar.



- Add Measure Names to the Columns pane.



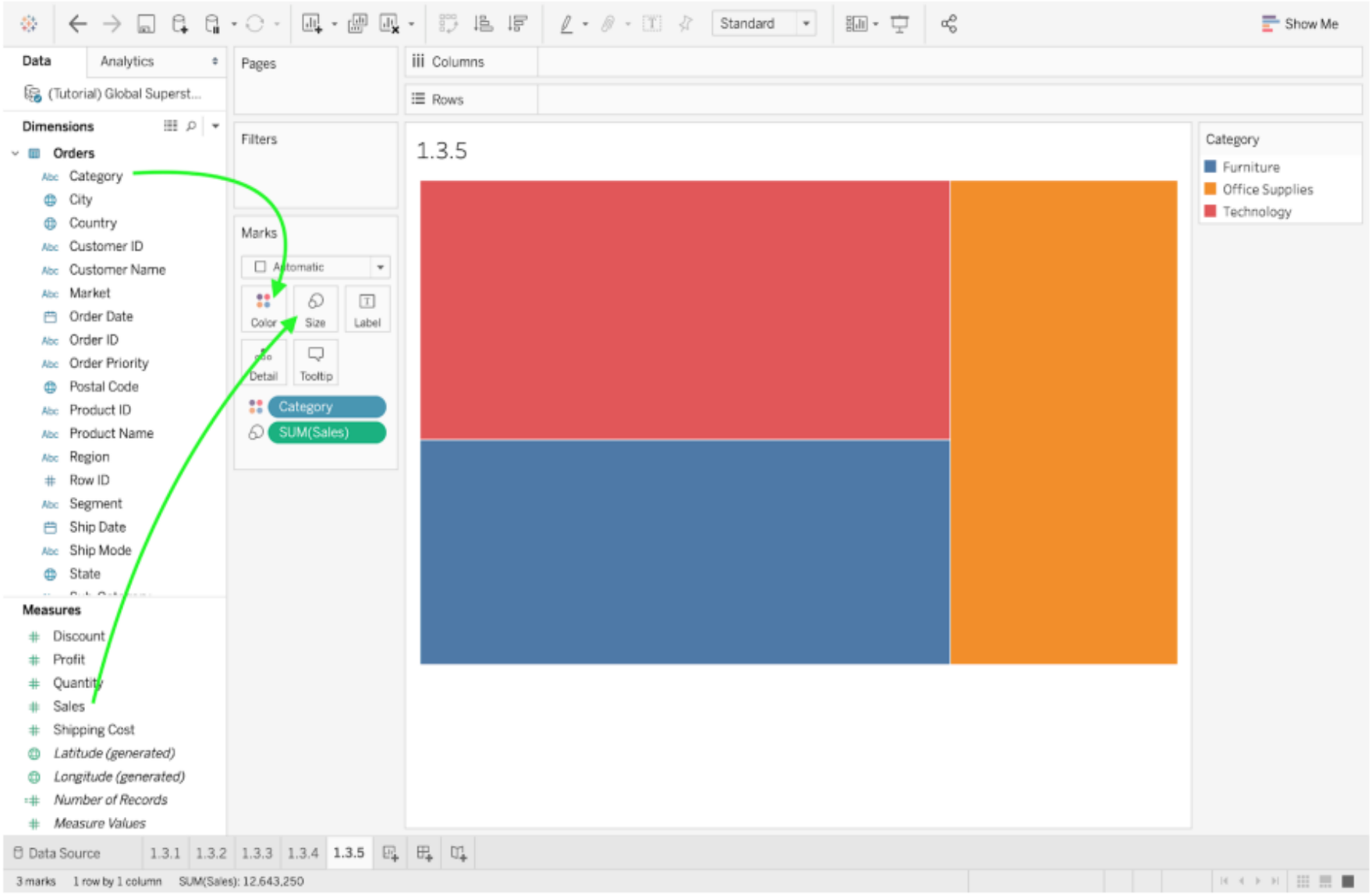
- Swap the order of Segment and Measure Names for an alternative visualization.



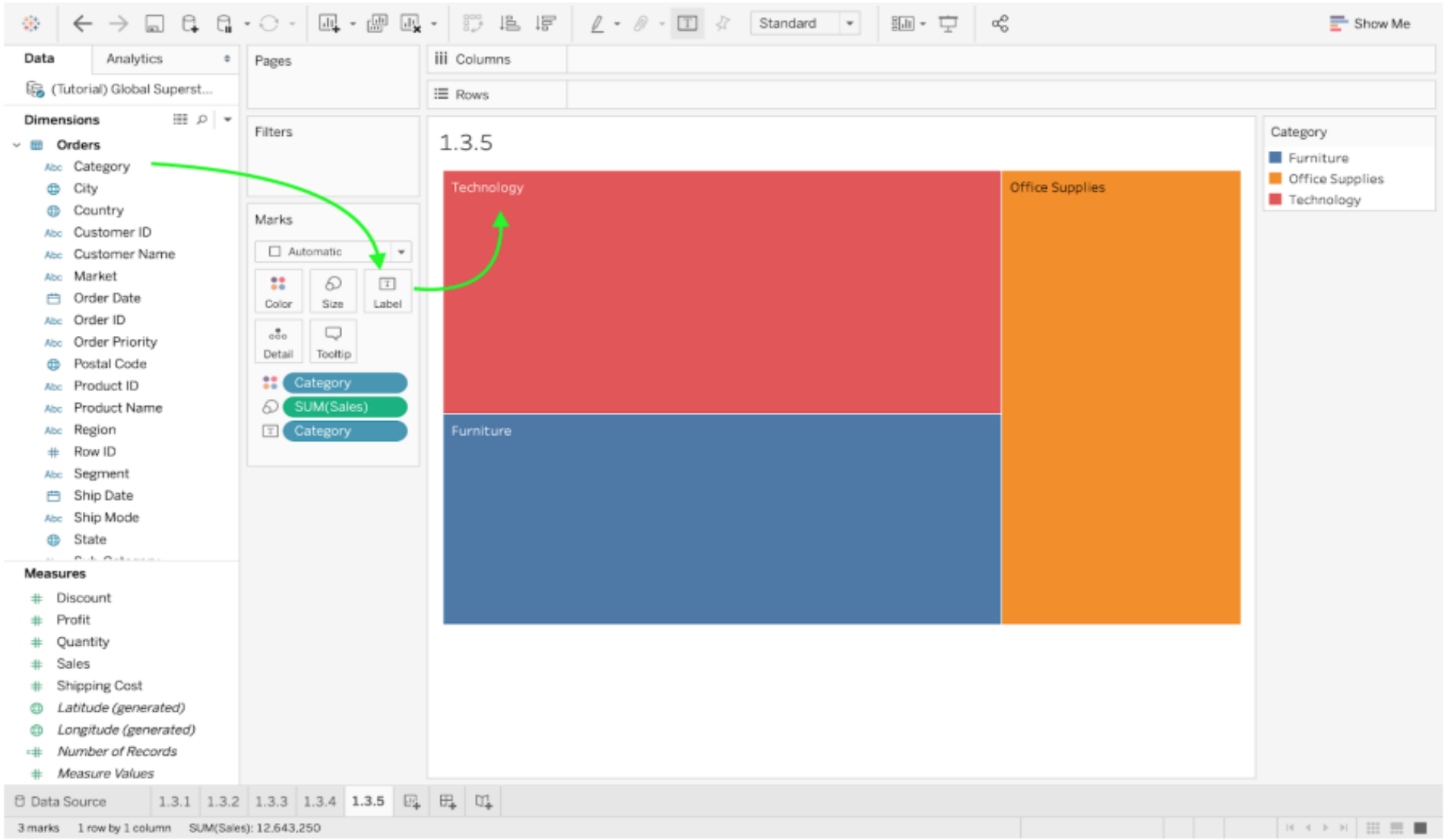
2.6: Visualization (Bubble Charts)

Drag a dimension (e.g., **Category**) to the Color mark and a measure (e.g., **Sales**) to the Size mark. It will generate a “blocky” square chart. You may complement this chart by dragging the **Category** dimension to the Label mark. Next you can also drag the Sub-Category dimension to the Label mark to further break down the square chart based on the different sub-categories. At this point, you will be able to quickly assess which sub-category generates the most sales by inspecting the areas of the rectangles. Finally, you can opt for a packed bubble chart (see figure below) by using the drop-down menu located in the Marks pane.

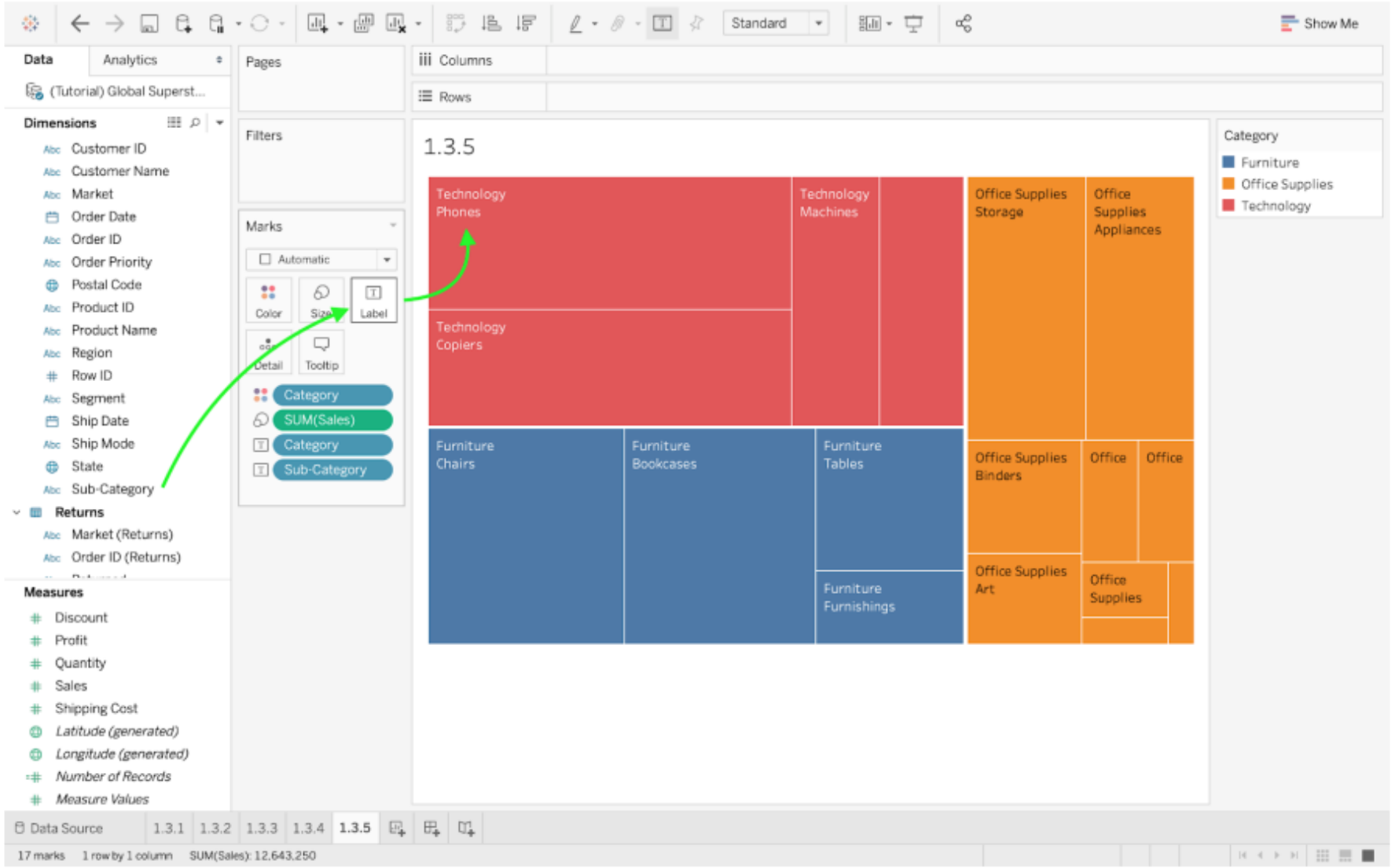
- Category and Sales, yet no columns and no rows.



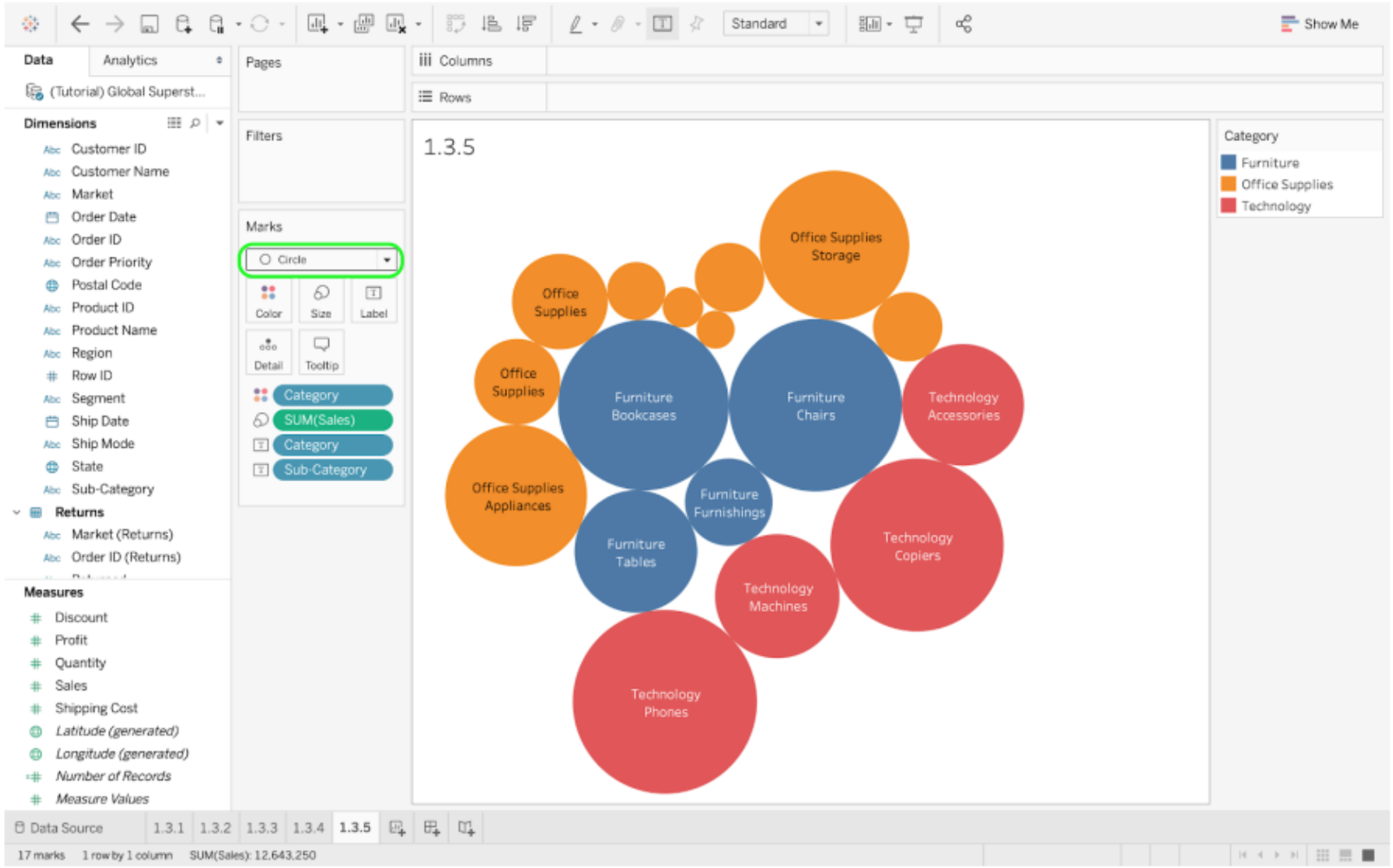
- Add labels for the categories.



- Add labels for the subcategories.



- Switch to a Packed Bubbles view.



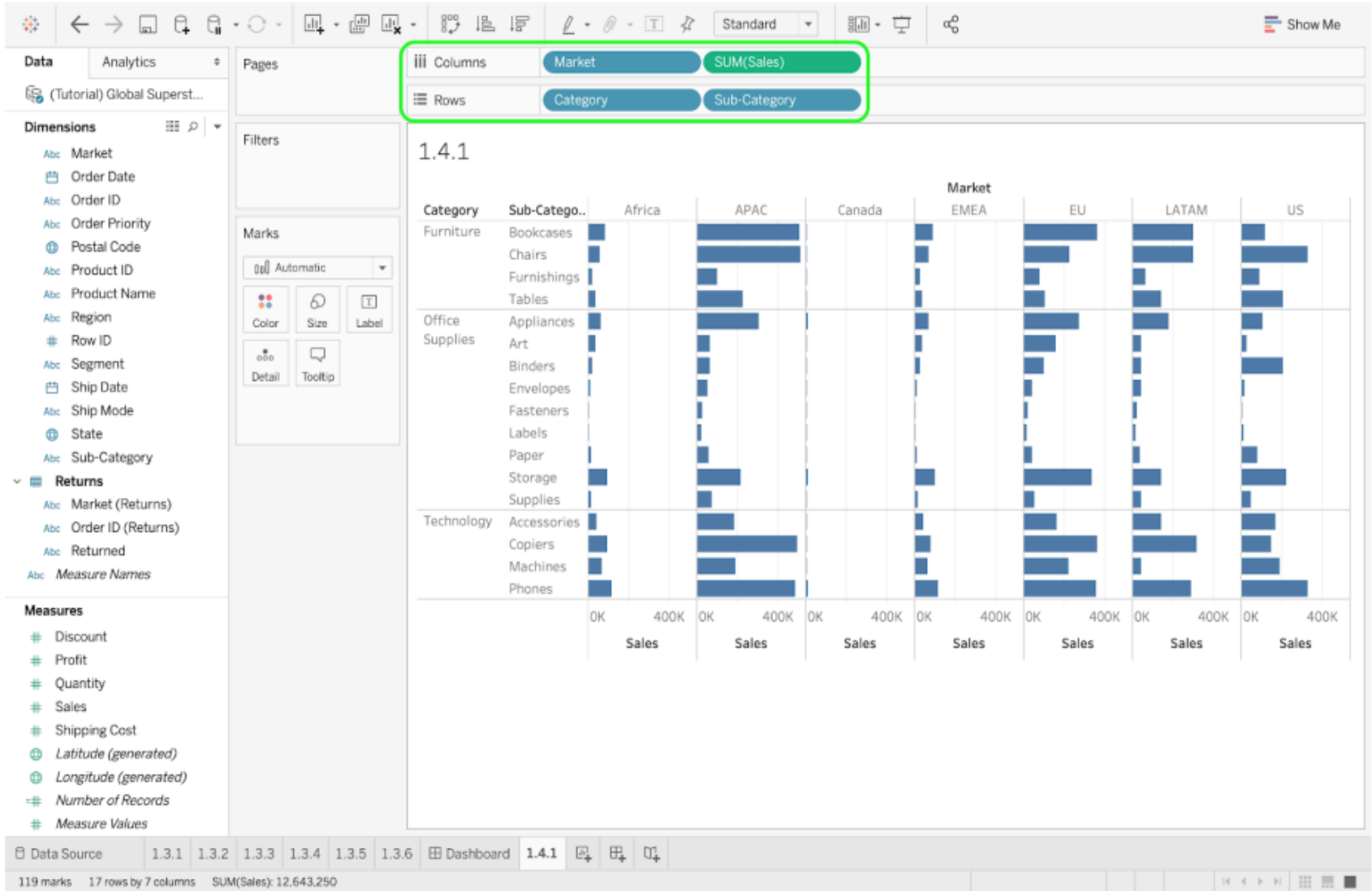
3. Business analysis: Investigate the average sales and profit per order by market, order category, and order subcategory.

To answer this question, you can start by dragging the relevant dimensions and measures to the Columns and Rows panes. For example, a possible configuration can be **Market** and **Sales** in Columns, and **Category** and **Sub-Category** in Rows. Instead of adding **Profit** to the Rows or to the Columns, you can drag the measure to the Color mark. This improves the visual aspect of the graph but does not help answer the above question. Next, click on the drop-down menu for both measures and switch from Sum to Average. In addition, some subcategories of the Office Supplies category do not seem to be insightful (due to their low sales level). To enhance the chart readability, you can group the subcategories that you do deem invaluable by right-clicking on your selection and clicking on Group.

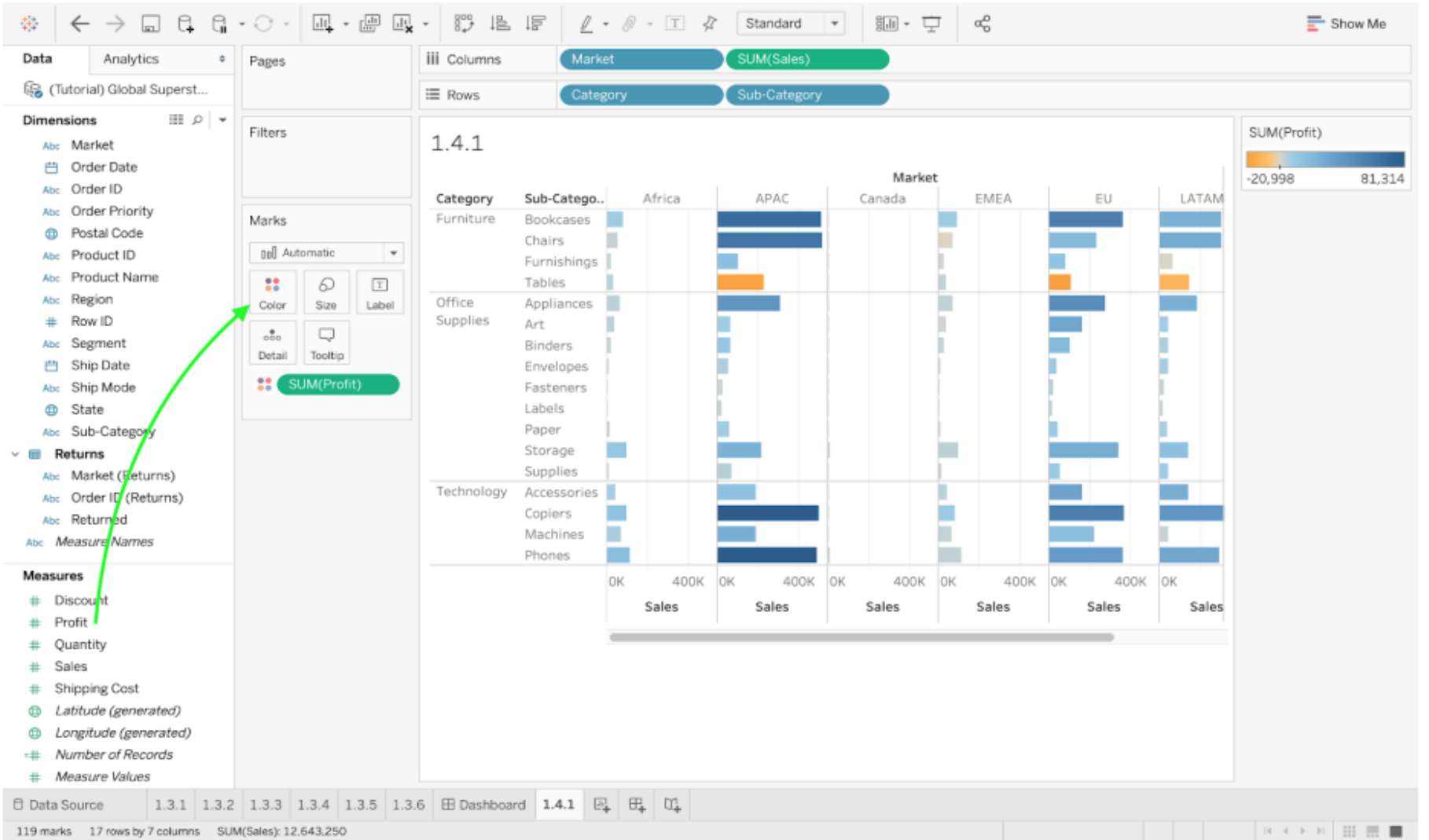
3. Business analysis (cont…)

At this point, you can start looking for interesting patterns. For example, the Table subcategory (from the Furniture category) seems to have significant average sales for several markets, but is not as profitable in other markets (see the orange hues in the figure below). In addition, the Copiers subcategory is very successful in the U.S. market. To compare this subcategory relative to other subcategories, you first need to add a Country filter (e.g., focusing only on the U.S). You can then complete your visualization by dragging the (AVG) Profit measure to the Label mark. You can see that the Copiers' hue of blue is darker relative to other subcategories, thus indicating a higher average profit. The text labels allow for a better comparison and show that no other subcategory is close to the Copiers' average profit of $817.9. Finally, by reading the bar chart, we can conclude that the Copiers subcategory has the highest average sales in the U.S. (hovering over the bar will reveal the exact amount, which is $2,199).

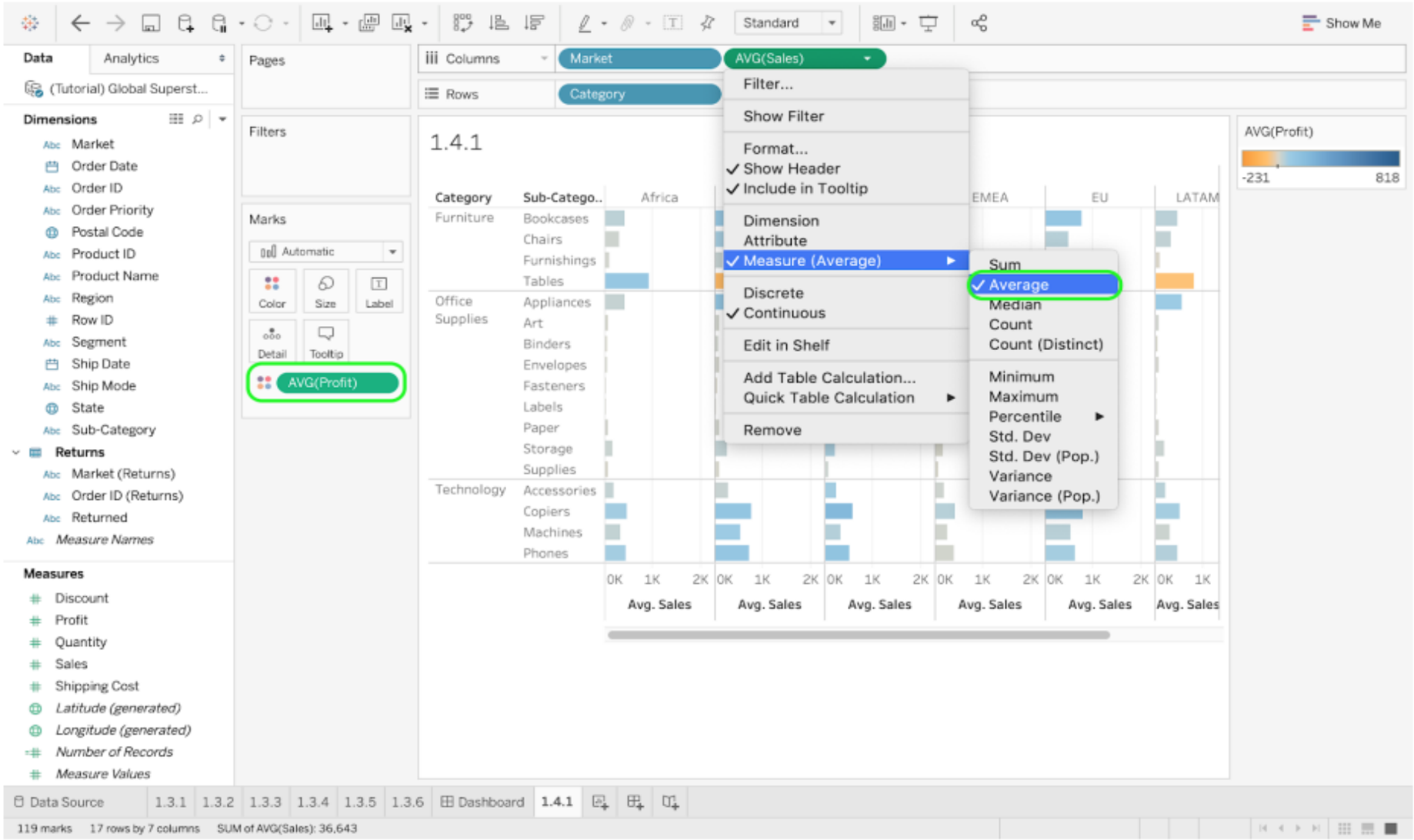
- Add the right measures and dimensions.



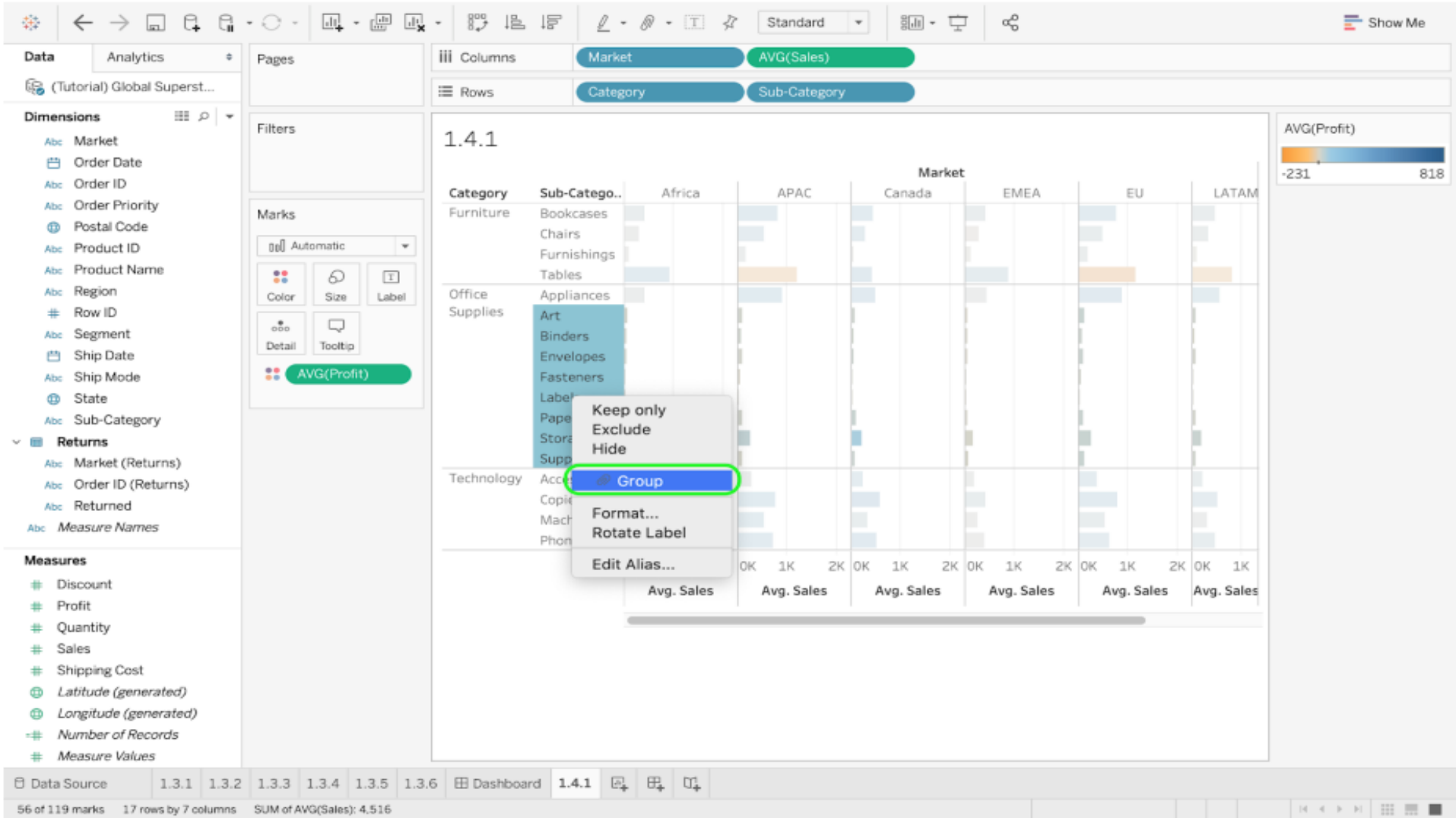
- Drag Profits to the Color mark (instead of dragging it to the Columns or Rows panes).



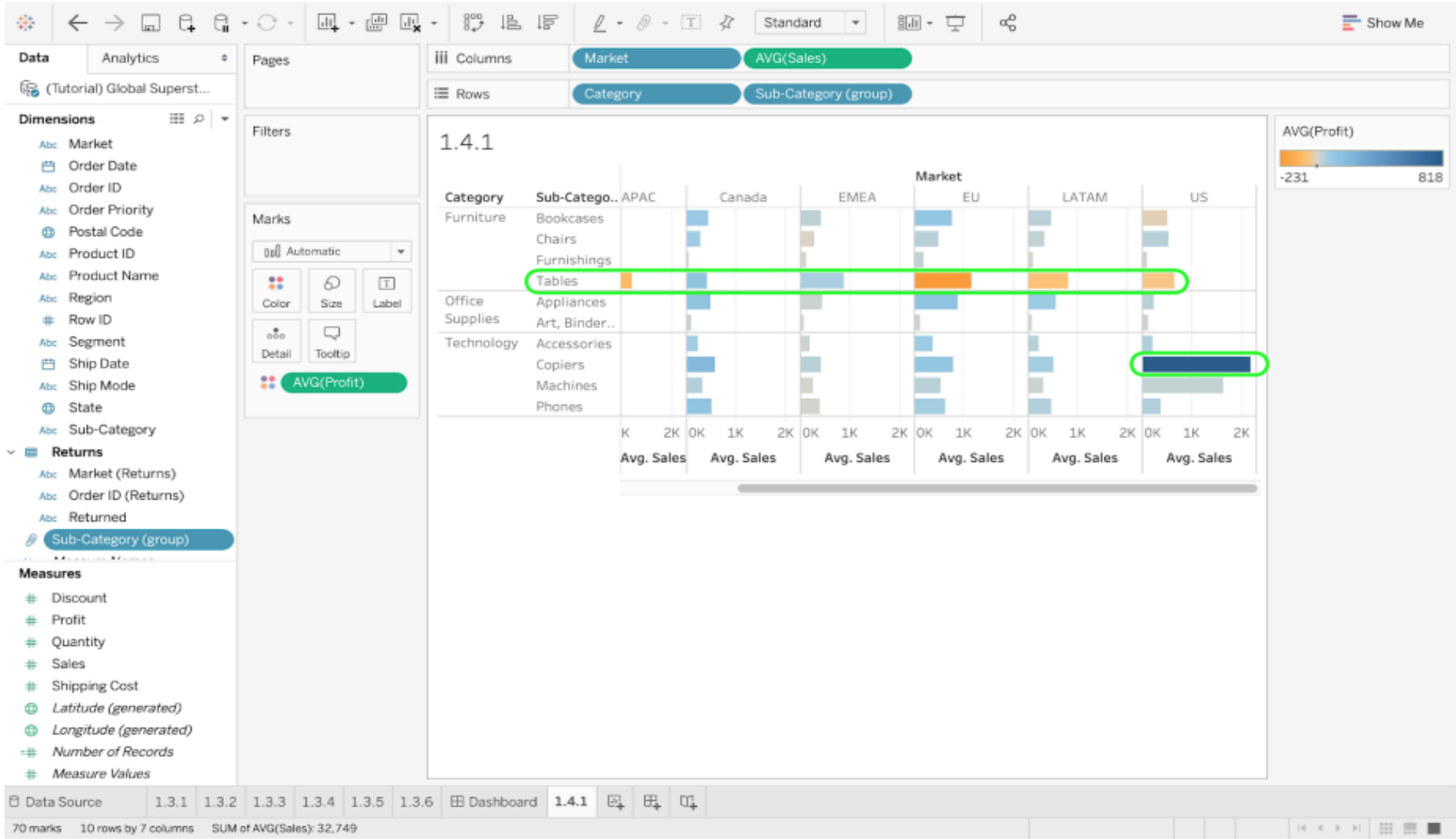
- Change the measure of Sales (and Profits) to Average.



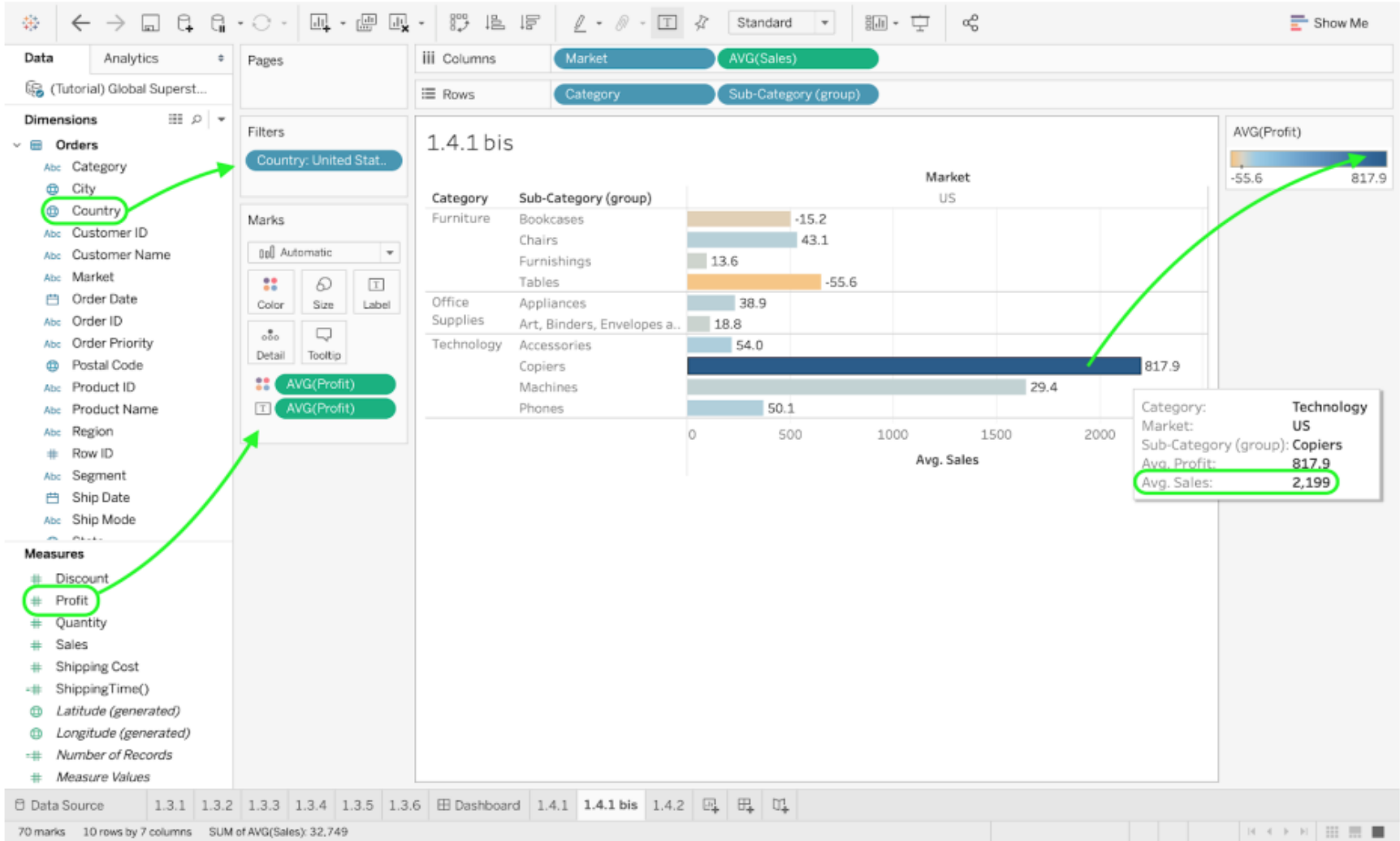
- Group the subcategories that you deem invaluable.



- Investigate.



- Add a Country filter (e.g., U.S. only) and take a closer look at the Copiers subcategory. Add a text label for (AVG) Profit to complement your Color mark.



4. Dashboard

Rename the sheets so that it becomes easier to understand your work. Click on ‘Dashboard’ and then ‘New Dashboard’.

This effective way of visualizing data can combine a combination of several sheets. From the Sheets pane on the left side, select the desired sheets and drag them to the center, one on top of the other. Next, you can use a great function of Tableau that defines one of the sheets to be a filter for the dashboard. Select the Sales Map and click on the Use as Filter button, located at the top right of the sheet. Once this option is selected, you can click on any country. At this time, the chart will evolve as you hop from one country to another. Try the filter options for different values and see the change in the dashboard.

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Standard

Dashboard Layout

Default
Phone

Device Preview

Size

Desktop Browser (1000 x 800)

Sheets

- Order_ShipMode
- Market_Sales
- OrderDate_Sales
- Country
- Dual-axis
- Sale-Cat-SubCat
- Sales-Profit-by-...

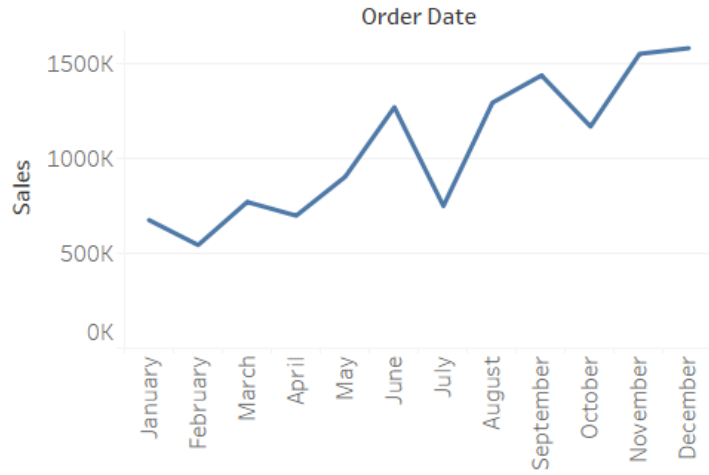
Objects

- Horizontal
- Vertical
- Text
- Image
- Web Page
- Blank
- Navigation
- Download
- Extension
- Ask Data

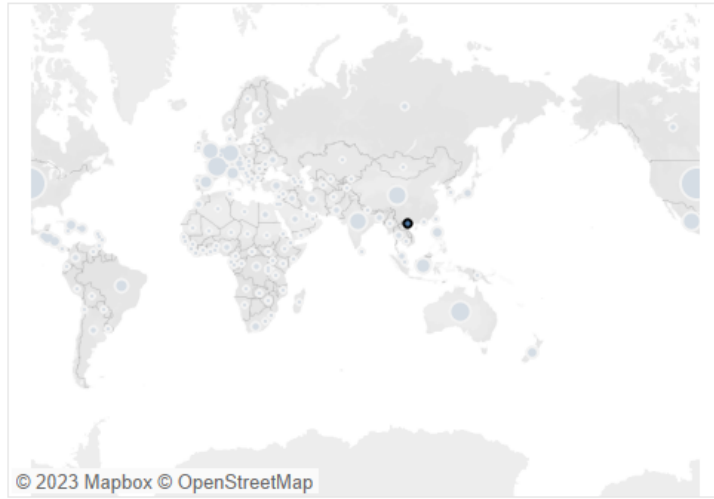
Tiled Floating

Show dashboard title

OrderDate_Sales



Country



Sales for different category, subcategory

verage sales and Profits by market, category, ub-category

Category	Sub-Cate..	Market: Africa	APAC	Canada
Furniture	Bookcases	37	108	103
	Chairs			
	Furnishi..	11	25	8
	Tables	108	-107	150
Office Su..	Applianc..	25	125	140
	Art, Bind..	9	11	
Technolo..	Accessor..			
	Copiers	68	124	205
	Machines			

1K 2K 3K — Avg. Sales (Africa) | 1K 2K 3K — Avg. Sales (APAC) | 1K 2K 3K — Avg. Sales (Canada)

Data Source | Order_ShipMode | Market_Sales | OrderDate_Sales | Country | Dual-axis | Sale-Cat-SubCat | Dashboard 1 | Sales-Profit-by-Categories | **Dashboard 2**

References

1. https://www.tableau.com/learn/training/20224
2. Lectures of Prof. Daniel Guetta from the Columbia Business School.