

# Data Visualisation Lab

Andrea Seveso

Lesson 01

Università Milano Bicocca 2020-2021

<https://tinyurl.com/DataViz2021>

download lesson 01 folder

Lab Handbook - Google Docs

Secure | https://docs.google.com/document/d/1YCZy-uo0gZFTXVNjkldEEa6WZQLjBR24YVJTMiruRWs/edit#h...

Giorgio

Lab Handbook

File Edit View Insert Format Tools Table Add-ons Help Last edit was 4 days ago

Comments Share

Every change that you make is automatically saved in Drive.

Outline

Data Visualization Lab Han...

Blogs

Books

Collections and showcases

Studios and Professionals

Softwares & Tutorials

Coding and libraries

Videos

Articles

Other useful stuff

# Data Visualization Lab Handbook

In this document I will upload interesting links to blogs, studios, books and other useful material to better know the data visualization world.

## SOMETHING USEFUL

An ongoing collection of interesting and useful stuff for the lab.

The screenshot shows a web browser window with the title bar "Data Viz Class" and the URL "file:///Users/Giorgio/Google%20Drive/Calibro/works/Courses/2016\_Bicocca%20Data%20Warehouse/Esam...". The main content area features a large, semi-transparent background image of a person's hands. Overlaid on this image is the text "LA SANITA' NELLA REGIONE LOMBARDIA" in a small, light blue font. Below it is a large, bold, black title: "Sanità: una panoramica sulla situazione delle strutture pubbliche e private in Lombardia". Underneath the title, smaller text reads "Un progetto di LAURA DESSÌ e MARICA LIMONGELLI". A section titled "INTRODUZIONE" contains text about the project's purpose, mentioning the analysis of healthcare data from the Region of Lombardy through Open Data Lombardia, focusing on hospital admissions and Major Diagnostic Categories (MDC) for the year 2015.

LA SANITA' NELLA REGIONE LOMBARDIA

# Sanità: una panoramica sulla situazione delle strutture pubbliche e private in Lombardia

Un progetto di LAURA DESSÌ e MARICA LIMONGELLI

## INTRODUZIONE

Attraverso i dati raccolti dalla **Regione Lombardia** e messi a disposizione dal sito Open Data Lombardia, si è analizzata la situazione sanitaria nelle strutture pubbliche e private. L'attenzione è stata posta sul numero di ricoveri e di secondi ricoveri effettuati nelle diverse strutture e sulle **MDC** (Major Diagnostic Categories) nell'anno 2015, così da avere una visione il più recente possibile. Le **MDC** sono le *categorie diagnostiche principali*, sono 25 e sono suddivise con un criterio clinico-anatomico, ma nel

## THE PROJECT

**Find an interesting topic that can be explored through data.**

**Collect the data from official sources, open data platforms, scraping digital platforms, etc.**

**Create a data journalism article with at least 3 visualisations.**

**See instructions on unimib platform for groups.**

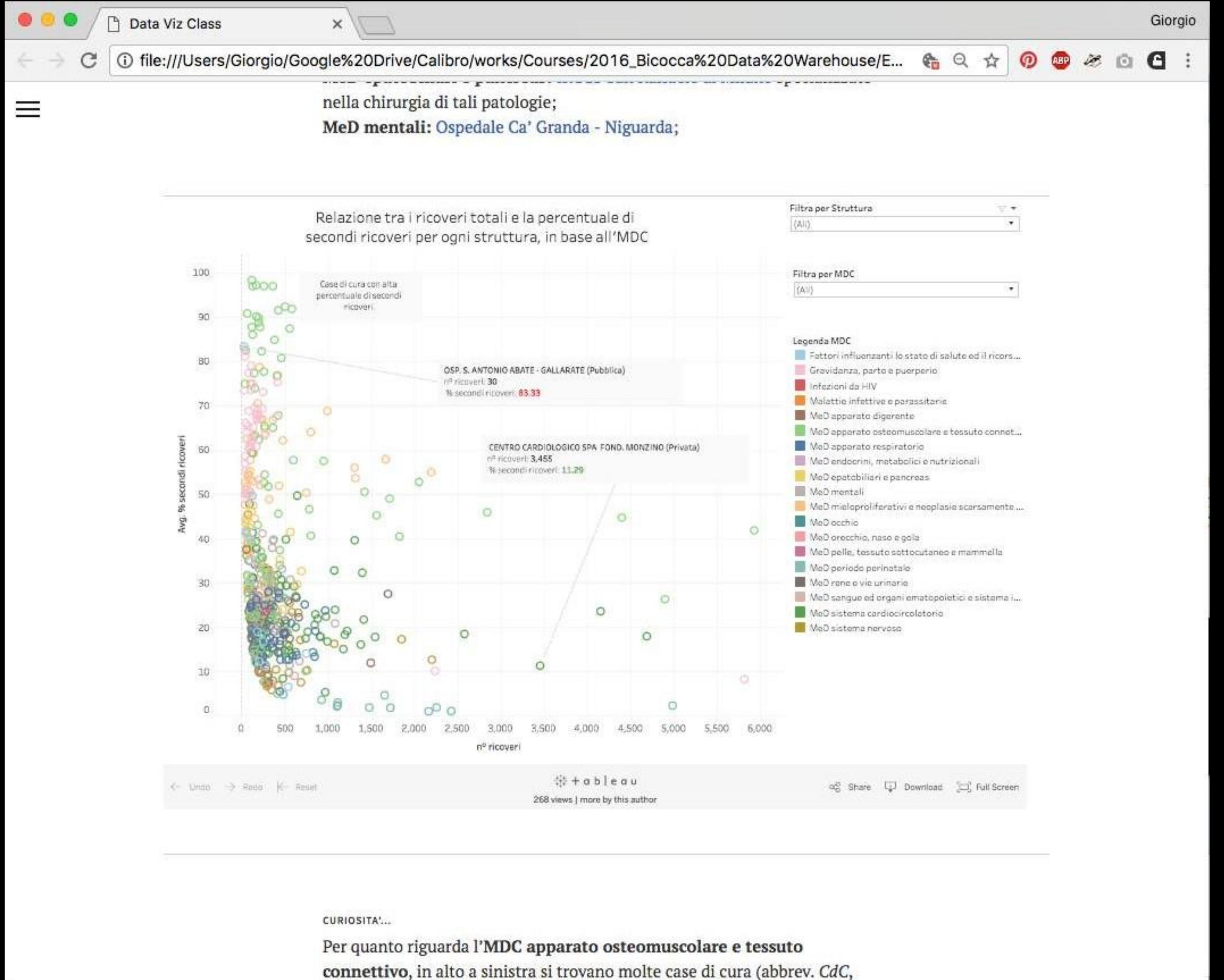
## THE PROJECT

Find an interesting topic that can be explored through data.

Collect the data from official sources, open data platforms, scraping digital platforms, etc.

Create a data journalism article with at least 3 visualisations.

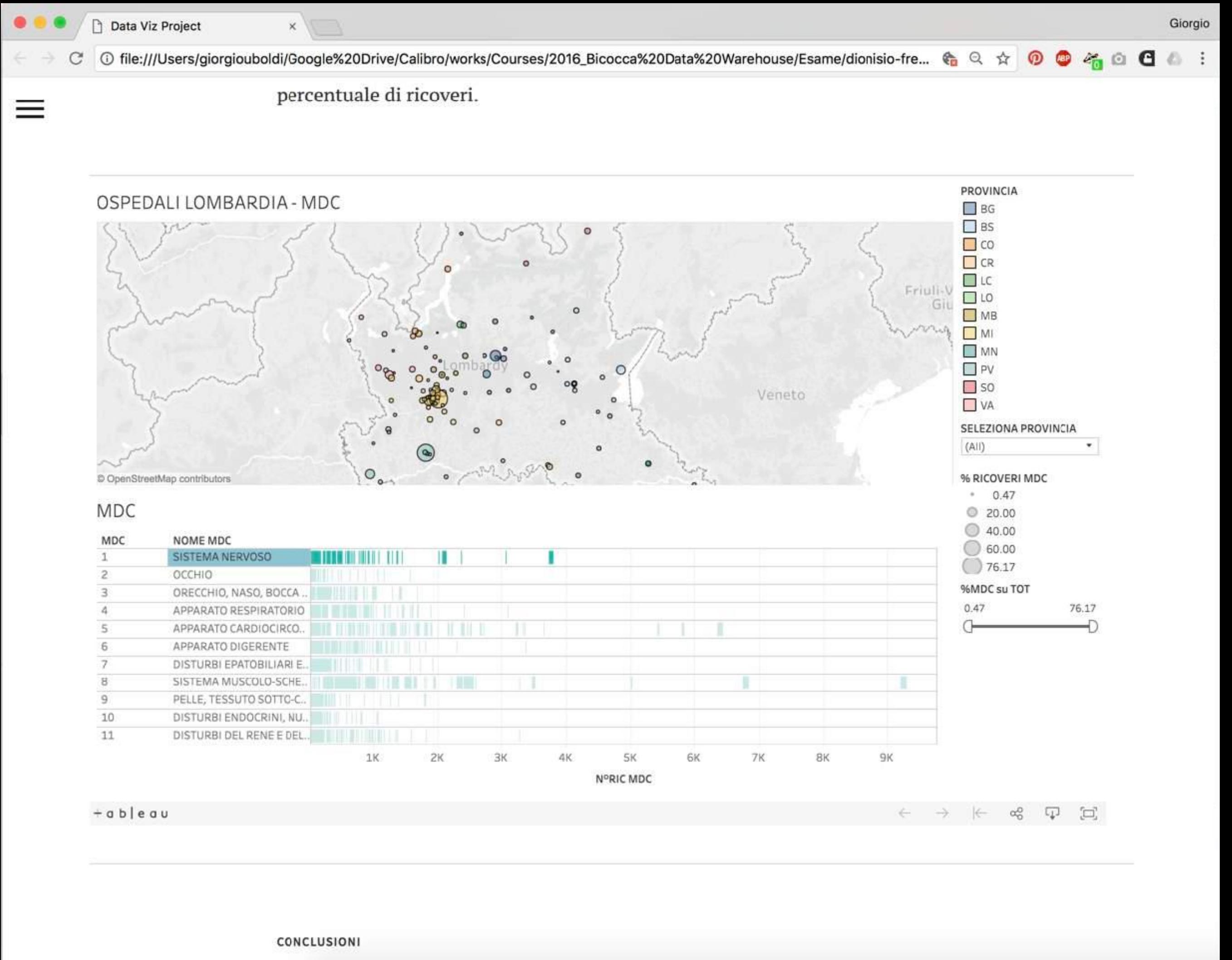
See instructions on unimib platform for groups.



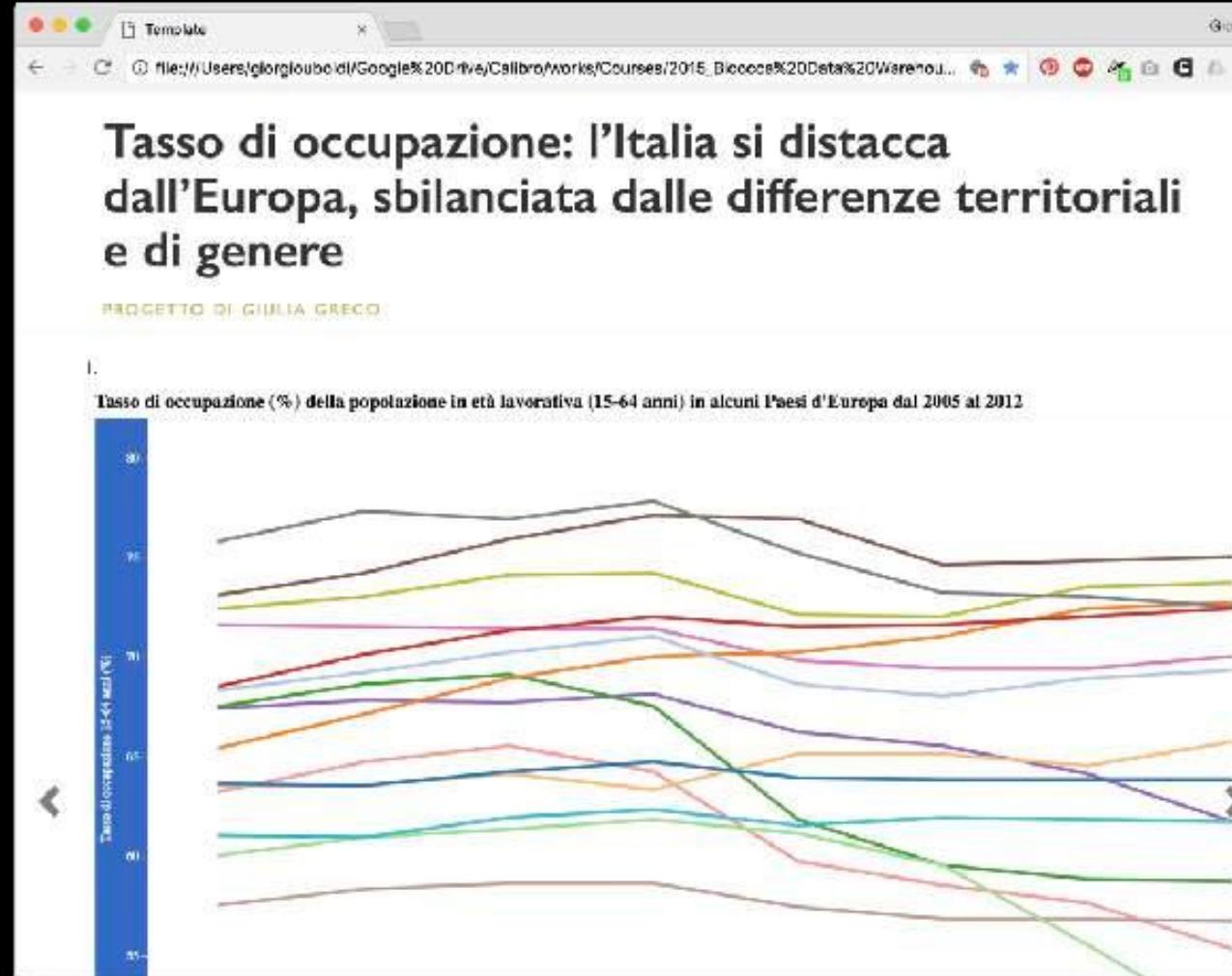
## SUGGESTION

Choose a topic you already know and interests you.

Choose a topic that has different dimensions (social, political, economical, technical, etc.).



## SOME EXAMPLES



## SUGGESTION

Keep track of what you did

Work with shared spreadsheets

Keep the original versions of the datasets

The screenshot shows a Google Docs document titled "README". The left sidebar contains a tree view of files and folders under "README". The main content area displays two sections of text:

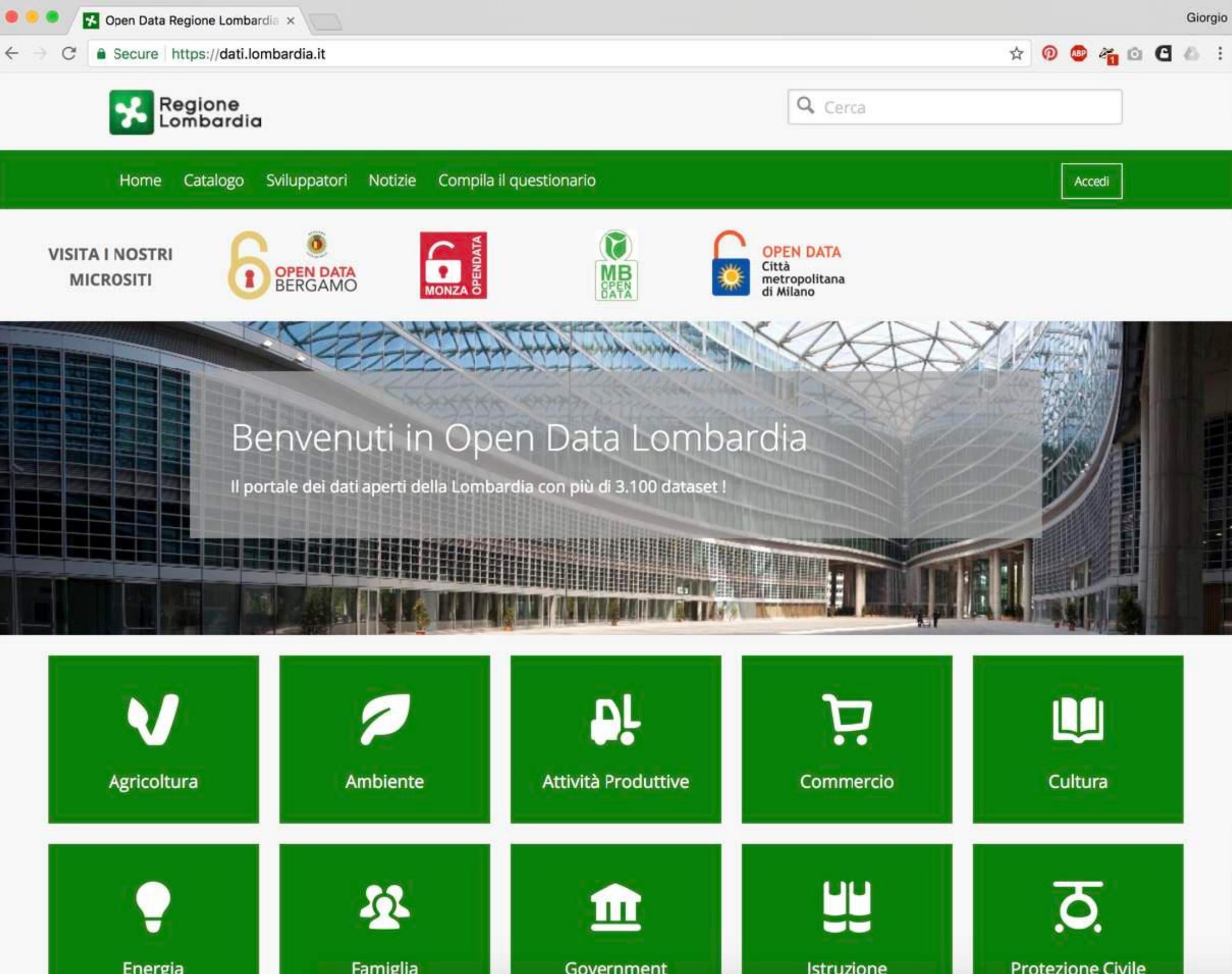
- users-designer-drugs.tsv (Louis)**

A tab-delimited file CSV contains all the users that contributed to the list of designer drug pages on Wikipedia. The columns represent:

  - name - the title of the designer drug page;
  - user - the username;
  - n\_edits - the number of edits the user made to the page;
  - n\_minor\_edits - the number of minor edits the user made to the page;
  - first\_edit - the time stamp of the first edit;
  - last\_edit - the time stamp of the last edit;
  - added\_bytes - total number of bytes added.
- designer-drugs-list-cat.tsv (Giorgio)**

A tab-delimited file CSV containing all the designer drugs, their category in the page and if there is a link or not to a wikipedia article. The file has been generated with [KimoNoLabs](#). The columns represent:

  - label - the title of the designer drug page;
  - level1 - the 1st level hierarchy in the page;
  - level2 - the 2nd level hierarchy in the page;
  - level3 - the 3rd level hierarchy in the page;



The screenshot shows the homepage of the Open Data Regione Lombardia website. At the top, there's a navigation bar with links for Home, Catalogo, Sviluppatori, Notizie, Compila il questionario, and Accedi. A search bar is also present. Below the navigation, there's a section titled "VISITA I NOSTRI MICROSITI" featuring links to "OPEN DATA BERGAMO" (with a key icon), "MONZA OPEN DATA" (with a lock icon), and "Città metropolitana di Milano" (with a sun and padlock icon). The main banner features a large image of a modern glass and steel building, likely the Expo 2015 pavilion, with the text "Benvenuti in Open Data Lombardia" and "Il portale dei dati aperti della Lombardia con più di 3.100 dataset !". Below the banner, there are ten green cards arranged in two rows of five, each representing a different sector: Agricoltura (leaf icon), Ambiente (leaf icon), Attività Produttive (truck icon), Commercio (shopping cart icon), Cultura (book icon), Energia (lightbulb icon), Famiglia (people icon), Government (building icon), Istruzione (books icon), and Protezione Civile (helmet icon).

DATA?

## Open data platforms

## Online repositories

From tools to extract data from digital platforms

## Scraping

DATA?

# Open data platforms

## Online repositories

**From tools to extract data from digital platforms**

## Scraping

The screenshot shows a web browser window with the URL [dataviz.tools/category/data-sources/](http://dataviz.tools/category/data-sources/). The page title is "Data Sources". It features five entries, each with a small thumbnail image and a link:

- The Quartz Directory of Essential Data**: A thumbnail of a yellow document titled "The Quartz Directory of Essential Data".

Digital publisher Quartz compiles and maintains this exhaustive and high-quality list of authoritative sources for data on various subjects.
- OpenAddresses**: A thumbnail of a logo featuring stylized buildings.

An open-source global database of address data. Parse & import into a database, put on a map, or use for geocoding.
- Spreadshare.co**: A thumbnail of a green logo with the text "Find Share Spreadsheets".

Although still in its infancy, Spreadshare is a novel concept. It essentially acts as a directory to collaborative Google sheets.
- Statistica**: A thumbnail of the Statista website interface.

The portal for statistics-immediate access to over one million statistics and facts
- Kaggle Datasets**: A thumbnail of the Kaggle Datasets interface.

A community-powered directory of open datasets on everything from government, health, and science to popular games and dating trends.

DATA?

## Open data platforms

## Online repositories

From tools to extract data from digital platforms

## Scraping

Wikipedia Edits Scraper and IP Localizer

Input

Enter URLs to Wikipedia articles: (one per line)

Name your result file: (default = resultDayMonthYearHourMin.tsv):  
result25Oct20170143\_014310

submit previous results

Wikipedia Edits Scraper and IP Localizer, an Introduction

Scrapes Wikipedia history and does IP to Geo for anonymous edits

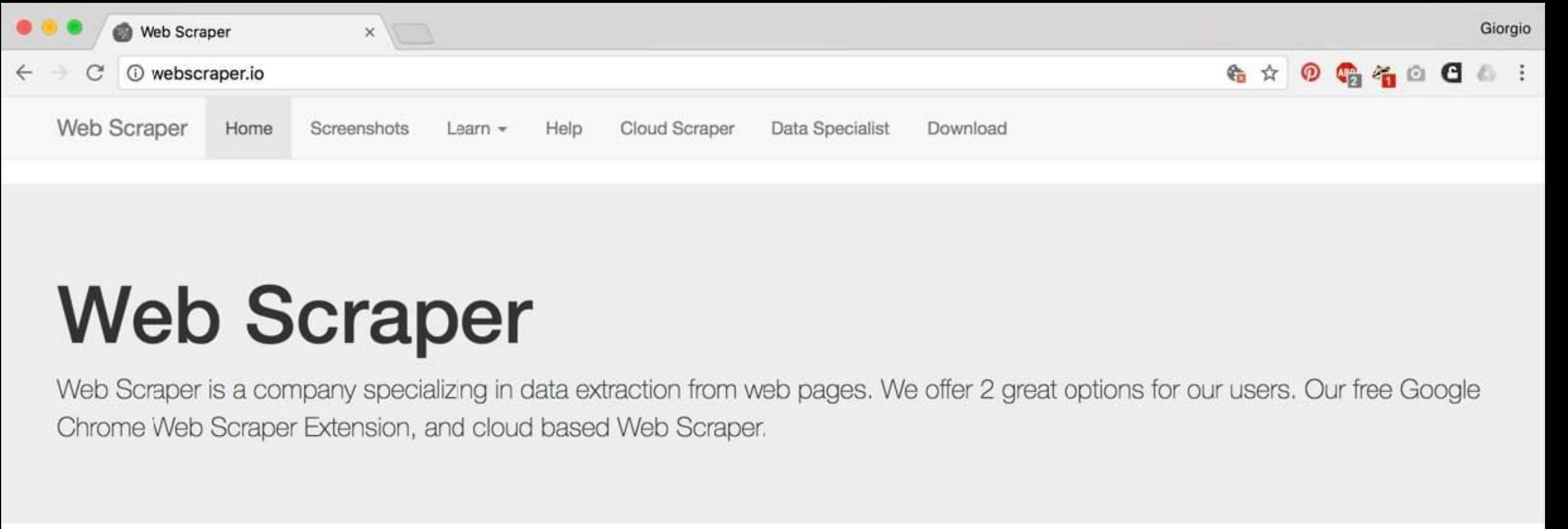
The tool scrapes the complete edit history for a specific Wikipedia page. When the tool finds an IP address instead of a user name it will use [Maxmind's GeoCity Lite database](#) (last updated May 03, 2017) to resolve the IP address to a geo-location. This tool is inspired on <http://wikiscanner.virgil.gr>

Input: a wikipedia page (e.g. [http://en.wikipedia.org/wiki/World\\_Wide\\_Web](http://en.wikipedia.org/wiki/World_Wide_Web))

Note: if very little results are returned while you expect more, make sure that the URL you have inputted does not actually redirect to a different Wikipedia page.

Output: a table with the following columns:

- URL pointing to the specific version of the page
- the time of the edit
- the date of the edit
- a link to the page of the user who edited
- the user name or IP address
- the size of the edit
- the comment accompanying the edit
- bot/using (when a bot or tool assisted user - detected by the phrase 'using', is encountered)
- city (when an IP address was detected instead of a user)
- country (when an IP address was detected instead of a user)
- country code (when an IP address was detected instead of a user)
- latitude (when an IP address was detected instead of a user)
- longitude (when an IP address was detected instead of a user)



**Web Scraper**

Web Scraper is a company specializing in data extraction from web pages. We offer 2 great options for our users. Our free Google Chrome Web Scraper Extension, and cloud based Web Scraper.

### Web Scraper Extension (Free!)

Using our extension you can create a plan (sitemap) how a web site should be traversed and what should be extracted. Using these sitemaps the Web Scraper will navigate the site accordingly and extract all data. Scraped data later can be exported as CSV.

[Download Free on Chrome Store »](#)

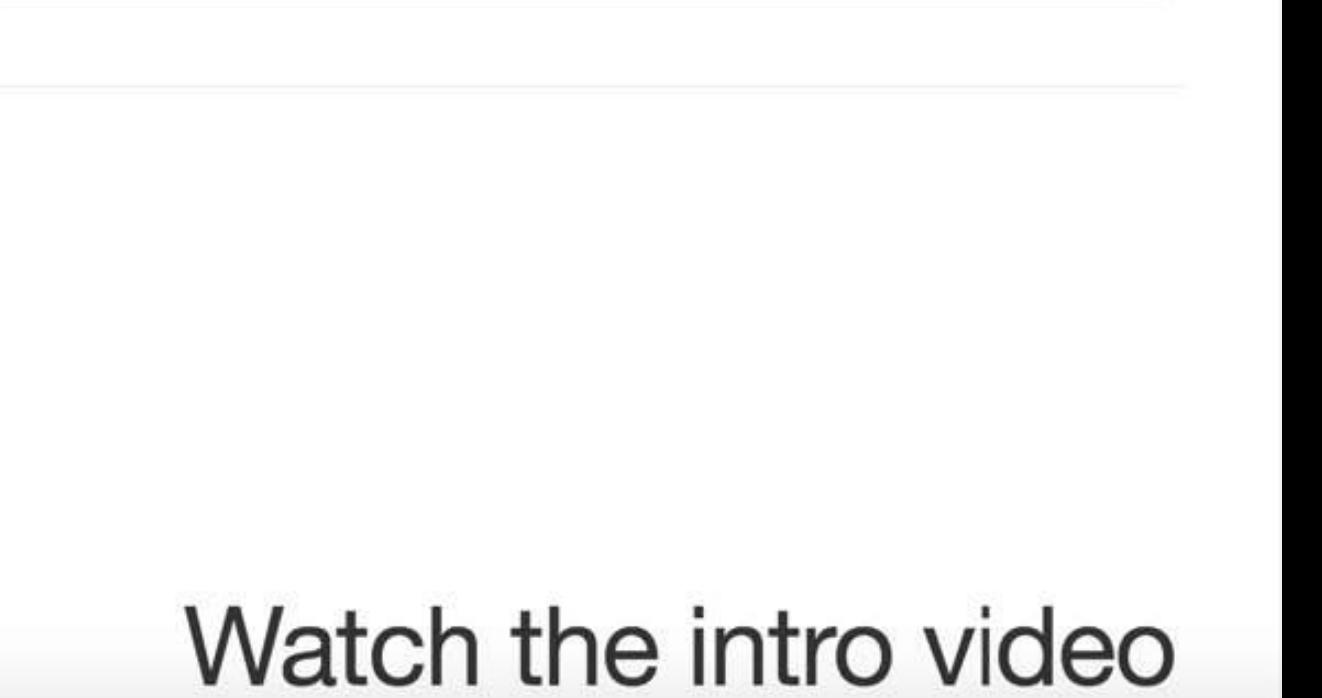
### Cloud Web Scraper

Cloud Web Scraper offers top quality results driven at the level you require. This option allows you to extract large amounts of data, run multiple scrapings at once, and even run them on a set schedule! Click below to learn more.

[Read more about the Cloud Web Scraper »](#)



**Watch the intro video**



DATA?

Open data platforms

Online repositories

From tools to extract data  
from digital platforms

Scraping

The screenshot shows a Google Drive interface with the following details:

- Address Bar:** DataViz\_studentsFolder - Google Drive | https://drive.google.com/drive/folders/0B7TgENsGObg3WHhhYWZnSXpScW8
- Search Bar:** Search Drive
- New Button:** NEW
- Breadcrumbs:** My Drive > Calibro > works > Courses > 2017\_Bicocca Data Visualization > DataV
- Left Sidebar:** My Drive, Computers, Shared with me, Recent, Google Photos, Starred, Bin, Backups. It also shows storage information: 59 GB of 100 GB used and an Upgrade storage button.
- Table View:** A list of files and folders in the current folder:

Name	Owner	Last modified
lesson01	me	10 Oct. 2017
lesson02	me	12 Oct. 2017
lesson03	me	9:57 pm
Template_Bicocca_1718	me	11:50 pm
Lab Handbook	me	20 Oct. 2017

The folder "Template\_Bicocca\_1718" is highlighted with a blue selection bar.

## THE TEMPLATE

The template is inside the shared folder called "**Template\_Bicocca\_2021**"

The screenshot shows a code editor window with two tabs: "style.css" and "index.html". The "index.html" tab is active, displaying the following HTML code:

```
1 | 
2 <!DOCTYPE html>
3 <html lang="en">
4 <head>
5   <meta charset="utf-8">
6   <meta http-equiv="X-UA-Compatible" content="IE=edge">
7   <meta name="viewport" content="width=device-width, initial-scale=1">
8   <!-- The above 3 meta tags *must* come first in the head; any
9     other head content must come *after* these tags -->
10  <meta name="description" content="">
11  <meta name="author" content="">
12  <link href="https://fonts.googleapis.com/css?family=Montserrat:400,70
13    0|PT+Serif:400,400i,700,700i|Source+Code+Pro|Source+Sans+Pro:200,200i
14    ,300,300i,400,400i,600,600i,700,700i,900,900i" rel="stylesheet">
15    <link rel="icon" href="..../favicon.ico">
16
17  <title>Data Viz Class</title>
18
19  <!-- Bootstrap core CSS -->
20  <link href="css/bootstrap.min.css" rel="stylesheet">
21
22  <!-- IE10 viewport hack for Surface/desktop Windows 8 bug -->
23  <link href="css/ie10-viewport-bug-workaround.css" rel="stylesheet">
24
25  <!-- Custom styles for this template -->
26  <link href="css/style.css" rel="stylesheet">
27
28  <!-- Just for debugging purposes. Don't actually copy these 2
29    lines! -->
30  <!--[if lt IE 9]><script src="..../assets/js/ie8-responsive-file-
warning.js"></script><![endif]-->
31  <script src="..../assets/js/ie-emulation-modes-warning.js"></
32    script>
33
34  <!-- HTML5 shim and Respond.js for IE8 support of HTML5 elements -->
```

## THE TEMPLATE

# How to use the template?

Edit the content inside **index.html**, embedding your visualisations (static or interactive).

Read the comments within the **html code** to better understand how to use it.

## SUGGESTED TOOLS

**Google spreadsheet**  
(data preparation)

**Plot.ly**  
(visual bootstrapping and semifinished visualizations)

**Tableau**  
(visual analytics, interactive visualizations)

**Python**  
(static visualizations)

**Gephi**  
(network graphs)

**TODAY' SLESSON**

# Tableau part 1

**TO DAY' SLESSON**

# Why Tableau?

**It has a free version**

**It allows different types of visualization**

**It allows to create interactive visualizations**

**It's useful for visual analytics and prototyping**

**It's widely spread in the industry** (business, design, journalism,etc.)



vs



Not free\*

No limits of data  
and connectors

Free

Only to local data  
Can't save locally

Can't print / export pdfs

\*free for students

## OVERVIEW

### Welcome screen

Here you can:

- **create a new project starting from a Excel file, text file, etc.**
- **open an existing project**

The screenshot shows the Tableau Welcome screen with the following sections:

- Connect:** Options for connecting to files (Excel, Text file, JSON file, PDF file, Spatial file, Statistical file, More...) and servers (Tableau Server, Microsoft SQL Server, MySQL, Oracle, Amazon Redshift, More...). It also lists Saved Data Sources (Sample - Superstore, World Indicators).
- Open:** A section titled "Open" with a thumbnail of a map visualization labeled "Superstore". Below it, "Open a Workbook" is written in orange.
- Discover:** A sidebar with the following categories:
  - Training:** Includes links to "Getting Started", "Connecting to Data", "Visual Analytics", and "Understanding Tableau".
  - Sharing:** Includes a link to "Learn more about ways to share".
  - Resources:** Includes links to "Blog - 7 tips and tricks from the dashboard experts", "Tableau Conference - Register Now", and "Forums".
- Sample Workbooks:** Thumbnails for "Superstore", "Regional", and "World Indicators", each with a "More Samples" link.
- VIZ OF THE WEEK:** A section featuring a visualization titled "Spanish Identity by Region →".

## OVERVIEW

### Welcome screen

#### Discover tutorials and resources

Tableau - Superstore [Read-Only]

### Connect

- To a File
  - Excel
  - Text file
  - JSON file
  - PDF file
  - Spatial file
  - Statistical file
  - More...
- To a Server
  - Tableau Server
  - Microsoft SQL Server
  - MySQL
  - Oracle
  - Amazon Redshift
  - More...

**Open**

Open a Workbook

Superstore

**Sample Workbooks**

Superstore

Regional

World Indicators

More Samples

World Indicators

VIZ OF THE WEEK

Spanish Identity by Region →

**Discover**

Training

Getting Started

Connecting to Data

Visual Analytics

Understanding Tableau

More training videos...

Sharing

Learn more about ways to share

Resources

Blog - 7 tips and tricks from the dashboard experts

Tableau Conference - Register Now

Forums

The screenshot shows the Tableau application window titled "Tableau - Superstore [Read-Only]". The left sidebar is titled "Connect" and lists options for connecting to files (To a File) and servers (To a Server). Below this is a section for "Saved Data Sources" with entries for "Sample - Superstore" and "World Indicators". The main area is titled "Open" and shows a thumbnail for the "Superstore" workbook, which is a map of US states with various data points. Below this are thumbnails for "Sample Workbooks": "Superstore" (a bar chart), "Regional" (a map of the US), and "World Indicators" (a bar chart). To the right, a red-bordered box highlights the "Discover" section, which contains links for "Training", "Getting Started", "Connecting to Data", "Visual Analytics", "Understanding Tableau", "More training videos...", "Sharing", "Learn more about ways to share", "Resources", "Blog - 7 tips and tricks from the dashboard experts", "Tableau Conference - Register Now", and "Forums". At the bottom right, there is a "VIZ OF THE WEEK" section featuring a thumbnail for "Spanish Identity by Region".

## OVERVIEW

### Data sources screen

It's the screen where you can see your data sources, format, transform and clean your data.

The screenshot shows the Tableau Data Sources screen titled "Tableau - Superstore [Read-Only]". On the left, the "Connections" pane lists "Sales Commission Tableau Data Extract". Below it, the "Table" pane shows "Extract (Extract.Extract)". The main area displays the "Sales Commission" extract with a table of data. The table has columns: Order Date, Region, Sales Person, Sales, Achievement (est...), Achieved Quota, and Base. The first few rows of data are:

Order Date	Region	Sales Person	Sales	Achievement (est...)	Achieved Quota	Base
01/01/2002 00:00:00	Central	Donald Mitchell	74.814	\$74,813.94	Below 50%	
01/01/2002 00:00:00	Central	Donna Walker	188.411	\$188,411.22	Below 50%	
01/01/2002 00:00:00	Central	Jennifer Anderson	105.709	\$105,709.32	Below 50%	
01/01/2002 00:00:00	Central	John Jones	658.205	\$658,205.41	100% +	
01/01/2002 00:00:00	Central	Lisa Martin	417.542	\$417,542.40	75-100%	
01/01/2002 00:00:00	Central	Mark Carter	14.899	\$14,899.36	Below 50%	
01/01/2002 00:00:00	Central	Michael Moore	541.602	\$541,601.87	100% +	
01/01/2002 00:00:00	Central	Nancy Garcia	427.021	\$427,021.09	75-100%	
01/01/2002 00:00:00	Central	Sarah Scott	150.404	\$150,403.86	Below 50%	
01/01/2002 00:00:00	Central	Susan Jackson	293.042	\$293,041.87	50-75%	
01/01/2002 00:00:00	Central	William Taylor	59.687	\$59,686.53	Below 50%	

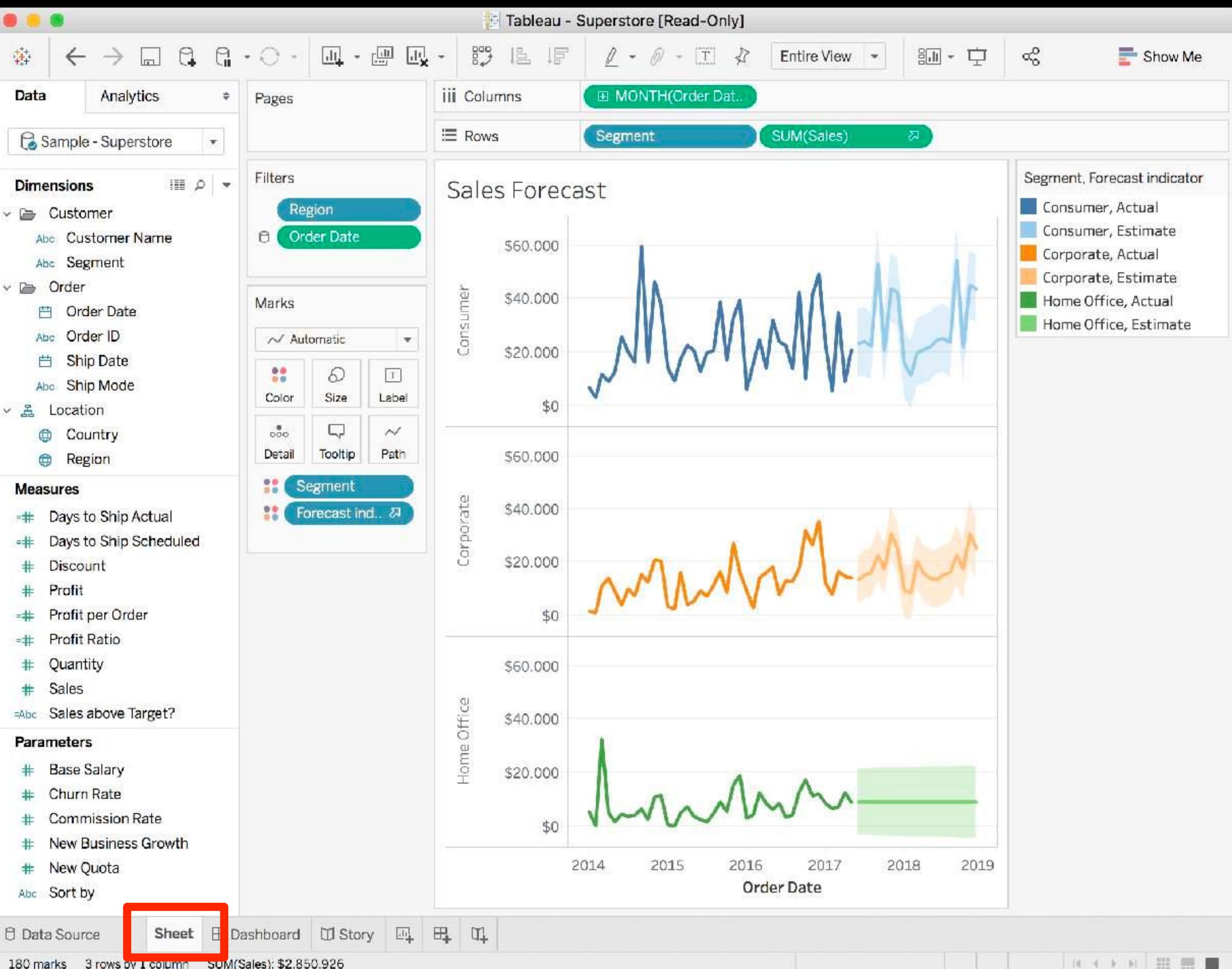
At the bottom, there are navigation tabs: "Data Source" (highlighted with a red box), "Sheet", "Dashboard", "Story", and three other icons. The top right shows "Connection Live", "Filters 0", and "Add".

## OVERVIEW

### Sheets

It's where you can visually explore your dataset and create visualizations.

You can also filter and interact with the visualizations.

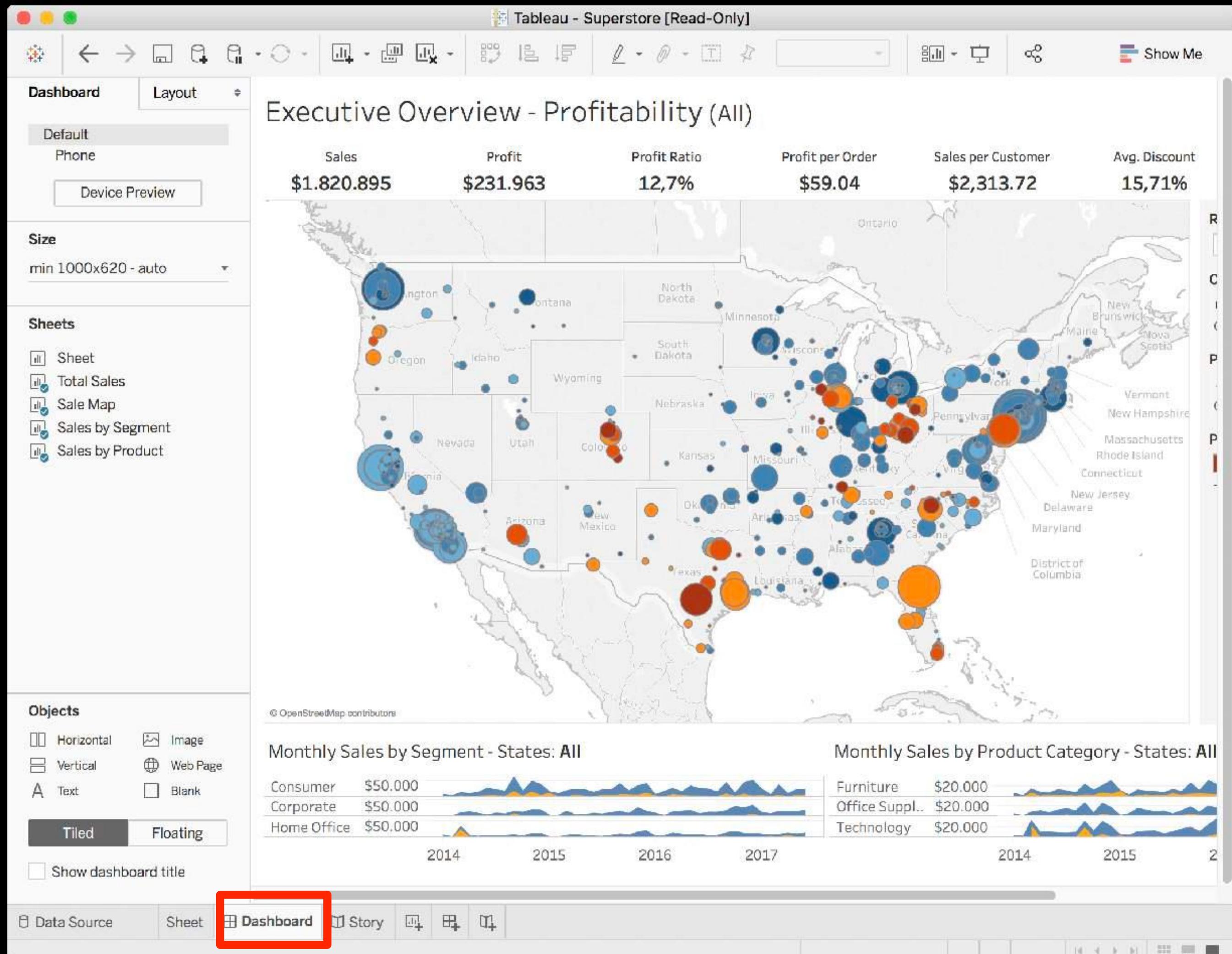


## OVERVIEW

# Dashboards

It's where you connect different visualizations (sheets) and create interactive dashboards.

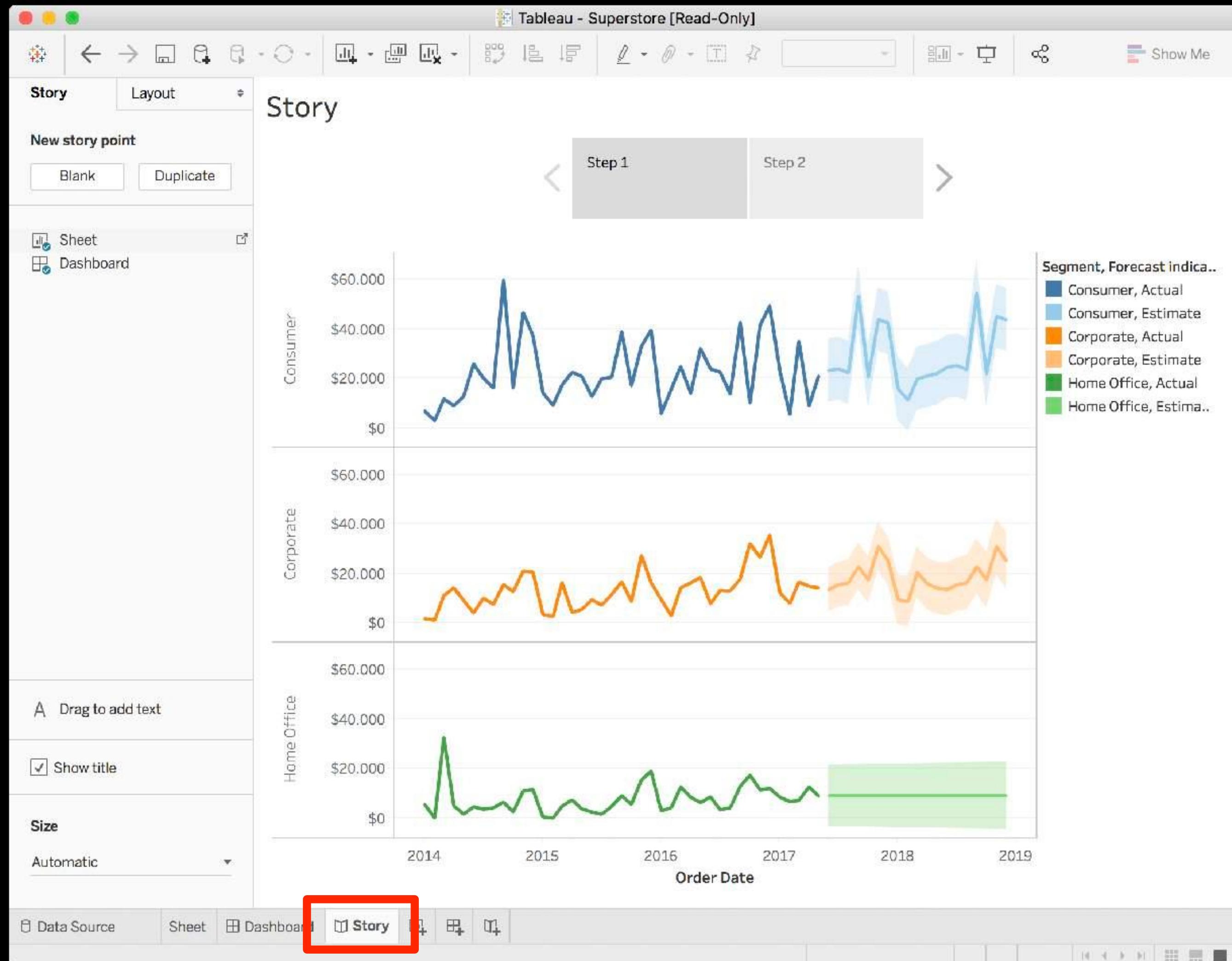
It's where you finalize your output (legends, filters, titles, layout, etc.)



## OVERVIEW

### Stories

It's another way to prepare your output and create a step by step visualization.



# VISUALIZING WORLD POPULATION

## Import the data

Select ‘Textfile’ on the left

Inside the data folder select  
01\_world\_population\_2016.csv

The screenshot shows the Tableau desktop application interface. On the left, a sidebar titled 'Connect' lists various file types: 'To a File' (Excel, Text file, JSON file, PDF file, Spatial file, Statistical file, More...), 'To a Server' (Tableau Server, Microsoft SQL Server, MySQL, Oracle, Amazon Redshift, More...), and 'Saved Data Sources' (Sample - Superstore, World Indicators). The 'Text file' option under 'To a File' is highlighted with a red box. The main area is titled 'Open' and shows a thumbnail of a map visualization titled 'Superstore'. Below it are sections for 'Sample Workbooks' (Superstore, Regional, World Indicators) and 'More Samples'. On the right, there's a 'Discover' sidebar with links to 'Training', 'Getting Started', 'Connecting to Data', 'Visual Analytics', 'Understanding Tableau', and 'More training videos...'. There are also sections for 'Sharing' (with a link to 'Learn more about ways to share') and 'Resources' (with links to 'Blog - 7 tips and tricks from the dashboard experts', 'Tableau Conference - Register Now', and 'Forums'). A large 'VIZ OF THE WEEK' section features a chart titled 'Spanish Identity by Region →'.

# VISUALIZING WORLD POPULATION

## Import the data

Tableau Public - Book3

Connections Add

01\_world\_population\_2016 Text File

Files

Use Data Interpreter  
Data Interpreter might be able to clean your Text File workbook.

01\_world\_population\_2016.csv  
02\_olympics\_countries.csv  
03\_world\_population\_2016.csv  
04\_olympics\_total.csv  
New Union

01\_world\_population\_2016.csv

Sort fields Data source order ▾

Show aliases Show hidden fields 217 rows

Country	Region	Population
American Samoa	East Asia & Pacific	55,599
Australia	East Asia & Pacific	24,127,159
Brunei Darussalam	East Asia & Pacific	423,196
Cambodia	East Asia & Pacific	15,762,370
China	East Asia & Pacific	1,378,665,000
Fiji	East Asia & Pacific	898,760
French Polynesia	East Asia & Pacific	280,208
Guam	East Asia & Pacific	162,896
Hong Kong SAR, China	East Asia & Pacific	7,346,700
Indonesia	East Asia & Pacific	261,115,456
Japan	East Asia & Pacific	126,994,511

Data Source Sheet 1

- 01\_world\_population\_2016.csv
- 02\_olympics\_countries.csv
- 03\_world\_population\_2016.csv
- 04\_olympics\_total.csv

New Union

Country	Region	Population
American Samoa	East Asia & Pacific	55,599
Australia	East Asia & Pacific	24,127,159
Brunei Darussalam	East Asia & Pacific	423,196
Cambodia	East Asia & Pacific	15,762,370
China	East Asia & Pacific	1,378,665,000
Fiji	East Asia & Pacific	898,760
French Polynesia	East Asia & Pacific	280,208
Guam	East Asia & Pacific	162,896
Hong Kong SAR, China	East Asia & Pacific	7,346,700
Indonesia	East Asia & Pacific	261,115,456
Japan	East Asia & Pacific	126,994,511

Data Source

Sheet 1

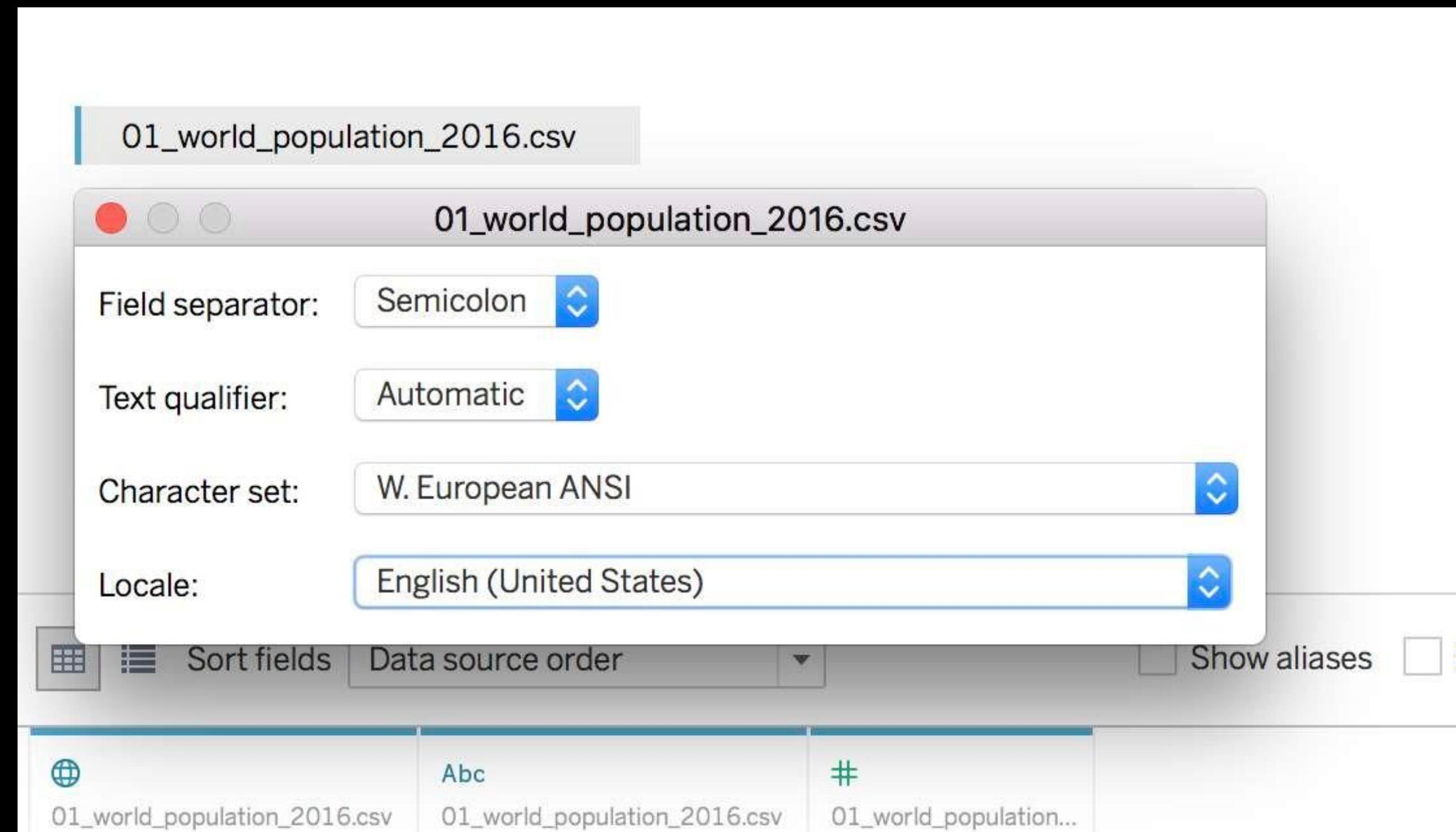


This dataset is about the population of each country in the world in 2016

01\_world\_population\_201...

- Field names are in first row
- Generate field names automatically
- Text File Properties...
- Convert to Union...
- Duplicate
- Remove

Besure this is selected



**Besure text file properties are like this**

CSV

Sort fields Data source order ▾  Show aliases  Show

Country	Region	#
Aruba	Latin America & Cari...	
Afghanistan	South Asia	
Angola	Sub-Saharan Africa	
Albania	Europe & Central Asia	
Andorra	Europe & Central Asia	
United Arab Emirates	Middle East & North ...	9,269,612
Argentina	Latin America & Cari...	43,847,430
Armenia	Europe & Central Asia	2,924,816

Pay attention to data types

# VISUALIZING WORLDPOPULATION

Import the data

Click on "Sheet 1"

Tableau Public - Book3

Connections Add

01\_world\_population\_2016 Text File

Files

Use Data Interpreter  
Data Interpreter might be able to clean your Text File workbook.

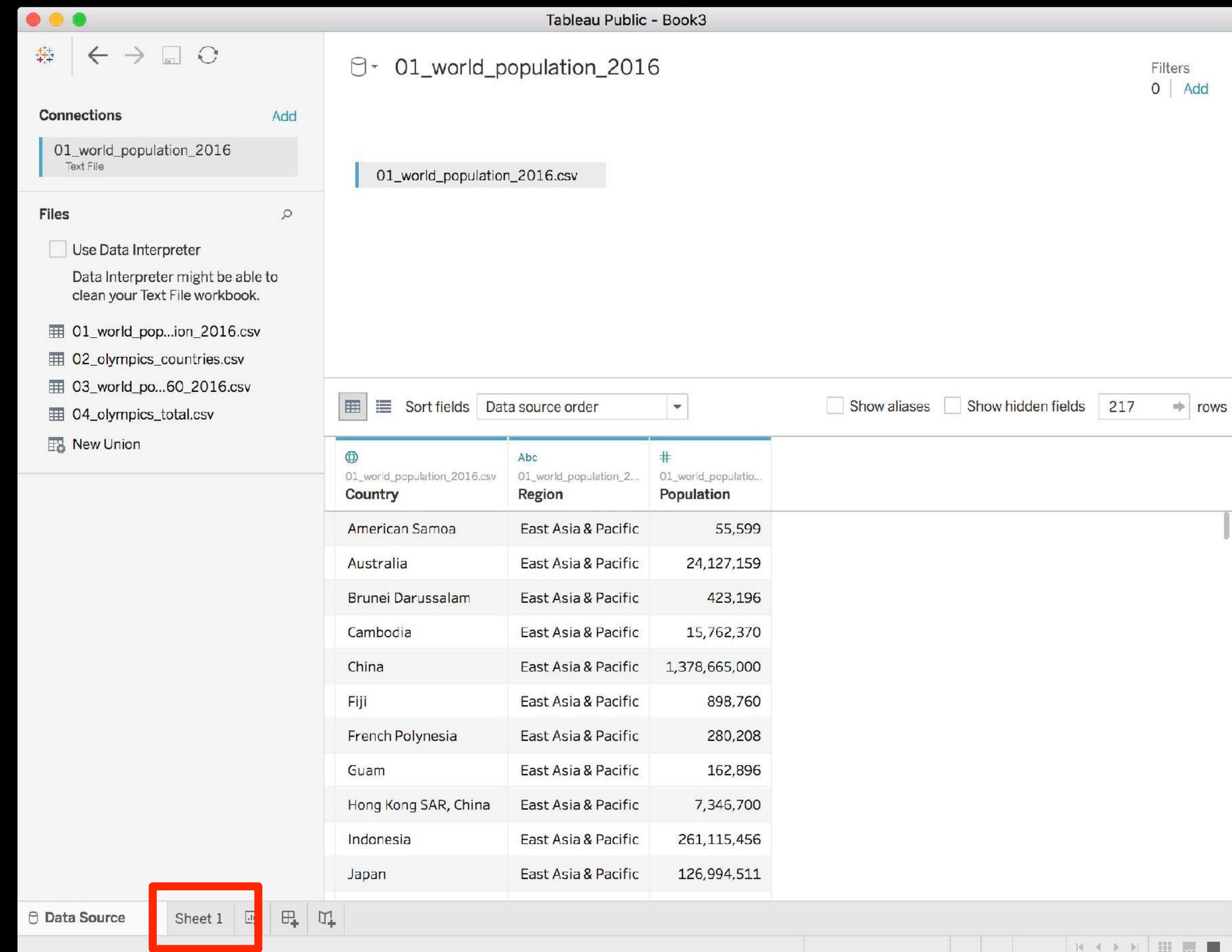
01\_world\_population\_2016.csv  
02\_olympics\_countries.csv  
03\_world\_population\_2016.csv  
04\_olympics\_total.csv  
New Union

Sort fields Data source order ▾

Show aliases Show hidden fields 217 rows

Country	Region	Population
American Samoa	East Asia & Pacific	55,599
Australia	East Asia & Pacific	24,127,159
Brunei Darussalam	East Asia & Pacific	423,196
Cambodia	East Asia & Pacific	15,762,370
China	East Asia & Pacific	1,378,665,000
Fiji	East Asia & Pacific	898,760
French Polynesia	East Asia & Pacific	280,208
Guam	East Asia & Pacific	162,896
Hong Kong SAR, China	East Asia & Pacific	7,346,700
Indonesia	East Asia & Pacific	261,115,456
Japan	East Asia & Pacific	126,994,511

Data Source Sheet 1



## VISUALIZING WORLD POPULATION

# Dimensions VS Measures

**Dimensions are fields that can't be aggregated (e.g. names, dates, IDs, geographical info)**

The screenshot shows the Tableau interface with the following details:

- Data Source:** 01\_world\_population\_2...
- Dimensions:** Country, Region, Measure Names (highlighted with a red box).
- Measures:** Population, Latitude (generated), Longitude (generated), Number of Records, Measure Values.
- Marks:** Automatic, Color, Size, Text, Detail, Tooltip.
- Sheet 1:** A blank sheet with three "Drop field here" placeholder boxes.
- Toolbar:** Standard mode, Show Me button.

## VISUALIZING WORLD POPULATION

### Dimensions VS Measures

**Measures are records that will be aggregated (summed, averaged, etc) to arrive at some final result.**

Inside we have also some generated fields such as “latitude and longitude”.

The screenshot shows the Tableau interface with the following details:

- Data pane:** Shows the data source "01\_world\_population\_2..." and the dimensions "Country", "Region", and "Measure Names".
- Marks card:** Set to "Automatic" with options for Color, Size, Text, Detail, and Tooltip.
- Sheet 1:** A blank canvas with three "Drop field here" placeholder boxes.
- Bottom pane:** Shows the "Data Source" tab and other navigation icons.

A red box highlights the "Measure Names" section in the Data pane, which contains the following generated fields:

- Population
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

## VISUALIZING WORLD POPULATION

### Dimensions VS Measures

**“Number of Records” is also not part of the underlying data.**

This field represents the number of rows in the data source.

The screenshot shows the Tableau interface with the following details:

- Data Pane:** On the left, under the "Data" tab, the data source "01\_world\_population\_2..." is selected. The "Dimensions" section lists "Country", "Region", and "Measure Names". The "Measures" section lists "Population", "Latitude (generated)", "Longitude (generated)", **"Number of Records"** (which is highlighted with a red box), and "Measure values".
- Marks Card:** In the center, the "Marks" card is set to "Automatic" and includes options for Color, Size, Text, Detail, and Tooltip.
- Sheet 1:** The main workspace is labeled "Sheet 1" and contains a placeholder text "Drop field here".
- Toolbars and Buttons:** The top bar includes standard Tableau icons for zoom, refresh, and navigation, along with a "Standard" view button and a "Show Me" button. The bottom bar includes buttons for "Data Source", "Sheet 1", and other sheet navigation.

## VISUALIZING WORLD POPULATION

### Dimensions VS Measures

**“Measure names” contains the names of all measures in your data, collected into a single field with discrete values.**

**“Measure names” contains all the measures in your data, collected into a single field with continuous values.**

The screenshot shows the Tableau interface with the following details:

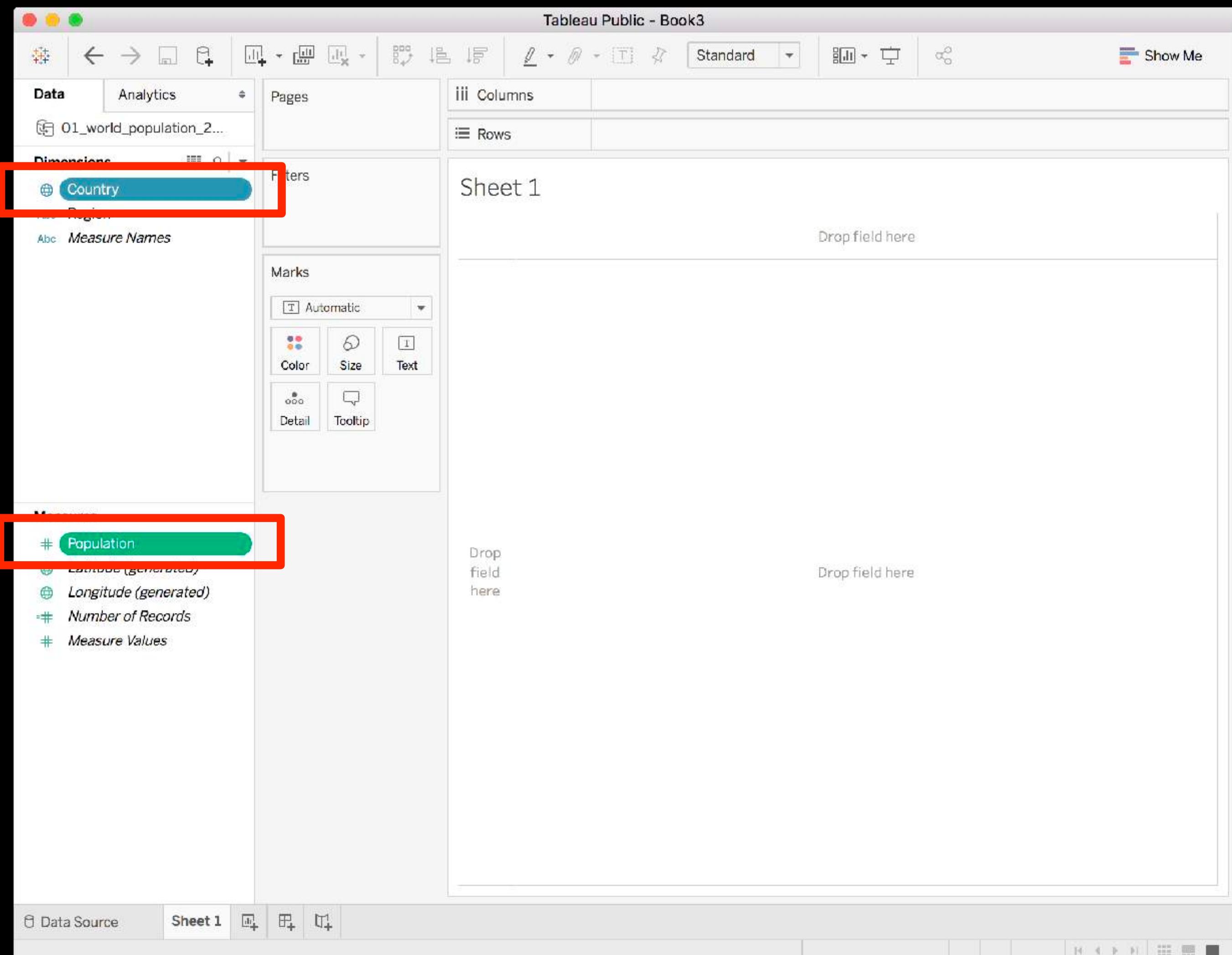
- Data pane:** Shows the data source "01\_world\_population\_2..." and the dimensions "Country" and "Region". Below them, under "Measures", are "Population", "Latitude (generated)", "Longitude (generated)", "Number of Records", and "Measure Values". The "Measure Values" item is highlighted with a red box.
- Marks card:** Displays options for "Automatic" marks, "Color", "Size", "Text", "Detail", and "Tooltip".
- Sheet 1:** A blank canvas with three "Drop field here" placeholder boxes.
- Bottom navigation:** Includes tabs for "Data Source" and "Sheet 1", along with other standard Tableau navigation icons.

# VISUALIZING WORLD POPULATION

Let's make a bar chart

How many people live in each country?

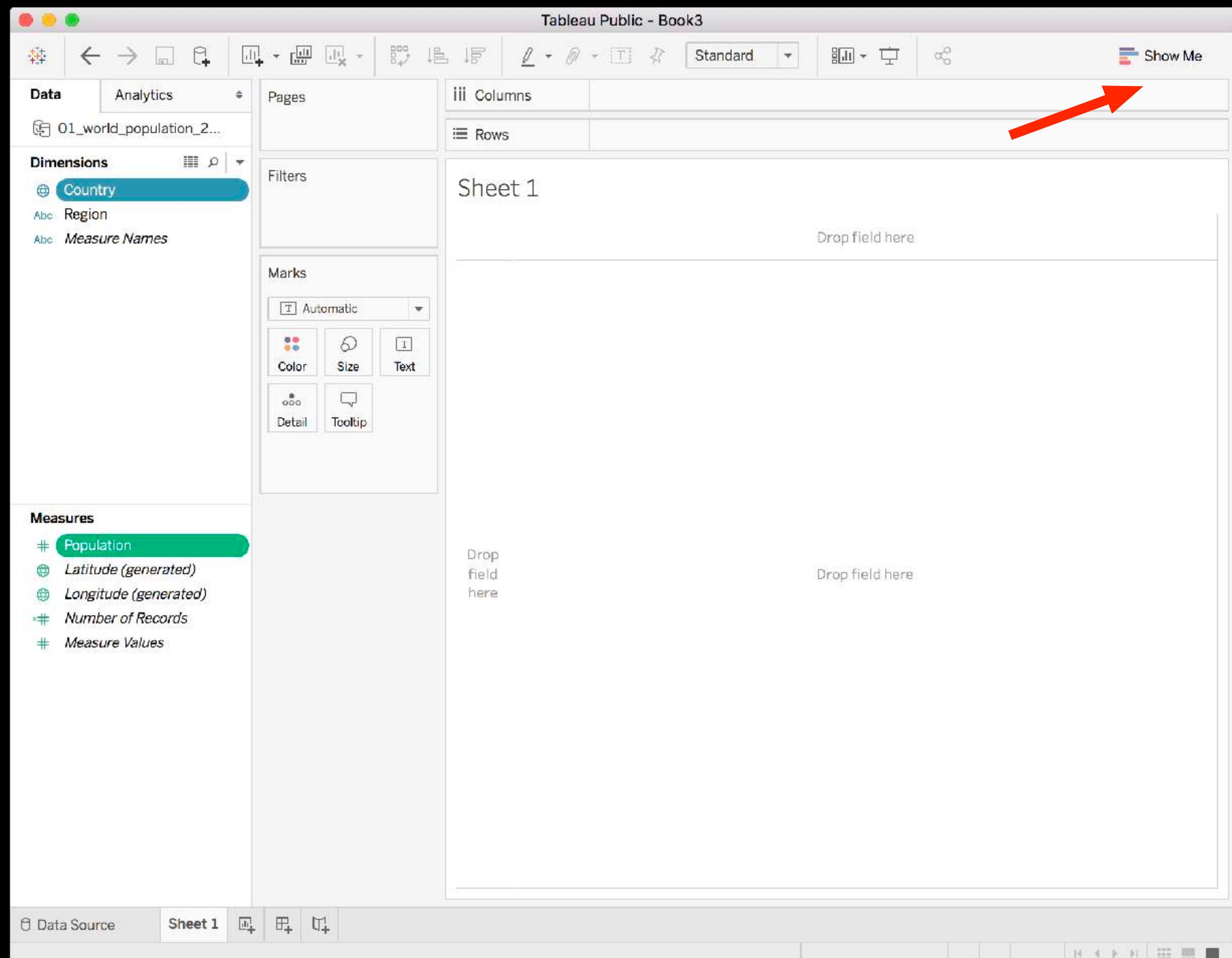
Select "Country" and "Population"



# VISUALIZING WORLDPOPULATION

Let's make a bar chart

Click on "Show Me"



# VISUALIZING WORLD POPULATION

Let's make a bar chart

The “Show me” tool shows you the charts you can create according to the dimensions and measures you have selected.

Tableau Public - Book3

The screenshot shows the Tableau interface with the 'Show Me' tool open. The 'Dimensions' section has 'Country' selected. The 'Measures' section has 'Population' selected. The 'Marks' card shows options for Color, Size, Text, Detail, and Tooltip. The 'Sheet 1' canvas is empty, with placeholder text 'Drop field here'. A legend on the right indicates that 'Population' is set to 'Color'. The 'Show Me' panel displays various chart types: maps, pie charts, bar charts, line graphs, and scatter plots. Below the 'Show Me' panel, instructions say 'For horizontal bars try 0 or more Dimensions 1 or more Measures'.

Tableau Public - Book3

Data Analytics

01\_world\_population\_2...

Dimensions

Country

Region

Measure Names

Marks

Automatic

Color

Size

Text

Detail

Tooltip

Sheet 1

Drop field here

Drop field here

Drop field here

For horizontal bars try  
0 or more Dimensions  
1 or more Measures

Show Me

# VISUALIZING WORLDPOPULATION

Let's make a bar chart

Click on the horizontal barchart

Tableau Public - Book3

Sheet 1

Drop field here

Drop field here

Drop field here

For horizontal bars try

0 or more Dimensions

1 or more Measures

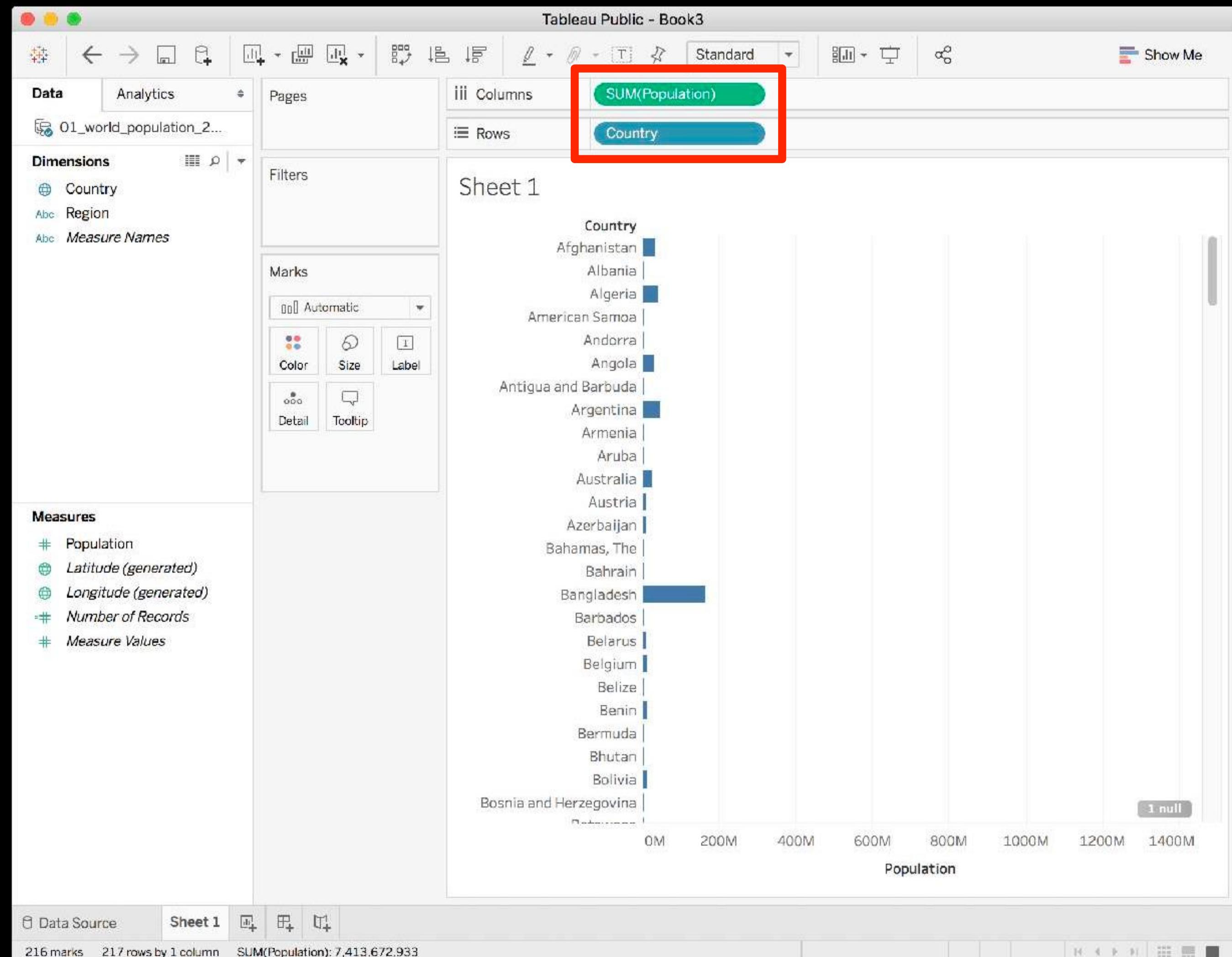
Tableau interface elements include: Data, Analytics, Pages, Columns, Rows, Filters, Marks (Automatic, Color, Size, Text, Detail, Tooltip), and Show Me.

# VISUALIZING WORLD POPULATION

## The shelves

**When you place a dimension on the Rows or Columns shelves, headers for the members of that dimension are created.**

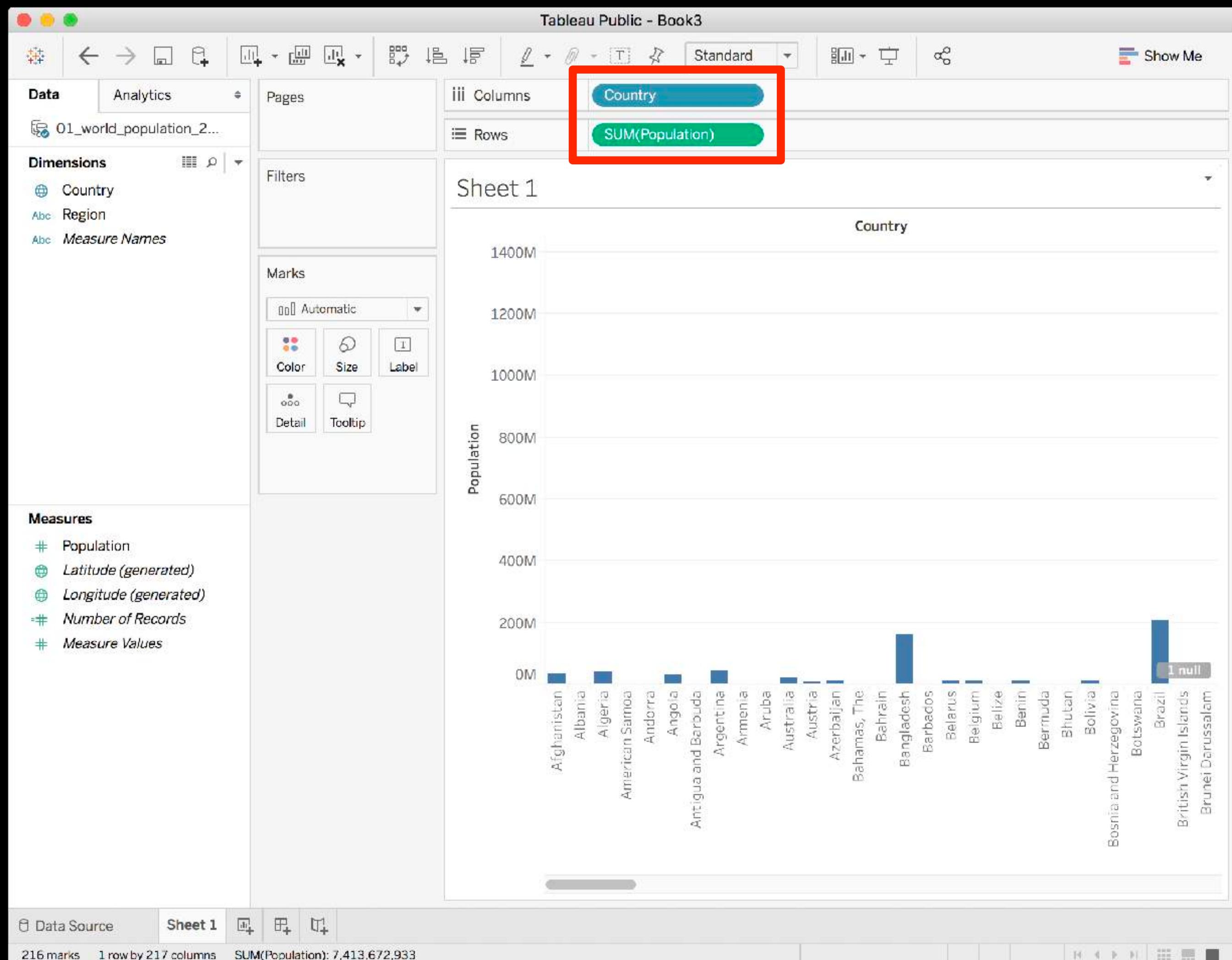
**When you place a measure on the Rows or Columns shelf, quantitative axes for that measure are created.**



# VISUALIZING WORLD POPULATION

## The shelves

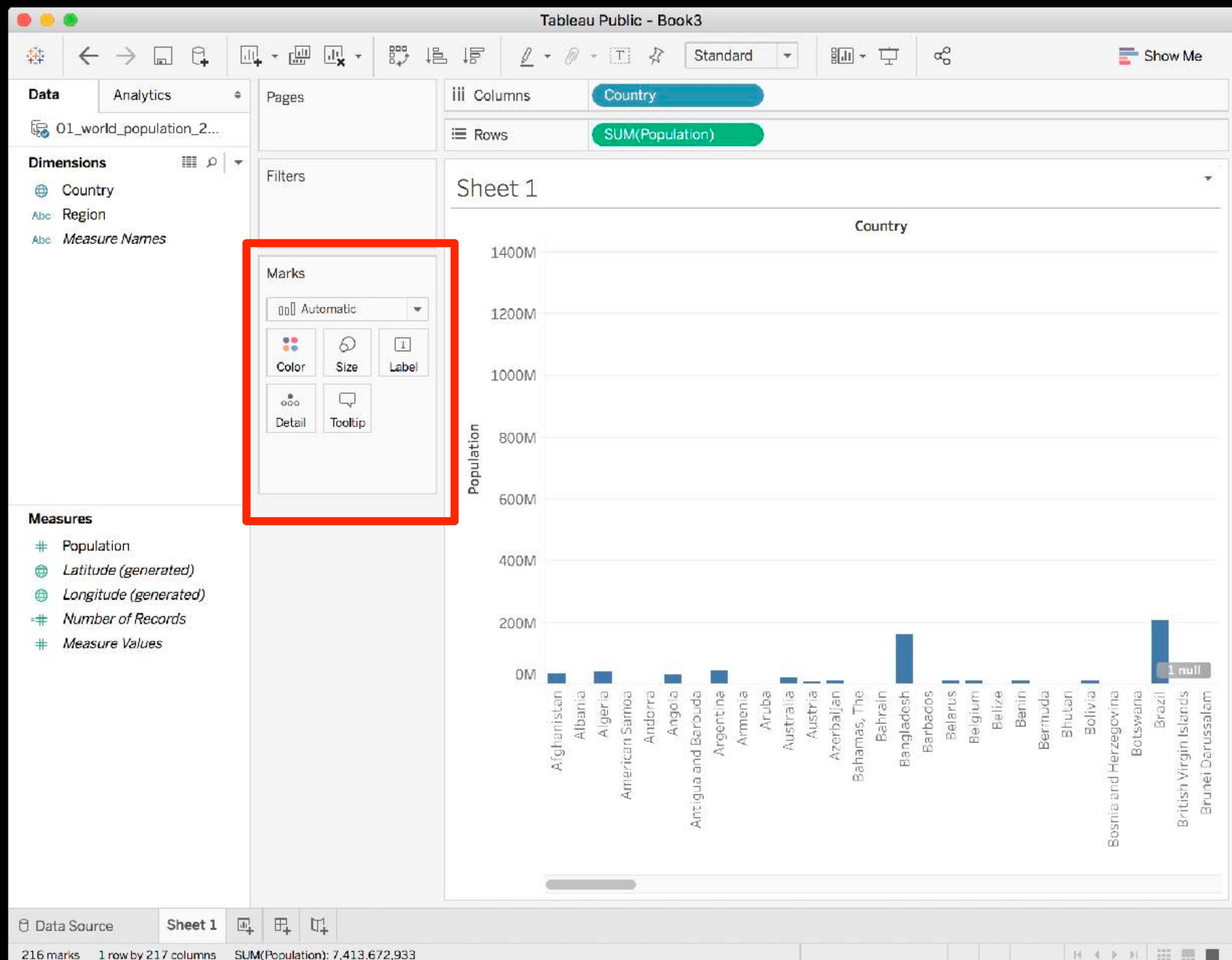
Try to invert the fields on the shelves.



# VISUALIZING WORLD POPULATION

## Marks

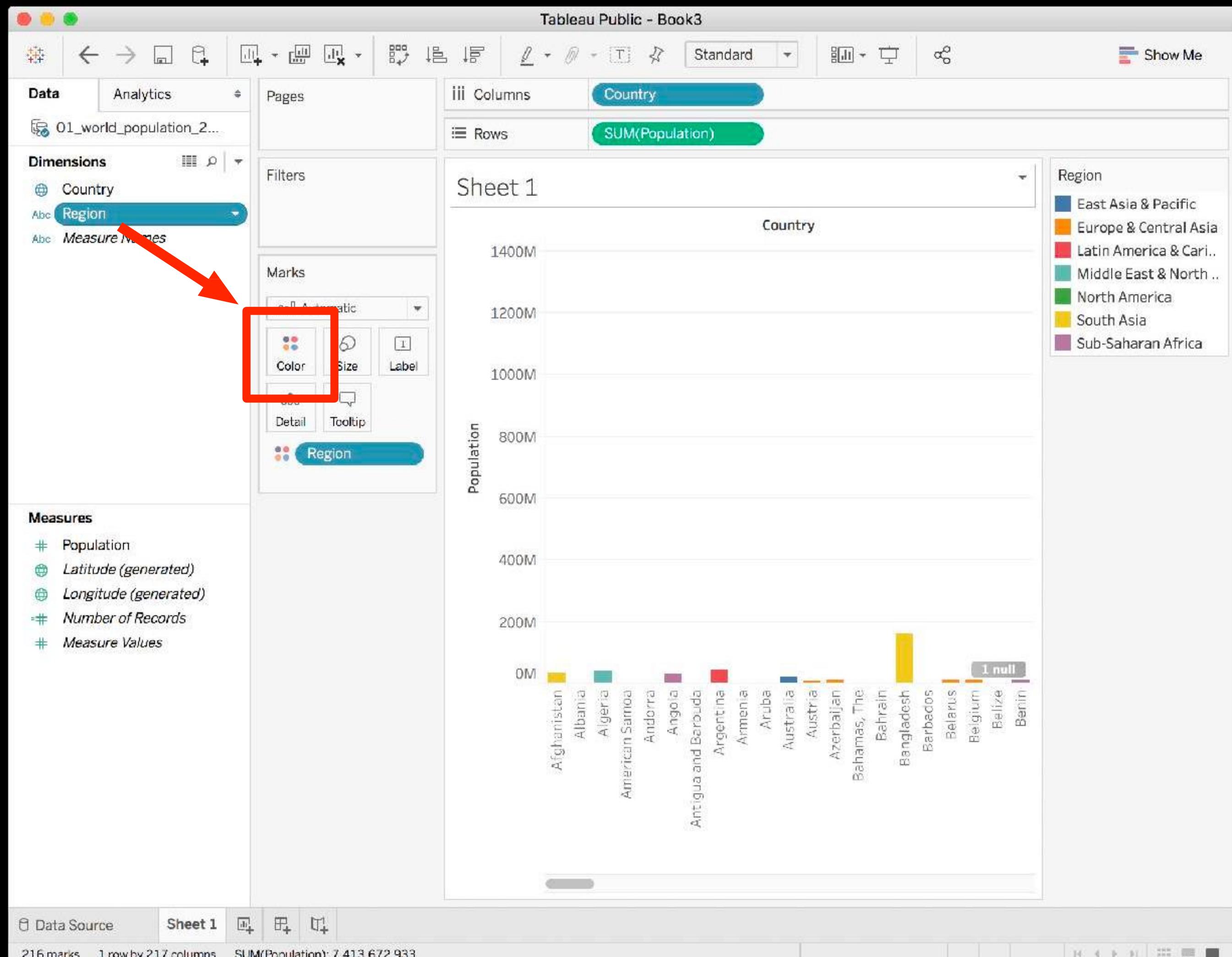
In this area you can manage the marks of your visualization and theirs visual variables.



# VISUALIZING WORLD POPULATION

## Marks

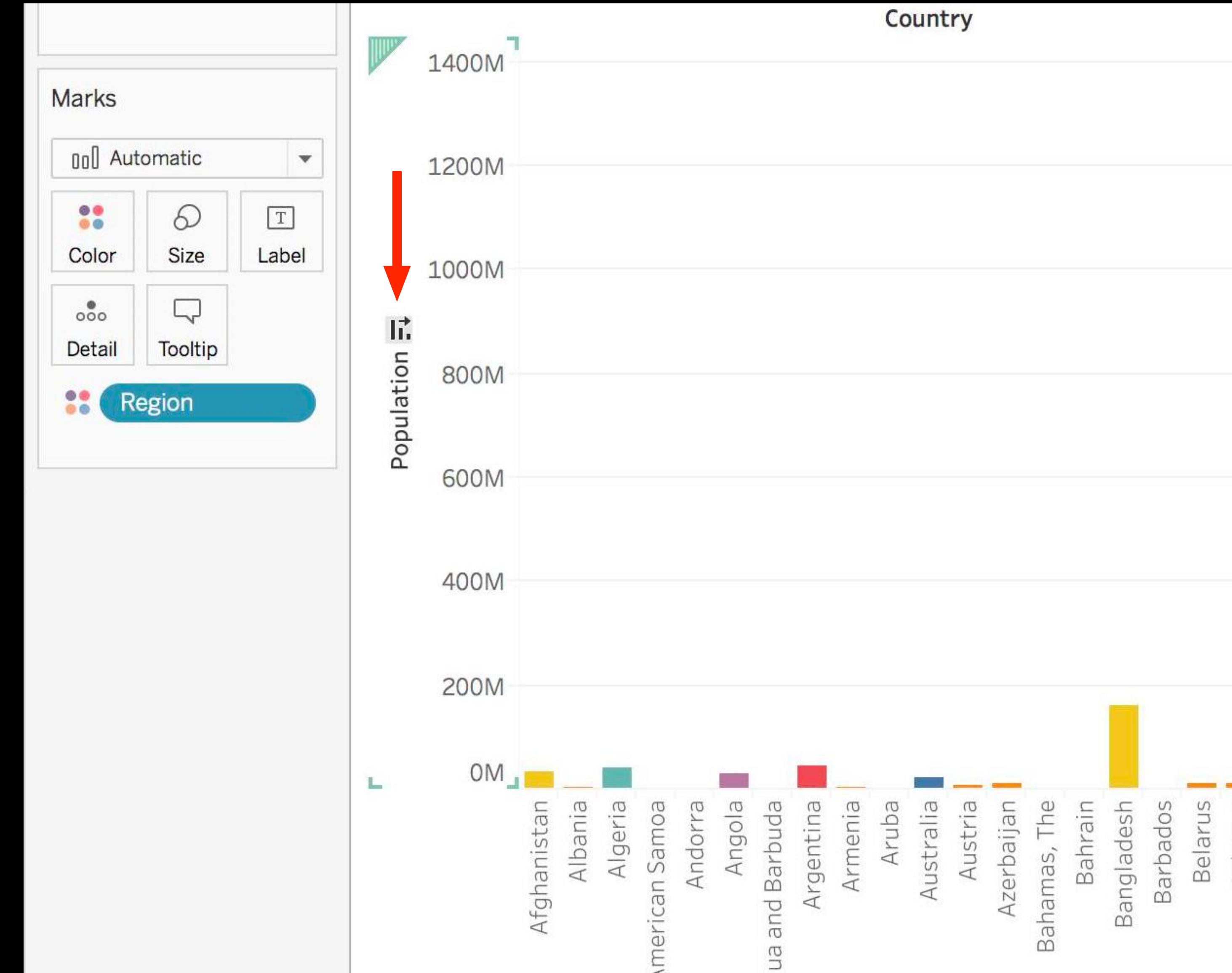
Drag and drop “region” over “color” to map the color according to the geographical region.

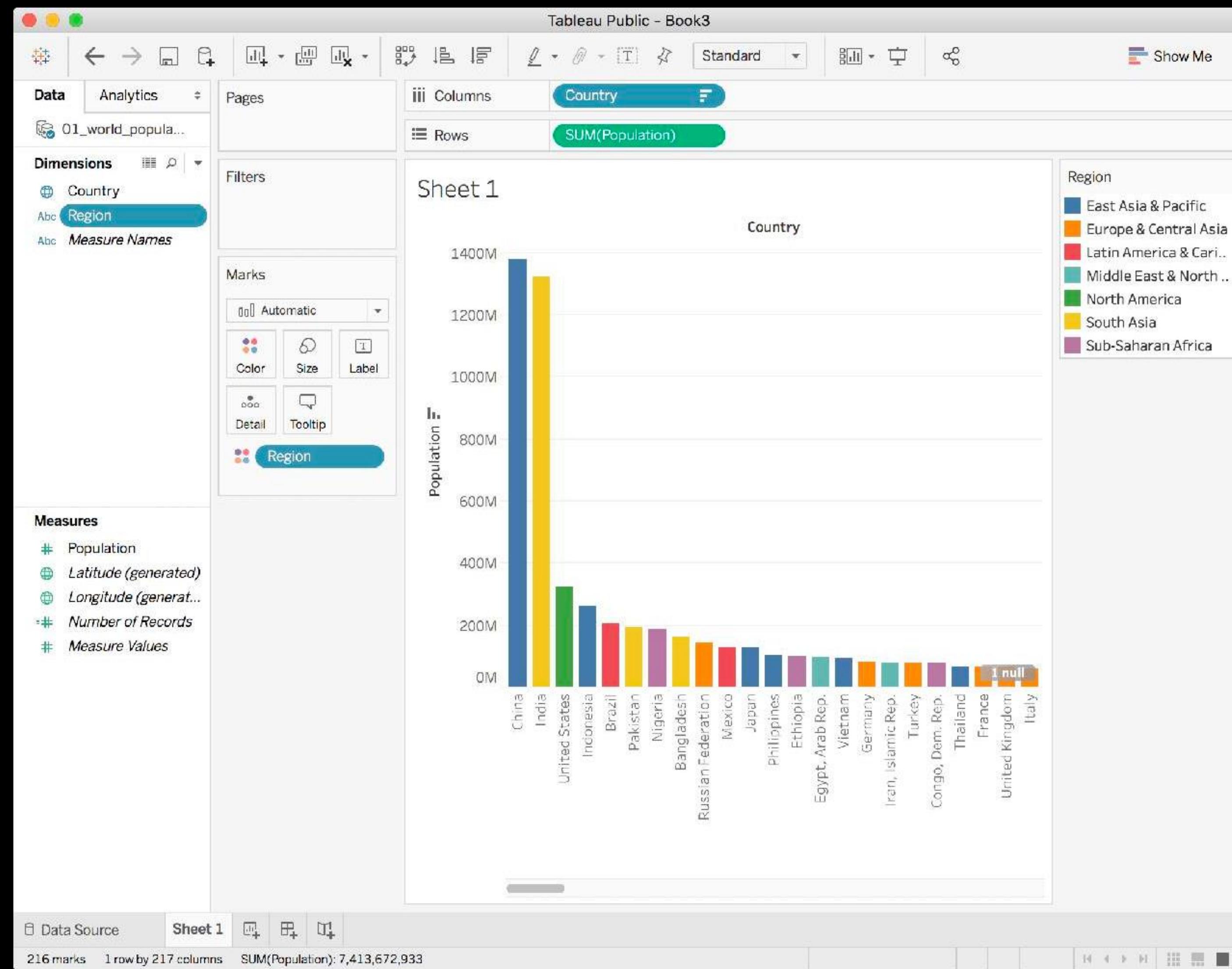


## VISUALIZING WORLD POPULATION

### Sorting

To sort the bars from the more populated country to the least populated one click on the small icon next to the “population” axis.

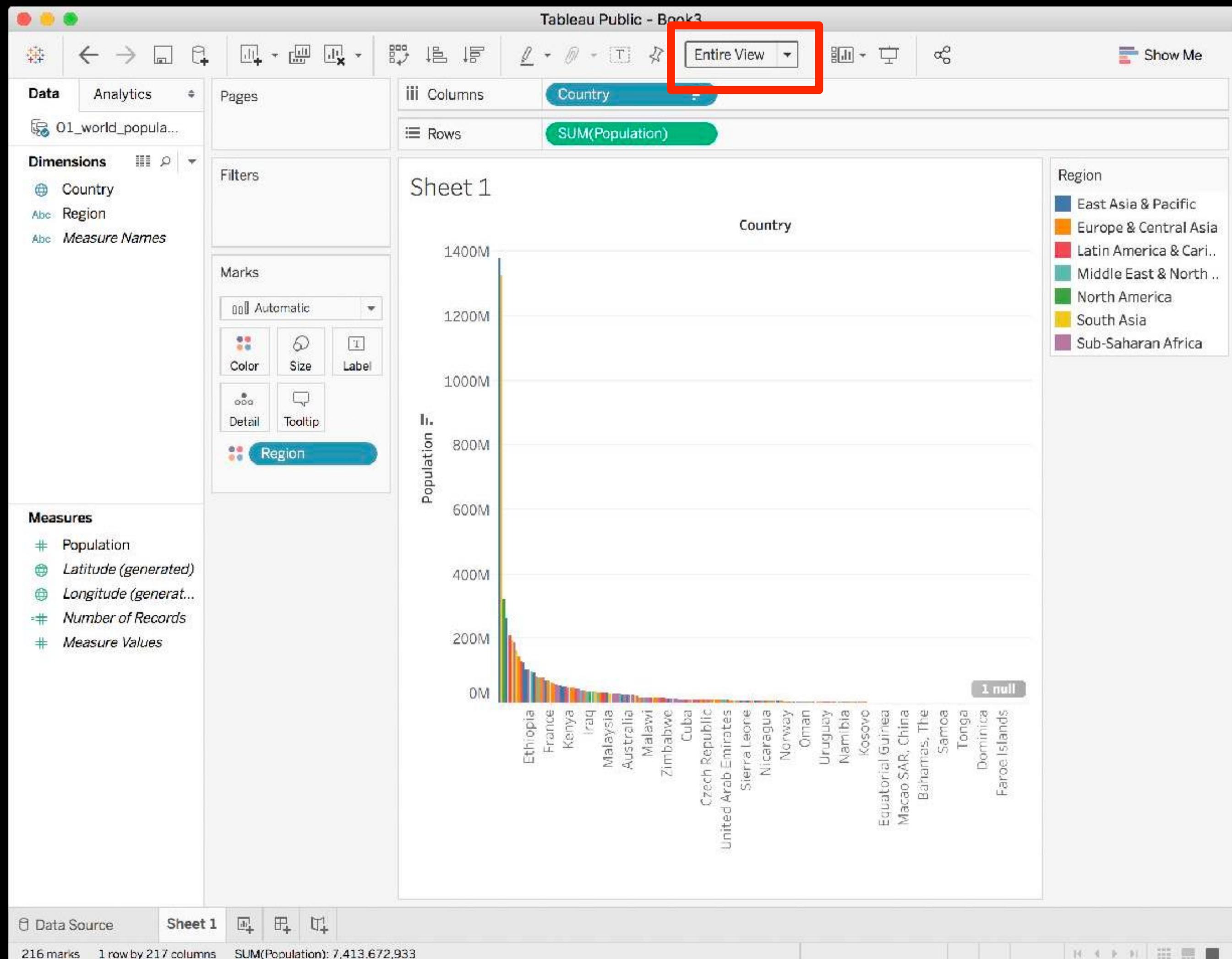




# VISUALIZING WORLD POPULATION

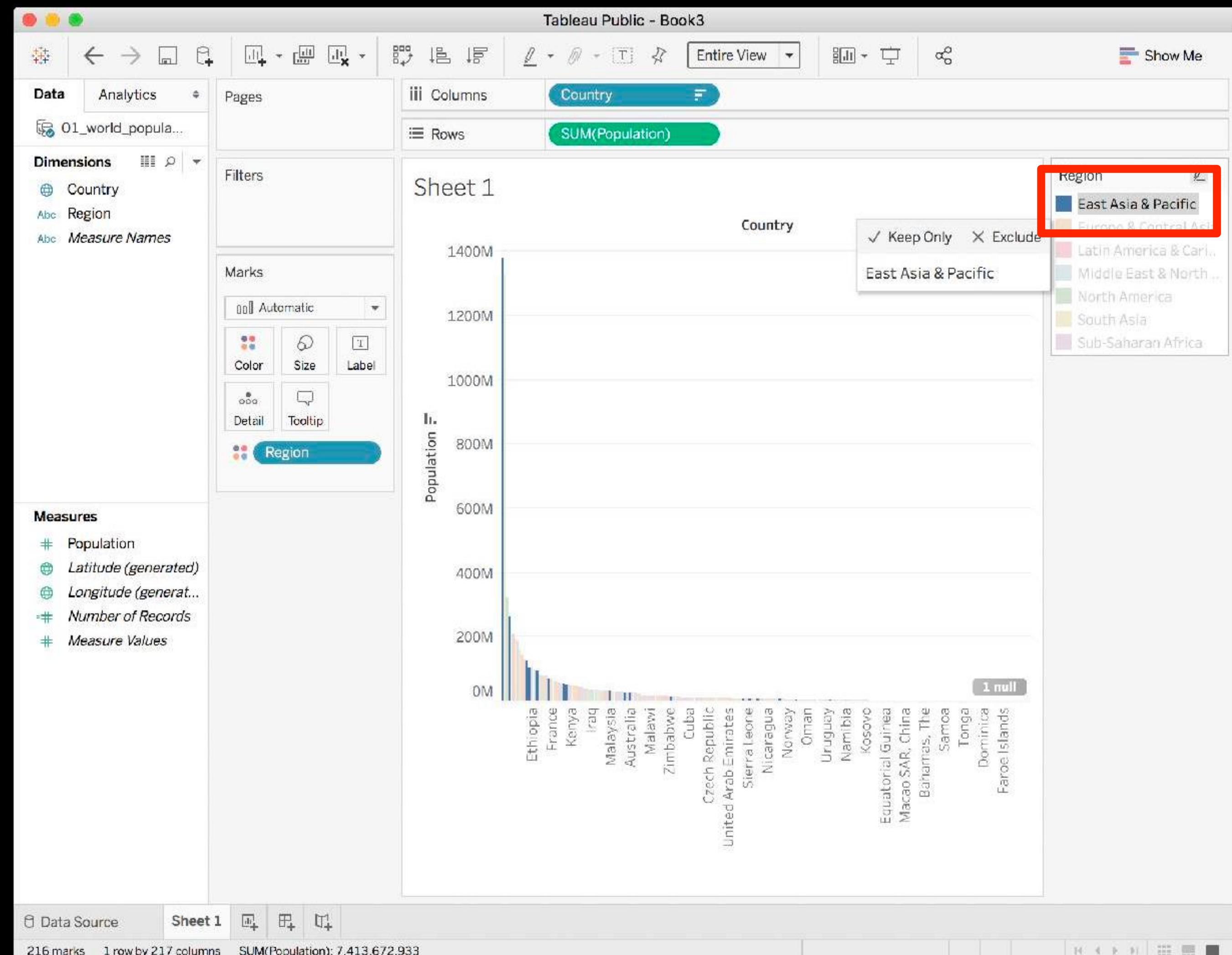
## Display options

Click on the dropdown to change fit the visualization in the window.



# VISUALIZING WORLD POPULATION

Interact with the legend to highlight categories

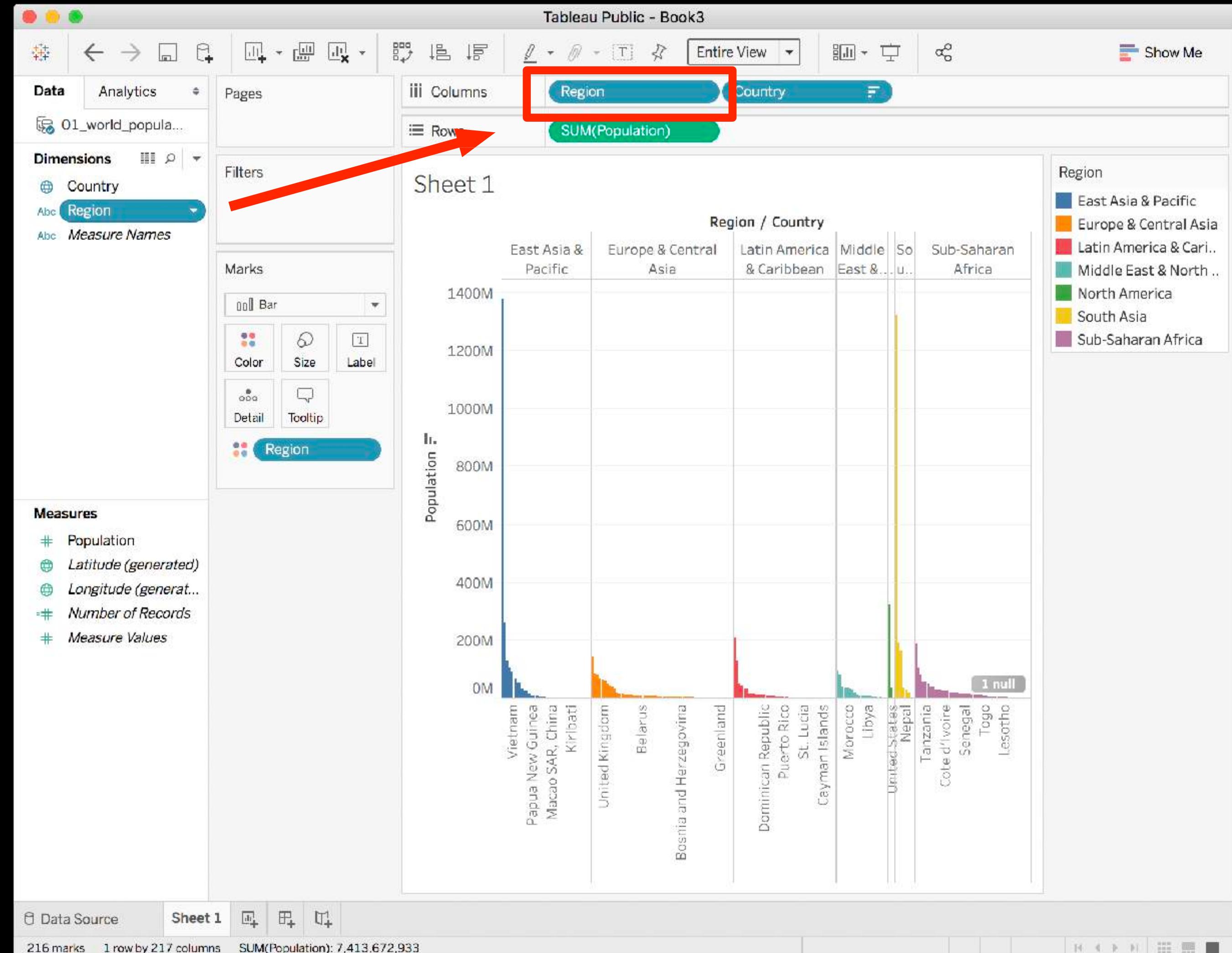


# VISUALIZING WORLD POPULATION

Let's group countries by region

Drag and drop "region" next to countries.

As you add more fields to the shelves, additional headers and axes are included in the table and you get an increasingly detailed picture of your data.

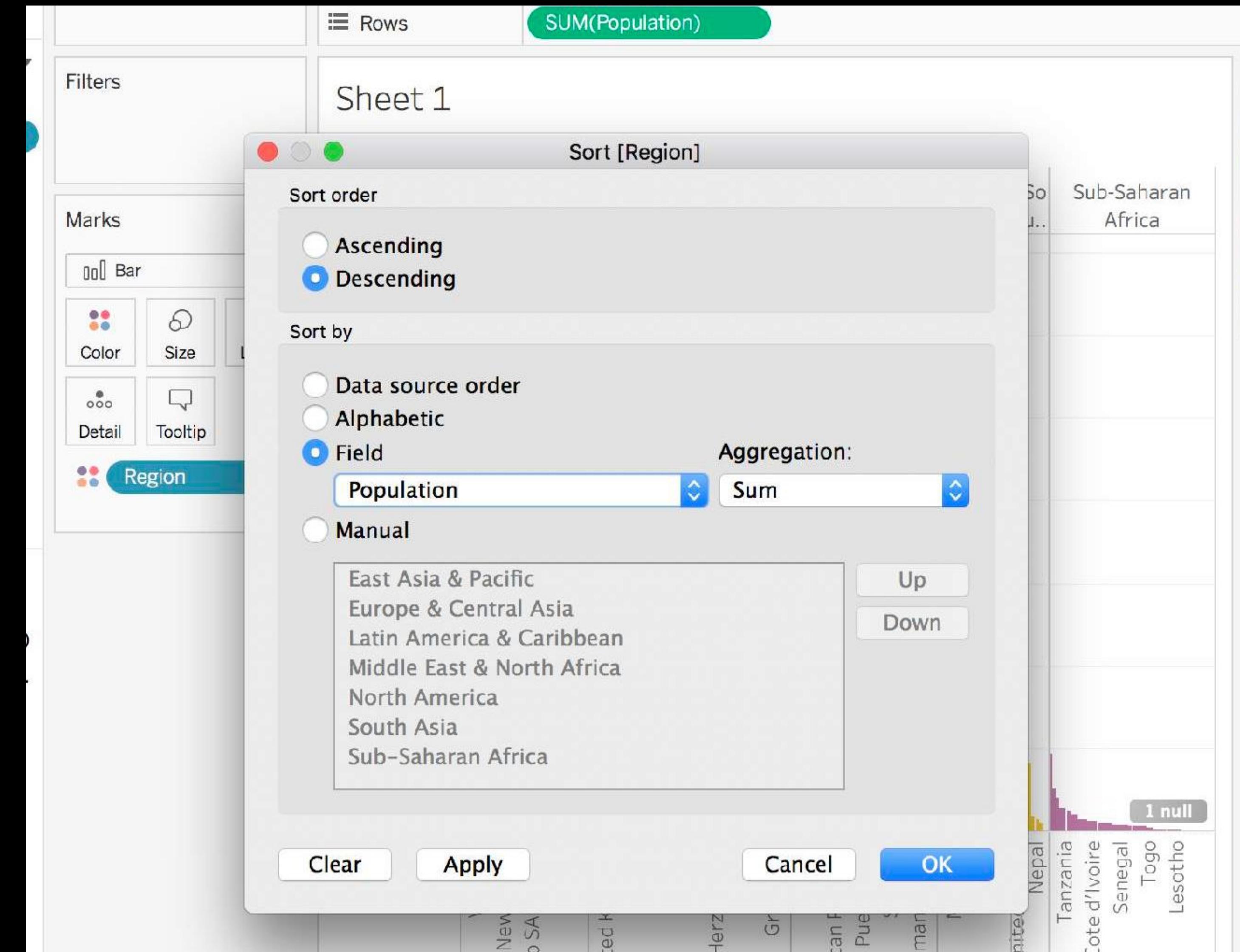


# VISUALIZING WORLD POPULATION

## Let's sort regions

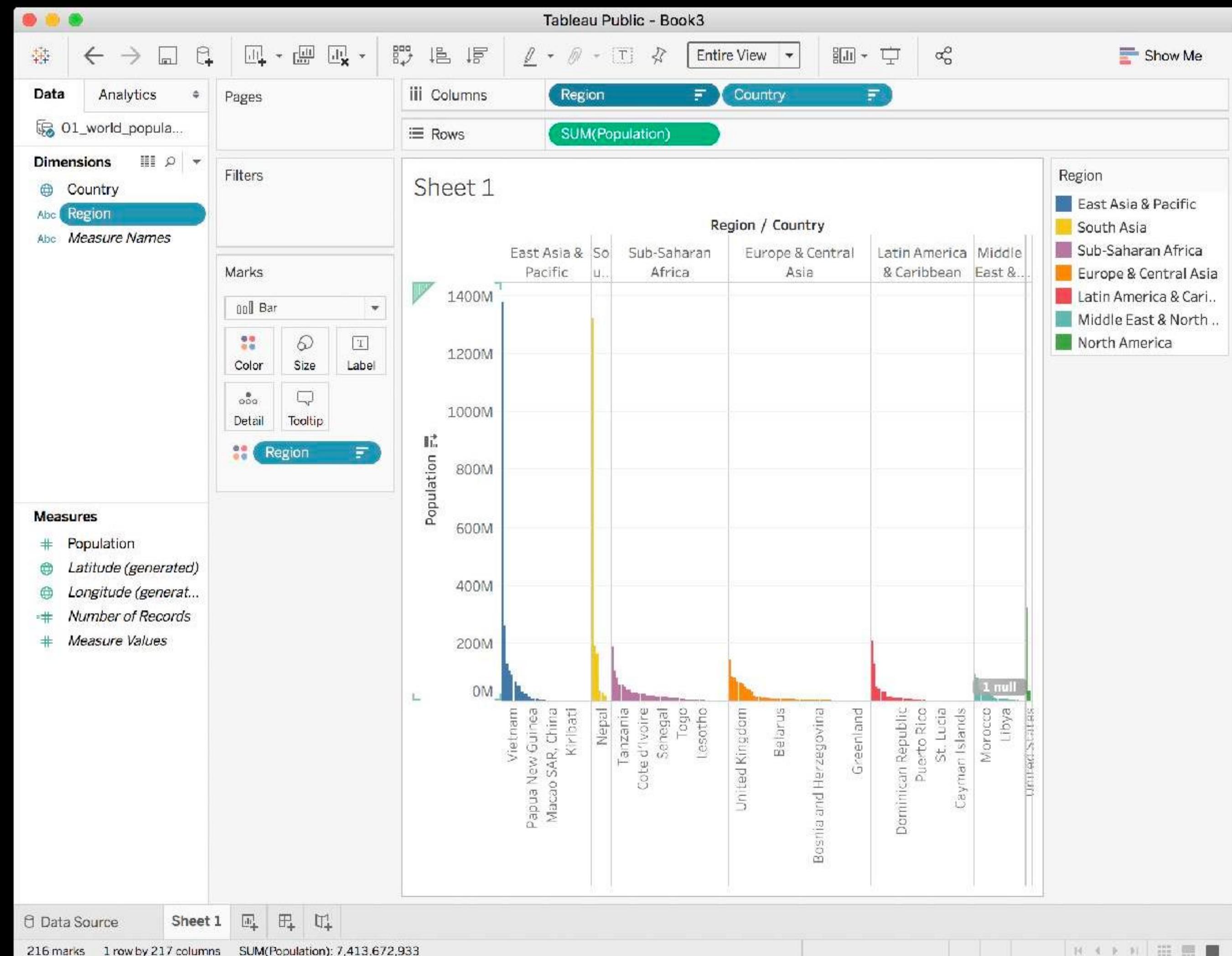
Click on the dropdown next to “region” on “Columns” and select “Sort”.

Change the sorting settings in this way.



# VISUALIZING WORLD POPULATION

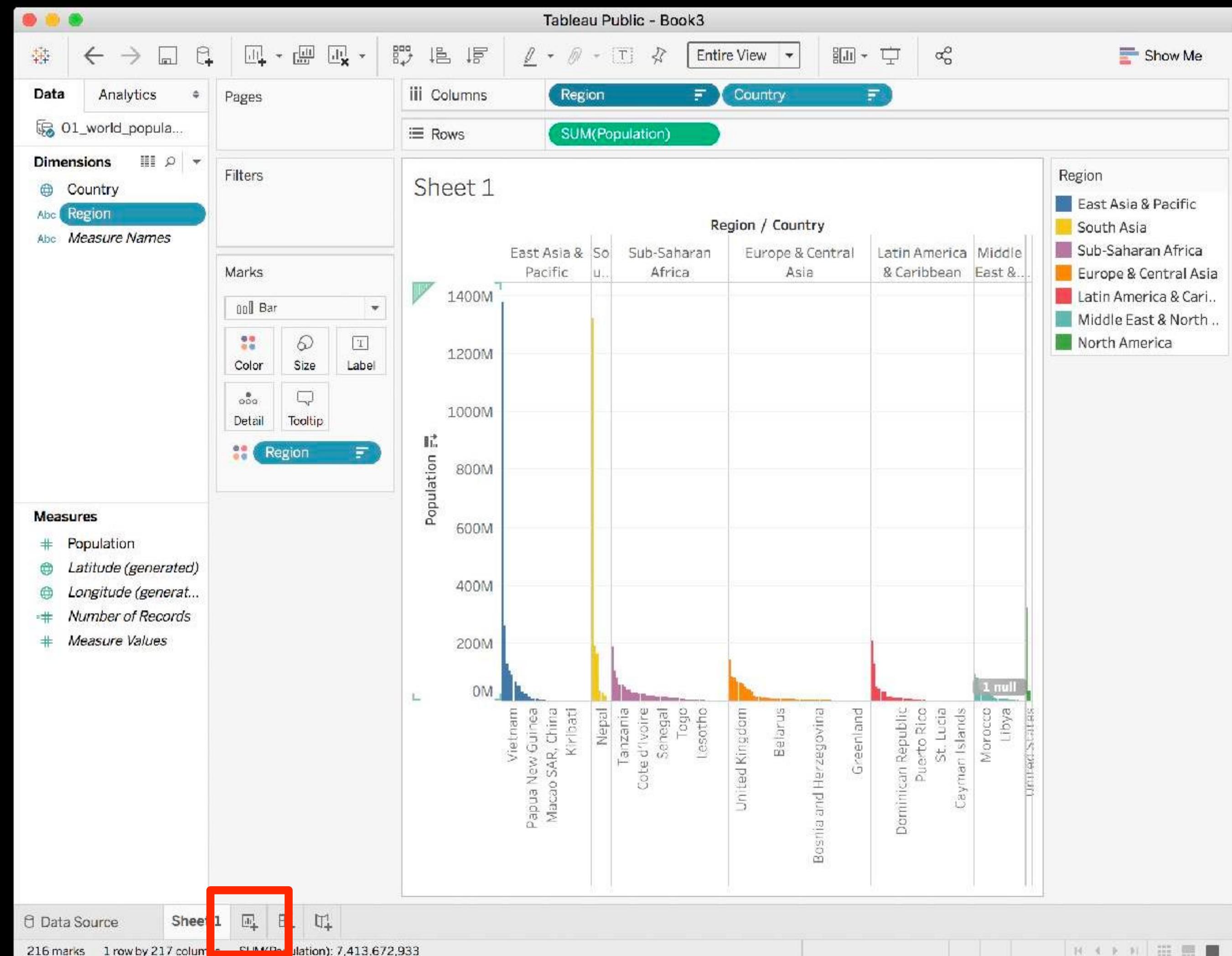
Let's sort regions



# VISUALIZING WORLD POPULATION

Let's make a treemap

Create a new sheet.

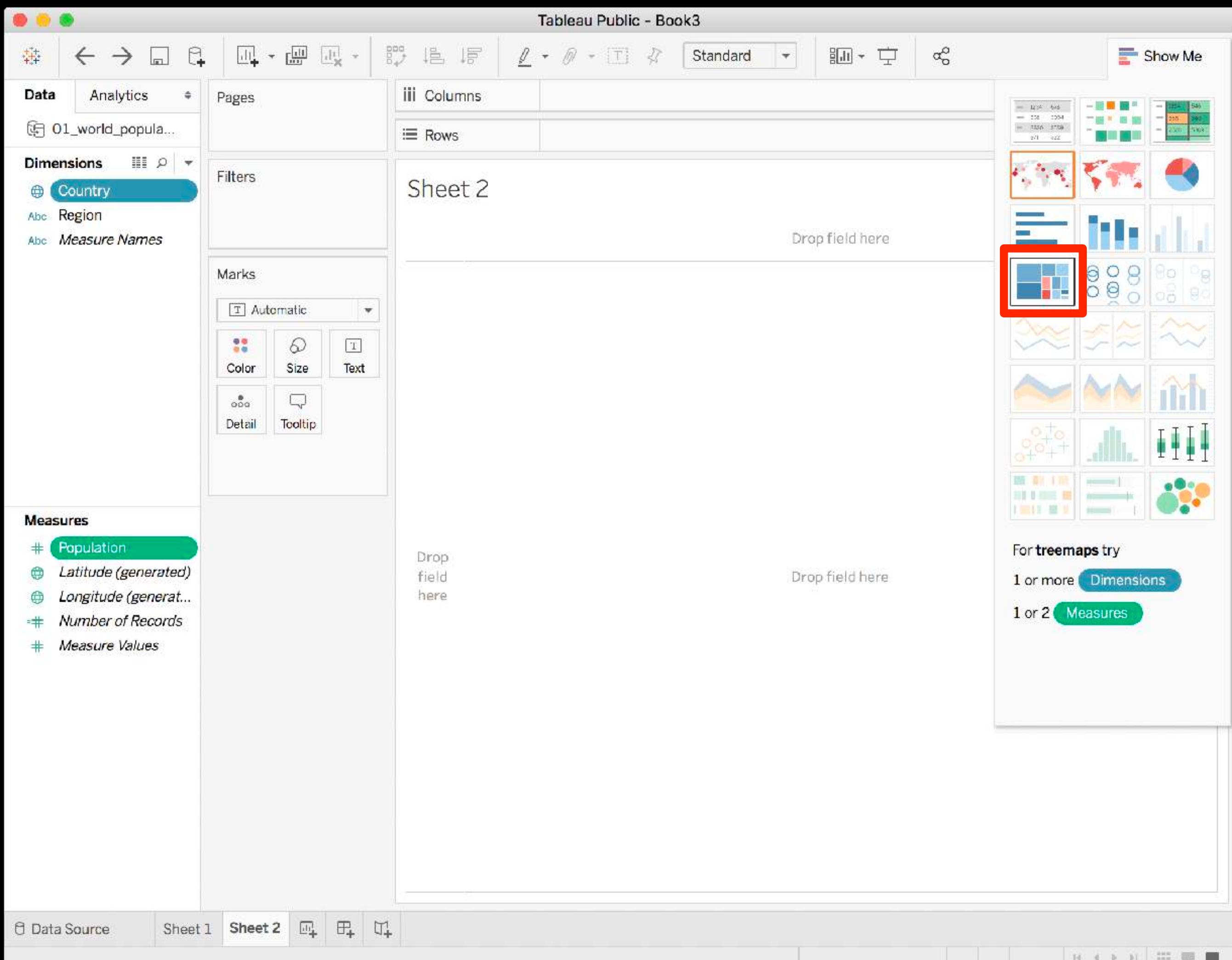


# VISUALIZING WORLD POPULATION

Let's make a treemap

Select "Country" and "Population".

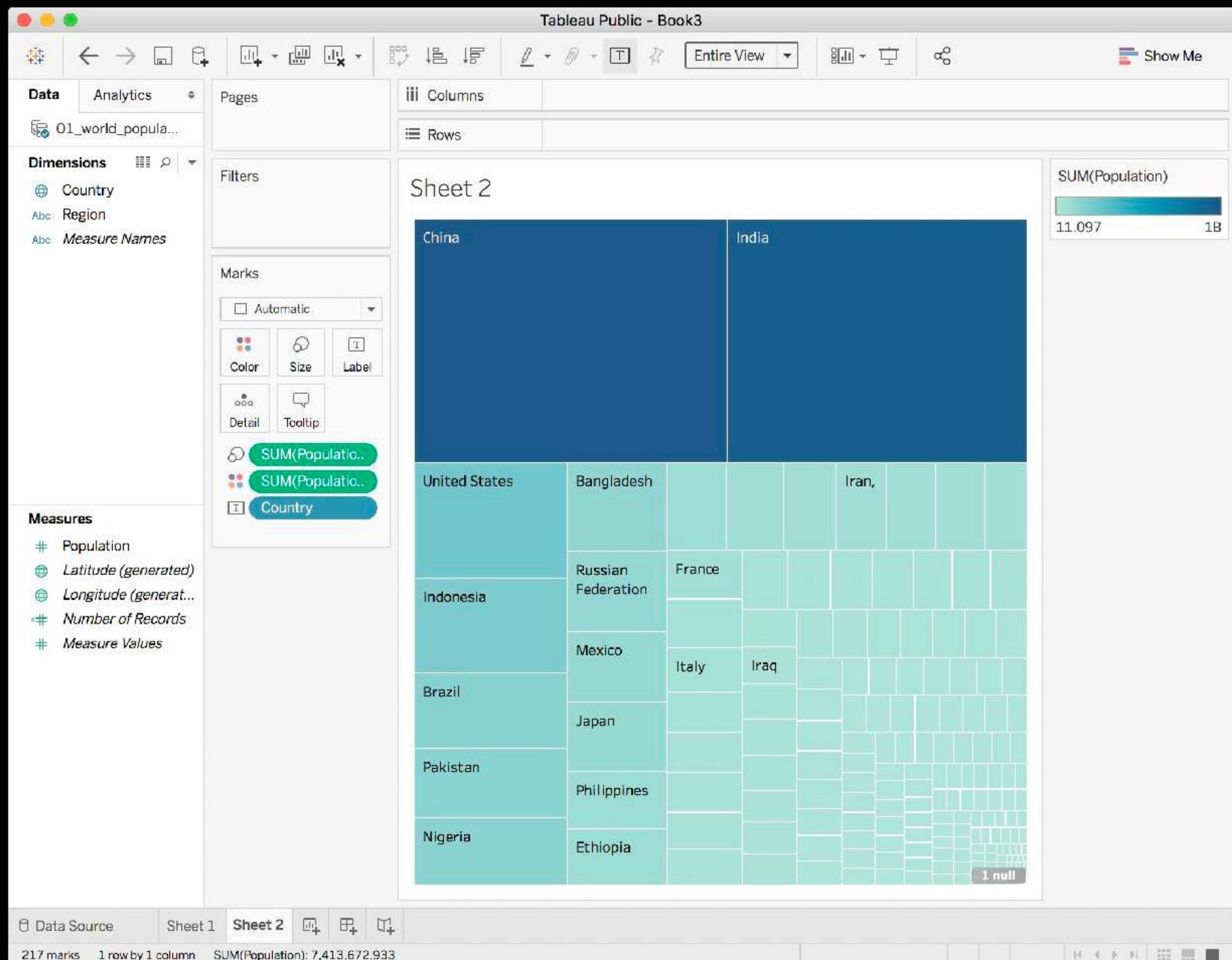
Click on "treemap" in the "show me" panel.



# VISUALIZING WORLD POPULATION

Let's make a treemap

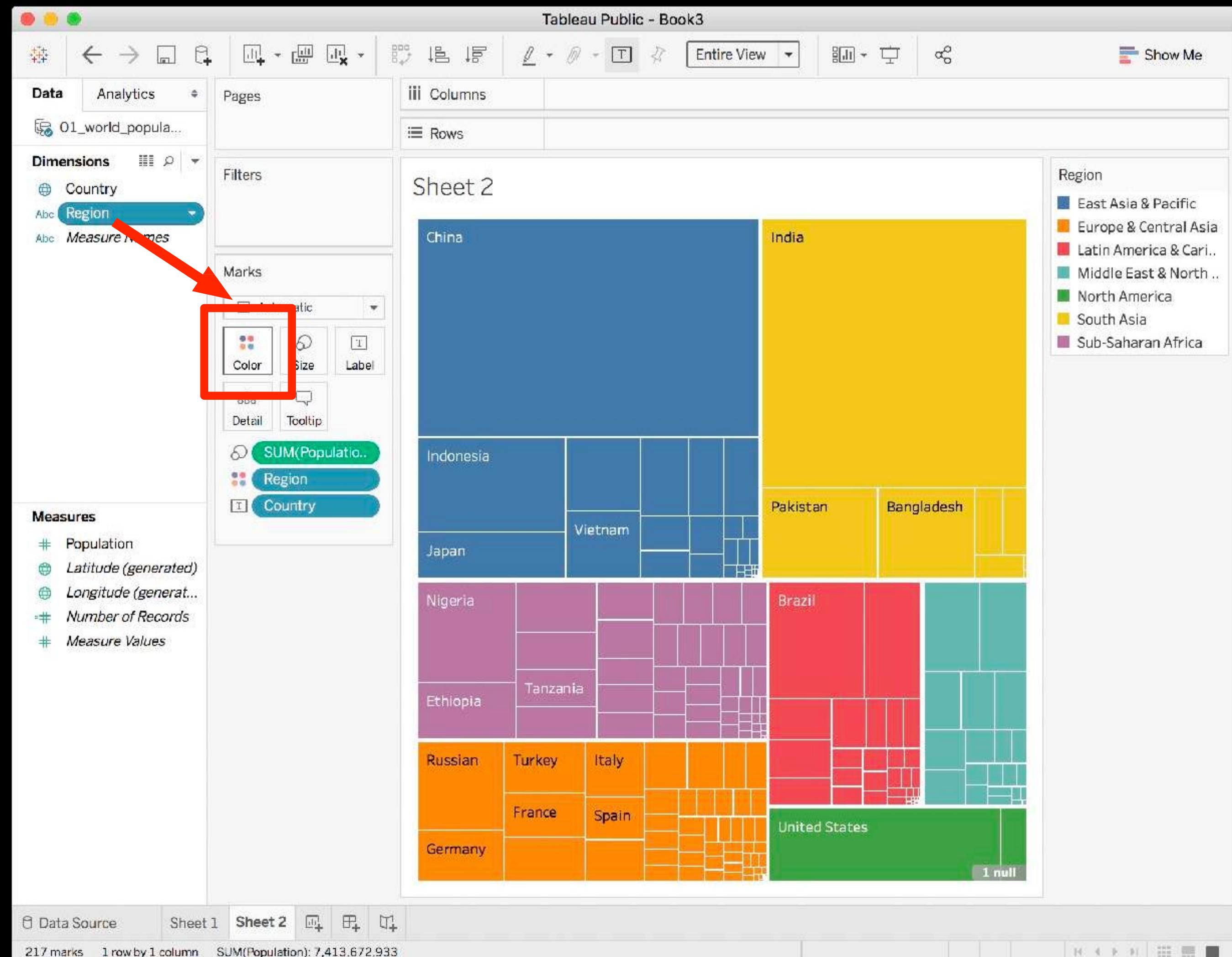
Tableau automatically mapped the size and the color of the rectangles on the “Population”.



# VISUALIZING WORLD POPULATION

Let's make a treemap

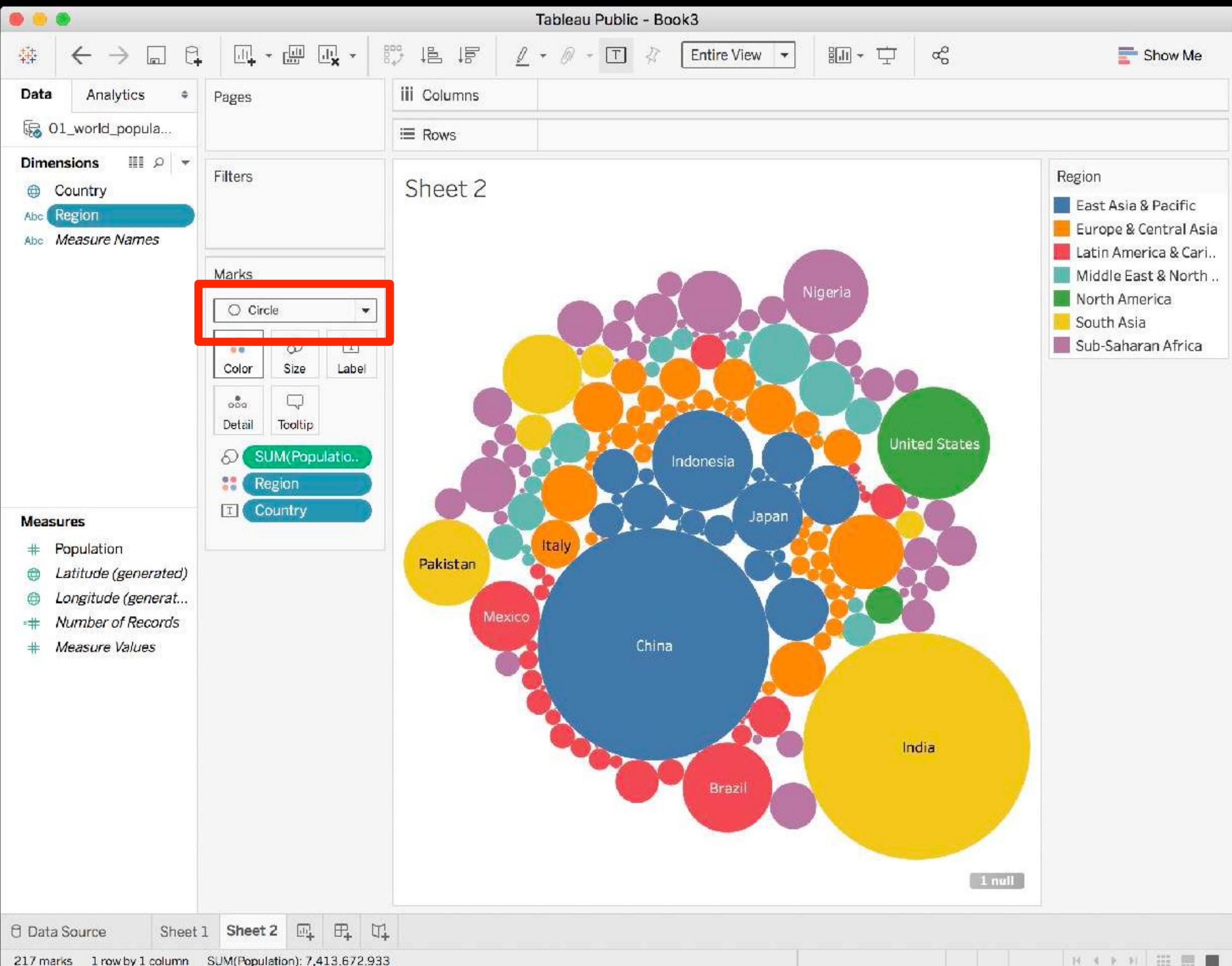
Drag "region" on color to add the countries and group them by region.



# VISUALIZING WORLD POPULATION

Let's make a bubble chart

Select "circle" as mark instead of "square".

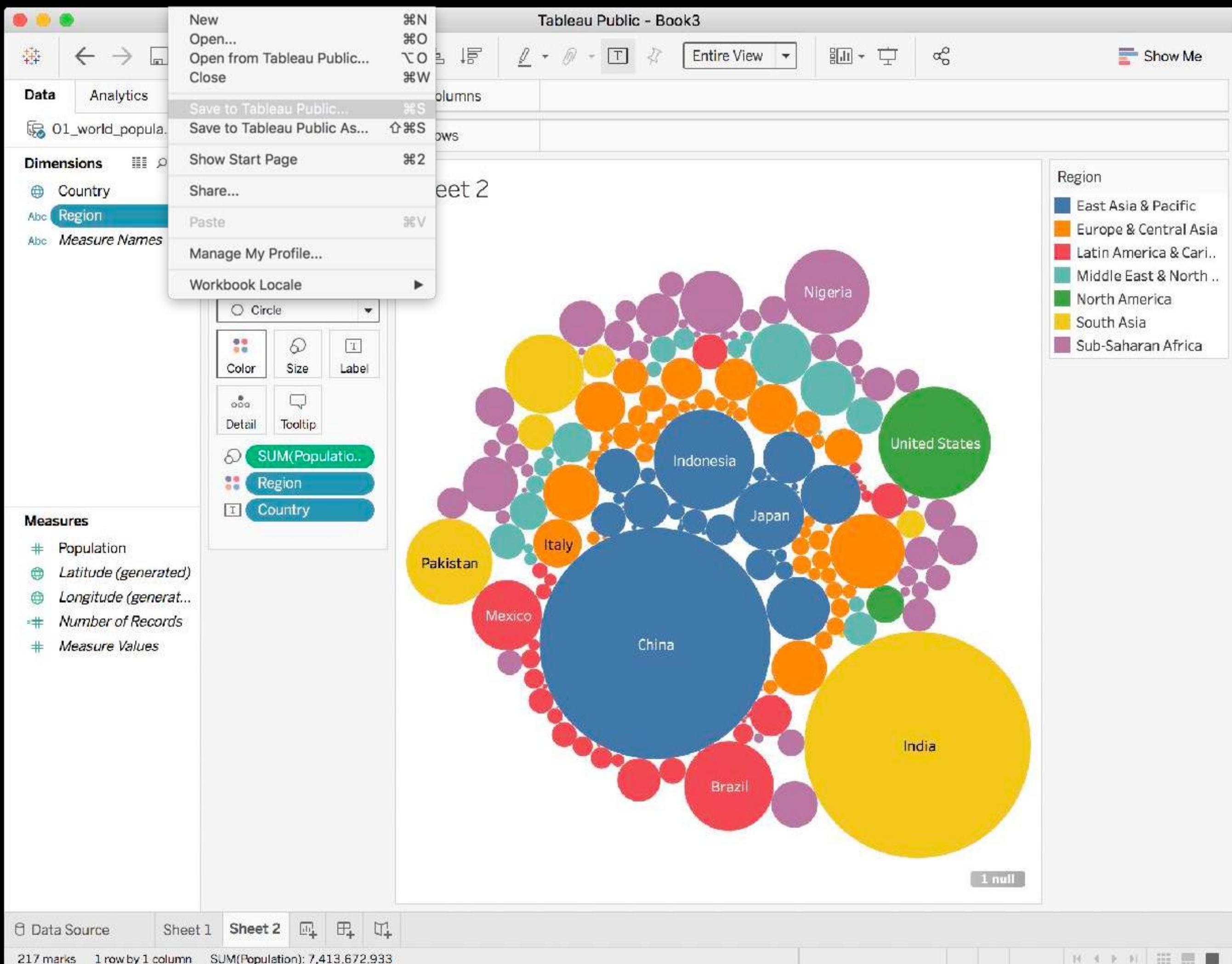


# VISUALIZING WORLD POPULATION

Save your work

Click on File > Save To Tableau Public.

Create an account if you don't have one already.



## EXERCISE

# Visualizing the Olympic games (part 1)

Create a new tableau file and upload  
**02\_olympics\_countries.csv**

Abc 02_olympics_coun... <b>Edition</b>	Abc 02_olympics_countrie... <b>Discipline</b>	🌐 02_olympics_count... <b>Country</b>	Abc 02_olympics_cou... <b>Medal</b>
1896-Athens	Swimming	Hungary	Gold
1896-Athens	Swimming	Austria	Silver
1896-Athens	Swimming	Greece	Bronze
1896-Athens	Swimming	Greece	Gold
1896-Athens	Swimming	Greece	Silver
1896-Athens	Swimming	Greece	Bronze
1896-Athens	Swimming	Hungary	Gold
1896-Athens	Swimming	Greece	Silver
1896-Athens	Swimming	Greece	Bronze

## EXERCISE

# Visualizing the Olympic games (part 1)

**Which country has won the most medals?**

**Which country has won the most Olympic gold medals of all time?**

**In which sport Italy has won the most medals?**

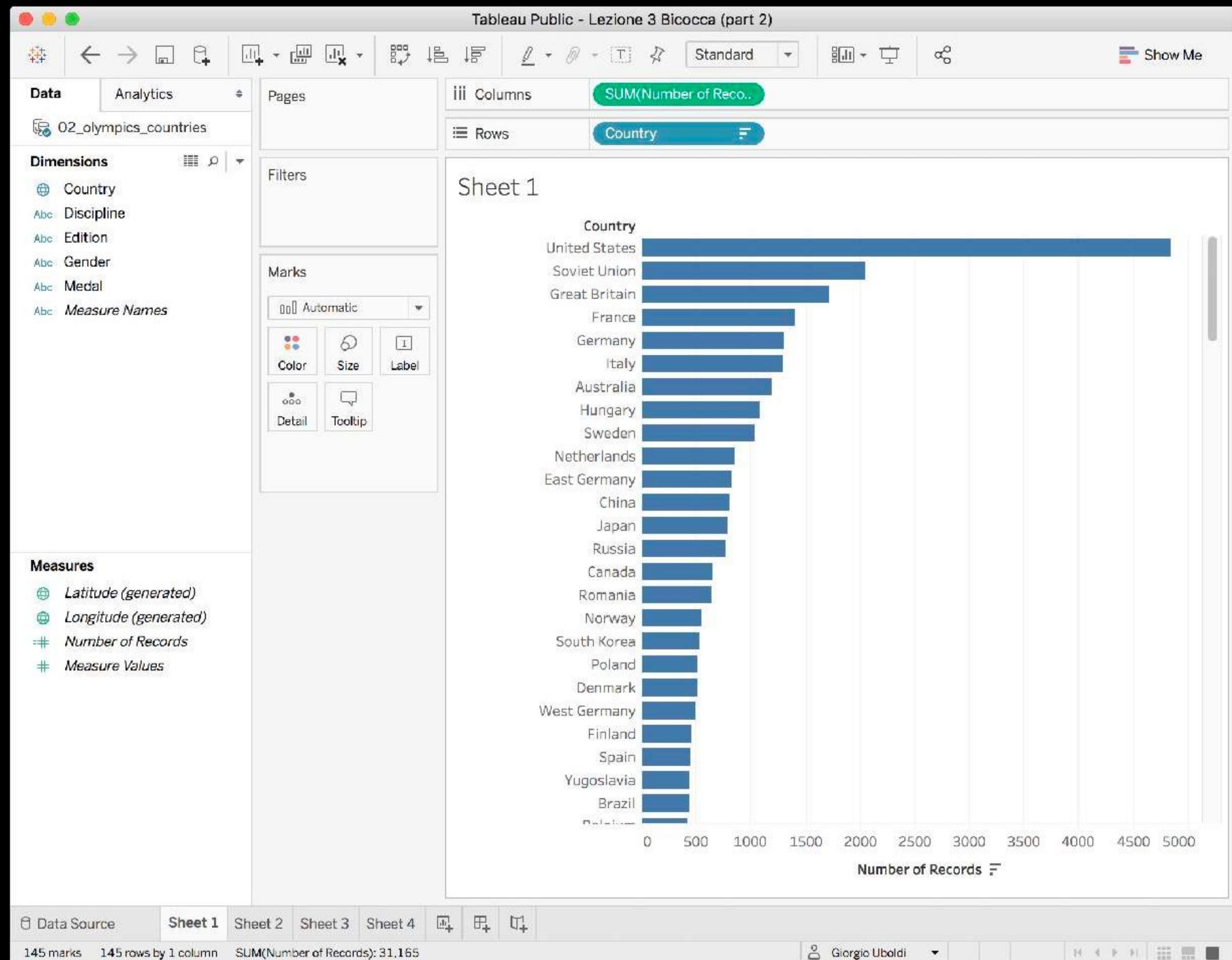
...

**\*remember that “number of records” represents the number of rows in the data source.**

Abc 02_olympics_coun... Edition	Abc 02_olympics_countrie... Discipline	🌐 02_olympics_count... Country	Abc 02_olympics_coun... Gender	Abc 02_olympics_cou... Medal
1896-Athens	Swimming	Hungary	Men	Gold
1896-Athens	Swimming	Austria	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Greece	Men	Gold
1896-Athens	Swimming	Greece	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Hungary	Men	Gold
1896-Athens	Swimming	Greece	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Austria	Men	Gold

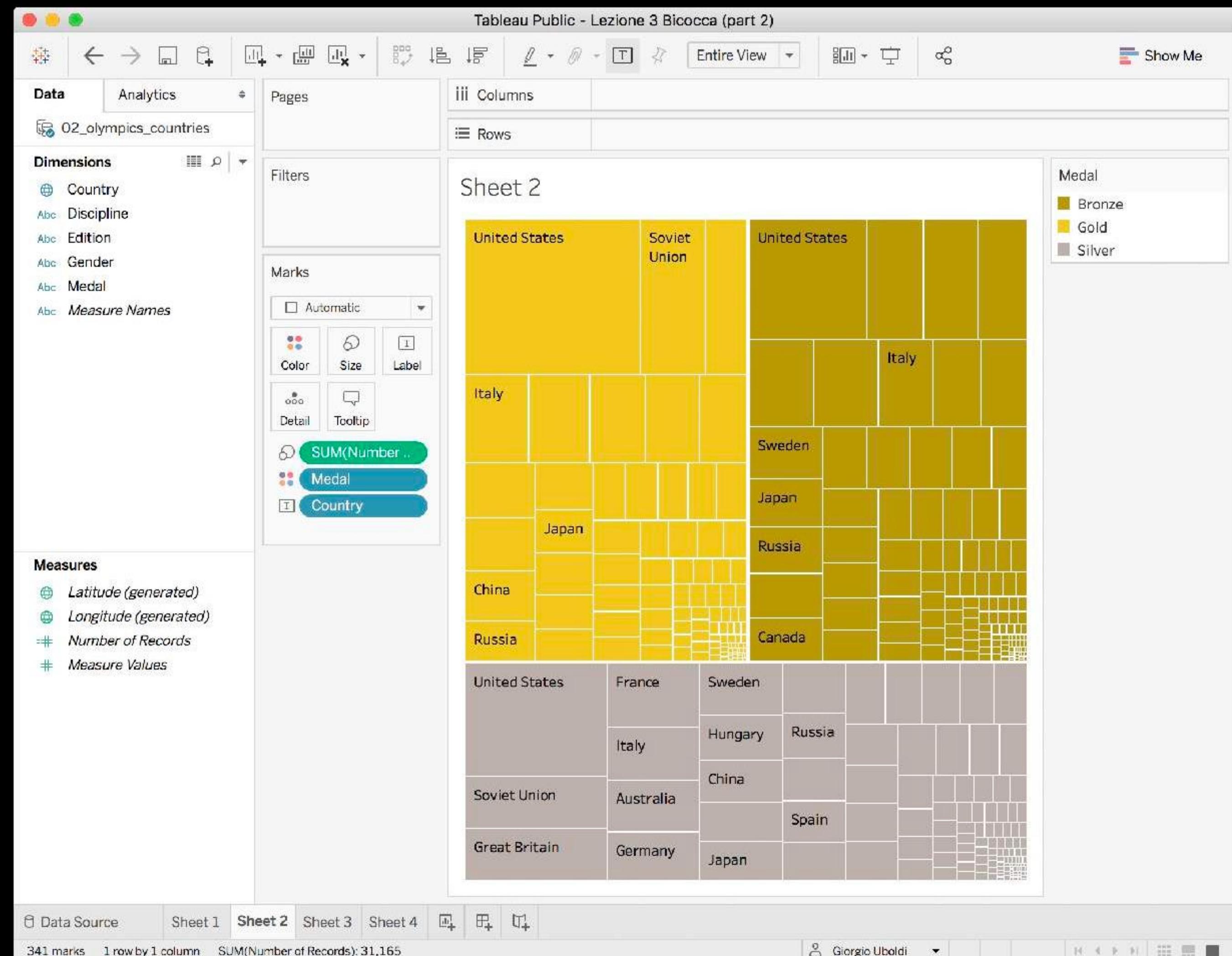
## EXERCISE

# Visualizing the Olympic games (part 1)



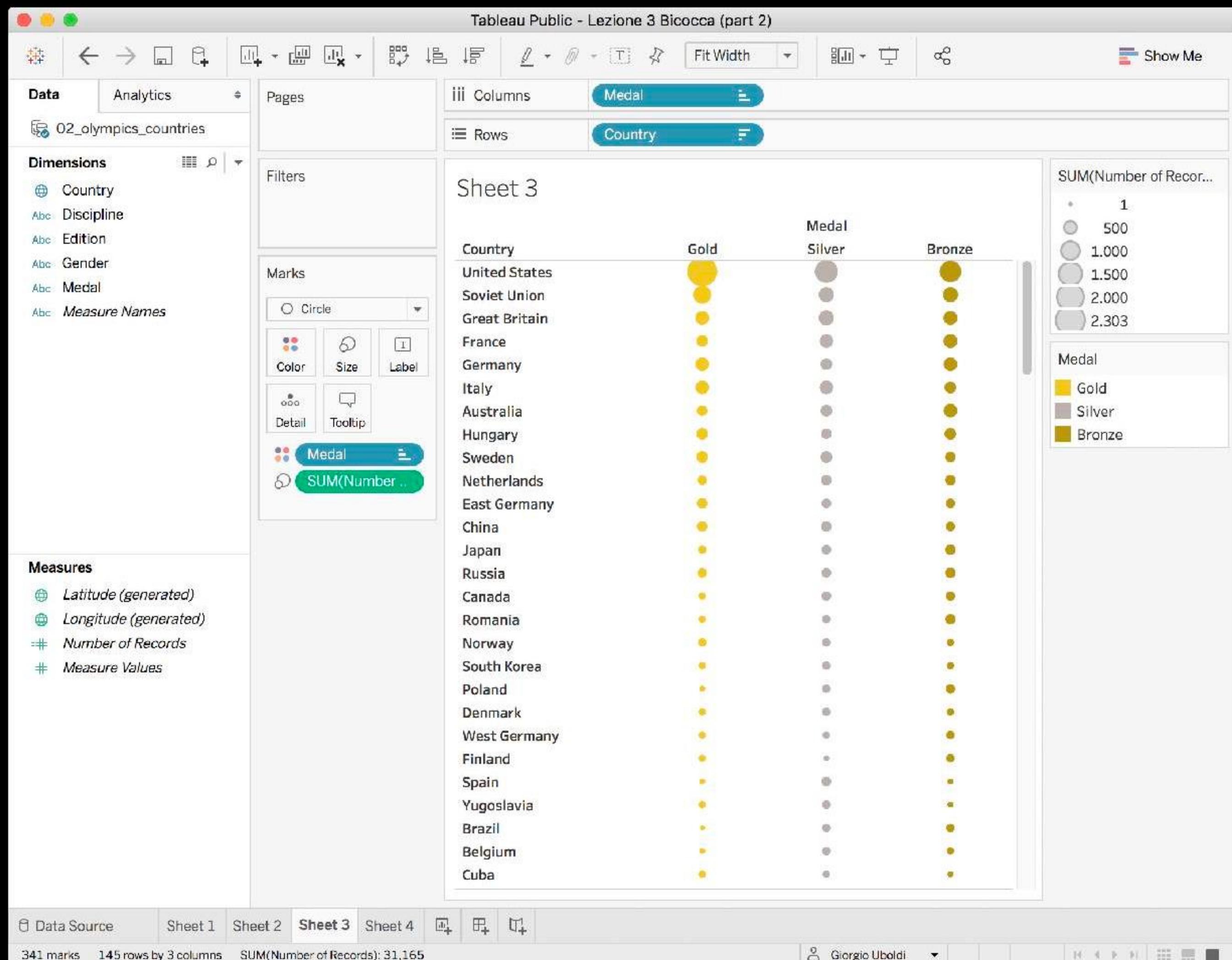
## EXERCISE

# Visualizing the Olympic games (part 1)



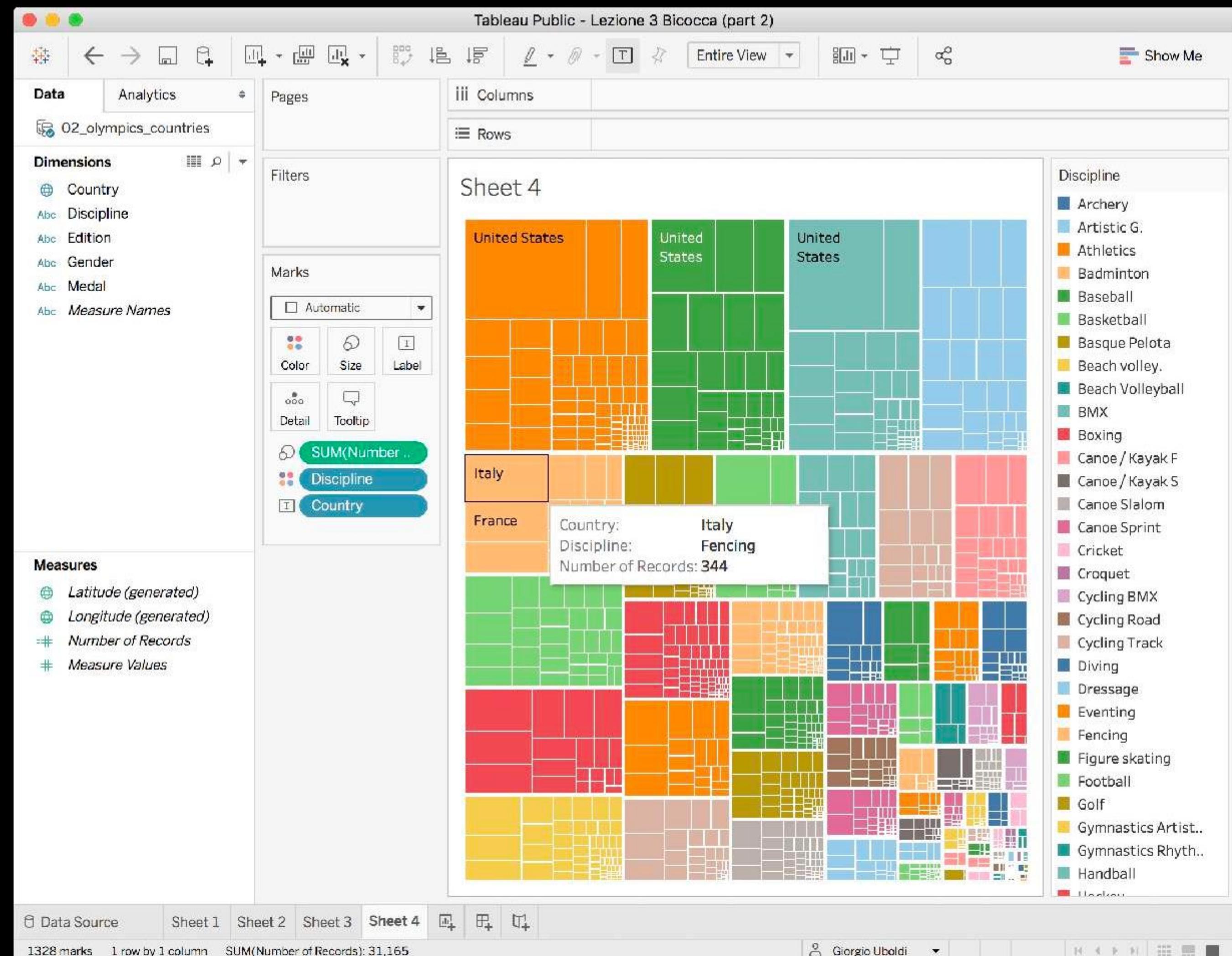
## EXERCISE

# Visualizing the Olympic games (part 1)



## EXERCISE

# Visualizing the Olympic games (part 1)



# VISUALIZING WORLD POPULATION

## Import the data

Select ‘Textfile’ on the left

Inside the data folder select  
03\_world\_population\_1960\_2016.csv

The screenshot shows the Tableau desktop application. On the left, a sidebar titled 'Connect' lists various file types: 'To a File' (Excel, Text file, JSON file, PDF file, Spatial file, Statistical file, More...), 'To a Server' (Tableau Server, Microsoft SQL Server, MySQL, Oracle, Amazon Redshift, More...), and 'Saved Data Sources' (Sample - Superstore, World Indicators). The 'Text file' option under 'To a File' is highlighted with a red box. In the center, the 'Open' section displays a thumbnail of a map titled 'Superstore' and a link to 'Open a Workbook'. On the right, the 'Discover' section includes links for 'Training', 'Getting Started', 'Connecting to Data', 'Visual Analytics', 'Understanding Tableau', and 'More training videos...'. Below these are sections for 'Sharing' (with a link to 'Learn more about ways to share') and 'Resources' (with links to 'Blog - 7 tips and tricks from the dashboard experts', 'Tableau Conference - Register Now', and 'Forums'). A large 'VIZ OF THE WEEK' graphic is visible at the bottom right.

- 01\_world\_population\_2016.csv
- 02\_olympics\_countries.csv
- 03\_world\_population\_1960\_2016.csv
- 04\_olympics\_total.csv

Sort fields Data source order ▾  Show aliases  Show hidden fields 1.000 → rows

New Union

 03_world_population_1960_2...	Abc Country	# Region	# Year	# Population
American Samoa		East Asia & Pacific	1960	20,013
Australia		East Asia & Pacific	1960	10,276,477
Brunei Darussalam		East Asia & Pacific	1960	81,745
Cambodia		East Asia & Pacific	1960	5,722,370
China		East Asia & Pacific	1960	667,070,000
Fiji		East Asia & Pacific	1960	393,386
French Polynesia		East Asia & Pacific	1960	78,076
Guam		East Asia & Pacific	1960	66,742
Hong Kong SAR, China		East Asia & Pacific	1960	3,075,605
Indonesia		East Asia & Pacific	1960	87,792,515
Japan		East Asia & Pacific	1960	92,500,572

Data Source Sheet 1   

This dataset is about the population of each country in the world from

- 01\_world\_population\_2016.csv
- 02\_olympics\_countries.csv
- 03\_world\_population\_1960\_2016.csv
- 04\_olympics\_total.csv

New Union

Country	Region	#	#
American Samoa	East Asia & Pacific		
Australia	East Asia & Pacific		
Brunei Darussalam	East Asia & Pacific		
Cambodia	East Asia & Pacific		
China	East Asia & Pacific		
Fiji	East Asia & Pacific	1960	393,386
French Polynesia	East Asia & Pacific	1960	78,076
Guam	East Asia & Pacific	1960	66,742
Hong Kong SAR, China	East Asia & Pacific	1960	3,075,605
Indonesia	East Asia & Pacific	1960	87,792,515
Japan	East Asia & Pacific	1960	92,500,572

Sort fields Data source order ▾

Show aliases Show hidden fields 1.000 → rows

Number (decimal)  
Number (whole)  
Date & Time  
✓ Date  
String  
Boolean  
Default

Data Source Sheet 1

Changed data type of “Year”

- 01\_world\_population\_2016.csv
- 02\_olympics\_countries.csv
- 03\_world\_population\_1960\_2016.csv
- 04\_olympics\_total.csv

Sort fields Data source order ▾

Show aliases  Show hidden fields 1.000 → rows

New Union

Country	Region	Year	Population
American Samoa	East Asia & Pacific	01/01/1960	20,013
Australia	East Asia & Pacific	01/01/1960	10,276,477
Brunei Darussalam	East Asia & Pacific	01/01/1960	81,745
Cambodia	East Asia & Pacific	01/01/1960	5,722,370
China	East Asia & Pacific	01/01/1960	667,070,000
Fiji	East Asia & Pacific	01/01/1960	393,386
French Polynesia	East Asia & Pacific	01/01/1960	78,076
Guam	East Asia & Pacific	01/01/1960	66,742
Hong Kong SAR, China	East Asia & Pacific	01/01/1960	3,075,605
Indonesia	East Asia & Pacific	01/01/1960	87,792,515
Japan	East Asia & Pacific	01/01/1960	92,500,572

Data Source Sheet 1   

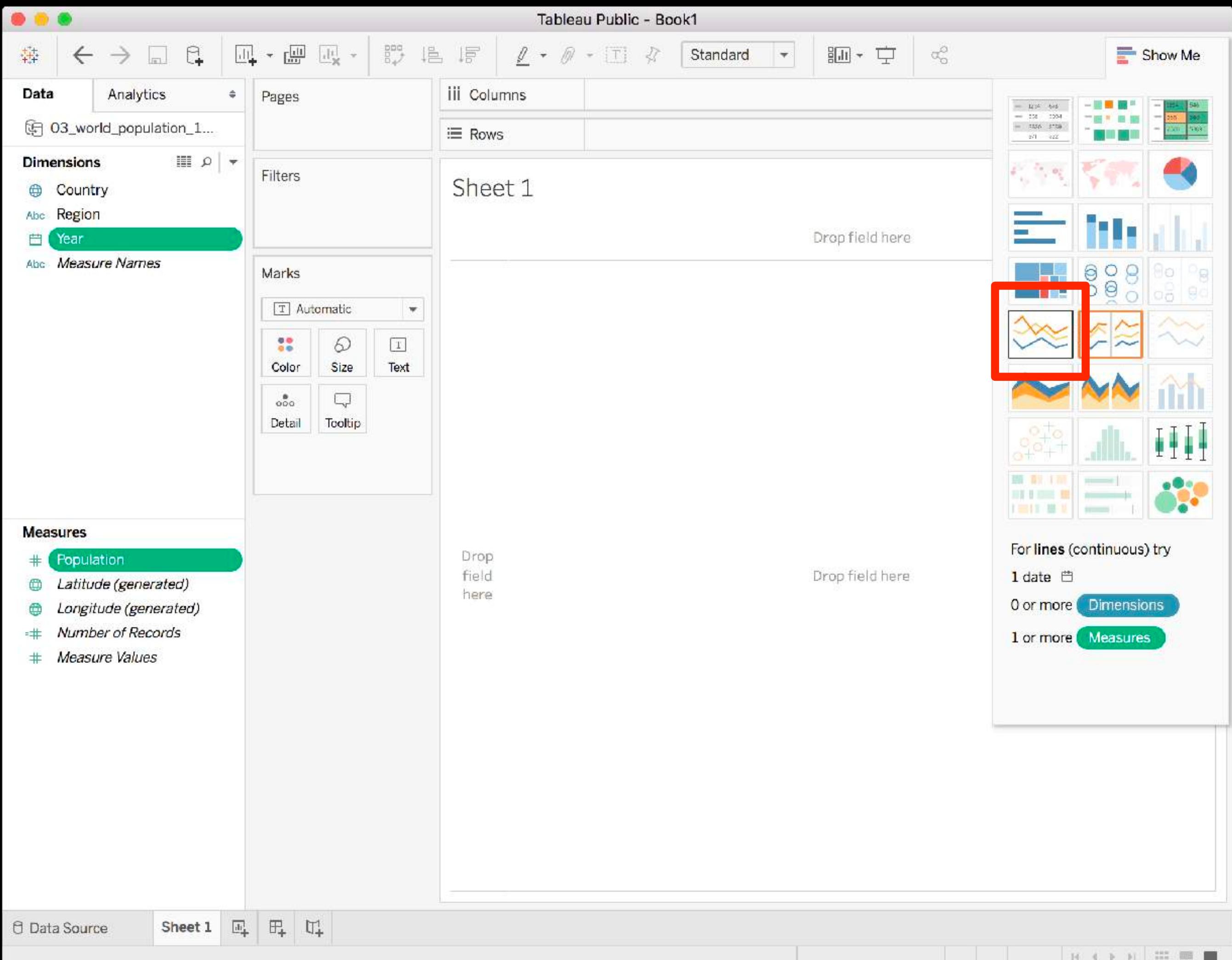
Changed data type of “Year”

## VISUALIZING WORLD POPULATION

Let's explore how the world population changed overtime

Select "Country", "Population and 'Year'.

In "Show me" select the line chart

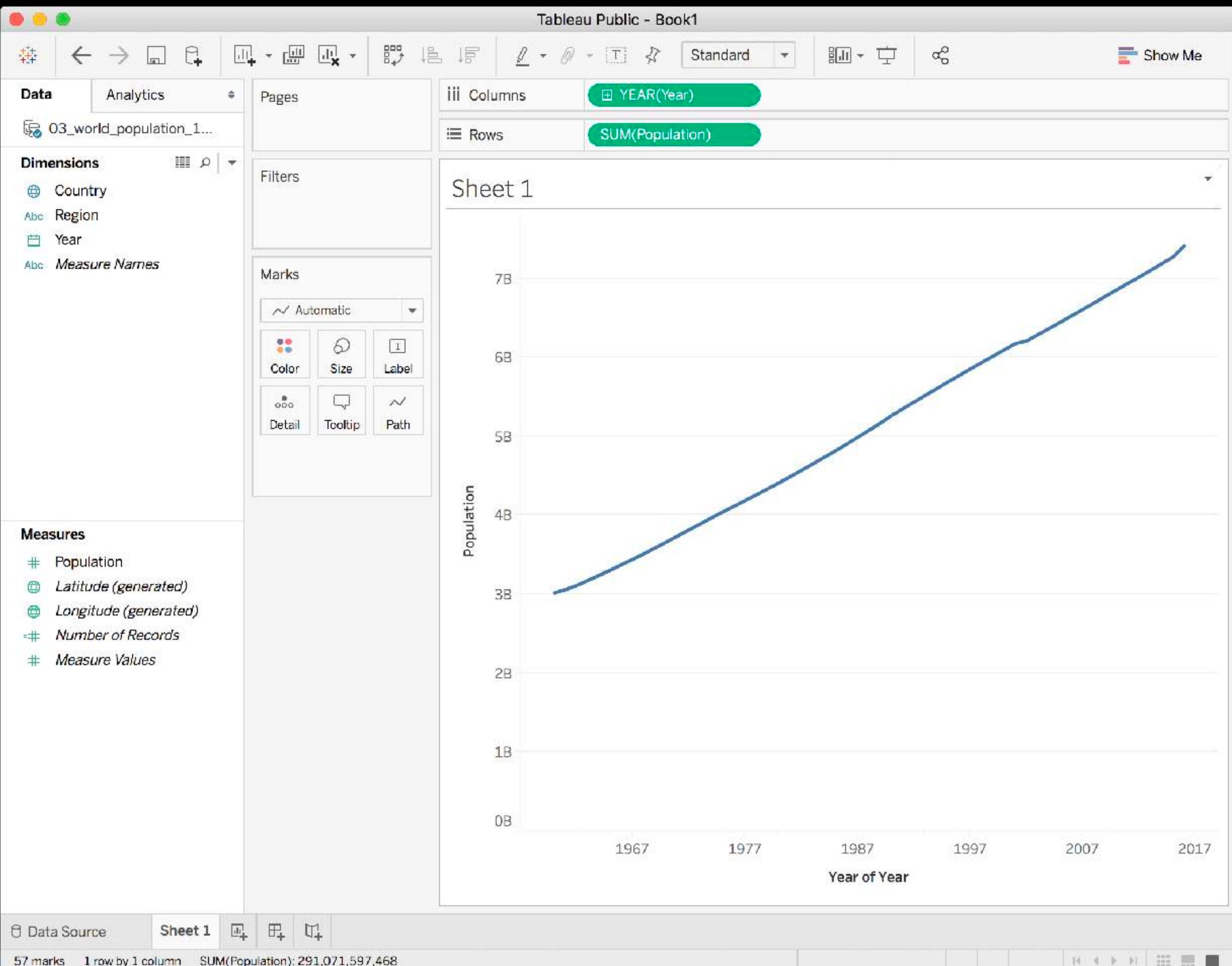


## VISUALIZING WORLDPOPULATION

Let's explore how the world population changed overtime

Select "Country", "Population and 'Year'.

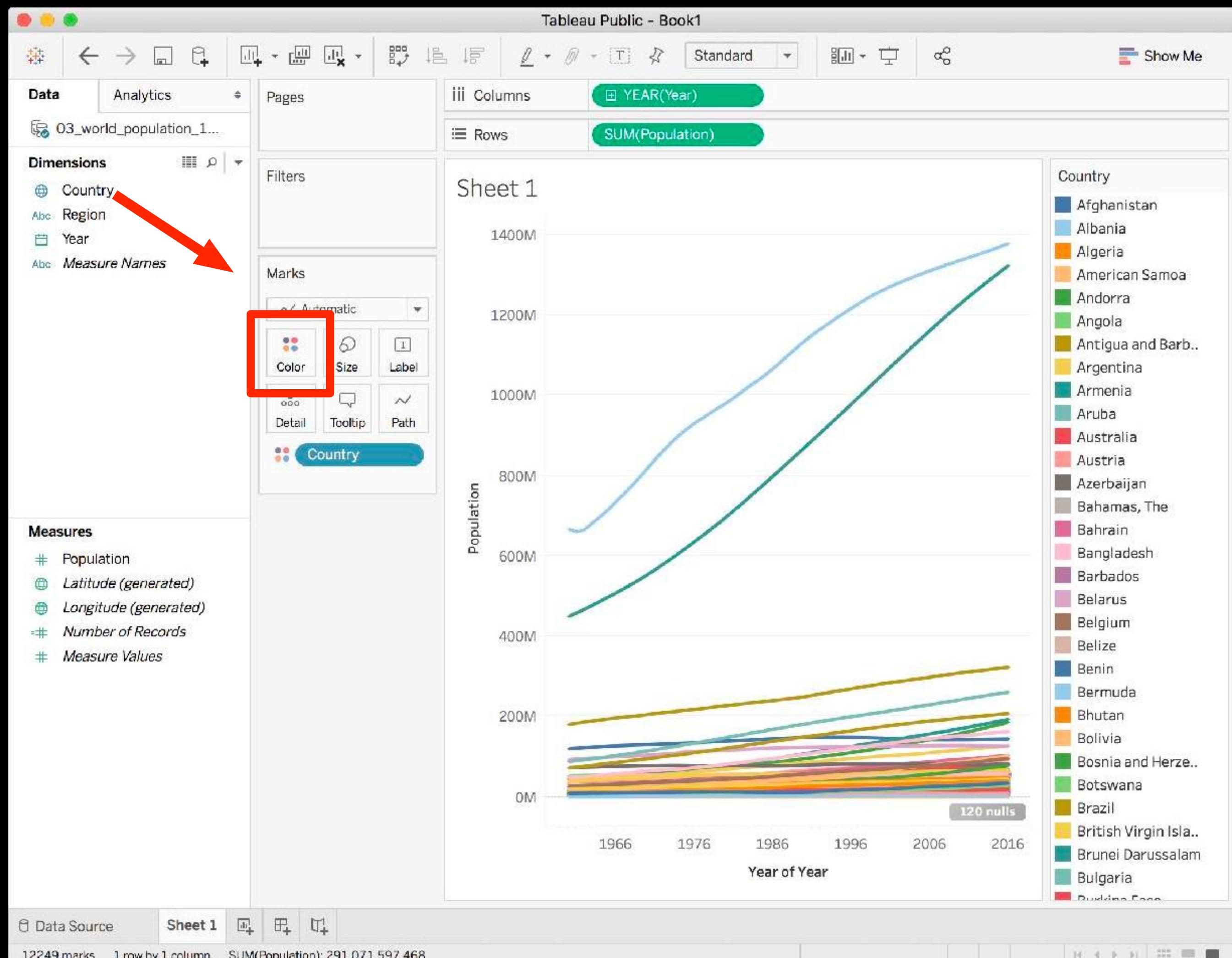
In "Show me" select the line chart



# VISUALIZING WORLD POPULATION

A line for each country

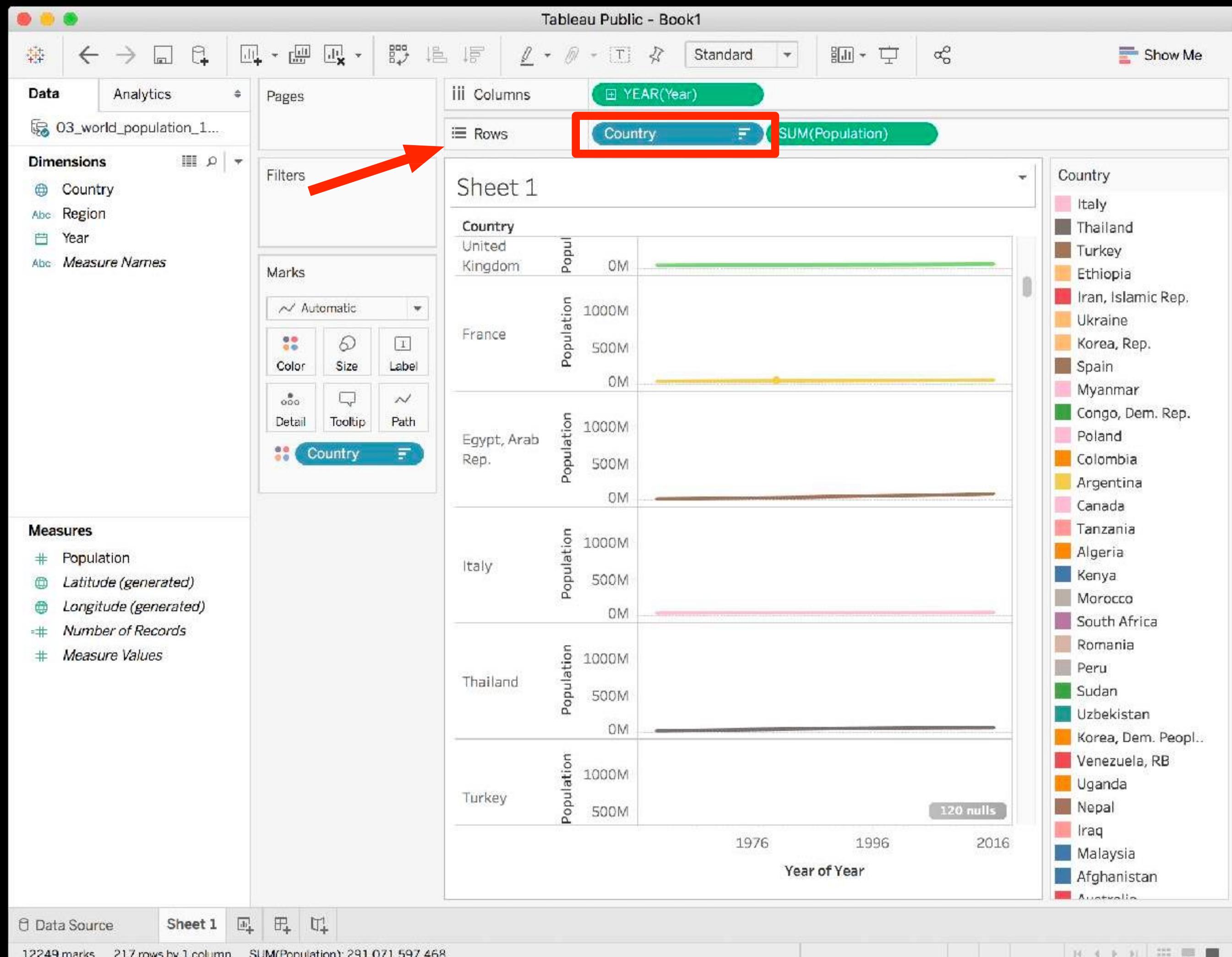
Drag “country” on “color” to add a line for each country.



# VISUALIZING WORLD POPULATION

A row for each country

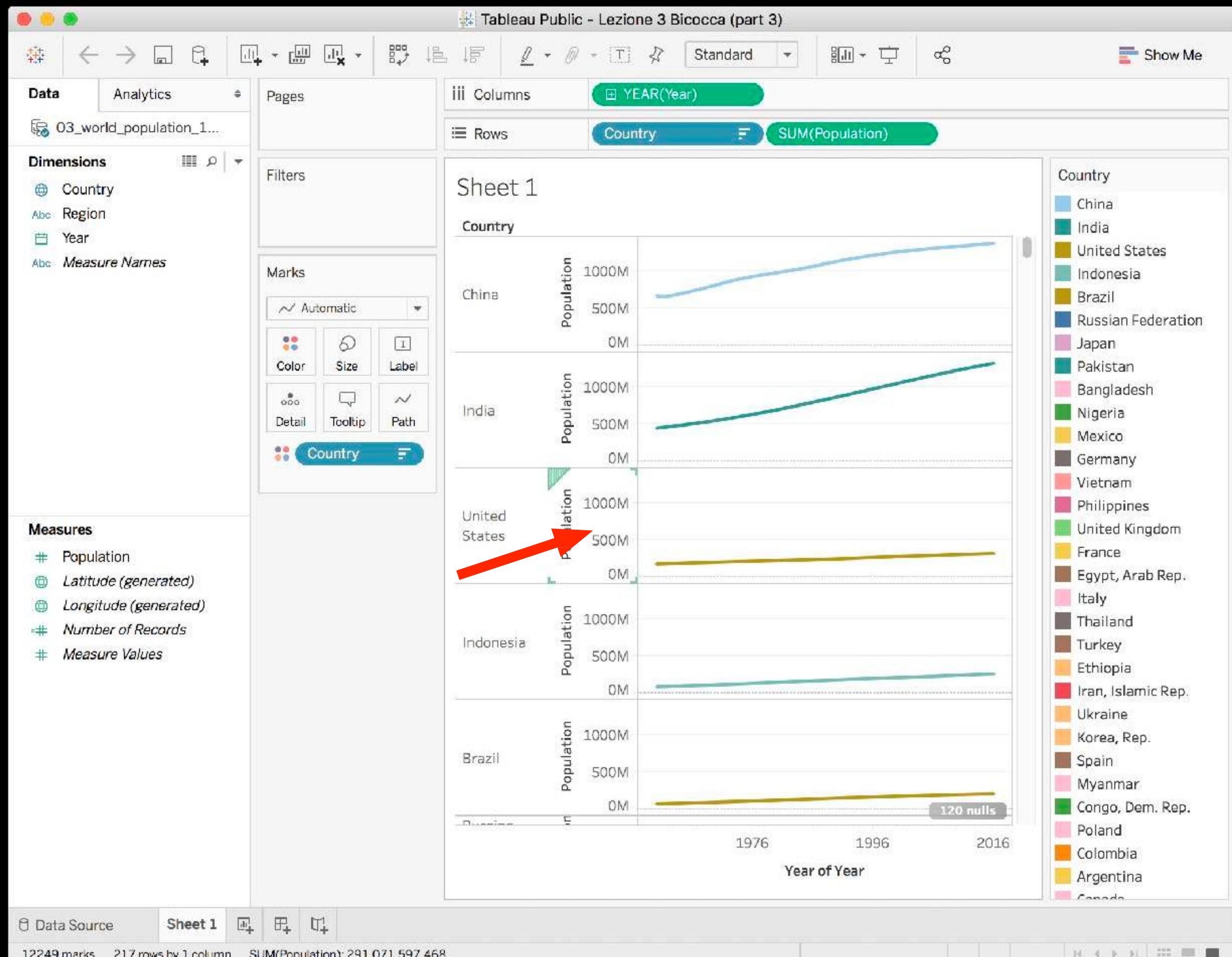
Drag "country" on "columns".



# VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

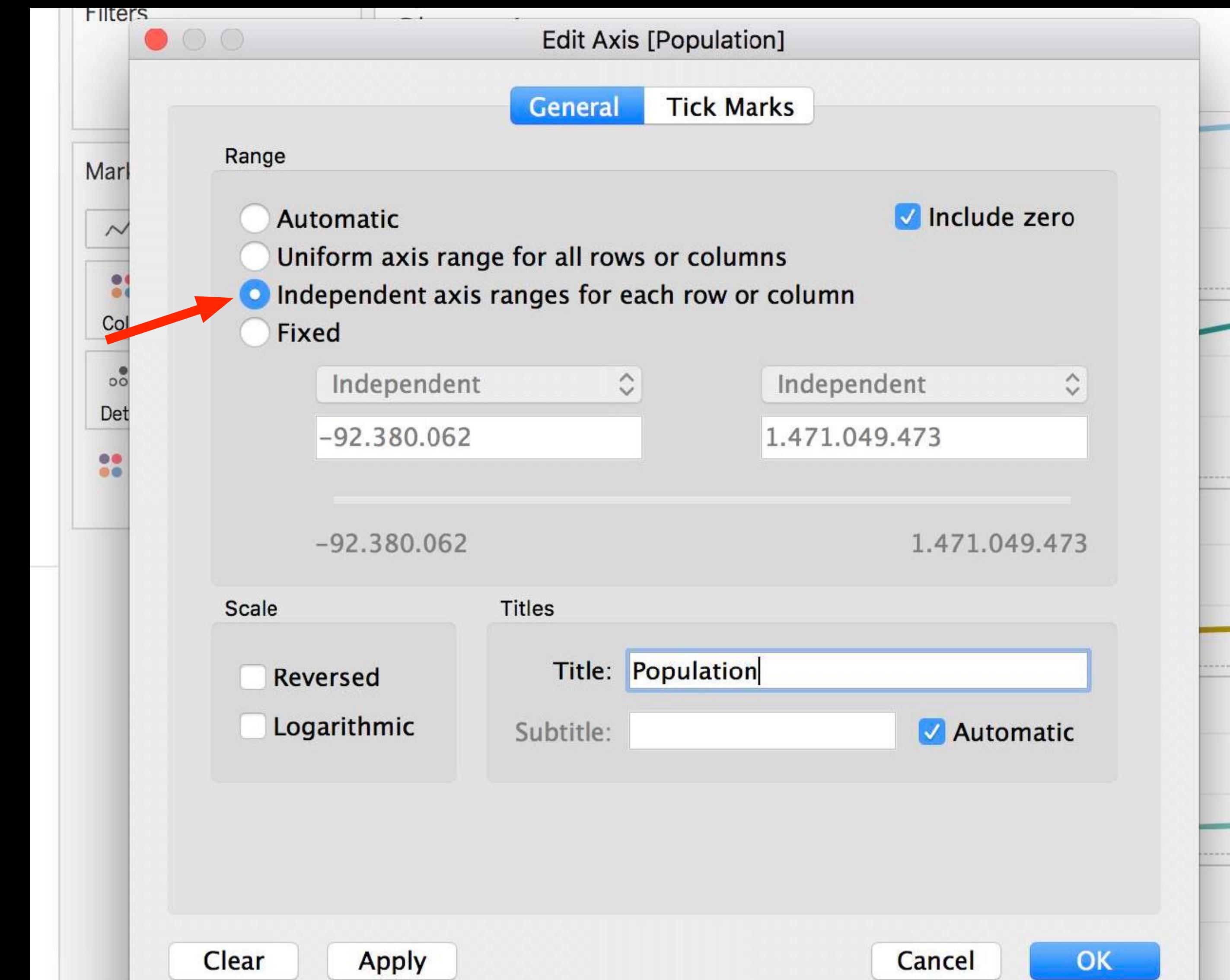
Double click on the “Population” axis.



## VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

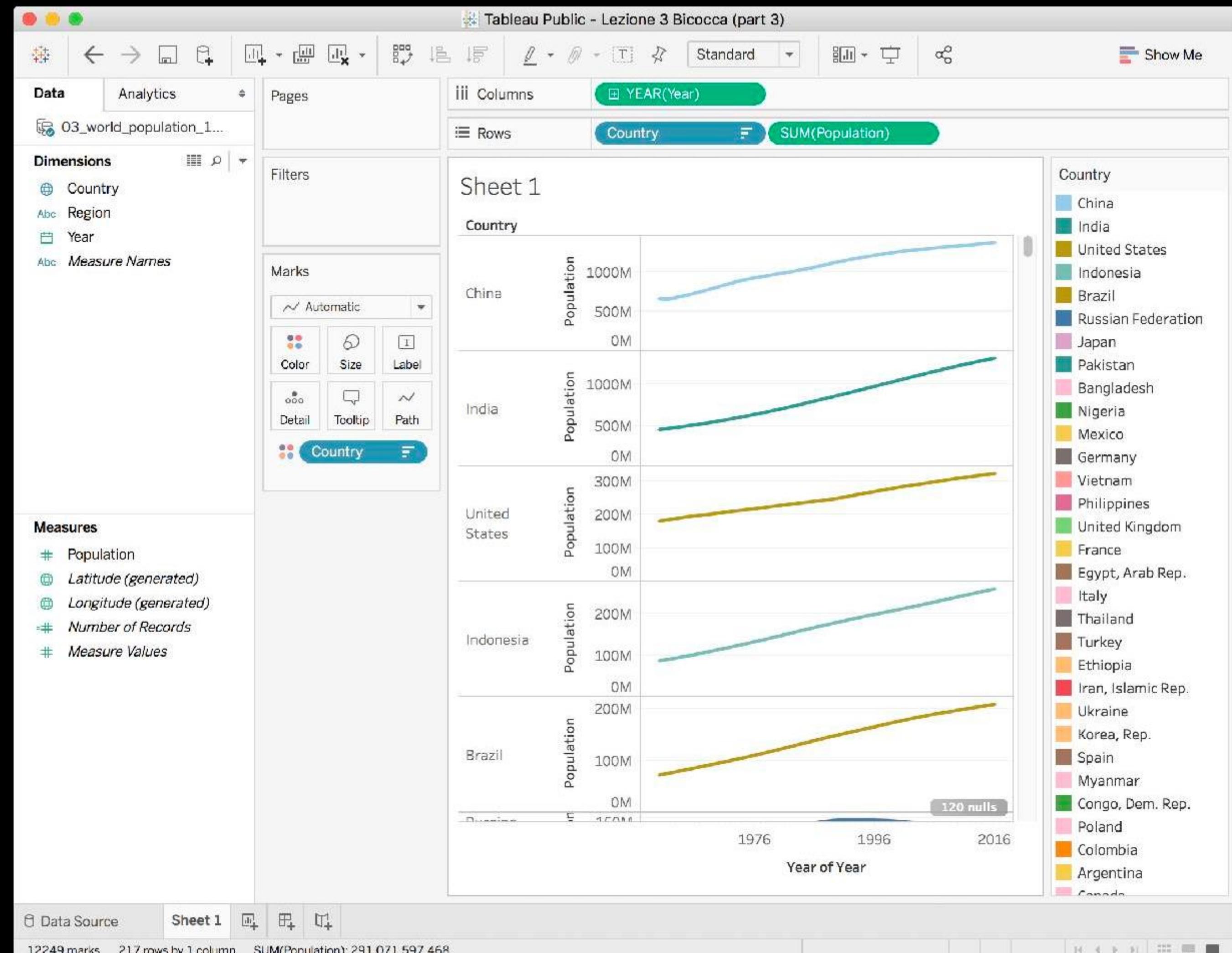
Select “Independent axis” in order to normalize the values of each country.



# VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

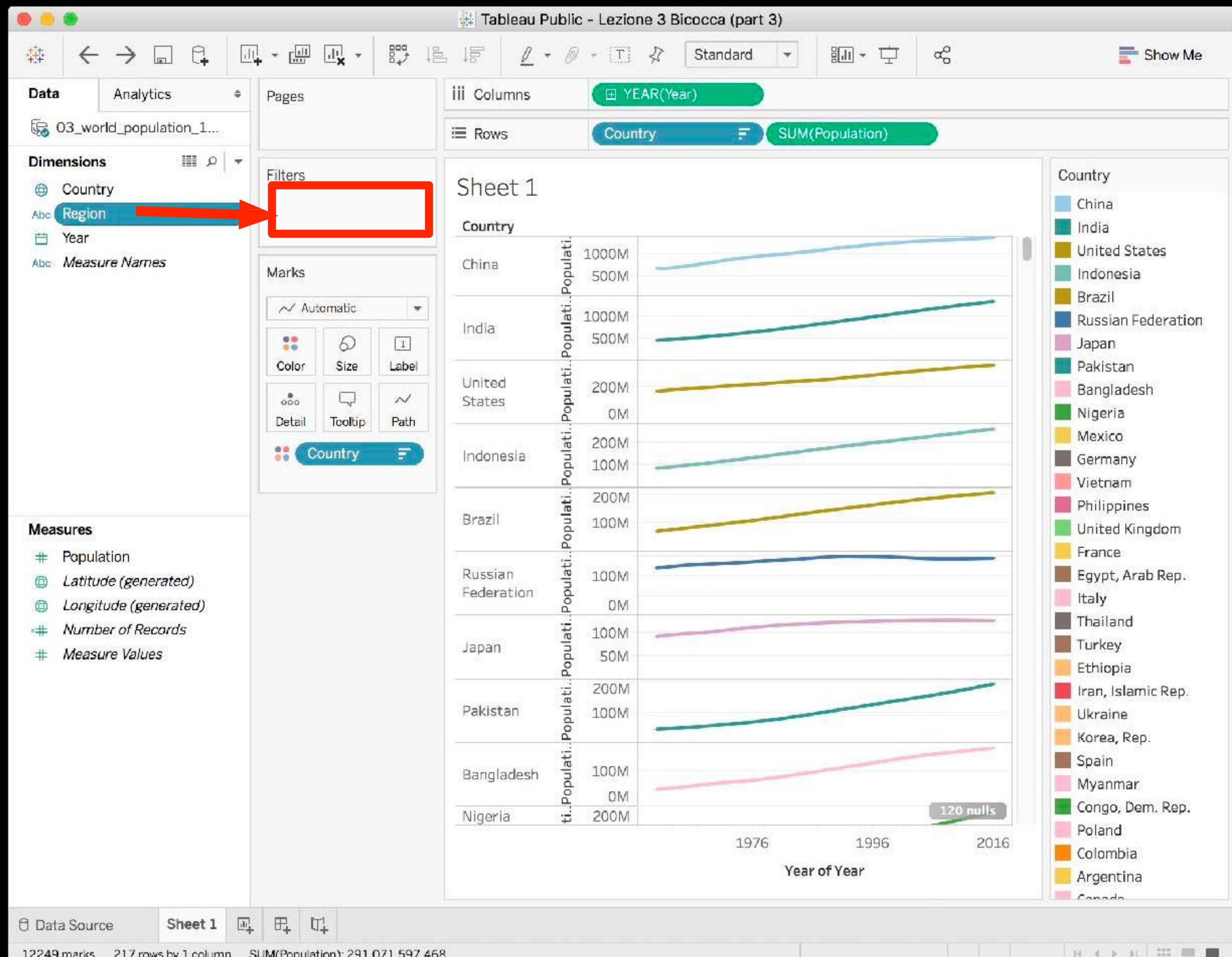
The population axis now is scaled according to the minimum and maximum value of each country.



# VISUALIZING WORLD POPULATION

Apply filters to see only european countries

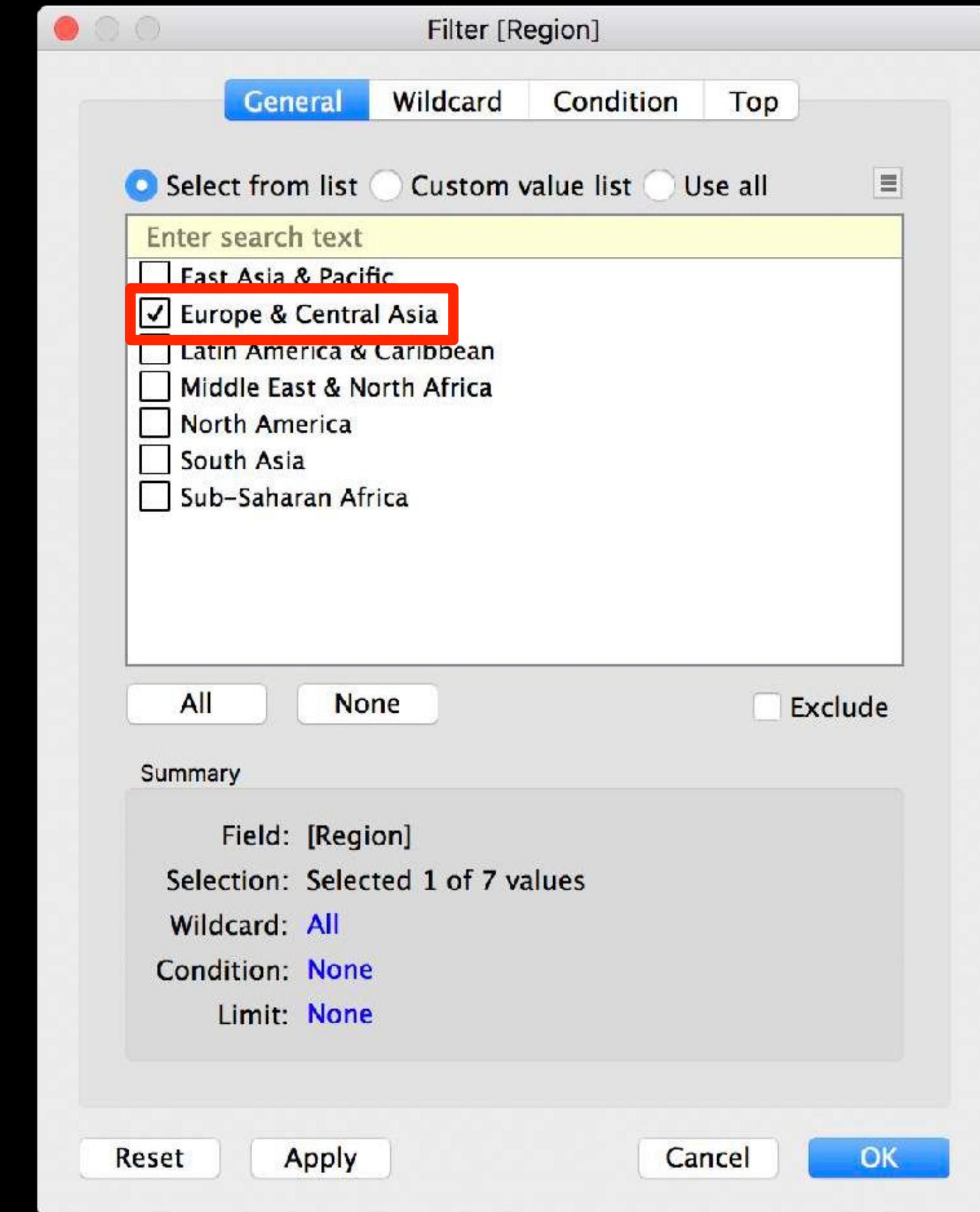
Drag "region" inside "Filters"



## VISUALIZING WORLD POPULATION

Apply filters to see only  
european countries

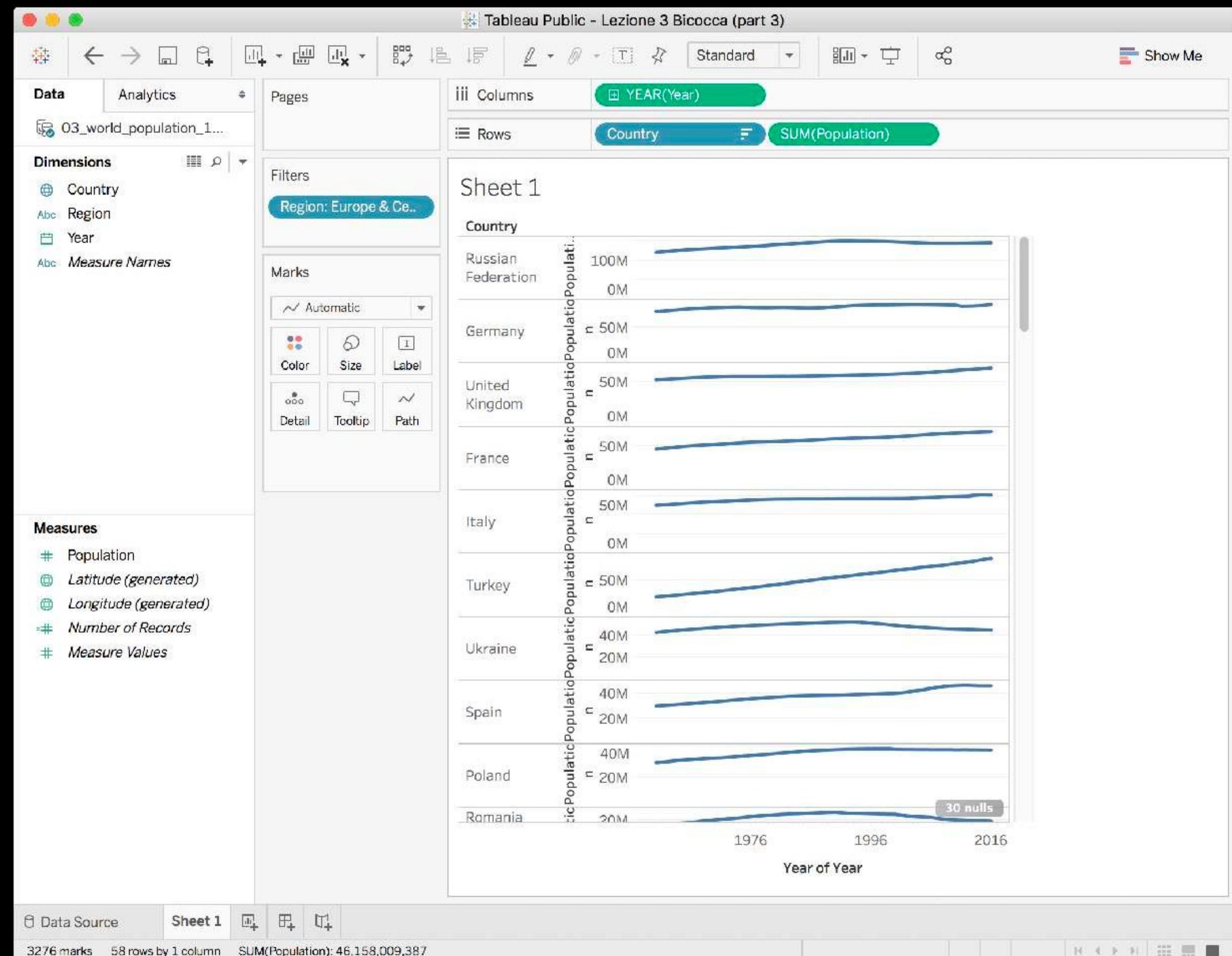
Select only “Europe & Central Asia” from the list



# VISUALIZING WORLD POPULATION

Apply filters to see only european countries

Remove "country" from color.

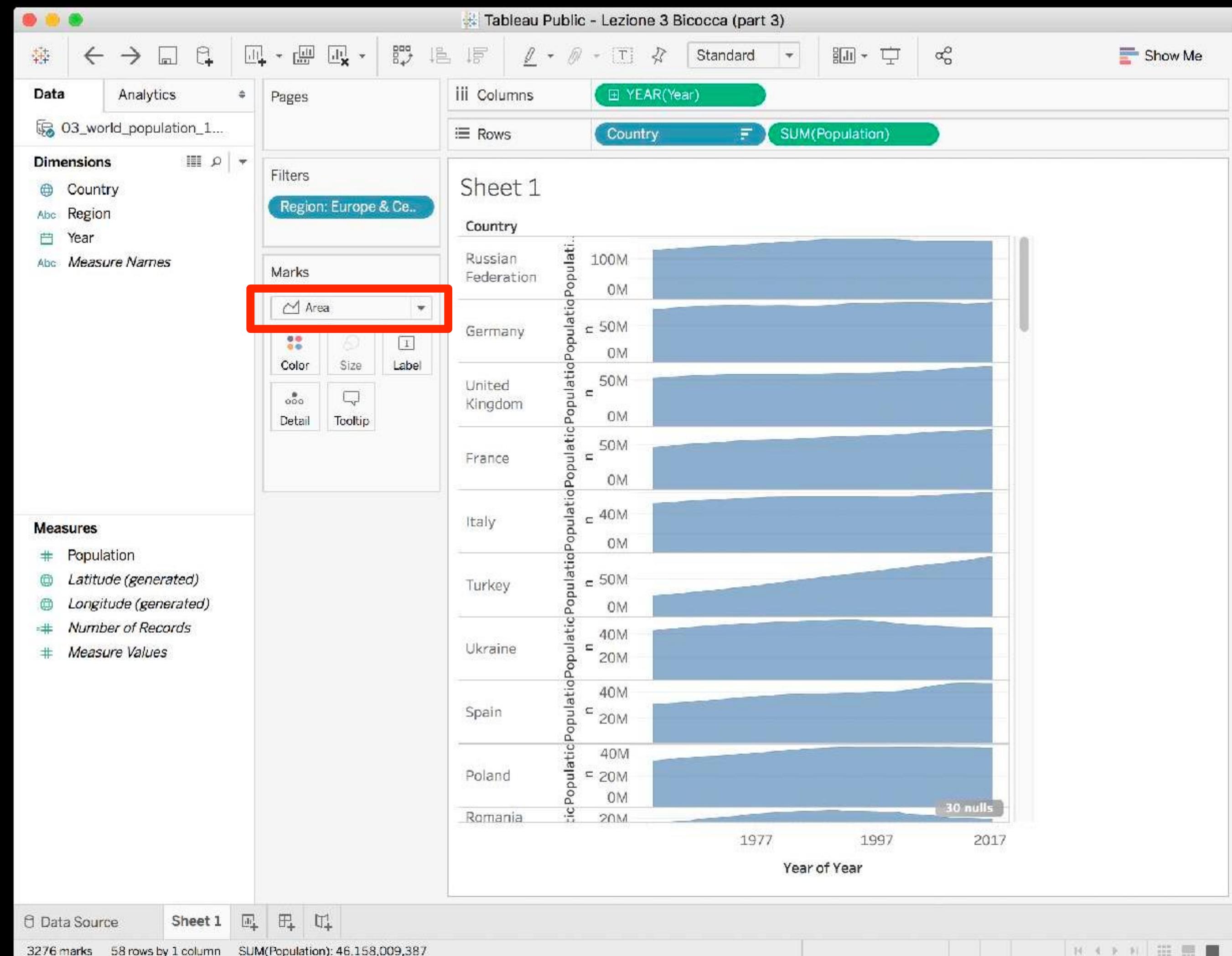


## VISUALIZING WORLD POPULATION

Apply filters to see only european countries

Select “area” as visual mark.

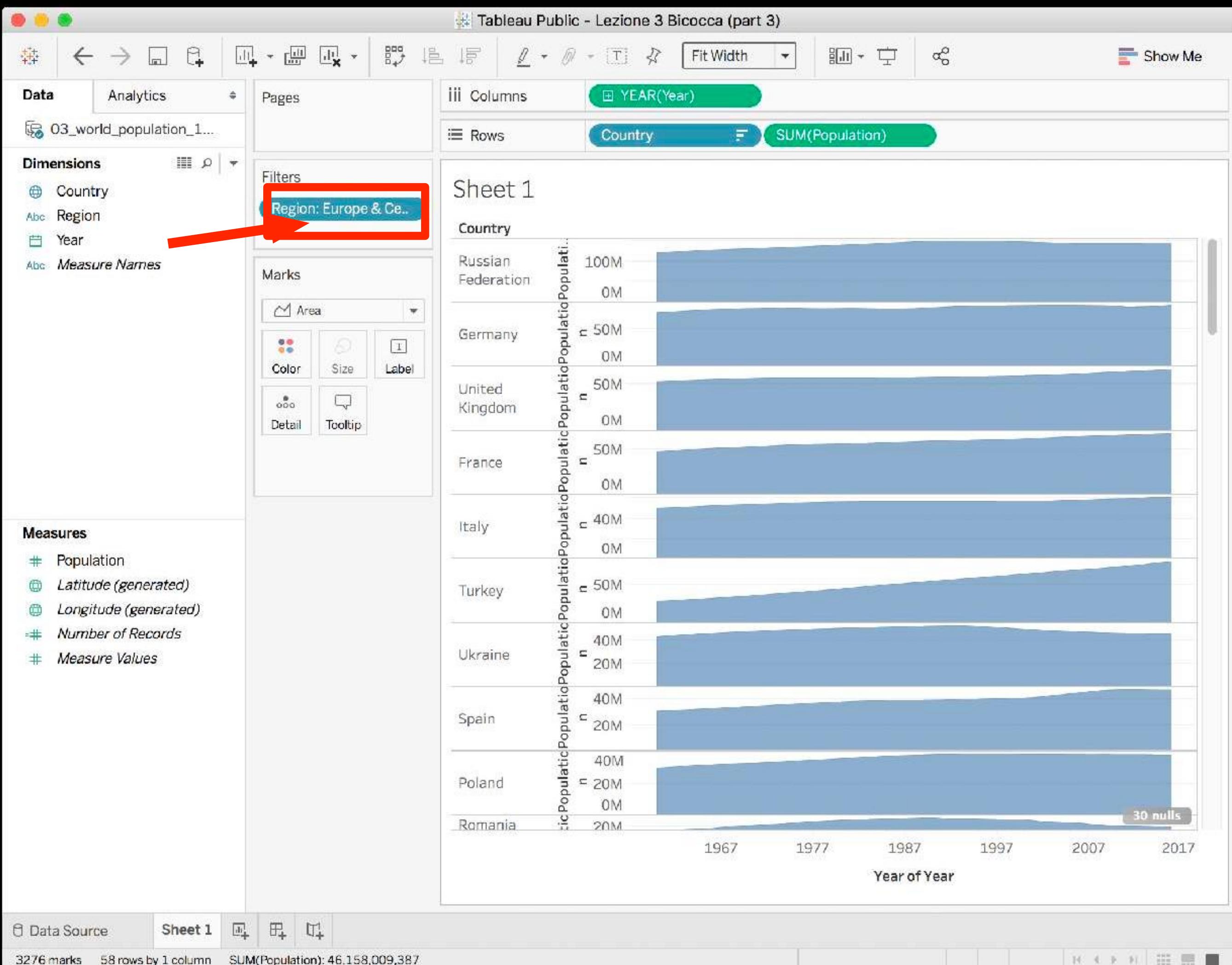
Explore the visualization.  
Do we see trends? Anomalies?  
What are the possible causes of certain anomalies?



## VISUALIZING WORLD POPULATION

Apply filters to see only  
the last 30 years

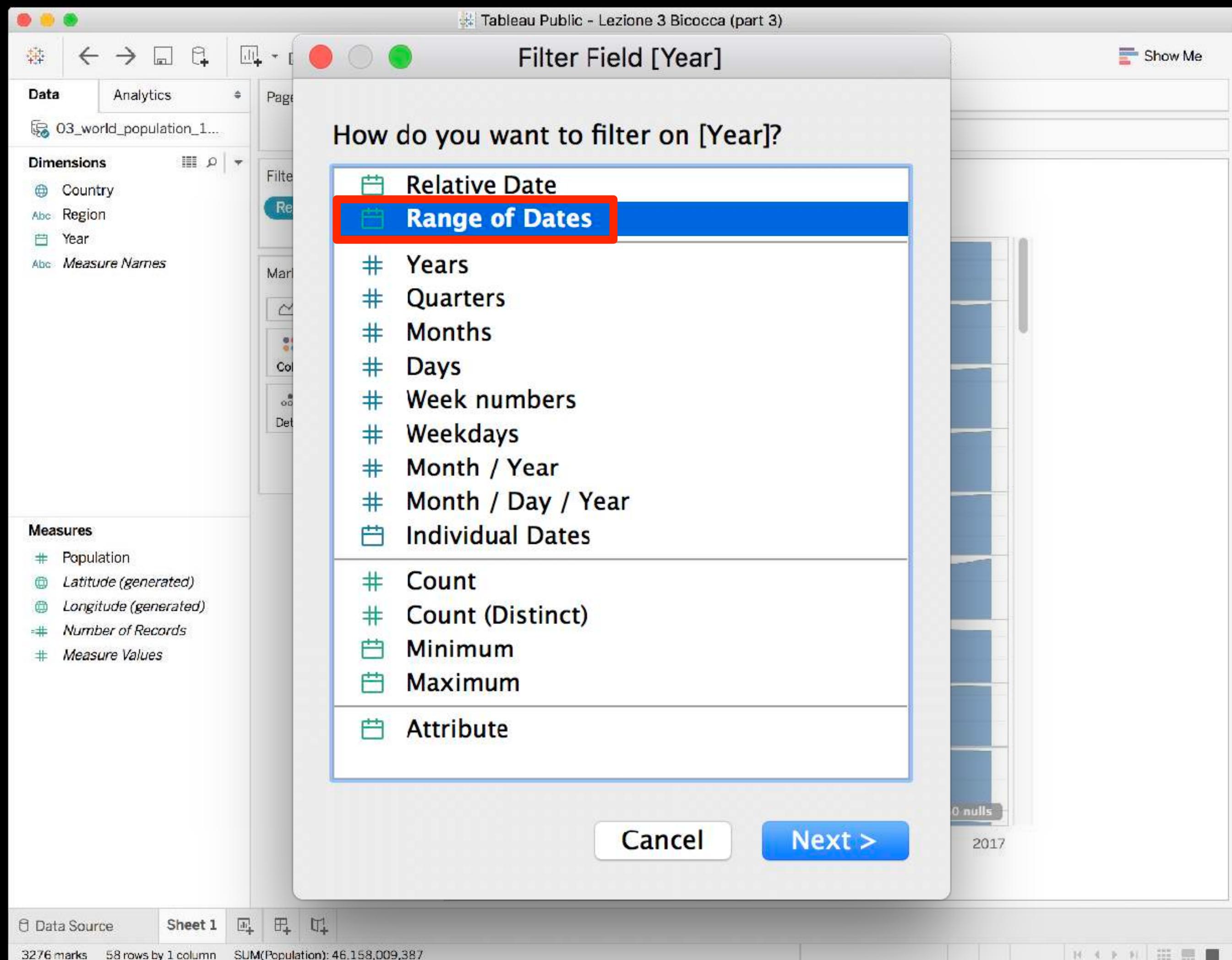
Drag "year" inside "Filters"



## VISUALIZING WORLD POPULATION

Apply filters to see only the last 30 years

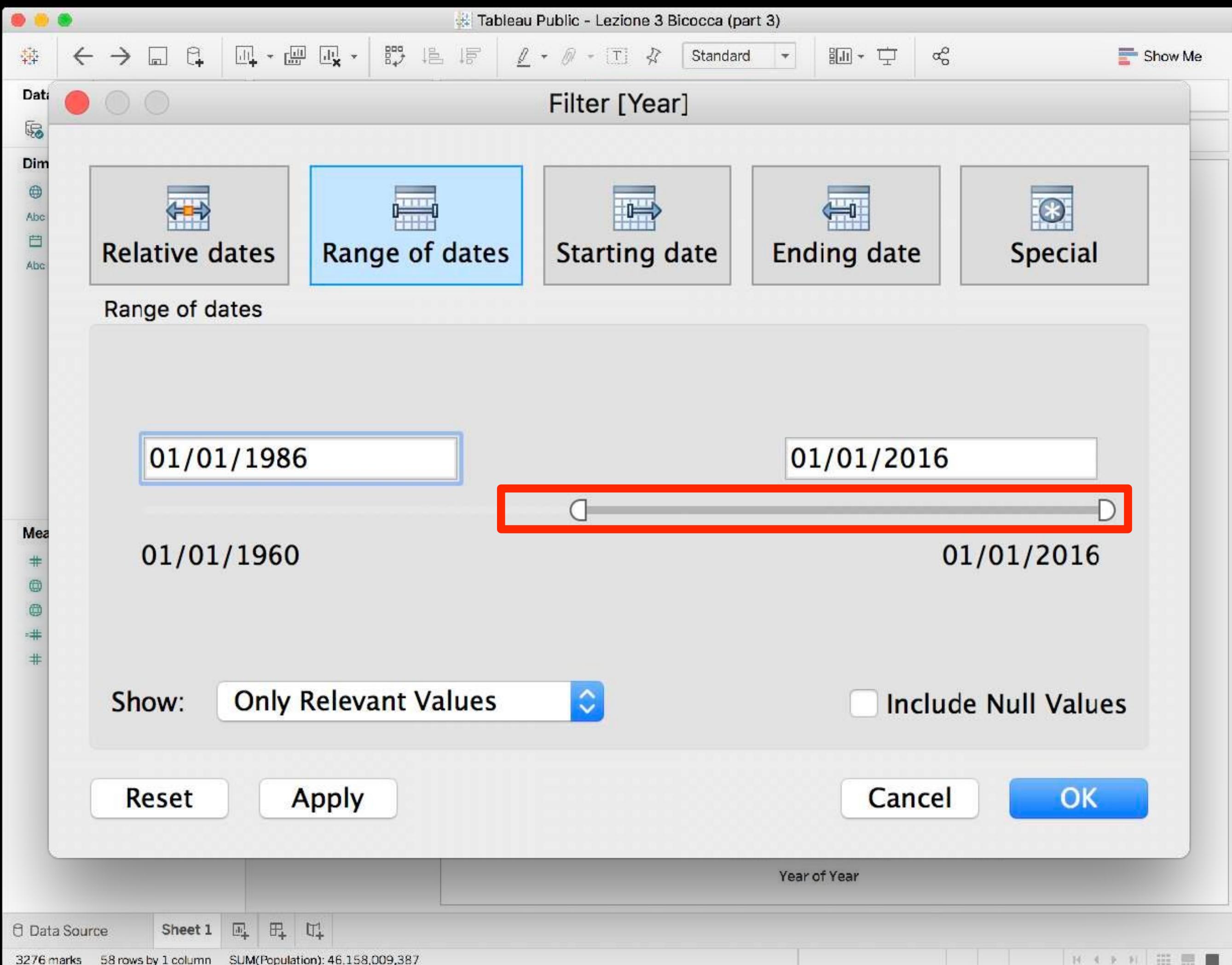
Drag “year” inside “Filters” and select “Range of Dates”.



## VISUALIZING WORLDPOPULATION

Apply filters to see only  
the last 30 years

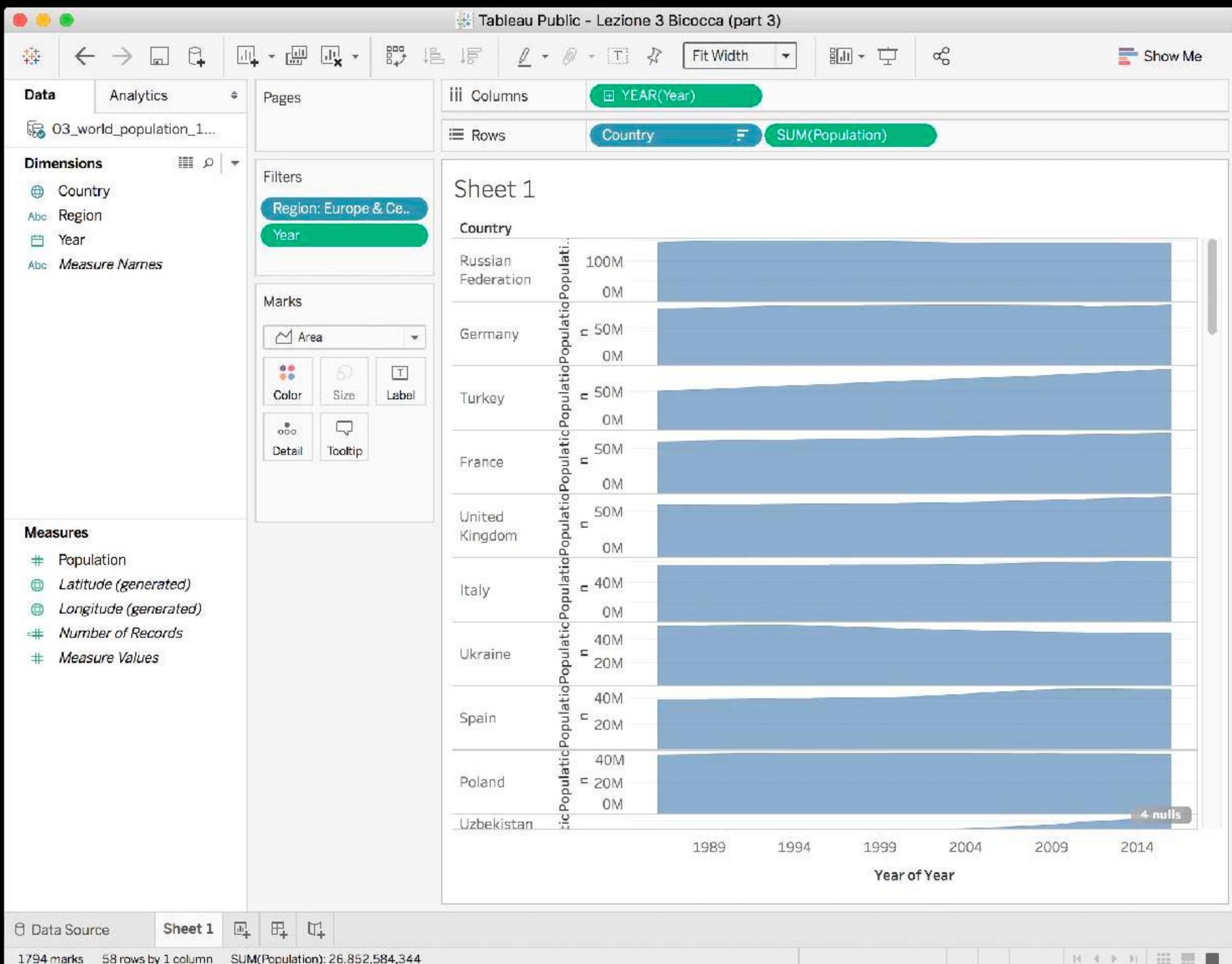
Select the range between 1986  
and 2016



## VISUALIZING WORLD POPULATION

Apply filters to see only  
the last 30 years

Save the file.



## EXERCISE

# Visualizing the Olympic games (part 2)

Create a new tableau file and upload  
**04\_olympics\_total.csv**

#	04_olympic...	04_olympics t...	Abc 04_olympics_tot...	Abc 04_olympics total.csv	Abc 04_olympics total.csv	04_olympics.total.c...	04_olympics.total.c...	Abc 04_olympics.total....	Abc 04_olympics.total.csv	Abc 04_olympics.tot...
Year	City	Sport	Discipline	Athlete	Country	Country 1	Gender	Event	Medal	
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	100M Freestyle	Gold	
1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Austria	Men	100M Freestyle	Silver	
1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Greece	Men	100M Freestyle For S...	Bronze	
1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Greece	Men	100M Freestyle For S...	Gold	
1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Greece	Men	100M Freestyle For S...	Silver	
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	1200M Freestyle	Bronze	
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	1200M Freestyle	Gold	
1896	Athens	Aquatics	Swimming	ANDREOU, Joannis	GRE	Greece	Men	1200M Freestyle	Silver	
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	400M Freestyle	Bronze	
1896	Athens	Aquatics	Swimming	NEUMANN, Paul	AUT	Austria	Men	400M Freestyle	Gold	
1896	Athens	Aquatics	Swimming	PEPANOS, Antonios	GRE	Greece	Men	400M Freestyle	Silver	

## EXERCISE

# Visualizing the Olympic games (part 2)

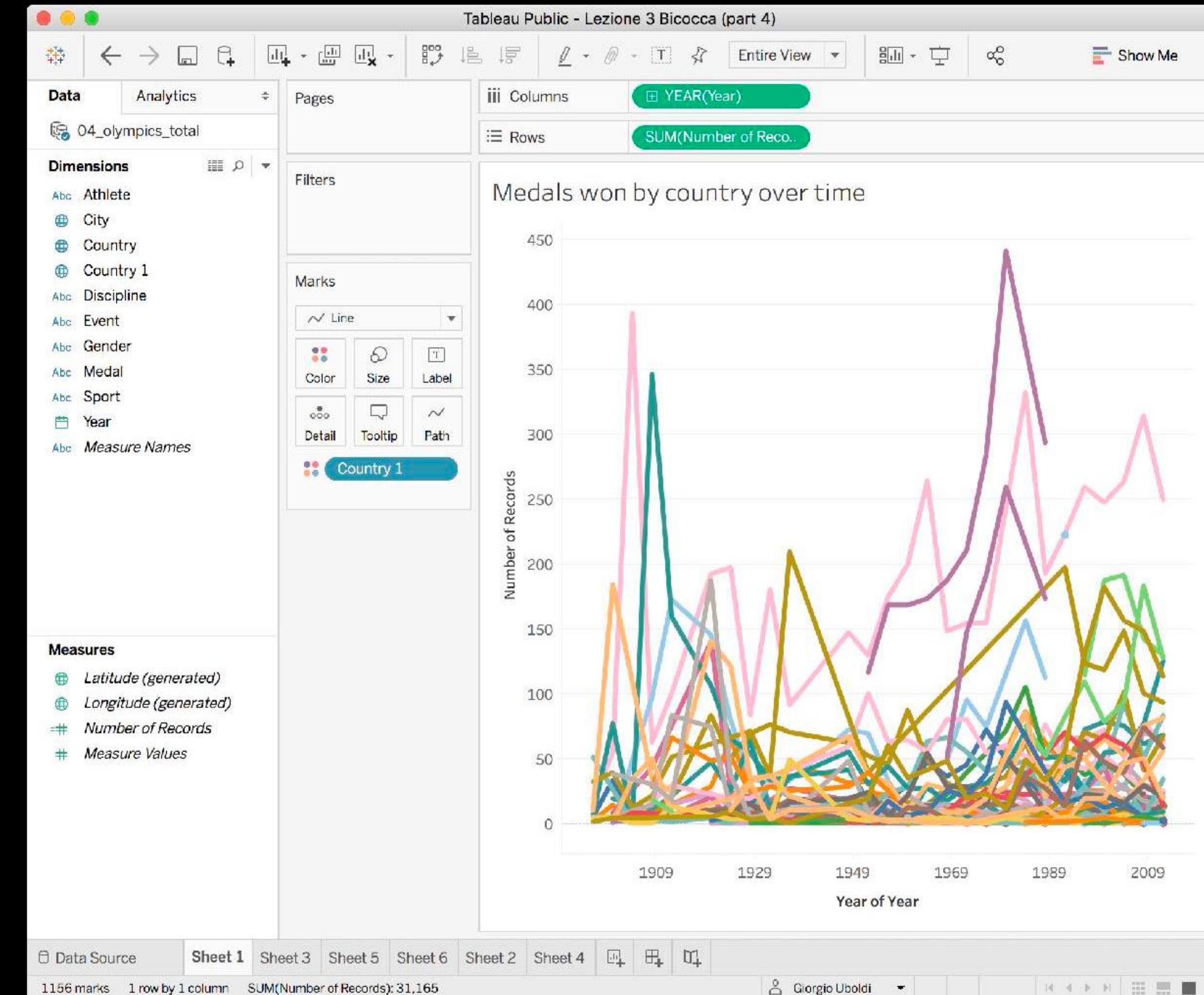
**How is the evolution of countries overtime? Which athlete has won the most medals? In which discipline? In which year? Who's the italian athlete who won the most gold medals?...**

#	04_olympic...	04_olympics.t...	Abc 04_olympics_tot...	Abc 04_olympics_total.csv	Abc 04_olympics_total.csv	04_olympics.total.c...	04_olympics.total.csv	Abc 04_olympics_total...	Abc 04_olympics_total.csv	Abc 04_olympics_tot...
Year	City	Sport	Discipline	Athlete	Country	Country 1	Gender	Event	Medal	
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	100M Freestyle	Gold	
1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Austria	Men	100M Freestyle	Silver	
1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Greece	Men	100M Freestyle For S...	Bronze	
1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Greece	Men	100M Freestyle For S...	Gold	
1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Greece	Men	100M Freestyle For S...	Silver	
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	1200M Freestyle	Bronze	
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	1200M Freestyle	Gold	
1896	Athens	Aquatics	Swimming	ANDREOU, Joannis	GRE	Greece	Men	1200M Freestyle	Silver	
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	400M Freestyle	Bronze	
1896	Athens	Aquatics	Swimming	NEUMANN, Paul	AUT	Austria	Men	400M Freestyle	Gold	

\*remember that “number of records” represents the number of rows in the data source.

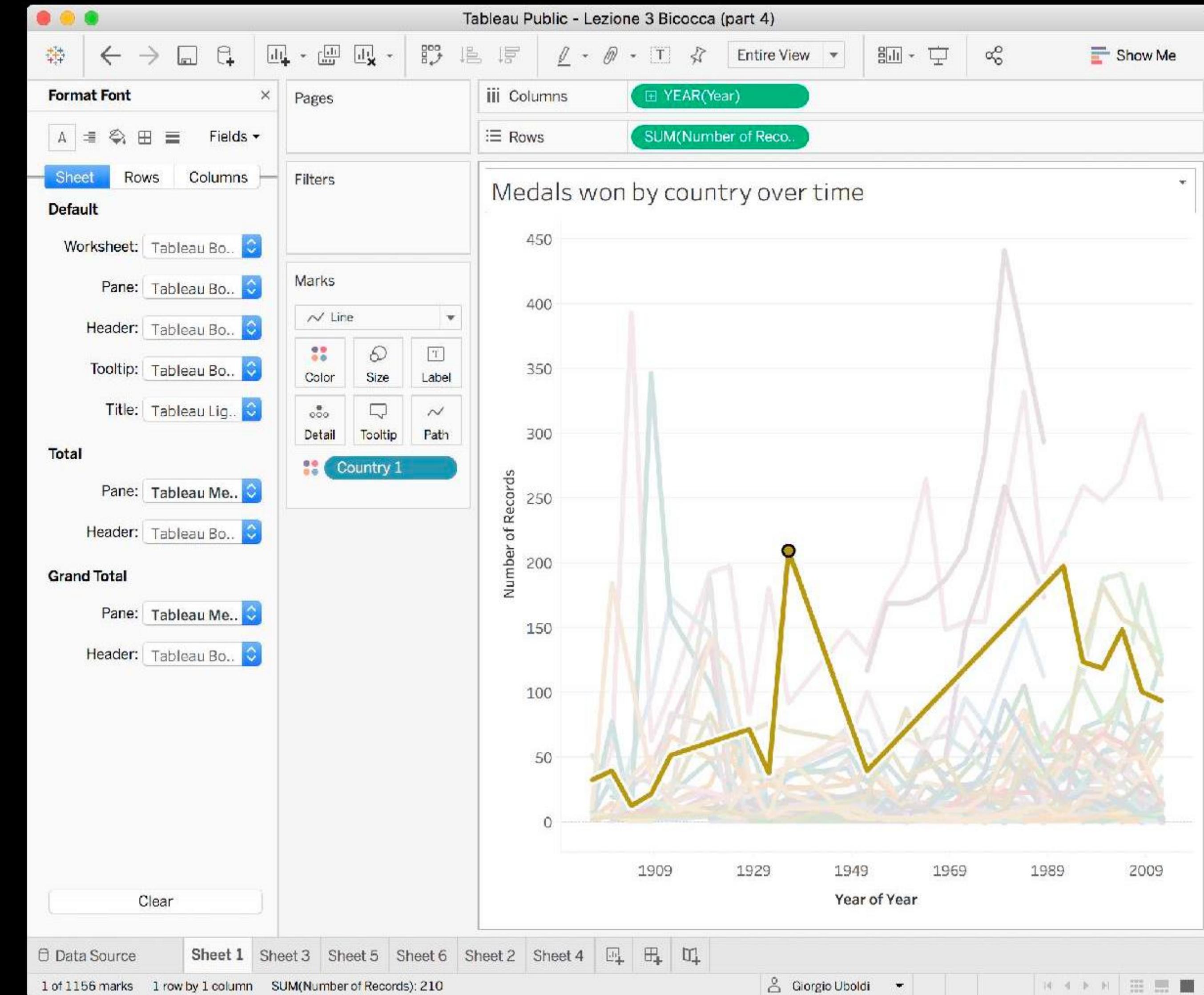
## EXERCISE

# Visualizing the Olympic games (part 2)



## EXERCISE

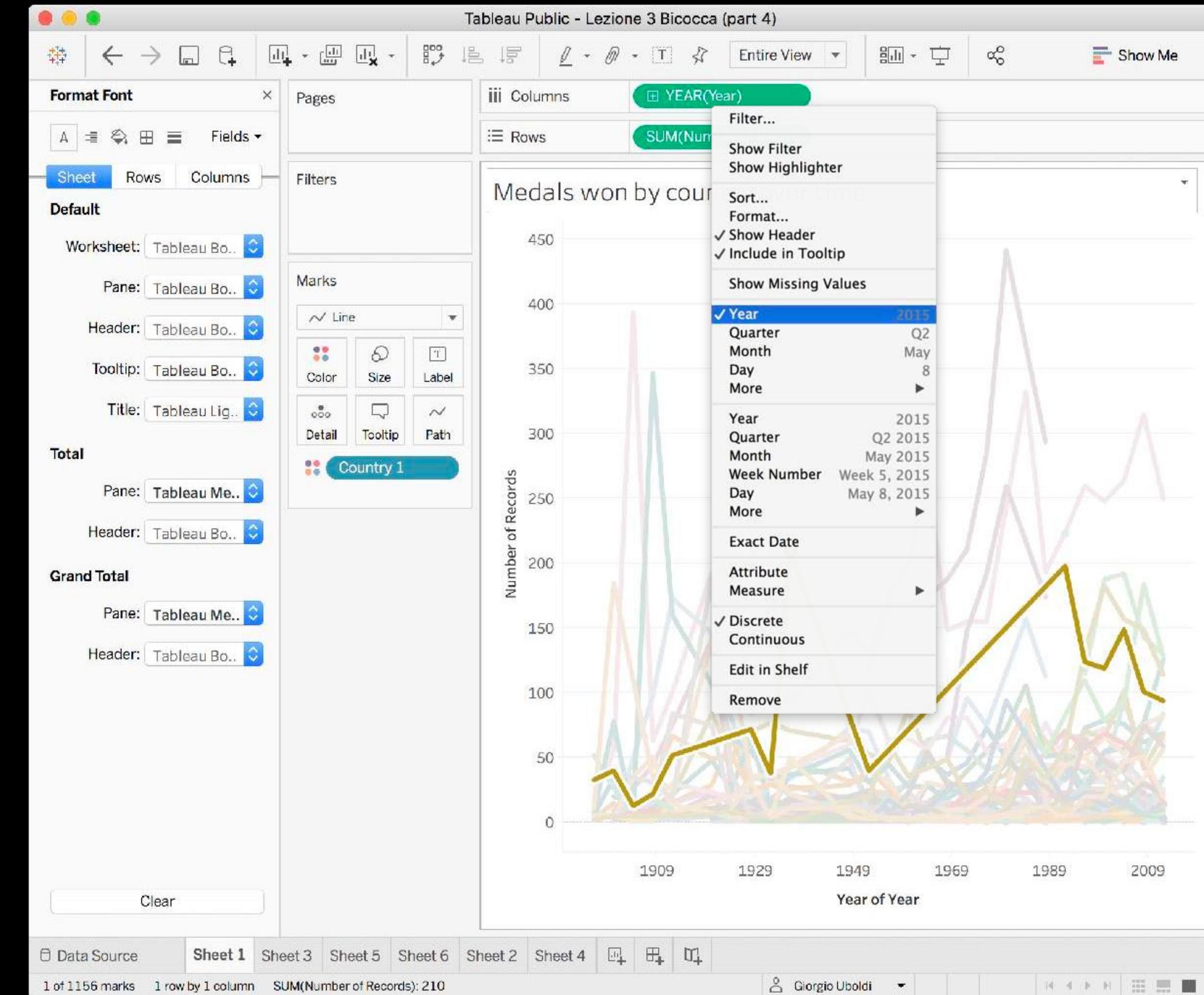
# Visualizing the Olympic games (part 2)



## EXERCISE

# Visualizing the Olympic games (part 2)

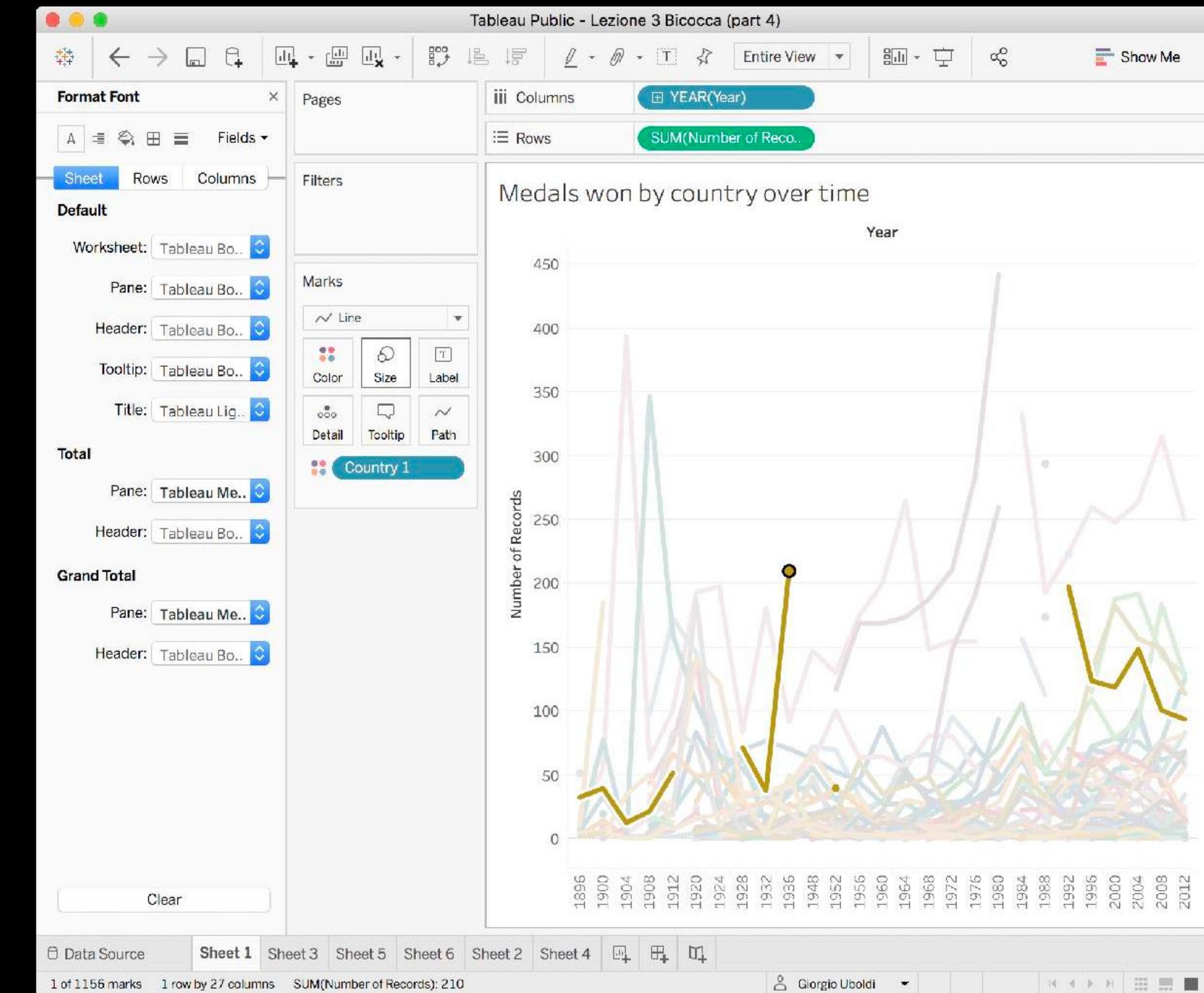
Pay attention to missing values



## EXERCISE

# Visualizing the Olympic games (part 2)

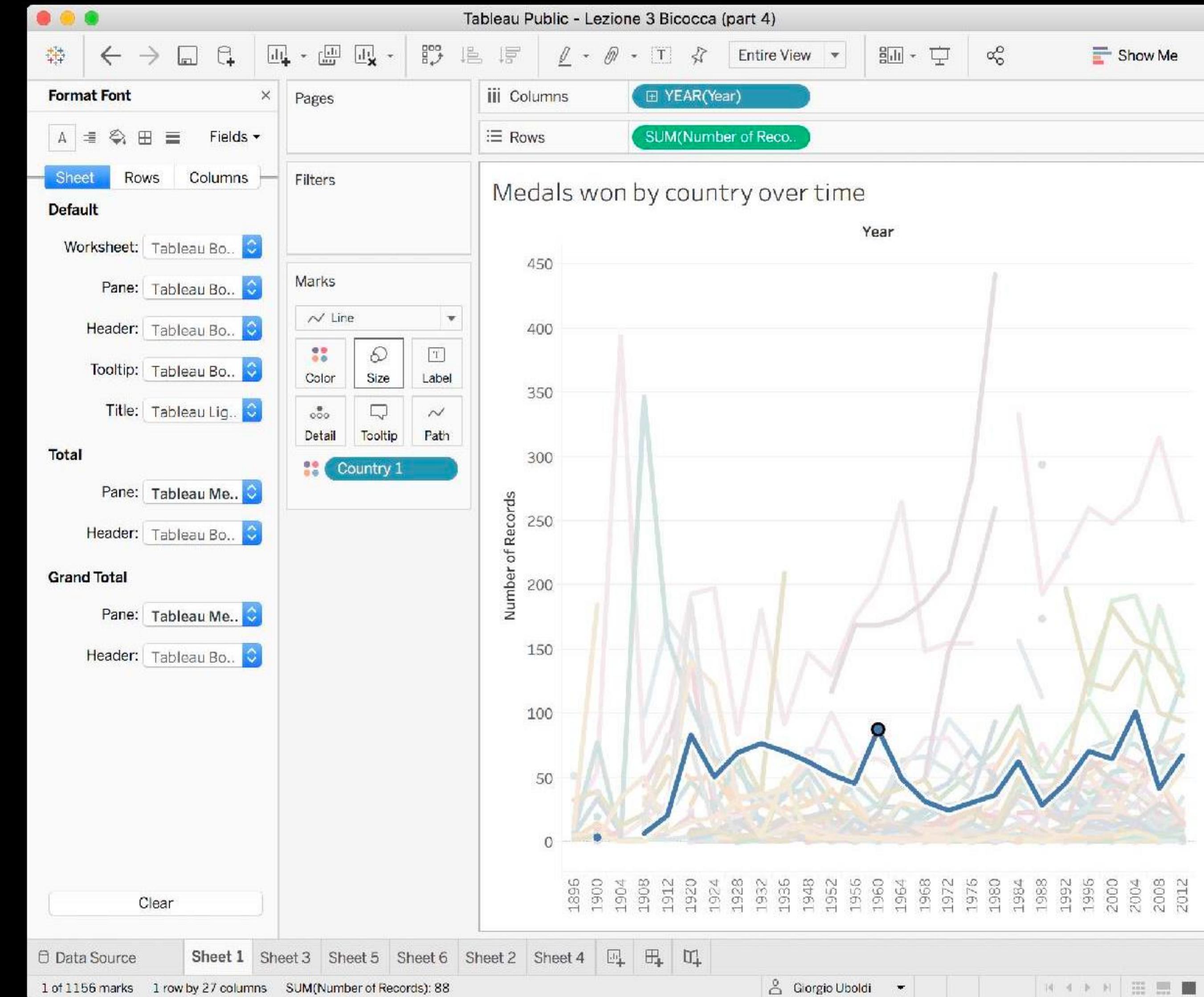
Pay attention to missing values



## EXERCISE

# Visualizing the Olympic games (part 2)

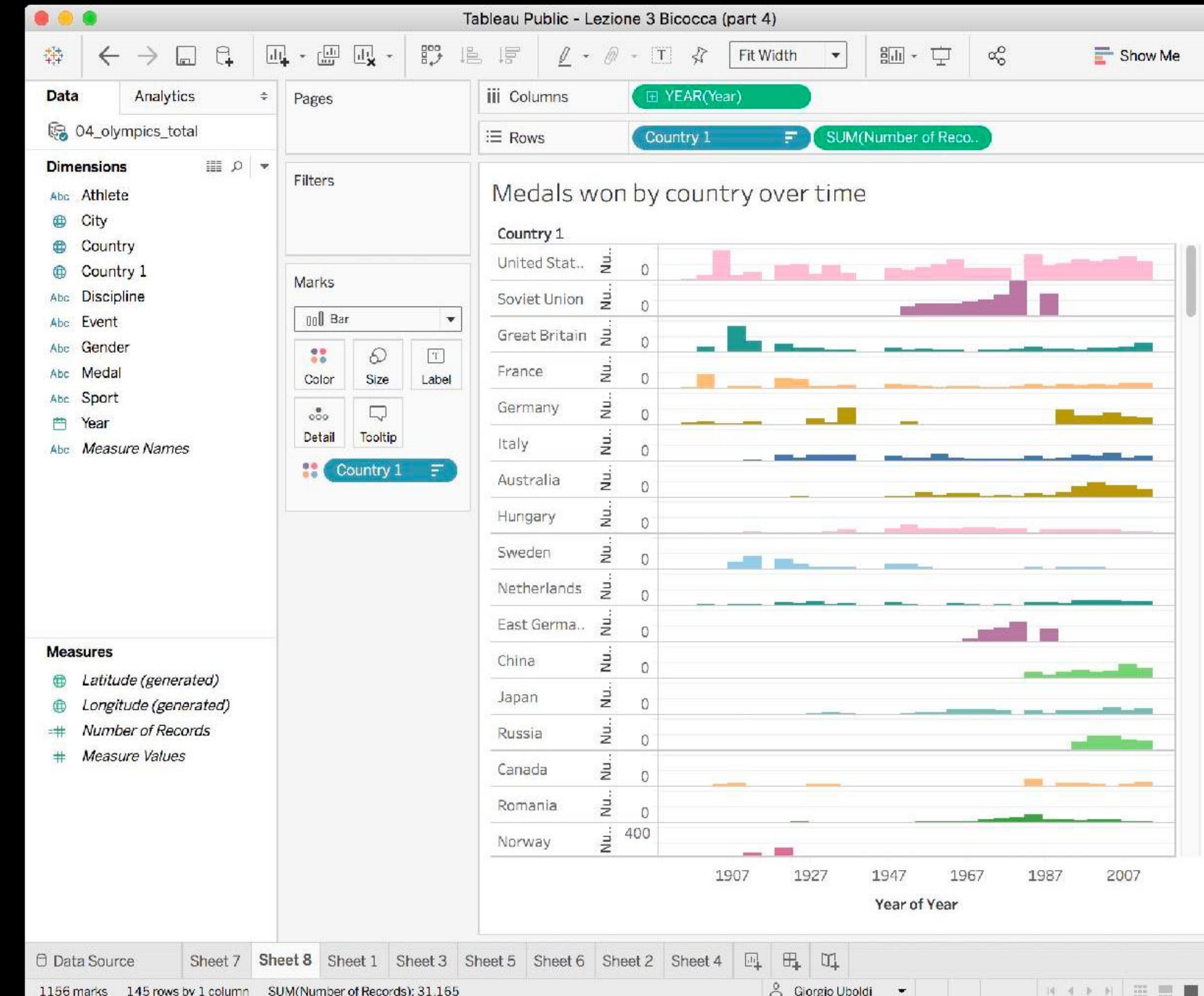
Pay attention to missing values



## EXERCISE

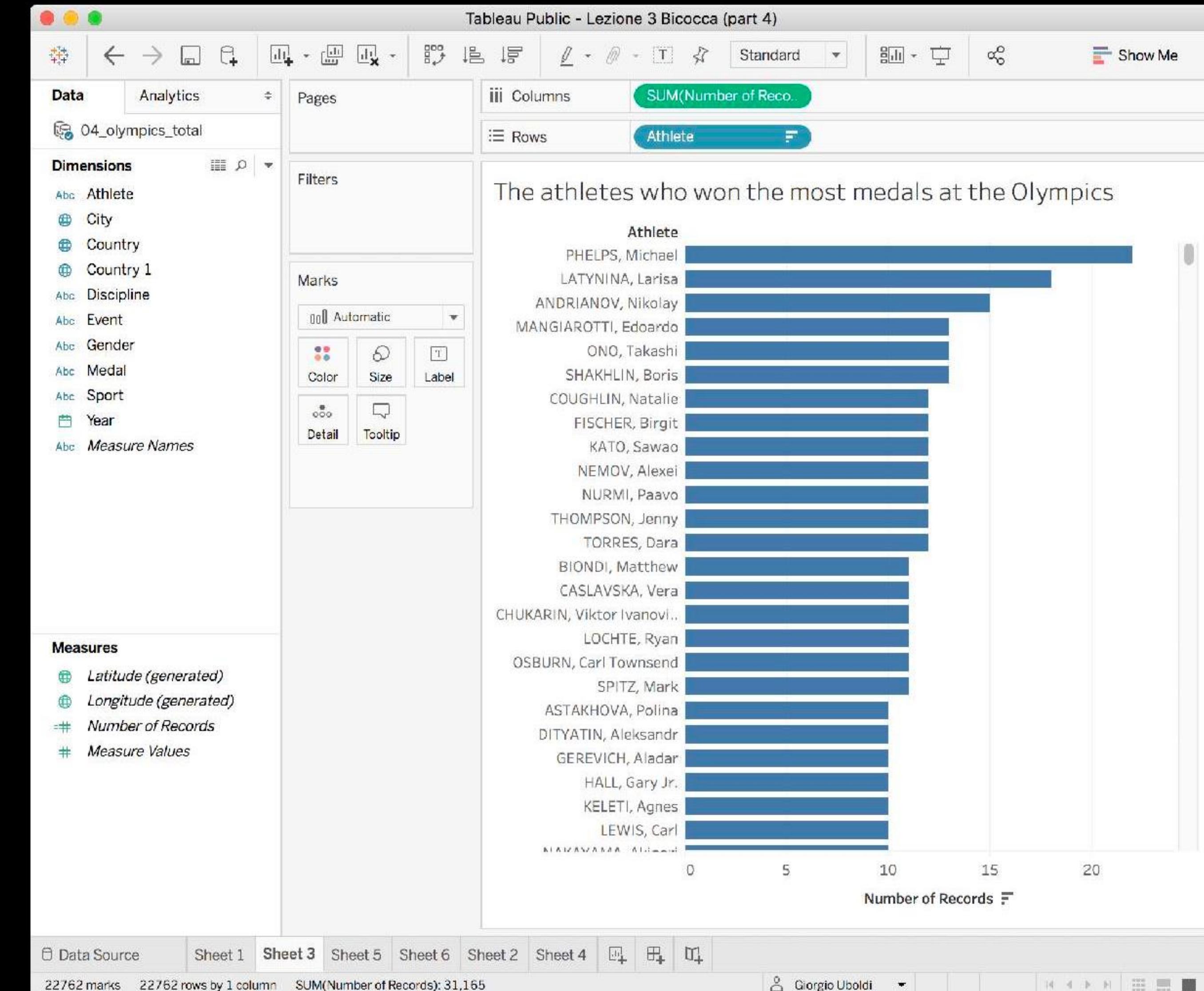
# Visualizing the Olympic games (part 2)

Pay attention to missing values



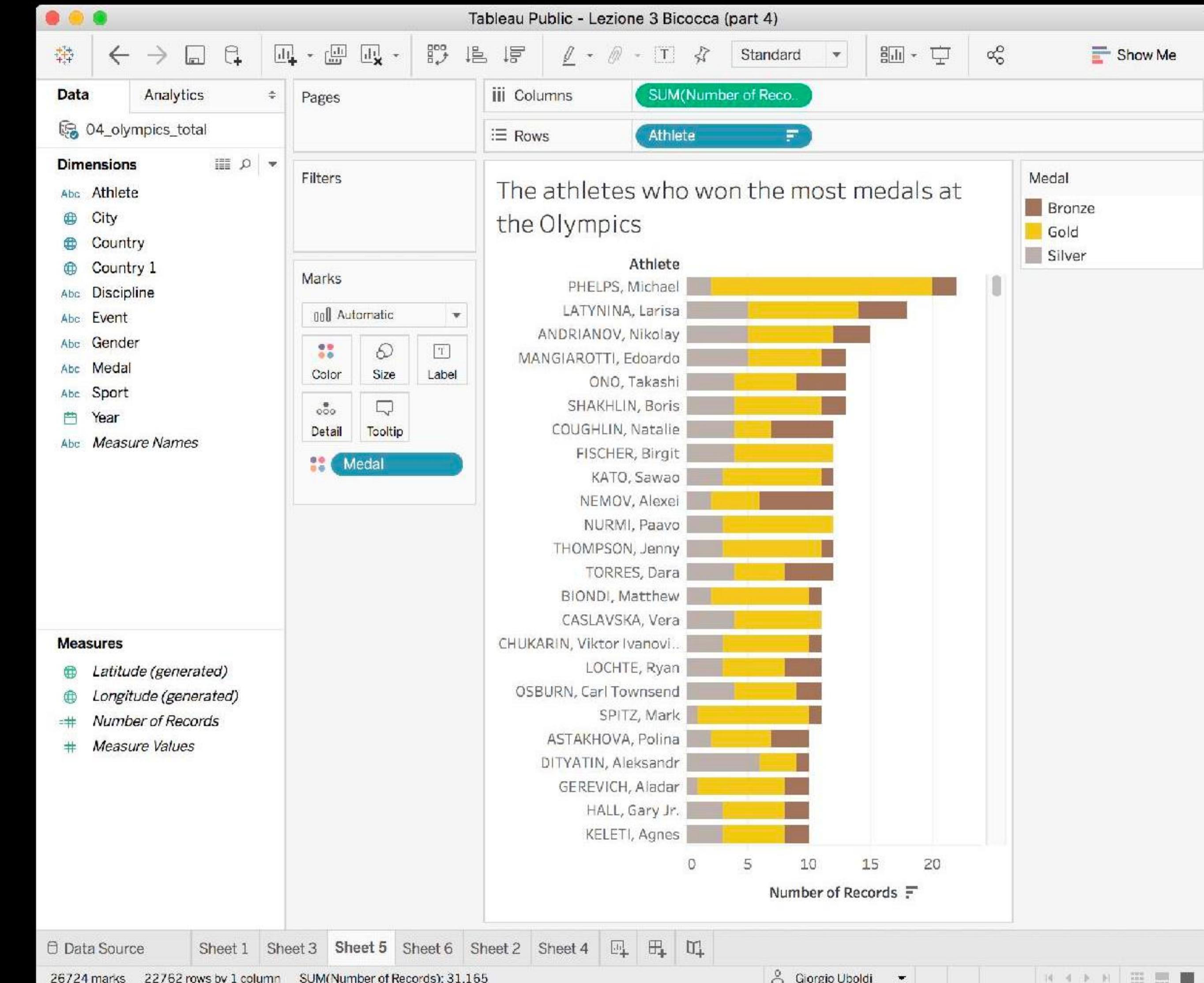
## EXERCISE

# Visualizing the Olympic games (part 2)



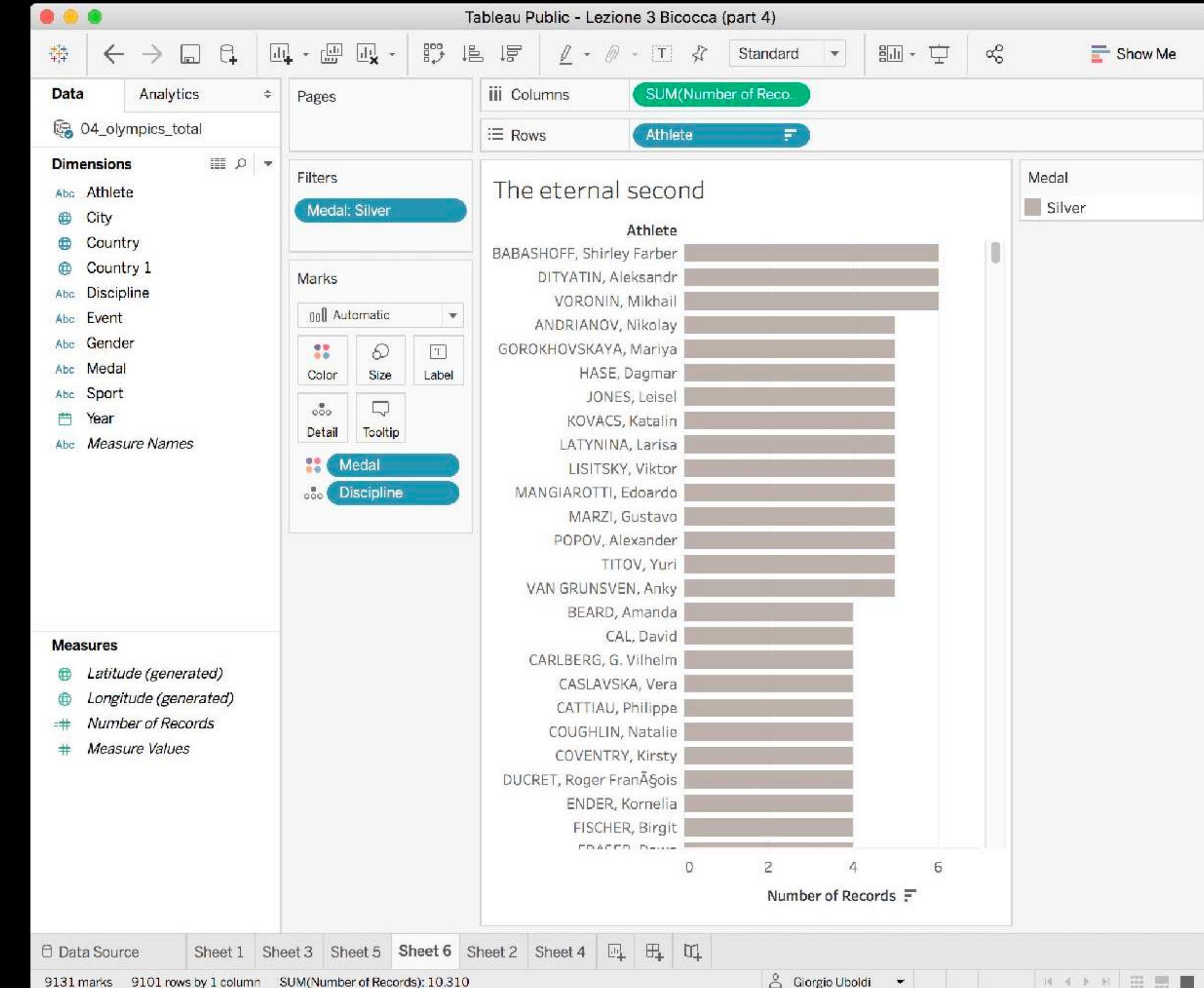
## EXERCISE

# Visualizing the Olympic games (part 2)



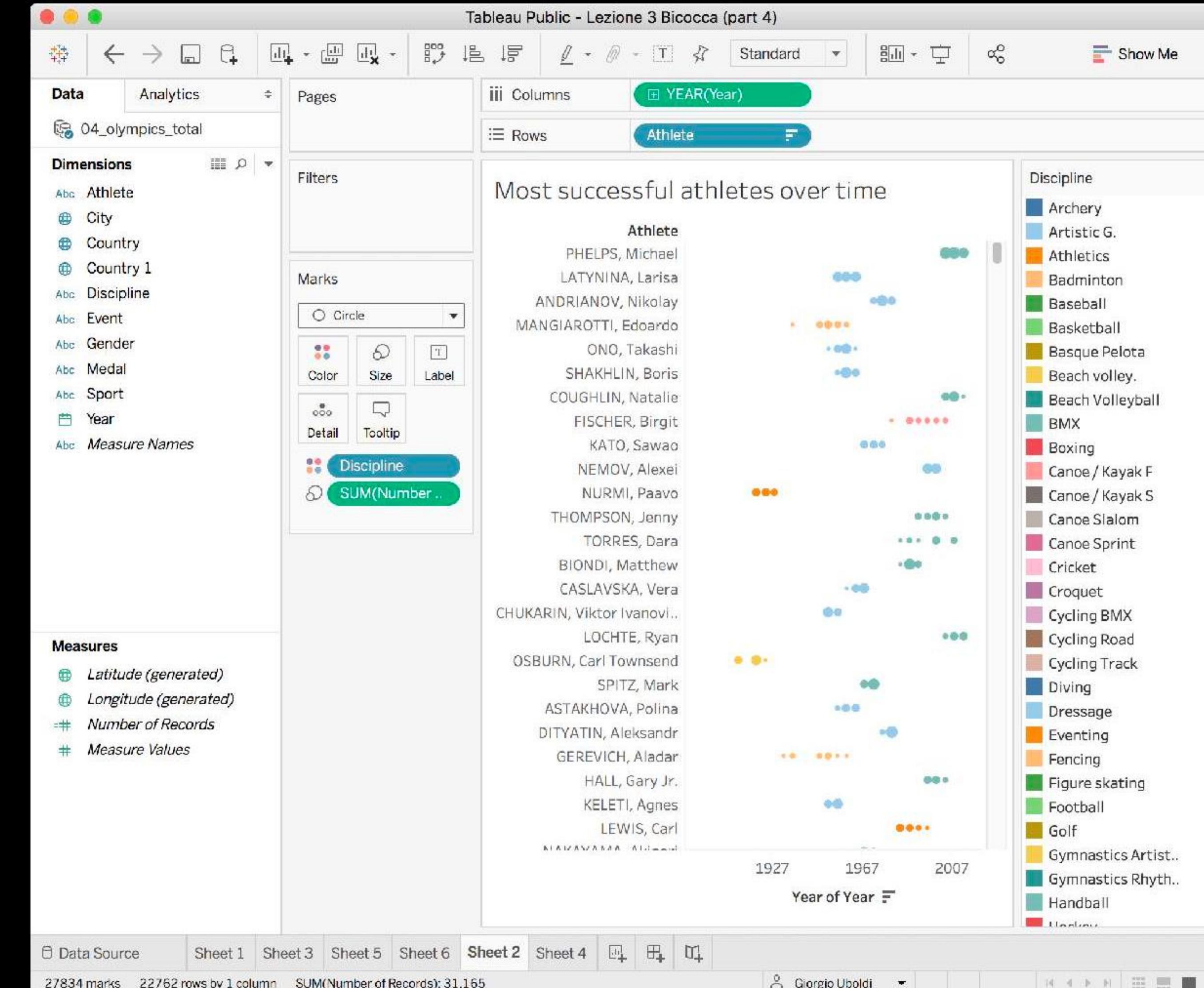
## EXERCISE

# Visualizing the Olympic games (part 2)



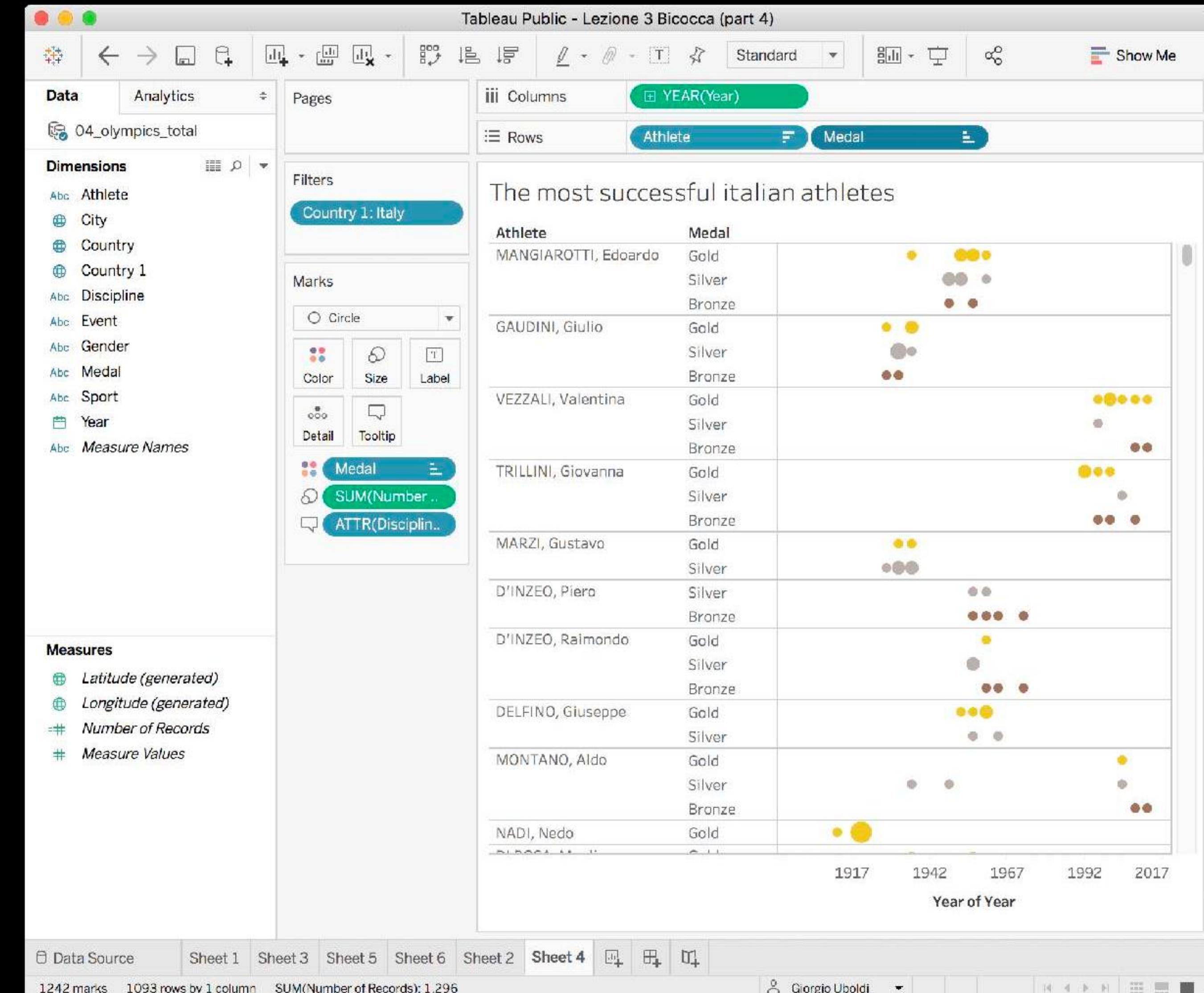
## EXERCISE

# Visualizing the Olympic games (part 2)



## EXERCISE

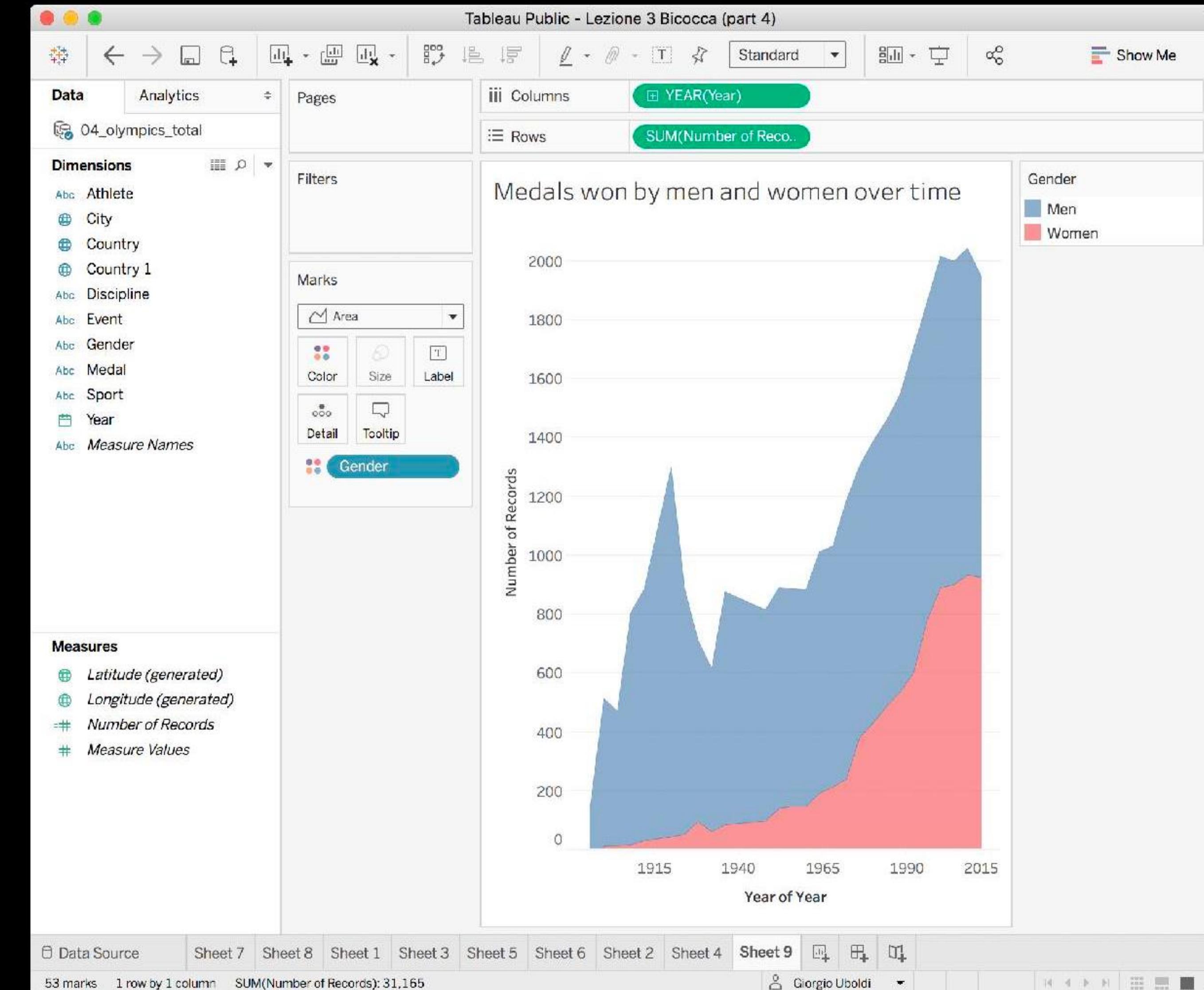
# Visualizing the Olympic games (part 2)



## EXERCISE

# Visualizing the Olympic games (part 2)

Pay attention when you make assumptions.  
Understand the data and the topic!



**IF YOU ARE LOST**

Follow the online tutorials here:

<https://public.tableau.com/en-us/s/resources>

Look for help here

<https://www.tableau.com/support/help>

<https://community.tableau.com/welcome>

and Google!