

Data Visualisation Lab

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Lesson 03

Università Milano Bicocca 2020–2021

[Tinyurl.com/DataViz2021](https://tinyurl.com/DataViz2021)
download lesson 03 folder

<https://tinyurl.com/PythonDataViz2021>
(also available in the Drive folder)

How skilled are you in Python?

TODAY' SLESSON

Tableau part 3

LAST LESSONS

What have we learned so far?

How to import data

Dimensions VS Measures

How to make basic charts
(bar charts, treemaps, line charts, bubble charts, area charts)

Sorting and filters

LAST LESSONS

What have we learned so far?

Joining datasets

Creating a map

Binning data

Group dimensions

Creating calculated fields

Add analysis to charts

EXPLORING THE CENSUS

Let's explore the data about the population in Milan

Download and import as "Text file" the file
"01_MilanCensus.csv"*

*downloaded from the Milano Open Data Platform

The screenshot shows a web browser window for the 'Dati Comune Milano' website. The URL in the address bar is dati.comune.milano.it/dato/item/27. The page title is 'Popolazione: residenti per cittadinanza e quartiere (1999-2016)'. The main content area displays the following information:

- Dato**:
 - Licenza: CC BY (Creative Commons Attribution)
 - Tipo di file: Comma-Separated Value (CSV), 57.217 KB
 - Download: A button labeled 'Accetta il contratto di licenza' (Accept license contract) is present. Below it, a note states: 'Per poter scaricare questi dati è necessario accettare il contratto di licenza' (To download these data, you must accept the license contract). A download icon shows 'scarichi effettuati 8551' (downloads performed).
- Anteprima del dato**: A button labeled 'Visualizza anteprima' (Preview data) is shown.
- Informazioni sul dato**:
 - descrizione: A detailed description of the dataset, stating it contains anagrafici data for residents by citizenship and neighborhood, with a warning about importing large files into databases.

On the right side of the page, there are sections for 'Voti' (Votes) with a rating of 7 stars, 'Condividi questa pagina' (Share this page) with social media links for Like, Myspace, Twitter, and LinkedIn, and 'Vedi anche' (See also) with links to related datasets like 'Proiezioni della famiglie per quartiere; Anni 2016-2035 (base 2015)' and 'Territorio: localizzazione dei quartieri della città (Nuclei d'Identità Locale - NIL)'.

EXPLORING THE CENSUS

Overview of the dataset

A dataset containing the number of residents in Milan by:

- Neighborhood
- Age
- Gender
- Citizenship
- Year (from 1999 to 2015)

Tableau Public - Book1

Filters
0 | Add

Connections
01_MilanCensus
Text File

Files
01_MilanCensus.csv
1_food.csv
New Union

01_MilanCensus.csv

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

Abc 01_MilanCensus.csv Quartiere	# 01_MilanCensus... Eta	Abc 01_MilanCensus... Genere	Abc 01_MilanCensus.csv Cittadinanza	Abc 01_MilanCensus... 1999	Abc 01_MilanCensus... 2000	Abc 01_MilanCensus... 2001	Abc 01_MilanCensus... 2002
Adriano	0	Femmine	Albania	0,00	0,00	1,00	2,00
Adriano	0	Femmine	Algeria	0,00	0,00	0,00	0,00
Adriano	0	Femmine	Bangladesh	0,00	1,00	0,00	1,00
Adriano	0	Femmine	Bolivia	0,00	0,00	0,00	0,00
Adriano	0	Femmine	Brasile	0,00	0,00	0,00	0,00
Adriano	0	Femmine	Cinese, Rep. Popol...	4,00	4,00	2,00	7,00
Adriano	0	Femmine	Croazia	1,00	0,00	0,00	0,00
Adriano	0	Femmine	Dominicana, Rep.	0,00	0,00	0,00	0,00
Adriano	0	Femmine	Ecuador	0,00	0,00	1,00	0,00
Adriano	0	Femmine	Egitto	1,00	1,00	0,00	2,00
Adriano	0	Femmine	El Salvador	0,00	0,00	0,00	0,00
Adriano	0	Femmine	Eritrea	0,00	0,00	0,00	0,00

Data Source Sheet 1

EXPLORING THE CENSUS

Check the text file properties

Check if “Field names are in first row”

The screenshot shows the Tableau Public interface with the following details:

- Connections:** 01_MilanCensus (Text File)
- Files:** 01_MilanCensus.csv, 1_food.csv, New Union
- Selected Item:** 01_MilanCensus.csv
- Properties Panel:** A context menu is open with the following options:
 - ✓ Field names are in first row** (highlighted with a red box)
 - Generate field names automatically
 - Text File Properties...
 - Convert to Union...
 - Duplicate Remove
- Data Preview:** Shows a table with columns: Quartiere, Eta, Genere, Cittadinanza, 1999, 2000, 2001, 2002.
- Bottom Navigation:** Data Source, Sheet 1, etc.

EXPLORING THE CENSUS

Check the text file properties

Check if the field separator is “Semicolon”.

Select “Italian (Italy)” as locale since the numbers were used with commas instead of periods.

01_MilanCensus

01_MilanCensus.csv

01_MilanCensus.csv

Field separator: Semicolon

Text qualifier: Automatic

Character set: W. European ANSI

Locale: Italian (Italy)

Sort fields Data source order Show aliases

Abc 01_MilanCensus.csv	# 01_MilanC... Eta	Abc 01_MilanCensus.. Genere	Abc 01_MilanCensus.csv Cittadinanza	# 01_MilanCen... 1999	# 01_Mila... 2000
Adriano	0	Femmine	Albania	0.0000	0.
Adriano	0	Femmine	Algeria	0.0000	0.

The screenshot shows a software interface for managing CSV files. At the top, there's a navigation bar with a folder icon and the title '01_MilanCensus'. Below it, a file named '01_MilanCensus.csv' is selected. A modal dialog box is open, showing properties for this file. The 'Field separator' is set to 'Semicolon' and the 'Text qualifier' is 'Automatic'. Under 'Character set', it says 'W. European ANSI'. The most prominent feature is the 'Locale' dropdown, which is set to 'Italian (Italy)'. Both the 'Field separator' and the 'Locale' dropdown are highlighted with a thick red box. At the bottom of the dialog, there are buttons for 'Sort fields', 'Data source order', and 'Show aliases'. The main window below the dialog shows the contents of the CSV file, which includes columns like 'Abc', '#', 'Abc', 'Abc', '#', and '#', along with some specific data rows for 'Adriano'.

EXPLORING THE CENSUS

Check the text file properties

01_MilanCensus

01_MilanCensus.csv

01_MilanCensus.csv

Field separator: Semicolon

Text qualifier: Automatic

Character set: W. European ANSI

Locale: Italian (Italy)

Sort fields Data source order ▾ Show aliases

Abc 01_MilanCensus.csv	# 01_MilanC...	Abc 01_MilanCensu...	Abc 01_MilanCensus.csv	# 01_MilanCen...	# 01_Mila...
Quartiere	Eta	Genere	Cittadinanza	1999	2000
Adriano	0	Femmine	Albania	0.0000	0.
Adriano	0	Femmine	Algeria	0.0000	0.

EXPLORING THE CENSUS

Preparing the dataset

For each year we have a column with the number of people.

To be more flexible during the exploration of the dataset we have to go from this format to this one:

... | YEAR | VALUE

...	1999	1245
...	2000	1291

The screenshot shows the Tableau Public interface with a project titled '01_MilanCensus'. In the 'Connections' pane, there is a single connection named '01_MilanCensus' (Text File). The 'Files' pane contains three items: '01_MilanCensus.csv', '1_food.csv', and 'New Union'. The main workspace displays a data preview of '01_MilanCensus.csv'. The schema includes columns: Quartiere, Eta, Genere, Cittadinanza, and five columns representing years: 1999, 2000, 2001, 2002, and 2003. The columns for the years are highlighted with a red box. The data rows show various demographic information across these years. The bottom of the screen shows the Tableau ribbon with tabs like Data Source, Sheet 1, etc.

Abc 01_MilanCensus.csv	# 01_MilanCens...	Abc 01_MilanCensus...	Abc 01_MilanCensus.csv	# 01_MilanCen...	# 01_MilanCen...	# 01_MilanCen...	# 01_MilanCen...	# 01_MilanCen...
Quartiere	Eta	Genere	Cittadinanza	1999	2000	2001	2002	2003
Adriano	0	Femmine	Albania	0.0000	0.0000	1.0000	2.0000	0.00
Adriano	0	Femmine	Algeria	0.0000	0.0000	0.0000	0.0000	0.00
Adriano	0	Femmine	Bangladesh	0.0000	1.0000	0.0000	1.0000	0.00
Adriano	0	Femmine	Bolivia	0.0000	0.0000	0.0000	0.0000	0.00
Adriano	0	Femmine	Brasile	0.0000	0.0000	0.0000	0.0000	0.00
Adriano	0	Femmine	Cinese, Rep. Popol...	4.0000	4.0000	2.0000	7.0000	2.00
Adriano	0	Femmine	Croazia	1.0000	0.0000	0.0000	0.0000	2.00
Adriano	0	Femmine	Dominicana, Rep.	0.0000	0.0000	0.0000	0.0000	0.00
Adriano	0	Femmine	Ecuador	0.0000	0.0000	1.0000	0.0000	0.00
Adriano	0	Femmine	Egitto	1.0000	1.0000	0.0000	2.0000	2.00
Adriano	0	Femmine	El Salvador	0.0000	0.0000	0.0000	0.0000	0.00
Adriano	0	Femmine	Eritrea	0.0000	0.0000	0.0000	0.0000	0.00

EXPLORING THE CENSUS

Preparing the dataset

Select all the columns from 1999 to 2015

Tableau Public - Book1

Connections Add
01_MilanCensus Text File

Files
01_MilanCensus.csv
1_food.csv
New Union

01_MilanCensus.csv

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

#	#	#	#	#	#	#	#	#	#	#	#
01_MilanCen...	01_MilanCen...	01_MilanCen...	01_MilanCen...	01_MilanCen...	01_MilanCen...	01_Milan...	01_MilanCen...	01_MilanCen...	01_MilanCen...	01_MilanCen...	01_MilanCen...
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015		
0	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000
0	3.0000	3.0000	10.0000	11.0000	3.0000	4.0000	8.0000	4.0000	3.0000	2.0000	2.0000
0	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
0	0.0000	2.0000	0.0000	1.0000	3.0000	2.0000	0.0000	4.0000	3.0000	0.0000	1.0000
0	2.0000	4.0000	5.0000	3.0000	4.0000	3.0000	0.0000	8.0000	4.0000	5.0000	0.0000
0	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000
0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000

EXPLORING THE CENSUS

Preparing the dataset

And click on “Pivot”

Show aliases Show hidden fields 1.000 rows

#	#	#	#	#	#	#	#
01_MilanCen...	01_MilanCen...	01_Milan...	01_Milan...	01_Milan...	01_Milan...	01_Milan...	01_Milan...
2009	2010	2011	2012				
0.0000	0.0000	3.0000	0.0				
0.0000	0.0000	0.0000	0.0				
0.0000	0.0000	0.0000	0.0				
0.0000	1.0000	1.0000	0.0	Pivot			
0.0000	0.0000	0.0000	1.0	Merge Mismatched Fields			
11.0000	3.0000	4.0000	8.0000	4.0000	3.0000	2.0000	
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	
1.0000	3.0000	2.0000	0.0000	4.0000	3.0000	1.0000	
3.0000	4.0000	3.0000	0.0000	8.0000	4.0000	5.0000	
1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	
0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	

EXPLORING THE CENSUS

Preparing the dataset

Rename the new columns “Year” and ‘Value’.

As we can see ‘Year’ is a string and not a date.

Change it to “Date”.

#	Abc 01_MilanCensus..	Abc 01_MilanCensus.csv	Abc Pivot	#
Eta	Genere	Cittadinanza	Year	Pivot Value
0	Femmine	Albania	1999	0.0000
0	Femmine	Algeria	1999	0.0000
0	Femmine	Bangladesh	1999	0.0000
0	Femmine	Bolivia	1999	0.0000
0	Femmine	Brasile	1999	0.0000
0	Femmine	Cinese, Rep. Popol...	1999	4.0000
0	Femmine	Croazia	1999	1.0000
0	Femmine	Dominicana, Rep.	1999	0.0000
0	Femmine	Ecuador	1999	0.0000
0	Femmine	Egitto	1999	1.0000
0	Femmine	El Salvador	1999	0.0000

EXPLORING THE CENSUS

Preparing the dataset

If the results are only “Null” transform it in string again and create the calculated field called “date” in the following way.

The screenshot shows a data preparation interface. At the top, there's a small window titled "Date" containing the formula "`"01/01/"+[Year]`". Below this, a message says "The calculation is valid." with "Apply" and "OK" buttons. The main area shows a preview of a table with columns: "Cittadinanza", "Genere", "Year", "Values", and "#". The first two rows show data for "Albania" and "Femmine".

Cittadinanza	Genere	Year	Values	#
Albania	Femmine	1999	0.0000	
Albania	Femmine	1999	0.0000	
Albania	Femmine	1999	0.0000	

EXPLORING THE CENSUS

Preparing the dataset

Now change the new calculated field type to “Date”.

The screenshot shows the Tableau Public interface with the following details:

- Connections:** 01_MilanCensus (Text File) is selected.
- Files:** 01_MilanCensus.csv, 1_food.csv, and New Union are listed.
- Sheet View:** The data preview for 01_MilanCensus.csv is shown, with the "Date" column highlighted by a red box.
- Table Headers:** The columns are labeled: Abc 01_MilanCensus.csv, # 01_MilanCensus.csv, Abc 01_MilanCensus.csv, Abc 01_MilanCensus.csv, Abc Pivot Year, Date, and # Pivot Values.
- Data Preview:** The data shows rows for Adriano, with various values for the Date column (e.g., 01/01/19...).
- Bottom Navigation:** Data Source, Sheet 1, and other navigation icons.

EXPLORING THE CENSUS

First questions

How is the population distributed by Neighborhood?

Create a new Sheet.

Tableau Public - Book1

Connections Add
01_MilanCensus Text File

Files
01_MilanCensus.csv
1_food.csv
New Union

01_MilanCensus.csv

Sort fields Modified ▾
 Show aliases Show hidden fields 1.000 → rows

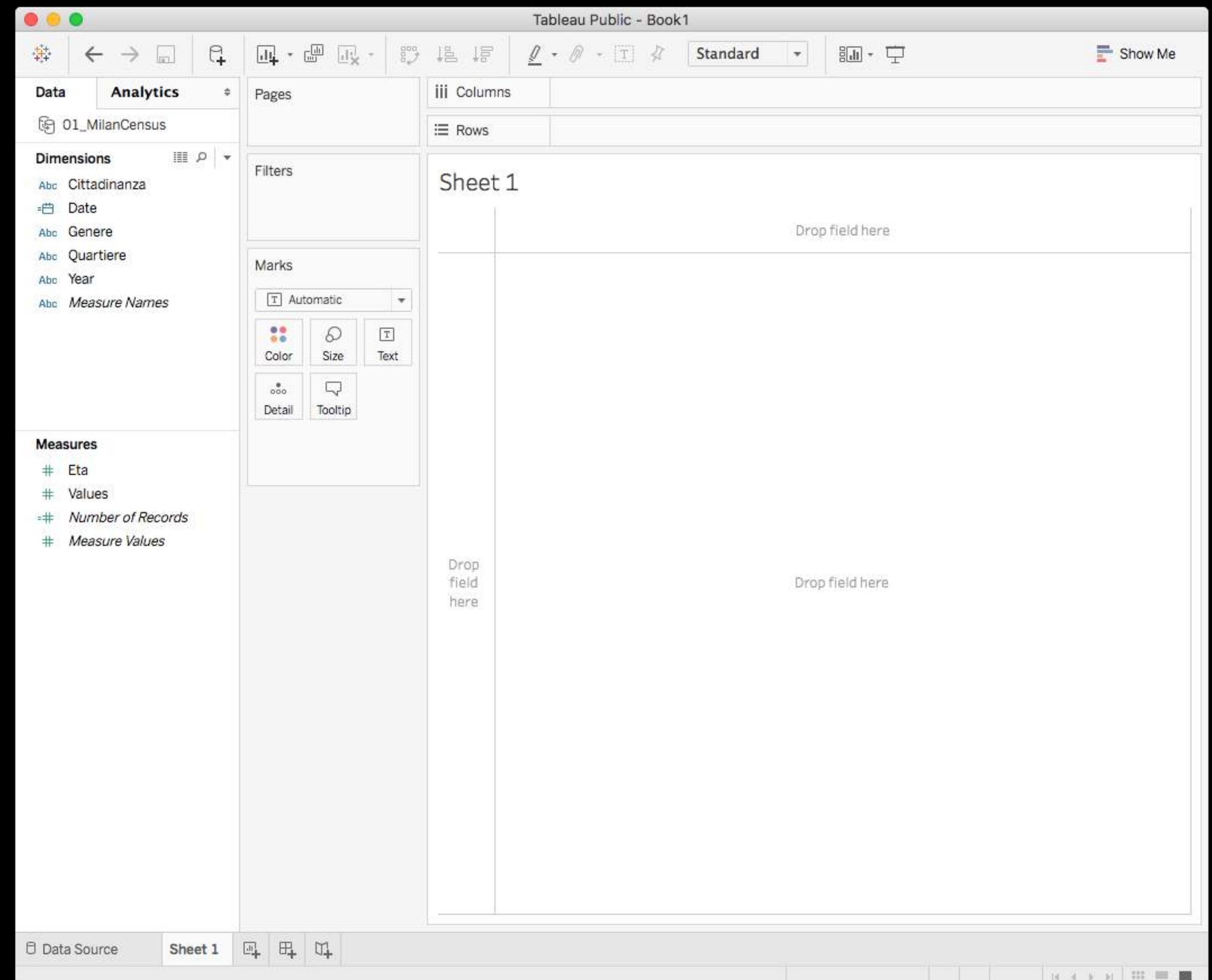
Abc 01_MilanCensus.csv Quartiere	# 01_MilanCensus.csv Eta	Abc 01_MilanCensus.csv Genere	Abc 01_MilanCensus.csv Cittadinanza	Abc Pivot Year	Calculation Date	# Pivot Values
Adriano	0	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	1	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	2	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	3	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	4	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	5	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	6	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	7	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	8	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	16	Maschi	Ucraina	1999	01/01/19...	0.0000
Adriano	10	Femmine	Albania	1999	01/01/19...	0.0000
Adriano	11	Femmine	Albania	1999	01/01/19...	0.0000

Data Source Sheet 1

EXPLORING THE CENSUS

First questions

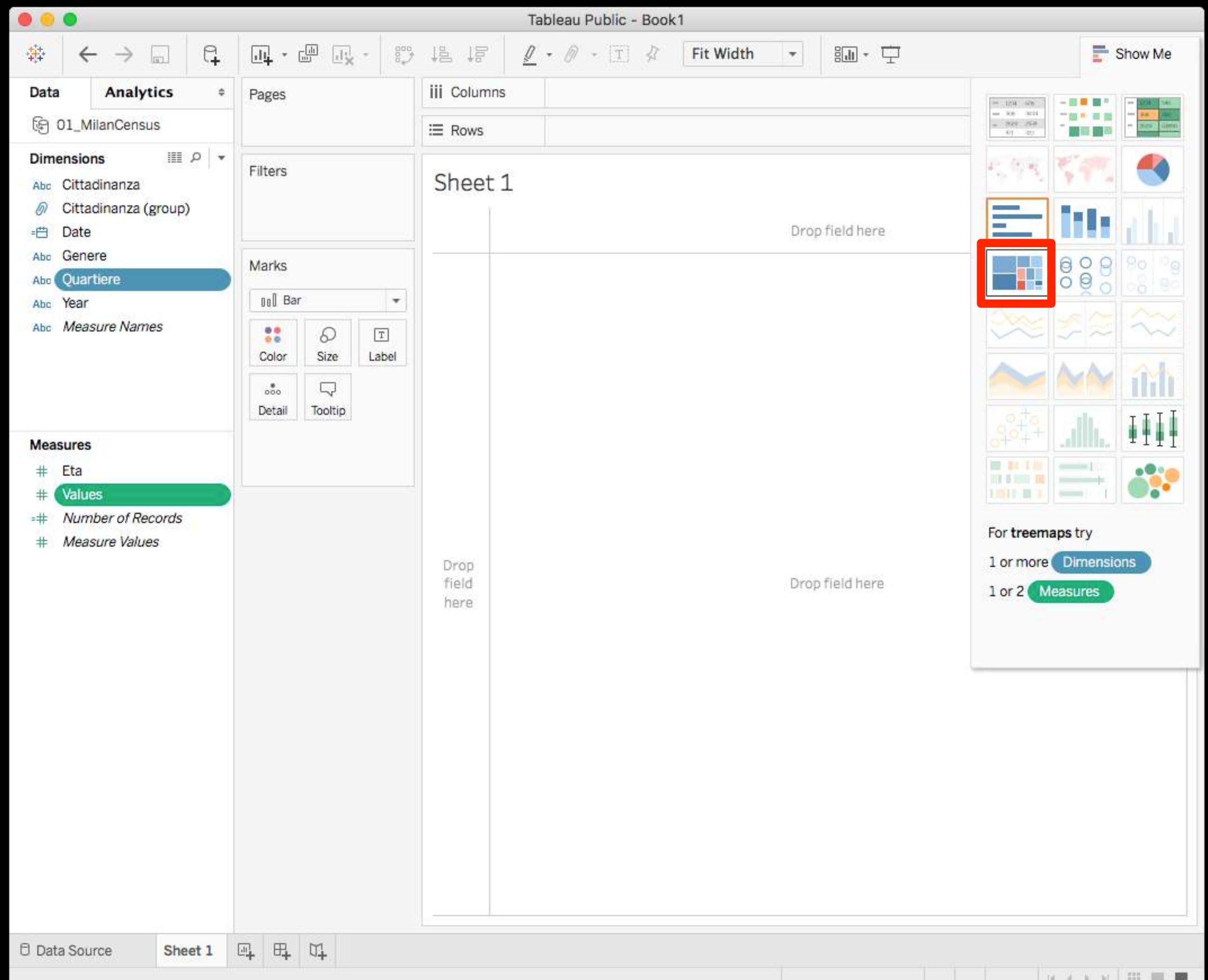
How is the population is distributed in the different neighborhoods?



EXPLORING THE CENSUS

Let's make a treemap

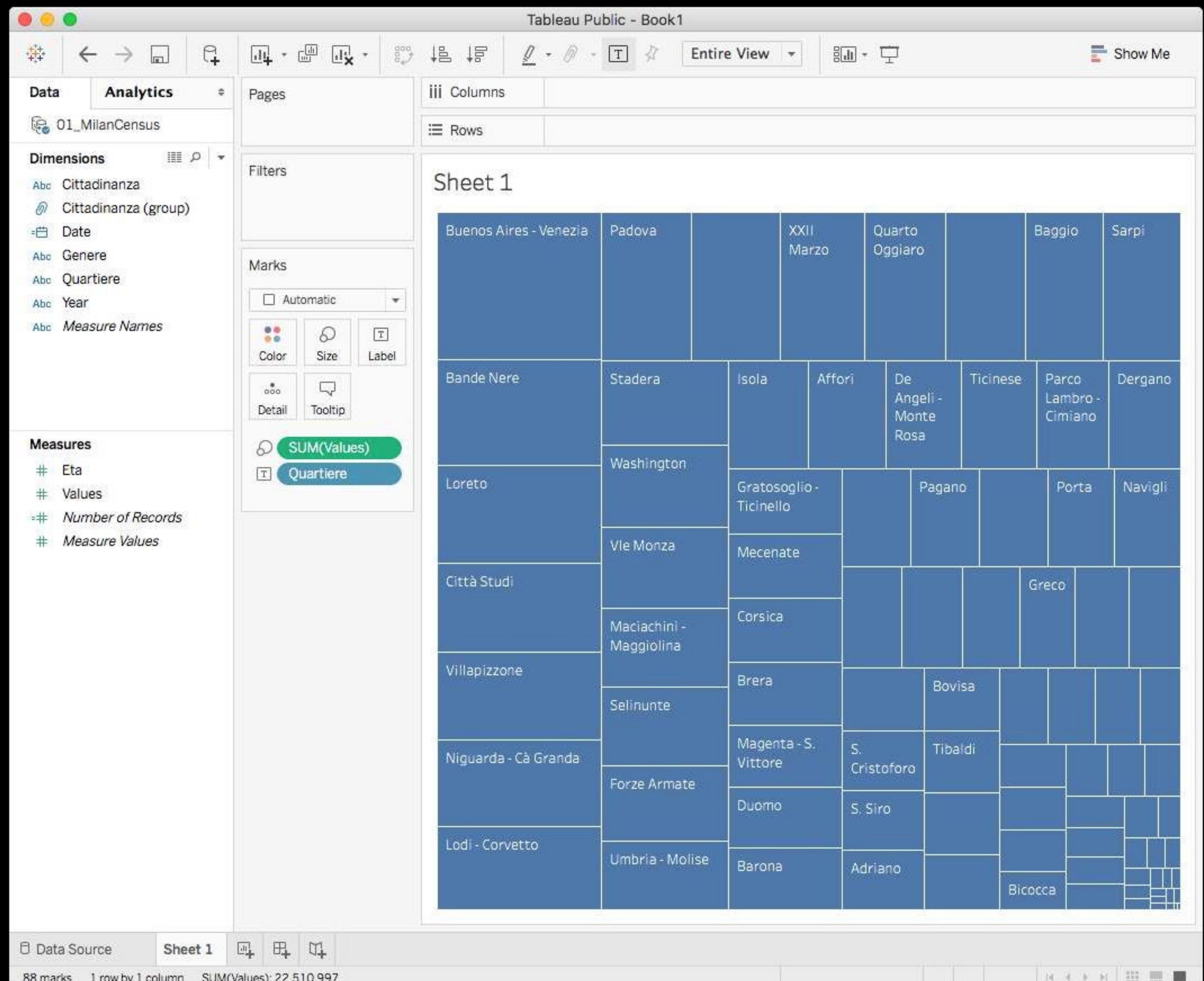
Select “Quartiere” and “Values”
and clicking on “Show me” select
“Treemap”.



EXPLORING THE CENSUS

Let's make a treemap

Click on “Entire View” to fit the treemap in the window and remove “SUM(Values)” from “Color”.



EXPLORING THE CENSUS

Let's make a treemap

Let's add "Date" to the filters to select only 2015.

Tableau Public - Book1

Show Me

Data Analytics

01_MilanCensus

Dimensions

- Cittadinanza
- Cittadinanza (group)
- Date
- Genere
- Quartiere
- Year
- Measure Names

Marks

- Automatic
- Color
- Size
- Detail
- Tooltip

Filters

YEAR(Date): 2015

Measures

- Eta
- Values
- Number of Records
- Measure Values

Pages

Columns

Rows

Filter Field [Date]

How do you want to filter on [Date]?

- Relative Date
- Range of Dates**
- Years**
- Quarters
- Months
- Days
- Week numbers
- Weekdays
- Month / Year
- Month / Day / Year
- Individual Dates
- Count
- Count (Distinct)
- Minimum
- Maximum
- Attribute

Cancel Next >

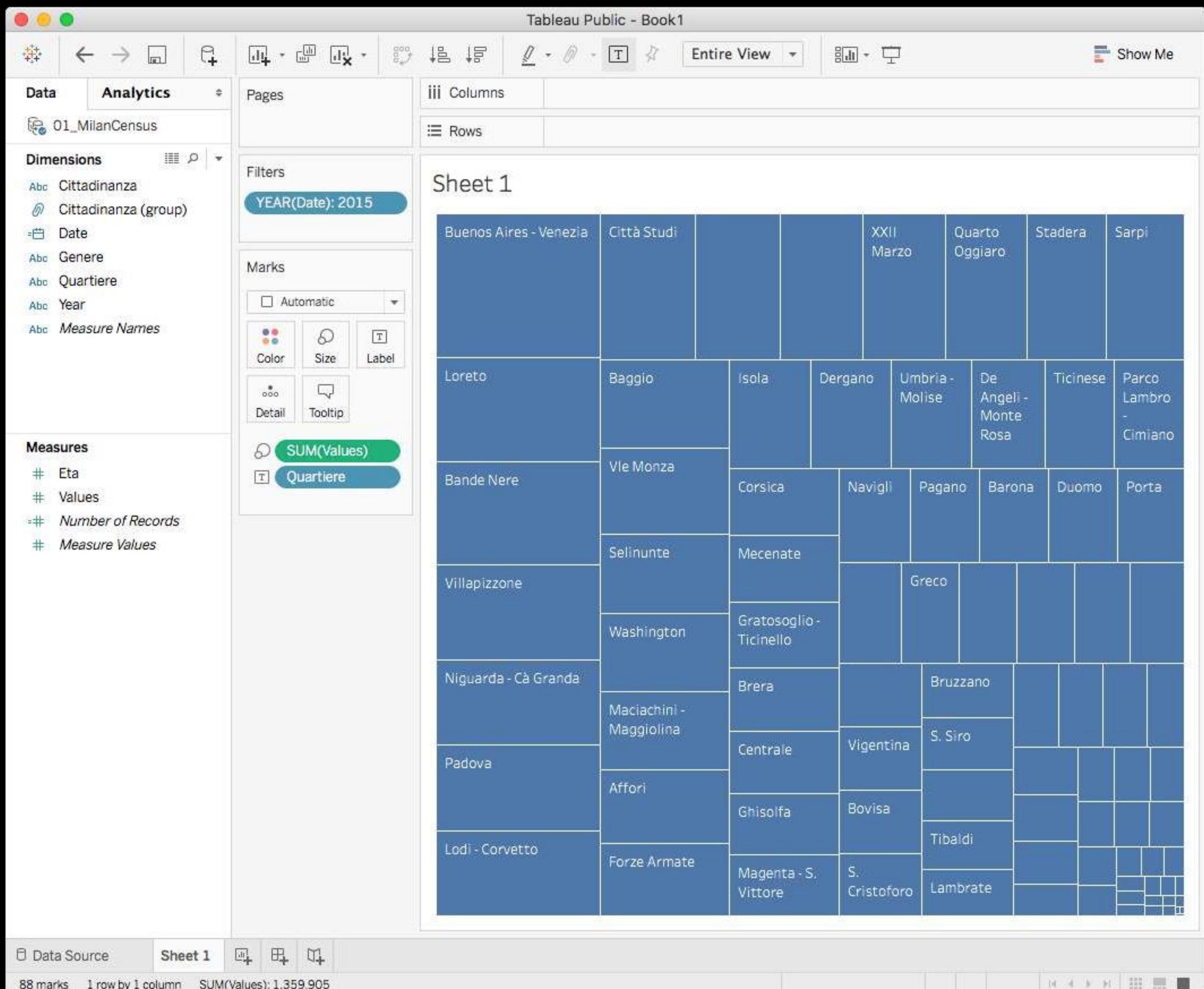
Data Source Sheet 1

88 marks 1 row by 1 column SUM(Values): 1,359,905

The screenshot shows a Tableau interface with a treemap visualization of Milan census data. On the left, the Data pane lists dimensions like Cittadinanza, Date, Genere, Quartiere, and Year. The Filters pane shows a filter for 'YEAR(Date): 2015'. A 'Filter Field [Date]' dialog box is open, prompting 'How do you want to filter on [Date]?'. The 'Years' option is selected, highlighted with a blue border. Other filtering options like 'Range of Dates', 'Individual Dates', and various date granularities (Quarters, Months, Days) are listed below. At the bottom of the dialog are 'Cancel' and 'Next >' buttons. The main visualization on the right shows a hierarchical treemap of Milan quartieri, with labels like Quarto Oggiaro, Stadera, Sarpi, De Angelis-Monte Rosa, Ticinese, Parco Lambro, Cimiano, Barona, Duomo, Porta, Siro, Baldi, Magenta-S. Vittore, S. Cristoforo, and Lambrate.

EXPLORING THE CENSUS

Let's make a treemap

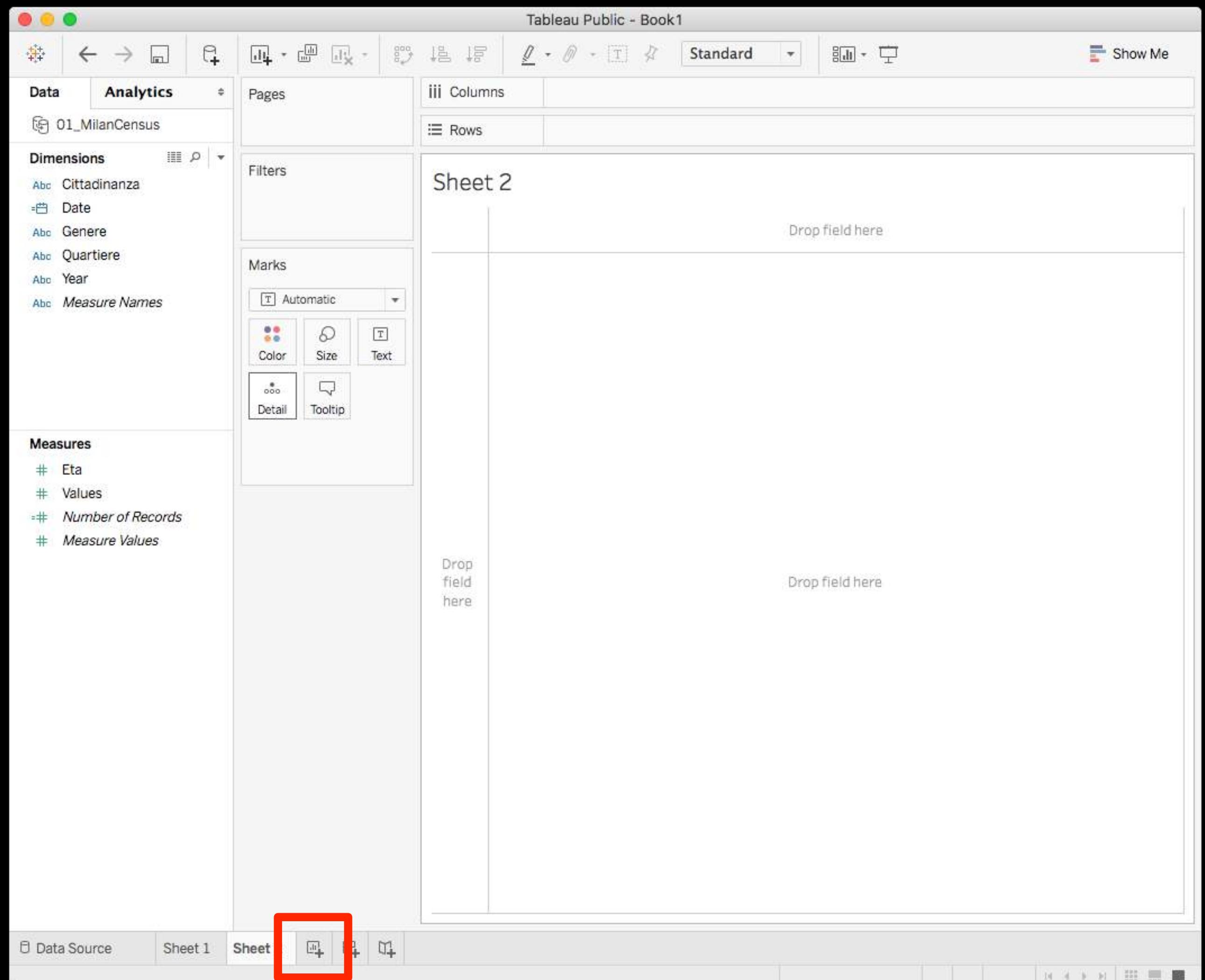


EXPLORING THE CENSUS

First questions

What's the percentage of
foreigner citizens in Milan?

Create a new sheet



EXPLORING THE CENSUS

Let's create a group based on citizenship

Click on “Citizenship” >Create > Group.

The screenshot shows the Tableau Public interface with the title "Tableau Public - Book1". In the top-left corner, there is a context menu for the dimension "Cittadinanza". The menu items are:

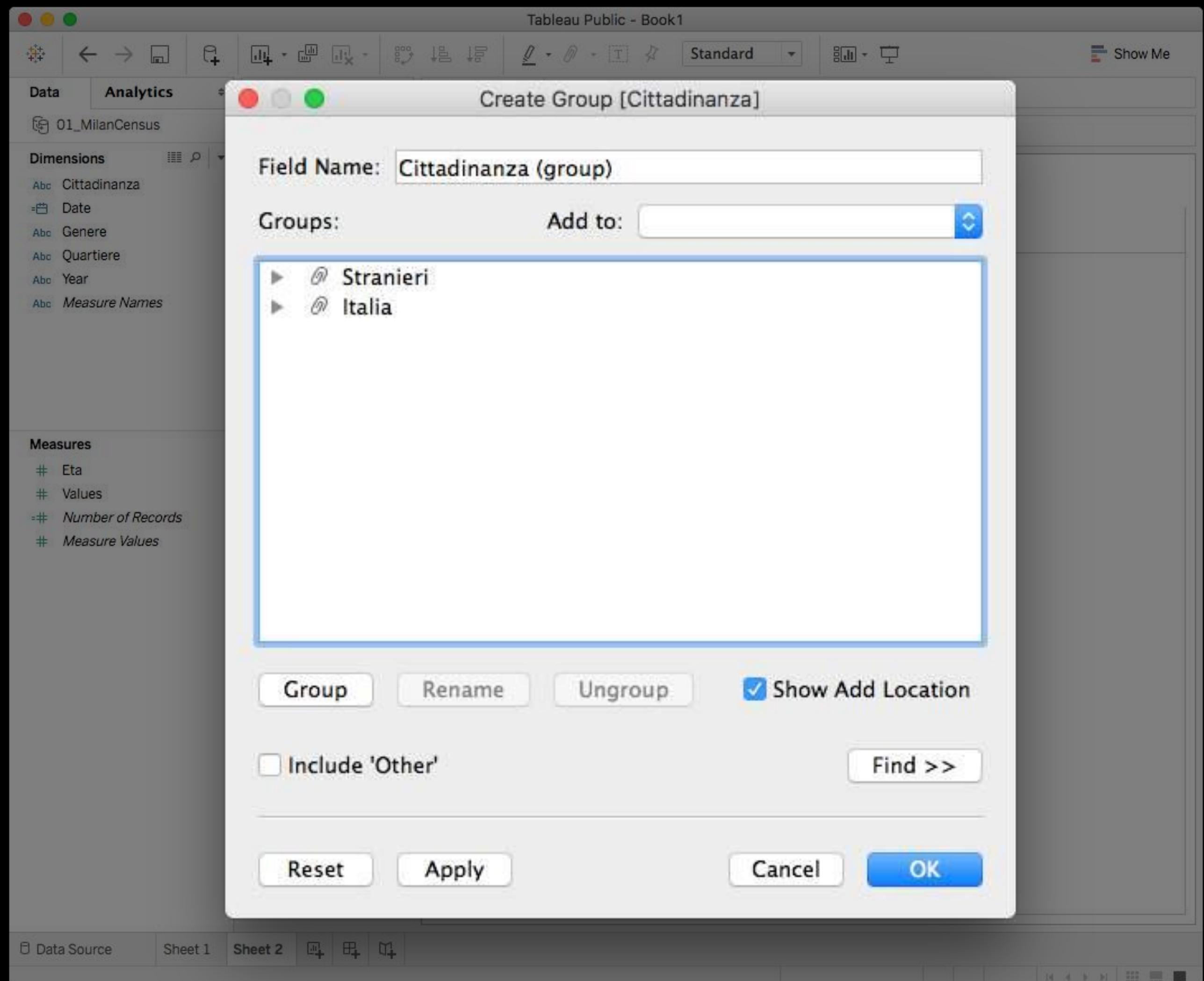
- Add to Sheet
- Duplicate
- Rename
- Hide
- Aliases...
- Create ▾
- Transform ▾
- Convert to Measure
- Change Data Type ▾
- Geographic Role ▾
- Default Properties ▾
- Group by ▾
- Folders ▾
- Hierarchy ▾
- Replace References...
- Describe...

The "Create" and "Group..." options are highlighted with blue selection bars. The main workspace is titled "Sheet 2" and contains two empty columns labeled "Drop field here".

EXPLORING THE CENSUS

Let's create a group based on citizenship

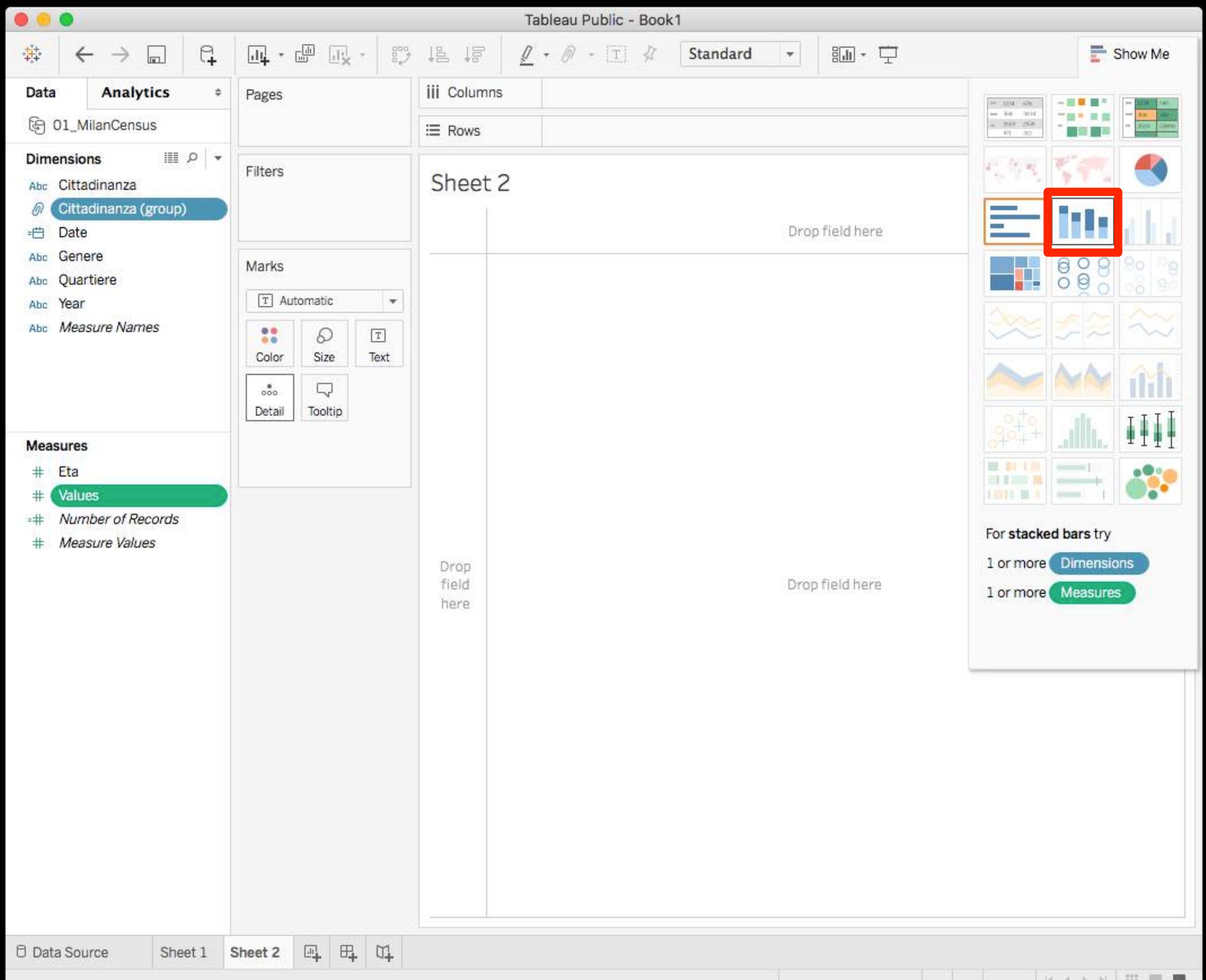
Let's make a group with only "Italia" and a group called "Stranieri" for all the other values of "Cittadinanza".



EXPLORING THE CENSUS

Let's make a stacked bar chart

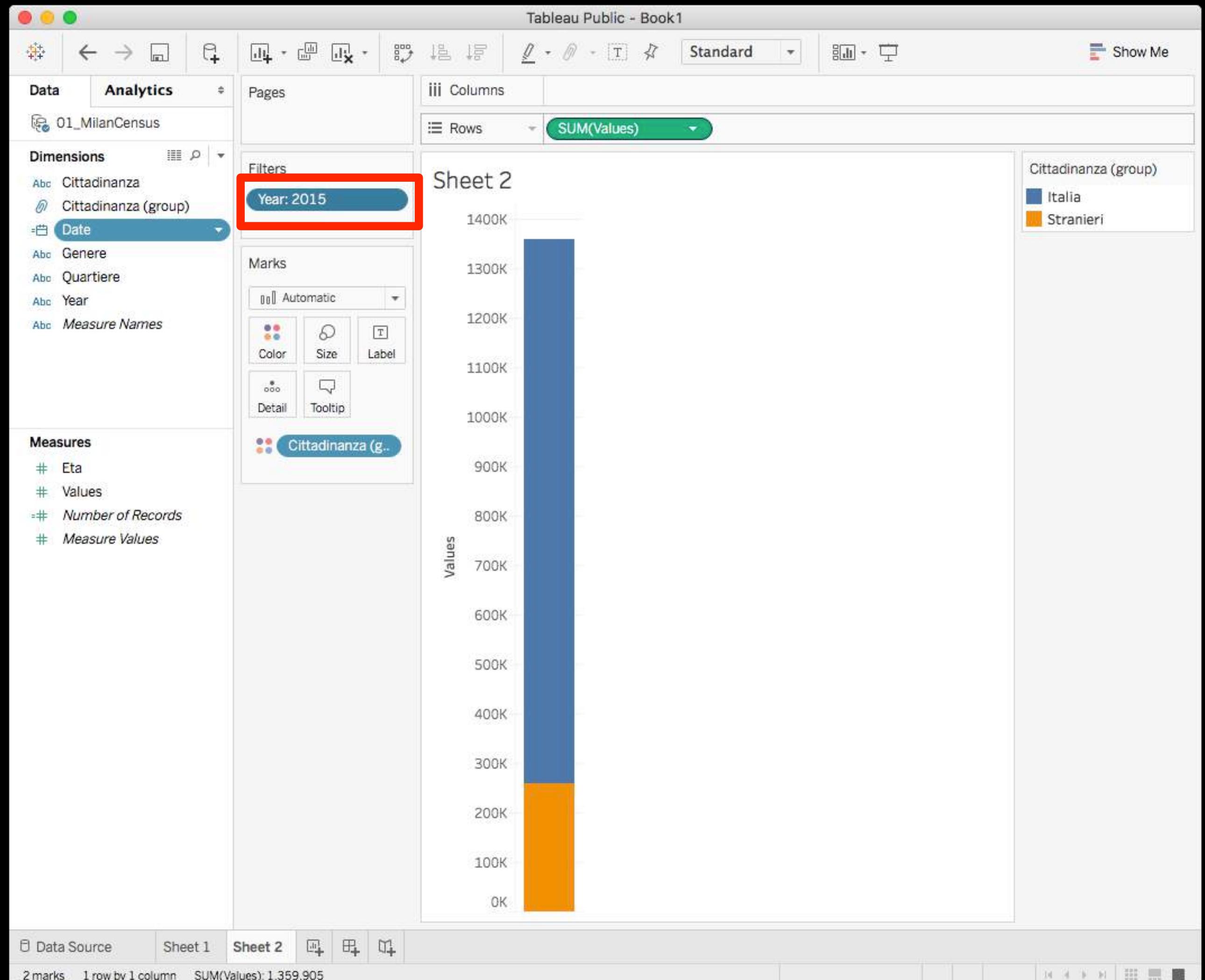
Select “Cittadinanza (Group)” and ‘Values’ and select stacked bar.



EXPLORING THE CENSUS

Let's make a stacked bar chart

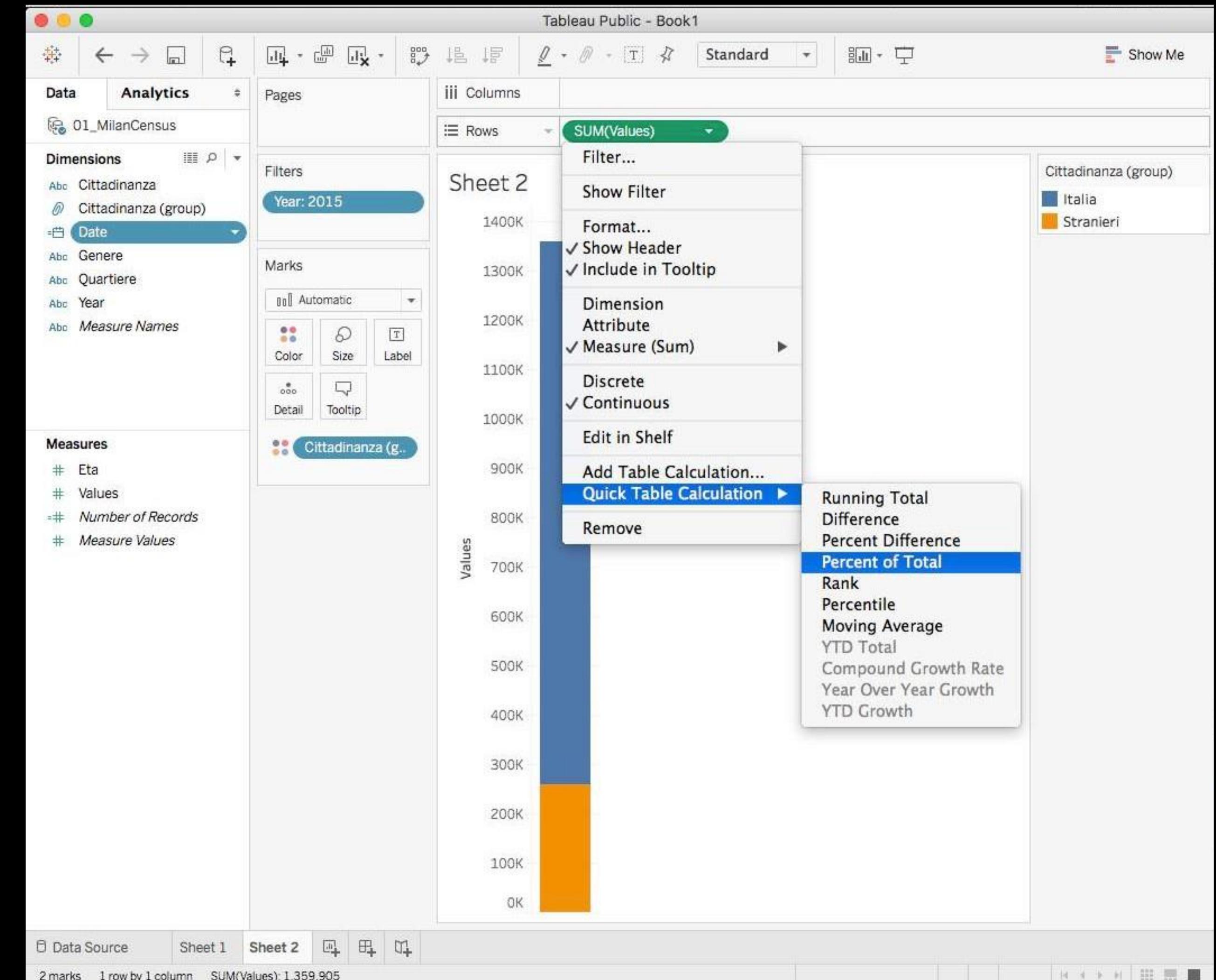
Apply the filter to "Date" against to have only the values for 2015.



EXPLORING THE CENSUS

Let's make a stacked bar chart

In order to see the percentage click on “SUM(Values)” in “Rows” and click on “Quick Table Calculation” and on “Percent of Total”.



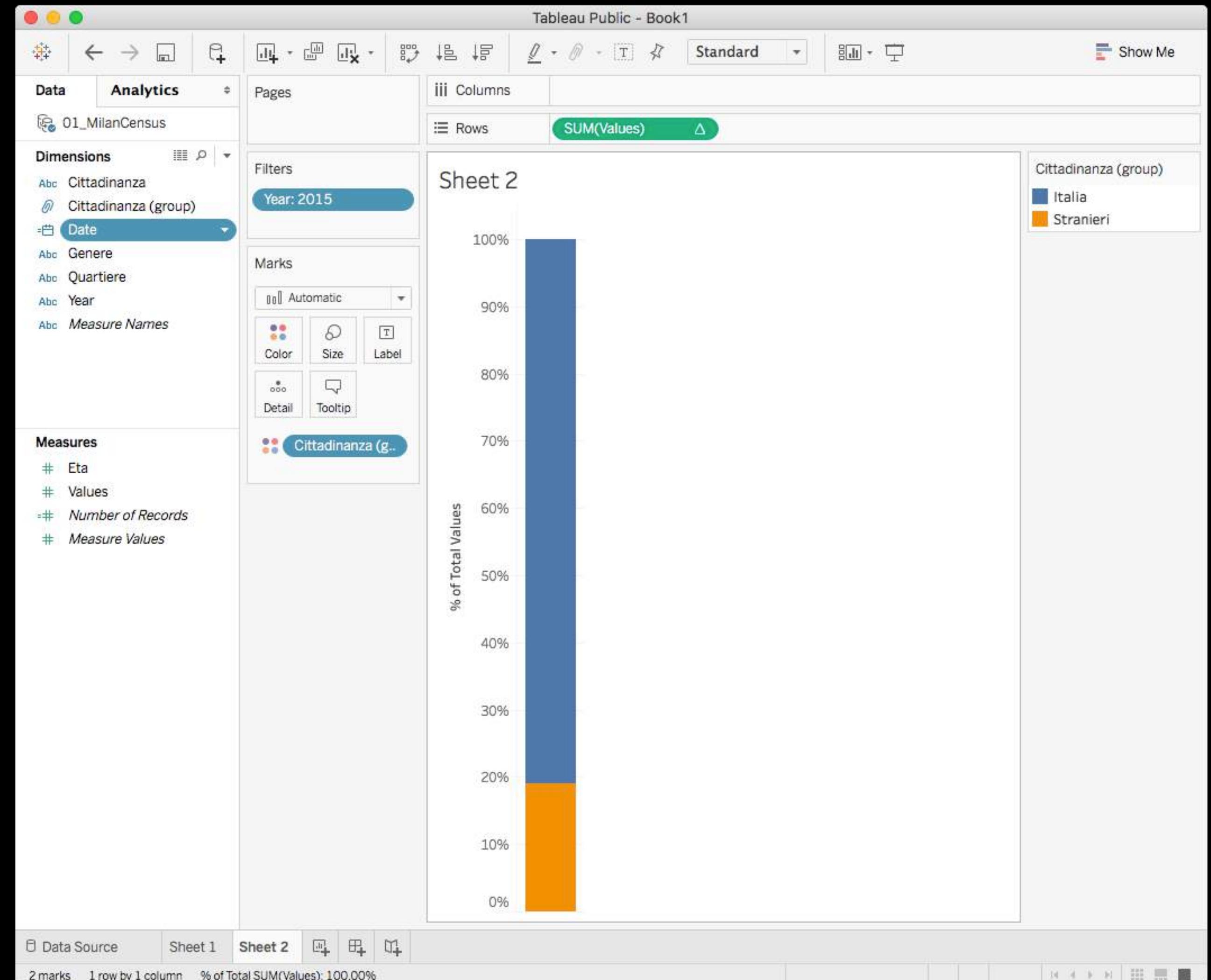
EXPLORING THE CENSUS

Let's make a stacked bar chart

Now we have the values mapped from 0 to 100%.

Italia = 80,95%

Stranieri = 10,05%

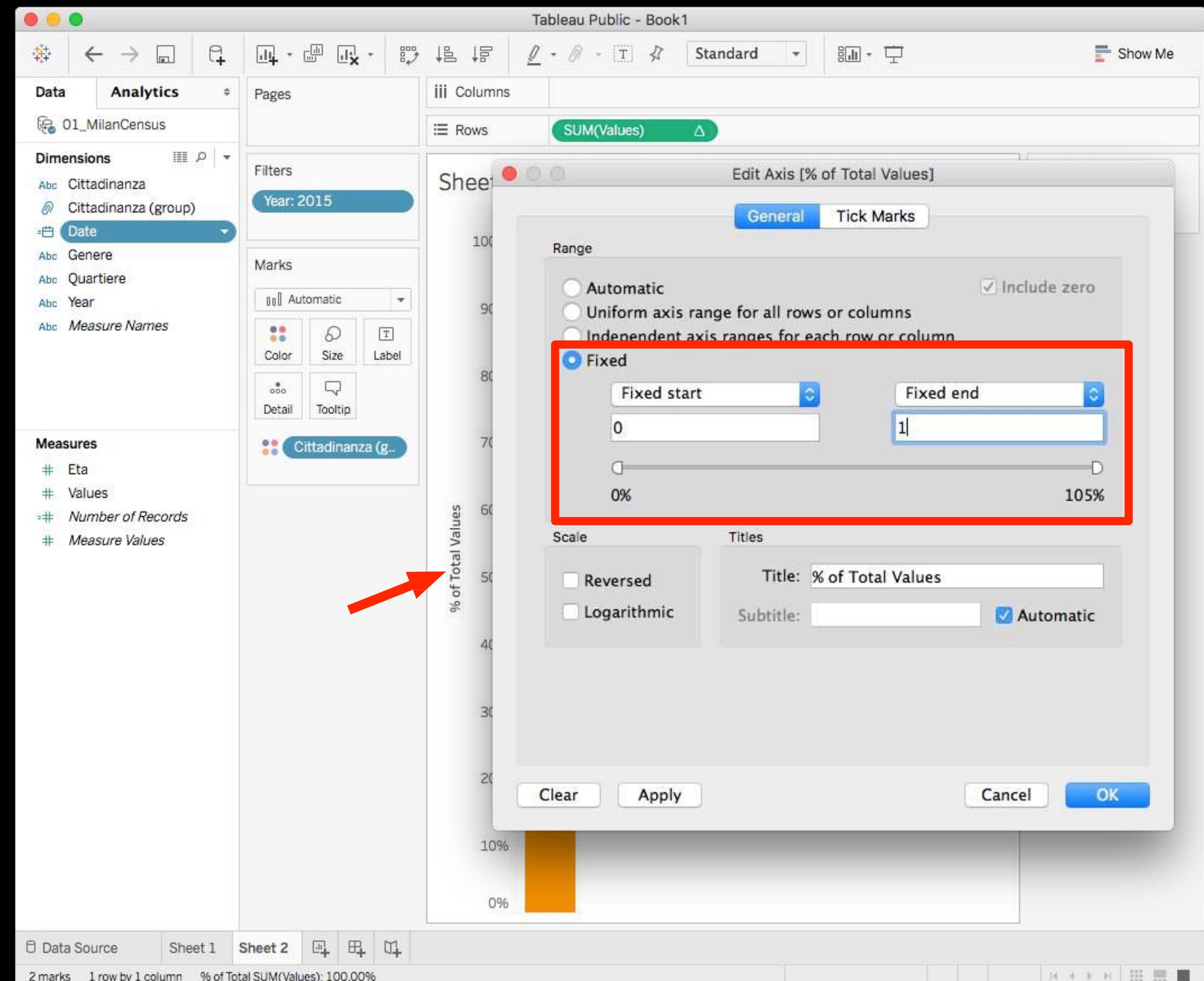


EXPLORING THE CENSUS

Let's make a stacked bar chart

Double click on "% of Total Values" label.

Select "Fixed" and specify the range from 0 to 1.

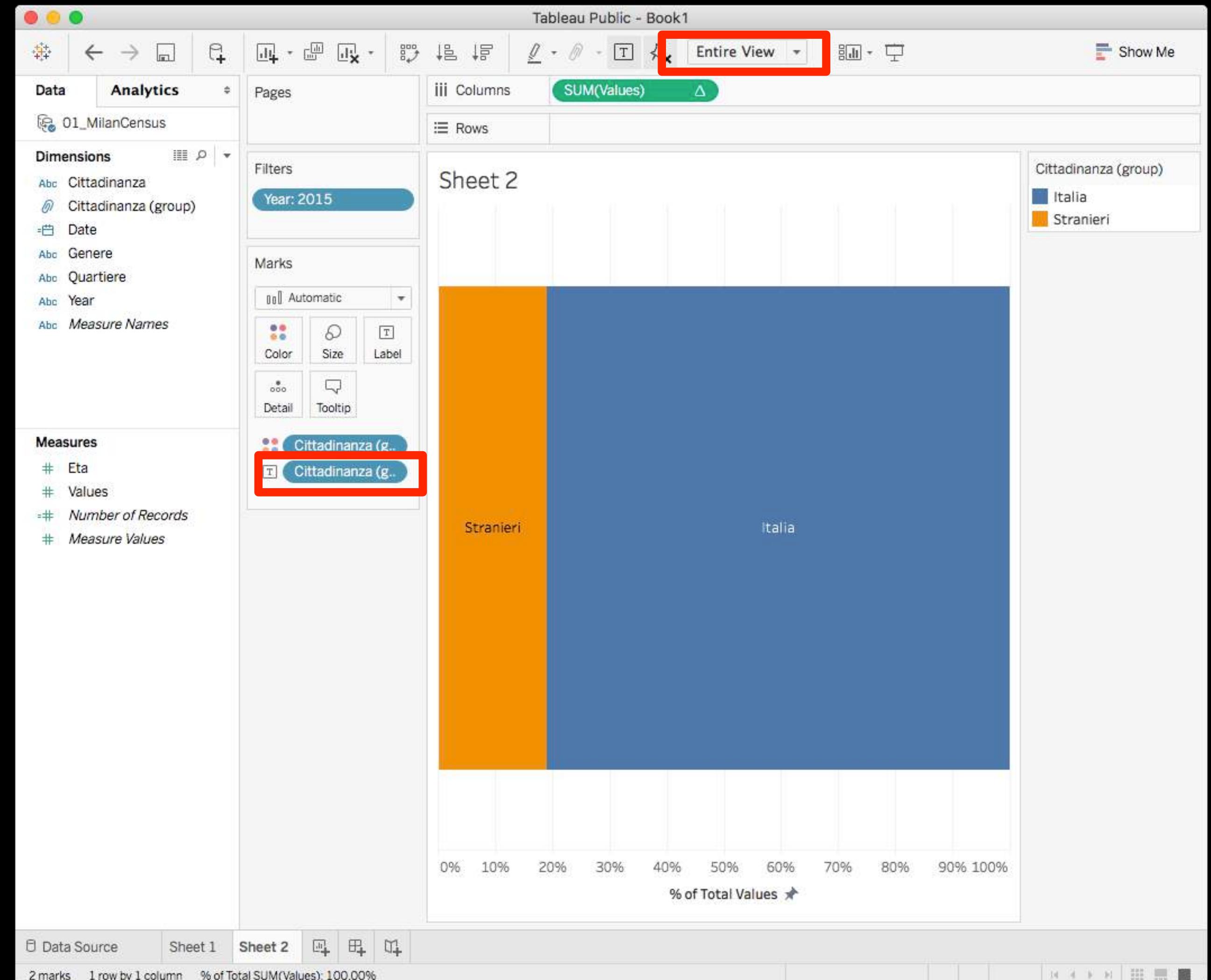


EXPLORING THE CENSUS

Let's make a stacked bar chart

Make the bar chart horizontal switching “Rows” with “Columns”.

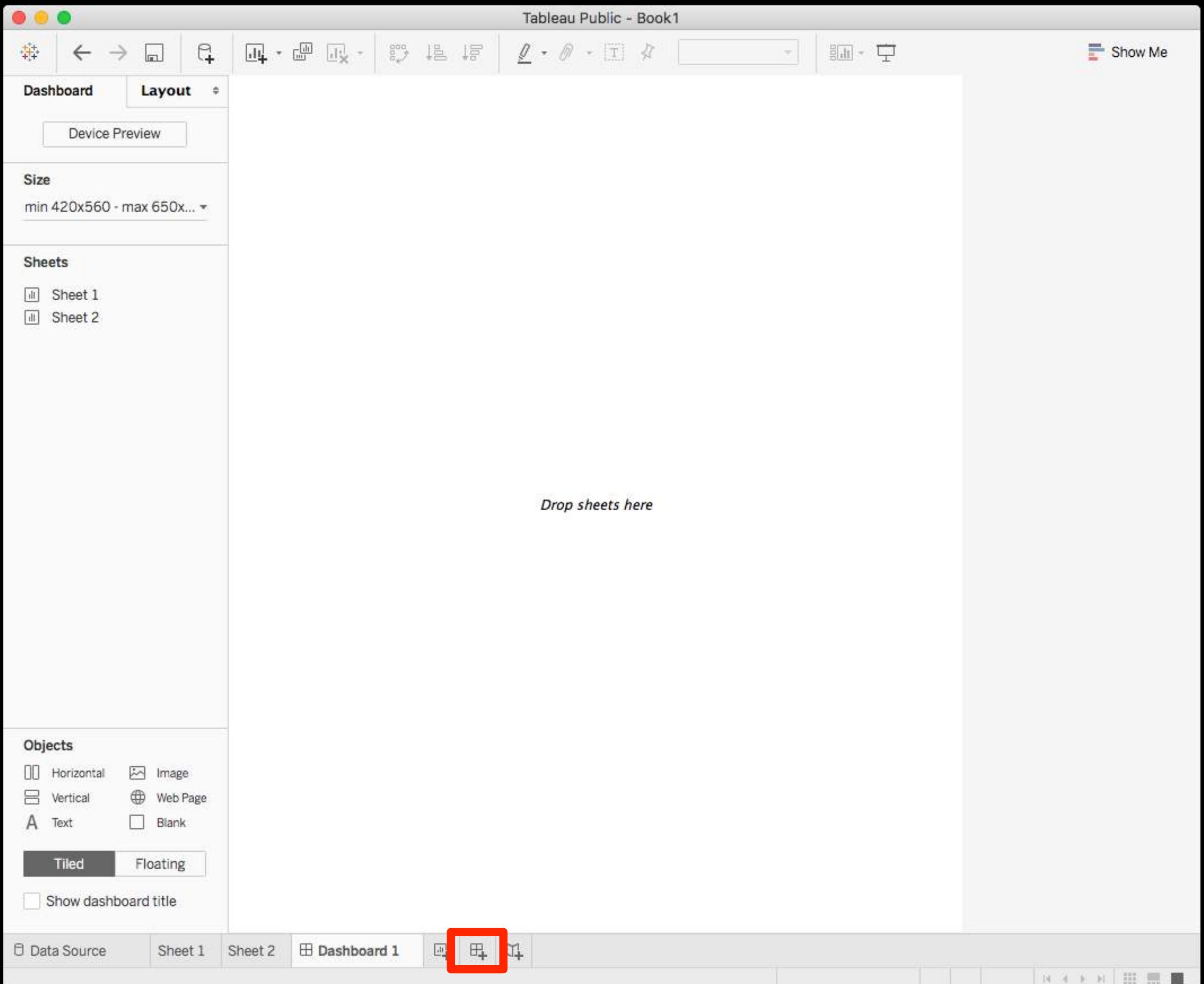
Drag “Cittadinanza (Group)” in “Label” and select “Entire View”



EXPLORING THE CENSUS

How can we combine the two visualizations?

Create a new dashboard.



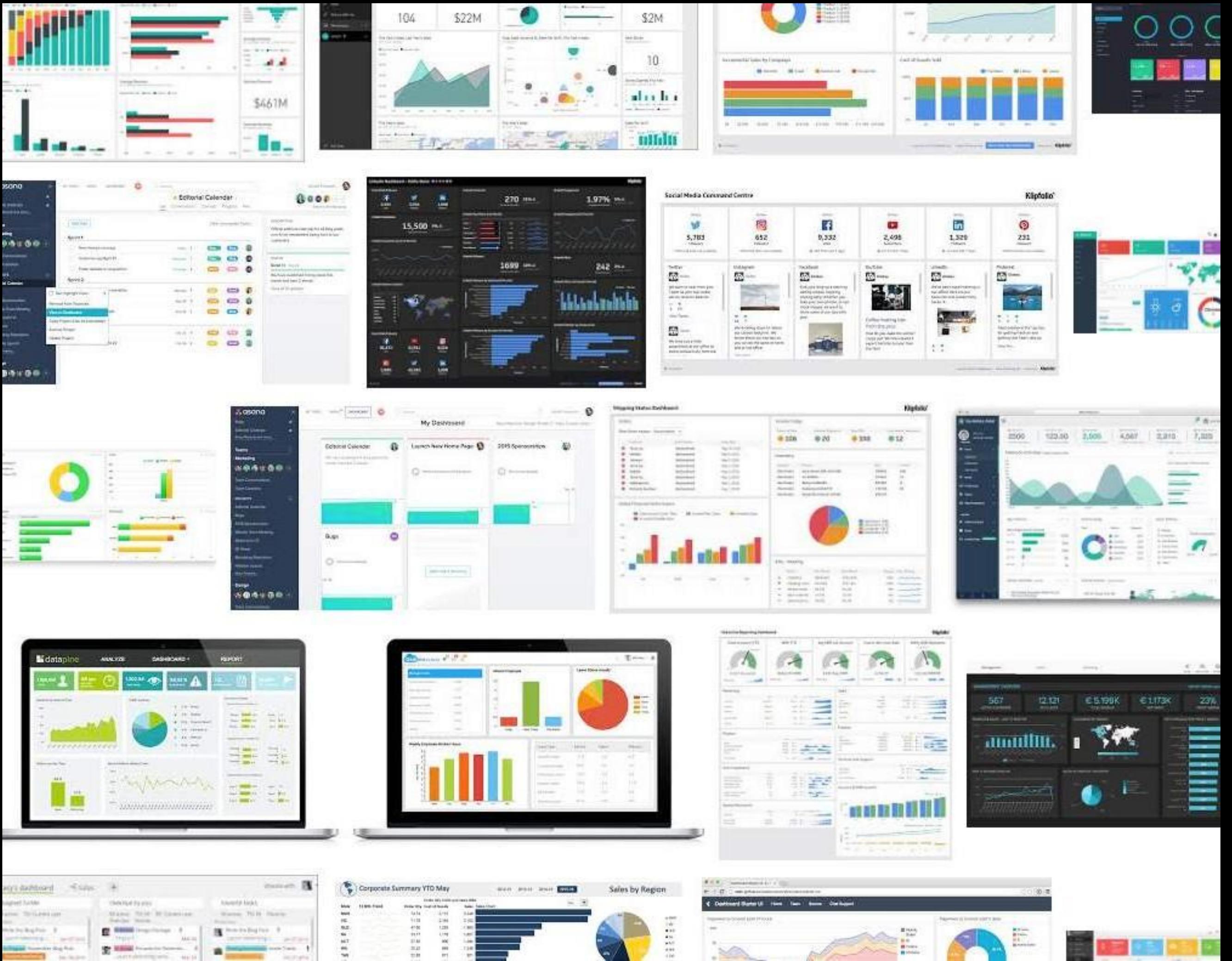
EXCURSUS

Dashboards



EXCURSUS

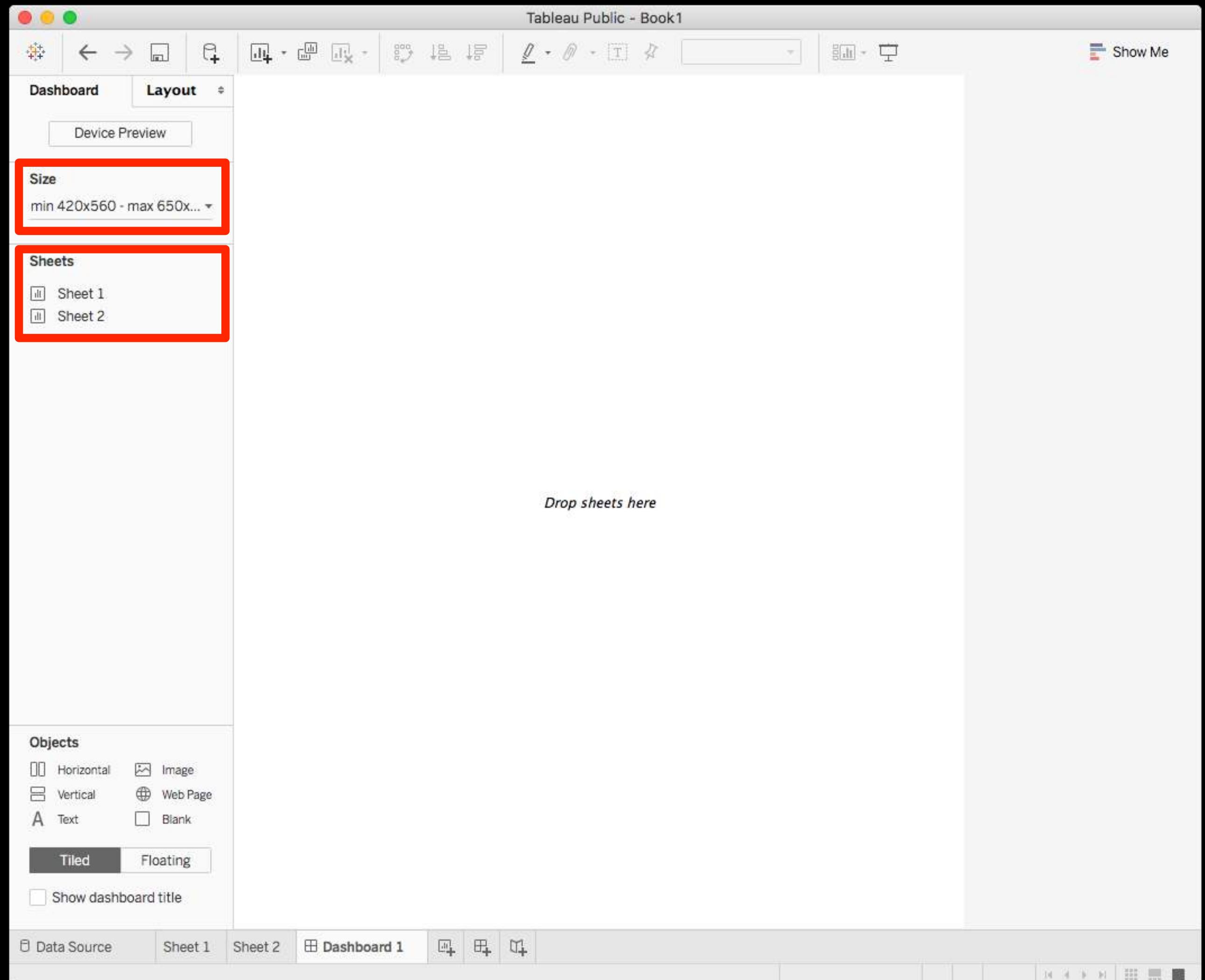
Dashboards



EXPLORING THE CENSUS

The dashboard page

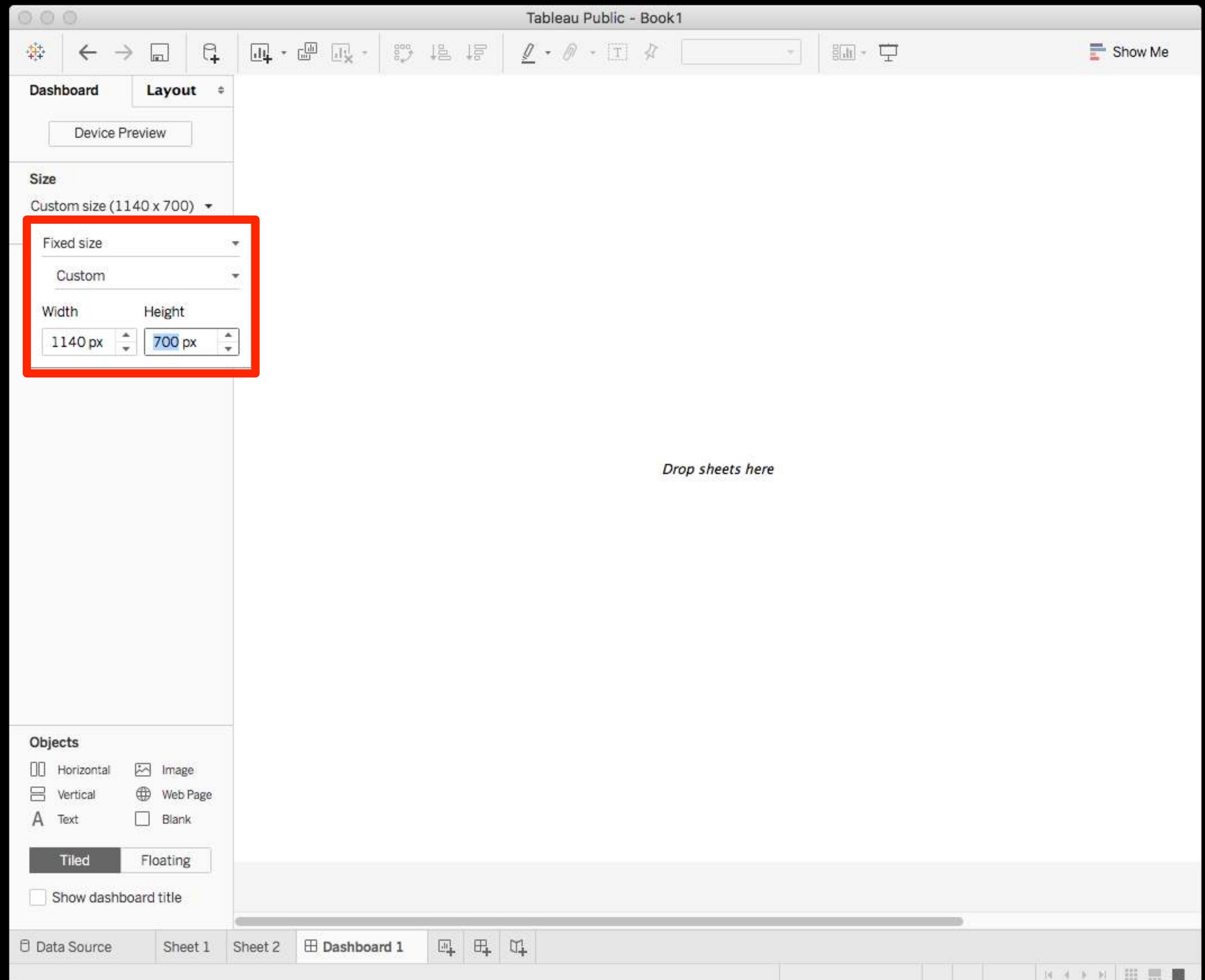
On the left part we have have the settings for the dashboard size and all the sheets created in Tableau.



EXPLORING THE CENSUS

The dashboard page

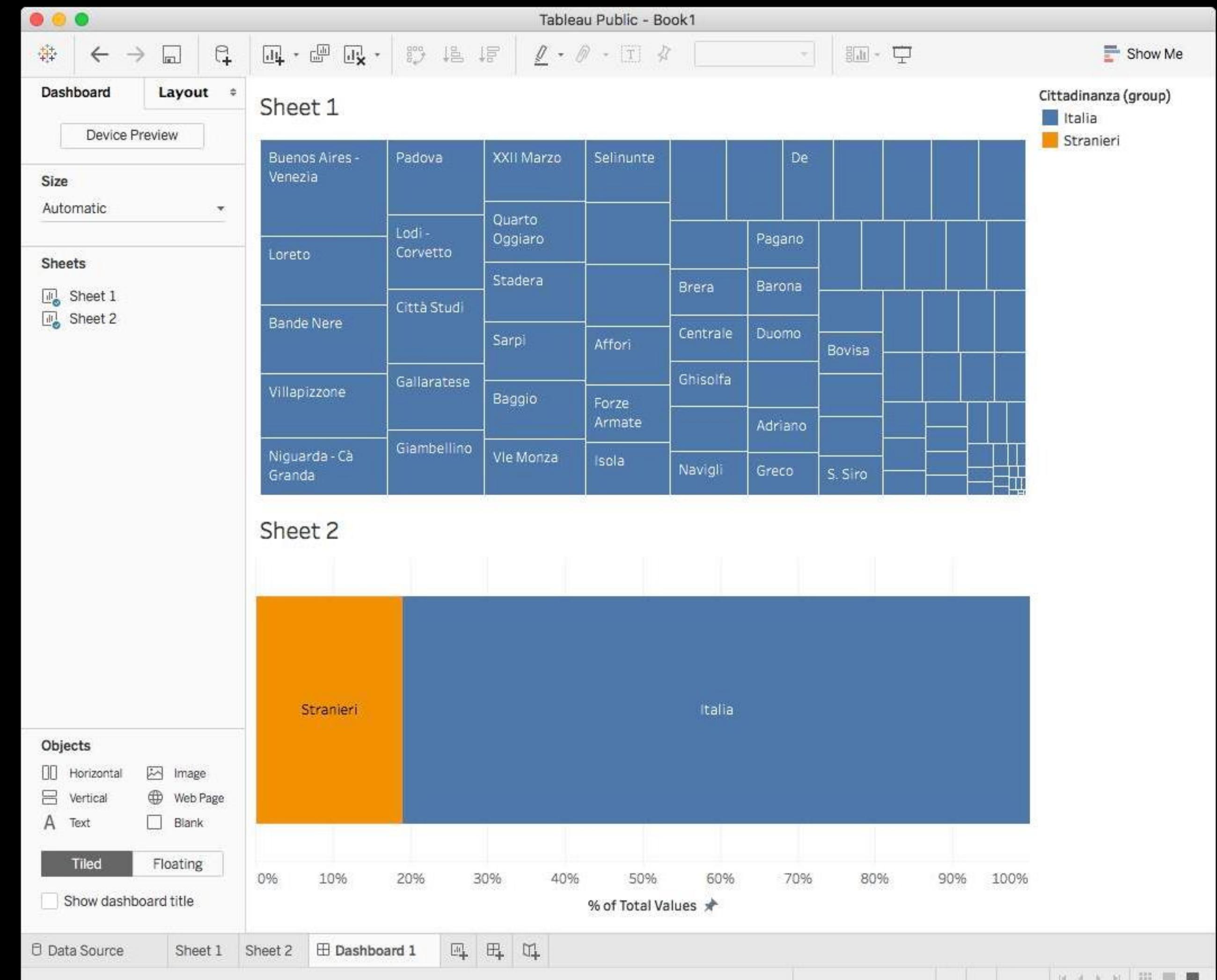
Let's set the size of the dashboard to 1140px per 700px (suggested size for the project template)



EXPLORING THE CENSUS

Designing the dashboard

Let's drag and drop the sheets on the right in the following way.



EXPLORING THE CENSUS

Designing the dashboard

Let's remove the legend from the right and decrease the size of "Sheet 2".

Tableau Public - Book1

Show Me

Dashboard Layout Device Preview

Size Automatic

Sheets

- Sheet 1
- Sheet 2

Objects

- Horizontal
- Image
- Vertical
- Web Page
- A Text
- Blank

Tiled Floating

Show dashboard title

Sheet 1

Buenos Aires - Venezia	Lodi - Corvetto	Stadera	Affori	Forze Armate	Isola	Dergano	Umbria - Molise	De Angeli - Monte Rosa
Loreto	Città Studi	Sarpi	Ticinese	Navigli				
Bande Nere	Gallaratese	Baggio	Parco Lambro - Cimiano	Porta Romana	Adriano	Brizzano	S. Siro	S.
Villapizzone	Giambellino	Vie Monza	Corsica	Tortona	Greco	Guastalla	Tibaldi	Lambrate
Niguarda - Ca Granda	XXII Marzo	Selinunte	Mecenate	Gratosoglio - Ticinello	Brera	Ronchetto S/N		
Padova	Quarto Oggiaro	Washington	Maciachini - Maggiolina	Centrale				

Sheet 2

Stranieri Italia

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

% of Total Values

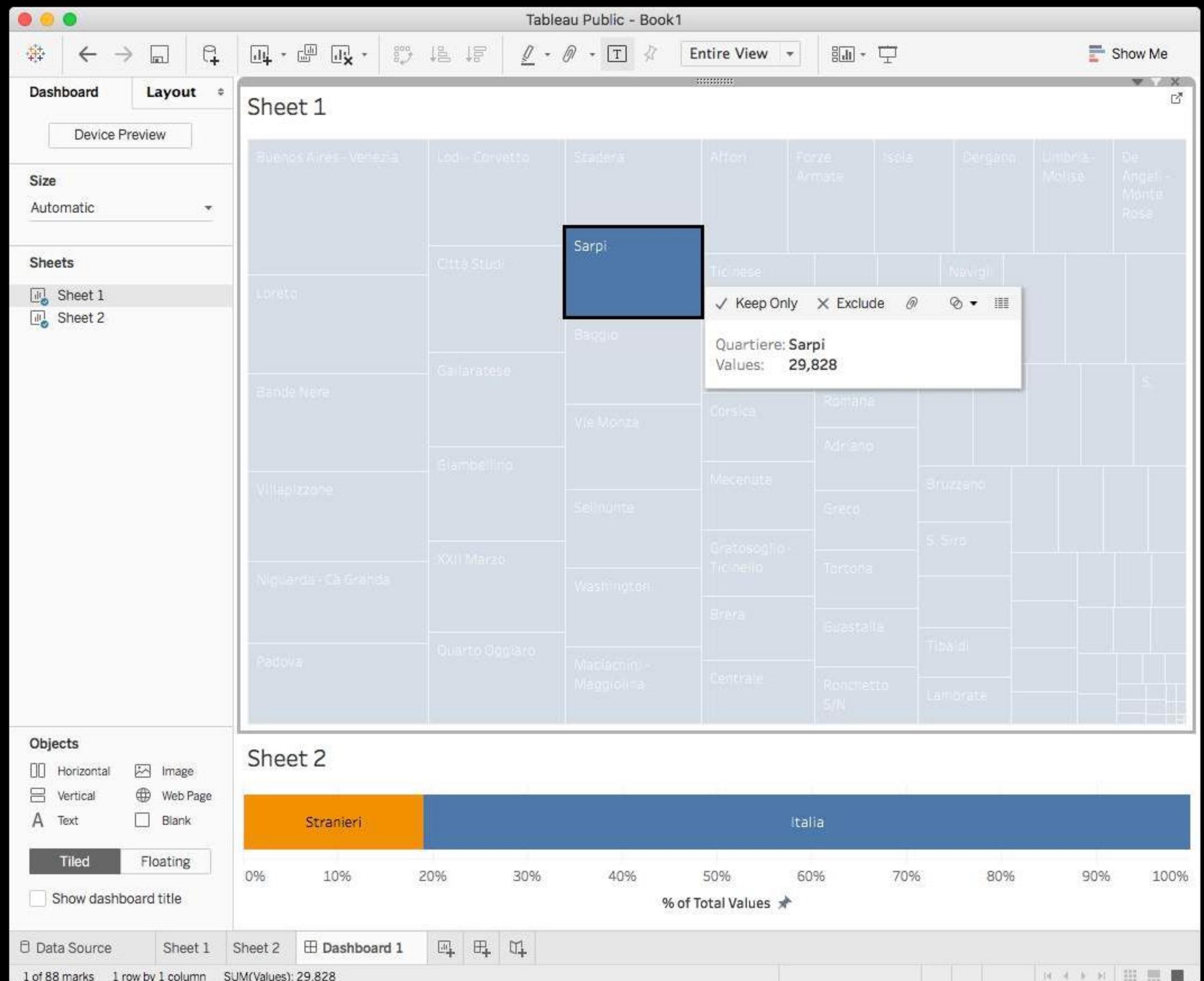
Data Source Sheet 1 Sheet 2 Dashboard 1

EXPLORING THE CENSUS

Designing the dashboard

If i click on a particular item the other visualization doesn't change.

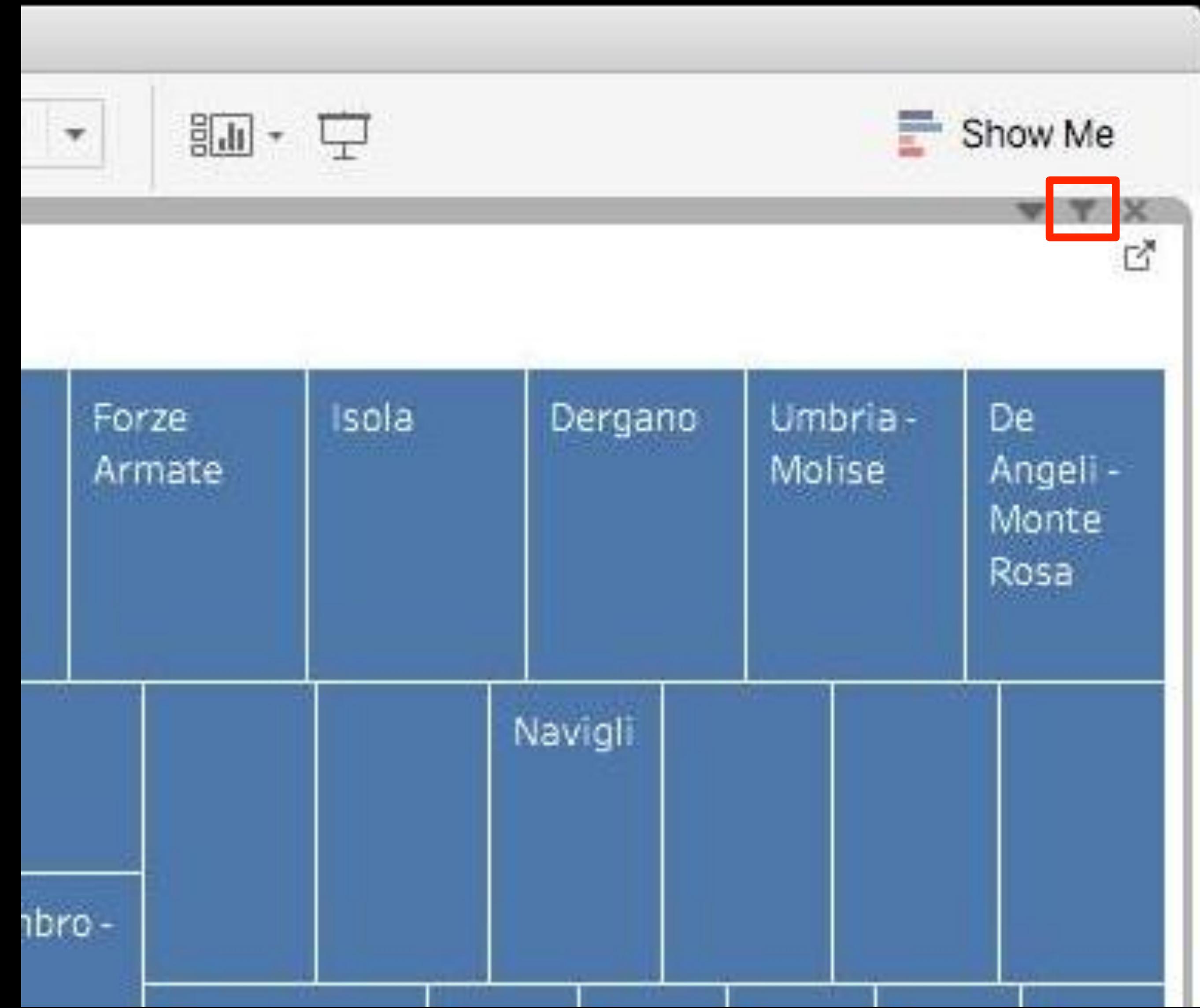
How can i link the two visualizations in order to filter?



EXPLORING THE CENSUS

Designing the dashboard

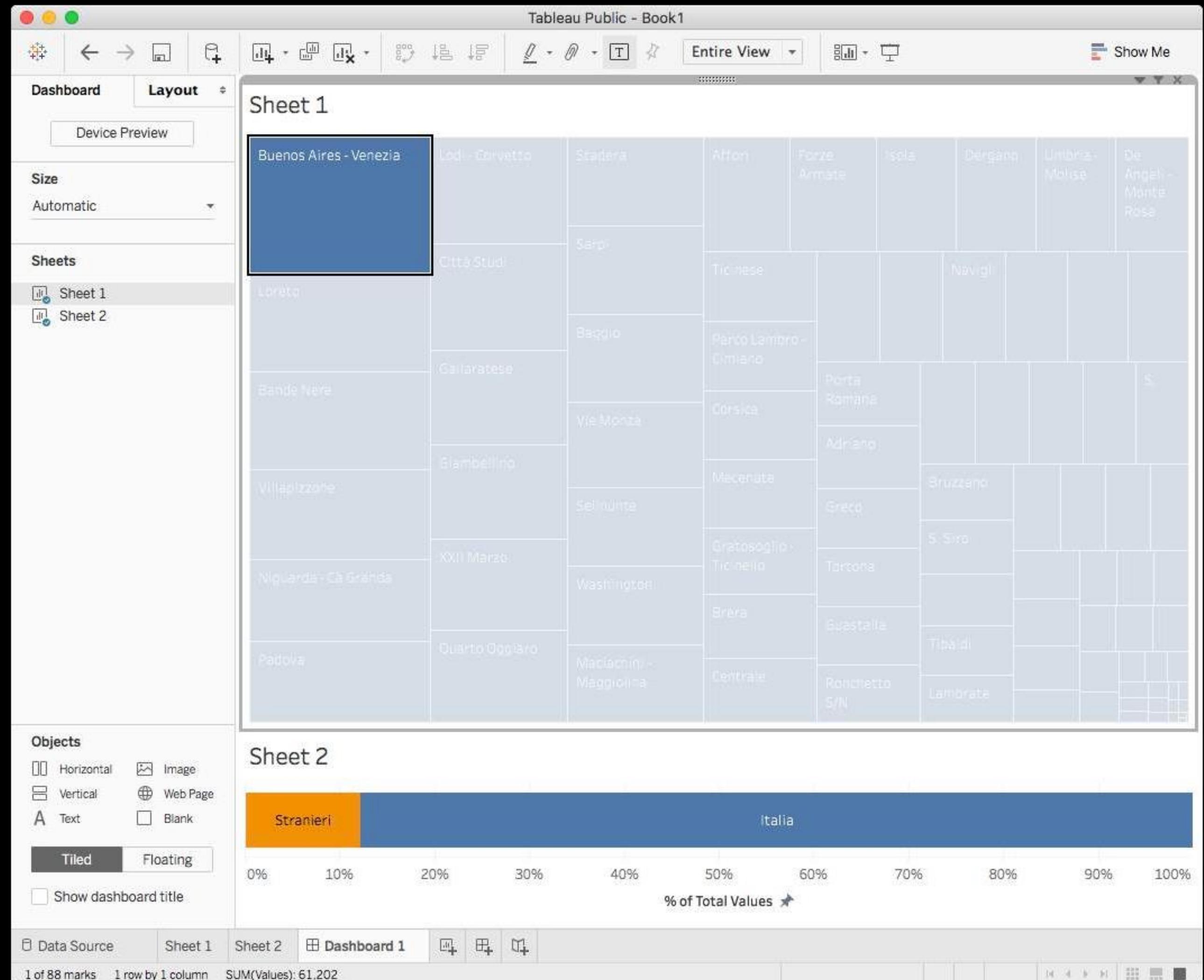
Click on the filter icon on top of the window of both visualizations.



EXPLORING THE CENSUS

Designing the dashboard

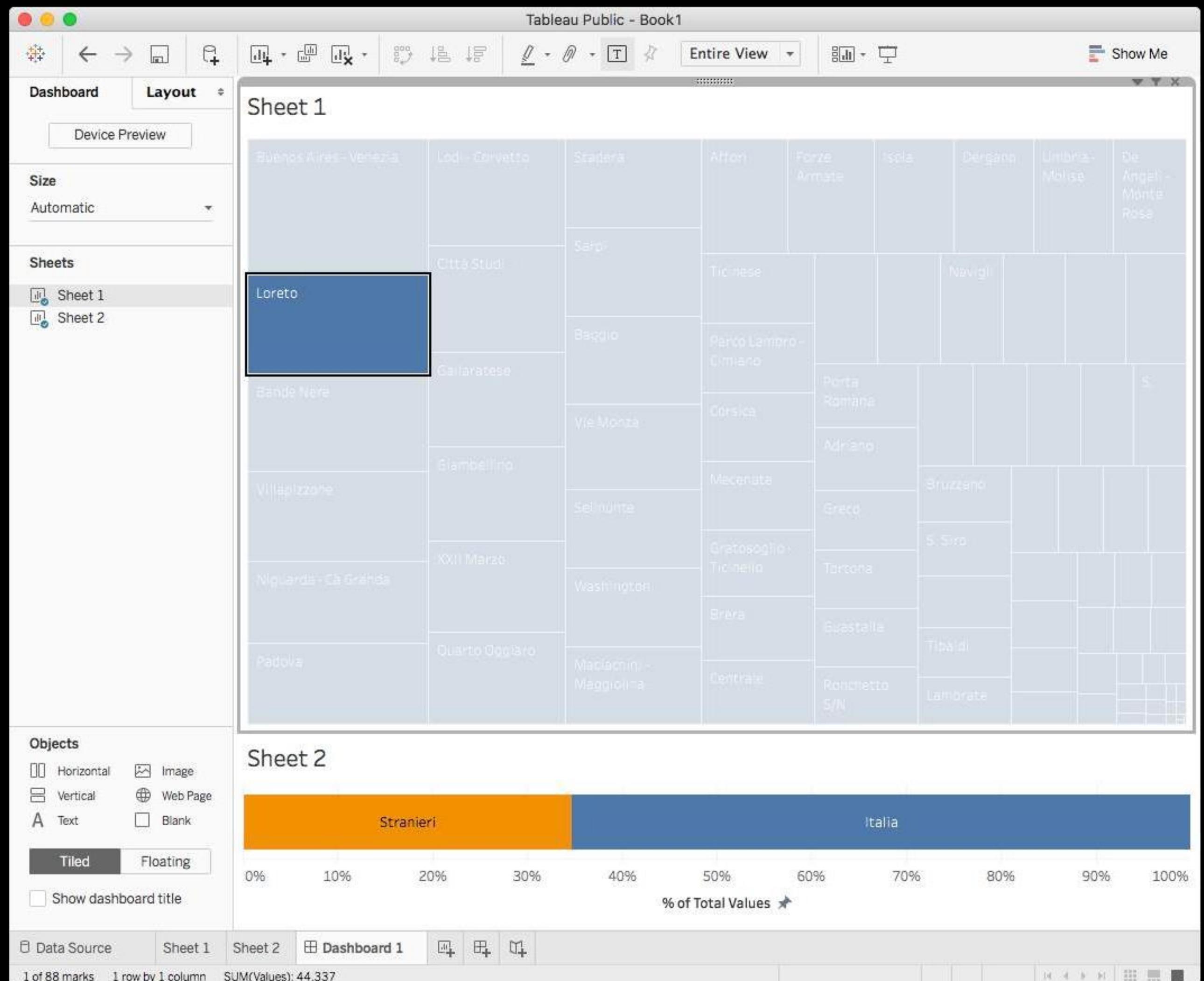
**Using the visualizations as filters
I can now interact with the
visualization and dynamically
filter the other one.**



EXPLORING THE CENSUS

Designing the dashboard

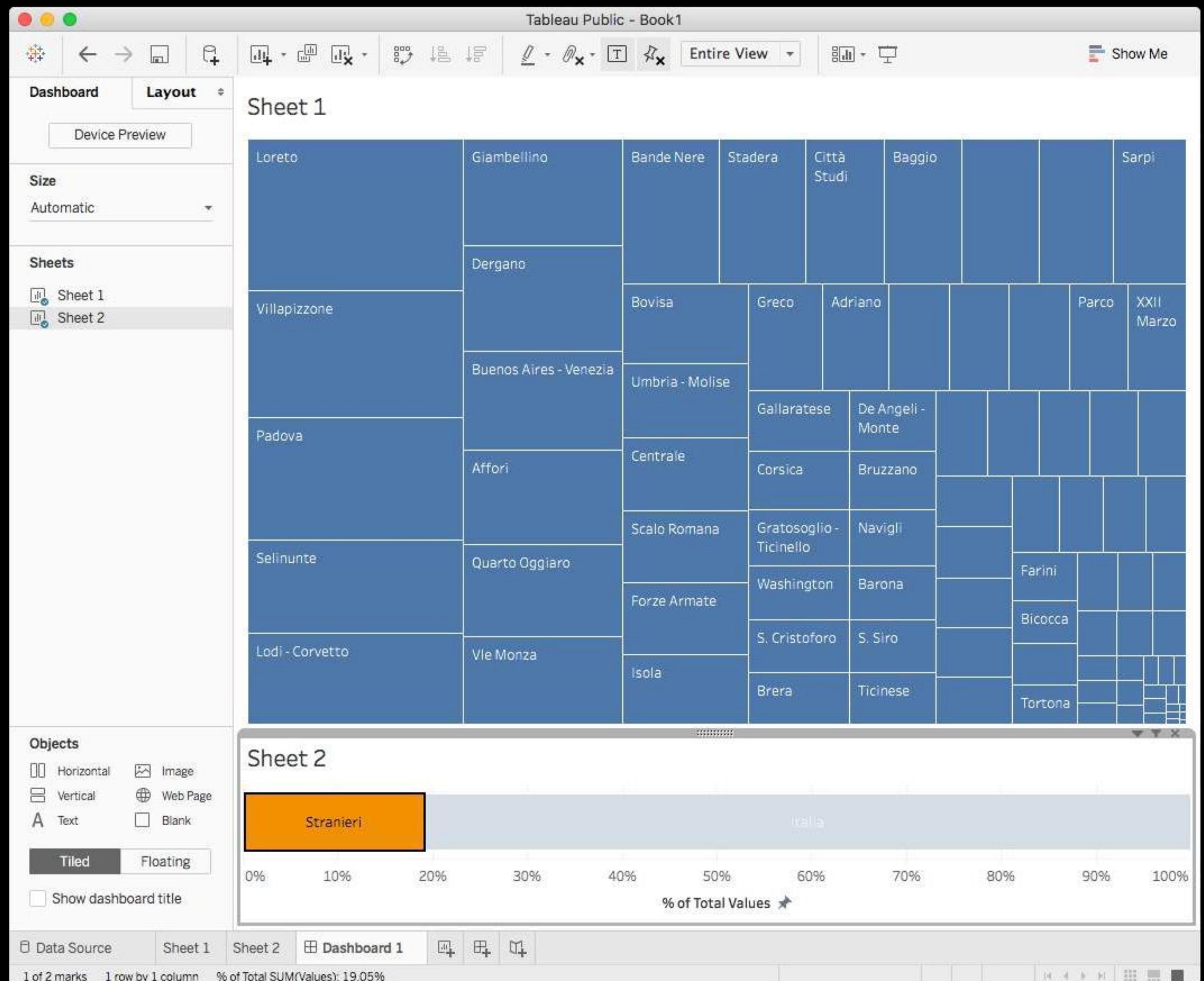
**Using the visualizations as filters
I can now interact with the
visualization and dynamically
filter the other one.**



EXPLORING THE CENSUS

Designing the dashboard

**Using the visualizations as filters
I can now interact with the
visualization and dynamically
filter the other one.**

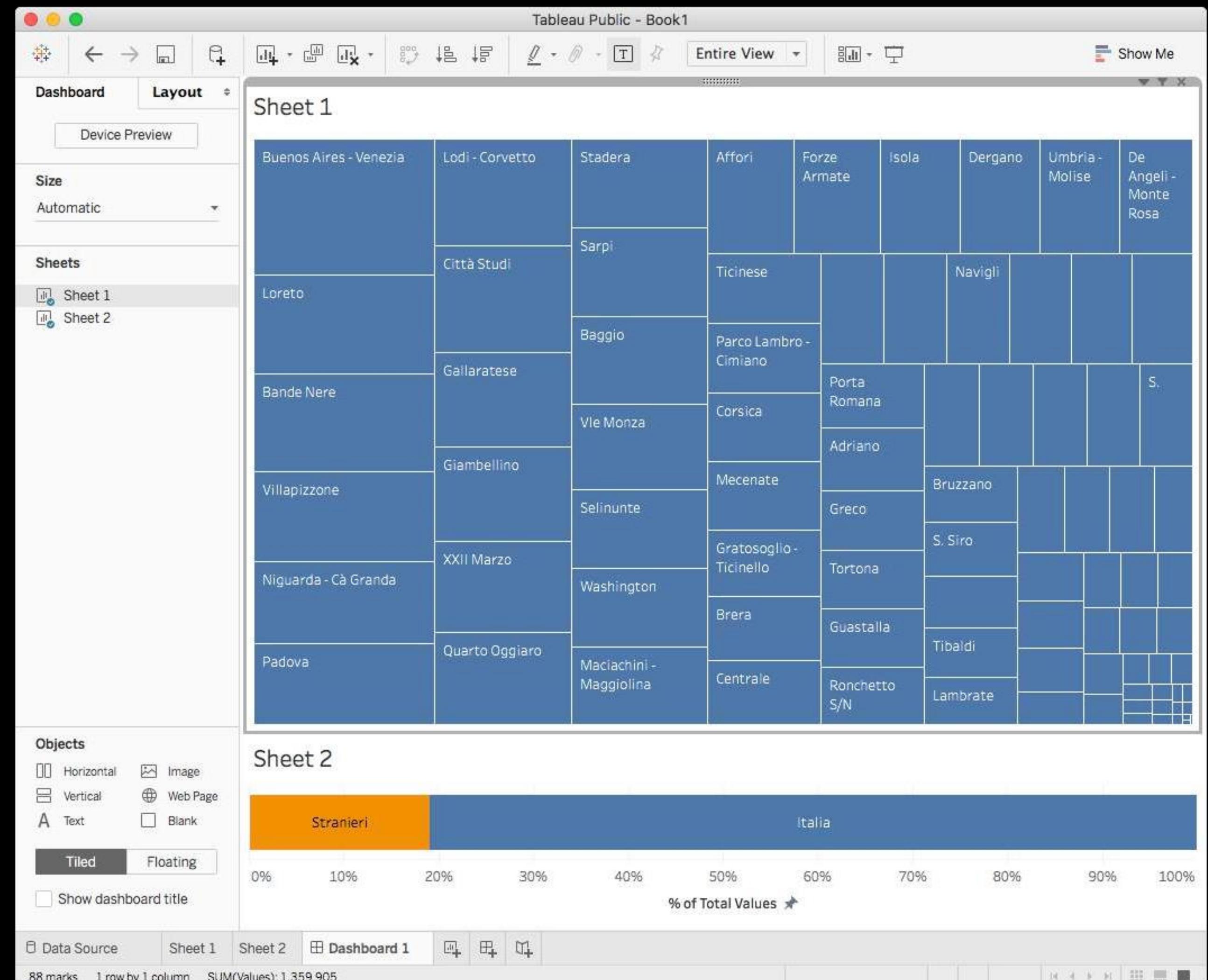


EXPLORING THE CENSUS

Explore the visualization

Which are the more “foreigner” areas?

Which are the more “Italian”?

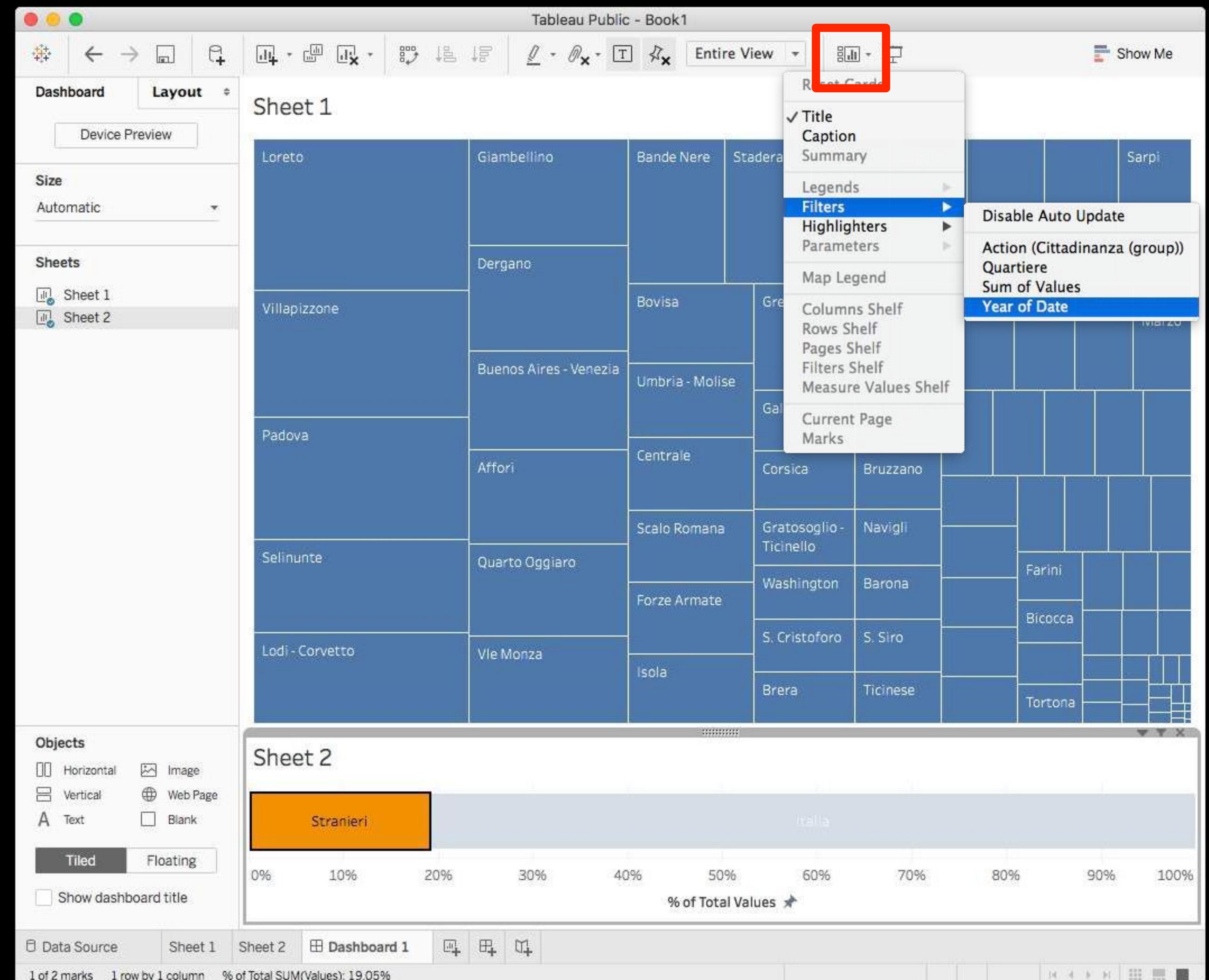


EXPLORING THE CENSUS

Designing the dashboard

Let's add now the filters for "Date". Click on top and select "Filters">>"Year of Date".

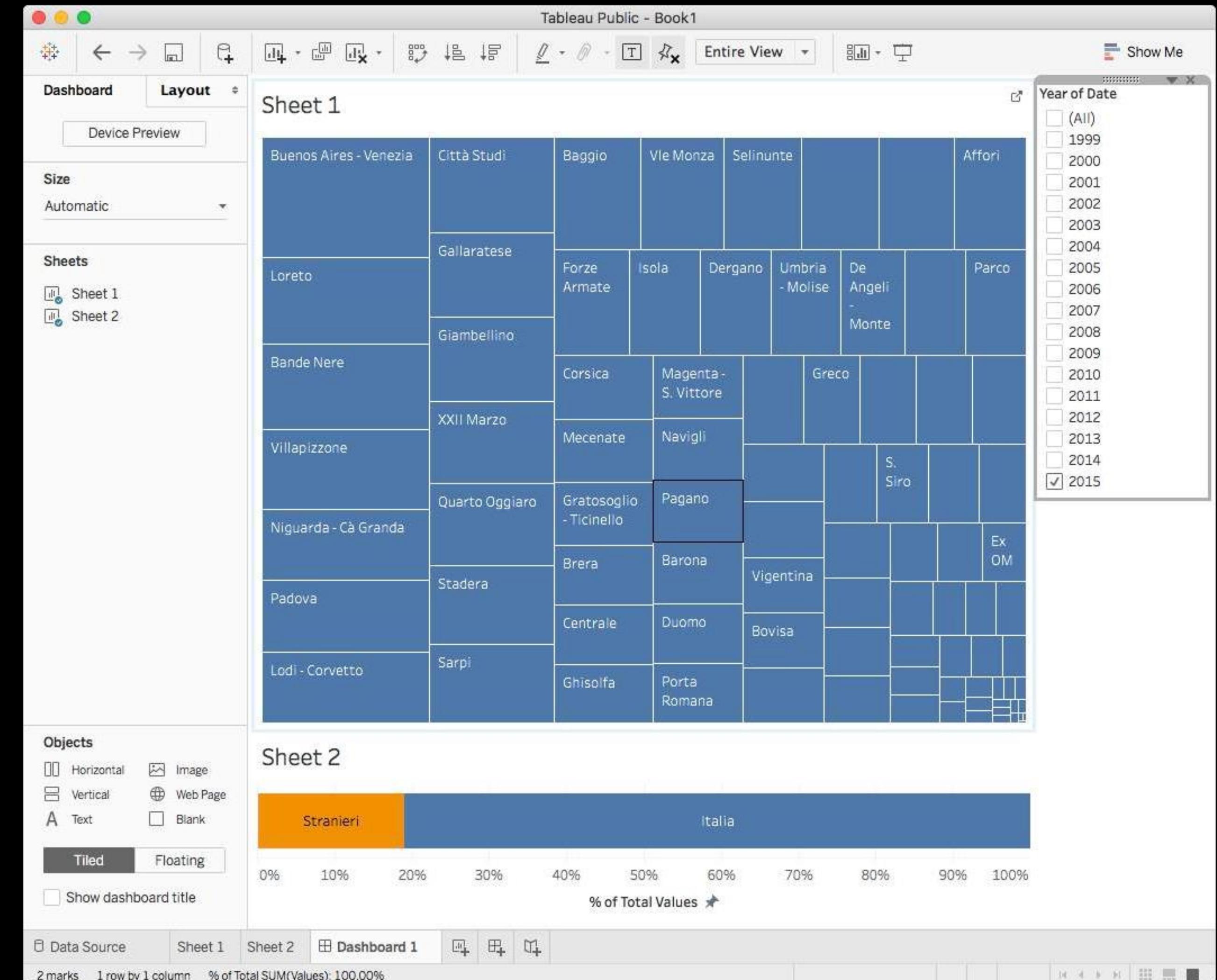
If we want to add other filters we have to add them in the original sheets.



EXPLORING THE CENSUS

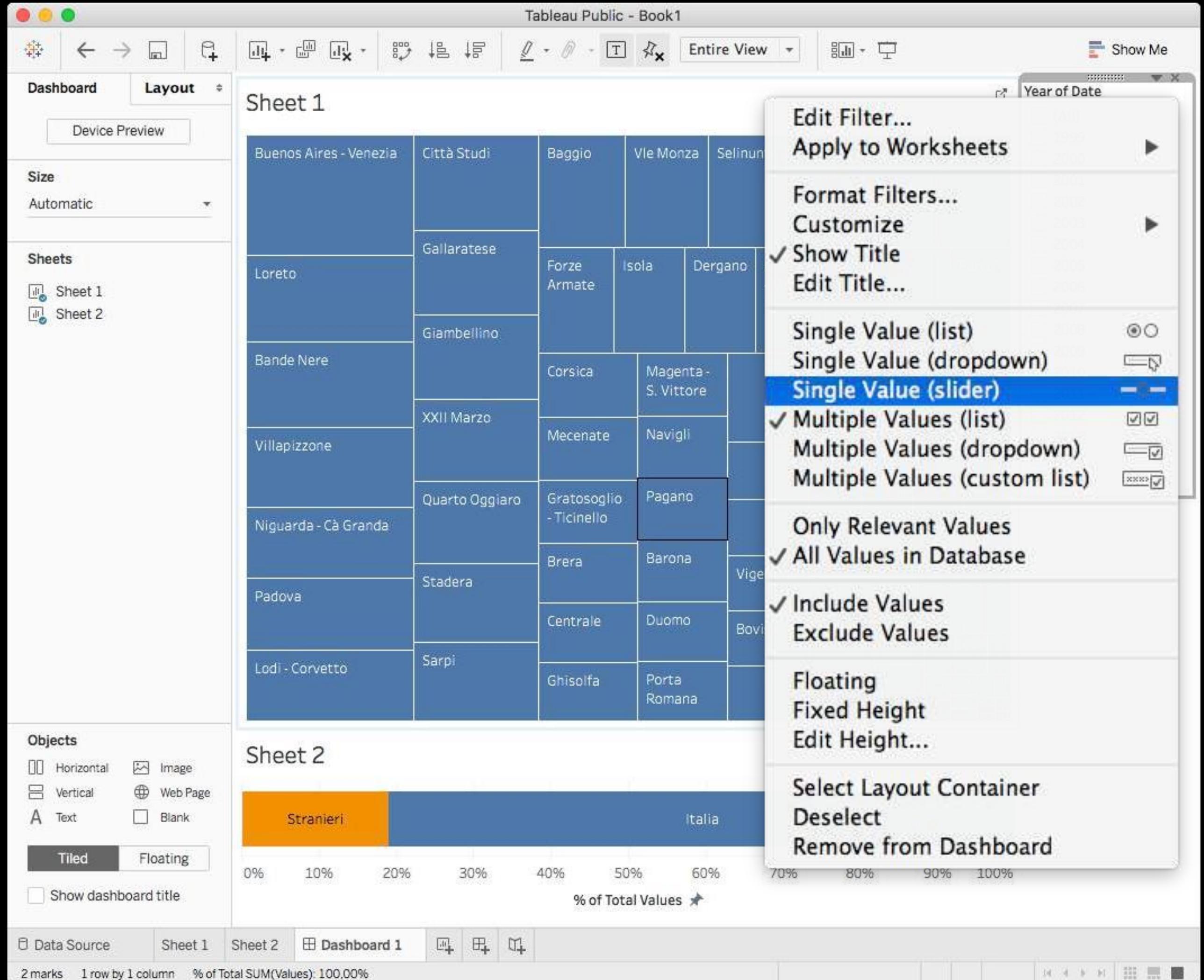
Designing the dashboard

The checkboxes will appear on the dashboard.



EXPLORING THE CENSUS

Designing the dashboard

To change the type of filter click on the small dropdown and select “Single Value (slider)”.


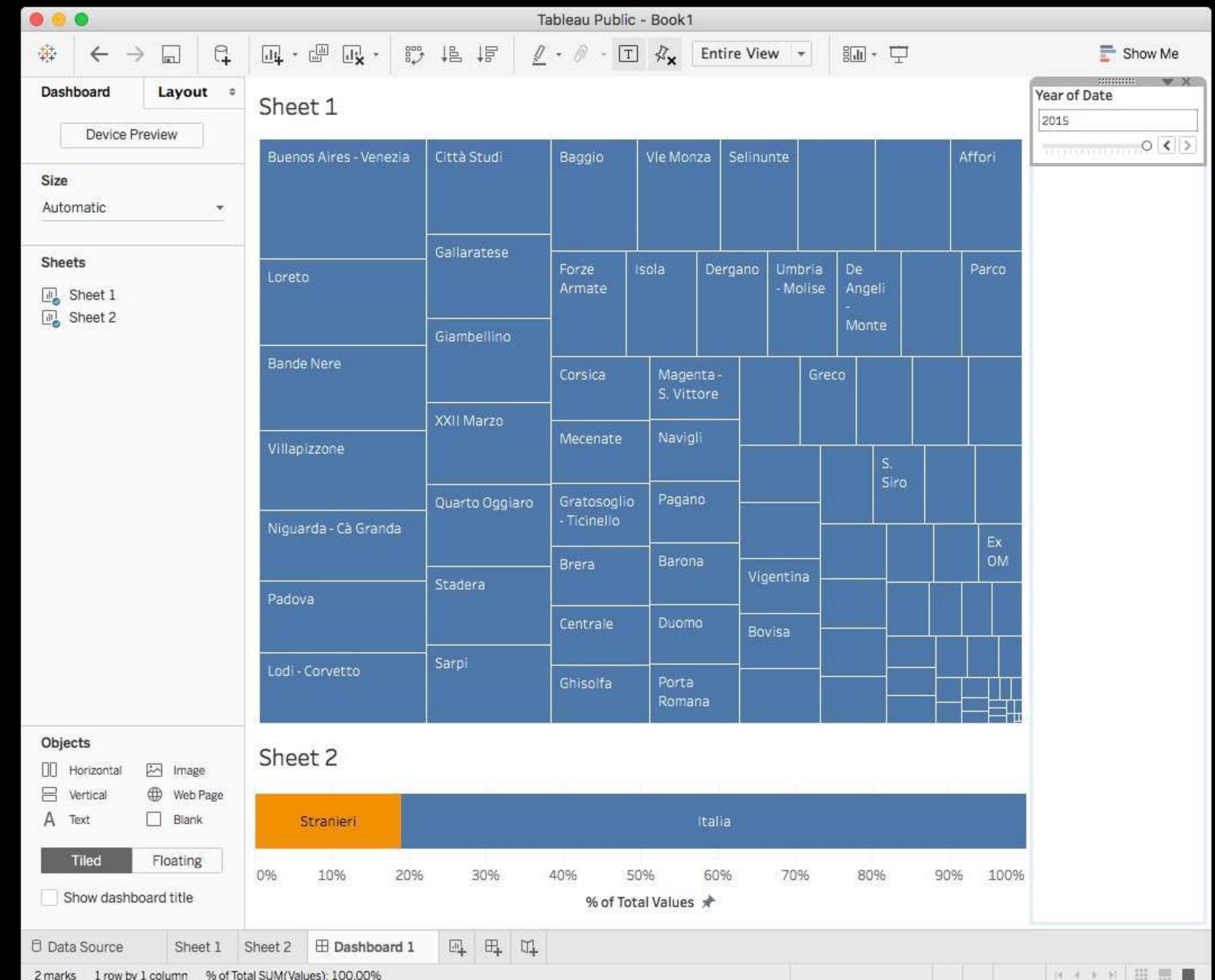
The screenshot shows the Tableau Public interface with a dashboard containing two sheets. Sheet 1 displays a grid of Italian neighborhoods, and Sheet 2 shows a bar chart of foreign population in Italy. A context menu is open over a filter named "Year of Date" in Sheet 1, specifically over the "Format Filters..." dropdown. The menu is titled "Edit Filter..." and includes options like "Apply to Worksheets", "Format Filters...", "Customize", and "Show Title". Under "Single Value (list)", "Single Value (dropdown)", and "Multiple Values (list)" are checked. The "Single Value (slider)" option is selected and highlighted in blue. Other options like "Only Relevant Values" and "All Values in Database" are also listed.

EXPLORING THE CENSUS

Designing the dashboard

Click on the slider to see how values change over time.

Save the file.



EXPLORING THE CENSUS

Exercise (40 minutes)

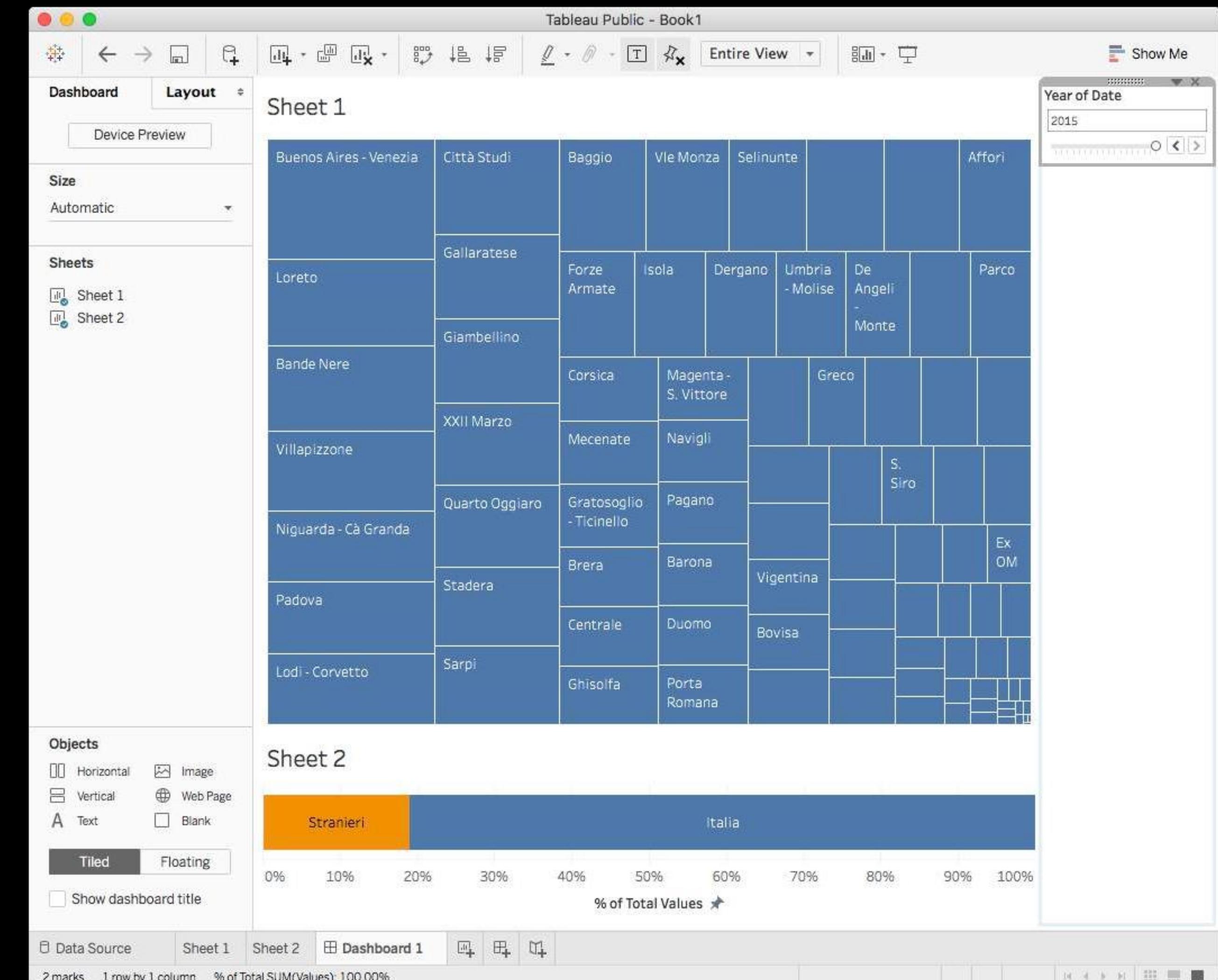
Explore the dataset creating new visualizations and new dashboards.

Examples:

How population change according to the age?

Is the ratio male/females always the same within different nationalities?

How different are two areas of the city?

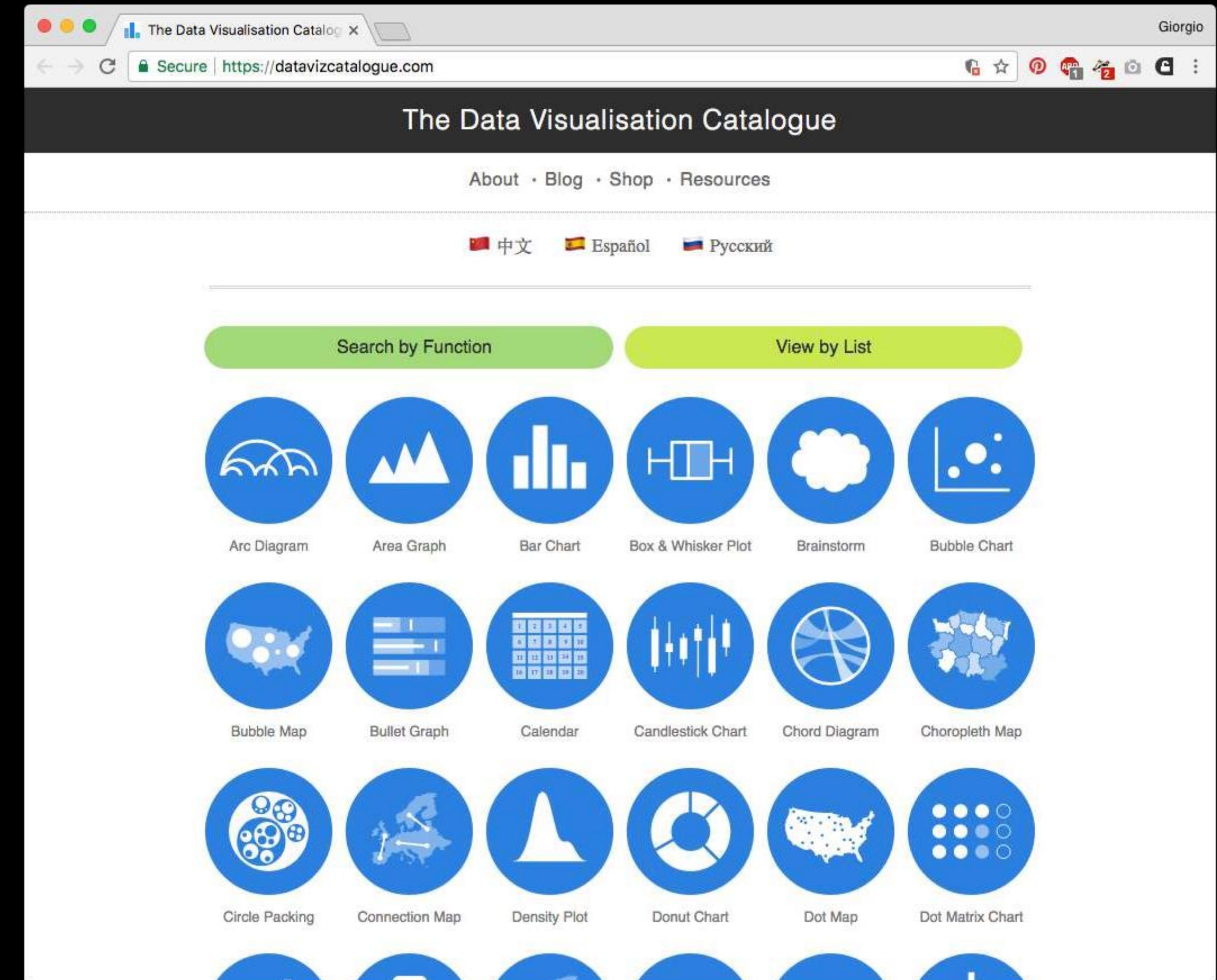


SAVE ALL YOUR DASHBOARDS

ALITTLE HELP

Explore new ways to visualize
your data according to function,
type of data and aesthetics.

<https://datavizcatalogue.com/>



ALITTLE HELP

Explore new ways to visualize
your data according to function,
type of data and aesthetics.

<http://datavizproject.com/>

Giorgio

Data Viz Project | Collection of Lab Handbook - Google Docs

datavizproject.com

D V P A project in beta by ferdio ALL FAMILY INPUT FUNCTION SHAPE Q i

The screenshot displays a grid of 12 data visualization examples:

- Sankey Diagram:** A flow diagram showing data flow from A to B, C, D, and E, with a feedback loop from F back to A.
- Alluvial Diagram:** A flow diagram showing data moving between categories A, B, and C.
- Donut Chart:** A donut chart divided into four segments labeled A, B, C, and D.
- Matrix Diagram:** A grid showing relationships between categories A, B, and C across rows 1, 2, and 3. A ribbon banner says "NOMINEE AWARDS".
- Matrix Diagram (Roof Shaped):** A diamond-shaped grid showing relationships between categories A, B, C, and D.
- Radial Histogram:** A sunburst-style radial histogram with values ranging from 0 to 20.
- Radial Bar Chart:** A radial bar chart with three concentric rings and values 200, 400, 600, 800, and 1000.
- Sorted Stream Graph:** A stream graph showing data flow from A to B, C, and D, with a feedback loop from D back to A.
- Fishbone Diagram:** A cause-and-effect diagram branching from PEOPLE and MACHINES to CAUSE.
- Pictorial fraction chart:** A chart of a person divided into 4 equal parts, with one part shaded red and labeled 75%.
- Isoleine Map:** A map where color intensity represents data values.
- Flow Map:** A map where the thickness of lines represents data flow.

ALITTLE HELP

Explore new ways to visualize your data according to function, type of data and aesthetics.

[https://github.com/ft-interactive/
chart-doctor/tree/master/visual-
vocabulary](https://github.com/ft-interactive/chart-doctor/tree/master/visual-vocabulary)

Visual vocabulary

Designing with data

There are so many ways to visualize data - how do we know which one to pick? Use the categories across the top to decide which data relationship is most important in your story, then look at the different types of chart within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, just a starting point for making informative and meaningful data visualizations.

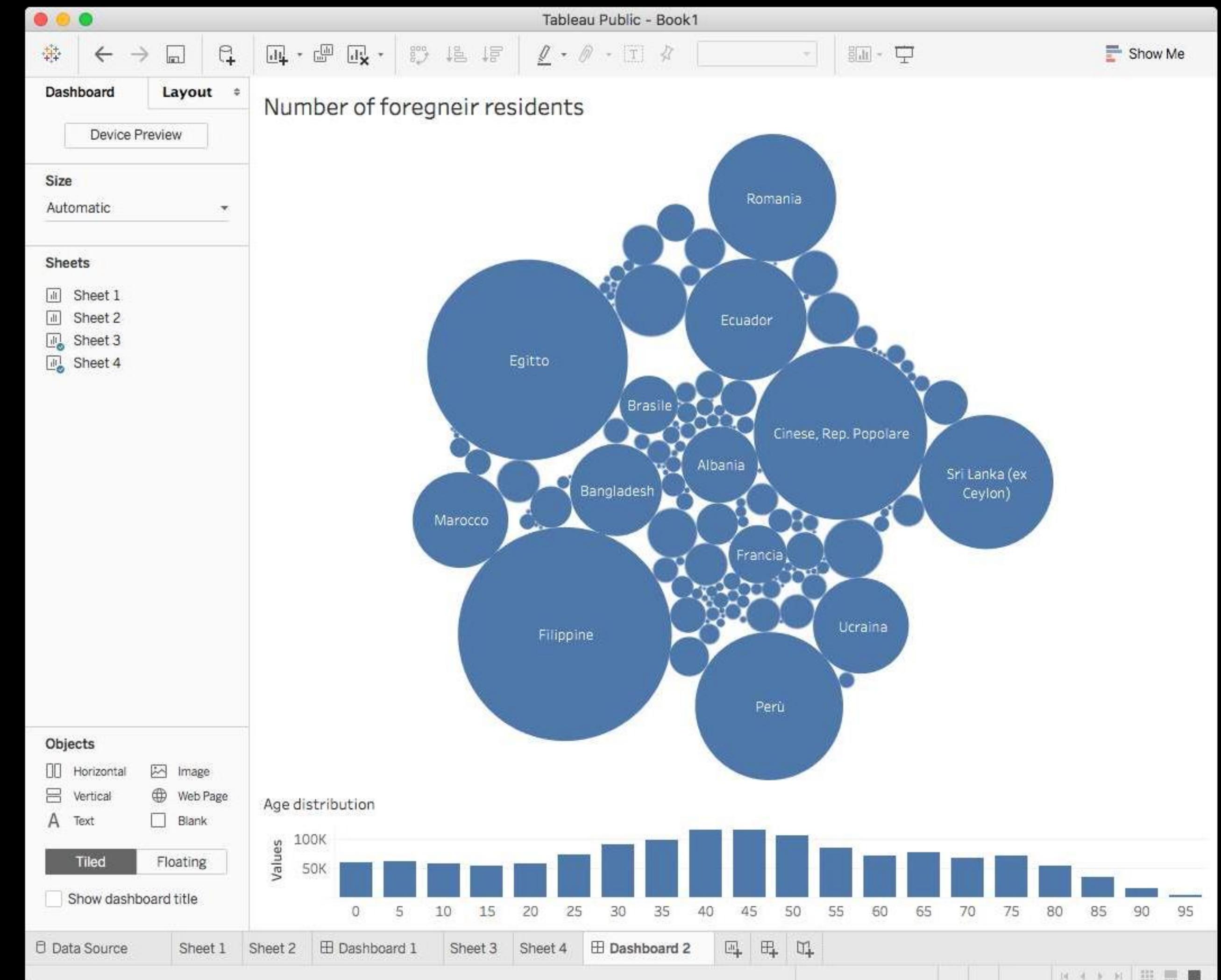
ft.com/vocabulary

FT

EXPLORING THE CENSUS

Some explorations

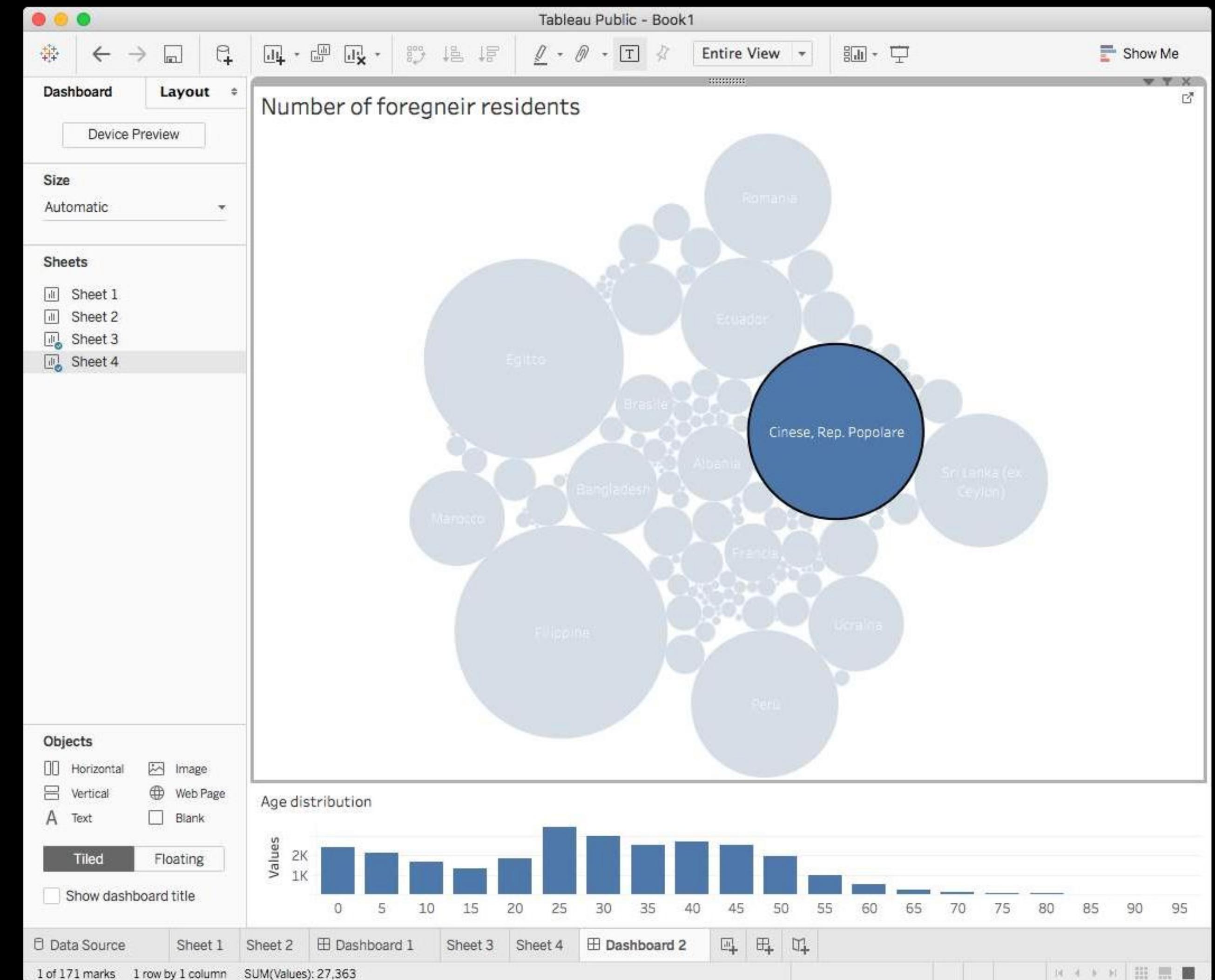
Exploring age groups and nationalities.



EXPLORING THE CENSUS

Some explorations

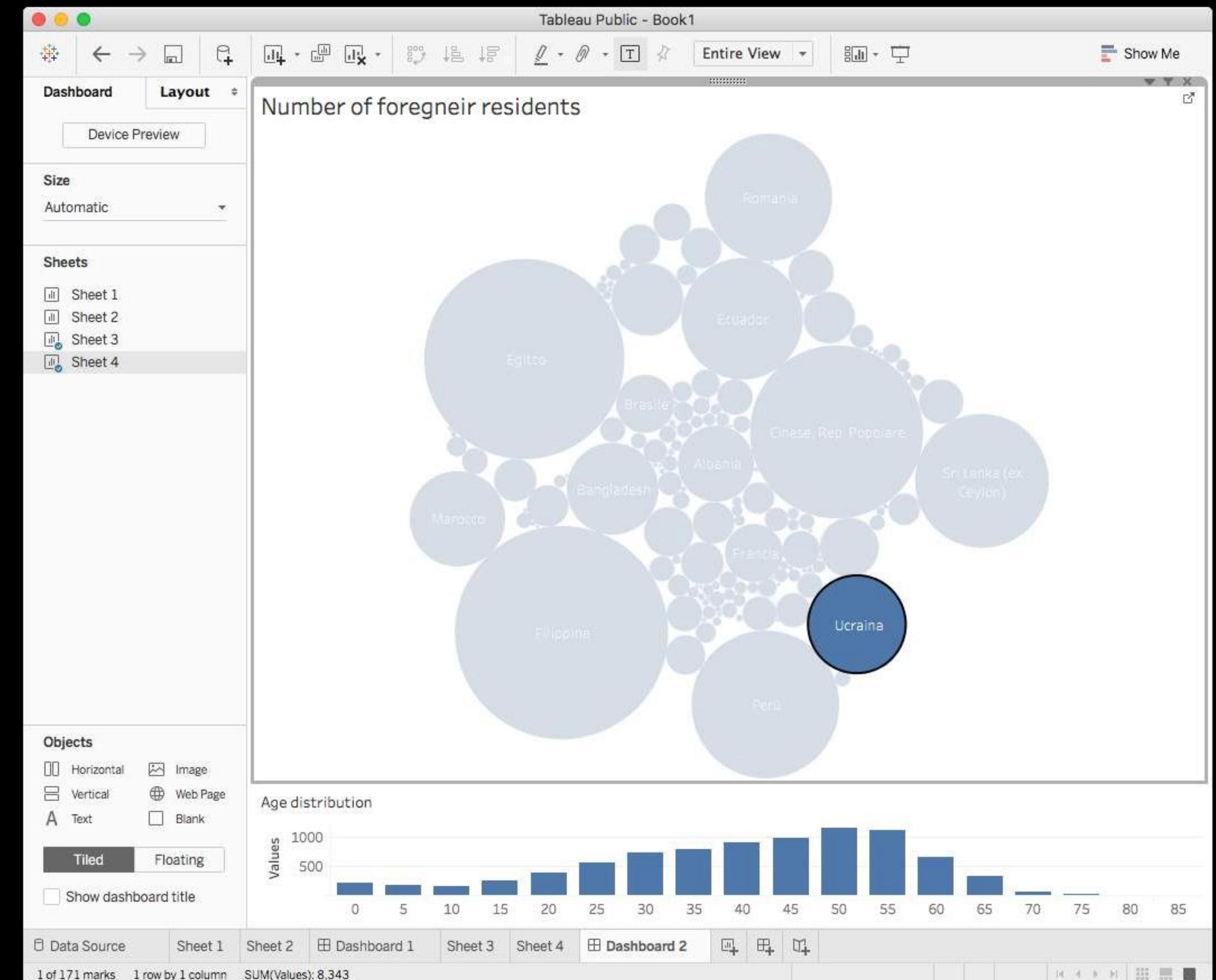
Exploring age groups and nationalities.



EXPLORING THE CENSUS

Some explorations

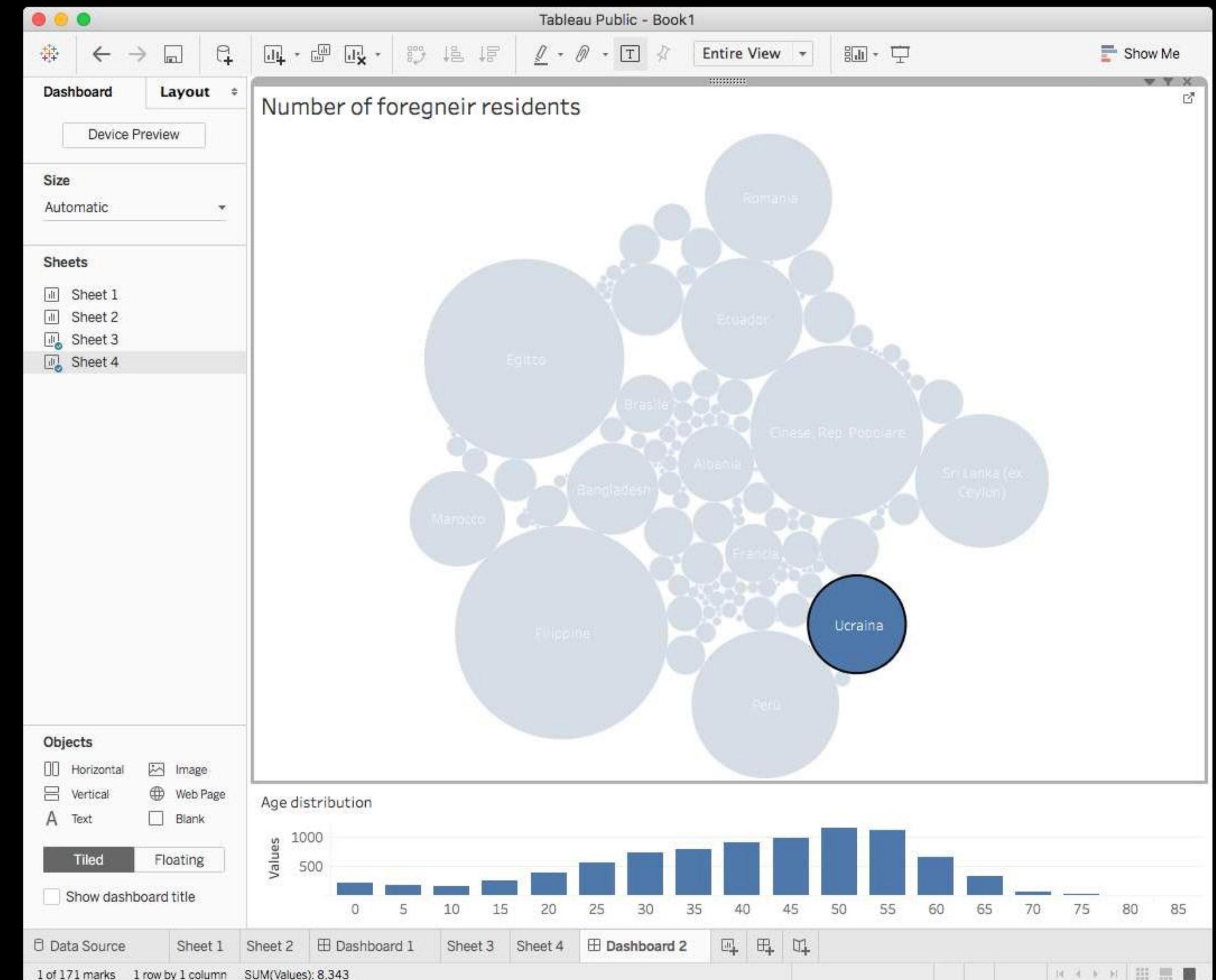
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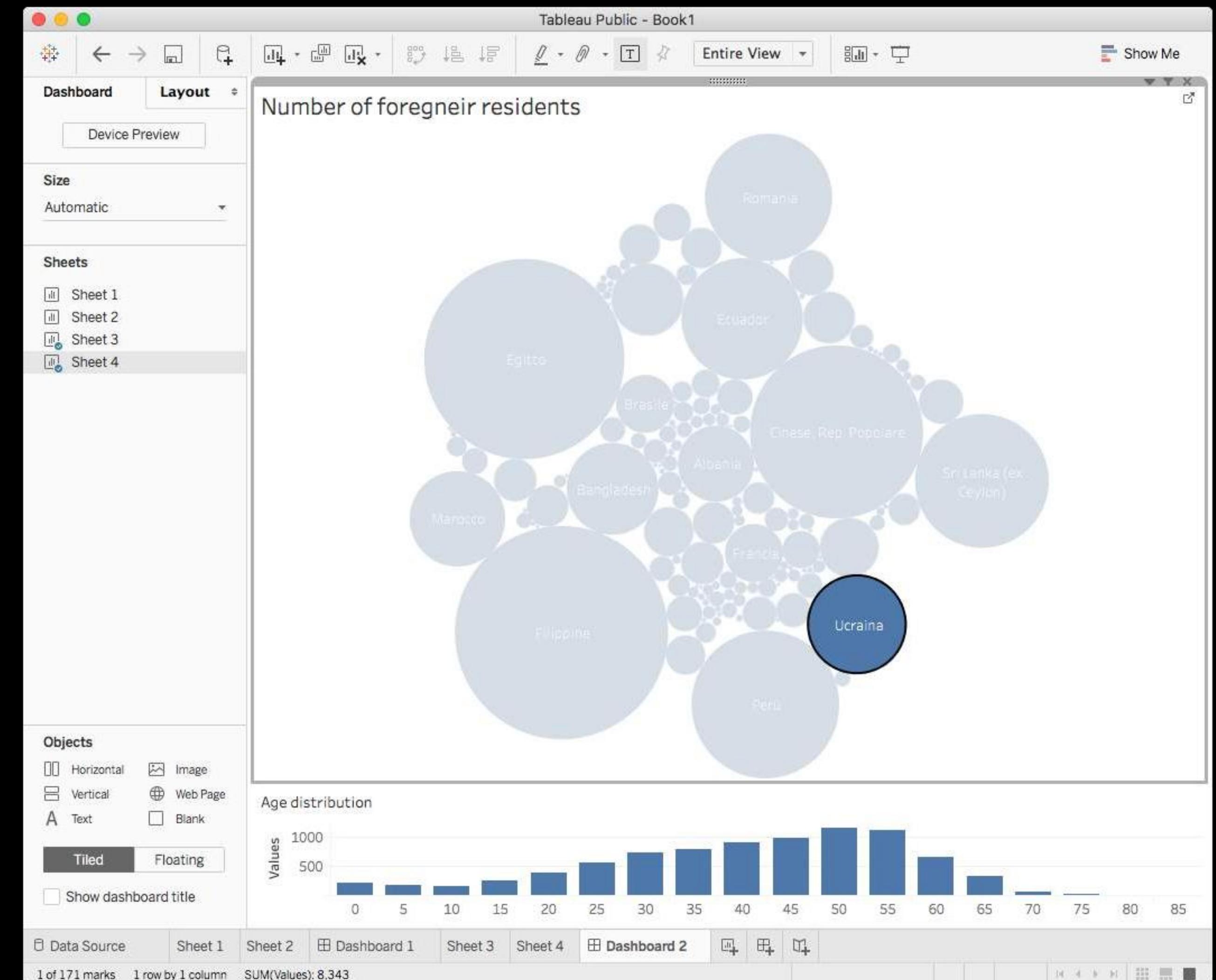
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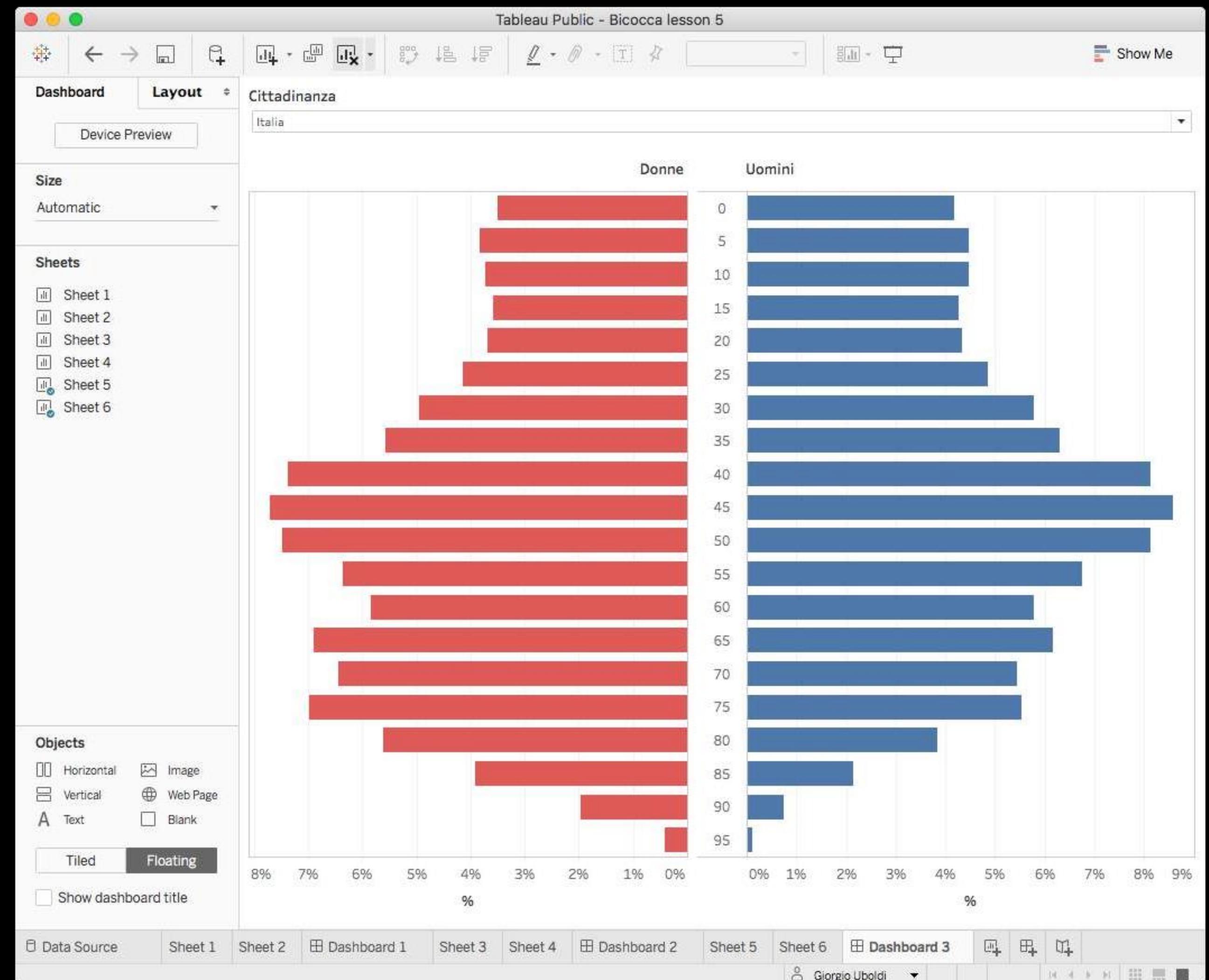
Exploring age groups and nationalities.



EXPLORING THE CENSUS

Some explorations

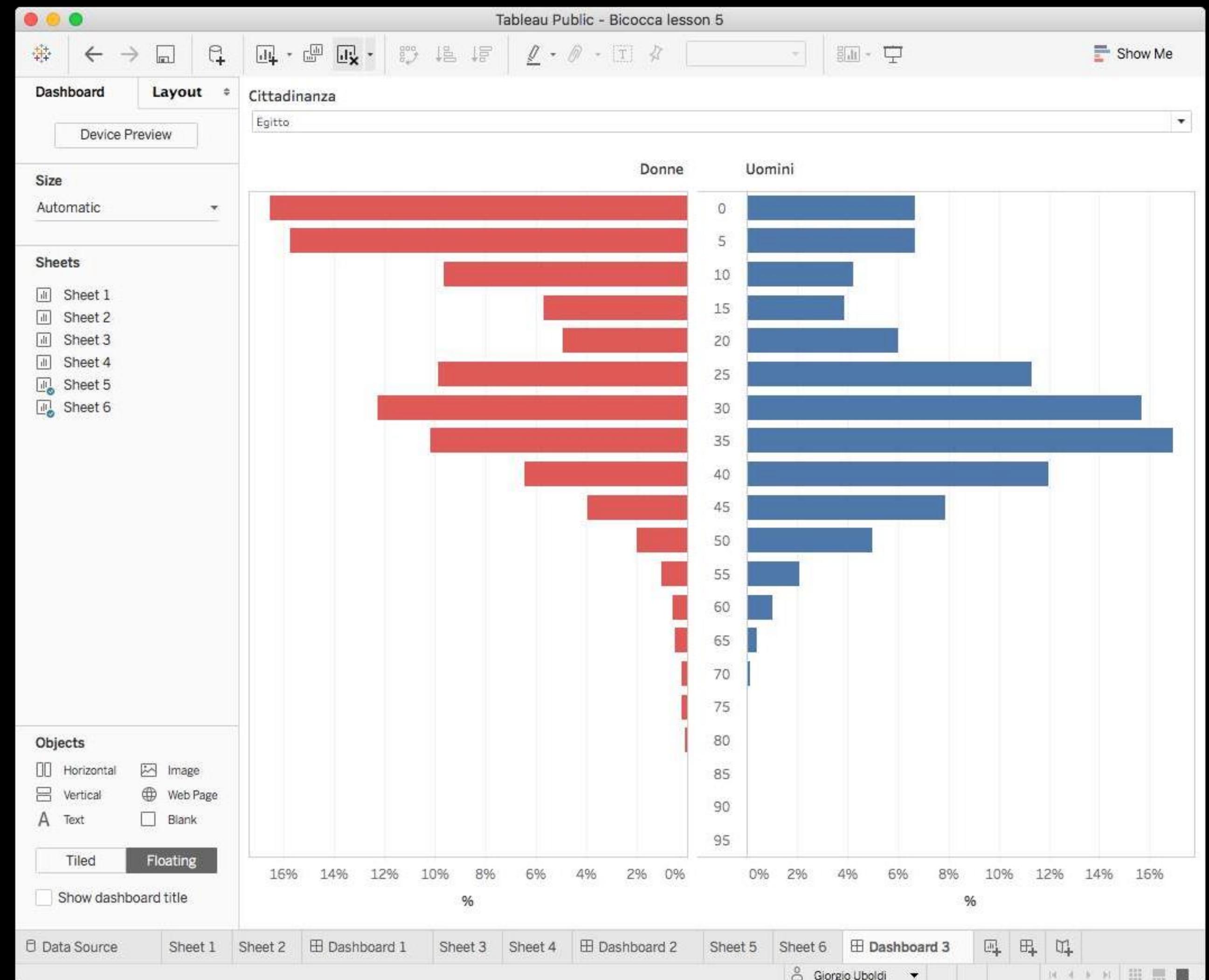
Exploring nationalities, age groups and gender.



EXPLORING THE CENSUS

Some explorations

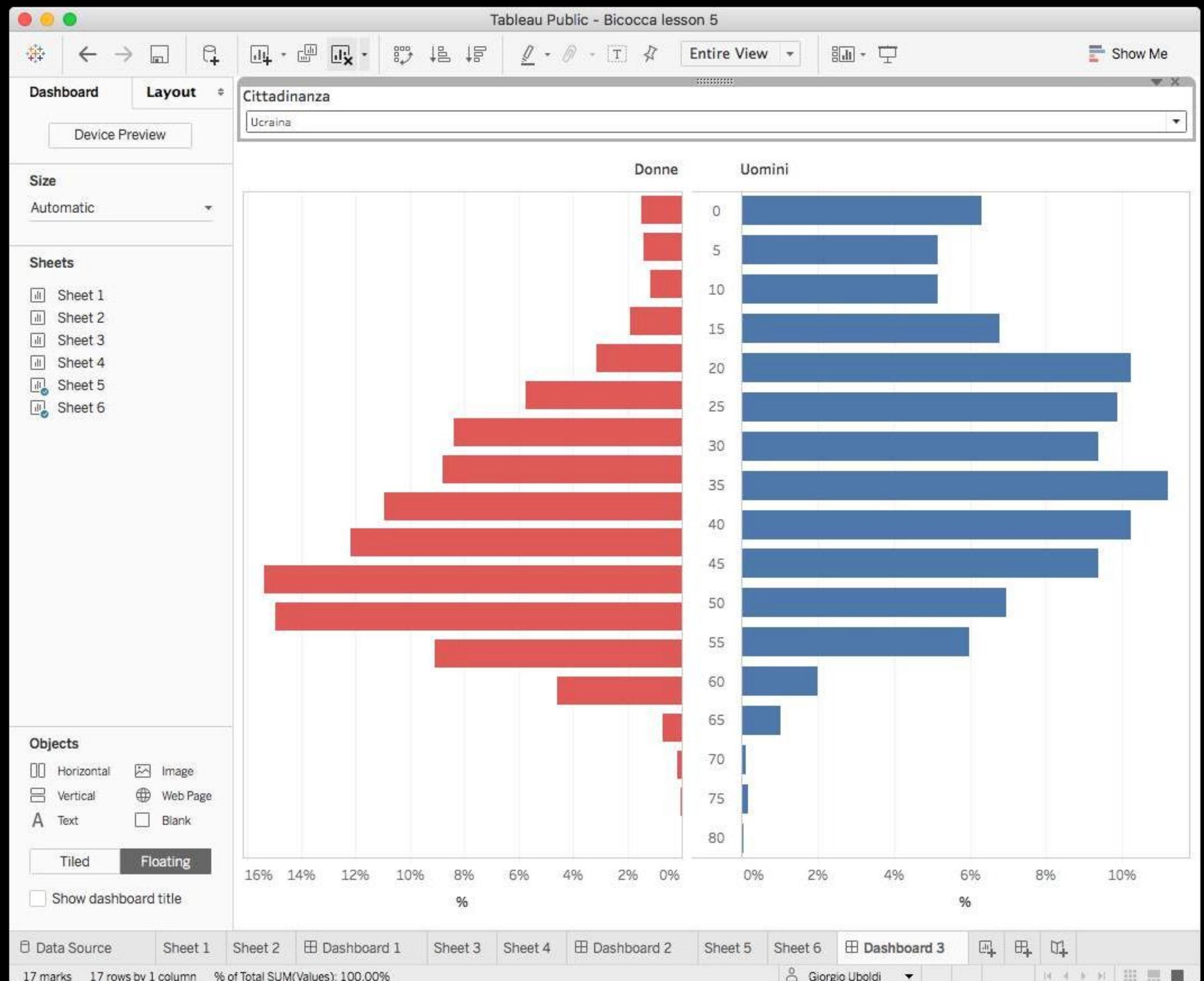
Exploring nationalities, age groups and gender.



EXPLORING THE CENSUS

Some explorations

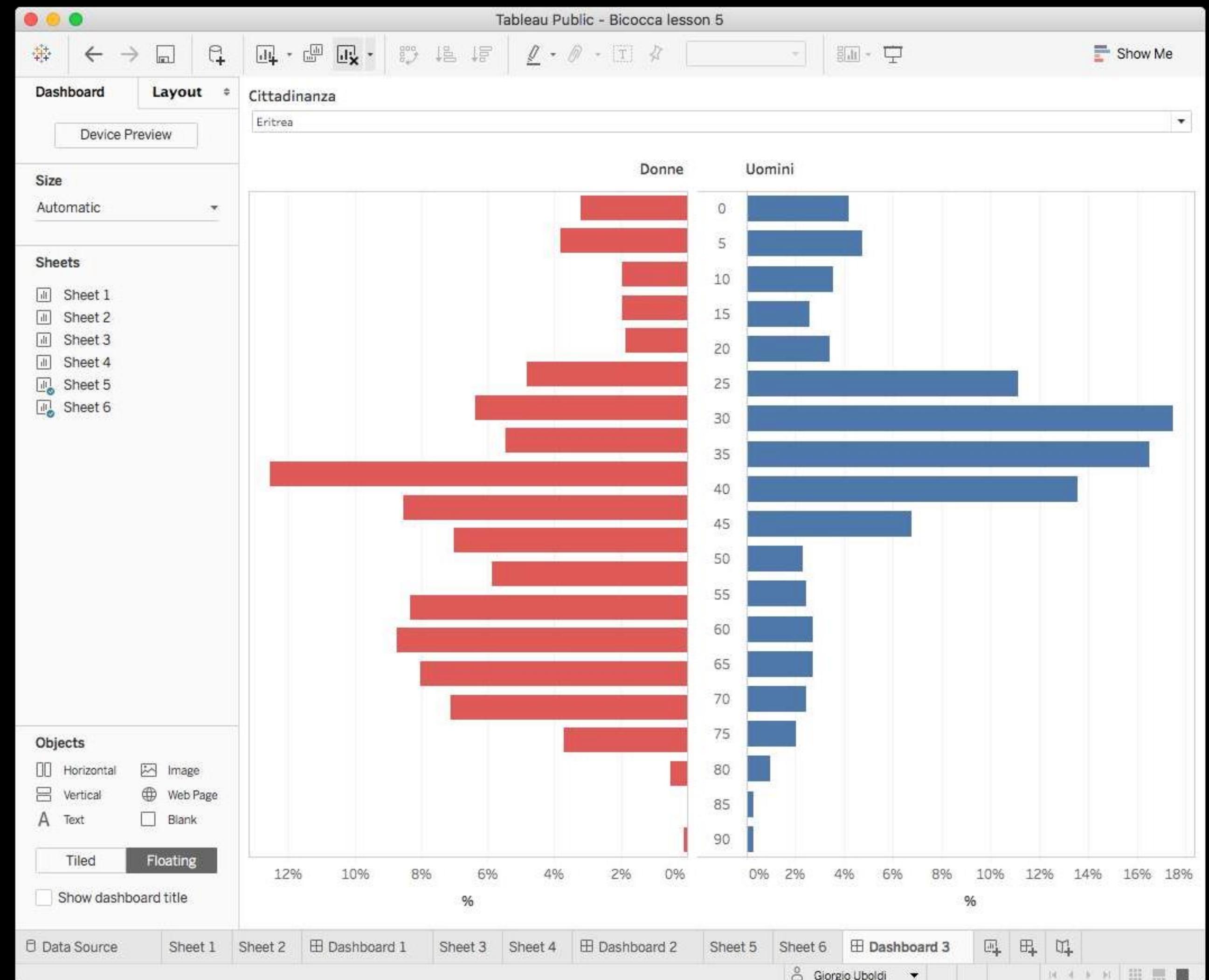
Exploring nationalities, age groups and gender.



EXPLORING THE CENSUS

Some explorations

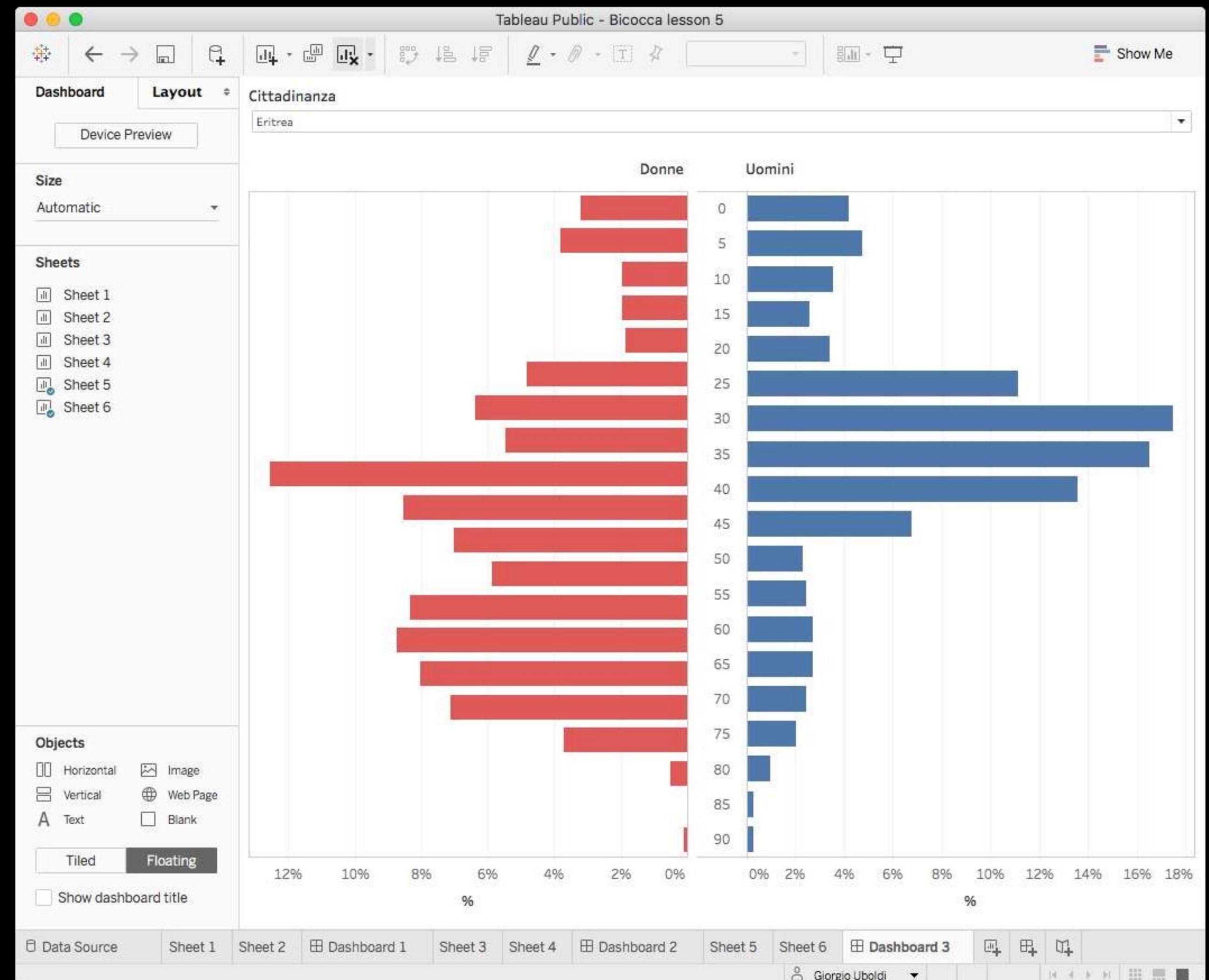
Exploring nationalities, age groups and gender.



EXPLORING THE CENSUS

Some explorations

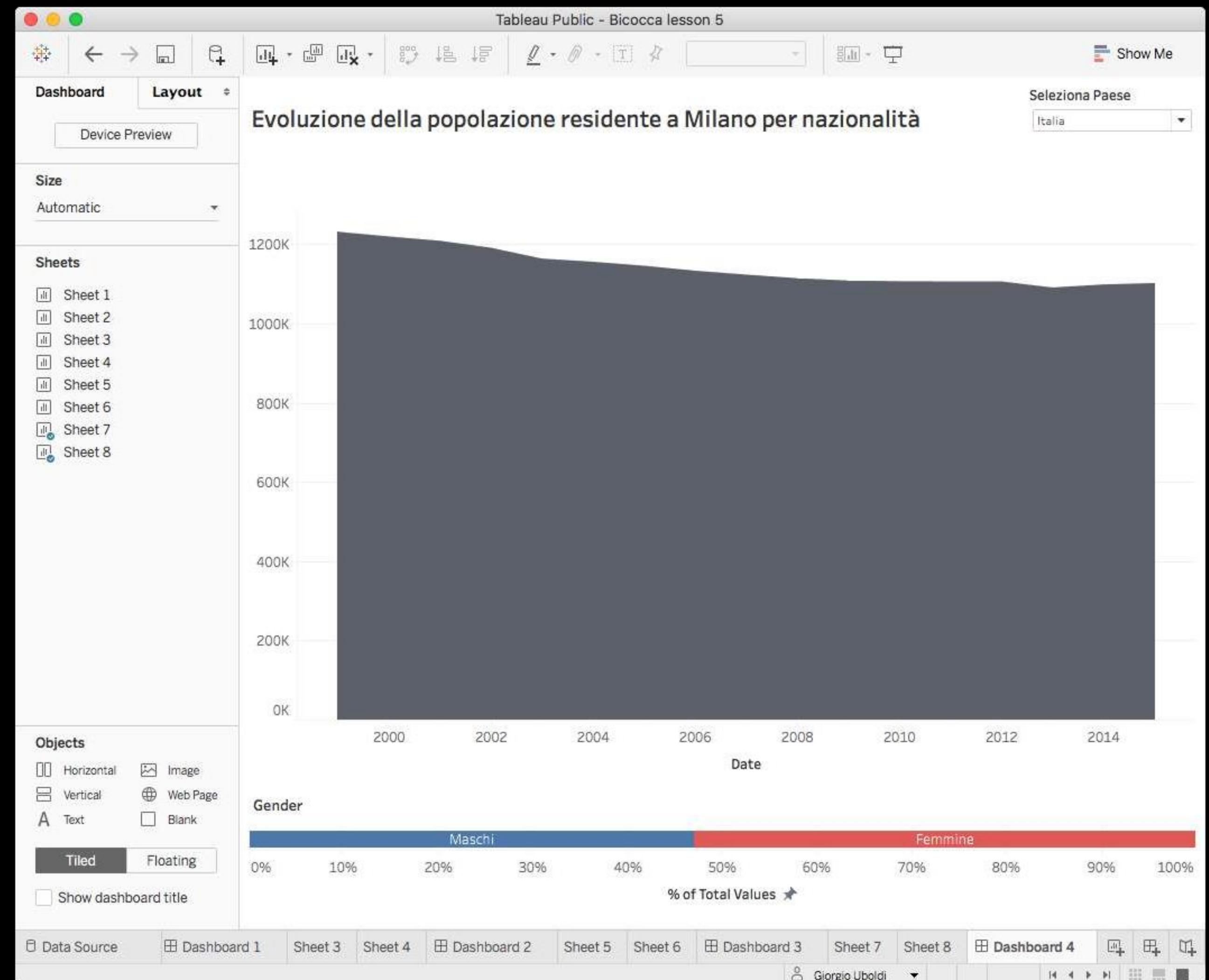
Exploring nationalities, age groups and gender.



EXPLORING THE CENSUS

Some explorations

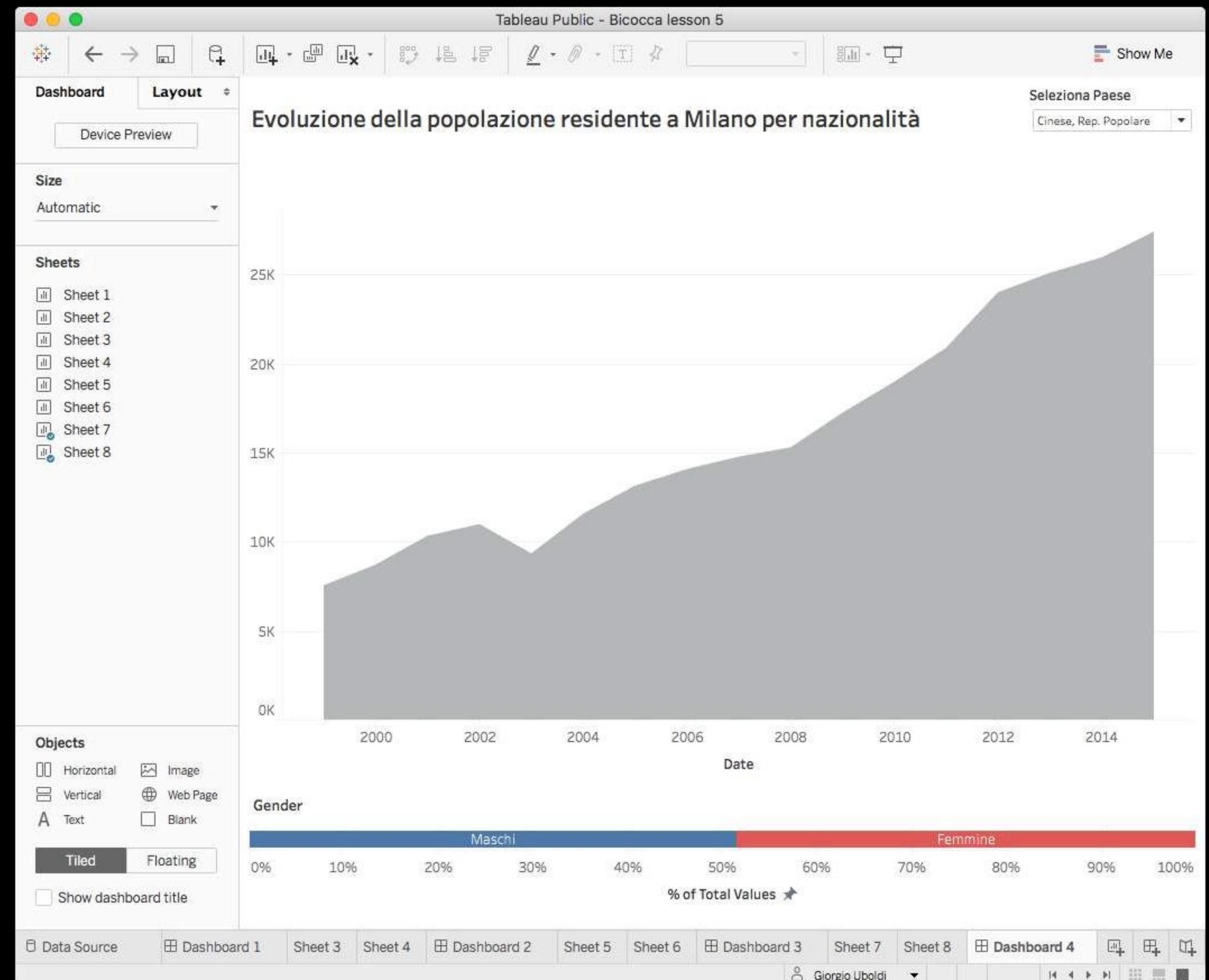
Exploring nationalities, age groups and gender overtime.



EXPLORING THE CENSUS

Some explorations

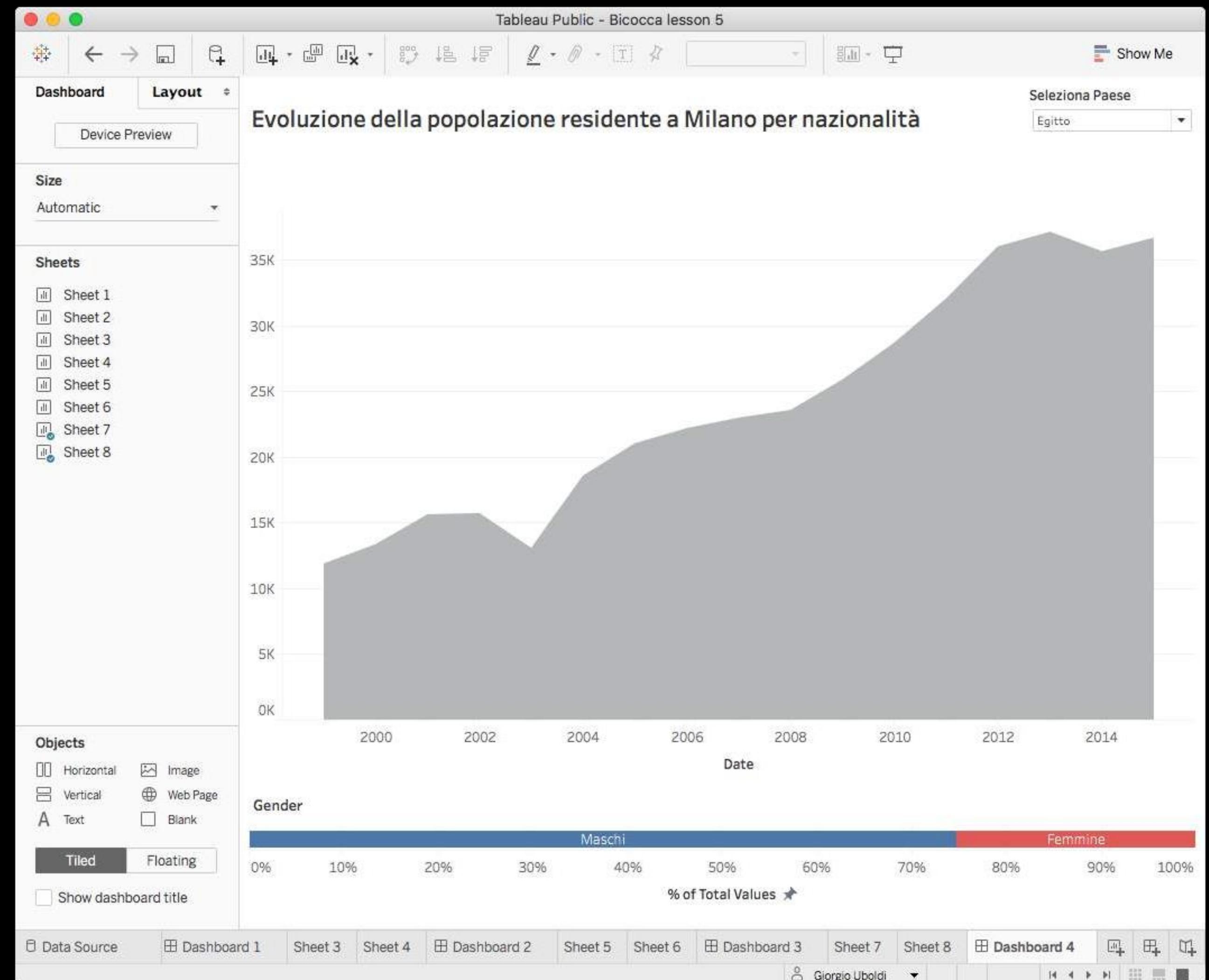
Exploring nationalities, age groups and gender overtime.



EXPLORING THE CENSUS

Some explorations

Exploring nationalities, age groups and gender overtime.

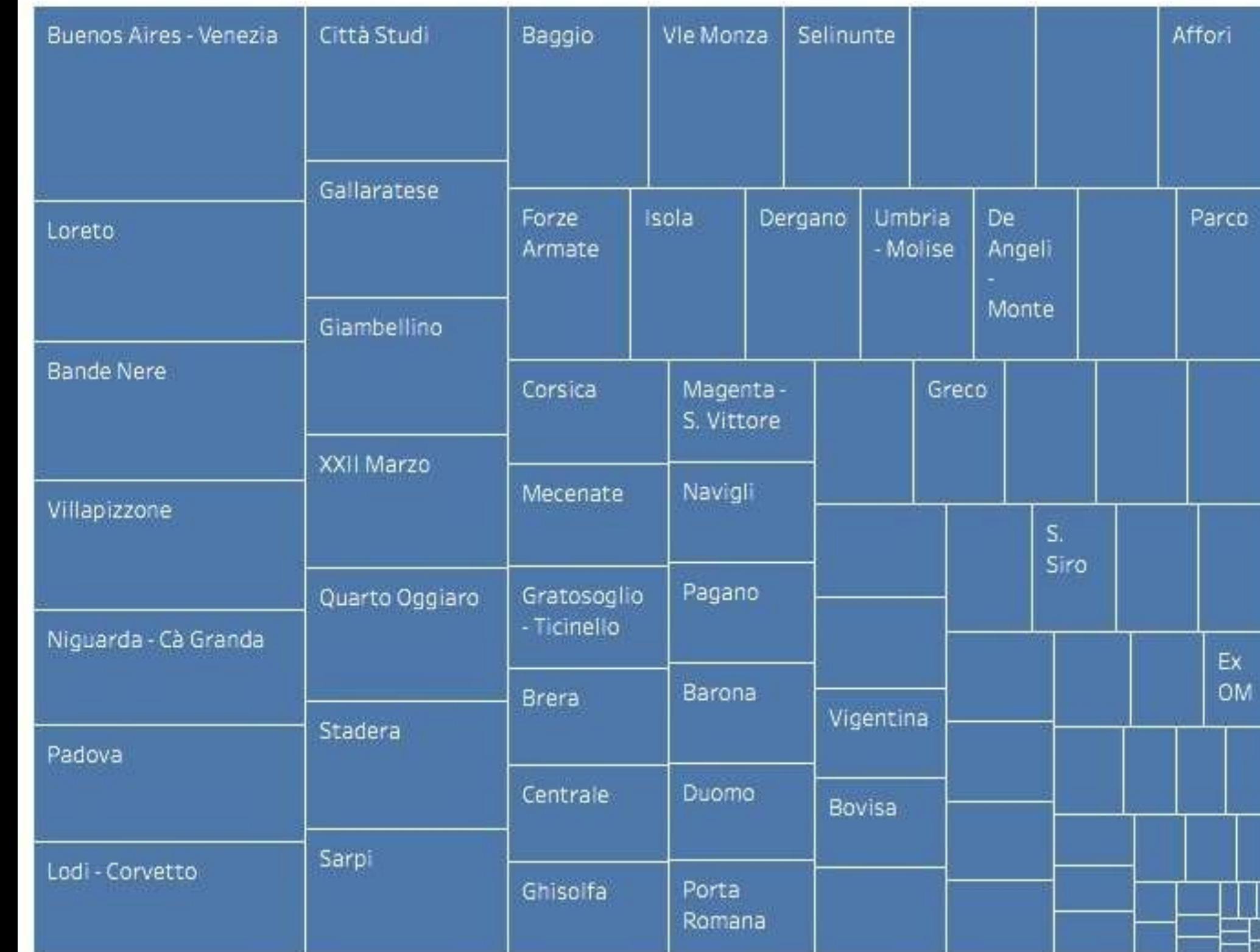


EXCURSUS

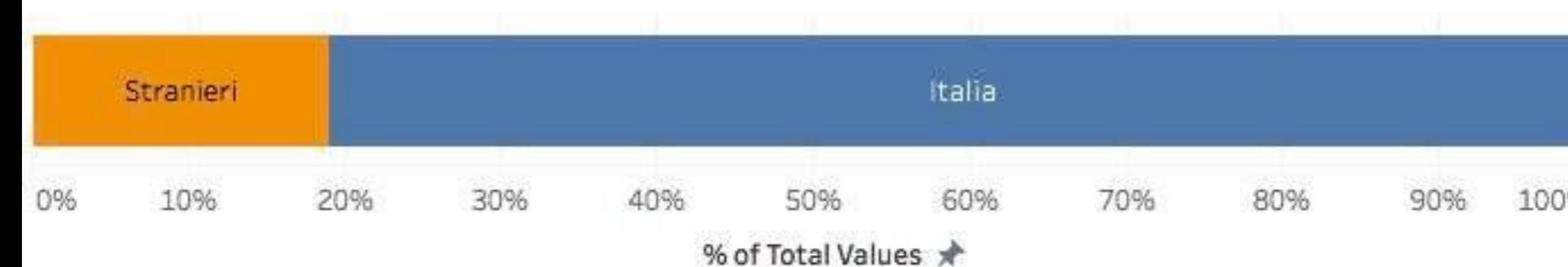
Is this chart
self-explanatory?

Do I understand the topic? What
does it show? What's the
meaning of the different colors?
What are the values?...

Sheet 1



Sheet 2



Year of Date

2015



DATA VIS WORKFLOW

An example

From <https://blog.datawrapper.de/better-charts/> by Lisa Charlotte Rost

The screenshot shows a web browser window with the title bar "What Questions to Ask When Creating Charts" and the URL "https://blog.datawrapper.de/better-charts/". The page itself is from the "UNCHARTED" blog, a Datawrapper blog. The post is dated Nov 15, 2017, and is categorized under "Thoughts & How To's". The author is Lisa Charlotte Rost. The main title of the post is "What Questions to Ask When Creating Charts". Below the title, there is a subtitle "The Attempt of a Data Vis Workflow". The text of the post discusses the messy process of creating data visualizations, mentioning various steps like finding data sources, sketching chart forms, and dealing with incompatible data formats. It also notes that there have been many attempts to categorize this workflow, ranging from broad data-focused approaches to narrower design or computation-focused ones.

Nov 15, 2017 Thoughts & How To's
by Lisa Charlotte Rost

What Questions to Ask When Creating Charts

The Attempt of a Data Vis Workflow

The process of creating a data visualisation can be messy: Finding data sources, sketching out a chart form, figuring out how to download data, analysing the data, trying out a chart type, bringing the data in a different format to try another chart type, researching more data, finding that the data doesn't fit to my article, deciding against the chart altogether – it's all very much entangled.

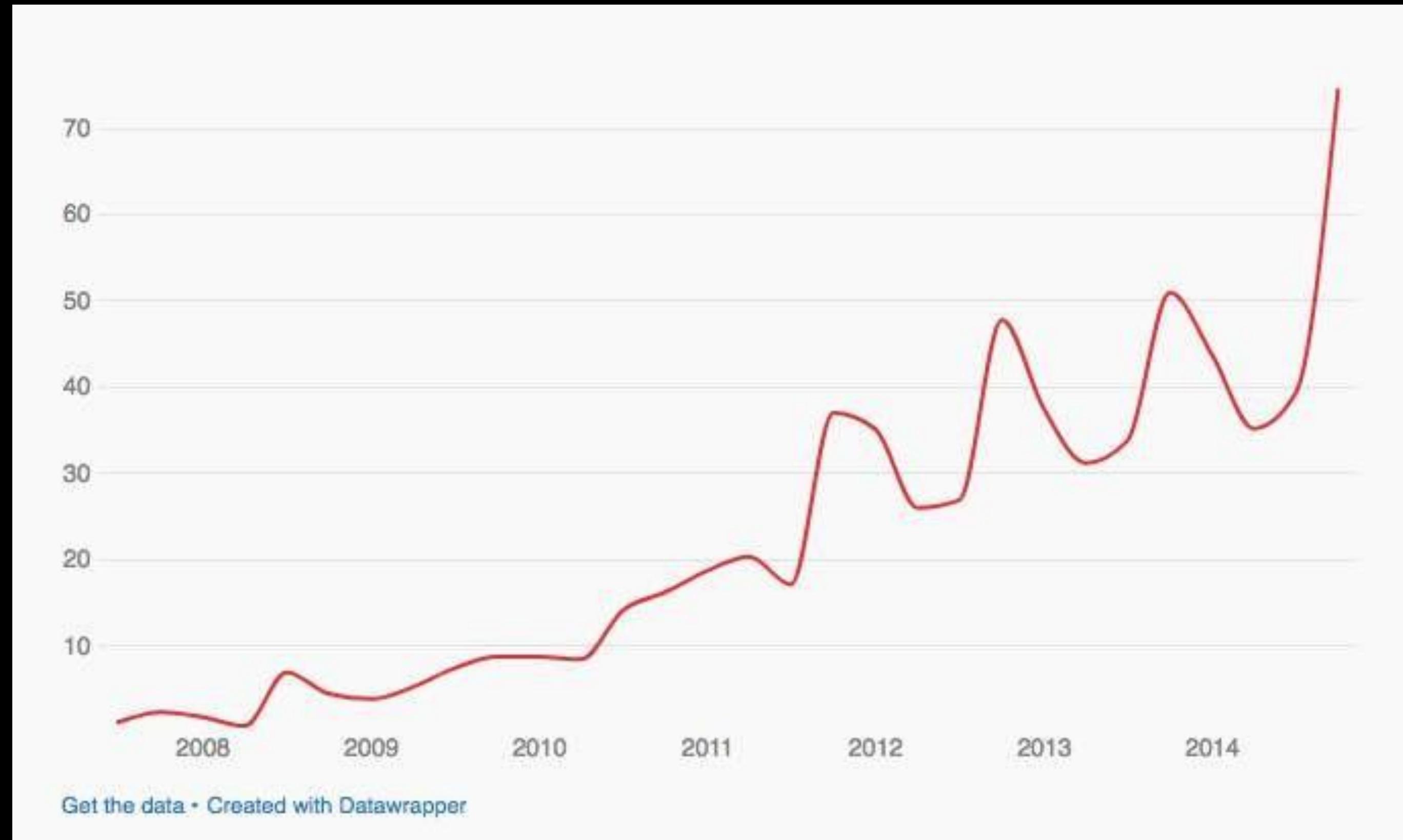
There have been many attempts to categorize this data vis pipeline. Some are more focused on data, some more on design or computation; some go further in their definition of "data vis" and some are more narrow:

A rather scientific view on the data vis

DATA VIS WORKFLOW

An example

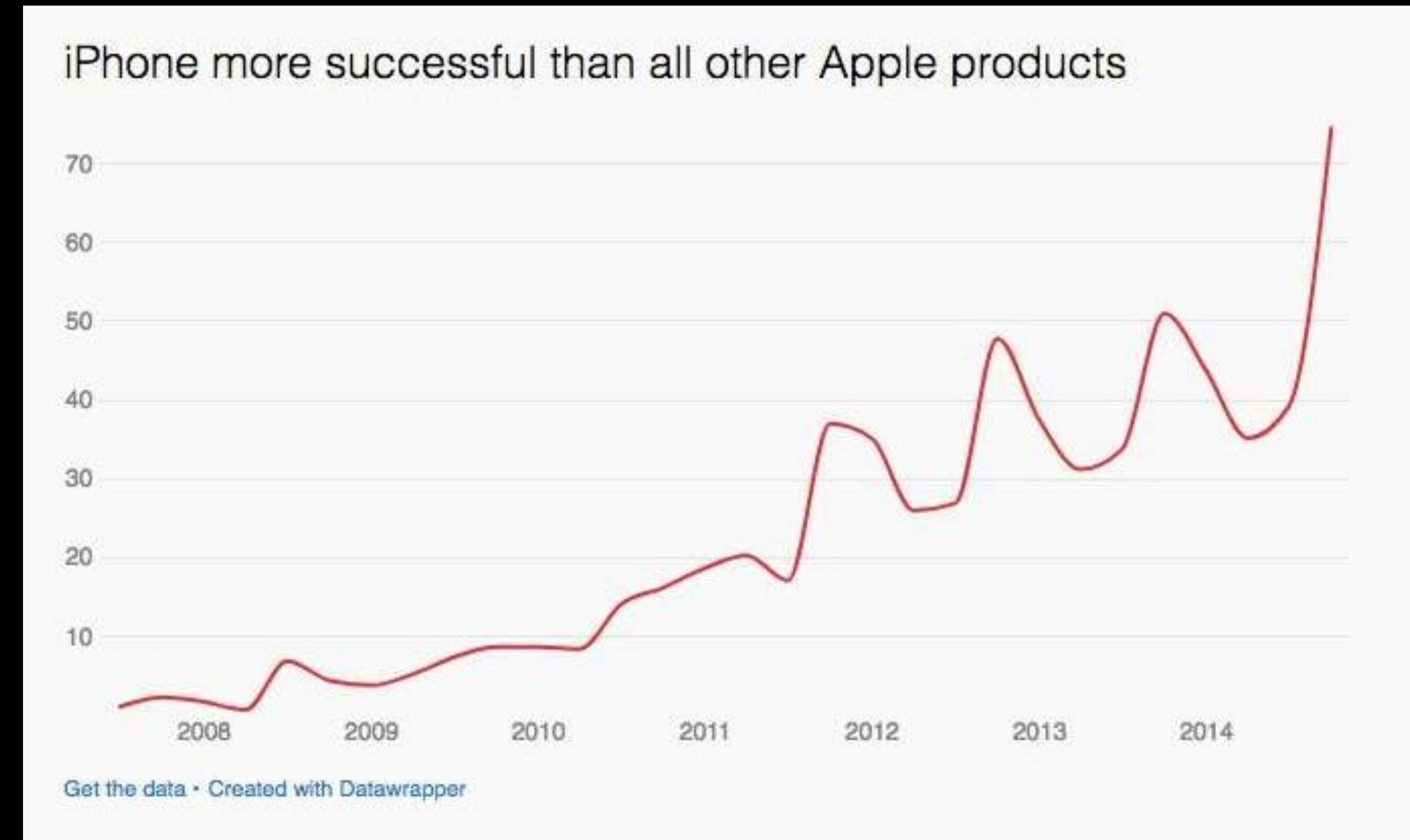
Ok..a chart of something increasing overtime.



DATA VIS WORKFLOW

An example

What's my point?



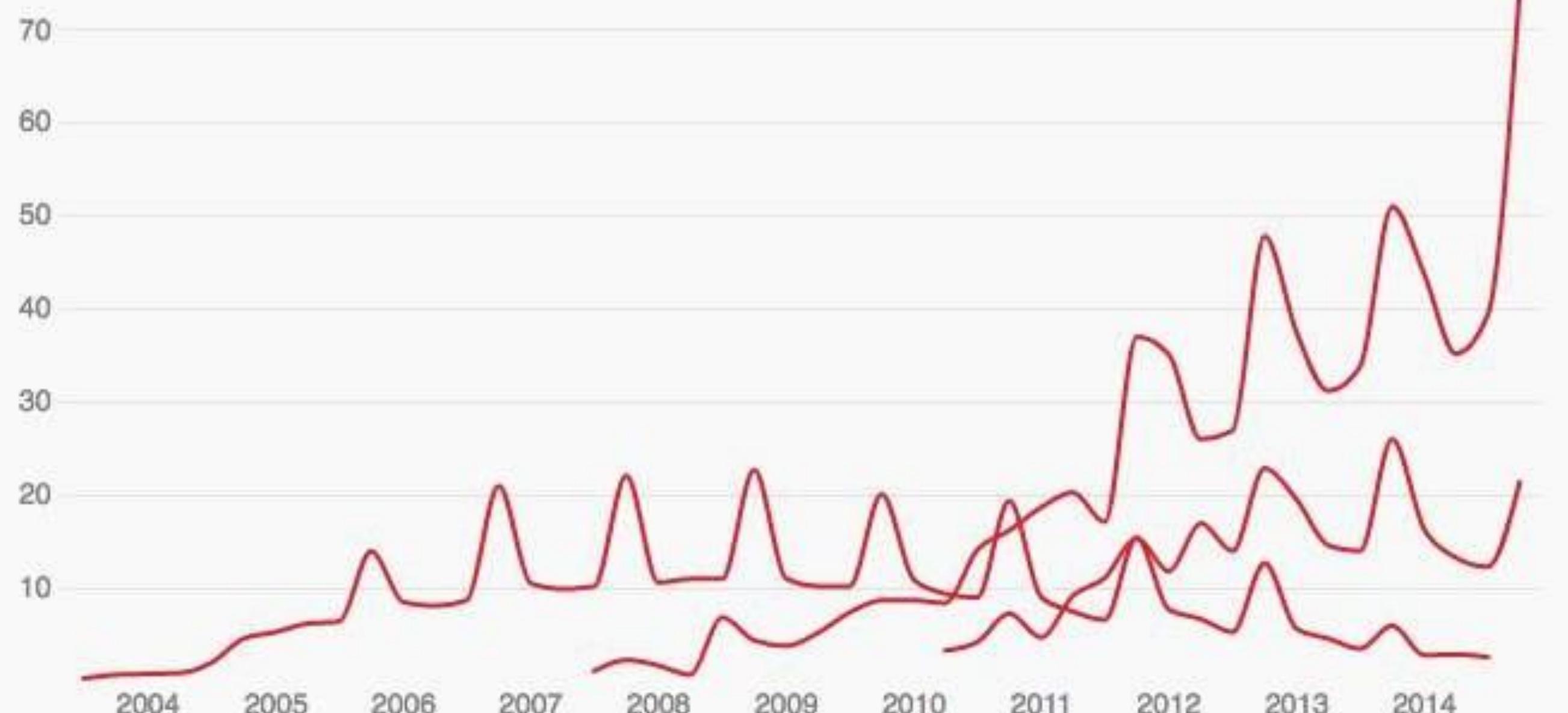
DATA VIS WORKFLOW

An example

What's my point?

How can I prove my point?

iPhone more successful than all other Apple products



[Get the data](#) • Created with Datawrapper

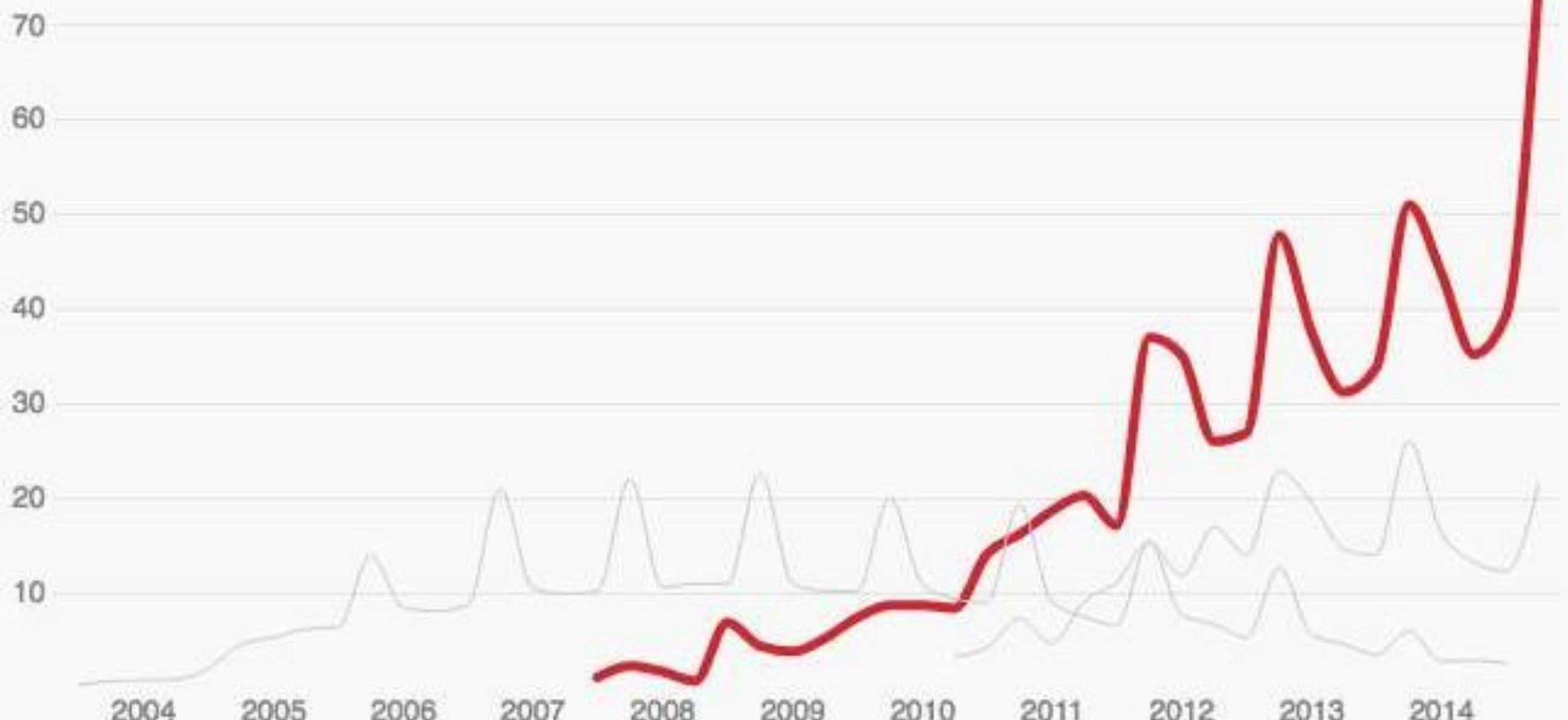
DATA VIS WORKFLOW

An example

What's my point?

**How can I prove my point?
How can i make it clear?**

iPhone more successful than all other Apple products



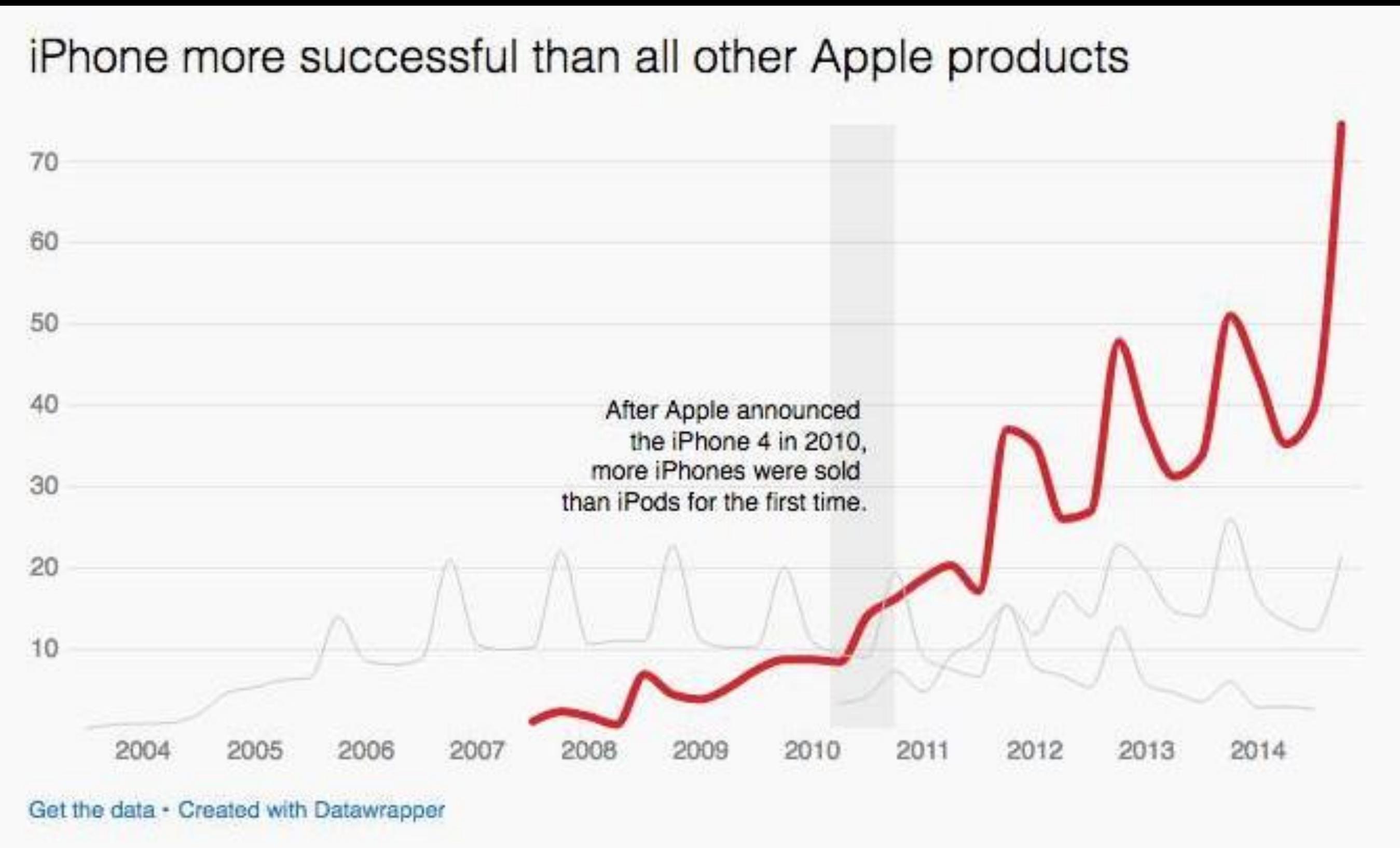
[Get the data](#) • Created with Datawrapper

DATA VIS WORKFLOW

An example

What's my point?

**How can I prove my point?
How can I make it clear?
What can do to emphasize it?**



DATA VIS WORKFLOW

An example

What's my point?

How can I prove my point?

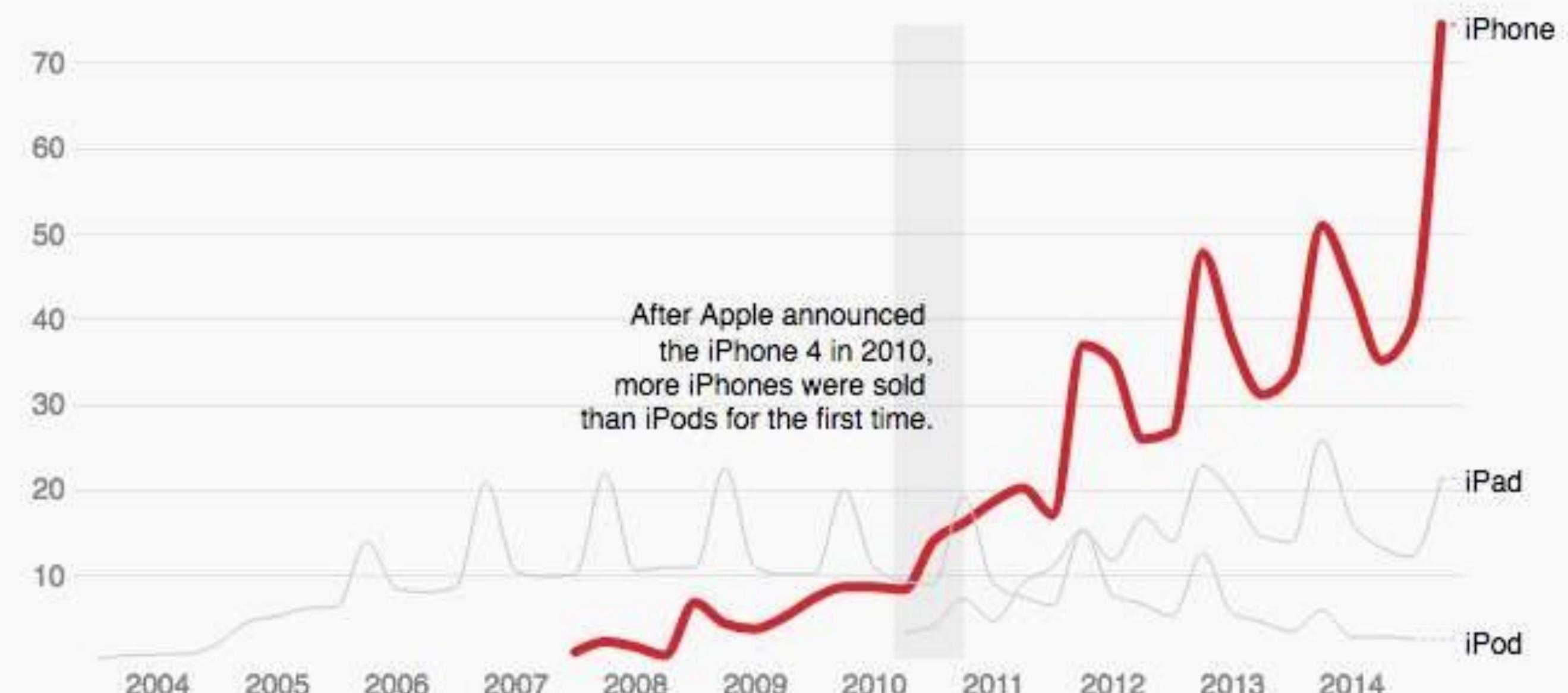
How can I make it clear?

What can do to emphasize it?

What does my chart show exactly?

iPhone more successful than all other Apple products

Worldwide sales of selected Apple products in million, by fiscal quarter, 2000 to 2014



Source: Apple Inc. • [Get the data](#) • Created with Datawrapper

DATA VIS WORKFLOW

An attempt of a Data Vis Workflow

Three questions for creating a chart

1. What's your point?

Headline

HYPOTHESIS

2. How can you emphasize your point in your chart?

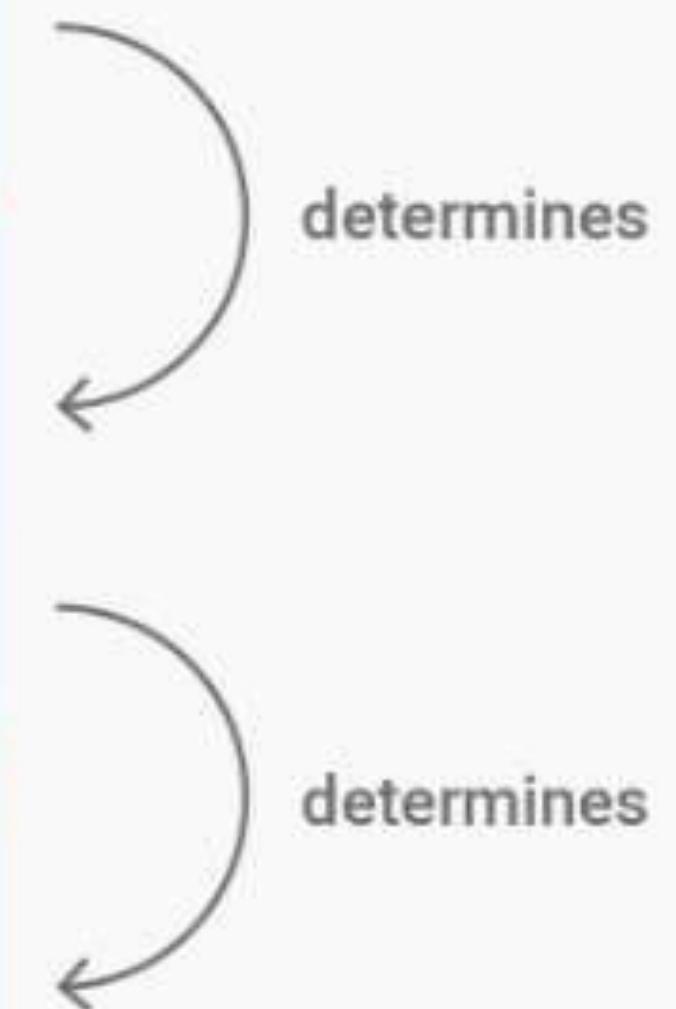
Chart type, data, color, highlights, annotations

PROOF

3. What does the final chart show exactly?

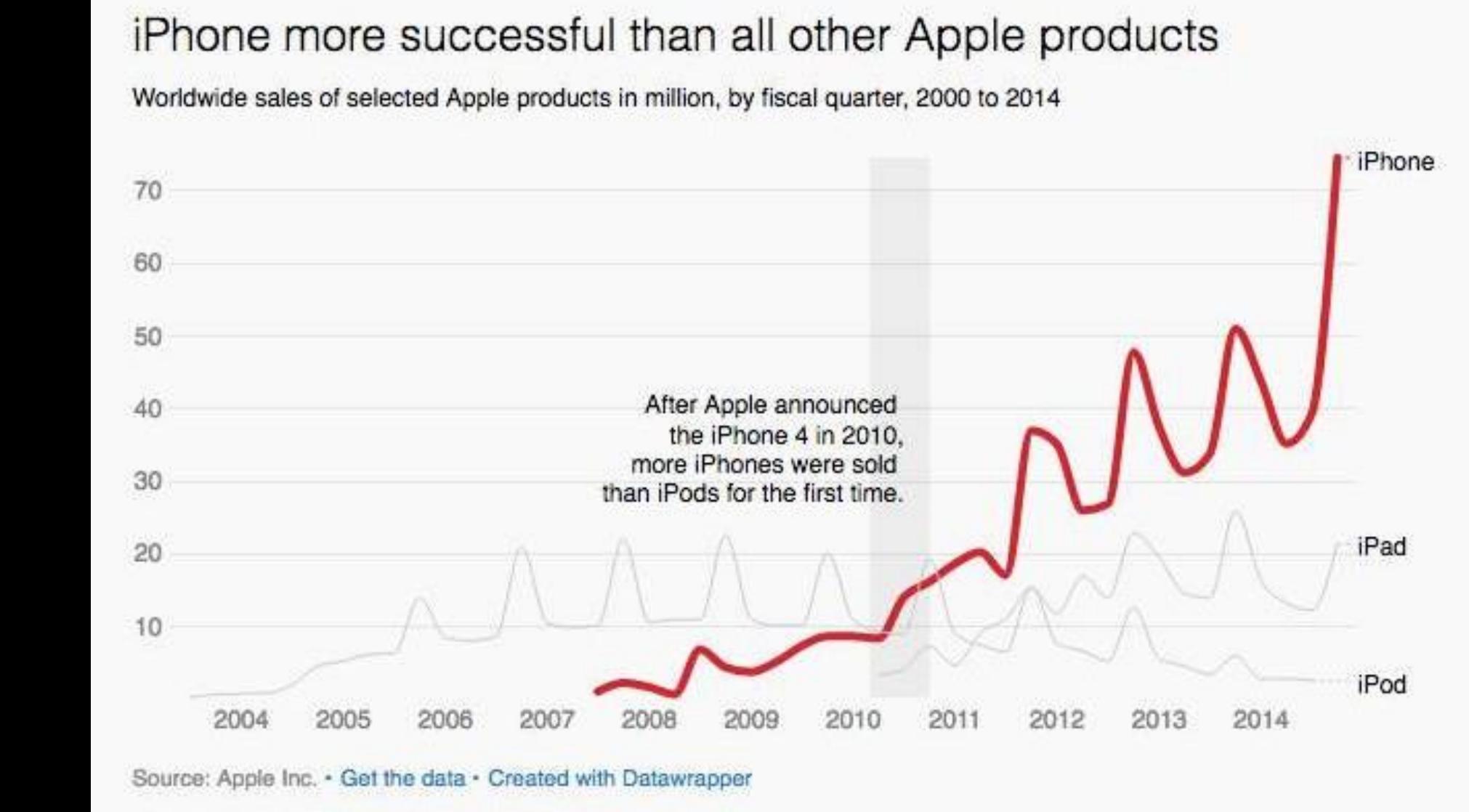
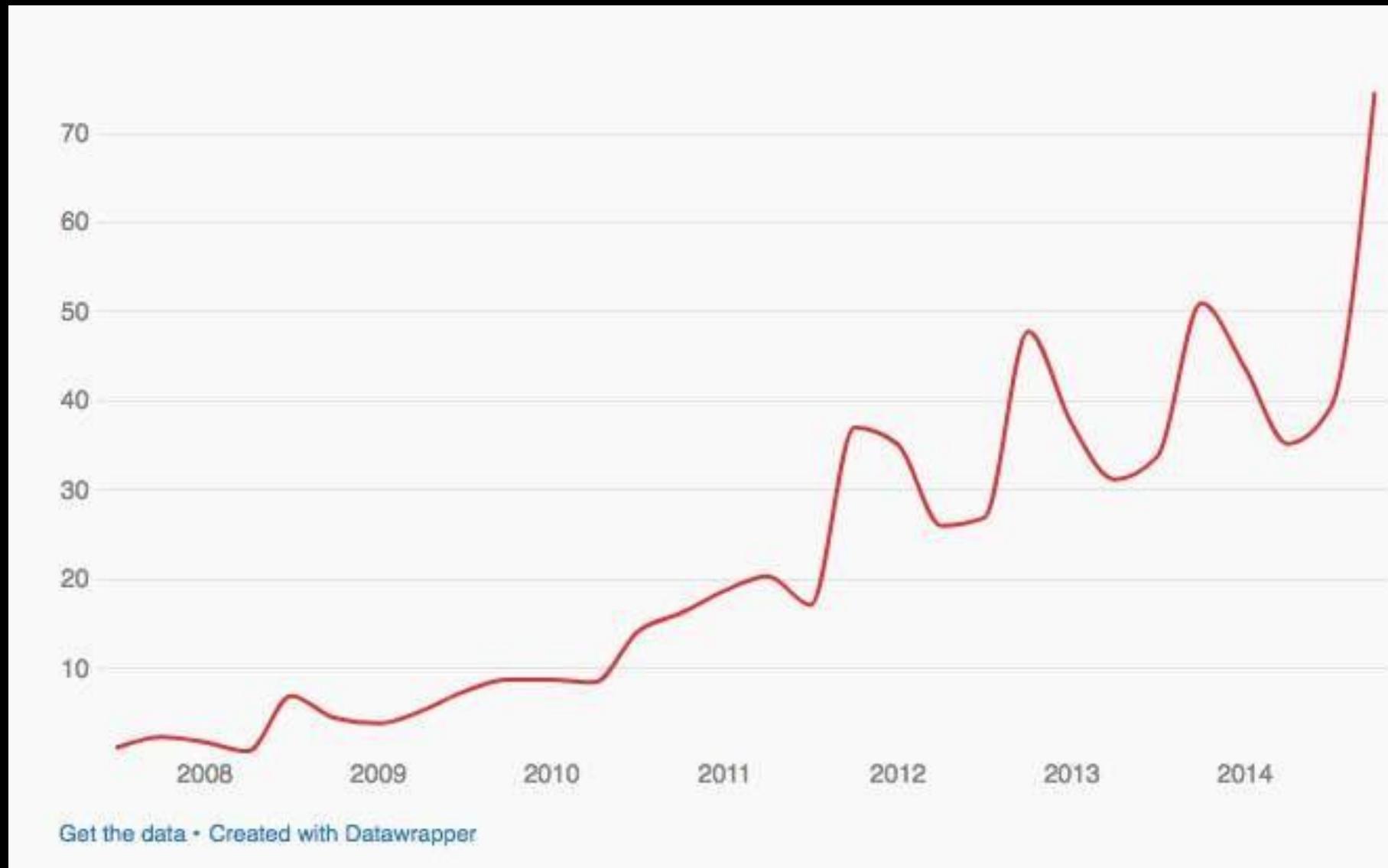
Description, legend/keys, source

EXPLAINING



EXCURSUS

An example



Exam failed

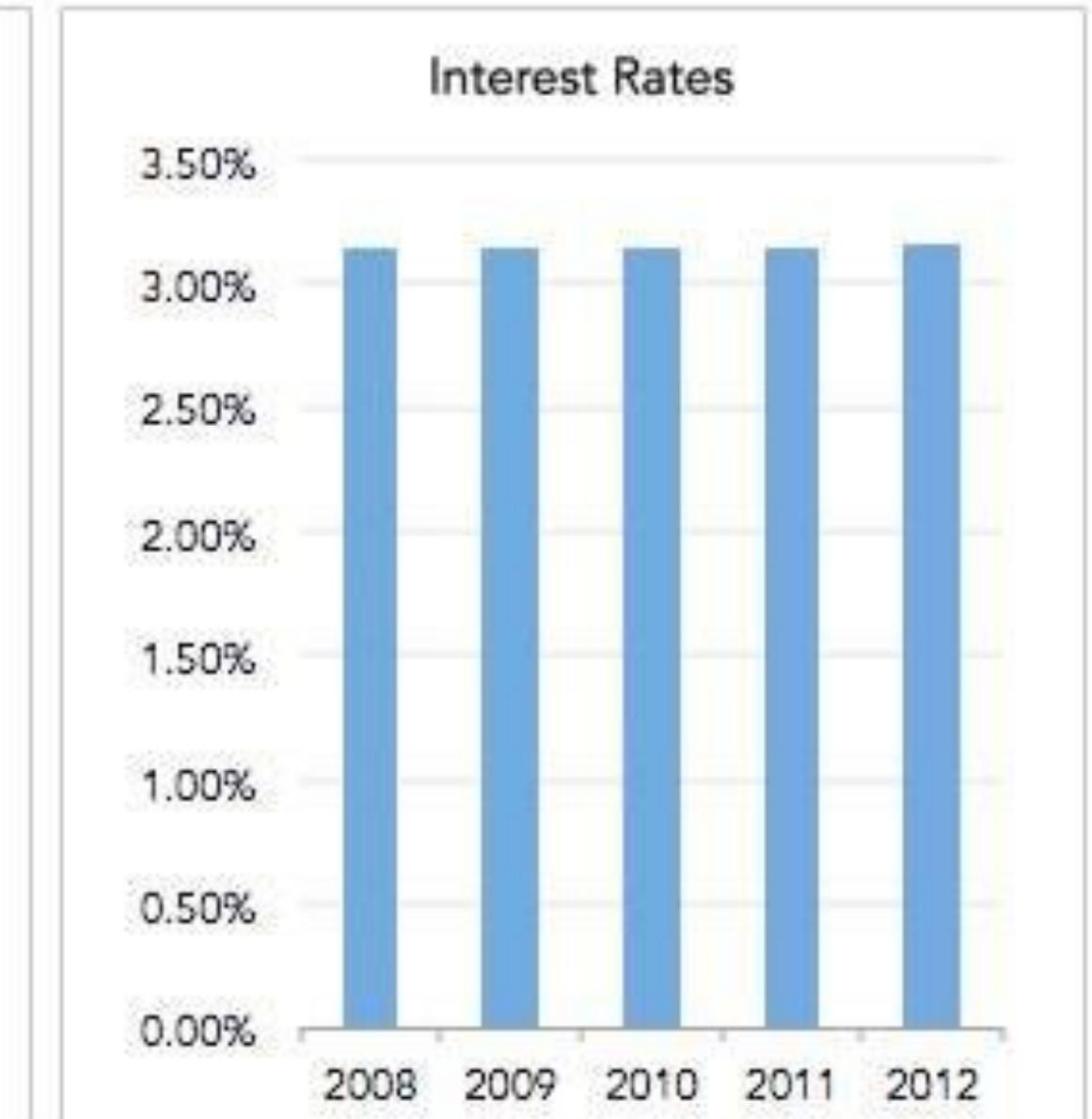
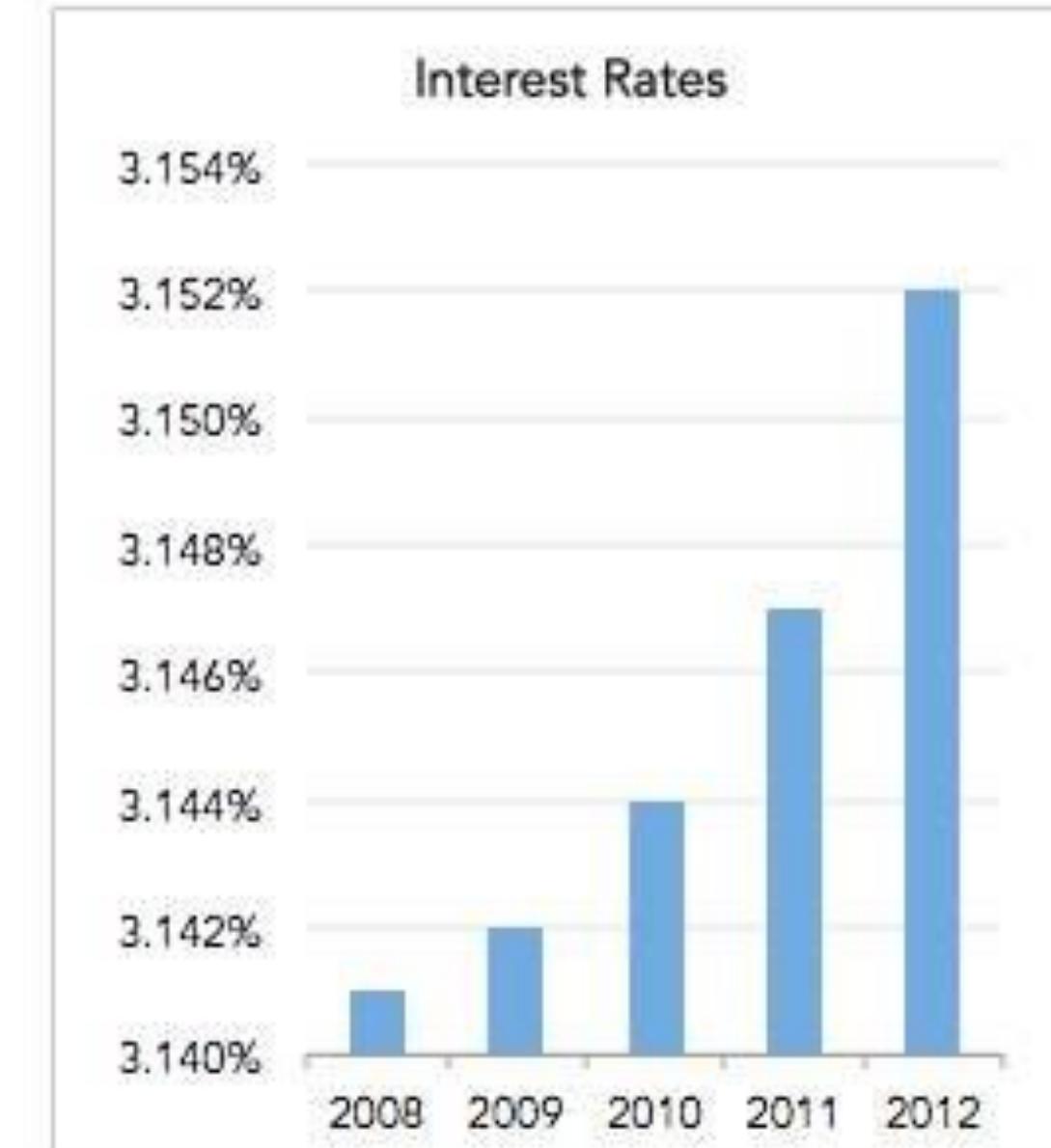
30/30

AVOID MISINTERPRETATIONS

Truncated Y-Axis

One of the easiest ways to misrepresent your data is by messing with the y-axis of a bar graph, line graph, or scatter plot. In most cases, the y-axis ranges from 0 to a maximum value that encompasses the range of the data. However, sometimes we change the range to better highlight the differences. Taken to an extreme, this technique can make differences in data seem much larger than they are.

Same Data, Different Y-Axis

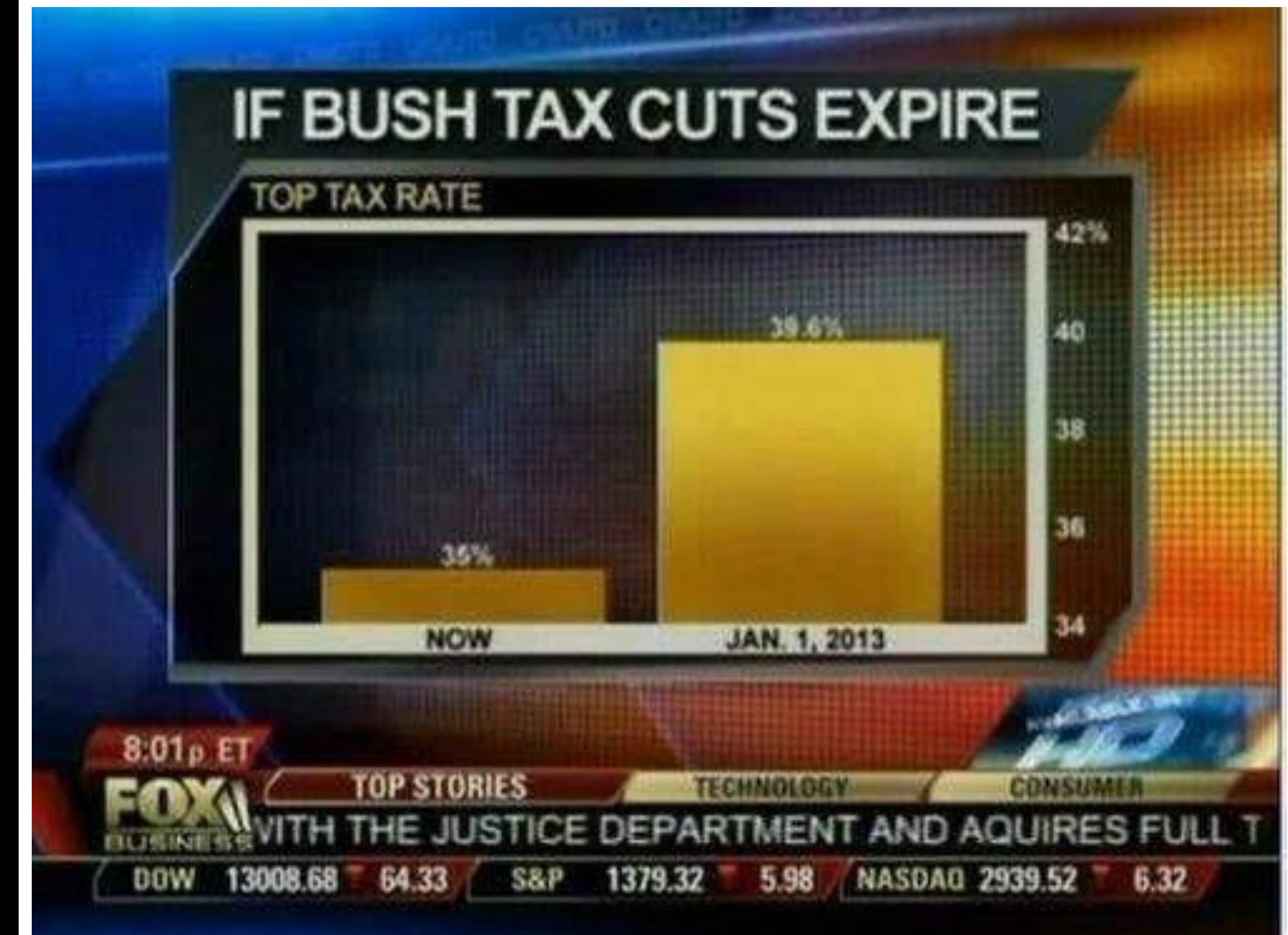


example from <https://blog.heapanalytics.com/how-to-lie-with-data-visualization/>

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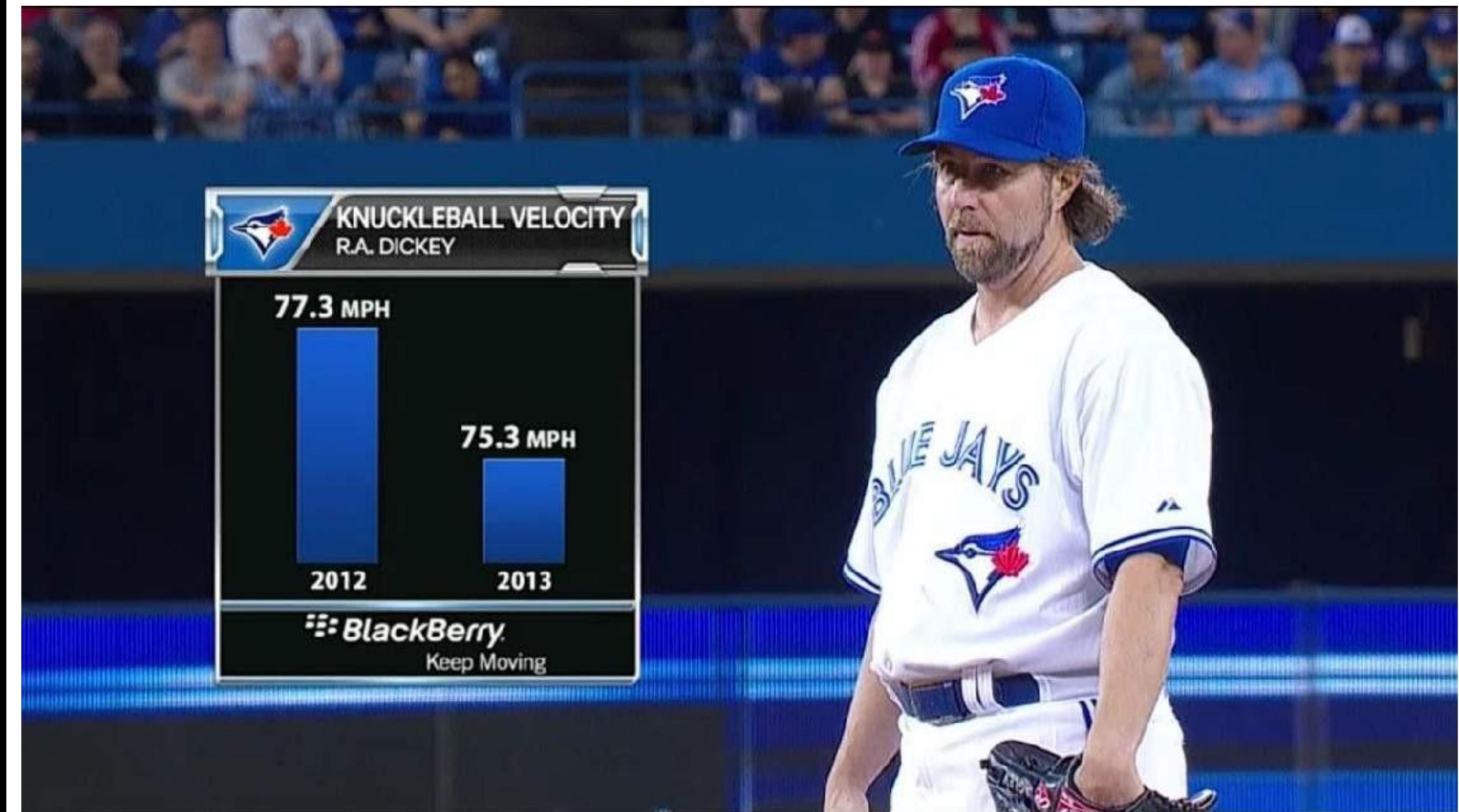


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example from <https://blog.heapanalytics.com/how-to-lie-with-data-visualization/>

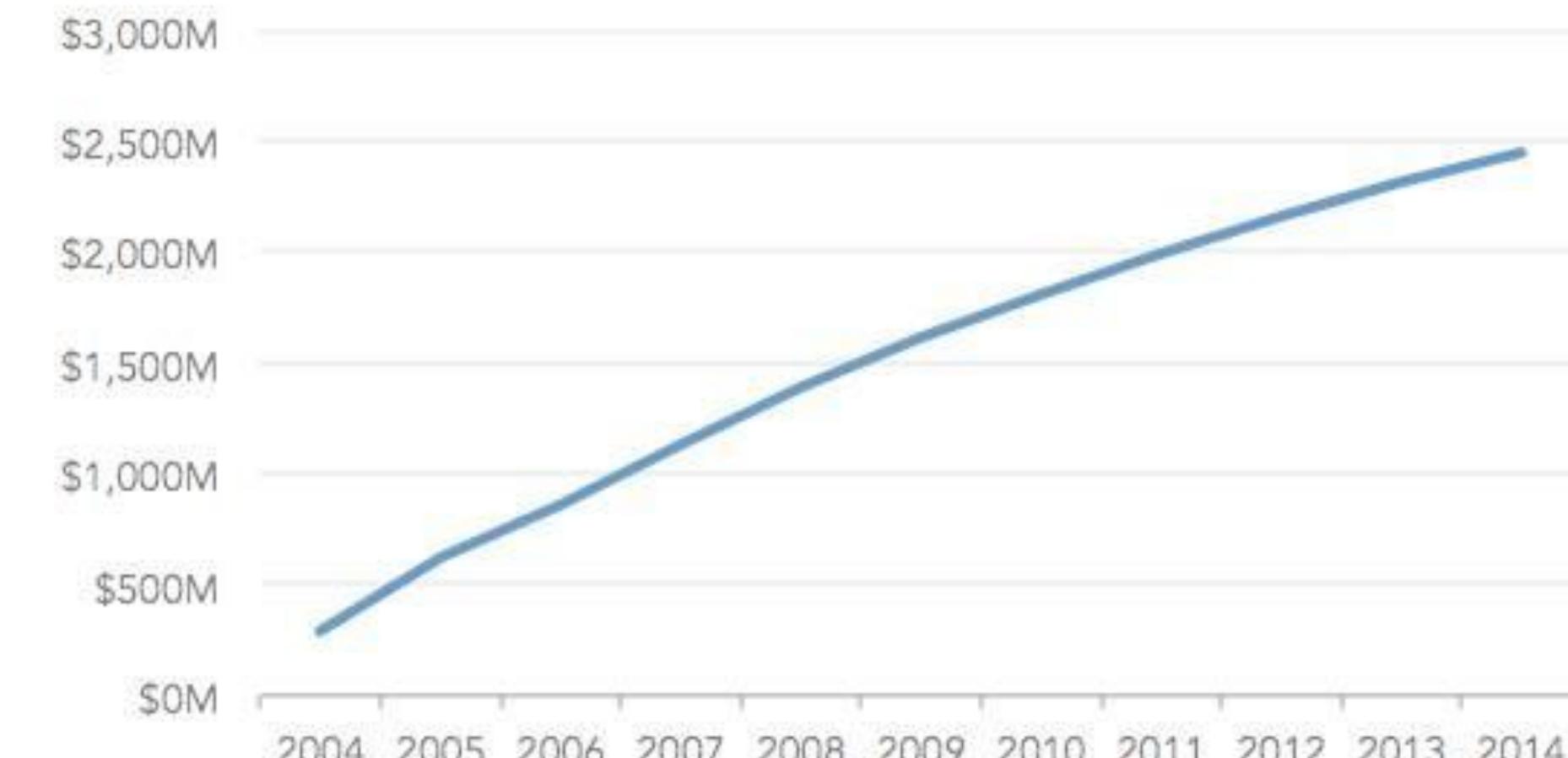
AVOID MISINTERPRETATIONS

Cumulative graphs

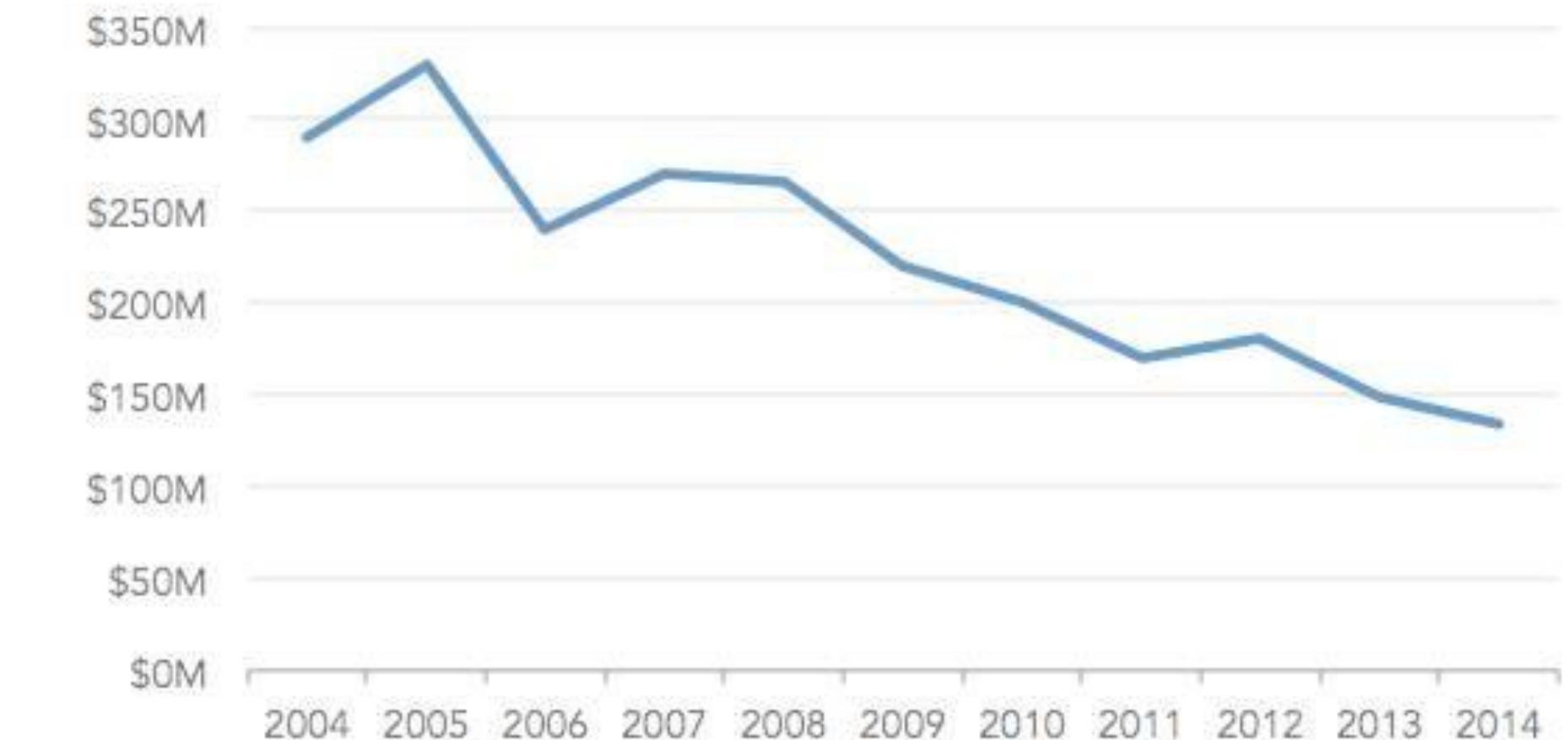
Many people opt to create cumulative graphs of things like number of users, revenue, downloads, or other important metrics. For example, instead of showing a graph of our quarterly revenue, we might choose to display a running total of revenue earned to date.

example from <https://blog.heapanalytics.com/how-to-lie-with-data-visualization/>

Cumulative Annual Revenue



Annual Revenue

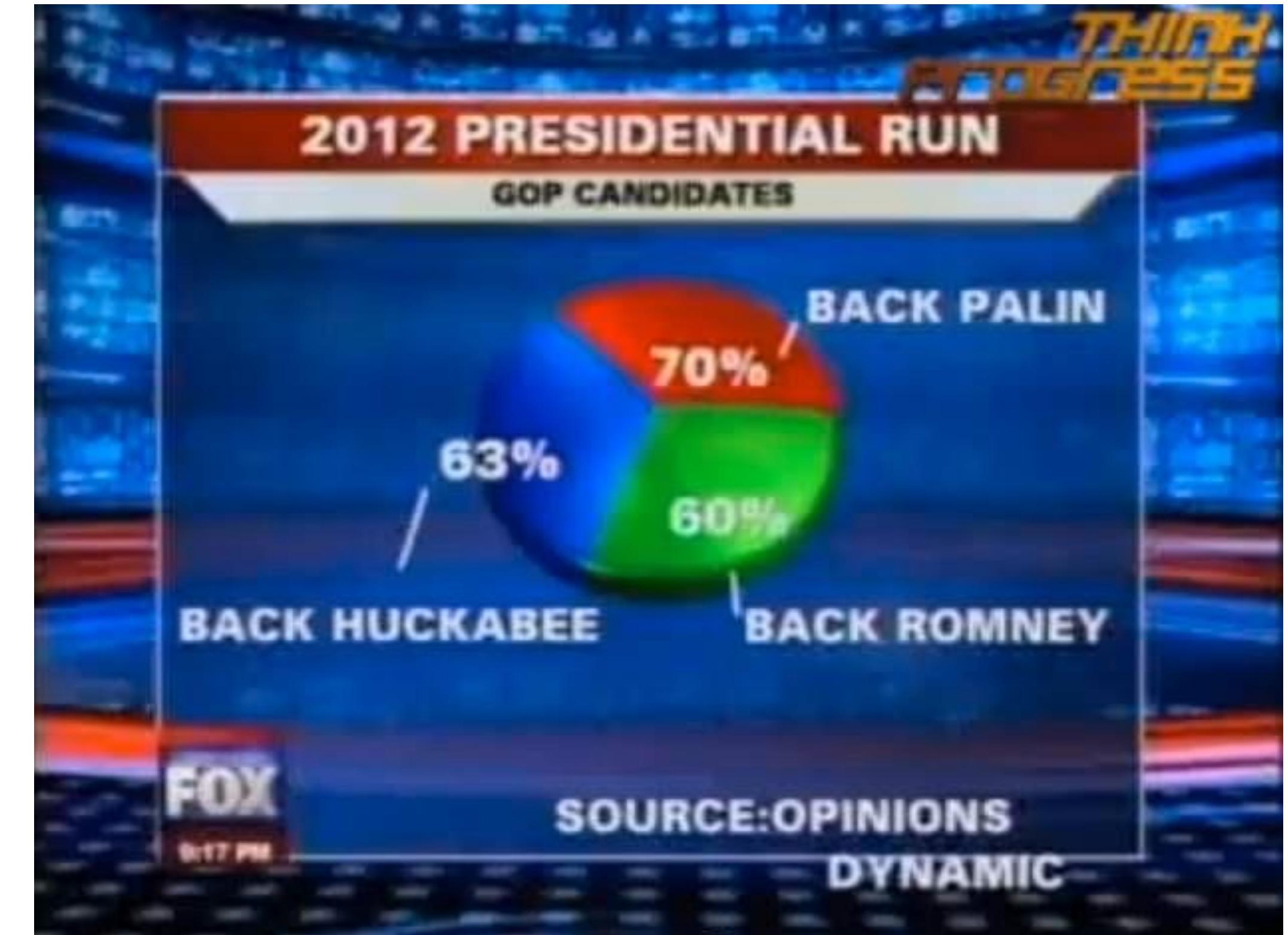


AVOID MISINTERPRETATIONS

Ignoring conventions

One of the most insidious tactics people use in constructing misleading data visualizations is to violate standard practices.

We're used to the fact that pie charts represent parts of a whole or that timelines progress from left to right. So when those rules get violated, we have a difficult time seeing what's actually going on. We're wired to misinterpret the data, due to our reliance on these conventions.



example from <https://blog.heapanalytics.com/how-to-lie-with-data-visualization/>

AVOID MISINTERPRETATIONS

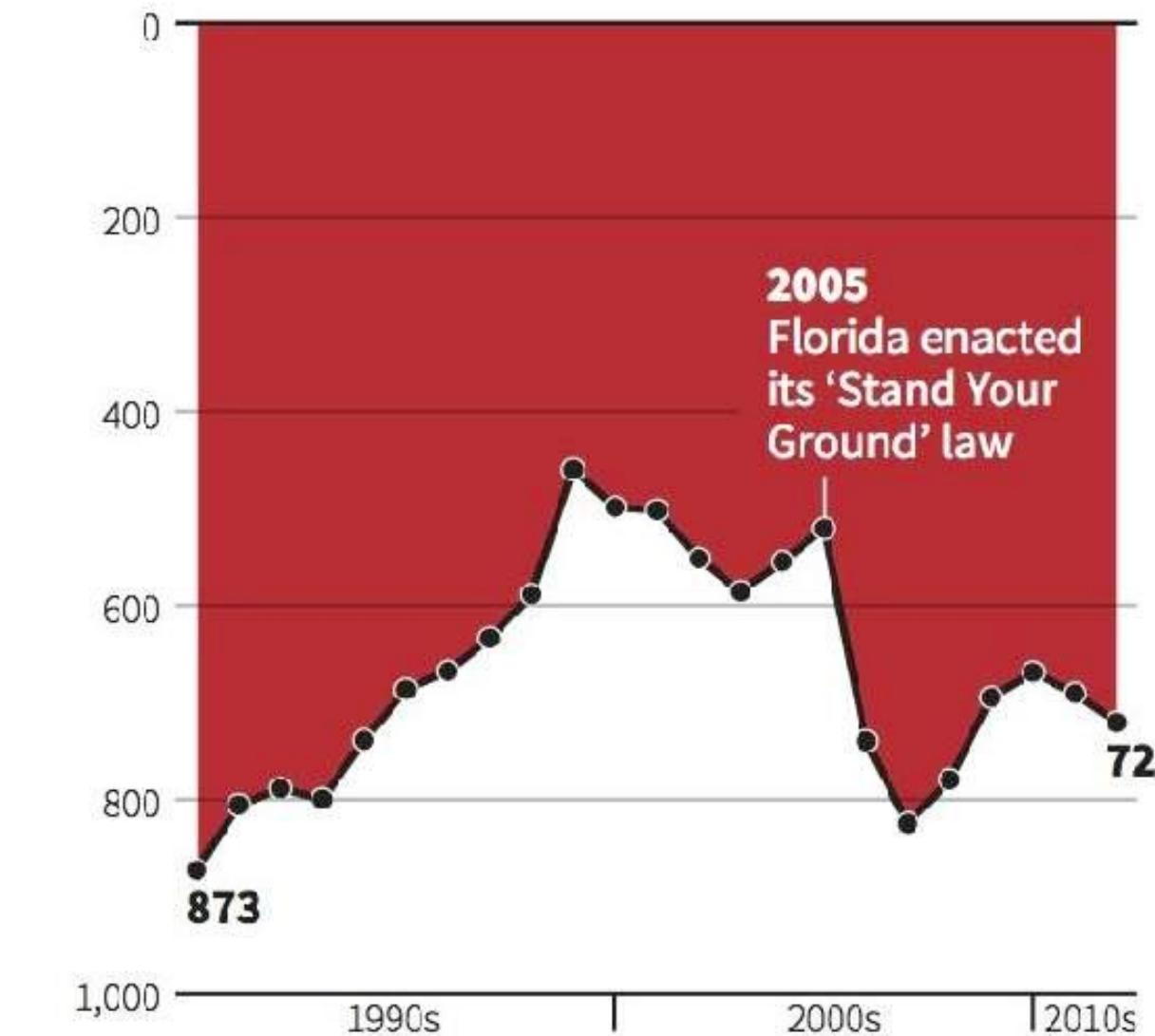
Ignoring conventions

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Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

C. Chan 16/02/2014

REUTERS

example from [https://blog.heapalytics.com/how-to-lie-with-data-visualization/](https://blog.heapanalytics.com/how-to-lie-with-data-visualization/)

Sheet 1



Sheet 2



Year of Date

201

1

La mappa della Milano multietnica

Year of Dat

2

Popolazione residente per quartiere

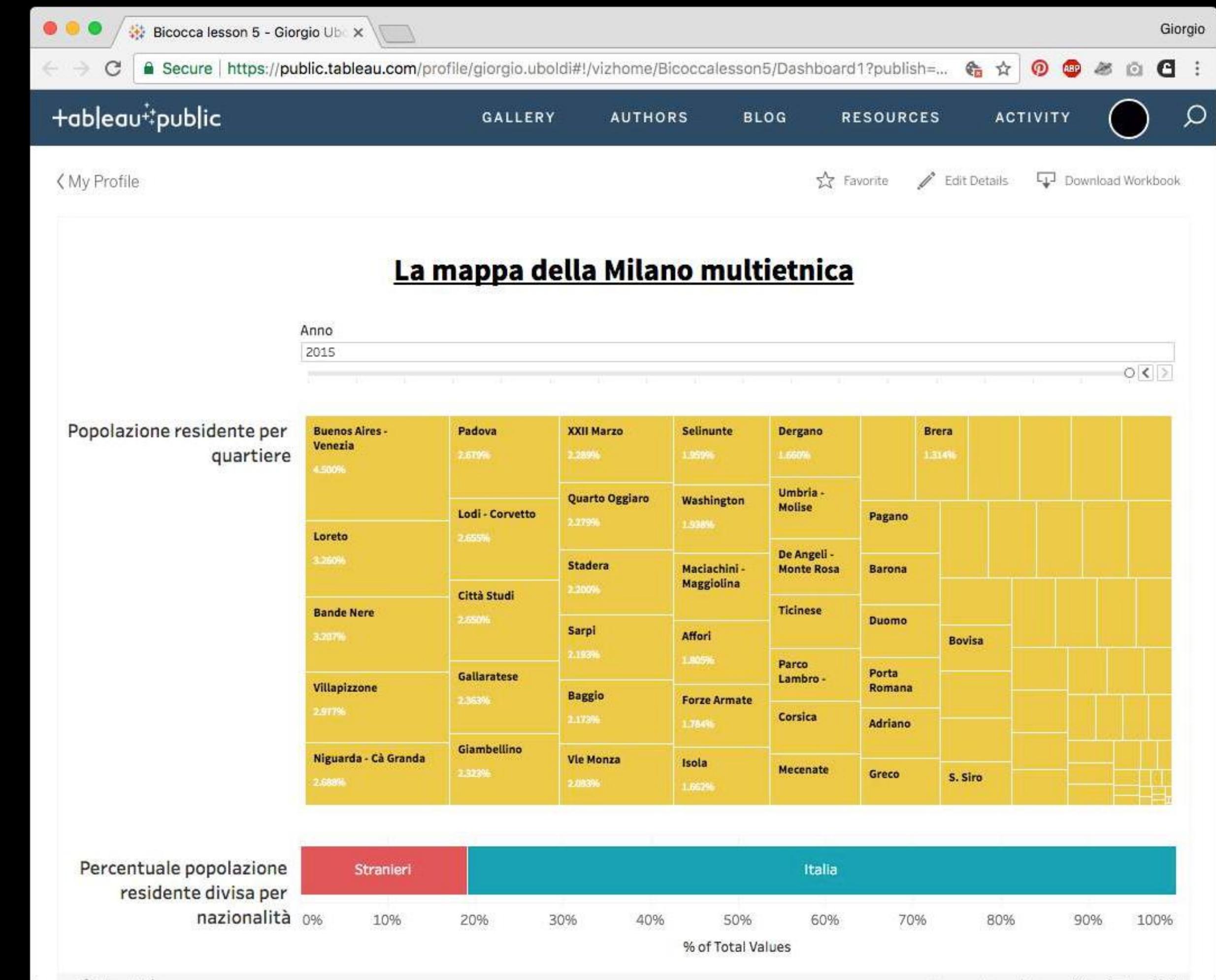
Percentuale
popolazione
residente divisa per
nazionalità



EXPORTING AND EMBEDDING

Save the visualization

Save on Tableau Public. The visualization will appear in your browser.



EXPORTING AND EMBEDDING

Save the visualization

You can download the PDF for further refinements in Illustrator (if you want to use static outputs)

The screenshot shows a Tableau Public dashboard titled "Bicocca lesson 5 - Giorgio Ub". The main visualization is a treemap chart titled "Percentuale popolazione residente divisa per nazionalità" (Percentage of population divided by nationality). The chart displays various neighborhoods in Milan with their respective percentages: Banda Nera (3.207%), Sarpi (2.650%), Affori (1.805%), Duomo (1.605%), Bovisa (1.505%), Parco Lambro (1.405%), Porta Romana (1.305%), Corsica (1.205%), Adriano (1.105%), Greco (1.005%), and S. Siro (0.905%). Below the chart, there is a "What's Tableau Public?" section with a description: "Create interactive graphs, maps, dashboards and apps. Publish them anywhere on the web. Anyone can do it. And it's free.", availability information ("Available for Windows and Mac"), and a "Get the App" button. The dashboard also includes a "Tableau Workbook" sidebar with options for PDF, Crosstab, Data, and Image. At the bottom, there are sections for "More Detail", "Last Saved: Nov 16, 2017", "Workbook Details: 12 Sheets", "Original Author: You (Giorgio Ubaldi)", and "Metadata" which lists Sheet1, Sheet2, Dashboard1, Age distribution, Number of foreign residents, Dashboard2, Uomini, and Donne.

Bicocca lesson 5

3 views | Giorgio Ubaldi

Last Saved: Nov 16, 2017

Workbook Details: 12 Sheets

Original Author: You (Giorgio Ubaldi)

Metadata:

- Sheet1
- Sheet2
- Dashboard1
- Age distribution
- Number of foreign residents
- Dashboard2
- Uomini
- Donne

EXPORTING AND EMBEDDING

Save the visualization

Or copy the code and embed it in a web page.

The screenshot shows a Tableau Public dashboard titled "Bicocca lesson 5 - Giorgio Ub". The main visualization is a treemap chart showing the percentage of the population by neighborhood. Below the treemap is a bar chart showing the percentage of the population by nationality. A tooltip is visible, showing the percentage of foreign residents in each neighborhood. On the right side of the dashboard, there is an "Embed Code" section with the following code:

```
<div class='tableauPlaceholder' id='t_15088337338130'></div>
```

Below the embed code is a "Link" field containing the URL: <https://public.tableau.com/views/E...>

The dashboard also includes a "More Detail" section with the following information:

- Last Saved: Nov 16, 2017
- Workbook Details: 12 Sheets
- Original Author: You (Giorgio Uboldi)
- Metadata: Sheet1, Sheet2, Dashboard1, Age distribution, Number of foreign residents, Dashboard2, Uomini, Donne

FINALIZING YOUR VISUALIZATIONS

Exercise

Open the dashboards and work on style and formats to finalize your work.

Try with other datasets from <https://www.kaggle.com/datasets> or with the ones of the previous lessons.

Work on details and graphic style and test the visualization with other classmates.

La mappa della Milano multietnica



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!

TELLING ASTORY

How can I explain all this
to an audience?

TELLING ASTORY

How can I communicate that
aha! moment to a public?

TELLING A STORY

A story consists of

- facts
- causal relationships
- a narrative sequence



TELLING A STORY

A story:

- ties facts together
- provides a narrative path through those facts
- presents a particular interpretation of those facts



Analysis

high formalization
low expressive potential
strong scientific rigor

Narration

low formalization
high expressive potential
weak rigor

Author driven

Strong ordering
Heavy messaging
Limited interactivity

Reader driven

Weak ordering
Light messaging
Free interactivity

It depends on the user

Does the user know the **topic**?

Does the user **understand the data underlying** the visualisation?

Does the user has a good **visual literacy**?

It depends on the user

It depends on the context

What's the cultural context?

Which are the constraints?

(time, formats, etc.)

TELLING ASTORY

It depends on the user

It depends on the context

It depends on the purpose

What's the research question?

What's the message I want to communicate?

Do I want to explicitly show the main the
insights or let the user explore the data?

TELLING ASTORY

Use “simple” narrative patterns to
engage with the reader

Repetition

HOW

A phenomenon is represented multiple times with changes to the main variable/dimension (the data) or the time frame or the animation pattern while other elements of the story don't change.

WHY

To show that the same phenomenon happens over and over again. It also strengthens the narrative through rhythm. Establishing a constant reference frame can help to emphasize change and differences.

EXAMPLE



<https://www.bloomberg.com/graphics/2015-whats-warming-the-world/>

Juxtaposition

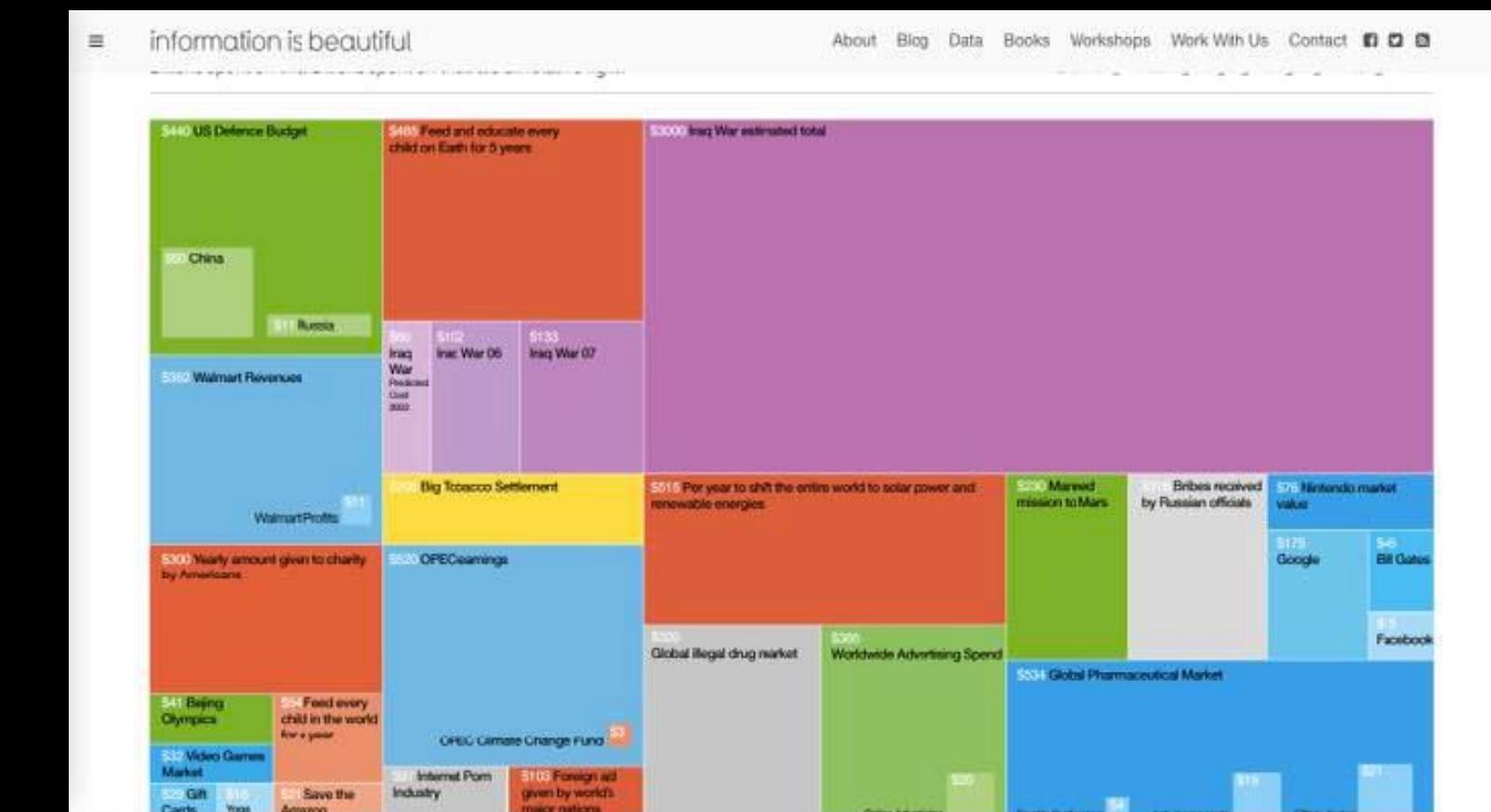
HOW

Showing two or more complementary visualizations juxtaposed.

WHY

Compare cases or samples, allows to highlight contrast, difference, absence of difference, change over time. Allows for individual exploration of (minor) differences.

EXAMPLE



<https://informationisbeautiful.net/visualizations/the-billion-dollar-gram/>

Interact with the user

HOW

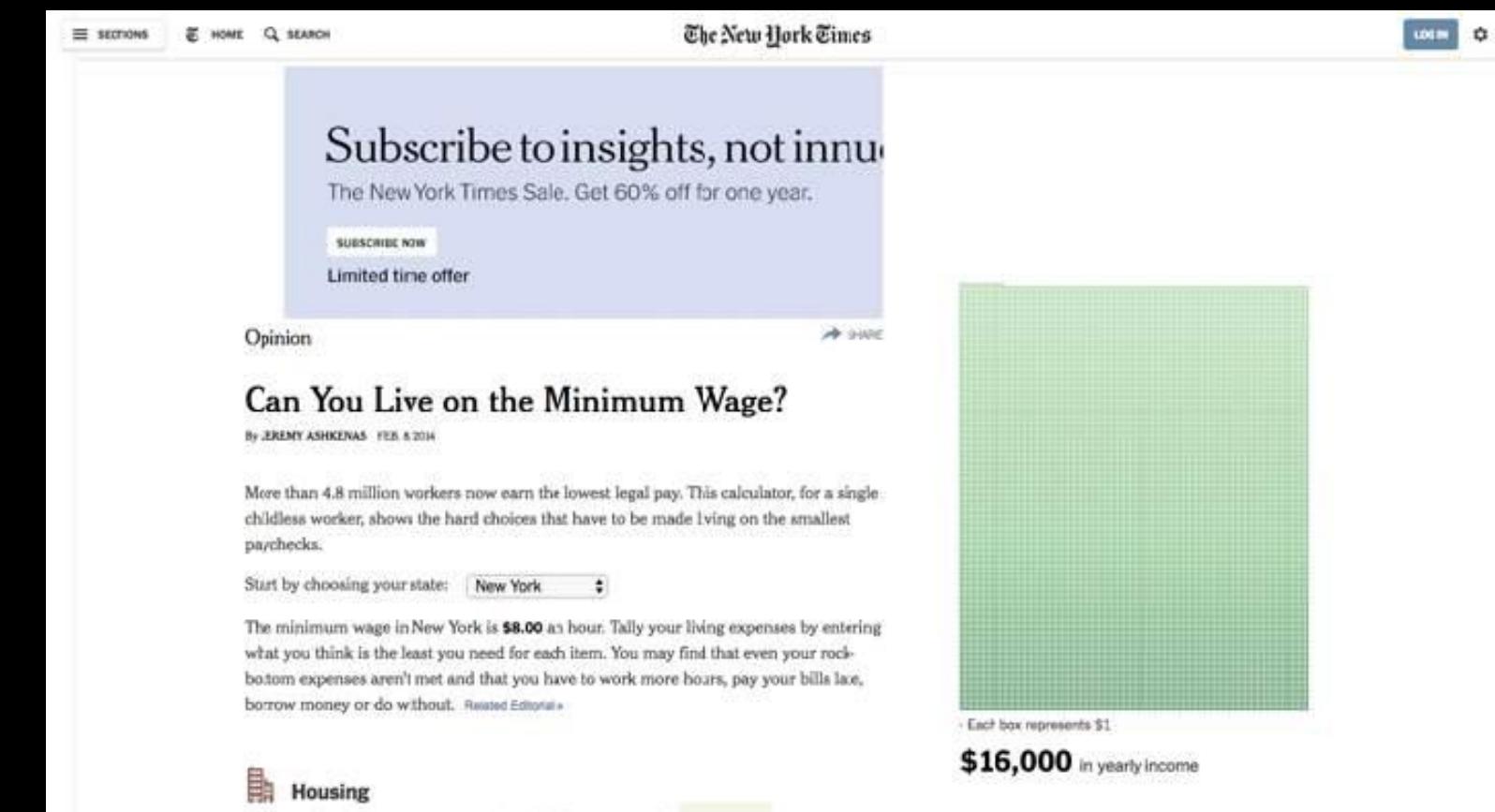
Audience becomes part of the narrative and the data experience.

WHY

Increase empathy, facilitate personal comparisons.

Helps make the data and information more personally relevant. To allow reader to use herself as measuring device.

EXAMPLE



<https://www.nytimes.com/interactive/2014/02/09/opinion/minimum-wage.html>

TELLING ASTORY

“Make a guess”

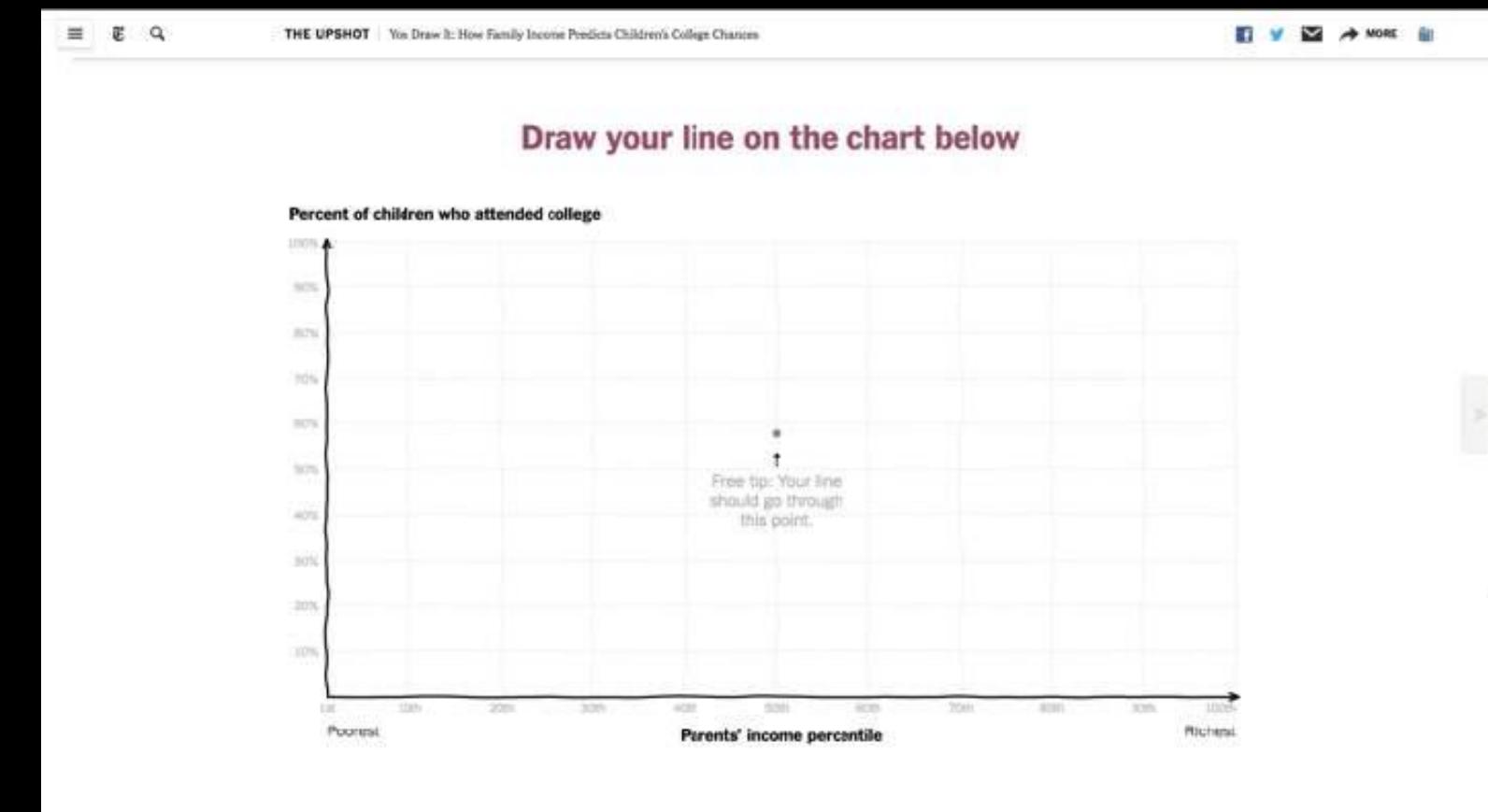
HOW

Enable the viewer to guess what insight they might find. If no interaction: interrupt the narrative with a question directly addressed to the viewer and provide the answer after. If interaction: prompt the user with an entry form.

WHY

Stimulates the viewer's curiosity, and possibly leads to a game-like experience. To engage the reader in causal reasoning about the phenomenon.

EXAMPLE

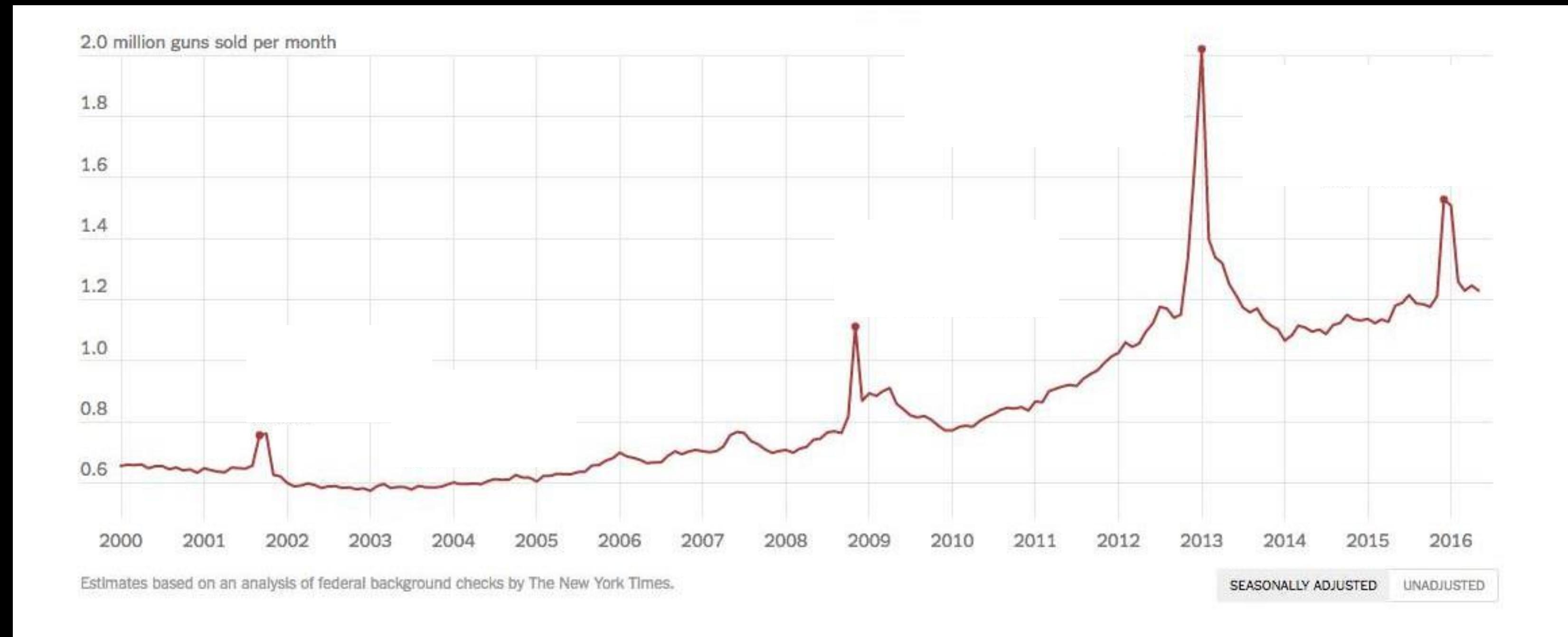


<https://www.nytimes.com/interactive/2015/05/28/upshot/you-draw-it-how-family-income-affects-childrens-college-chances.html>

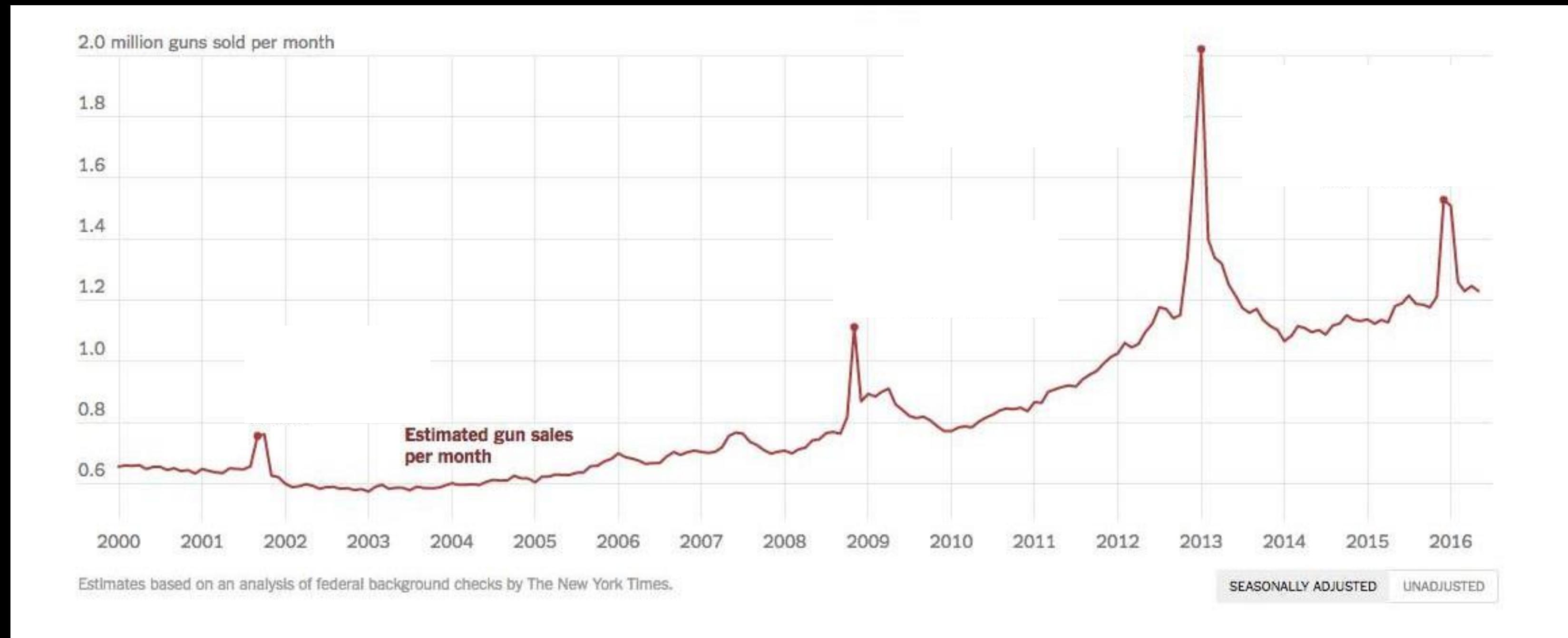
TELLING ASTORY

Help the reader

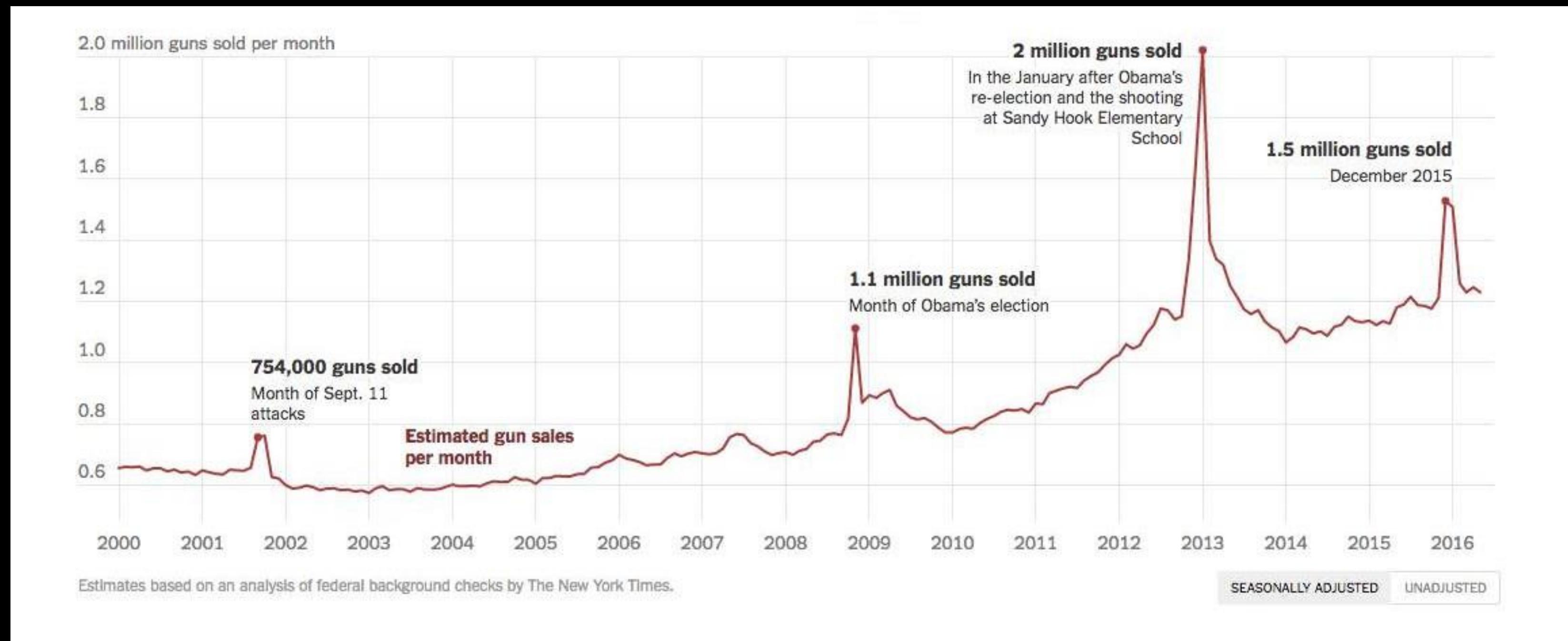
Pay attention to the labels and axes



Reduce the need for legends of information

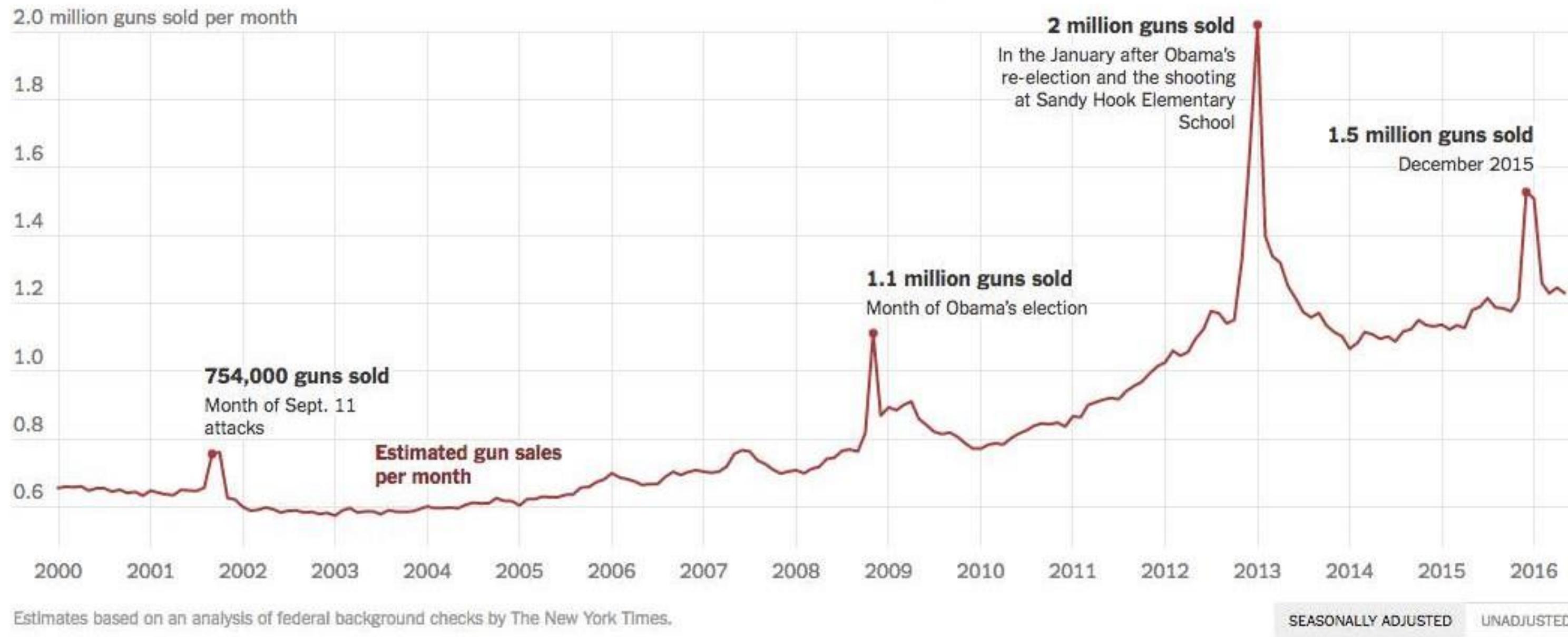


Annotate



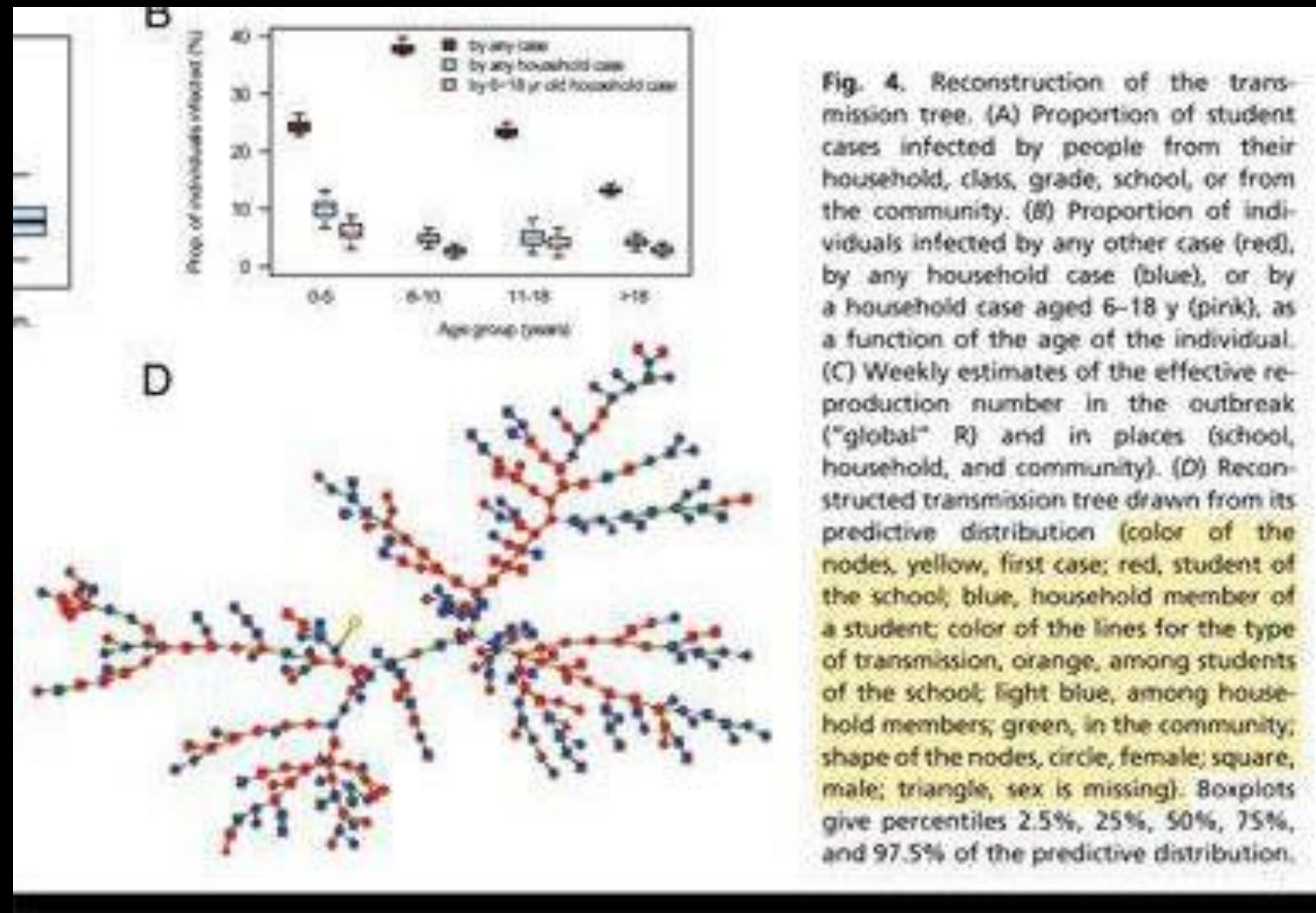
What Happens After Calls for New Gun Restrictions? Sales Go Up

By GREGOR AISCH and JOSH KELLER UPDATED June 13, 2016



Use text to support the visual

Don't be too abstract



Jonathan Corum, NYTimes, 2014

Don't be too abstract

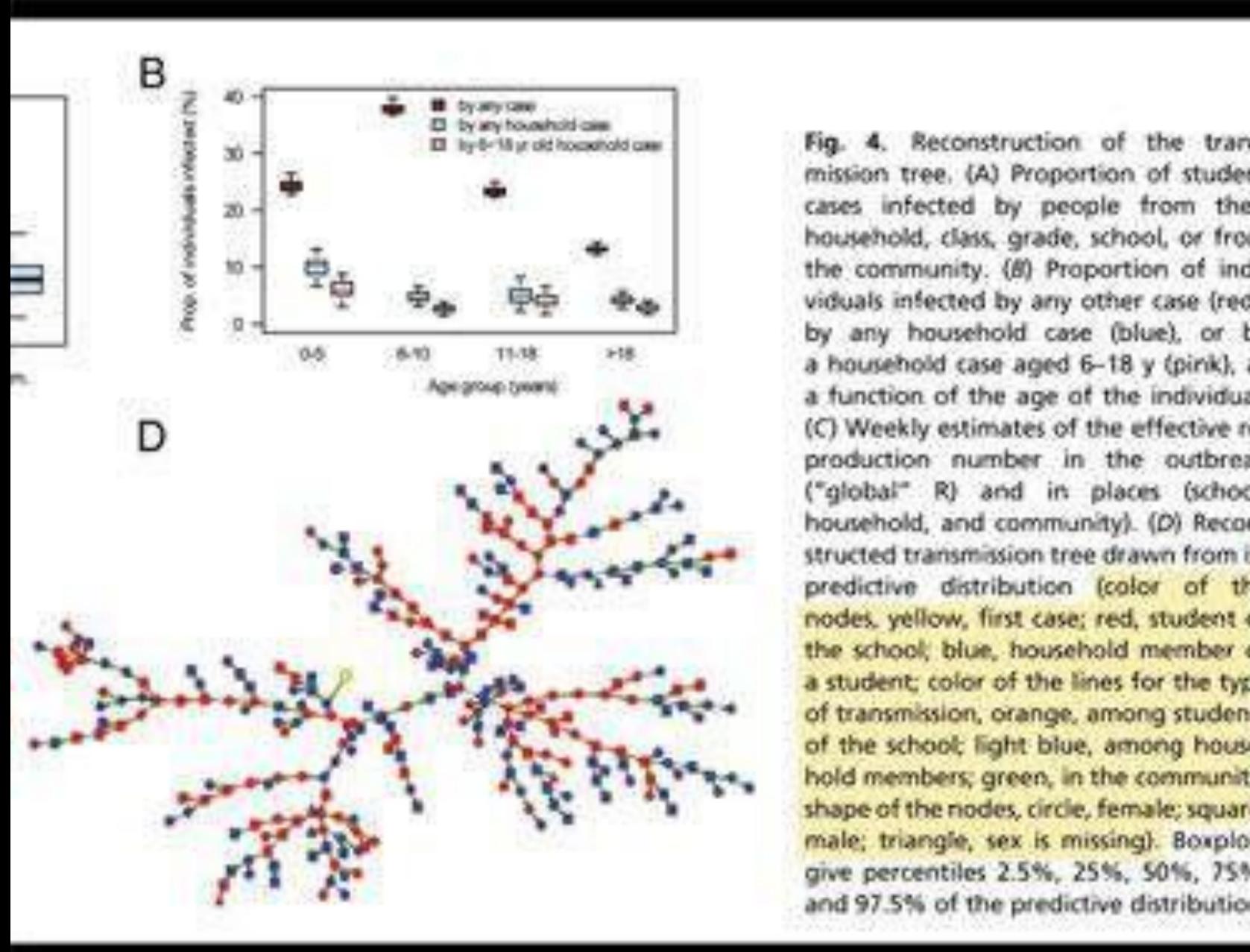
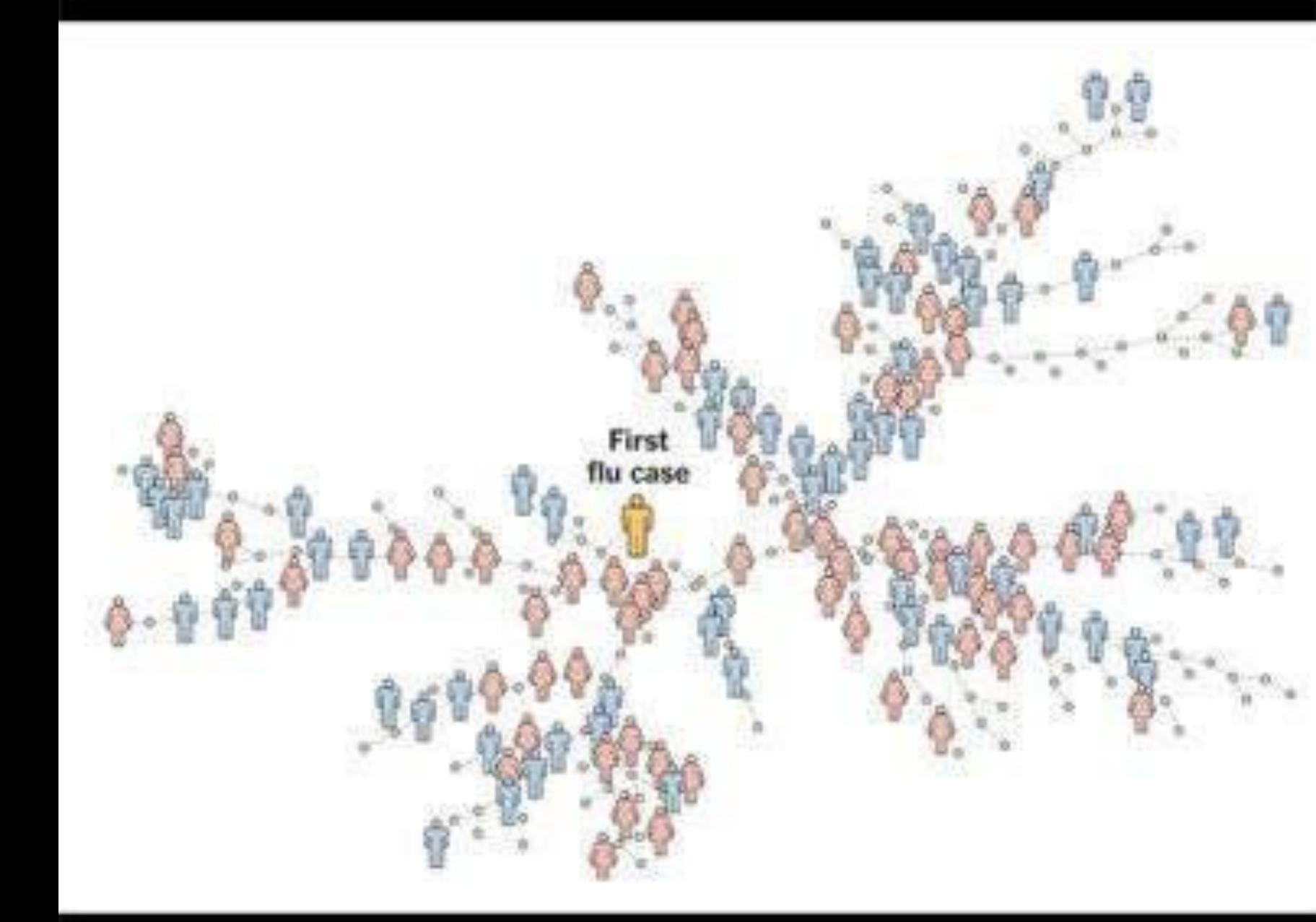


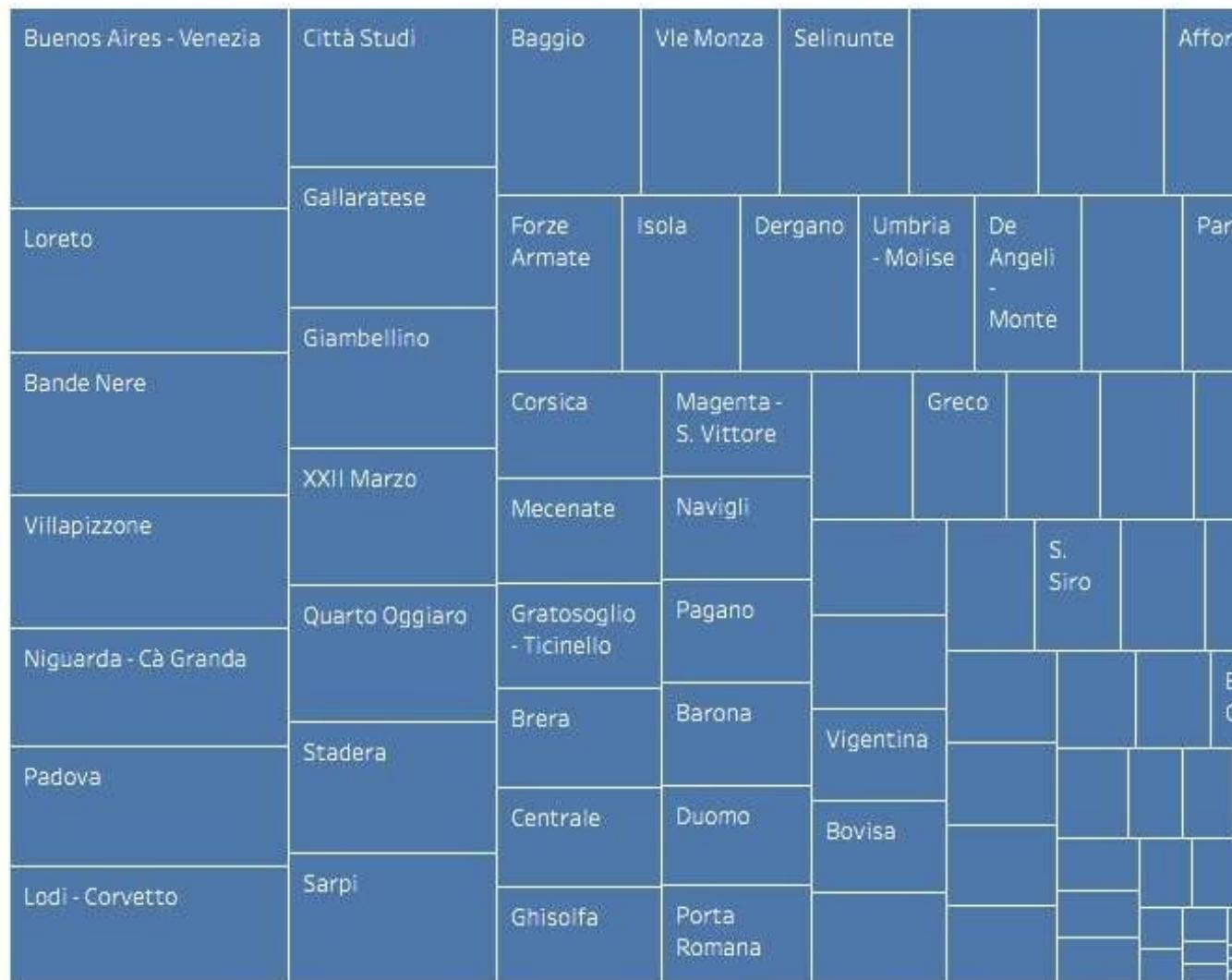
Fig. 4. Reconstruction of the transmission tree. (A) Proportion of student cases infected by people from their household, class, grade, school, or from the community. (B) Proportion of individuals infected by any other case (red), by any household case (blue), or by a household case aged 6–18 y (pink), as a function of the age of the individual. (C) Weekly estimates of the effective reproduction number in the outbreak ("global" R) and in places (school, household, and community). (D) Reconstructed transmission tree drawn from its predictive distribution (color of the nodes, yellow, first case; red, student of the school; blue, household member of a student; color of the lines for the type of transmission, orange, among students of the school; light blue, among household members; green, in the community; shape of the nodes, circle, female; square, male; triangle, sex is missing). Boxplots give percentiles 2.5%, 25%, 50%, 75%, and 97.5% of the predictive distribution.



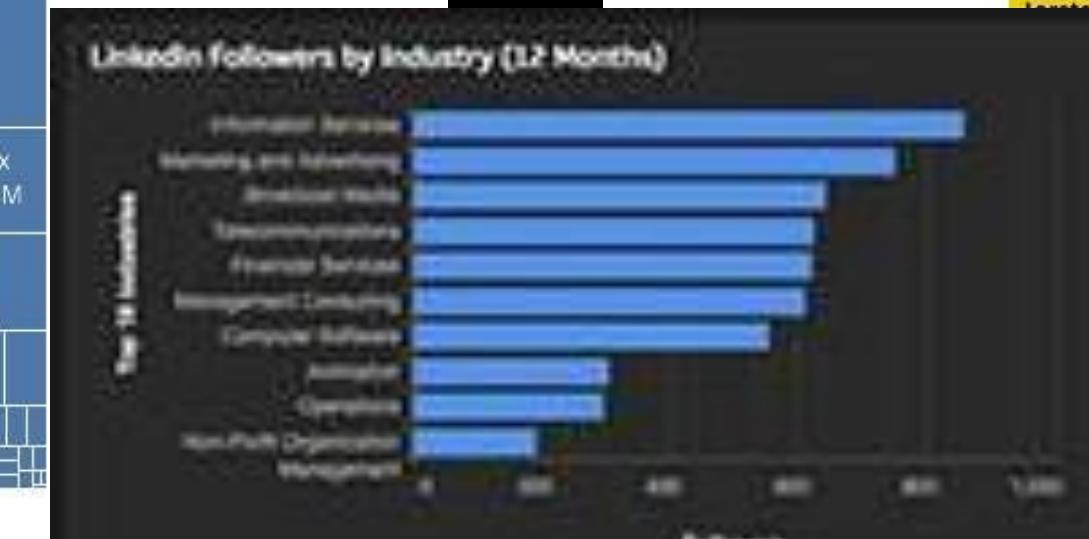
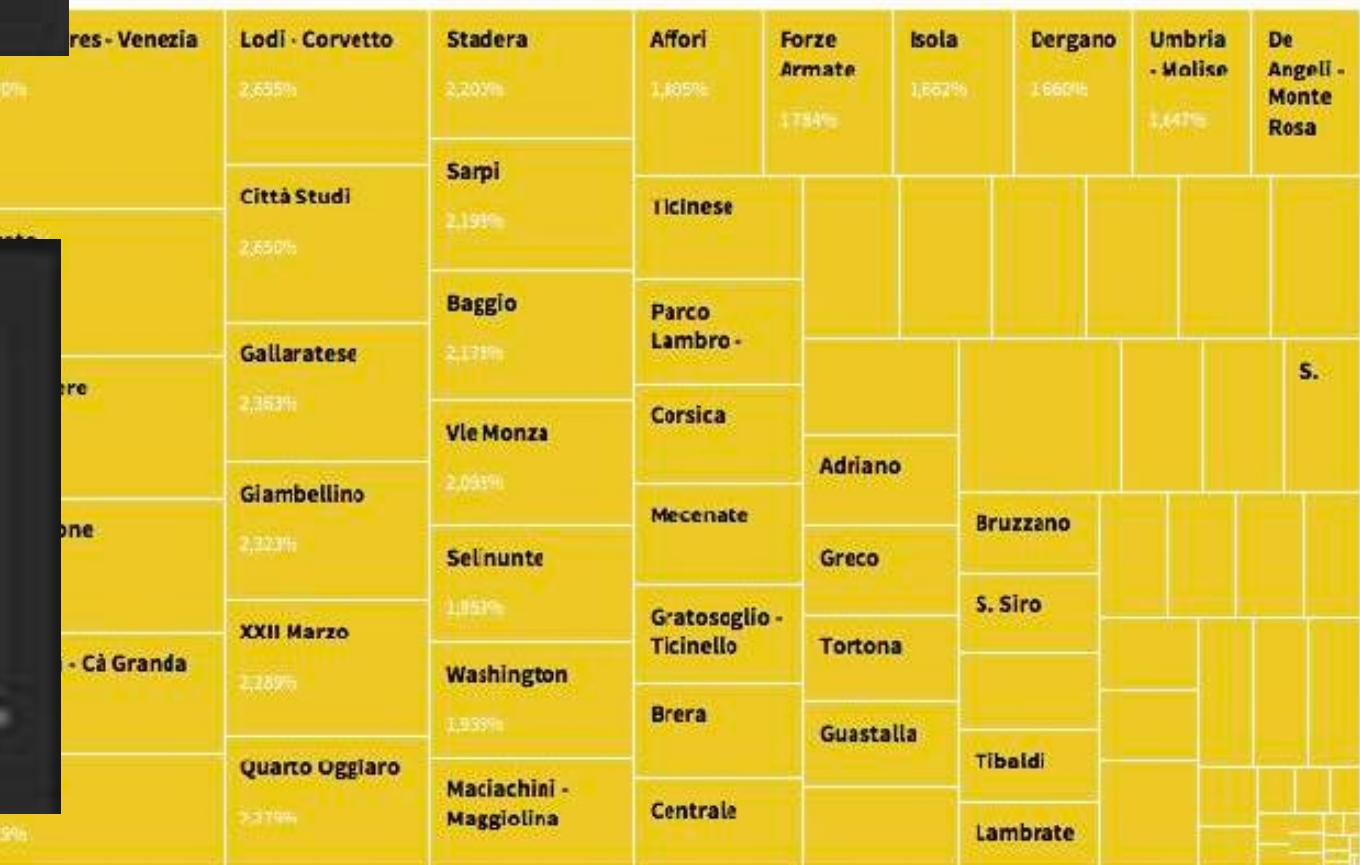
Keep it simple!



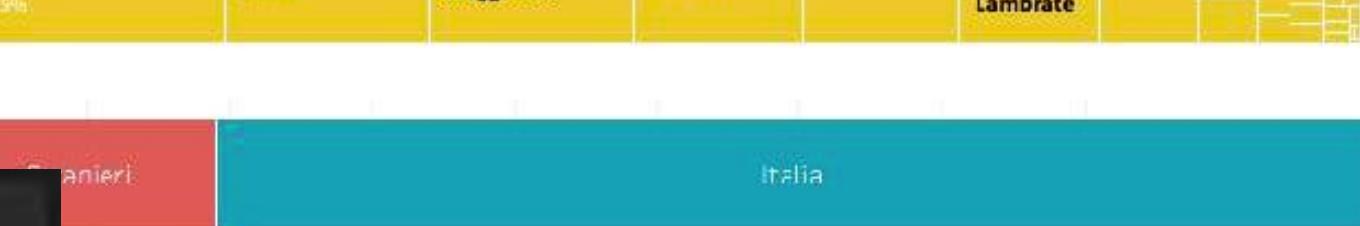
Sheet 1



a mappa della Milano multietnica



Sheet 2



Don't be your own audience