

TABLEAU

ADVANCED

CHARTS

A DATA DOZEN WORKSHOP

BUILT FOR THE OLIN BUSINESS SCHOOL AT WASHU

DATA DOZEN

a visual analytics studio

LET'S GET STARTED

This workshop dives into the more advanced features of Tableau Software. Exploring a series of different charts, we'll discuss the benefits and limitations of each type as we learn how to build it. We'll create four different chart types for each of our three different categories: time, benchmarks, and key performance indicators. During the course of this workshop, you'll use a variety of new Tableau tools, including parameters, sets, calculated fields, table calculations, the pages shelf, the analytics pane, and dual axes combination charts. We'll do all of this using a rich data set compiled from the World Bank's World Development Indicators data set joined with a fascinating happiness data set. Don't forget to [download Tableau Public](#) and download the data set to build your own version! As always, all of the resources related to this workshop, including the complete Tableau workbook, can be found on our [workshop series website](#).

DATA + TABLEAU

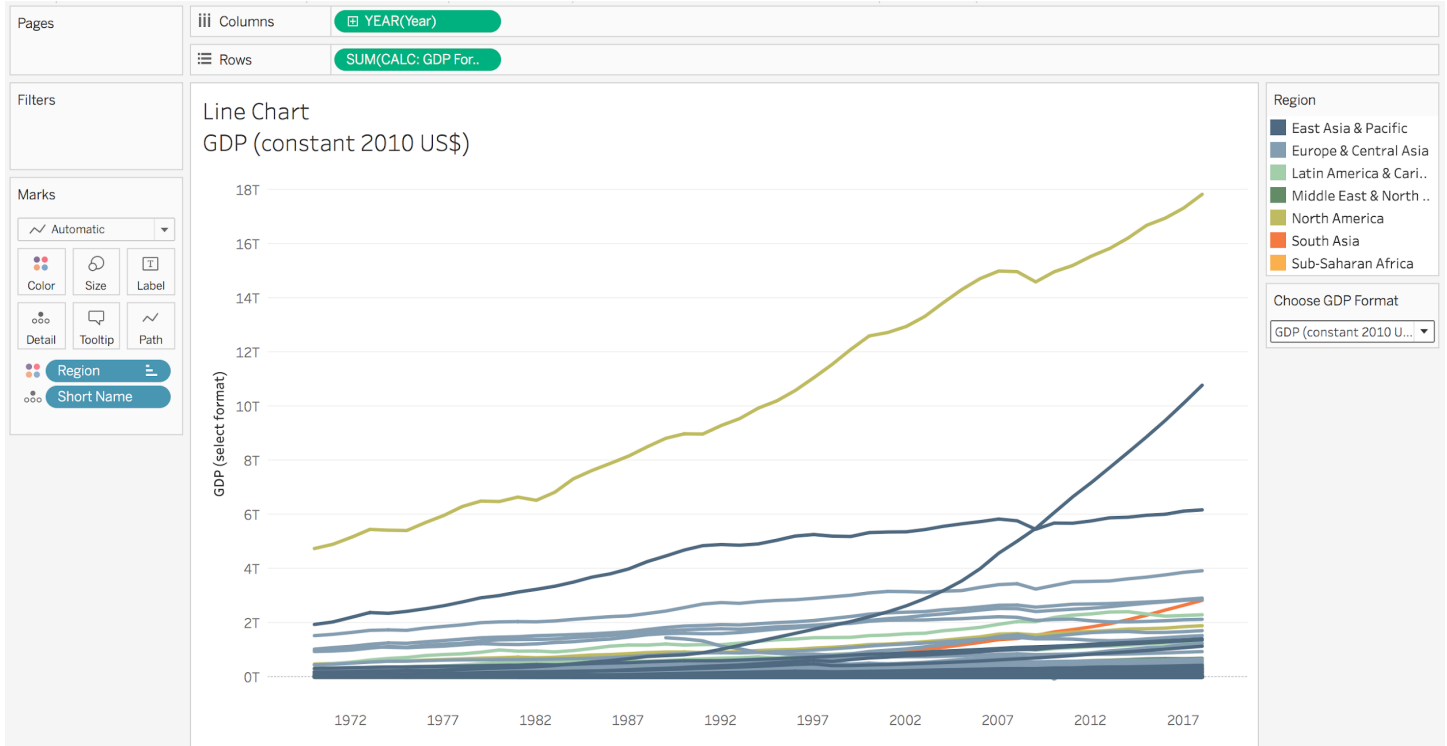
CONNECT TO DATA

- ▶ Connect to Data
 - ▷ Launch Tableau Public.
 - ▷ Under Connect and To a File, click Excel Workbook.
 - ▷ Navigate to the 1970-2018-World-Development-Indicators-World-Bank.xlsx and click Open.
 - ▷ The data will load in the preview area.
- ▶ Click the orange tab labeled Sheet 1 to go to Tableau's building environment.

ORGANIZE YOUR DATA PANE

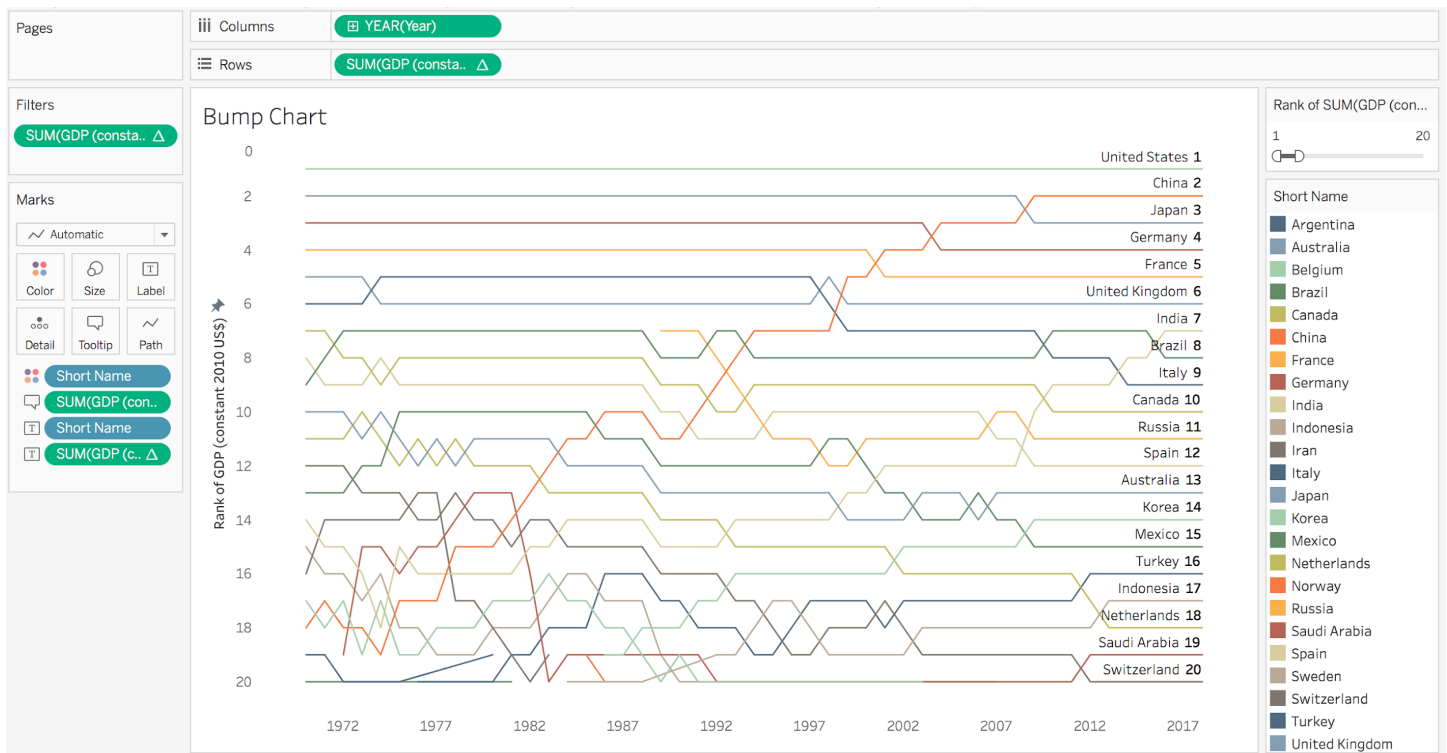
- ▶ Change Data Type
 - ▷ Change Year from a number to a Date
- ▶ Group by Folder
 - ▷ In the data pane, click the dropdown menu next to the search button and click group by folder.
 - ▷ Select several measures in the data pane, right click, folders, new folder. Here are a few sample groupings:
 - ▷ GDP (all variables)
 - ▷ Exports & Imports
 - ▷ Structure of Outputs (Agriculture, Industry, Manufacturing, Services)
 - ▷ People (Population, Labor Force, Life Satisfaction)

TIME



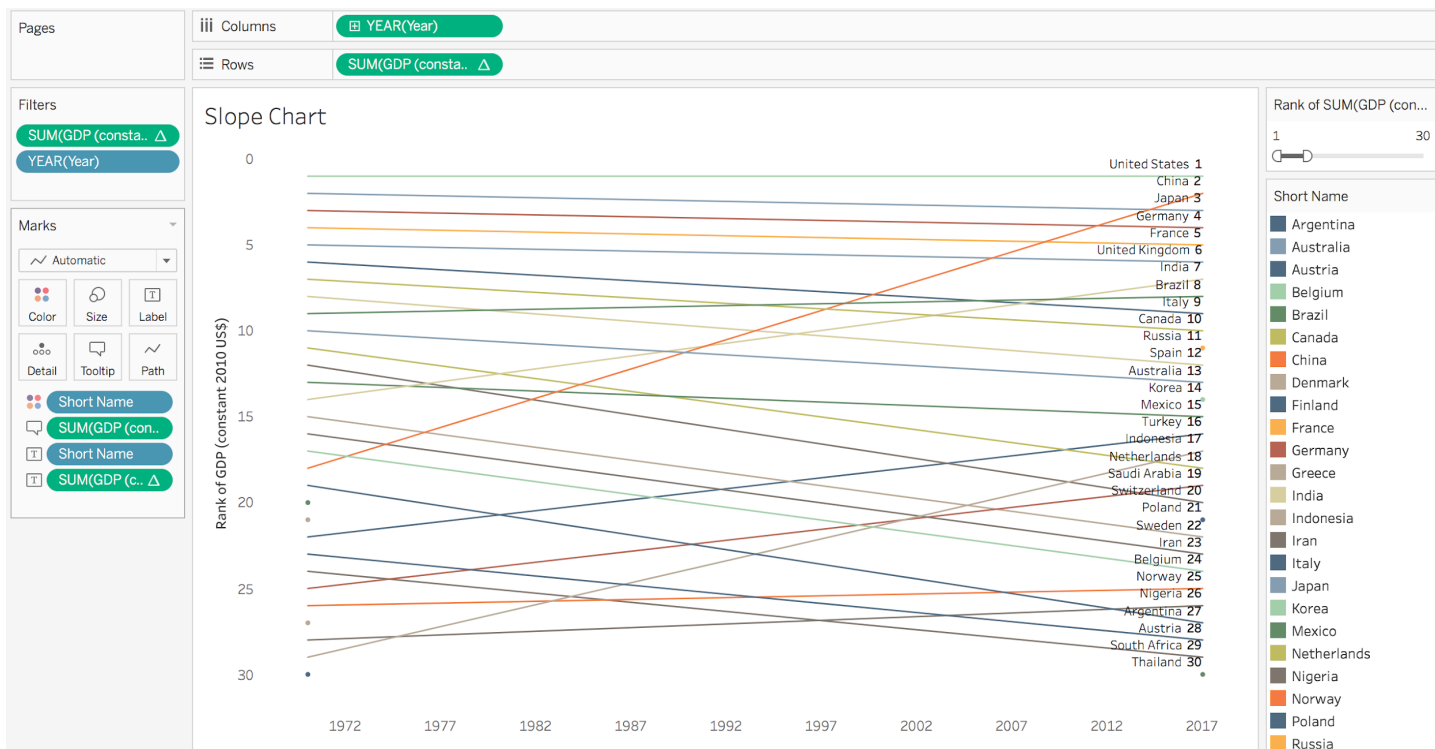
LINE CHART

- ▶ Line Chart
 - ▷ Year to columns
 - ▷ GDP (constant 2010 US\$) to Rows
 - ▷ Region to Color
 - ▷ Short Name to Detail
- ▶ Parameter
 - ▷ Right click in data pane > create parameter
 - ▷ Settings: Name: Choose GDP Format | Data type: Integer | Allowable values: list
 - ▷ Value 1 (display as: Constant GDP (2010 US\$))
 - ▷ Value 2 (display as: Nominal GDP (current US\$))
 - ▷ Show Parameter Control
- ▶ Calculated Field
 - ▷ Create new calculated field named CALC: GDP Format Parameter
 - ▷ IF [Choose GDP Format] = 1 THEN [GDP (constant 2010 US\$)] ELSE [GDP (current US\$)] END
 - ▷ Replace Rows with new calculated field



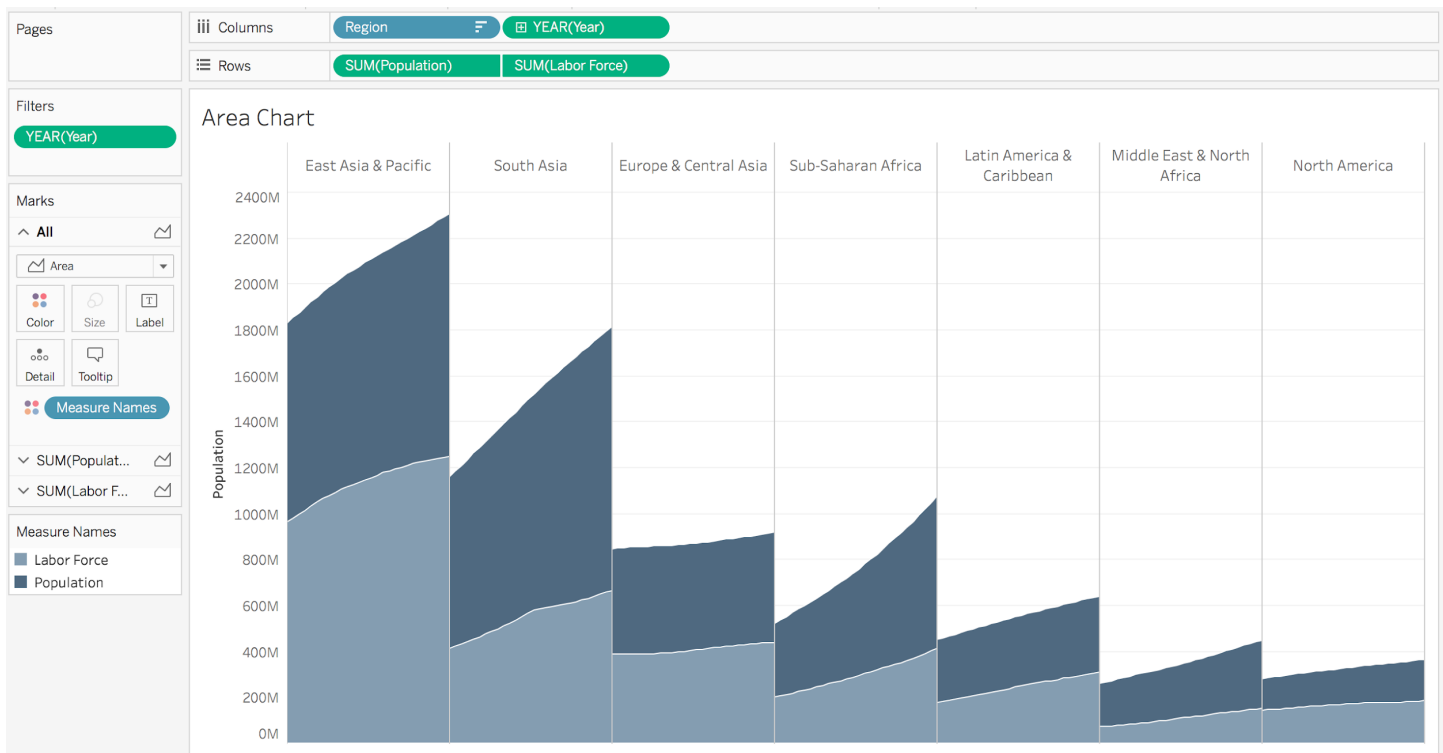
BUMP CHART

- Bump Chart
 - Year to columns
 - GDP (constant) to rows
 - Short Name to detail
 - GDP (constant) on rows dropdown menu > Quick table calculation > Rank
 - Compute Using > Short Name
 - Edit Y axis > Reversed and uncheck include 0
- Filter and Labels
 - GDP (constant) on rows dropdown menu > Show Filter > 1 to 20
 - Size > make lines thinner
 - Short Name and Rank to Label (command and drag to copy rank from rows)
 - Label > Show mark labels > ... > format and alignment



SLOPE CHART

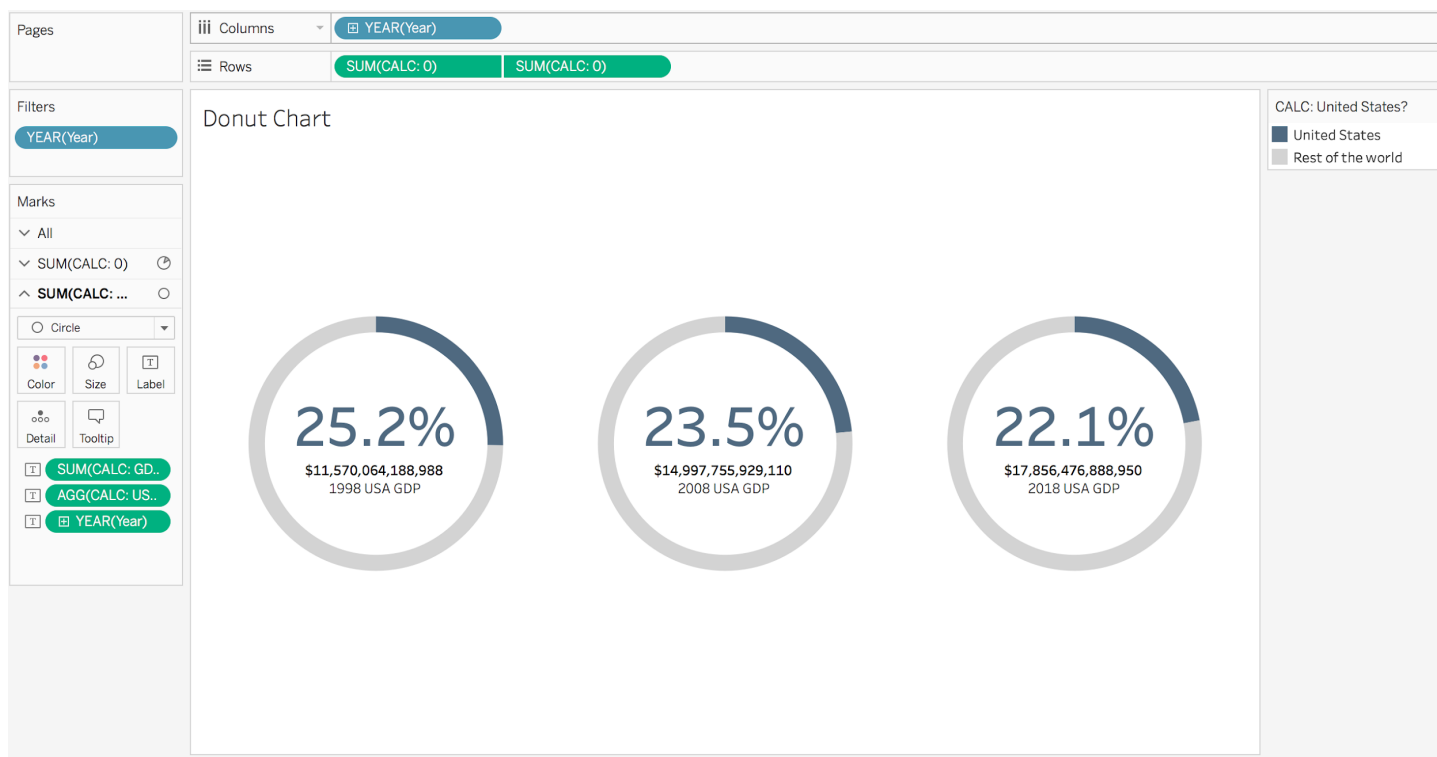
- Duplicate bump chart
- Year to filter > choose discrete year > check 1970 and 2018
- Expand rank filter to show top 30 countries



AREA CHART

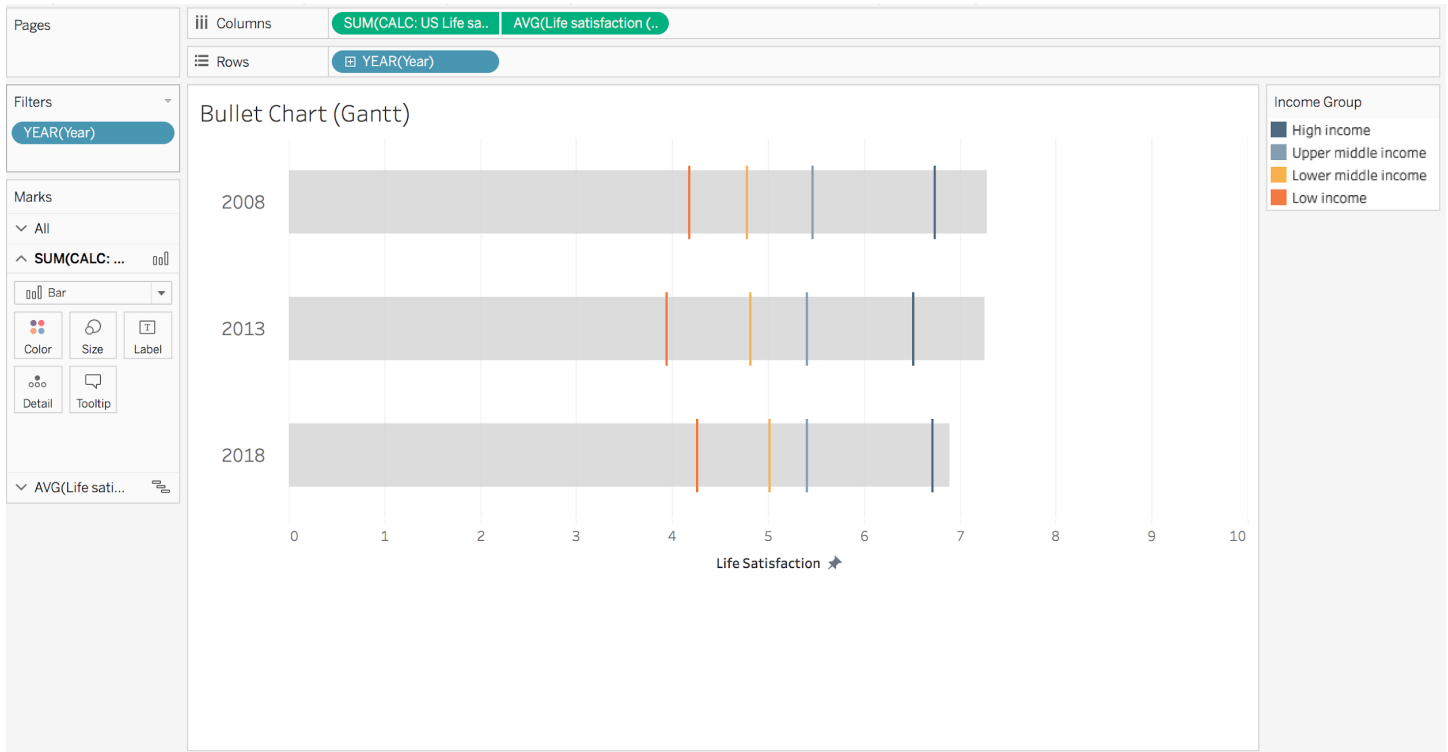
- ▶ Area Chart
 - ▷ Year to columns
 - ▷ Population to rows
 - ▷ Region to columns to create small multiples
 - ▷ Sort Region by population in descending order
 - ▷ Change mark type from Automatic to Area
- ▶ Dual Axis Combination Chart
 - ▷ Labor Force to rows
 - ▷ Dual Axis and synchronize axes
 - ▷ Show year filter and keep 1991 to 2018
 - ▷ Notice that Measure Names is on color

BENCHMARKS



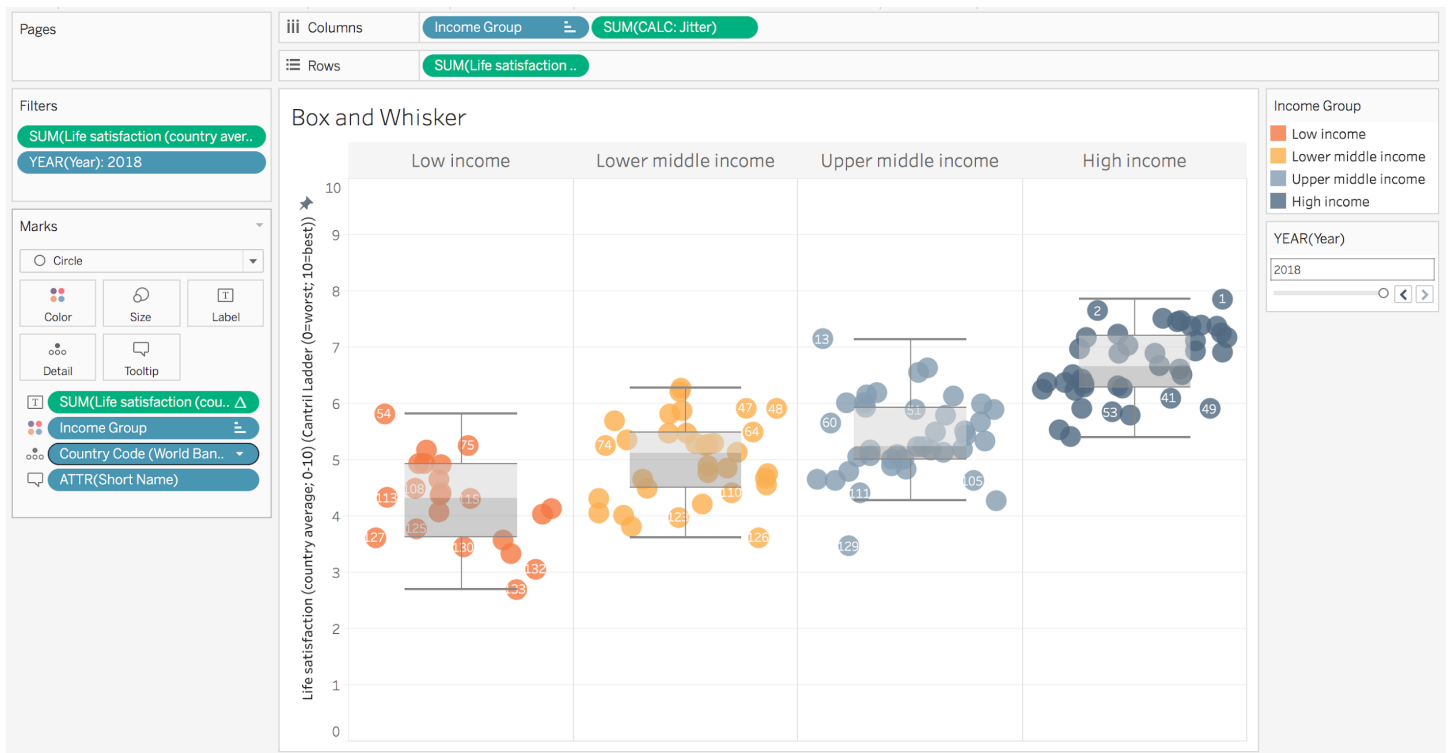
DONUT CHART

- ▶ Pie Chart
 - ▶ Create a new calculated field called CALC: United States? > [Country Code (World Bank)] = "USA"
 - ▶ CALC: United States to Color and change mark type from Automatic to Pie
 - ▶ GDP (constant) to Angle and filter Year to 2018
 - ▶ Reorder color legend and change colors, and change View from standard to entire view
- ▶ Donut Chart
 - ▶ Create a new calculated field CALC: 0 (just the number 0)
 - ▶ CALC: 0 to Rows twice to create two pie charts
 - ▶ Last marks card: change mark from pie to circle, and remove all pills; make circle white and smaller
 - ▶ Dual axis and synchronize axes; remove extra headers, borders and lines
- ▶ Label
 - ▶ CALC: GDP (constant) to tooltip > Quick table calculation > Percent of Total
 - ▶ CALC: US GDP > IF [Country Code (World Bank)] = "USA" THEN [GDP (constant 2010 US\$)] END
 - ▶ CALC: US % of World GDP > sum([CALC: US GDP]) / sum([GDP (constant 2010 US\$)])
 - ▶ Last Marks Card: Take both calculations to label
 - ▶ Small Multiples by taking year to columns (labels are dynamic)



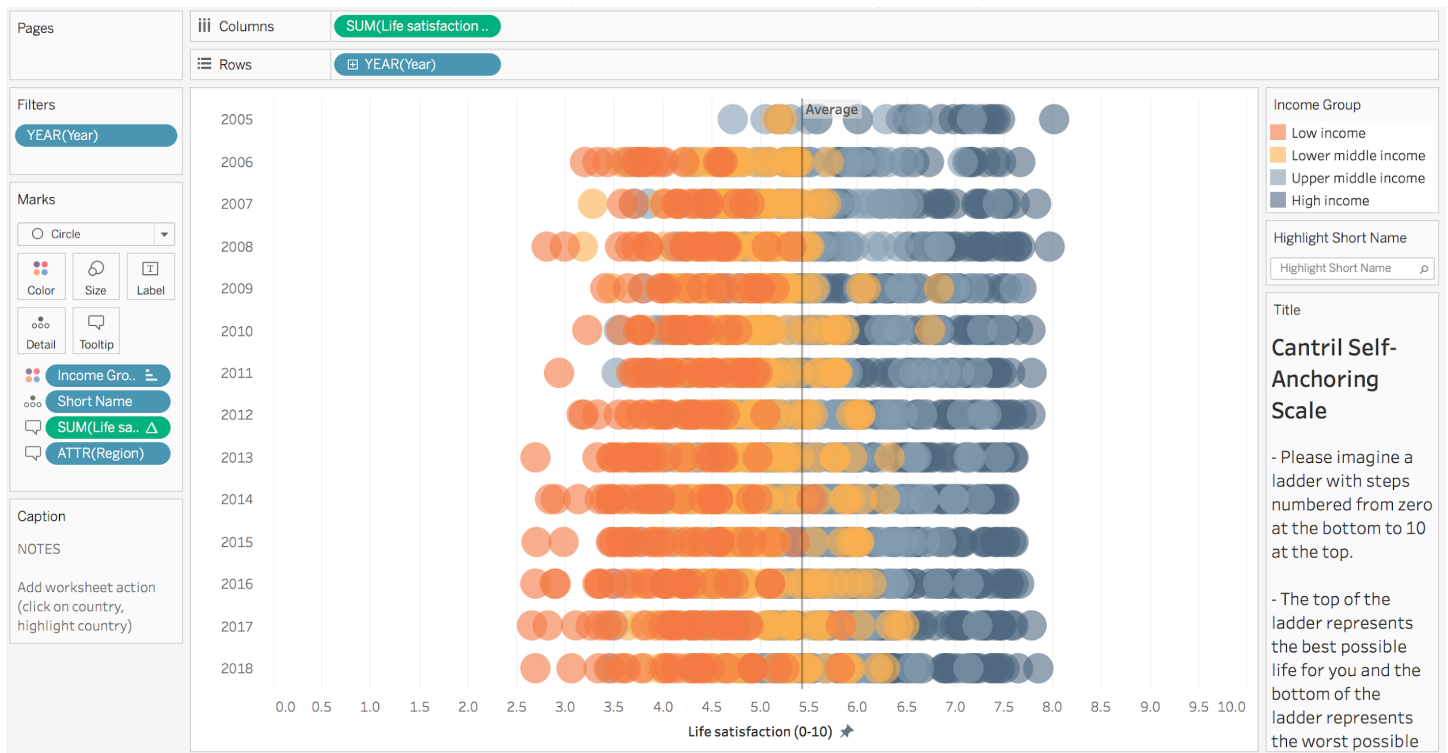
BULLET CHART

- ▶ US Bars
 - ▷ Create new calculated field: CALC: US Life Satisfaction
 - ▷ IF [Country Code (World Bank)] = "USA" THEN [Life satisfaction (country average; 0-10) (Cantril Ladder (0=worst; 10=best))] END
 - ▷ Discrete Year to Rows
 - ▷ Filter Year to 2008, 2013, and 2018
 - ▷ CALC US Life Satisfaction to Columns
 - ▷ Fix X axis from 0 to 10
 - ▷ Change bars grey
- ▶ Benchmarks
 - ▷ Life Satisfaction to Columns
 - ▷ Change aggregation from Sum to Average
 - ▷ Last marks card: Income group to color and mark type to Gantt Bar
 - ▷ Dual axes and synchronize
- ▶ Circle Variation
 - ▷ Duplicate bullet chart
 - ▷ Replace Income Group with Short Name, change mark type to circle
 - ▷ Filter the Short Name countries, keeping United States and several others
 - ▷ Right click on United States in color legend and select Hide



BOX AND WHISKER PLOT

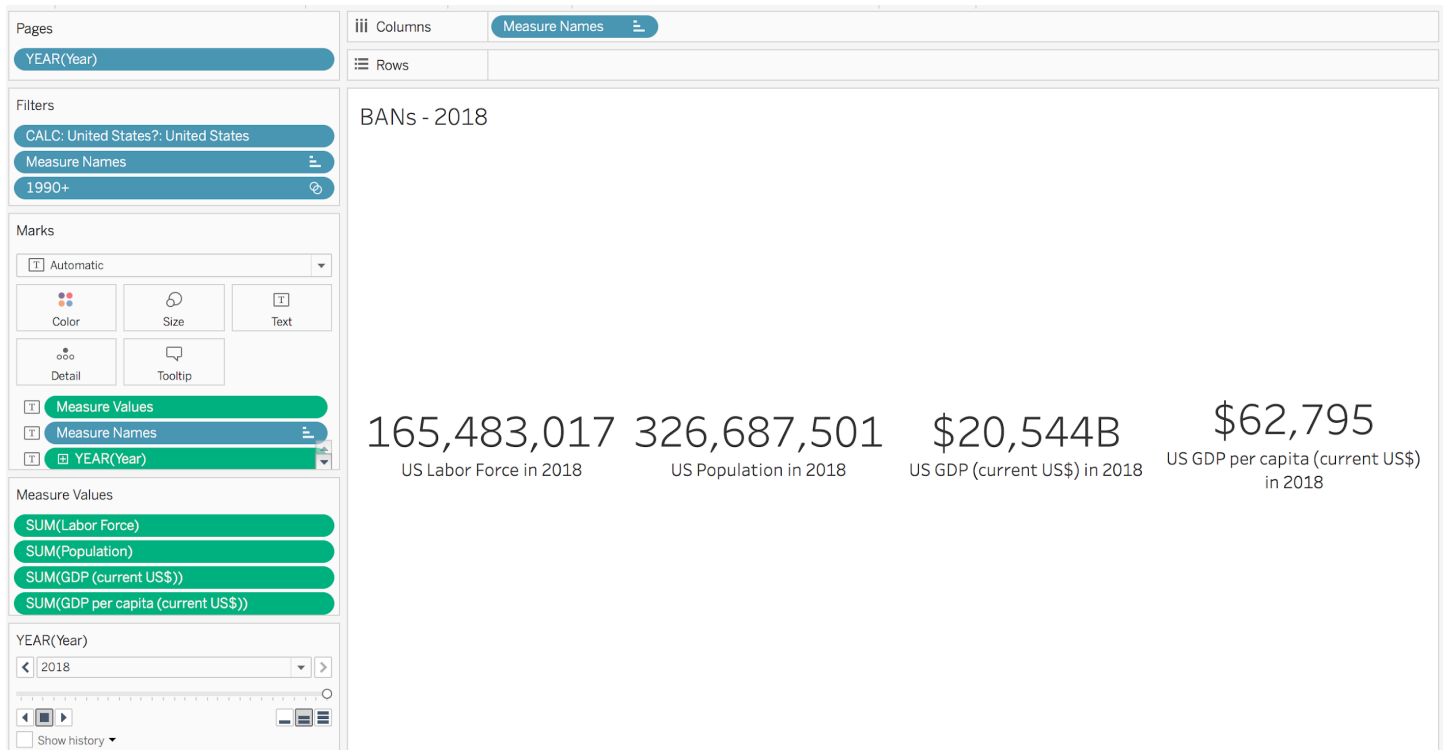
- ▶ Box Plot
 - ▶ Year to filter and keep 2018
 - ▶ Income Group to Columns (default sort manually from low to high)
 - ▶ Life Satisfaction to Rows (fix y axis 0 to 10)
 - ▶ Short Name to Detail
 - ▶ Mark type from Automatic to Circle
 - ▶ Analytics Pane > Drag out Box Plot
- ▶ Jitter
 - ▶ New calculated field: CALC: Jitter random()
 - ▶ Jitter to Columns (after Income Group)
 - ▶ Adjust color, opacity and size of individual marks
 - ▶ Life Satisfaction to Label > Quick table calculation > Rank
 - ▶ Edit table calculation > Specific Dimensions > Income Group + Short Name
 - ▶ Center label and make font white



DOT DISTRIBUTION

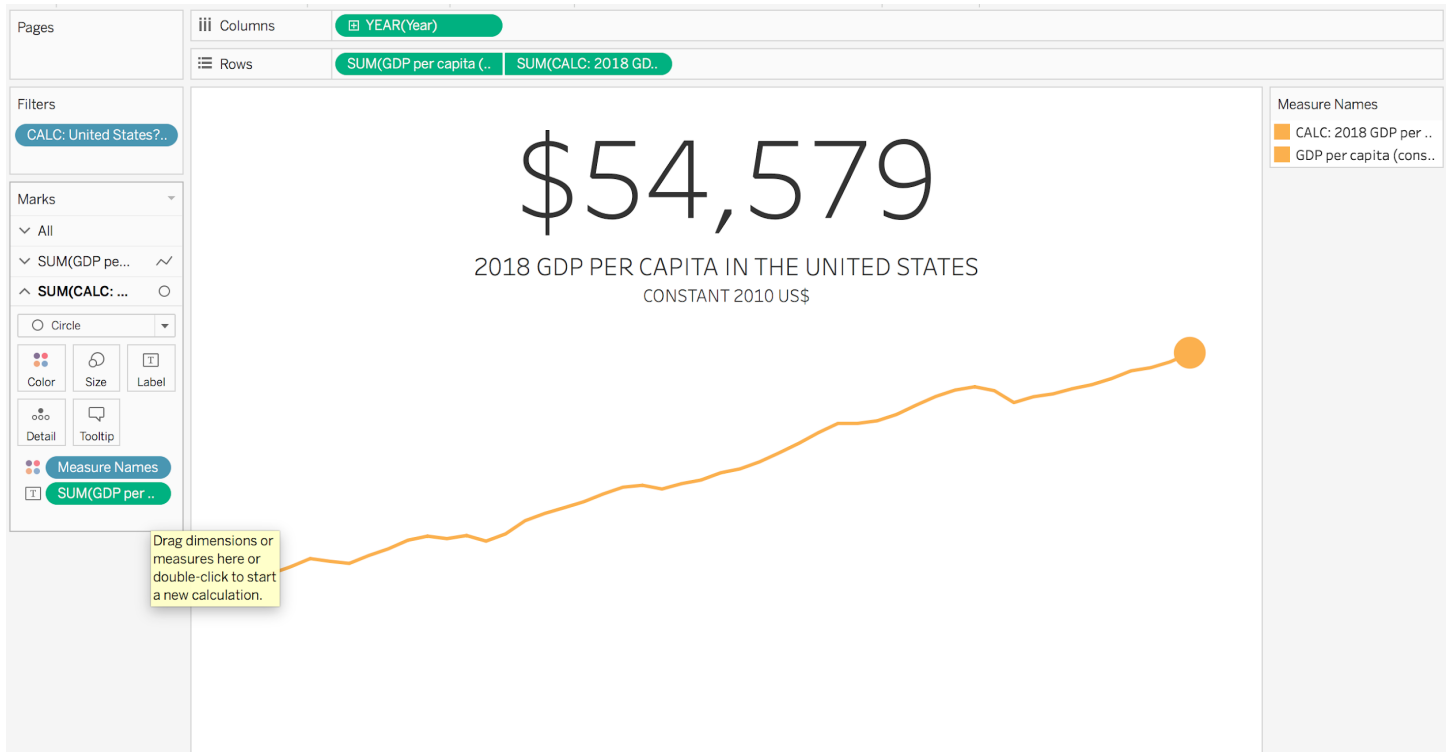
- ▶ Dots
 - ▷ Filter Year to 2005 to 2018 and view from Standard to Entire View
 - ▷ Discrete Year to rows
 - ▷ Life Satisfaction to columns
 - ▷ Mark Type to circle
 - ▷ Short Name to detail
 - ▷ Fix x axis from 0 to 10
 - ▷ Income Group to Color
 - ▷ Short Name > Show highlighter
- ▶ Average Line
 - ▷ Analytics pane > Drag Average to Pane
 - ▷ Worksheet > Actions > Highlighter > Select > Selected Fields > Short Name

KEY PERFORMANCE INDICATORS (KPIs)



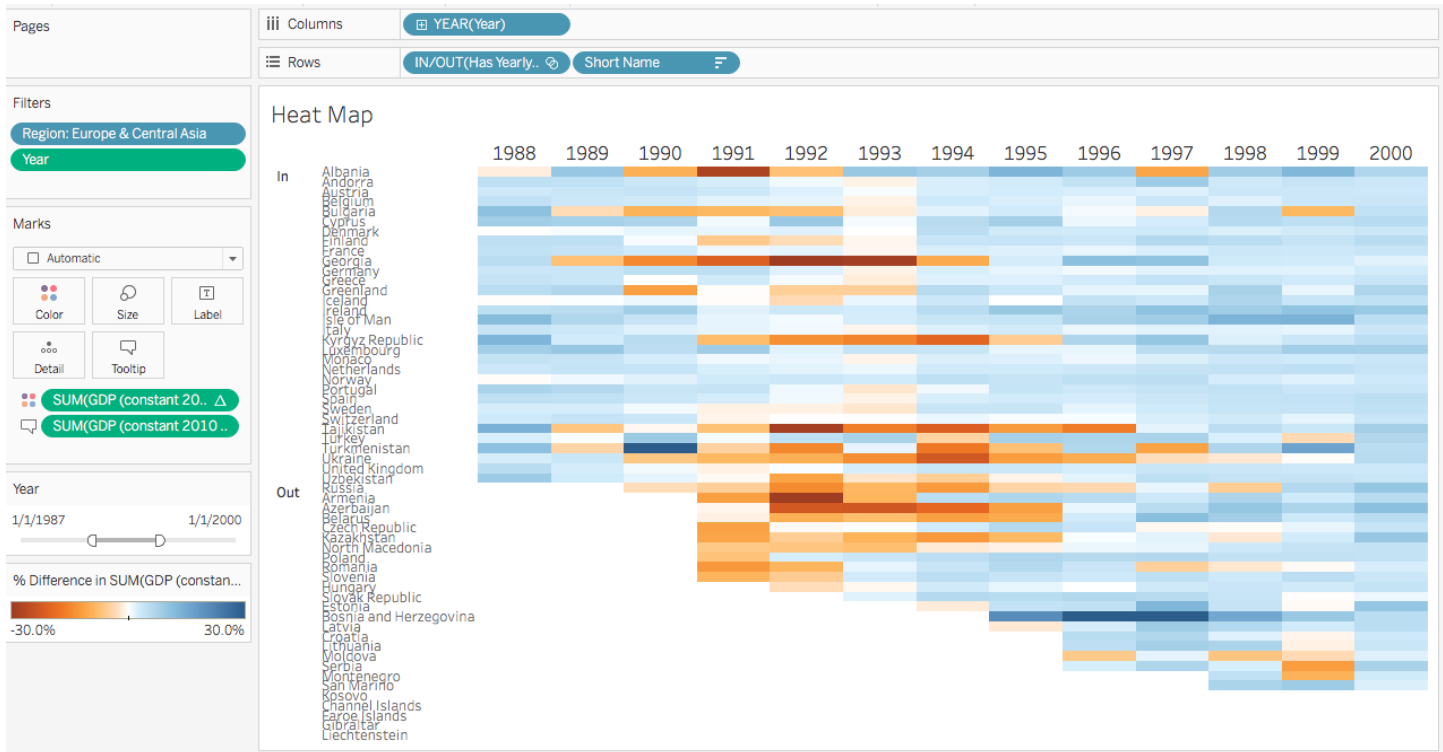
BAN (BIG AWESOME NUMBERS)

- ▶ Measure Names and Measure Values
 - ▷ Filter Year to 2018 and filter short name to United States
 - ▷ Measure Names to Filter (Population, Labor Force, GDP (current), GDP per capita (current))
 - ▷ Measure Names to Columns and Measure Values to Text
 - ▷ Year and Measure Names to Text and adjust text formatting
 - ▷ Adjust number formatting on Measure Values card
- ▶ Pages & Set
 - ▷ Year to pages (realize labor force data starts in 1990)
 - ▷ Right click Year > Create > Set > Name 1990 > Select all years after 1990
 - ▷ 1990+ set to filter



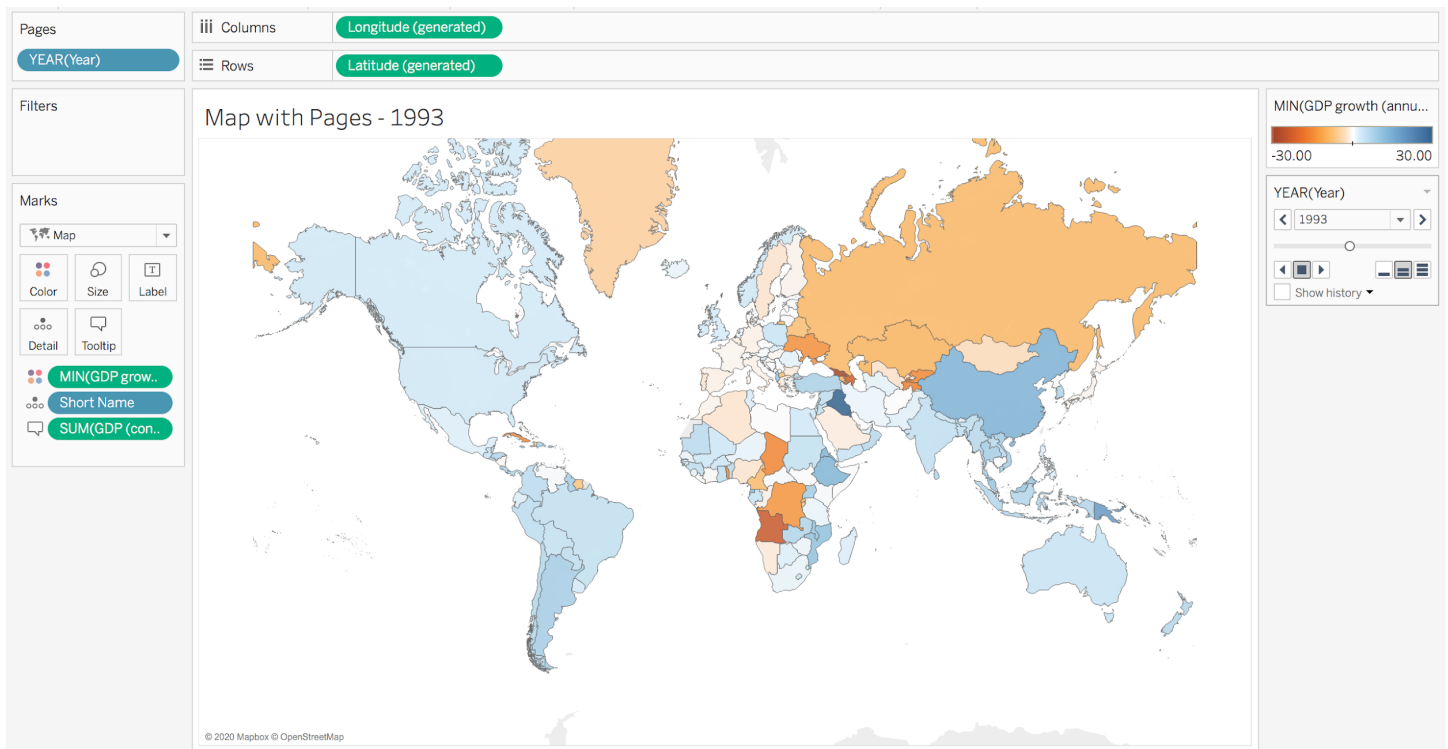
SPARKLINE

- ▶ Line
 - ▷ CALC: United States? True to filters
 - ▷ Year to columns
 - ▷ GDP per capita (constant) to rows
- ▶ Spark
 - ▷ New calculated field: CALC: 2018 GDP per capita (constant)
 - ▷ IF YEAR([Year]) = 2018 THEN [GDP per capita (constant 2010 US\$)] END
 - ▷ CALC: 2018 GDP per capita (constant) to rows
 - ▷ Last marks card: change mark type from line to circle, adjust size
 - ▷ Dual axis and synchronize axes
- ▶ Title
 - ▷ Double click title and adjust as needed
- ▶ Area Variation
 - ▷ Duplicate sparkline sheet and remove 2018 calculation from rows
 - ▷ Change mark type from line to area
- ▶ Region Variable
 - ▷ Duplicate sparkline sheet and remove US filter
 - ▷ Region to Columns
 - ▷ Change aggregation on GDP per capita to median instead of sum (Europe point of interest)



HEATMAP WITH GRID

- ▶ Text Table
 - ▷ Filter Region to Europe and Central Asia
 - ▷ Filter Year to 1988 to 2000
 - ▷ Discrete Year to Columns
 - ▷ Short Name to Rows
 - ▷ GDP (constant) to text (format to billions in currency)
 - ▷ Sort Short Name by Field, GDP (constant) aggregated by count)
- ▶ Heat Map
 - ▷ Change GDP (constant) to quick table calculation > year over year growth (format as %)
 - ▷ Change that pill from text to color
 - ▷ Adjust color to have white in middle, Advanced color> start and end at -.3 and .3
 - ▷ Entire view



HEATMAP WITH GEOSPATIAL DATA

- Map
 - ▷ Filter Year to 2018
 - ▷ Long and Lat to Columns and Rows
 - ▷ Short name to Detail
 - ▷ Mark type = filled map
 - ▷ GDP growth rate to Color
 - ▷ Drag Year to Pages

WRAP UP

SAVE YOUR WORKBOOK

The final step is to save your workbook! If you haven't already created a Tableau Public account, [return to Tableau Public](#), click Sign In, and create a new account. Once you've done that, here's how you save your workbook.

- ▶ Go to File, Save to Tableau Public As, and then enter your Tableau Public account credentials.
- ▶ Name your workbook.
- ▶ Edit the workbook details on your Tableau Public page. You can control whether the workbook appears on your profile page and whether someone else can download the workbook and data.
- ▶ Note that you should NEVER save anything private on Tableau Public. This is a place to only save work you've done with public data, like we've done here. To save your work locally, you will need [Tableau Desktop, which is completely free for students and instructors](#). If you're an administrator, it will run approximately \$70 a month.

TAKE THE SURVEY

Now that you're all done with the workshop, we'd so appreciate your feedback so that we can continue to improve our workshops for future attendees. [Just click here](#) to answer a few quick questions. Thank you!