National Institutes of Health
Office of Management

INTRODUCTION TO TABLEAU FOR HEALTH AND POLICY

Class 1: Introduction to Tableau

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Table of Contents

About the Data 4
County Level Variables 4
Population counts 4
Poverty counts 4
SNAP participant counts 4
SNAP participant benefits 5
Ratios 5
Introduction to Tableau 5
What is Tableau? 5
Tableau Versions 5
Introducing Tableau file types 6
Managing Data Sources 6
Connecting to a data source 6
Joining related data sources 11
Reading loosely structured Excel files 17
Exploring the Tableau Interface 22
Dimensions and Measures 22
Dimensions 23
Measures 25
Menu and Toolbar 27
Data Pane 28
Analytics Pane 29
Shelves and Cards 30
Pages Shelf 30
Filters Shelf 30
Marks Card 38
Managing Tableau Data 38
Adding, duplicating, and renaming worksheets 40
Saving Your Work 47
Exporting Data 47
Exporting as an Image 48

Exporting as Data 48
Exporting to Excel (as crosstab) 49

About the Data

In this session, I will be imported USDA data, on their SNAP program.

The County data worksheet contains 46 variables.

The data includes the following variables (filtered for the years 2006 – 2010):

County Level Variables

- FIPS: Federal Information Processing Standards code.
- FIPSTXT: FIPS code in text format with leading zeros.
- COFIPS: County code portion of total FIPS code (last three digits), not unique across States.
- CODEF: Source of county definition: BEA_ONLY for Bureau of Economic Analysis, CEN_ONLY for Census Bureau, and CEN_BEA when both Census Bureau and BEA use the same definition.
- CONAME: County name and two-digit State identifier.
- URBCODE: 2003 Rural-Urban Continuum Code per ERS. For more information about the rural-urban code, see 2003 Rural-Urban Continuum Codes.
- METRO: Metro/non-metro code per U. S. Census Bureau. For the metropolitan/non-metropolitan codes used in the data set, see Rural Definitions: Data Documentation and Methods.

Population counts

Area estimates of population counts are obtained from the U.S. Census Bureau's data, which includes a description of the methods used to create the estimates.

- POPxx: Estimated population count, with the year for the data indicated by the last two digits of the variable name.

Poverty counts

The Small Area Income & Poverty Estimates Program of the U.S. Census Bureau provides area estimates of the number of persons in households[1] with total income below 100 percent of the Federal poverty level (FPL)[2].

- NUMPOVxx: Estimated total number of poor people, with the year for the data indicated by the last two digits of the variable name. Data are provided for 1999, 2000, 2006, 2007, and 2010.

SNAP participant counts

Participation counts at the county level are provided primarily by the Small Area Income & Poverty Estimates (SAIPE) program of the U.S. Census Bureau.

- PRGNUMxx: Estimated number of active SNAP/Food Stamp Program (FSP) participants. The last two digits (xx) indicate the year for the data.

[1] Income" above refers to "modified adjusted gross income" (MAGI). For most people, it is the same or very similar to "adjusted gross income" (AGI). MAGI isn't a number on your tax return.
[2] In 2017, this is 12,060 for individuals or $24,600 for a family of 4.

- PRGxx_yy: Percentage change in the number of SNAP/FSP participants between the two years represented by "xx" and "yy" in the variable name.

SNAP participant benefits

The Regional Economic Information System, Bureau of Economic Analysis of the U.S. Department of Commerce provides estimates of total annual benefits issued by area. State and county estimates are based on county tabulations of the distributed benefits from FNS, USDA.

- PRGBENxx: Estimated total annual amount of SNAP/FSP benefits (in thousands) issued to State or county residents in a year. The last two digits indicate the calendar year for the data.

Ratios

A number of variables in the file compare participant counts or program benefits to an underlying population group (computing the values in green).

- PRG_POPxx: The ratio of program participants to area population, with the last two digits of the variable name indicating the data year.
- PRG_POVxx: The ratio of program participants to area count of poor persons, with the last two digits of the variable name indicating the data year.
- AMB_POPxx: The ratio of total average monthly program benefits issued to all participants in an area to that area's total population count, with the last two digits of the variable name indicating the data year.
- AMB_POVxx: The ratio of total average monthly program benefits issued to all participants in an area to that area's count of poor persons, with the last two digits of the variable name indicating the data year.
- AMB_PARxx: The ratio of total average monthly program benefits issued to all participants in an area to that area's count of program participants, with the last two digits of the variable name indicating the data year.

Introduction to Tableau

What is Tableau?

Tableau is a tool that allows you to easily connect to data, then visualize and create interactive, sharable dashboards.

Tableau Versions

There are many different versions of Tableau, all with slightly different capabilities.

There is a completely free version called Tableau Public, which includes a Tableau Public interface app that you download. This version lets you do almost everything the other versions can do.

However, with the free version you can only connect to Excel spreadsheets, text files, and Microsoft access files. Also, all Tableau Public analysis is stored online and can be viewed by anyone.

There are also paid Tableau desktop versions. These come in two flavors:

1. Personal Desktop

2. Professional Desktop

Both of these versions allow you to save data and workbooks to your desktop and provide ways to share your work with others online.

The NIH Library has a license to Tableau Professional Desktop. which is installed on our Data Sciences workstation.

Introducing Tableau file types

Tableau has a number of different file types:

1. The first is the Tableau workbook, which ends in the **twb** file extension. The workbook stores a visualization without including the source data.
2. The second is the Tableau data source, or **tds** file. This file stores the server address, password, and other information required to access a data source.
3. The next file type is the Tableau bookmark, which has a **tbm** extension. Tableau bookmarks are a connection to a worksheet in another Tableau workbook. Creating these connections lets you reference other workbooks from within a file so you do not have to recreate the visualization in your current file.
4. Next, is the Tableau data extract, or **.tde** file. These files store Tableau data as a filtered and aggregated extract. You might not get the individual results you are looking for, but you will have a look at an aggregated view of your data.
5. Finally, there is the Tableau packaged workbook. These files have a .**twbx** extension, and they store extracted data and visualizations for viewing in Tableau, or Tableau Reader.

Managing Data Sources

Connecting to a data source

Worksheet: **SNAP_just_county**

When you are ready to create a visualization within Tableau, you need to connect to an outside data source.

In this section, I will show you how to connect to an Excel workbook. However, the skills that you learn here, will also apply to other types of data sources as well.

When you fire up Tableau, you will see the start screen [Figure 1].

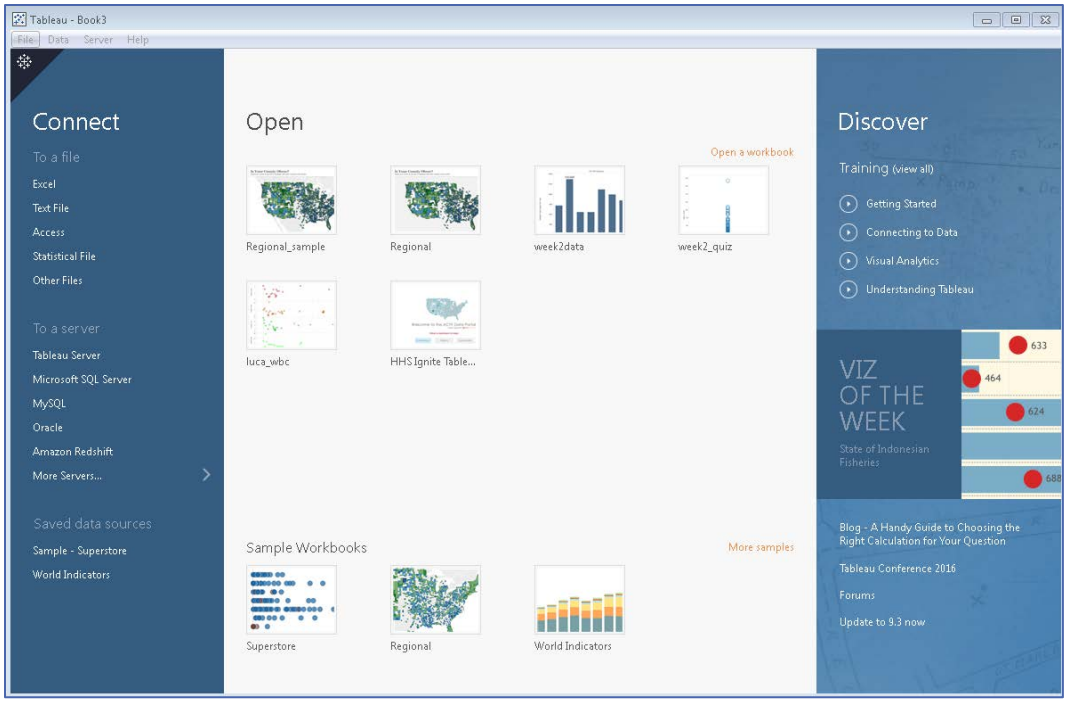


Figure 1: Tableau Start Screen.

The section on the left is where you connect to data sources. You can see that Tableau can connect to different files, different servers, or databases.

In the middle section of the start screen are previously used data sets, or example workbooks.

On the right are training resources.

1. To connect to an Excel worksheet, simply click on the Excel link, and navigate to the file that you want to import [Figure 2].

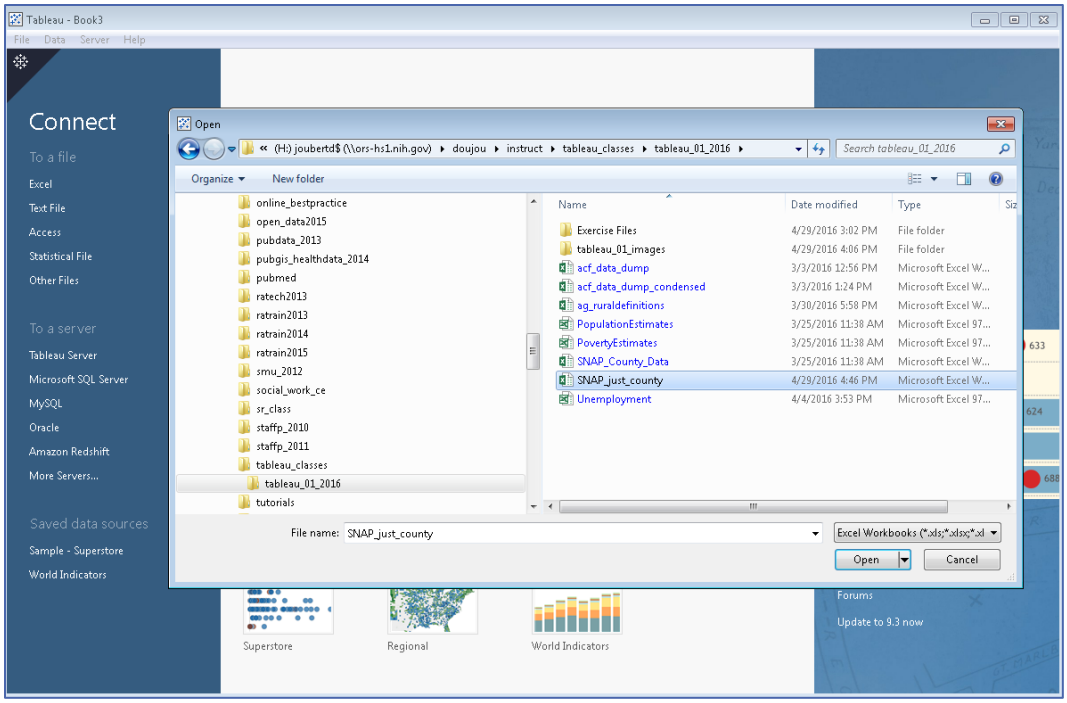


Figure 2: Importing an Excel file into Tableau.

2. For this example, I am going to open the **SNAP_just_county** file. The screen you will see is the data import screen [Figure 3].
3. Drag the **just_county** sheet to the **data preview** section of the import screen [Figure 3].
4. Starting from the top of the import screen, I can:
    a. Click on the data icon near the name of the worksheet, or click ***Add*** to add a new data source, on the Connections panel [Figure 3].
    b. Choose a live or extracted view of the data.
    c. Filter the data by selecting ***Filter>Add>Add>***List of variable names.
    d. Search for sheets by clicking on the **Search** icon.

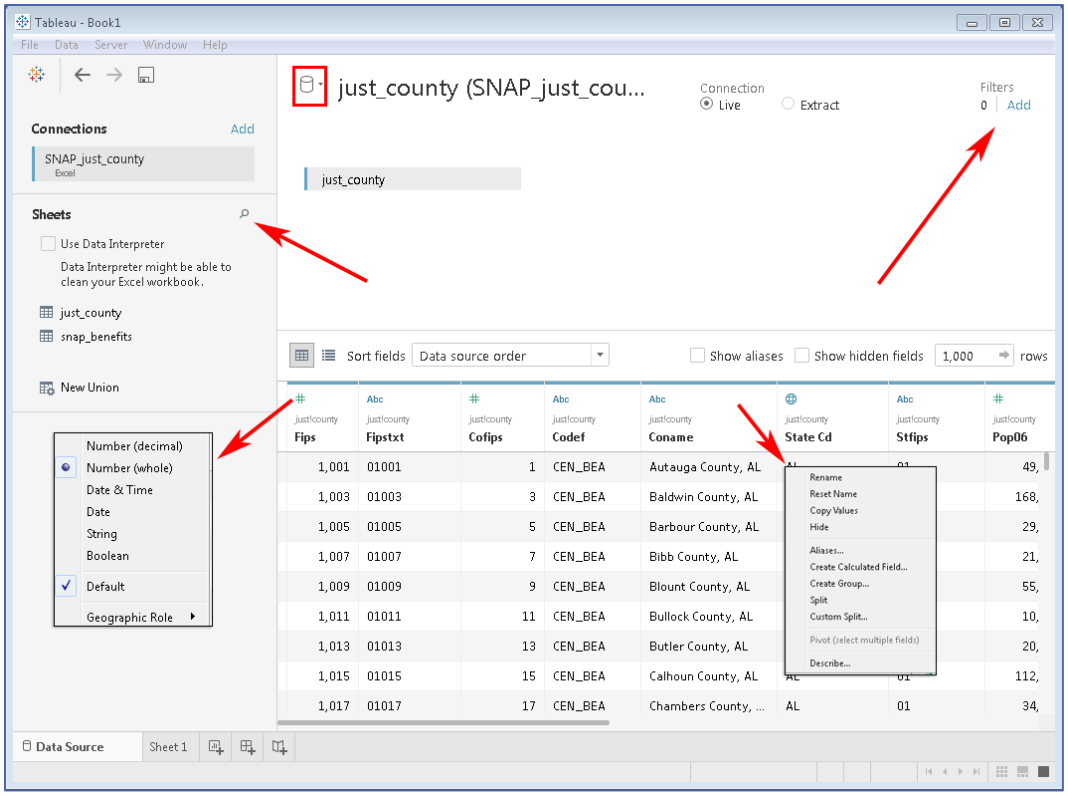


Figure 3: Tableau data import screen.

5. There are two dropdown menus over each variable name.
6. With the first options, I can correct any errors in the field types. For example the FIPS codes are being "recognized" as a number, when it should be represented as a text field.
7. Using the second option, I can rename/describe the variable. These options can also be changed after you import the data.
    a. Choose ***Describe>Load*** variable.
    b. As you can see from Figure 4, there are 3,196 members (counties) in this file.

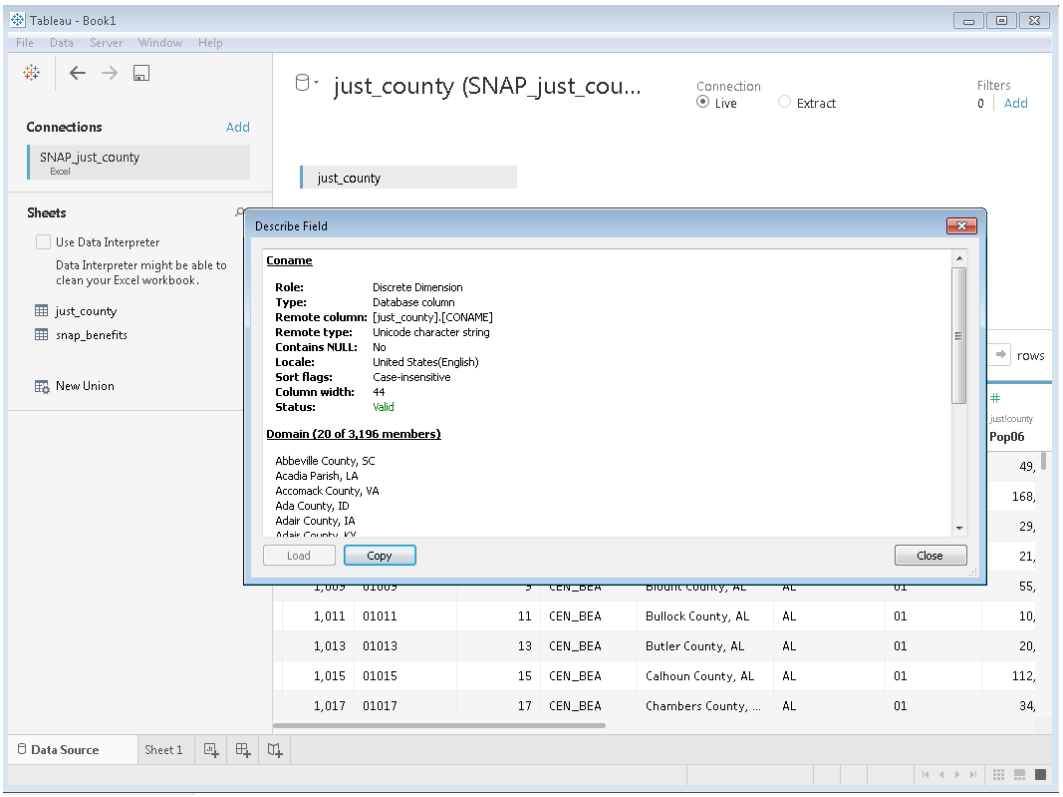


Figure 4: Describing a variable in Tableau.

8. Let us go ahead and change the values for the FIPS codes, to **string**. Because I am using the live view of the data, a query is executed against the original data file.
9. Click on the tab labels as ***Sheet 1*** to switch to what I call the **workbook** view [Figure 5]. You can always switch back to the data view by clicking on the Data Source tab.

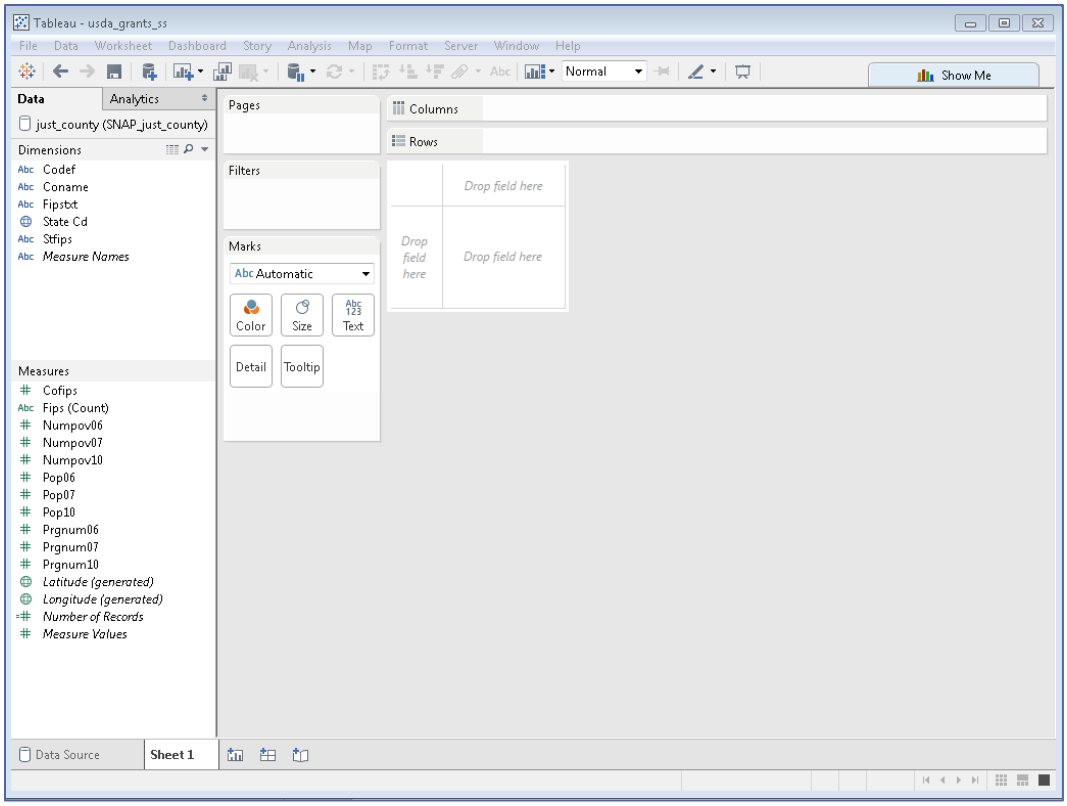


Figure 5: SNAP Data loaded into a Tableau workbook.

Joining related data sources

1. Sometimes it might be necessary to grab data from different sources and join them using a common field (primary key).
2. The primary key in this data set is the FIPS code. This means that both the **just_grants** and **snap_benefits** tables have FIPS fields.
3. Click on the **Data** Sources tab near the bottom left.
4. There are two ways to create a union. The first is to double-click on the New Union icon. The second is to drag the New Union icon to the sheets workspace.
5. Double-click on the **snap_benefits** table to add it to the workspace.
6. If you perform a join and you see something like Figure 6, it means that Tableau could not figure out which fields to join.
7. If you look closely at Figure 6, you can see that the FIPS column/field in the grants table is still formatted as a number.

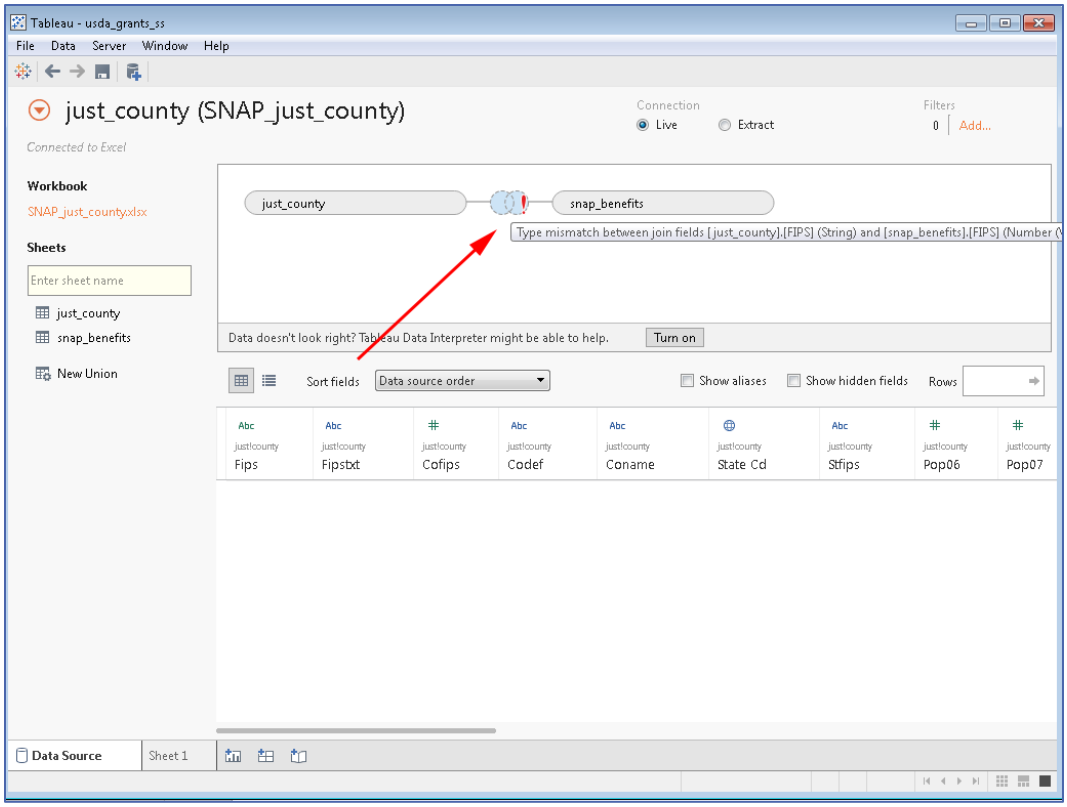


Figure 6: A join mismatch.

8. Scroll over to the ***FIPS (snap!benefits)*** column and covert this value to a string. Once this is done, the join will work [Figure 7].

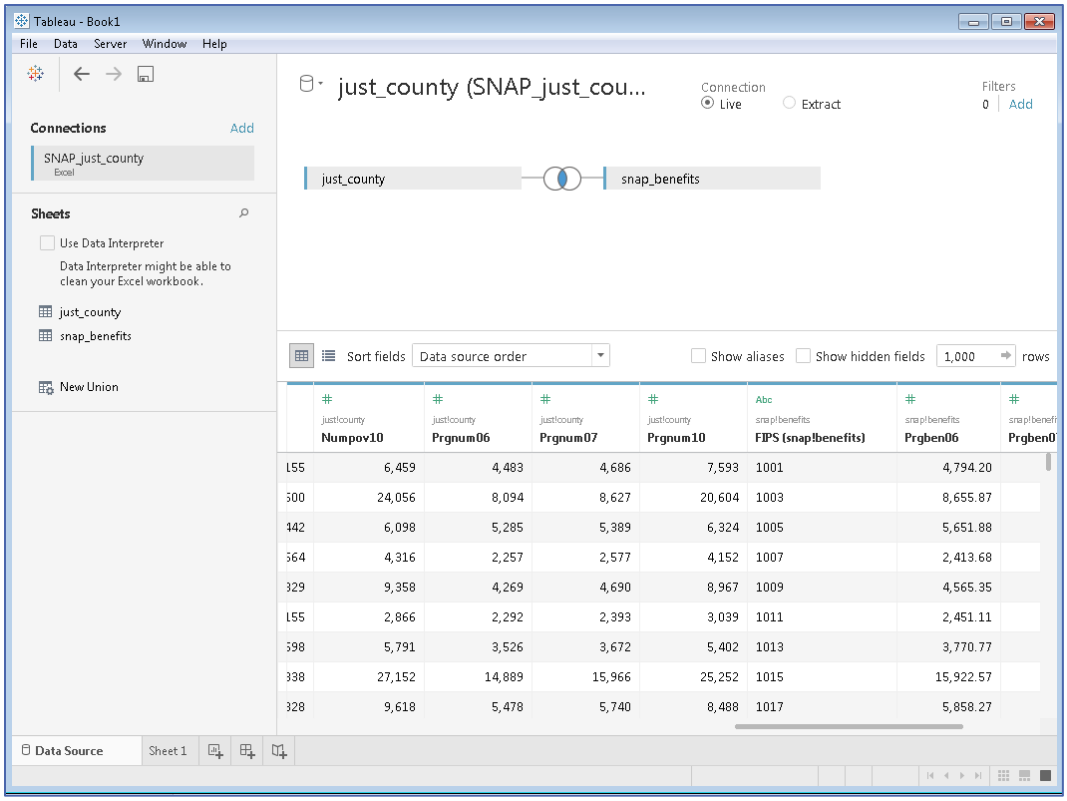


Figure 7: Performing a join in Tableau.

9. If you click on the **Join** icon, the join parameters will pop up [Figure 8]. As you can see in Figure 8, there are two types of joins possible:
    a. **Inner join**: Only matches within both tables.
    b. **Left-join**: All the values in the left table (just county) and all matching values in the right table (snap_benefits). Members with no matches will show up as **null** on the right.

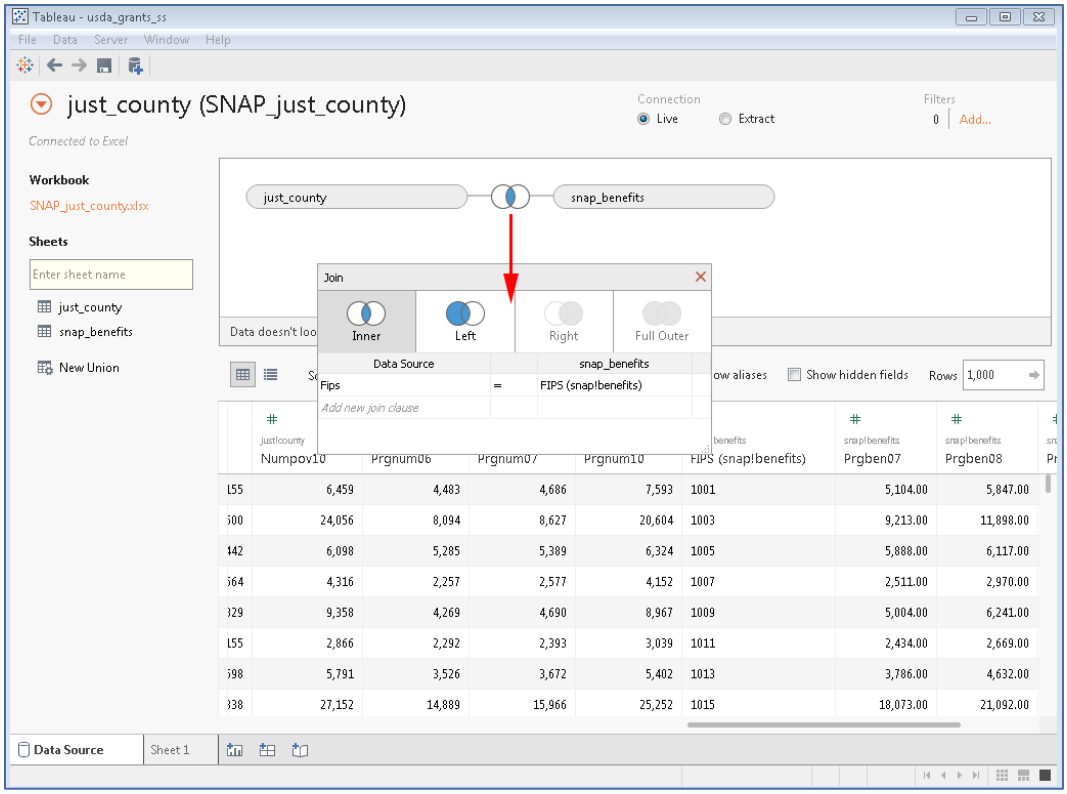


Figure 8: Join properties.

10. You can filter each of the data sources (look for other variables) or change the type of "connection expression" via the join popup menu [Figure 9]. This is useful because sometimes tables will have the same data in a field…but the column name might be different.

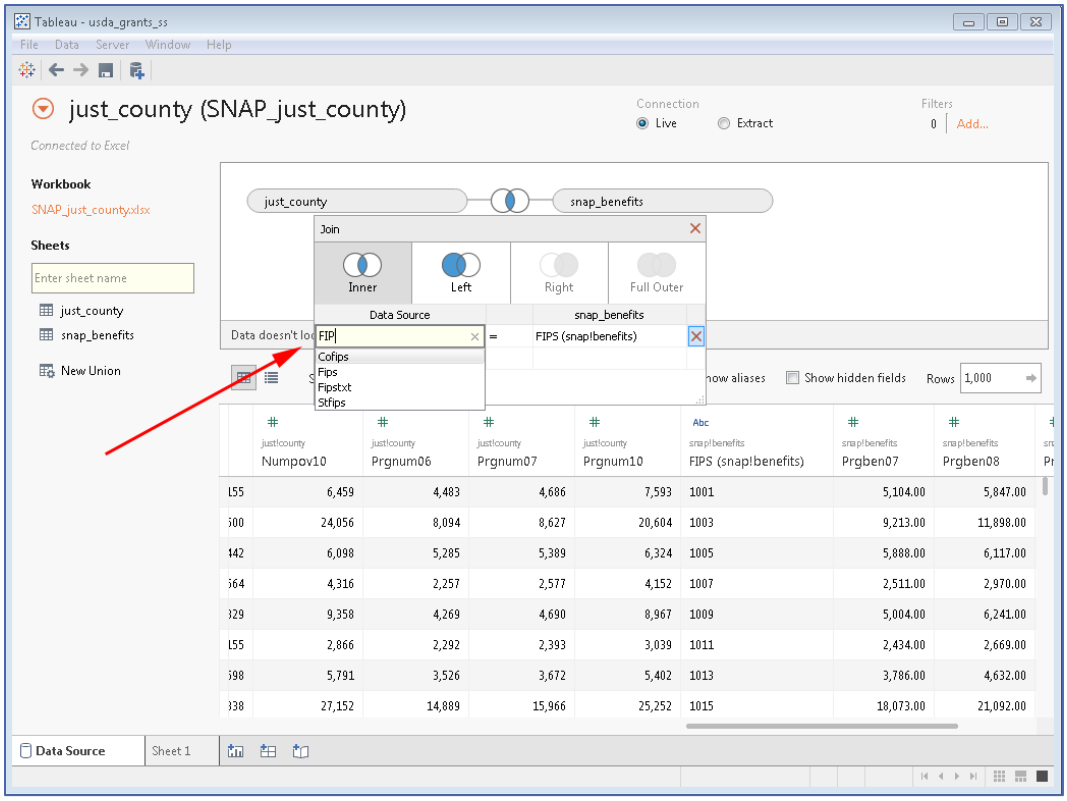


Figure 9: Join options.

11. Click on the ***Sheet 1*** tab.
12. Figure 10 is displaying the joined data. As you can see in Figure 10, the data panel is now divided into two separate sections: (**just_county** and **snap_benefits**).

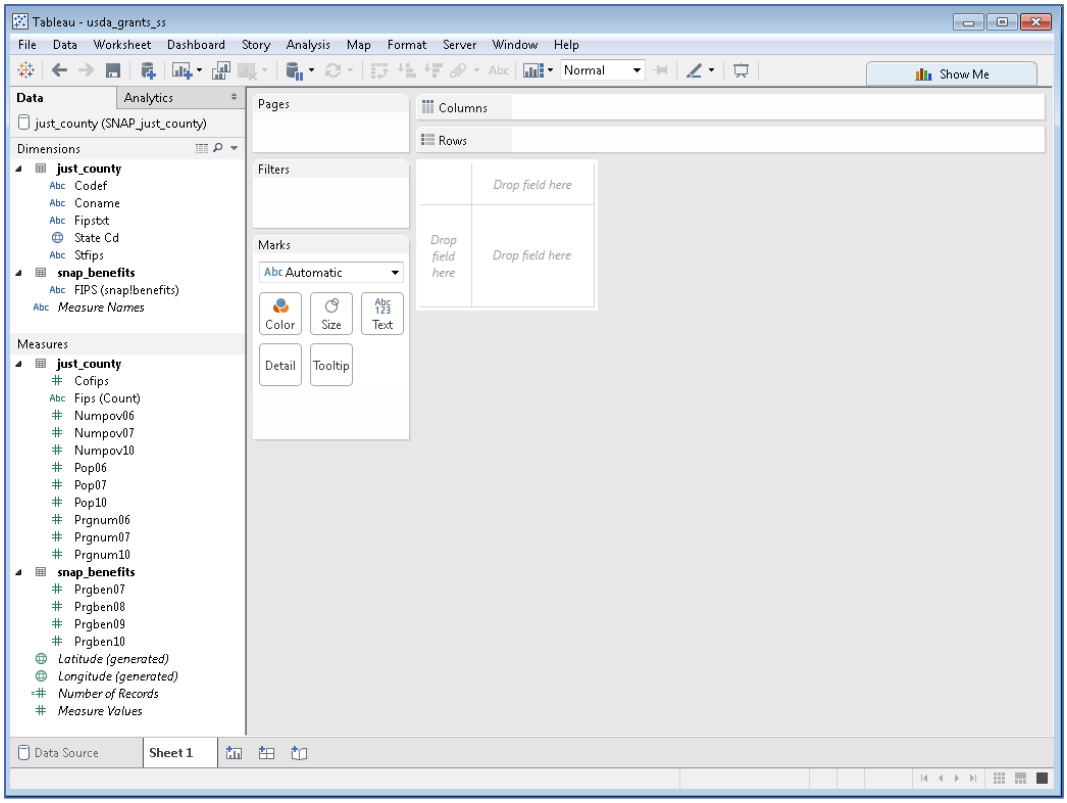


Figure 10: Data sheet with the joined data.

13. If I wanted to, I could rename each one of the variables [Figure 11].
14. If you click on the little blue half circle [Figure 11], you can change the variable back to its default name.

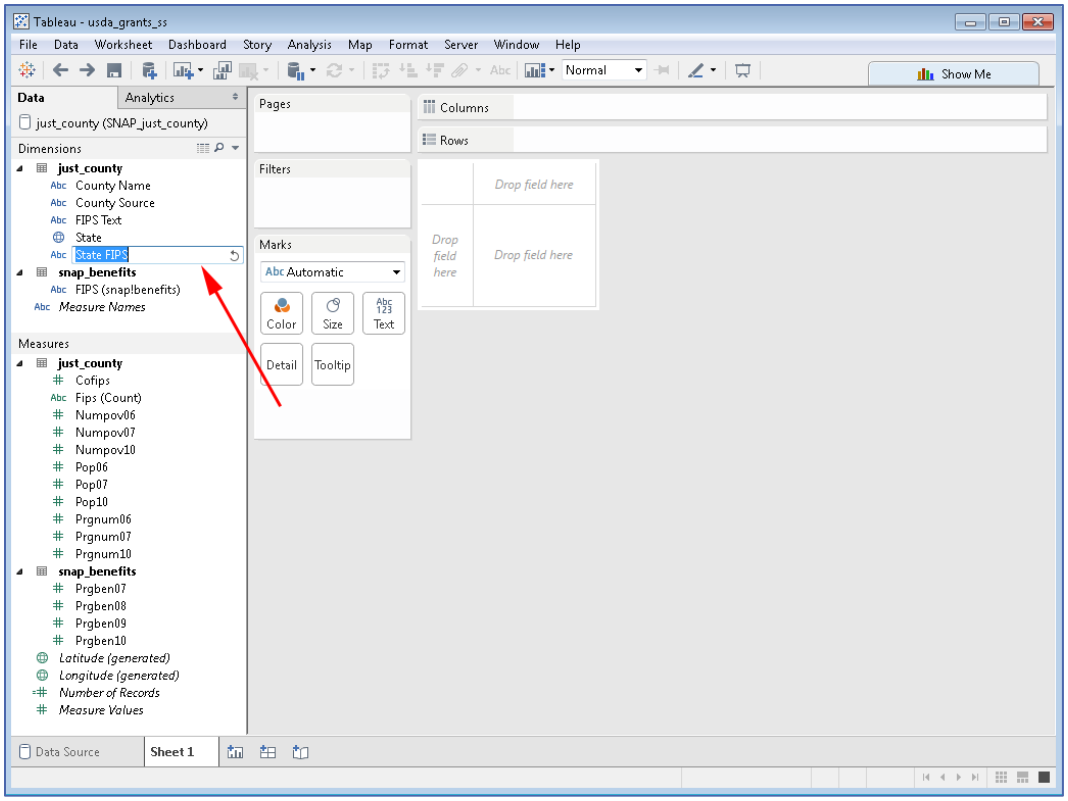


Figure 11: Renaming variables in Tableau.

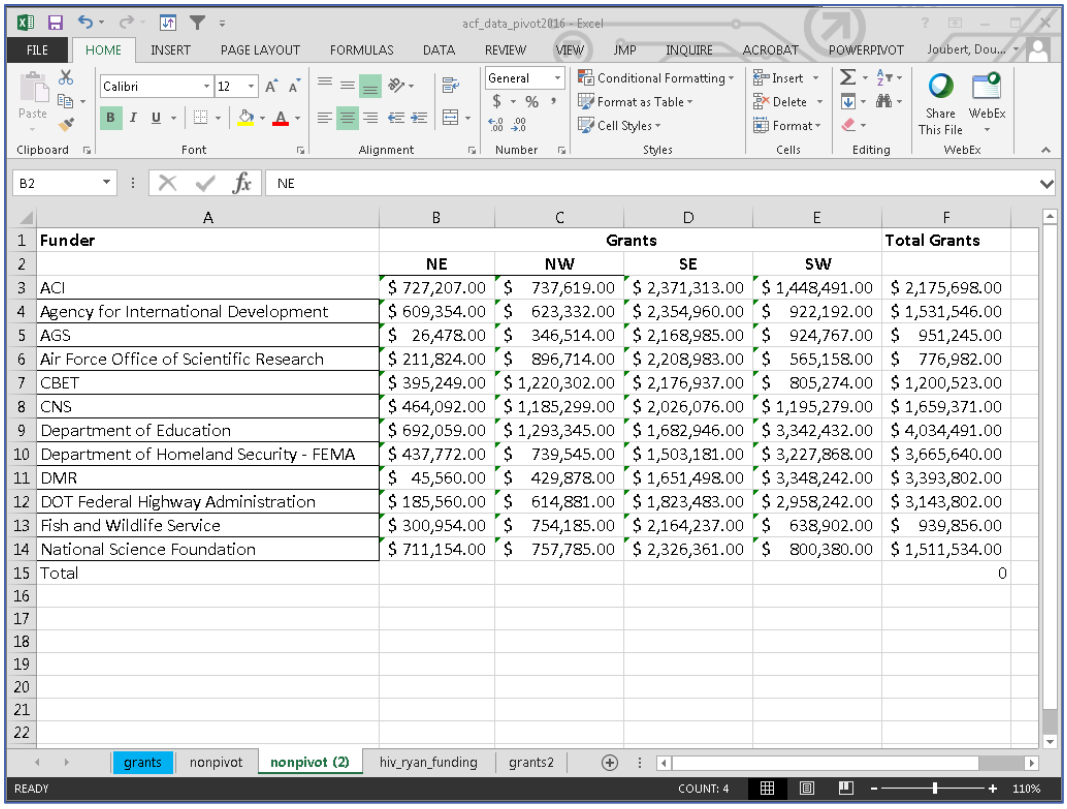
Reading loosely structured Excel files

Worksheet: **acf_data_tab2016**

Worksheet: **ag_ruraldefinitions_national**

Tableau has the ability to "correct" the formatting for some types of data. If you look at the table in Figure 12, you can see that it is not formatted like the previous Excel file.

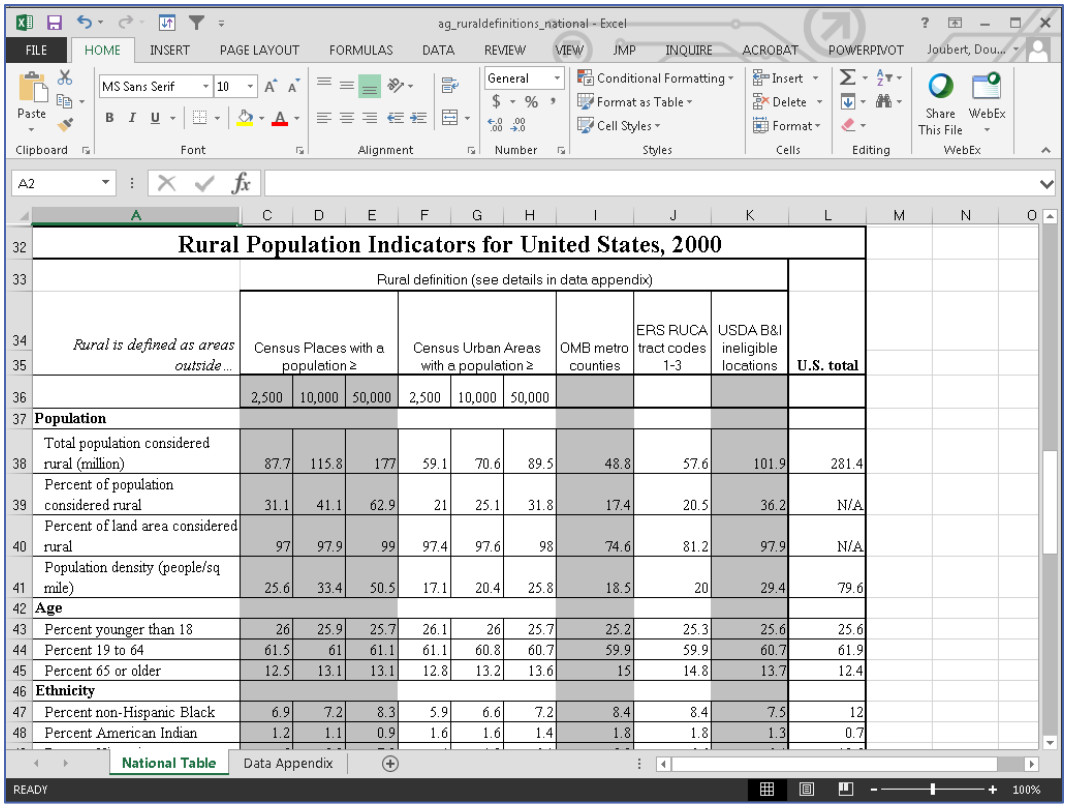
The Data Interpreter tool allows you to tweak irregularly structured data so that it can be imported into Tableau. It works with simple files like the ones shown in Figure 12.



Funder	Grants				Total Grants
	NE	NW	SE	SW	
ACI	$ 727,207.00	$ 737,619.00	$ 2,371,313.00	$ 1,448,491.00	$ 2,175,698.00
Agency for International Development	$ 609,354.00	$ 623,332.00	$ 2,354,960.00	$ 922,192.00	$ 1,531,546.00
AGS	$ 26,478.00	$ 346,514.00	$ 2,168,985.00	$ 924,767.00	$ 951,245.00
Air Force Office of Scientific Research	$ 211,824.00	$ 896,714.00	$ 2,208,983.00	$ 565,158.00	$ 776,982.00
CBET	$ 395,249.00	$ 1,220,302.00	$ 2,176,937.00	$ 805,274.00	$ 1,200,523.00
CNS	$ 464,092.00	$ 1,185,299.00	$ 2,026,076.00	$ 1,195,279.00	$ 1,659,371.00
Department of Education	$ 692,059.00	$ 1,293,345.00	$ 1,682,946.00	$ 3,342,432.00	$ 4,034,491.00
Department of Homeland Security - FEMA	$ 437,772.00	$ 739,545.00	$ 1,503,181.00	$ 3,227,868.00	$ 3,665,640.00
DMR	$ 45,560.00	$ 429,878.00	$ 1,651,498.00	$ 3,348,242.00	$ 3,393,802.00
DOT Federal Highway Administration	$ 185,560.00	$ 614,881.00	$ 1,823,483.00	$ 2,958,242.00	$ 3,143,802.00
Fish and Wildlife Service	$ 300,954.00	$ 754,185.00	$ 2,164,237.00	$ 638,902.00	$ 939,856.00
National Science Foundation	$ 711,154.00	$ 757,785.00	$ 2,326,361.00	$ 800,380.00	$ 1,511,534.00
Total					0

Figure 12: Formatted Excel table.

However, for more challenging files [Figure 13], Tableau is less successful. This is because this worksheet has been formatted for print.



Rural Population Indicators for United States, 2000										
	Rural definition (see details in data appendix)									
Rural is defined as areas outside...	Census Places with a population ≥			Census Urban Areas with a population ≥			OMB metro counties	ERS RUCA tract codes 1-3	USDA B&I ineligible locations	**U.S. total**
	2,500	10,000	50,000	2,500	10,000	50,000				
Population										
Total population considered rural (million)	87.7	115.8	177	59.1	70.6	89.5	48.8	57.6	101.9	281.4
Percent of population considered rural	31.1	41.1	62.9	21	25.1	31.8	17.4	20.5	36.2	N/A
Percent of land area considered rural	97	97.9	99	97.4	97.6	98	74.6	81.2	97.9	N/A
Population density (people/sq mile)	25.6	33.4	50.5	17.1	20.4	25.8	18.5	20	29.4	79.6
Age										
Percent younger than 18	26	25.9	25.7	26.1	26	25.7	25.2	25.3	25.6	25.6
Percent 19 to 64	61.5	61	61.1	61.1	60.8	60.7	59.9	59.9	60.7	61.9
Percent 65 or older	12.5	13.1	13.1	12.8	13.2	13.6	15	14.8	13.7	12.4
Ethnicity										
Percent non-Hispanic Black	6.9	7.2	8.3	5.9	6.6	7.2	8.4	8.4	7.5	12
Percent American Indian	1.2	1.1	0.9	1.6	1.6	1.4	1.8	1.8	1.3	0.7

Figure 13: USDA data file with complex formatting.

1. Open up Tableau, and connect to the **acf_data_tab2016** worksheet.
2. As you can see, there are 5 worksheets in the workbook.
3. Drag the **nonpivot (2)** table to the sheets workspace. If Tableau cannot interpret the data, the **Data Interpreter** icon will appear [Figure 14].

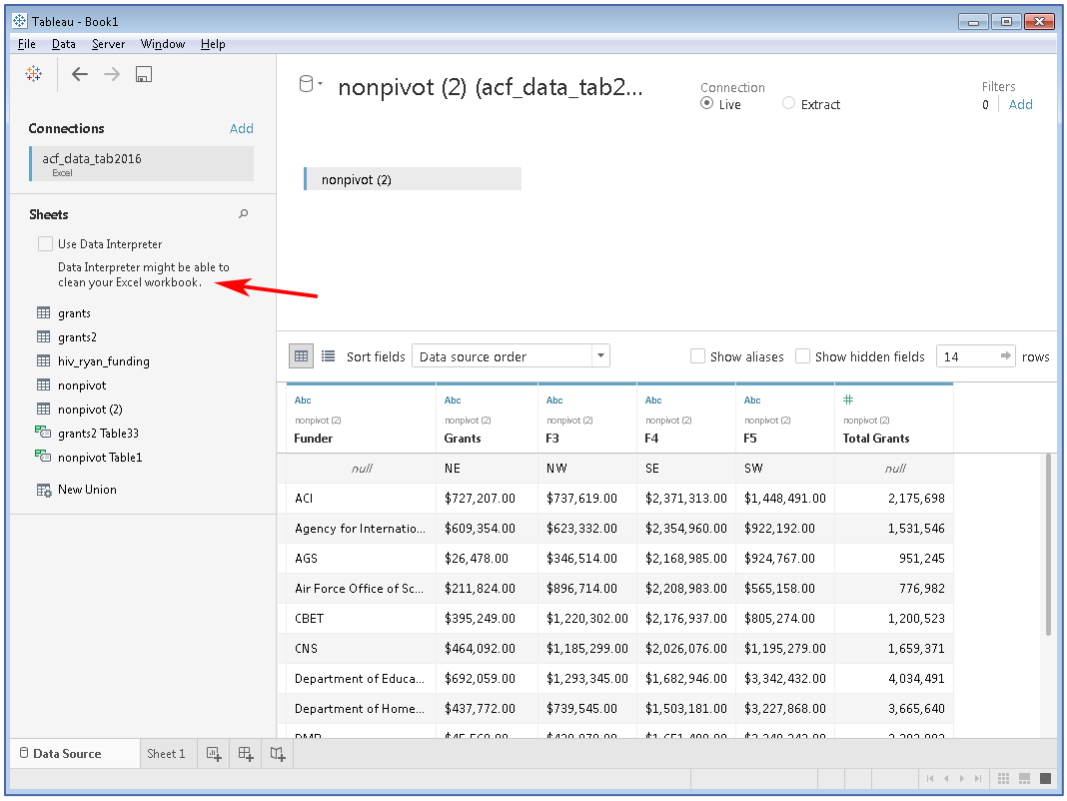


Figure 14: Data Interpreter.

4. Click **Use Data Interpreter**.
5. Figure 15 shows the results of the reformatted data. If you notice, the merged columns at the top have been collapsed and the columns have been renamed.

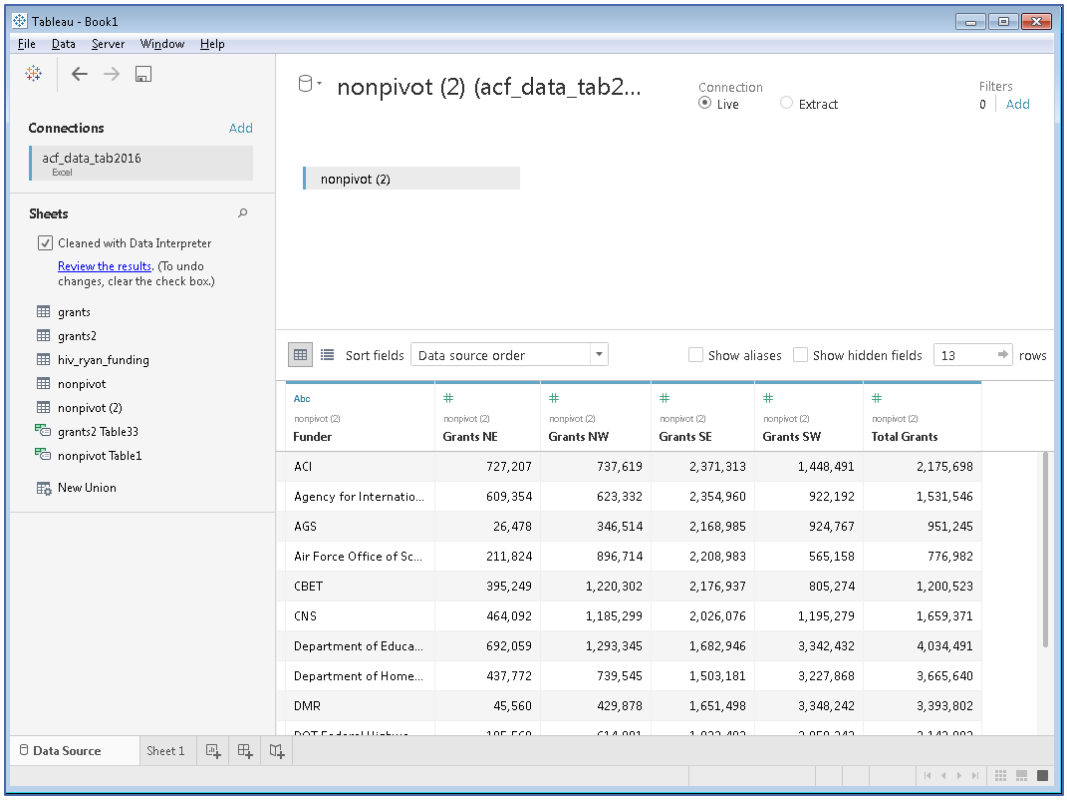
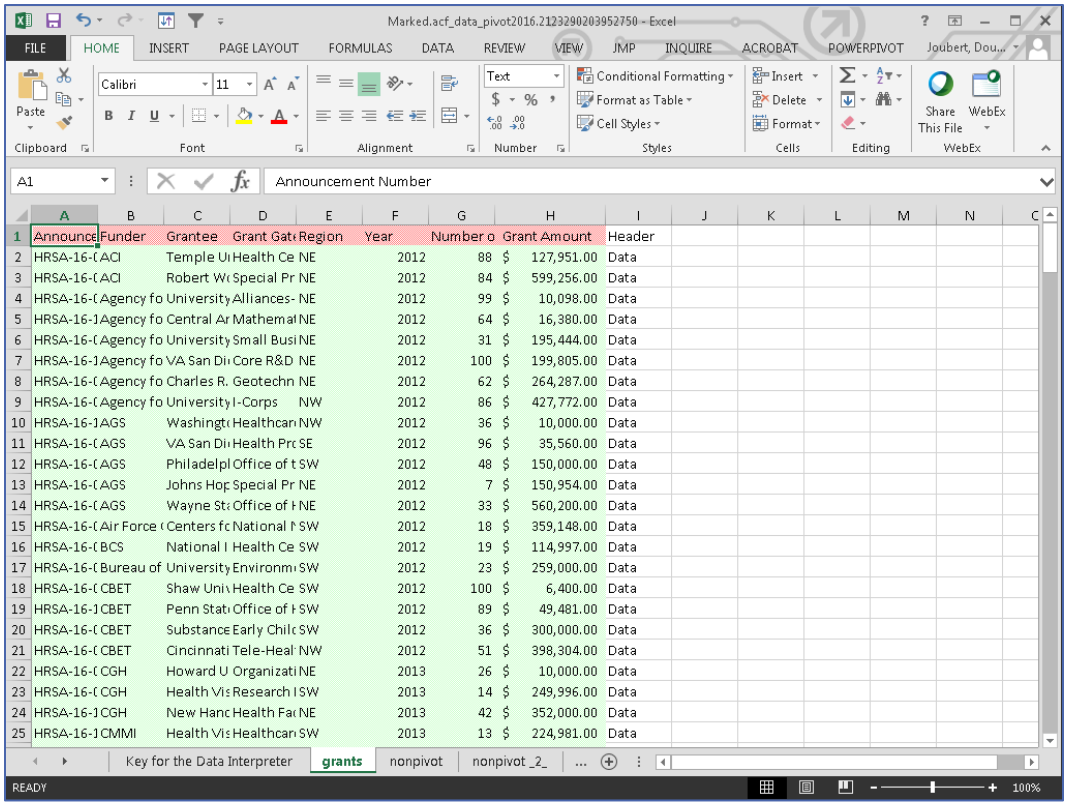


Figure 15: Reformatted Data Interpreter data.

6. Click on ***Review Results*** to see how Tableau parsed the data [Figure 16].



Announce	Funder	Grantee	Grant Gat	Region	Year	Number o	Grant Amount	Header
HRSA-16-(	ACI	Temple Ui	Health Ce	NE	2012	88	$ 127,951.00	Data
HRSA-16-(	ACI	Robert W(	Special Pr	NE	2012	84	$ 599,256.00	Data
HRSA-16-(	Agency fo	University	Alliances-	NE	2012	99	$ 10,098.00	Data
HRSA-16-1	Agency fo	Central Ar	Mathemat	NE	2012	64	$ 16,380.00	Data
HRSA-16-(	Agency fo	University	Small Busi	NE	2012	31	$ 195,444.00	Data
HRSA-16-1	Agency fo	VA San Di	Core R&D	NE	2012	100	$ 199,805.00	Data
HRSA-16-(	Agency fo	Charles R.	Geotechn	NE	2012	62	$ 264,287.00	Data
HRSA-16-(	Agency fo	University	I-Corps	NW	2012	86	$ 427,772.00	Data
HRSA-16-1	AGS	Washingt	Healthcar	NW	2012	36	$ 10,000.00	Data
HRSA-16-(	AGS	VA San Di	Health Pr	SE	2012	96	$ 35,560.00	Data
HRSA-16-(	AGS	Philadelpl	Office of t	SW	2012	48	$ 150,000.00	Data
HRSA-16-(	AGS	Johns Hop	Special Pr	NE	2012	7	$ 150,954.00	Data
HRSA-16-(	AGS	Wayne St	Office of F	NE	2012	33	$ 560,200.00	Data
HRSA-16-(	Air Force (	Centers fo	National M	SW	2012	18	$ 359,148.00	Data
HRSA-16-(	BCS	National I	Health Ce	SW	2012	19	$ 114,997.00	Data
HRSA-16-(	Bureau of	University	Environm	SW	2012	23	$ 259,000.00	Data
HRSA-16-(	CBET	Shaw Uni	Health Ce	SW	2012	100	$ 6,400.00	Data
HRSA-16-1	CBET	Penn Stat	Office of F	SW	2012	89	$ 49,481.00	Data
HRSA-16-(	CBET	Substance	Early Chil	SW	2012	36	$ 300,000.00	Data
HRSA-16-(	CBET	Cincinnati	Tele-Heal	NW	2012	51	$ 398,304.00	Data
HRSA-16-(	CGH	Howard U	Organizati	NE	2013	26	$ 10,000.00	Data
HRSA-16-(	CGH	Health Vis	Research I	SW	2013	14	$ 249,996.00	Data
HRSA-16-1	CGH	New Hanc	Health Fa	NE	2013	42	$ 352,000.00	Data
HRSA-16-1	CMMI	Health Vis	Healthcar	SW	2013	13	$ 224,981.00	Data

Figure 16: Color-coded Data Interpreter report.

Exploring the Tableau Interface

Worksheet: **SNAP_just_county** data

I want to briefly explore the Tableau interface so that you have a better idea of what you are looking at when you add data to the workspace.

If you are not already connected to this data, click on the **Data Source** tab.

1. Add the **just_county** and **snap_benefits** data to the worksheet.
2. Make sure the join works.
3. Double-click on Sheet 1 and rename it to **usda_snap.**

Dimensions and Measures

Worksheet: **SNAP_just_county data**

When you connect to a data source, Tableau assigns each field in the data source as playing one of two possible data roles: (1) **dimensions** or (2) **measures**.

If we think of Tableau data in terms of variables, the **dimensions are discrete/categorical variables**, and the **measures are continuous variables**.

Dimensions

Tableau considers discrete/categorical information (for example, fields where the values are strings or Boolean values) as dimensions.

1. Double-click on the **County Name** dimension, or drag it to the Rows shelf [Figure 17].

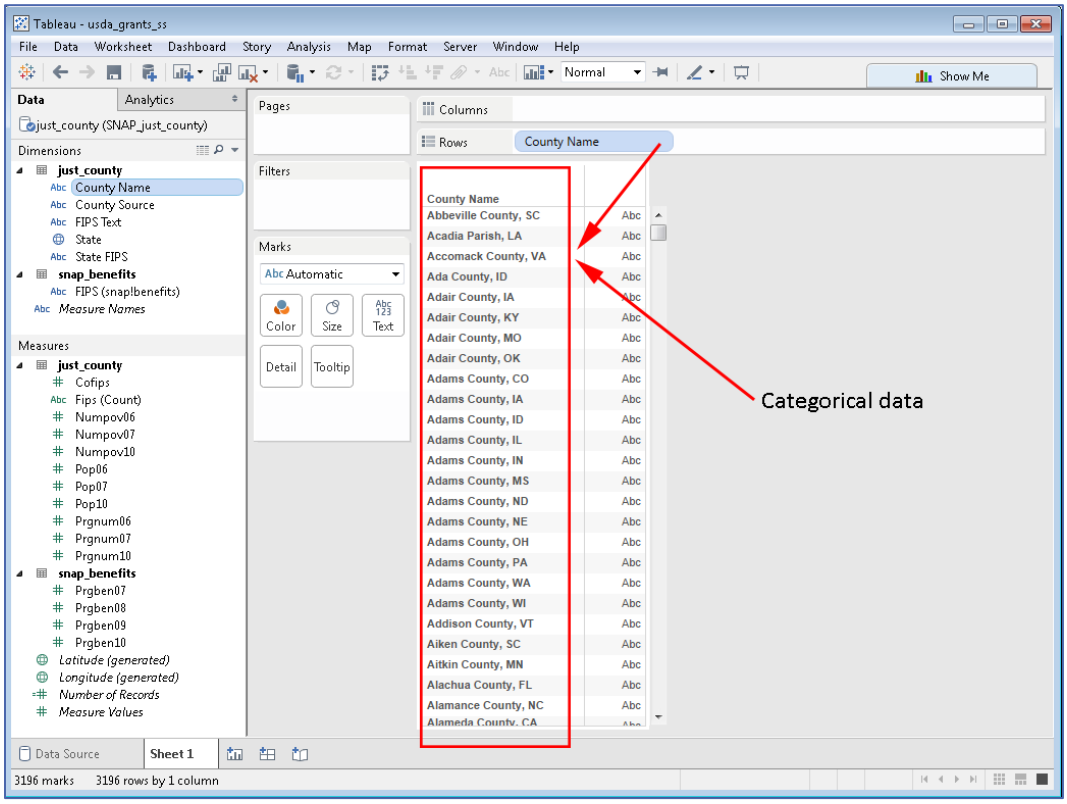


Figure 17: Representing a dimension (Grantee) in Tableau.

2. Tableau treats any field you drag on to a shelf as a "pill."
3. A pills background color indicates whether it is **discrete (blue) or continuous (green)**.
4. You can change the field to a measure just by clicking the field and choosing **Measure** from the dropdown menu.
5. Change the **County_Name** variable to a measure by clicking on the dropdown menu and then choosing ***Grantee>Measure>Count*** [Figure 18].

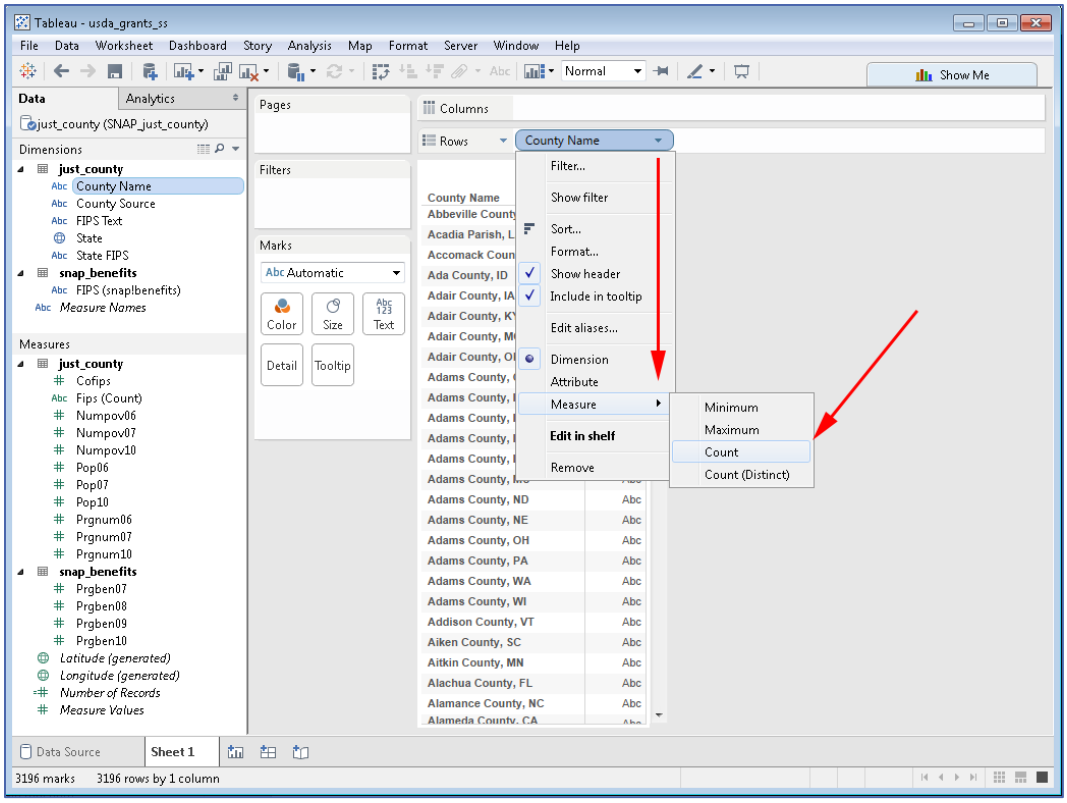


Figure 18: Changing a dimension to a measure in Tableau.

6. As illustrated in Figure 19, the view will now contain a **continuous axis** instead of **column or row headers, and the field's background will become green**.
7. Also, **CNT** has been added to the variable name in the shelf.
8. If I hover over the bar in the graph, the count of counties (3,196) is displayed.

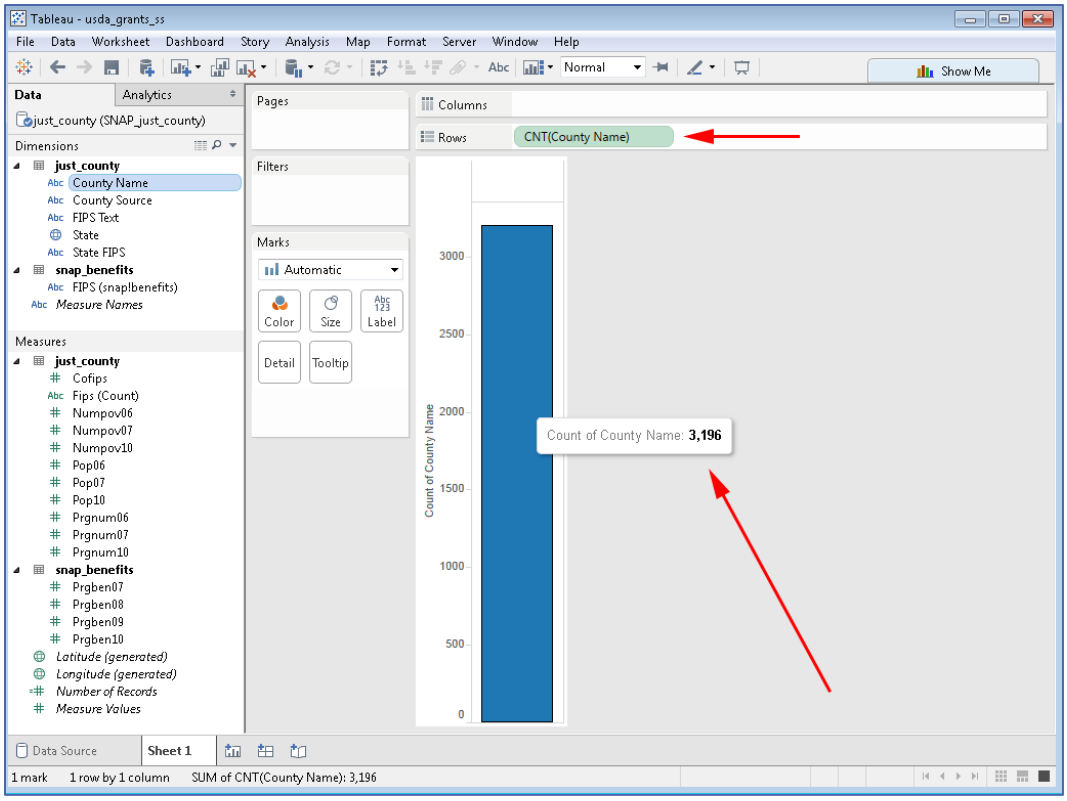


Figure 19: County variable as a measure.

Your options are limited when converting a dimension to a measure. For the **County name** variable, you can have either the count or the unique count, meaning you cannot have a min/max for a categorical variable.

Change **County** back to a dimension.

Measures

Tableau assigns any fields that contain quantitative, numerical information (that is, fields where the values are numbers) to the **Measures** area in the **Data** pane.

1. Rename the **PRGBEN06** to **Program Benefits 06**.
2. Move the **Program Benefits 06 variable** to the **Columns** shelf [Figure 20].

As you can see in Figure 20, when you drag a **Measures** variable to **Rows** or **Columns**, Tableau creates a **continuous axis**.

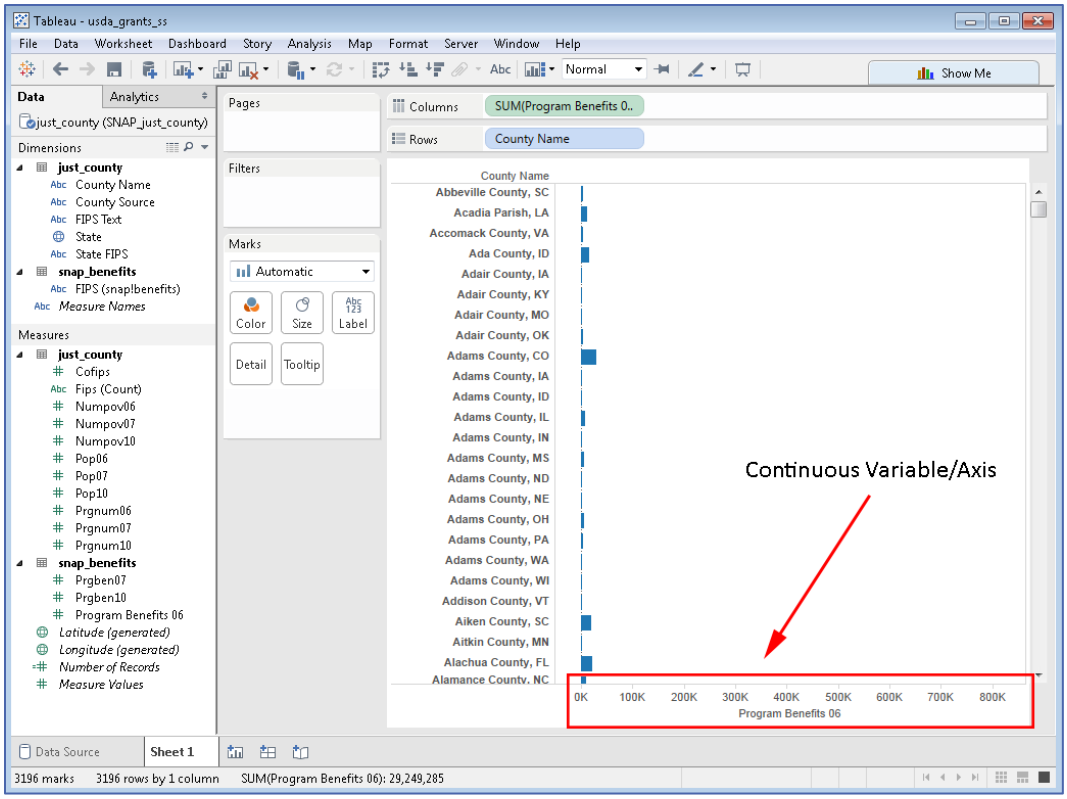


Figure 20: Adding a measure to a graph.

3. If you need to change any properties of a variable, you can also use the variable drop-down menu [Figure 21].

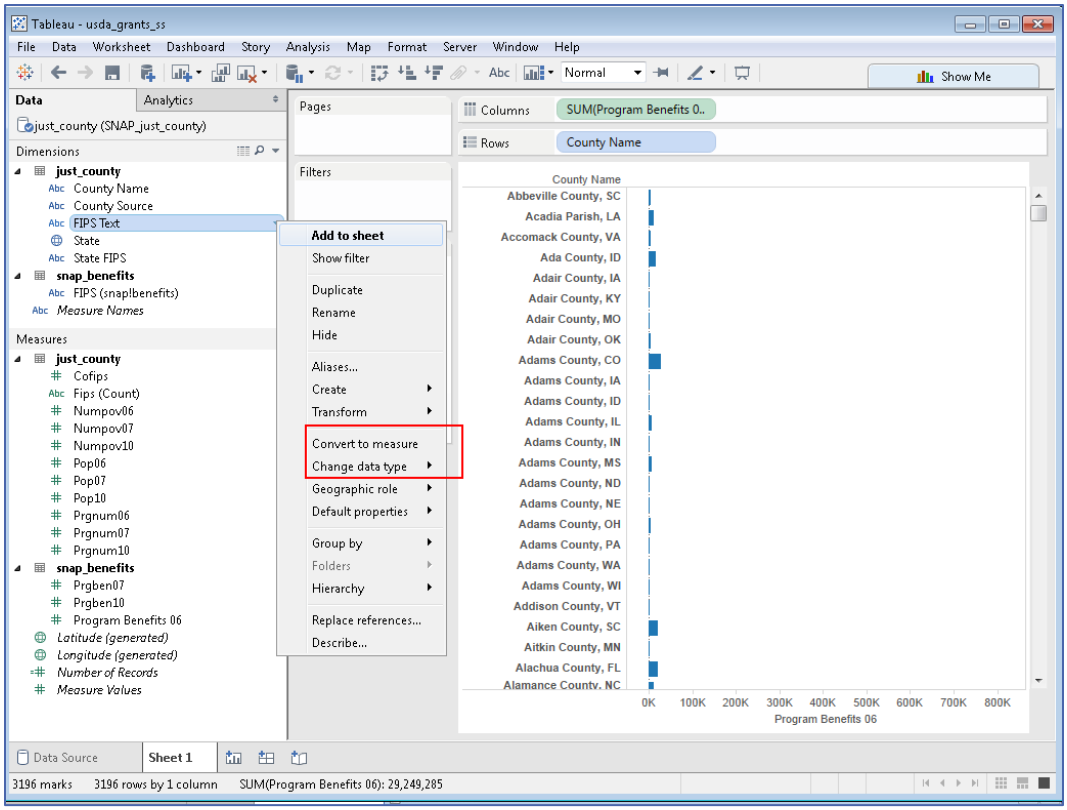


Figure 21: Converting a variable to a measure.

Just remember that the methods used to represent your variables (discrete or continuous) needs to be informed by your research question, or by the type of analysis you are performing.

Menu and Toolbar

At the top of the screen are a series of menu options and the toolbar. We will be diving into these functions later, I simply wanted to give you a quick overview of the interface.

You can also access training resources from the **Help** menu.

The Toolbar is located right below the Menu bar, and gives you access to common functions.

Important icons on the main menu are [Figure 22]:

1. Undo
2. Clear sheet
3. Menu>Analysis
4. Menu>Format

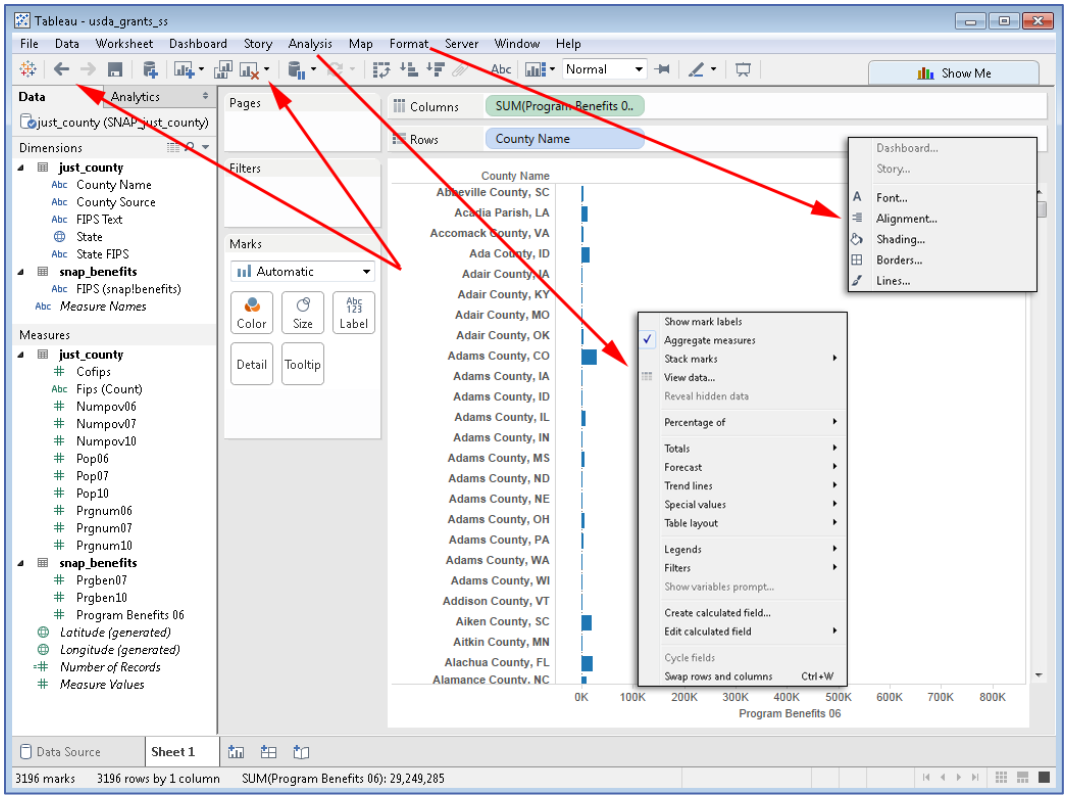


Figure 22: Common Tableau analysis/formatting tools.

Data Pane

At the far left of the screen are two panels: (1) the **Data** panel and (2) the **Analytics** panel.

The **Data** Pane lists all of the dimensions and measures in your workbook.

If you click on the **View Data** icon [Figure 23], you can open up the data associated with the worksheet.

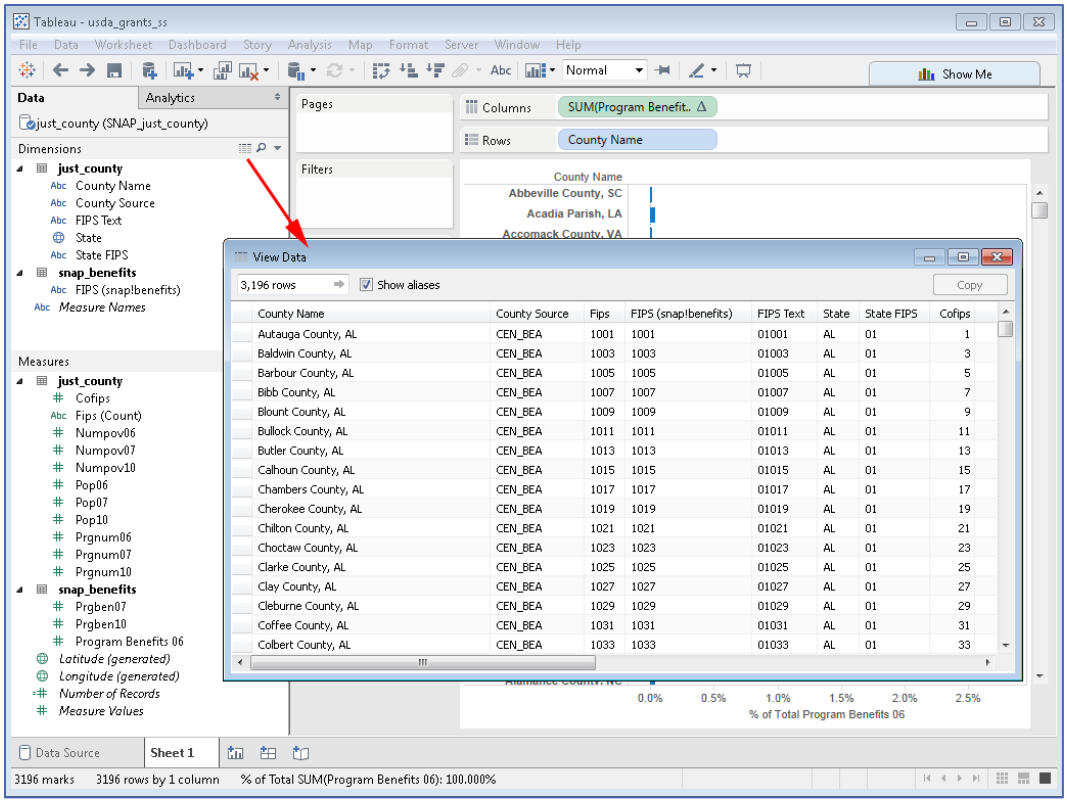


Figure 23: Viewing the data from the Data Panel.

You can also use the panel to select values and copy them to Excel.

Ctrl+mouse to select individual rows.

Shift+mouse to select multiple rows.

Analytics Pane

The Analytics pane provides quick and easy access to common analytic features in Tableau.

For example, you can drag reference lines, box plots, trend lines forecasts, and other items into your view from the **Analytics** pane [Figure 24].

As I previously mentioned, only the appropriate options will be highlighted in dark grey [Figure 24].

Double-click on the **Analytics** option to add it to the chart. Or, you can drag it to the chart to choose custom options.

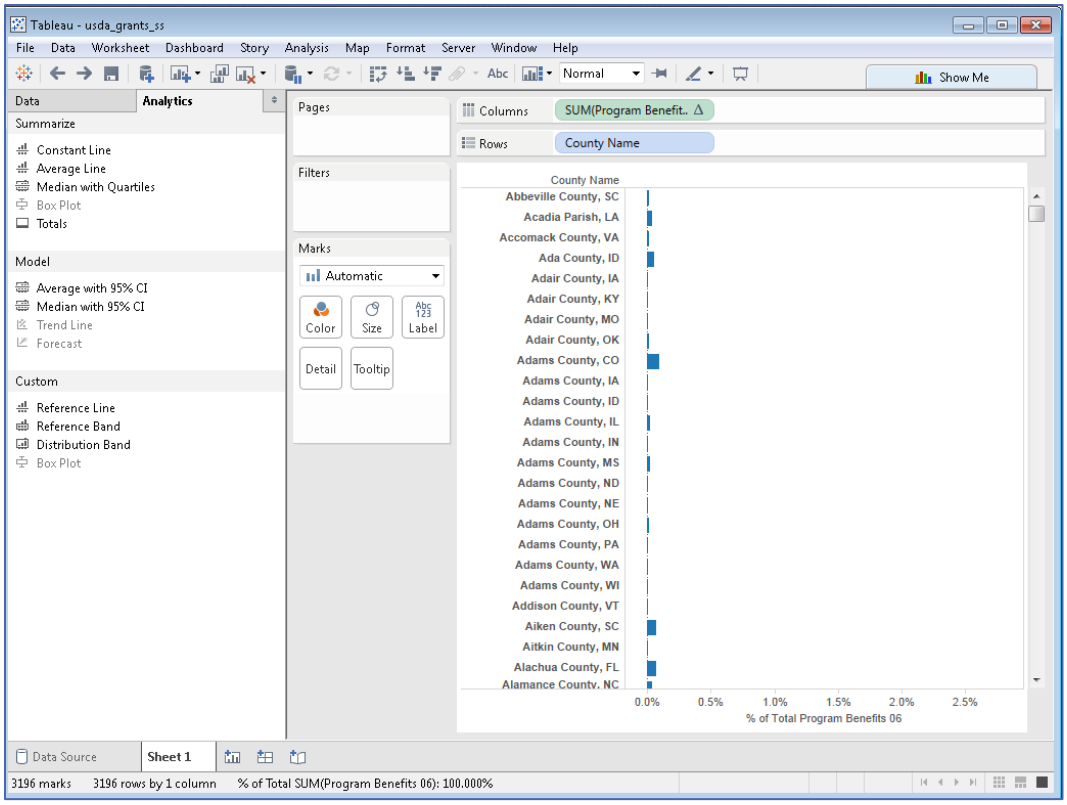


Figure 24: Analytics pane.

Shelves and Cards

Worksheet: **SNAP_just_county data**

If not already on the worksheet, move the **Program Benefits 06** variable to the **Columns** shelf, and the **County Name** dimension, or drag it to the **Rows** shelf.

Pages Shelf

The Pages shelf lets you break a view into a series of pages so you can better analyze how a specific field affects the rest of the data in a view.

When you place a dimension on the **Pages** shelf, you are adding a new row for each member in the dimension.

The **Pages** shelf creates a set of pages with a different view on each page. Each view is based on a member of the field you placed on the **Pages** shelf. You can easily flip through the views and compare them on a **common axis**.

Filters Shelf

The Filters shelf allows you to specify which data to include and exclude.

1. Add the **State Cd** dimension to the Filters shelf, and choose ***AL***, ***LA***, and ***MS*** as the states to filter [Figure 25].
2. Choose ***Apply***, and then ***OK***.

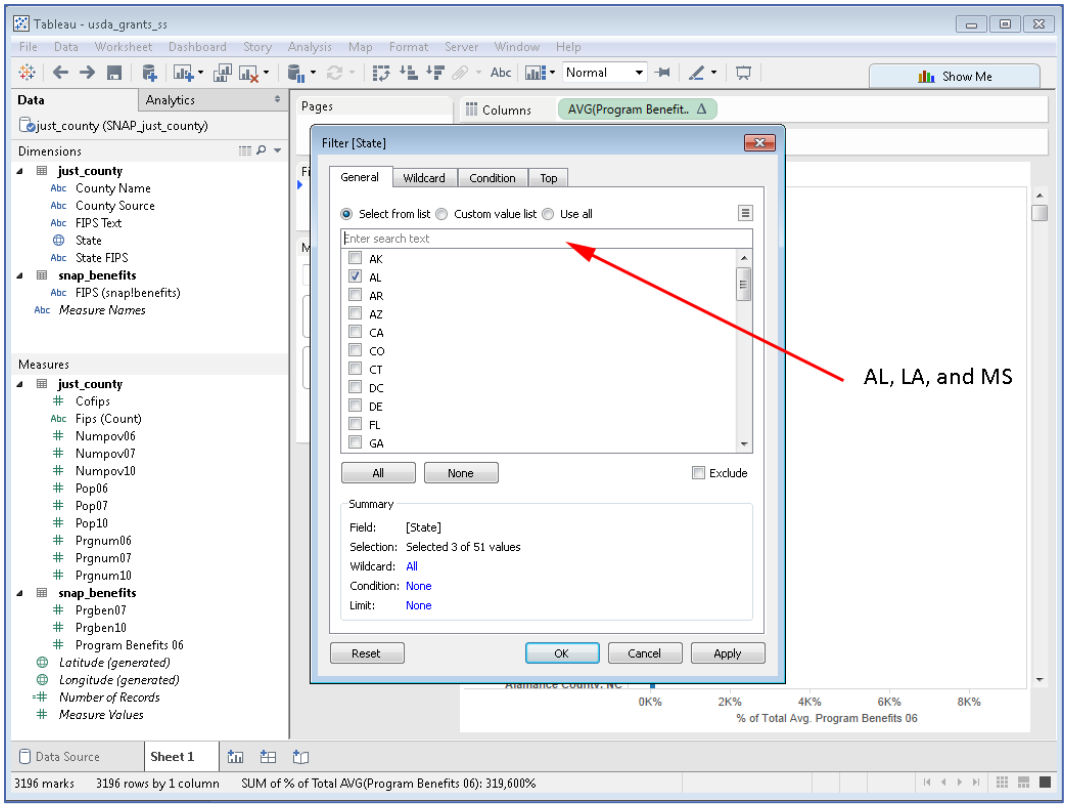


Figure 25: Adding a variable to the Filters shelf – choose the attribute.

3. The worksheet now displays only the **Program Benefits 06** in Alabama, Louisiana, and Mississippi [Figure 26].

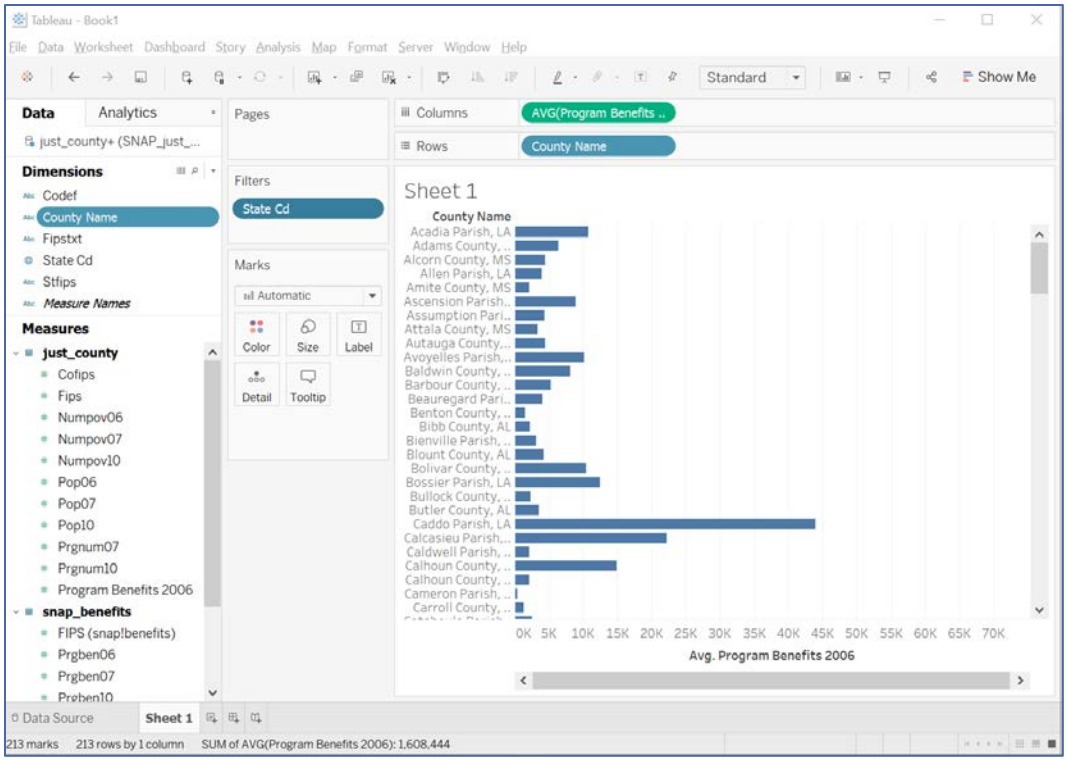


Figure 26: Filtered data.

4. Data options are accessed by clicking anywhere on the x-axis [Figure 27].
5. There are three options:
    a. Sort ascending
    b. Sort descending
    c. View data

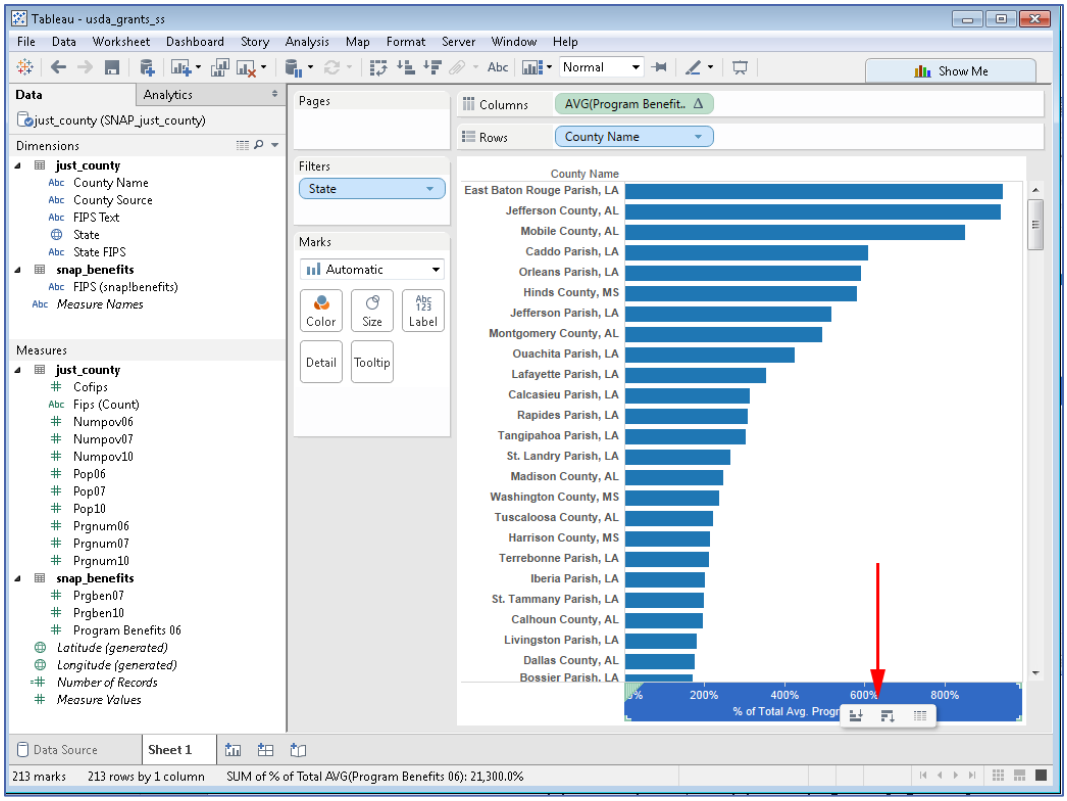


Figure 27: Data sorting options via a graph.

6. Click on the View Data icon.
7. There are two data views: (1) summary view, and (2) full data view [Figure 28].
8. You can export the data from either of these tabs.

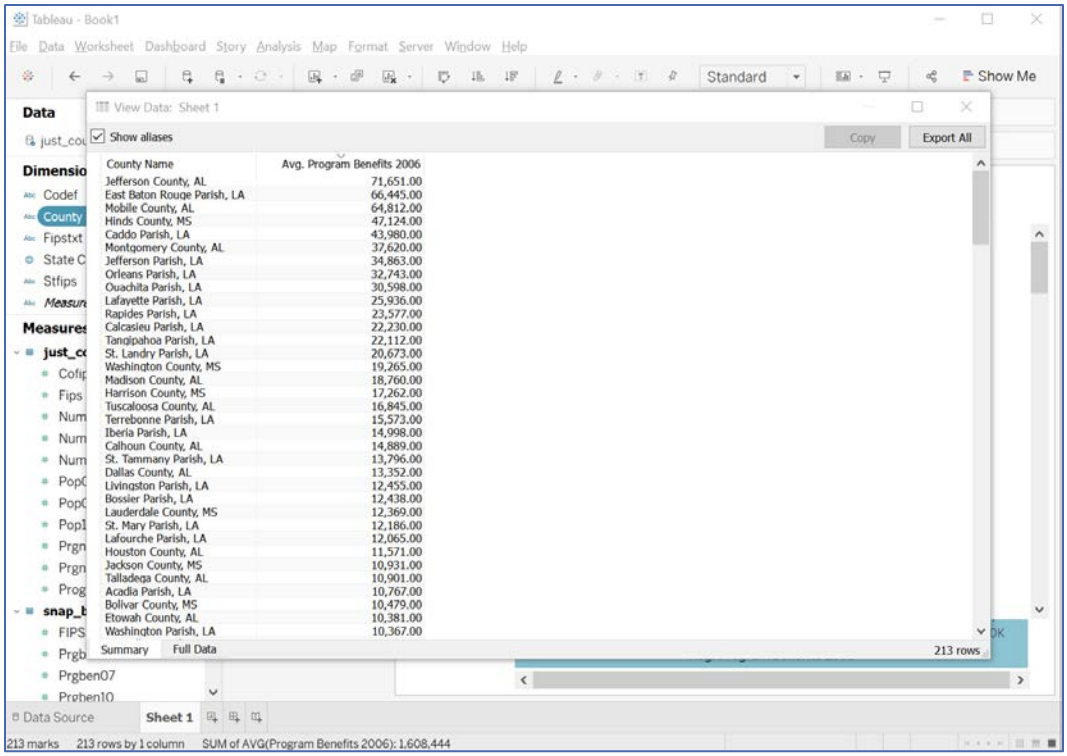


Figure 28: Data view options.

9. Close the Data View popup box.

Want to make the filter more dynamic? No problem.

1. Click **Show Filter** from the Filter pulldown menu [Figure 29].

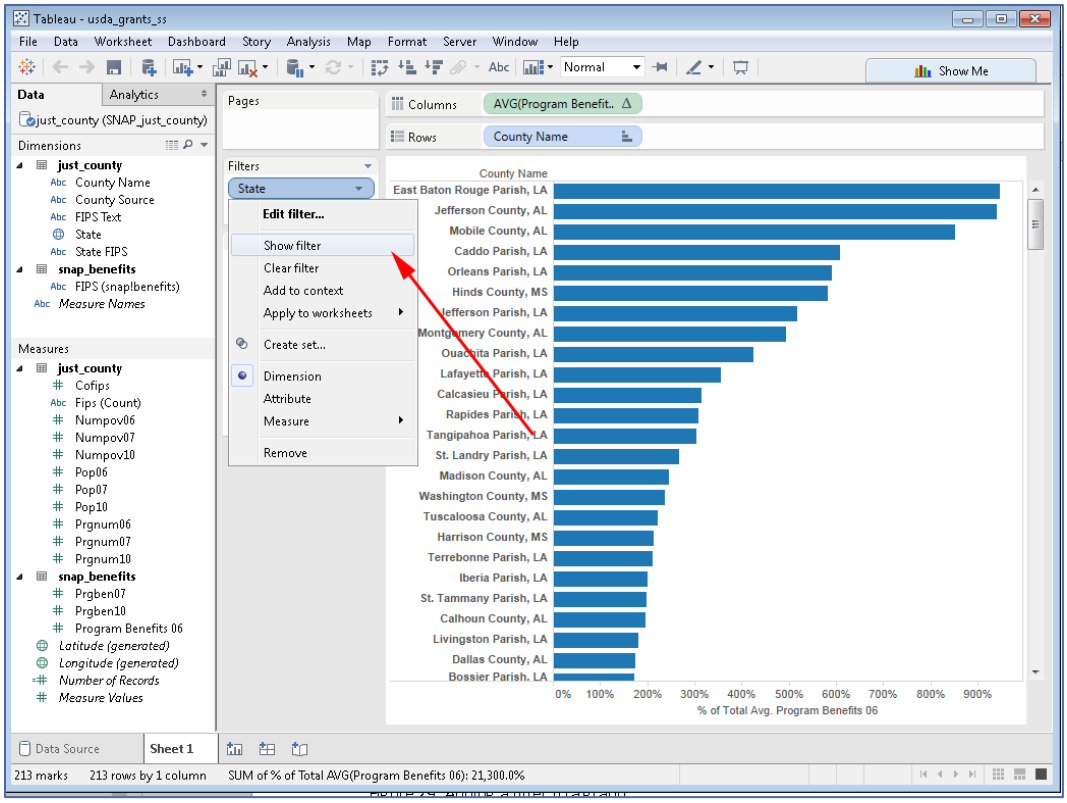


Figure 29: Adding a filter to a graph.

2. This adds a filter to the worksheet [Figure 30], which gives you the ability to quickly filter the data.

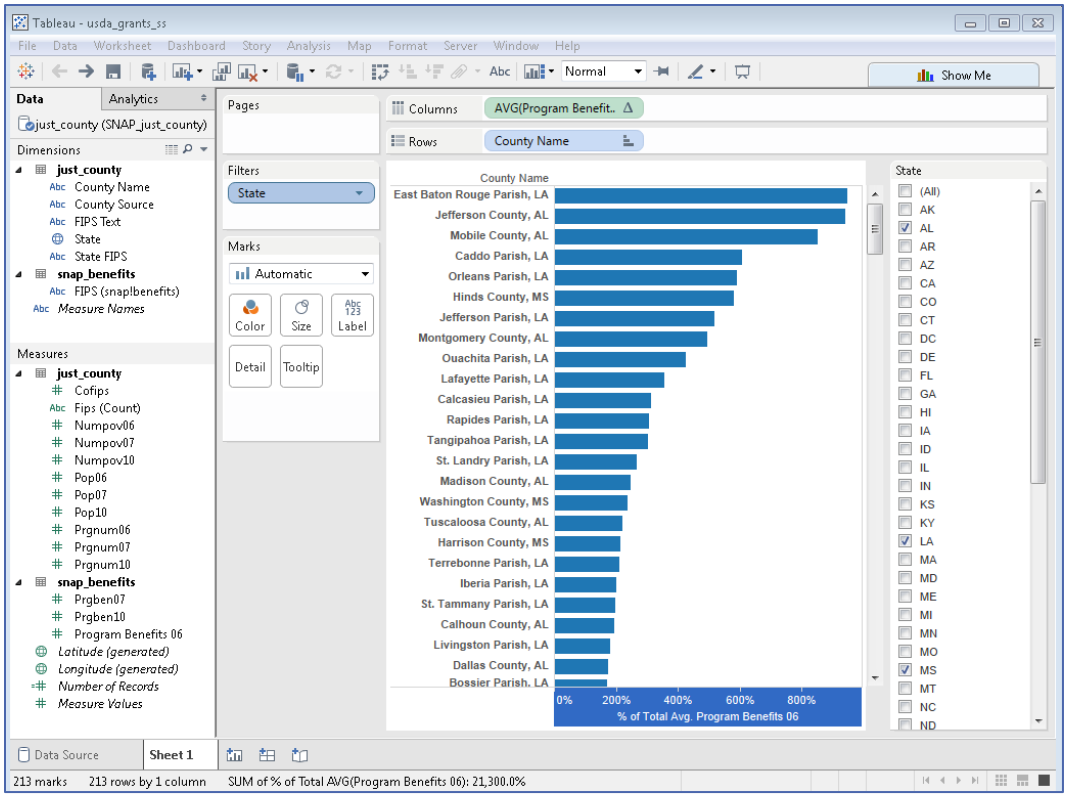


Figure 30: Filtering the Program Benefits data.

3. If you hover over the filter, a dropdown menu will appear in the upper left hand side of the filter [Figure 31]. This menu provides you with a number of options for formatting the filter.
4. Change the filter to ***Multiple Values (dropdown)*** [Figure 31].

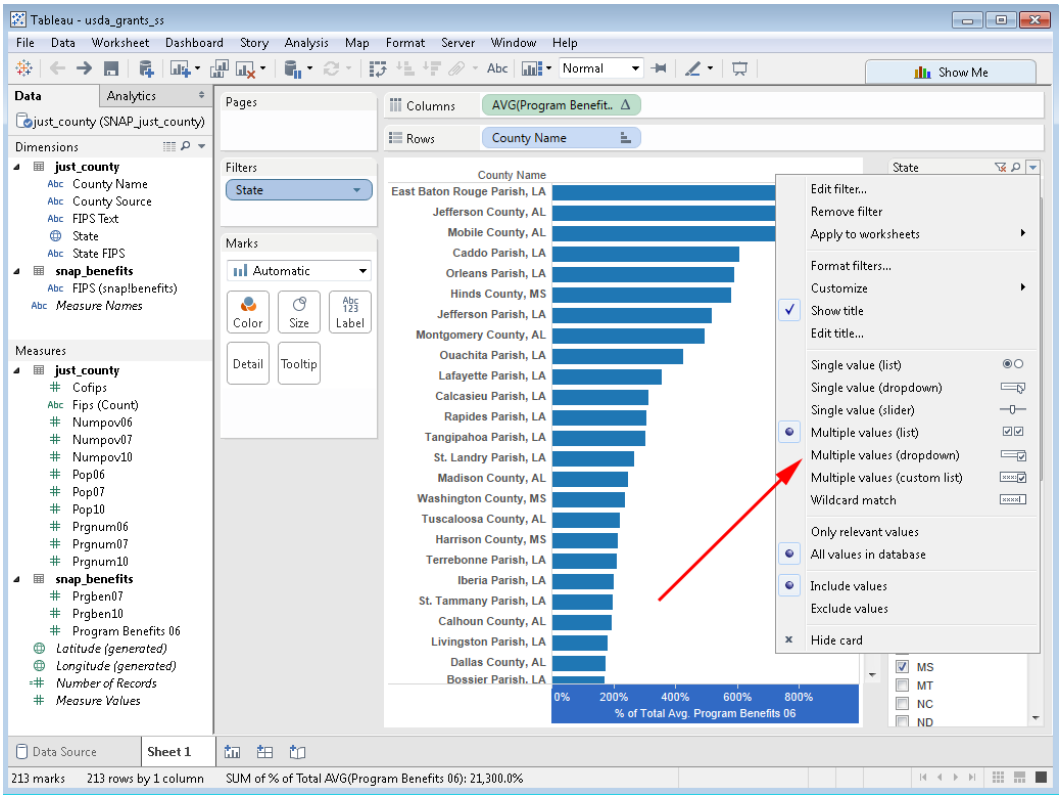


Figure 31: Filter options menu in Tableau.

5. As you can see in Figure 32, this gives us more room on the worksheet.

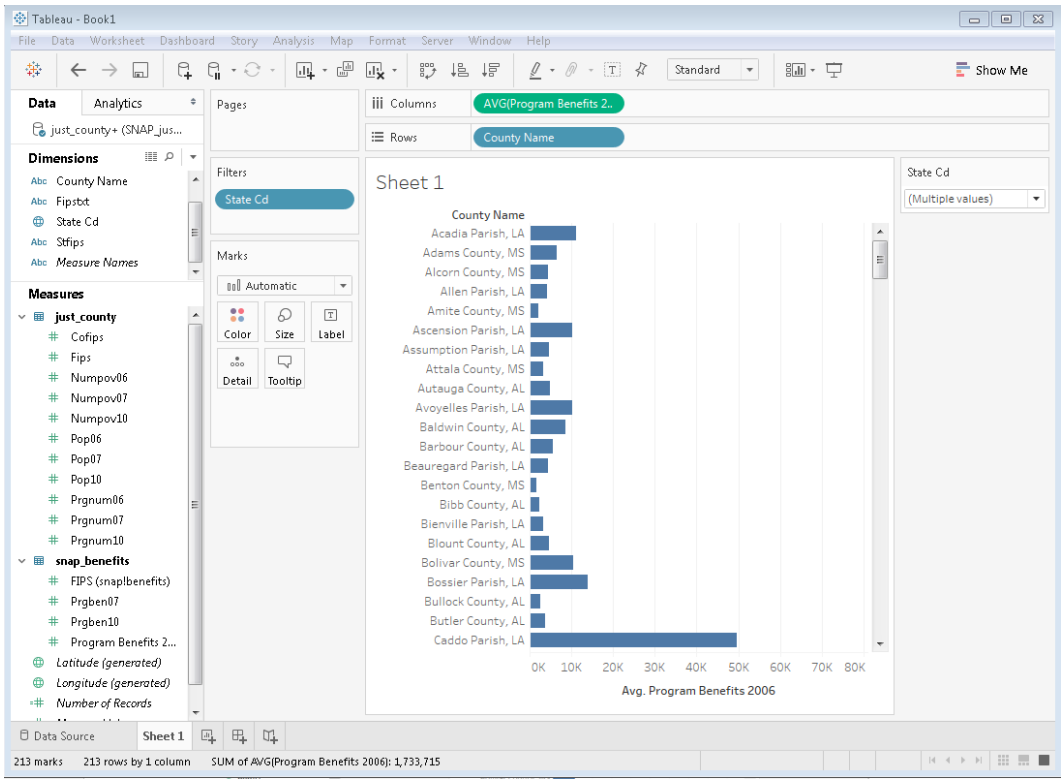


Figure 32: Multiple Values filter in Tableau.

Marks Card

The Marks card is where you control mark properties. It contains the mark type selector along with controls for Color, Size, Label, Detail, Tooltip, Shape, and Angle. The controls that are available depend on the mark type.

We will explore Marks cards in the second webinar.

Managing Tableau Data

1. Select Clear Sheet, to clear the Tableau workspace.
2. Double-click on the ***County Name*** variable to add it to the **Rows** shelf [Figure 33].
3. Double-click on all of the ***Prgnum*** variables: ***Prgnum06***, ***Prgnum07***, and ***Prgnum10*** [Figure 33].

As a reminder, these variables estimate the total annual amount of SNAP/FSP program participants by state or county residents in a year.

As you can see in Figure 33, when you add multiple measures, the variable is automatically added to the Filters card/shelf.

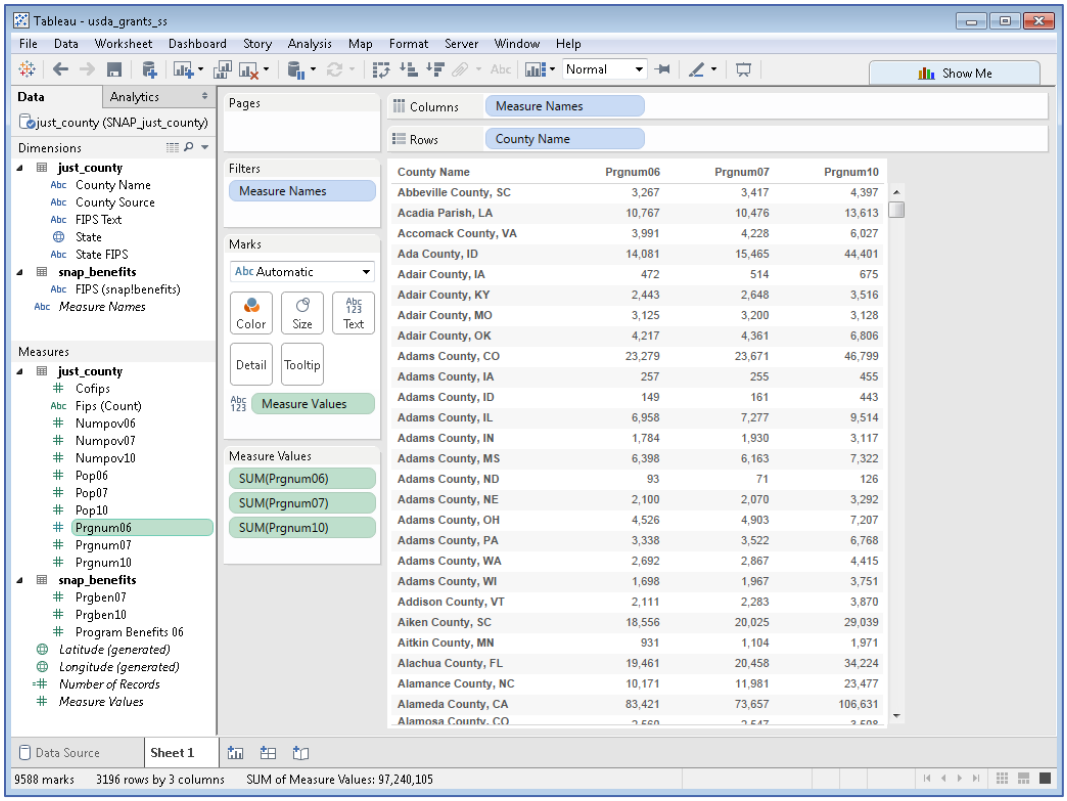
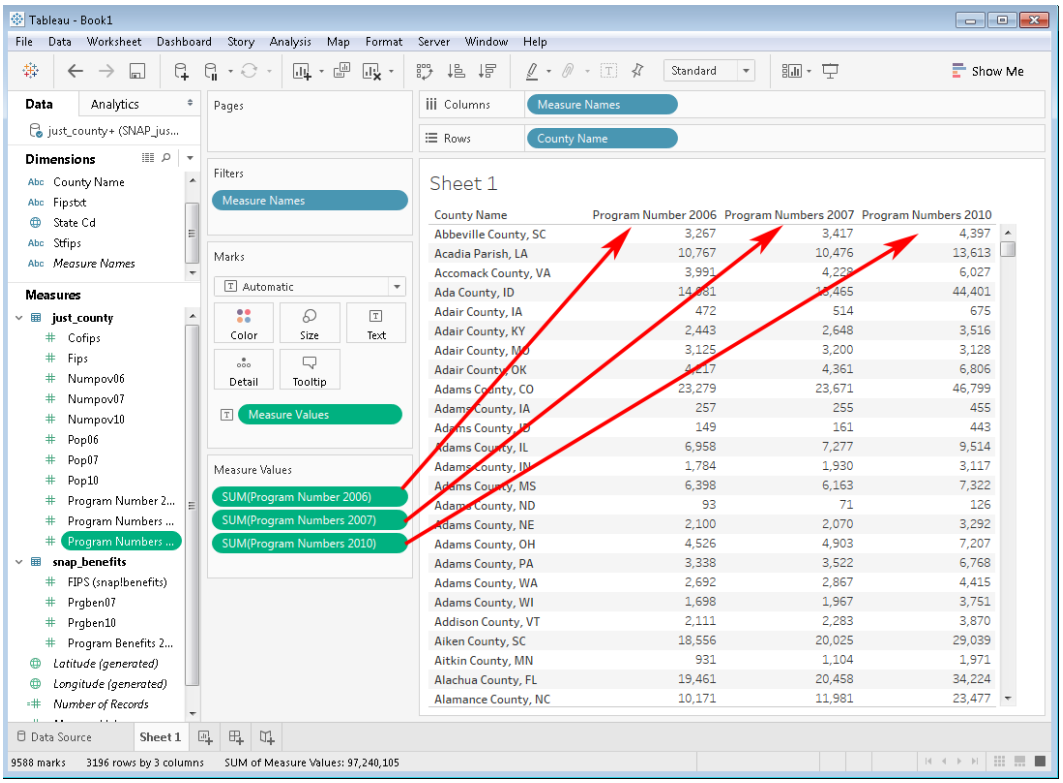


Figure 33: County Name and Program Numbers variables displayed in Tableau.

4. Change each of the **Prgnum** variables, so that they are easier to understand (Program Numbers 2006, 2007, and 2010) [Figure 34].

As you can see in Figure 34, each time I change the variable name…the **Measure Values** and the **Column Headers** are updated in the worksheet.



County Name	Program Number 2006	Program Numbers 2007	Program Numbers 2010
Abbeville County, SC	3,267	3,417	4,397
Acadia Parish, LA	10,767	10,476	13,613
Accomack County, VA	3,991	4,228	6,027
Ada County, ID	14,981	18,465	44,401
Adair County, IA	472	514	675
Adair County, KY	2,443	2,648	3,516
Adair County, MO	3,125	3,200	3,128
Adair County, OK	4,217	4,361	6,806
Adams County, CO	23,279	23,671	46,799
Adams County, IA	257	255	455
Adams County, ID	149	161	443
Adams County, IL	6,958	7,277	9,514
Adams County, IN	1,784	1,930	3,117
Adams County, MS	6,398	6,163	7,322
Adams County, ND	93	71	126
Adams County, NE	2,100	2,070	3,292
Adams County, OH	4,526	4,903	7,207
Adams County, PA	3,338	3,522	6,768
Adams County, WA	2,692	2,867	4,415
Adams County, WI	1,698	1,967	3,751
Addison County, VT	2,111	2,283	3,870
Aiken County, SC	18,556	20,025	29,039
Aitkin County, MN	931	1,104	1,971
Alachua County, FL	19,461	20,458	34,224
Alamance County, NC	10,171	11,981	23,477

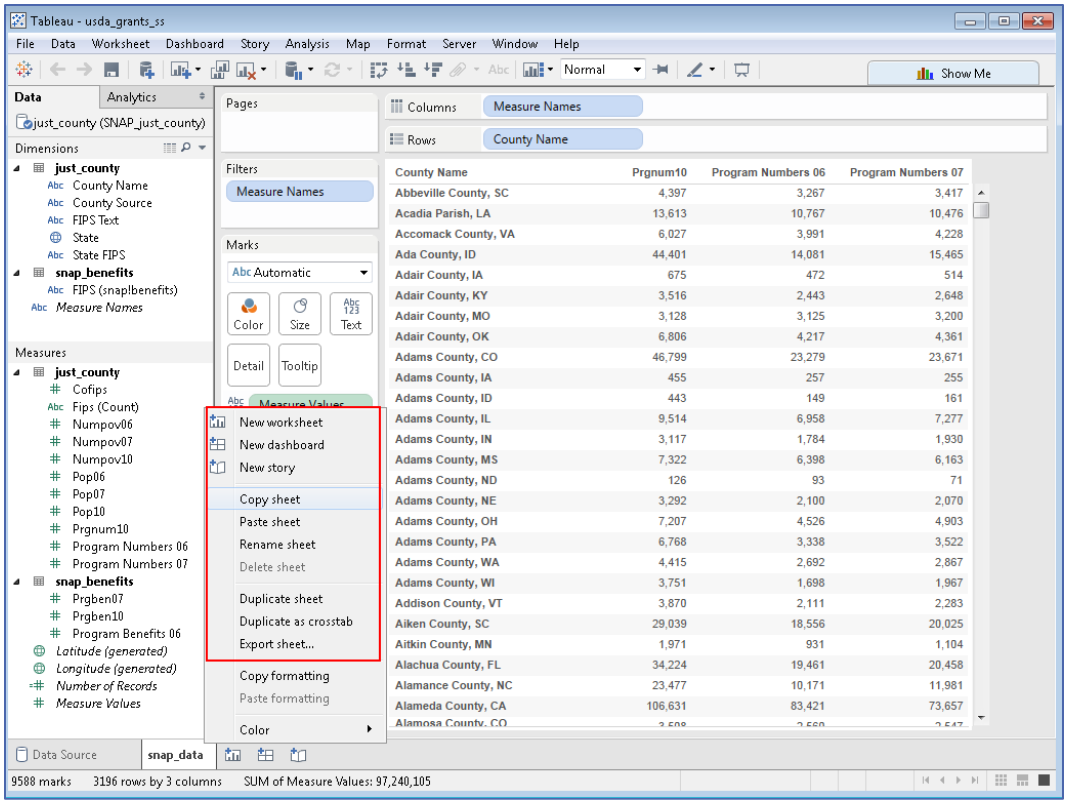
Figure 34: Updating variable names in Tableau.

Adding, duplicating, and renaming worksheets

I have already shown you how to rename a worksheet.

However, now I would like to explore more worksheet options.

1. First, if you hover over a worksheet, Tableau will give you a preview of the data or the graph.
2. If you right-click on a worksheet, you will see all of the available worksheet options [Figure 35].



County Name	Prgnum10	Program Numbers 06	Program Numbers 07
Abbeville County, SC	4,397	3,267	3,417
Acadia Parish, LA	13,613	10,767	10,476
Accomack County, VA	6,027	3,991	4,228
Ada County, ID	44,401	14,081	15,465
Adair County, IA	675	472	514
Adair County, KY	3,516	2,443	2,648
Adair County, MO	3,128	3,125	3,200
Adair County, OK	6,806	4,217	4,361
Adams County, CO	46,799	23,279	23,671
Adams County, IA	455	257	255
Adams County, ID	443	149	161
Adams County, IL	9,514	6,958	7,277
Adams County, IN	3,117	1,784	1,930
Adams County, MS	7,322	6,398	6,163
Adams County, ND	126	93	71
Adams County, NE	3,292	2,100	2,070
Adams County, OH	7,207	4,526	4,903
Adams County, PA	6,768	3,338	3,522
Adams County, WA	4,415	2,692	2,867
Adams County, WI	3,751	1,698	1,967
Addison County, VT	3,870	2,111	2,283
Aiken County, SC	29,039	18,556	20,025
Aitkin County, MN	1,971	931	1,104
Alachua County, FL	34,224	19,461	20,458
Alamance County, NC	23,477	10,171	11,981
Alameda County, CA	106,631	83,421	73,657

Figure 35: Worksheet options available from the worksheet tab.

3. Let us go ahead and duplicate this worksheet.
4. Rename the worksheet **snap_chart**.
5. Open up the **Show Me** tab [Figure 36].
6. Choose ***Horizontal Bars*** as the option [Figure 36].

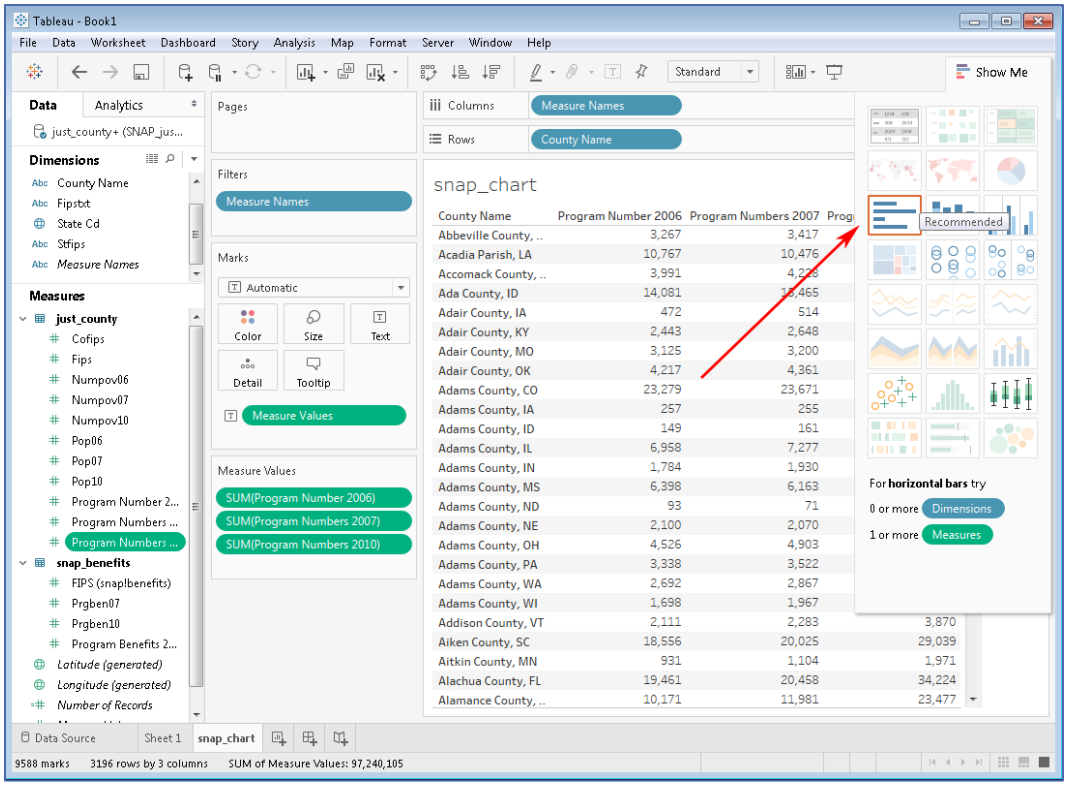


Figure 36: Creating a bar chart from the SNAP data.

7. We are going to cover visualization in another webinar. However, I wanted to point out a couple of things about the **Show Me** tab.
    a. Horizontal Bar is highlighted as a recommended chart.
    b. A visualization tip is provided at the bottom of the **Show Me** tab. In this example, we need at least 1 measure to make a horizontal bar chart.
    c. The only charts that are displayed are the ones that are appropriate for your data.
8. Figure 37 displays the reformatted data.

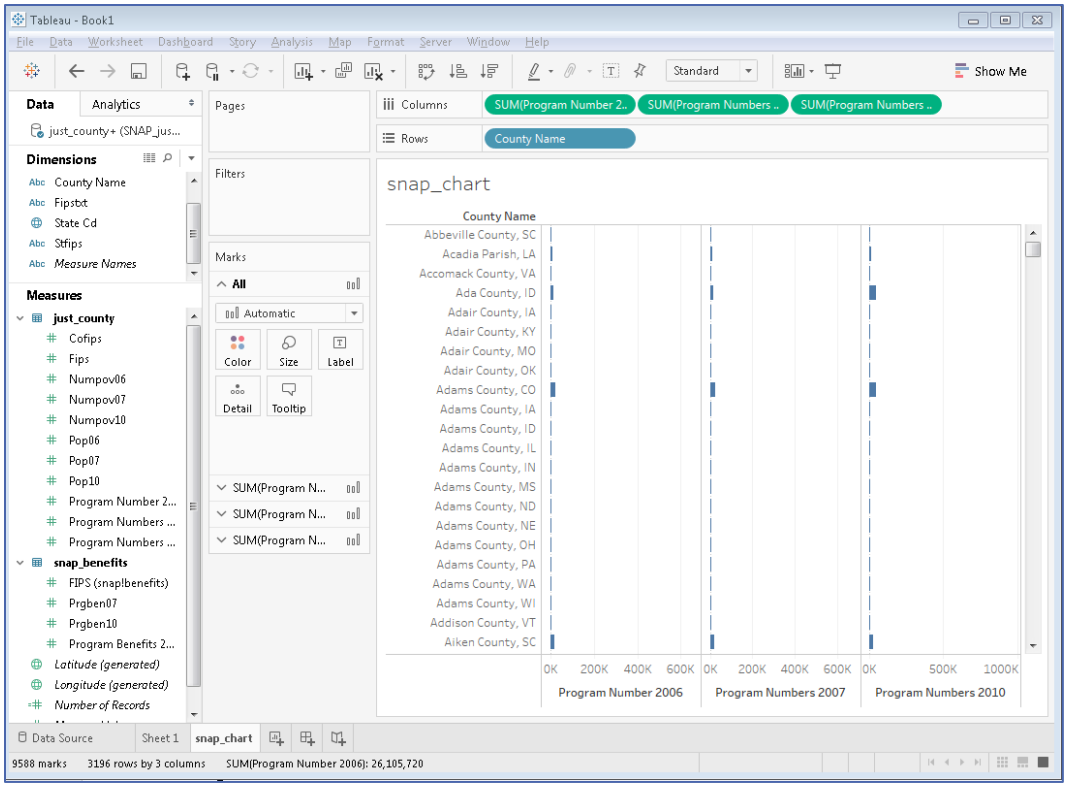


Figure 37: SNAP data formatted as a bar chart.

9. While we are on this screen, I would like to show you two very useful tools. The first is the **Swap** function (**Crtl+w**) [Figure 38].
10. The options in the **Show/Hide** card menu (near the **Fit** tool) allow you to turn on/off various cards [Figure 38]. You are probably noticing that Tableau gives you many options for exploring the same functions.
11. As a reminder, I can always right-click near the bottom of the worksheet, to reset all of the cards.

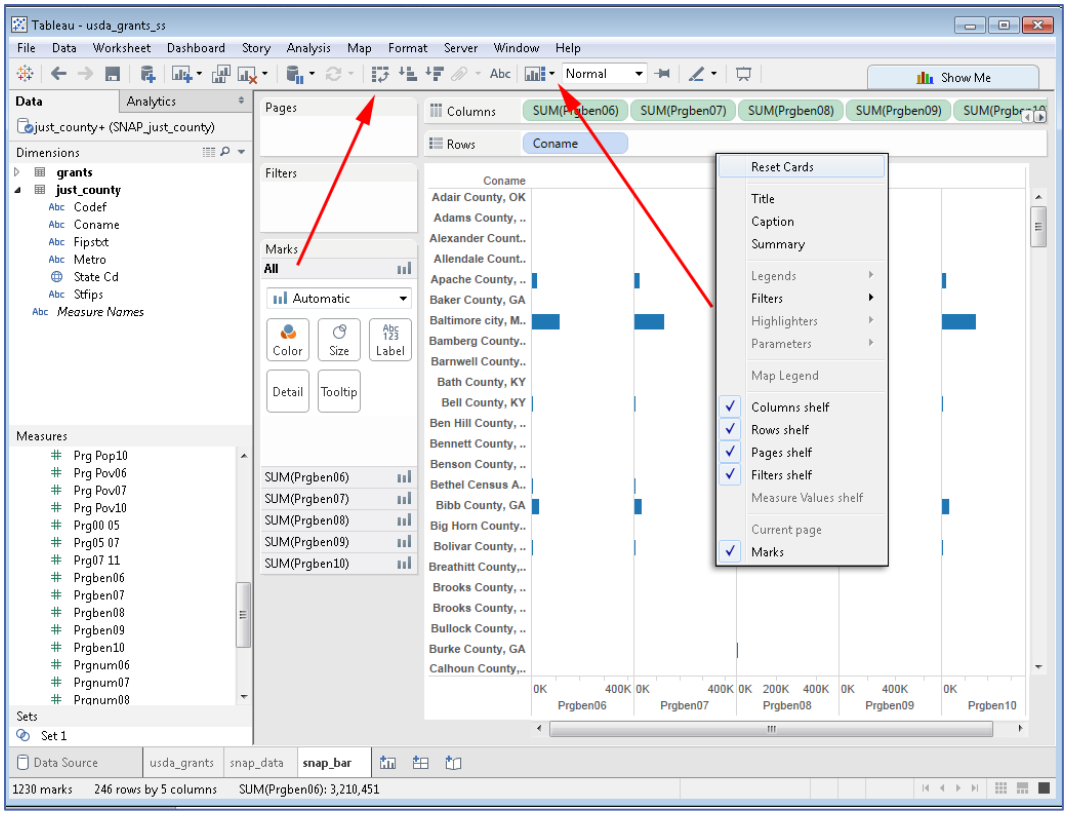


Figure 38: Swap and card options.

I just showed how to turn off various options (like the cards/shelfs), now I would like to show you how to turn on particular elements.

By default, the title, caption, and summary statistics are turned off. However, you can turn them on by going to the Worksheet menu. Title and caption are self-explanatory and I do not use them that often. However, I would like to show you the **Show Summary** and the **View Toolba**r tools.

1. Select ***Worksheet>Show Summary*** [Figure 39].

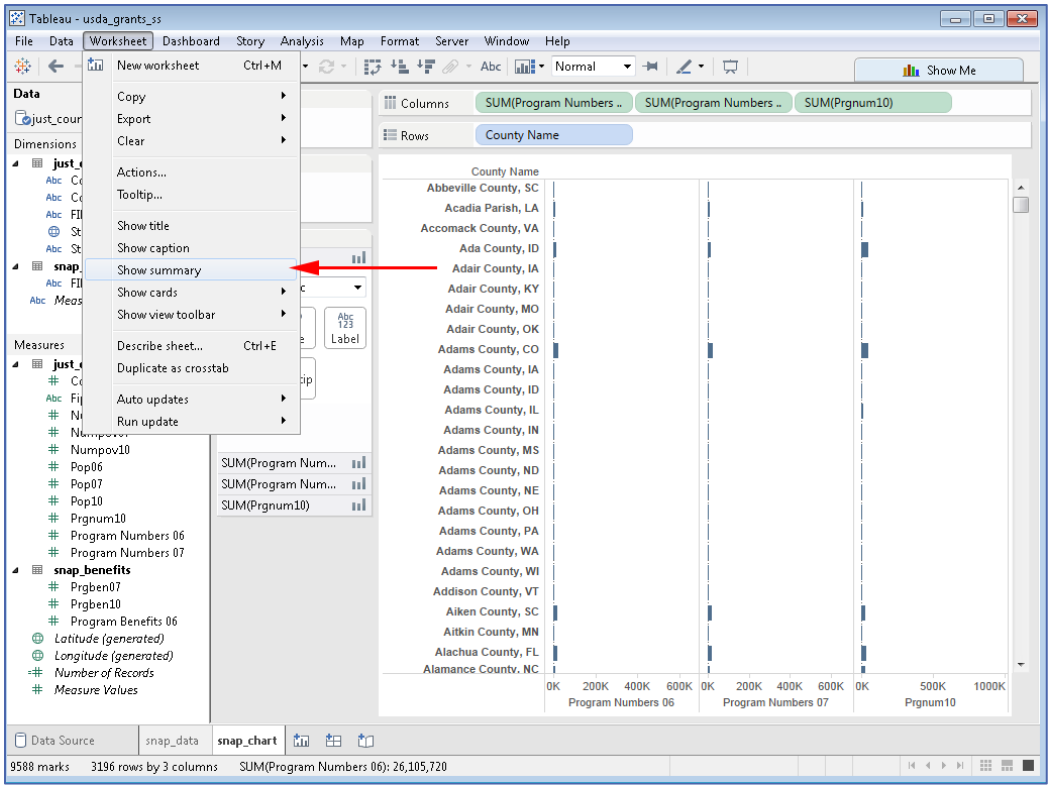


Figure 39: Displaying summary statistics for a worksheet.

2. Figure 40 shows the summary statistics for each of the three quantitative variables.

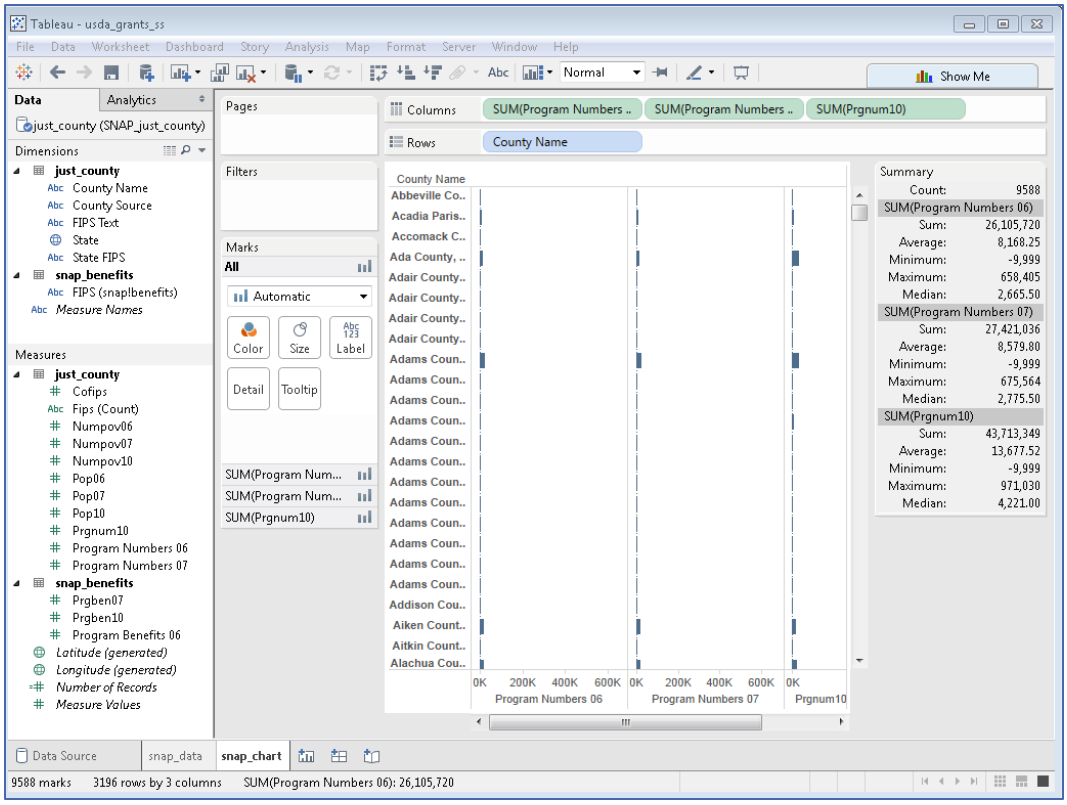


Figure 40: Summary statistics for the SNAP data.

3. You can change the display (types of statistics displayed) for this tab by clicking on the small arrow near the right top of the tab [Figure 41].

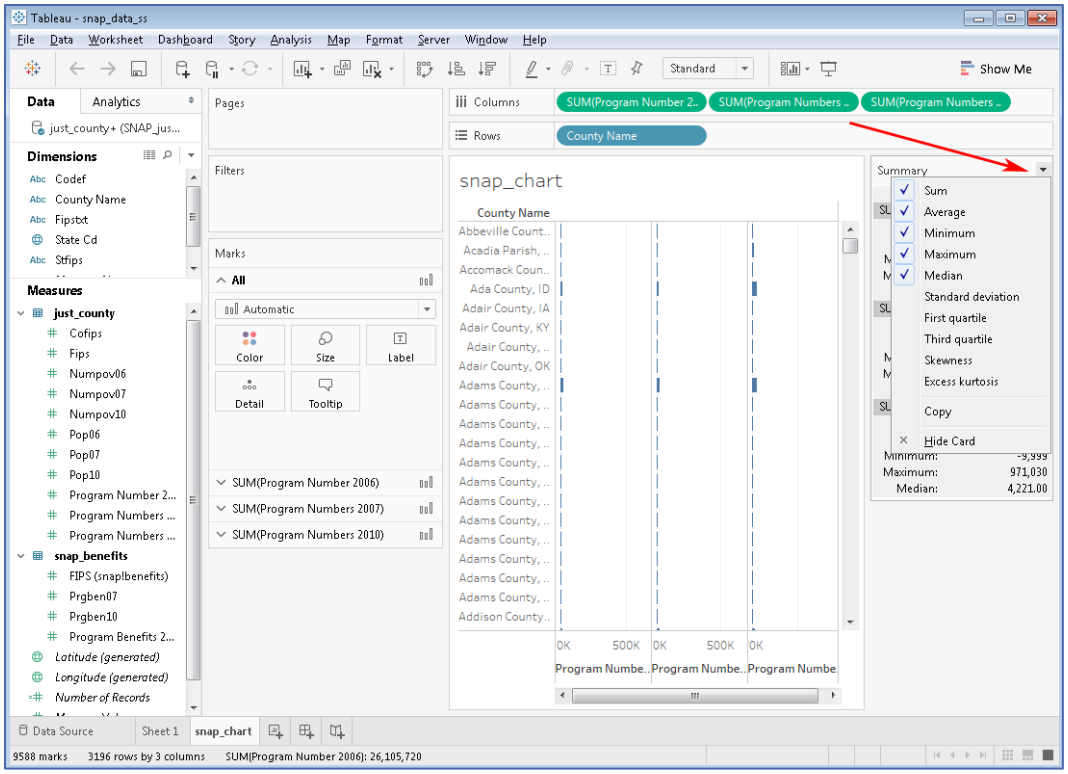


Figure 41: Changing the summary stats that are displayed.

4. Click ***Hide Card*** to remove this tab [Figure 41].

Saving Your Work

Tableau provides three ways for you to save your work:

1. Workbooks: Saves all open worksheets.
2. Packaged Workbooks: Saves the workbook along with all referenced local file data sources and images into a single file.
3. Bookmarks: Saves the current worksheet.

You can share workbooks and bookmarks, provided users can access the relevant data sources. If users do not have access to the data you used in your analysis, you can save your work as a packaged workbook.

Custom fields such as binned measures, calculated fields, groups, and sets are saved with workbooks and bookmarks

Exporting Data

There are three methods for exporting workbook data:

1. Exporting as an Image
2. Exporting as Data

3. Exporting as Crosstab to Excel

Exporting as an Image

The export image command saves the current view as an image file. You can export to an image file with the following three steps.

1. Select Worksheet > Export > Image [Figure 42].
2. In the Copy Image dialog box, select the contents you want to include in the image and the legend layout (if the view contains a legend).
3. Click Save.
4. In the Save Image dialog box, navigate to where you want to save the image file and type a file name into the text box. Select a file format from the Save as type drop-down menu.
5. Click Save.

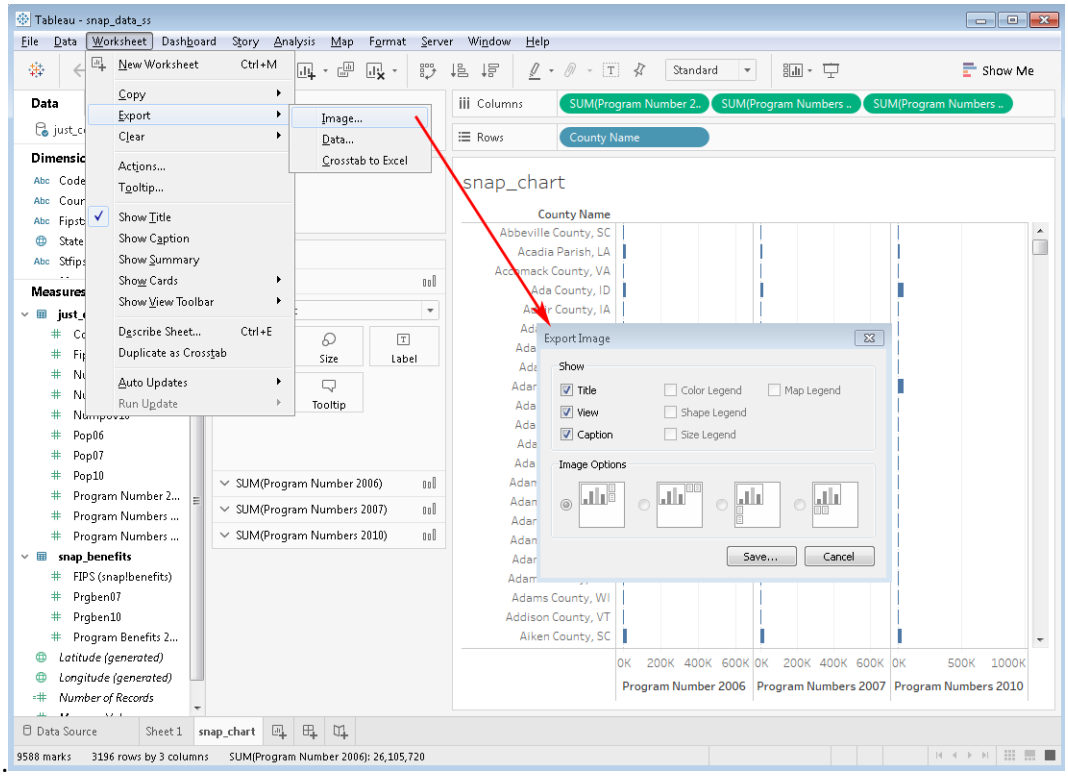


Figure 42: Exporting a worksheet as an image.

You can also publish one or more views to PDF by selecting ***File > Print to PDF***.

When printing a sheet, filters in the view are not included. To show filters, create a dashboard containing the sheet and print the dashboard to PDF.

Exporting as Data

Select ***Worksheet > Export >Data***.

Creates a connection to an Access database.

Exporting to Excel (as crosstab)

Select ***Worksheet > Export > Crosstab to Excel***.

Tableau automatically pastes a crosstab version of the current view into a new Excel workbook. This option automatically opens a new instance of the Excel application.

As you can see in Figure 43, this process is similar to using the Copy feature available from the Data View pop-up menu.

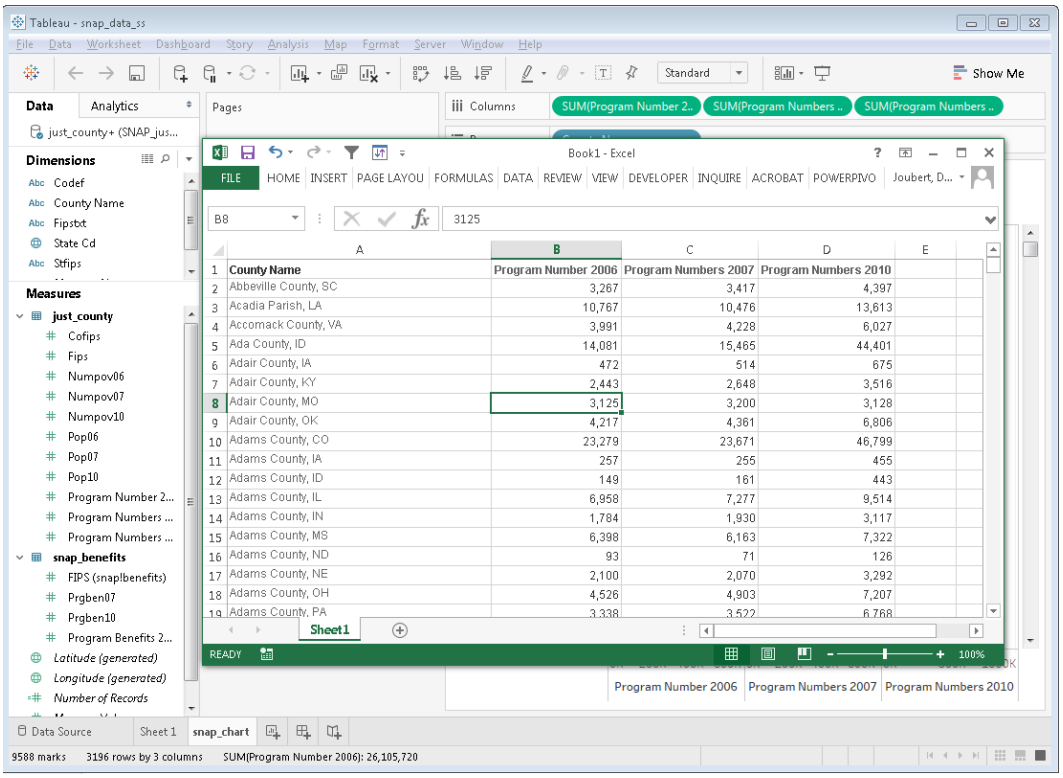


Figure 43: Exporting summary data to Excel.