

Working with National Supply & Demand Data

Many queries (reports) are provided for additional analysis of the National Supply and Demand (NSD) data. To begin analysis, export your query to CSV. CSV files are usually opened automatically in Excel but can be opened manually. Google Sheets can also open (import) these files. CSV files can also be imported into MS-Access, SAS, SPSS, and other databases. Once in these tools data can be summarized and graphed.

Field names are described on the web site. See: <http://aaae.agedweb.org/nsd/DataDescription.aspx>

Excel

The query will be imported into Excel as a worksheet. Save the CSV as an Excel file (.xlsx). Simple analysis can be done by creating new columns and adding formulas. For example you can add two columns.

- Be cautious of summing columns and using the total to develop ratios (percent) as missing data can skew the calculation.
- Be cautious using pre-computed ratios such as Yield. Averaging the column will sum the column and divide by the number of rows. This is not the same as an overall average. To get an overall average sum the numerator and denominator columns and divide. The data that makes up the pre-computed ratio is presented for this purpose.

Save workbooks with a descriptive name. The name should include the data source, a name for the data, and the date of the data. For example, NSD Gender 2020-2022.xlsx. Be consistent in your naming convention.

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The screenshot shows an Excel spreadsheet with the following data structure:

State	Year	AAAE Reg	NAAE Reg	FFA Reg	Institution	Program	White	Non-Whit	Hispanic	AA_Black	AI_AN	Asian	Multi	NH_Pt	Other	Unknown	Femal
Alabama	2018	Southern	V	Southern	1	23	0	0	0	0	0	0	0	0	0	0	23
Alabama	2019	Southern	V	Southern	1	13	13	0	0	0	0	0	0	0	0	0	0
Alabama	2020	Southern	V	Southern	1	18	18	0	0	0	0	0	0	0	0	0	0
Alabama	2021	Southern	V	Southern	1	14	14	0	0	0	0	0	0	0	0	0	0
Alabama	2022	Southern	V	Southern	1	12	12	0	0	0	0	0	0	0	0	0	0
Arizona	2018	Western	I	Western	1	8	8	0	0	0	0	0	0	0	0	0	0
Arizona	2019	Western	I	Western	1	4	4	0	0	0	0	0	0	0	0	0	0
Arizona	2020	Western	I	Western	1	5	5	0	0	0	0	0	0	0	0	0	0
Arizona	2021	Western	I	Western	1	5	5	0	0	0	0	0	0	0	0	0	0
Arizona	2022	Western	I	Western	1	4	3	1	0	0	0	0	1	0	0	0	0
Arkansas	2018	Southern	II	Southern	3	26	25	1	1	0	0	0	0	0	0	0	0
Arkansas	2019	Southern	II	Southern	4	22	21	1	0	0	1	0	0	0	0	0	0
Arkansas	2020	Southern	II	Southern	4	29	28	1	0	0	1	0	0	0	0	0	0
Arkansas	2021	Southern	II	Southern	3	19	19	0	0	0	0	0	0	0	0	0	0
Arkansas	2022	Southern	II	Southern	5	35	32	3	0	0	0	0	0	0	0	3	0
California	2018	Western	I	Western	4	72	56	16	11	1	0	0	0	4	0	0	0
California	2019	Western	I	Western	5	70	59	11	6	1	0	2	1	0	0	1	0
California	2020	Western	I	Western	4	76	59	17	14	0	0	1	1	1	1	0	0
California	2021	Western	I	Western	3	45	37	8	5	1	0	0	2	0	0	0	0
California	2022	Western	I	Western	4	75	61	14	8	0	0	1	2	0	1	2	0
Colorado	2018	Western	II	Central	1	11	11	0	0	0	0	0	0	0	0	0	0
Colorado	2019	Western	II	Central	1	14	13	1	0	0	0	1	0	0	0	0	0
Colorado	2020	Western	II	Central	1	7	7	0	0	0	0	0	0	0	0	0	0
Colorado	2021	Western	II	Central	1	4	4	0	0	0	0	0	0	0	0	0	0

Sample Export

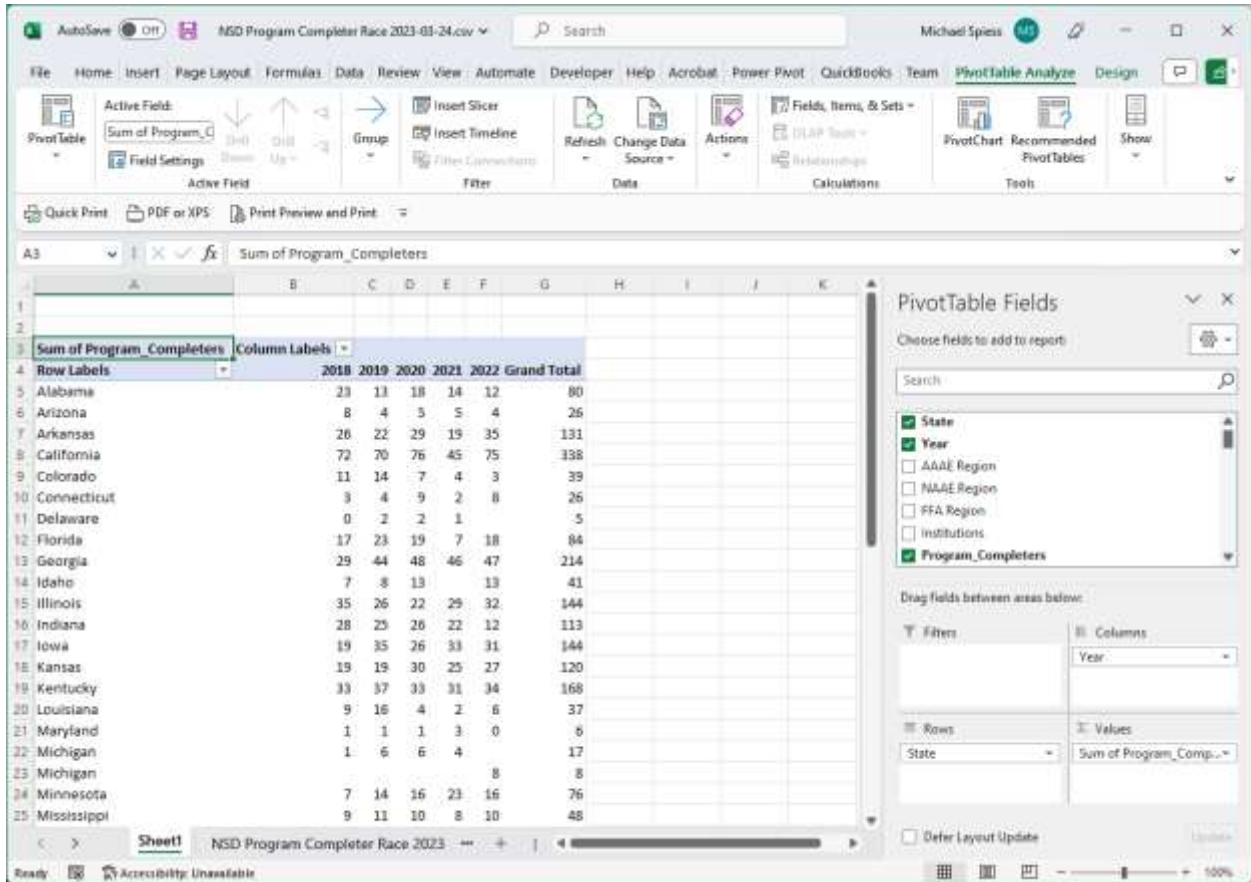
Pivot Tables

Excel can easily create pivot tables. Microsoft provides a tutorial at:

<https://support.microsoft.com/en-us/office/create-a-pivottable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576>

Pivot tables are a powerful tool to filter and summarize data. Most data sets have AAAE, NAAE, and FFA regions that can be used to summarize data. So for example you want to create tables of the gender make up of teachers by year for each region. This is simple. Simply make Year the row, gender the columns and filter by region. To change the data in the table simply change the filter. To create a pivot table:

1. Select the upper left cell in the data table.
2. From the ribbon select Insert, then Pivot Table.
3. Save the pivot table to a new sheet.
4. A pivot table has three parts: Rows, Columns, and the data (values). A field list is displayed. Drag fields to rows, columns, and values boxes.

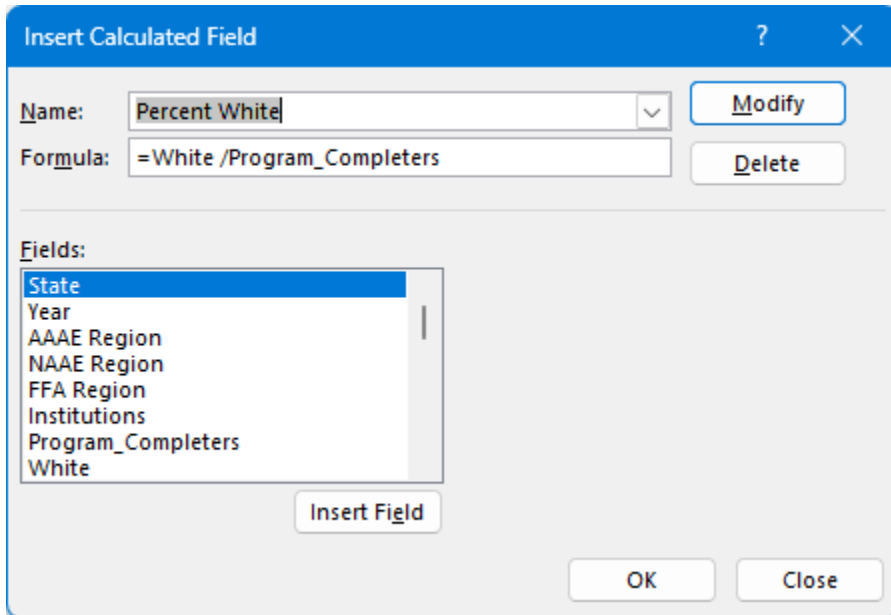


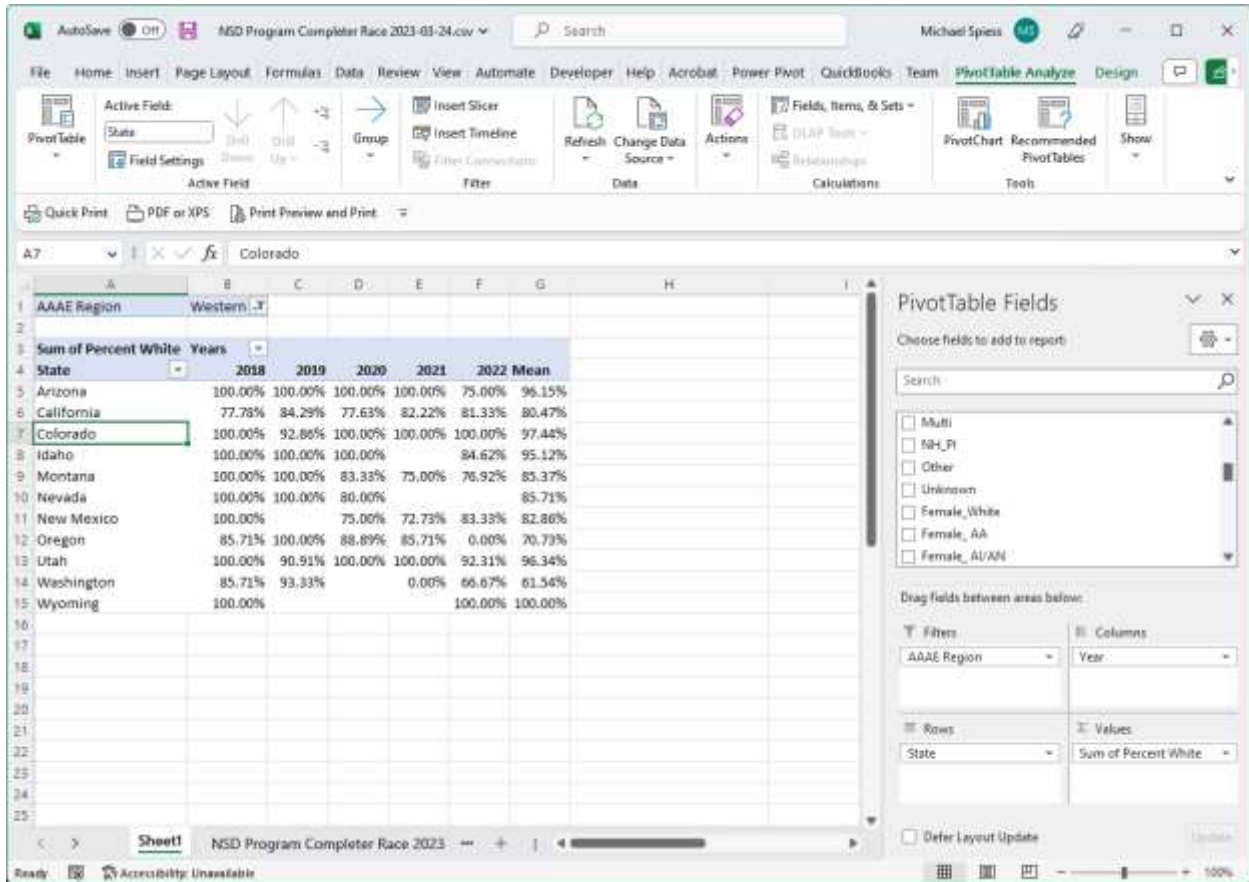
5. Once you have the data where you want it you can adjust how it is displayed.
 - a. Values are most commonly shown as a sum. However, data can be represented as a count or an average. Right click in the data area and choose summarize values by.
 - b. You may want to show values as a percentage. Again, right click in the data area and select Show Values As.
6. Headings in the table can be edited by selecting the cell and typing in a custom heading.
7. Totals can be deleted by right clicking on the heading and selecting remove grand total.
8. Data can be filtered easily.
 - a. To filter rows, select the dropdown in the heading. Sorting options are also there.
 - b. To filter columns, select the dropdown in the heading.
 - c. To filter the data drag the filter field into the “filters” box. Then select the dropdown (upper left of the sheet) and add the filter.

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State	2018	2019	2020	2021	2022	Mean
Arizona	100.00%	100.00%	100.00%	100.00%	75.00%	96.15%
California	77.78%	84.29%	77.63%	82.22%	81.33%	80.47%
Colorado	100.00%	92.86%	100.00%	100.00%	100.00%	97.44%
Idaho	100.00%	100.00%	100.00%		84.62%	95.12%
Montana	100.00%	100.00%	83.33%	75.00%	76.92%	83.37%
Nevada	100.00%	100.00%	80.00%			85.71%
New Mexico	100.00%		75.00%	72.73%	83.33%	82.86%
Oregon	85.71%	100.00%	88.89%	85.71%	0.00%	70.73%
Utah	100.00%	90.91%	100.00%	100.00%	92.31%	96.34%
Washington	85.71%	93.33%		0.00%	66.67%	61.54%
Wyoming	100.00%				100.00%	100.00%

- You can also make a computed column. In the PivotTable Analyze ribbon choose Fields, Items, & Sets. Choose Calculated Field. Name the column and define the calculation. The new column will be added to the pivot table. Note that divide by zero errors can occur. To fix see Pivot Table Options and check the “for error values show” box.





10. You may find it easier to use the pivot table just to do a summary (e.g., by region) then create your own calculations. To do this copy the pivot table. In a new sheet and *paste as values*. Now the data is just numbers you can treat as data.
11. If you make multiple pivot tables in one workbook they should be on separate sheets. Rename the sheet with a descriptive name to identify your work more easily.
12. Once you have your table the way you want it to select the cells and Copy. Paste into a document where it can be further formatted (e.g., APA style table).

Google Sheets

While Google Sheets do not have the rich features of Excel, they do provide the ability to have users simultaneously edit the document. This can be a benefit for collaboration.

1. Download the CSV file. The download can be to the local computer or to a Google Drive folder.
2. Open a Google Sheet.
3. Choose File | Import and select the CSV file (or drag).
4. The file will be imported into a tab with the filename. You can rename the tab if desired (right click on the tab).

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	A	B	C	D	E	F	G	H
1	State	Year	AAAE Region	NAAE Region	FFA Region	Institutions	Program_Compl	White
2	Alabama	2018	Southern	V	Southern	1	23	
3	Alabama	2019	Southern	V	Southern	1	13	
4	Alabama	2020	Southern	V	Southern	1	18	
5	Alabama	2021	Southern	V	Southern	1	14	
6	Alabama	2022	Southern	V	Southern	1	12	
7	Arizona	2018	Western	I	Western	1	8	
8	Arizona	2019	Western	I	Western	1	4	
9	Arizona	2020	Western	I	Western	1	5	
10	Arizona	2021	Western	I	Western	1	5	
11	Arizona	2022	Western	I	Western	1	4	
12	Arkansas	2018	Southern	II	Southern	3	26	
13	Arkansas	2019	Southern	II	Southern	4	22	
14	Arkansas	2020	Southern	II	Southern	4	29	
15	Arkansas	2021	Southern	II	Southern	3	19	

Pivot Table

1. Select the upper left cell in the data tab.
2. Choose Insert | Pivot Table. Choose new sheet. The pivot table will be created on a new tab. Rename as desired.
3. Drag the fields to the rows, columns, and values.
4. See additional discussion under Excel – Pivot Table above.

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The screenshot shows a Google Sheets spreadsheet with a pivot table. The pivot table is titled "SUM of Program Year" and has the following data:

AAAE Region	2018	2019	2020
North Central	279	312	296
Southern	448	443	454
Western	146	149	147
Grand Total	873	904	897

The Pivot table editor is open on the right, showing the following settings:

- Source: NSD Program Comple
- Rows: AAAE Region (Sorted by: Ascending)
- Columns: Year
- Show totals:

The Pivot table editor also shows a list of suggested fields on the right, including State, Year, AAAE Region, NAAE Region, FFA Region, Institutions, Program_Completers, White, Non-White, and Hispanic.

Access

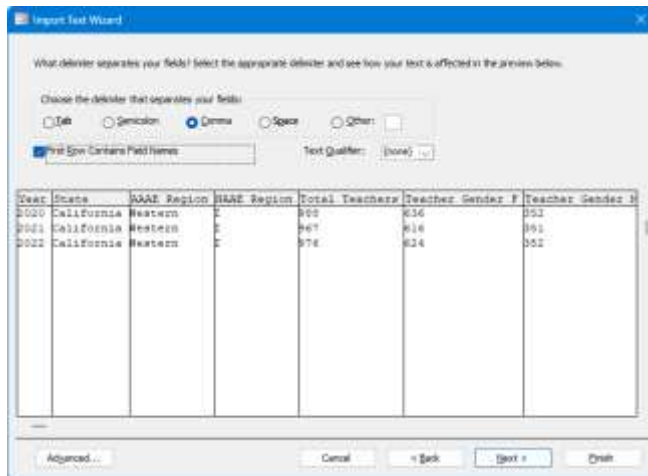
A database like Access may be useful if you wish to join data with other data sources. To import the NSD data into Access use the steps below. Data will be imported into a table.

1. Select External Data. In the ribbon select New Data Source, then from file, then text.
2. In the dialog box choose a folder and the CSV file to import.



3. Choose to import into a new table.
4. Choose Delimited, then choose comma and check the box that first row contains Field Names.

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5. Complete the dialog and give the new table a name.
6. Data can now be accessed using SQL queries.