TEXAS STATE UNIVERSITY

Budget Office
Finance and Support Services Division

# Analyzing Financial and Budget Data with Excel Pivot Tables

**Purpose**

To learn how to manipulate both financial data and budget data exported from SAP in Excel Pivot Tables for financial analysis.

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## GENERAL COMMENTS/SUGGESTIONS:

Creating pivot tables in Excel is a fairly easy task. Data extraction and data organization is the more complex part of having a successful data set ready for use in a pivot table. Depending on the analysis required the data set might consist of one data download from SAP or it might be combined from several downloads, possibly even from different transactions.

Throughout this document we will walk the user through the various tasks that may need to be performed to create a successful data set and we will suggest what we feel are best practices for setting up successful data sets.

## DATA PULLS:

- For expense data we recommend pulling data from SAP transaction ZFMRP_RFFMEP1AX – All Postings. Detailed instructions on this transaction can be found here:
  - https://gato-docs.its.txstate.edu/jcr:9a70df76-2cd7-430c-8224-76ae95d3f4ad/All%20Postings%20Report.pdf
- For Budget data we recommend using FMEDDW. Detailed instructions can be found here:
  - https://gato-docs.its.txstate.edu/jcr:b257c281-0a93-4e1d-8970-e6ac143801e9/FMEDDW-Budget%20Entry%20Documents%20Report.pdf
- Both transactions give the end user the ability to pull data across fiscal years which allows for quicker and more consistent downloads and organization of data.

## ORGANIZING DATA IN PREPARATION FOR USE IN A PIVOT TABLE:

Using pivot table requires that your data be organized into columns with headers.

After downloading data from SAP into Excel worksheets it may be necessary to complete several tasks in order to prepare your data set for use in a pivot table:

- Examples include: Combine worksheets into one workbook, rename worksheet tabs to identify data within the worksheet, combining data from multiple worksheets into one large combined data set, adding columns to further sort or label data, and create lookup tables to assign high-level values or categories to detail data.

- **Excel Tasks** discussed in class and in this document include the following:

  Copy data (Control C)
  Copy worksheet
  Copy worksheet into another workbook
  Format columns of numbers (Text to Columns)
  Format numerical columns as currency or accounting
  Hide columns
  Insert a worksheet
  Insert column
  Insert formula
  Moving worksheets with drag and drop
  Moving worksheets with move function

Paste data (Control V)
Paste special values
Remove duplicates
Renaming worksheet tabs
Selecting large data (Control, Shift, End)
Turn on filters on large groups of data

- **Functions** discussed in class and in this document include the following:
  VLOOKUP
  Left
  Concatenate
  Insert pivot
  Right

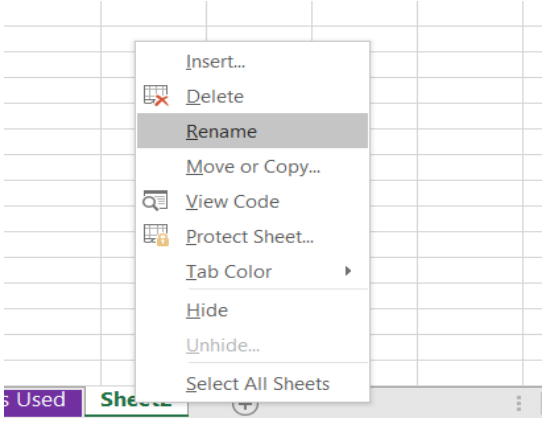
- **Pivot Table Skills** discussed in class and in this document include the following:
  Copy pivot
  Change pivot data source
  Change view of field selection box
  Design: Discuss grand totals and subtotals
  Design: Repeat all item labels
  Drill down to detail within a pivot
  Fix number formatting in field selections
  Insert a pivot in an existing worksheet
  Move items up or down in a pivot
  Refresh pivot data
  Selecting data for pivot
  Turn filters on and off

## WORKING WITH WORKSHEETS

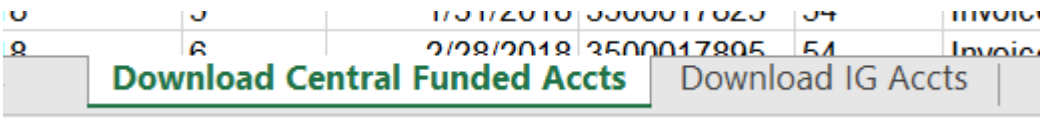
## Renaming a worksheet tab:

When the data is loaded into Excel the worksheet tab names will be generic. Sheet 1, Sheet 2 etc. Renaming a worksheet allows for better identification of what is in the worksheet.

To do this put your mouse pointer in the worksheet tab and right click:



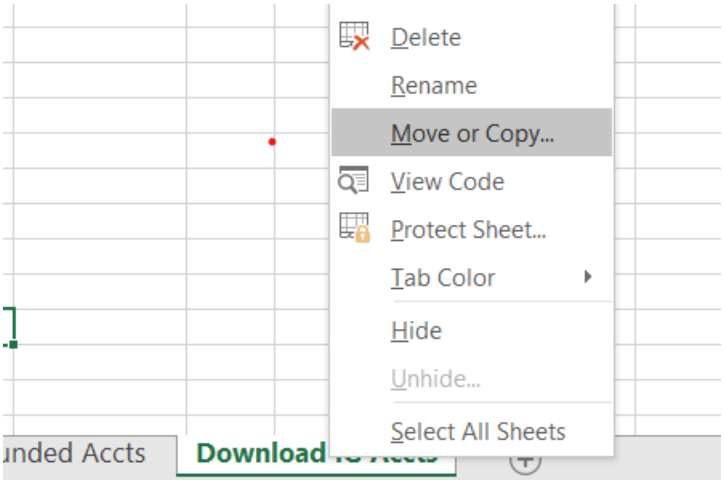
Choose Rename. This will make it so you can type a new name in the space, then hit enter. Notice the name of the worksheet is no longer “Sheet 1”.




*Hint: it’s a good idea to rename your original downloads with some sort of naming convention that tells you that was the download. Then copy the download in a new tab and use the new tab to organize your data for a pivot table. This preserves your downloads in case something goes wrong in your pivot data tab.*

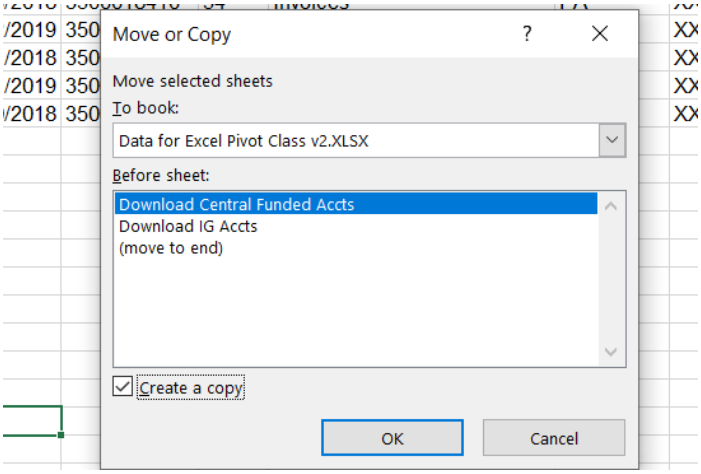
## Copy (or Move) a worksheet(s) in the same workbook:

To copy your worksheet simply right click on the worksheet tab name and choose move or copy:

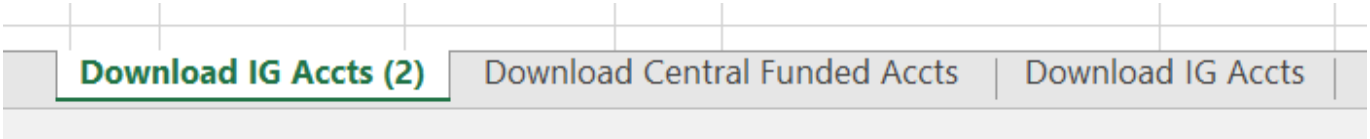



Click the Create a copy box as shown below and click ok.

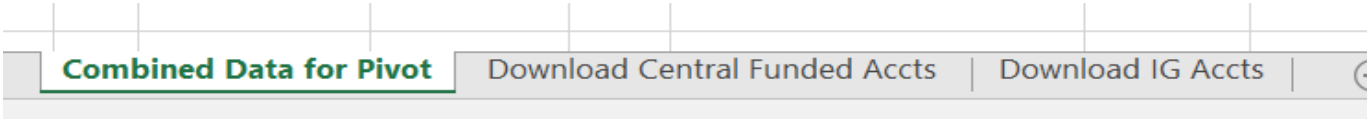
You can also choose where to place it by highlighting another tab in the dialog box and your new tab will go before the one you have selected, or you can move it the end by choosing (Move to end).



You now have a new tab which needs to be renamed into something meaningful for the task being performed.




In our example, we renamed it to Combined Data for Pivot:

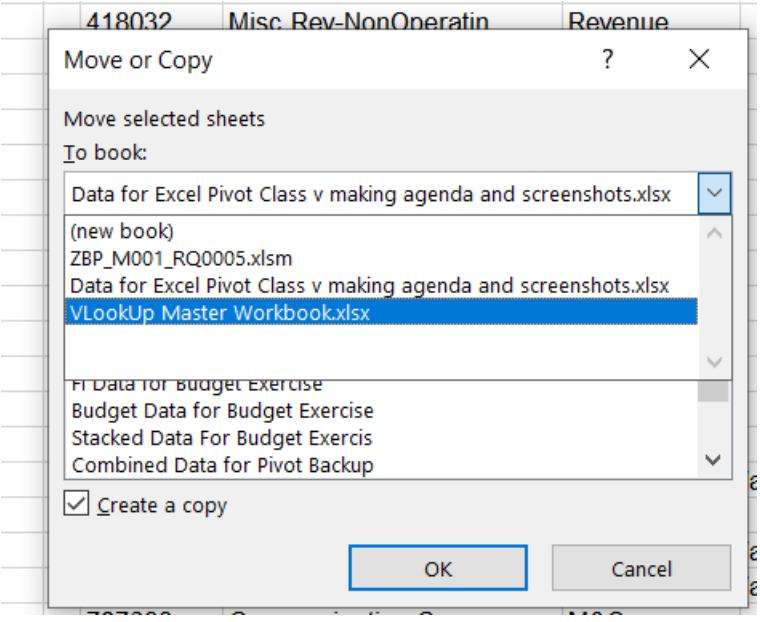



Note: you can also drag and drop worksheets to reorder them in your workbook if all you are trying to do is rearrange them. To do this, with your mouse, click on the tab name you want to rearrange. While holding your mouse down, drag the tab to the desired location.

## Copy a worksheet into a different workbook:

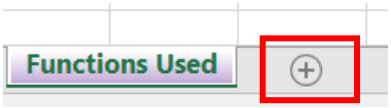
Repeat the same steps as above:

- Right click in tab
- Choose Move or Copy
- Click Create a copy
- Before you hit ok choose a different workbook name from the drop-down list on the "To Book:" drop down list. The other workbook must be open in the same window for this to work.
- Click OK



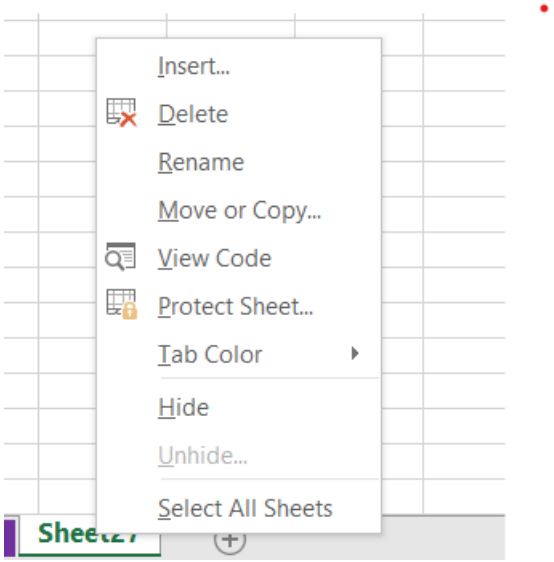
## Inserting Worksheets:

**Click the + icon at the end of your existing worksheets:**

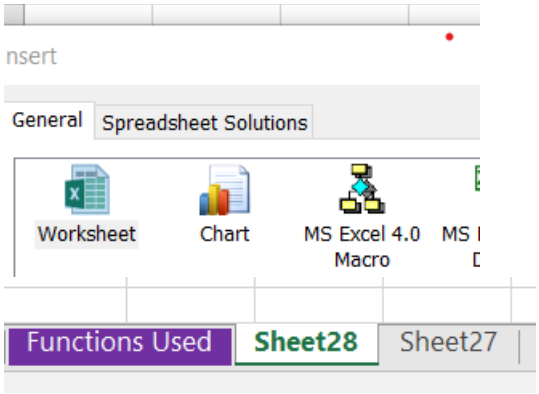



**This inserts a new worksheet:**


**Or right click your mouse on one of your current tabs to get the selection box and click Insert:**




**Then choose worksheet and click OK**




## To combine data from two worksheet tabs into one tab for use in a pivot:

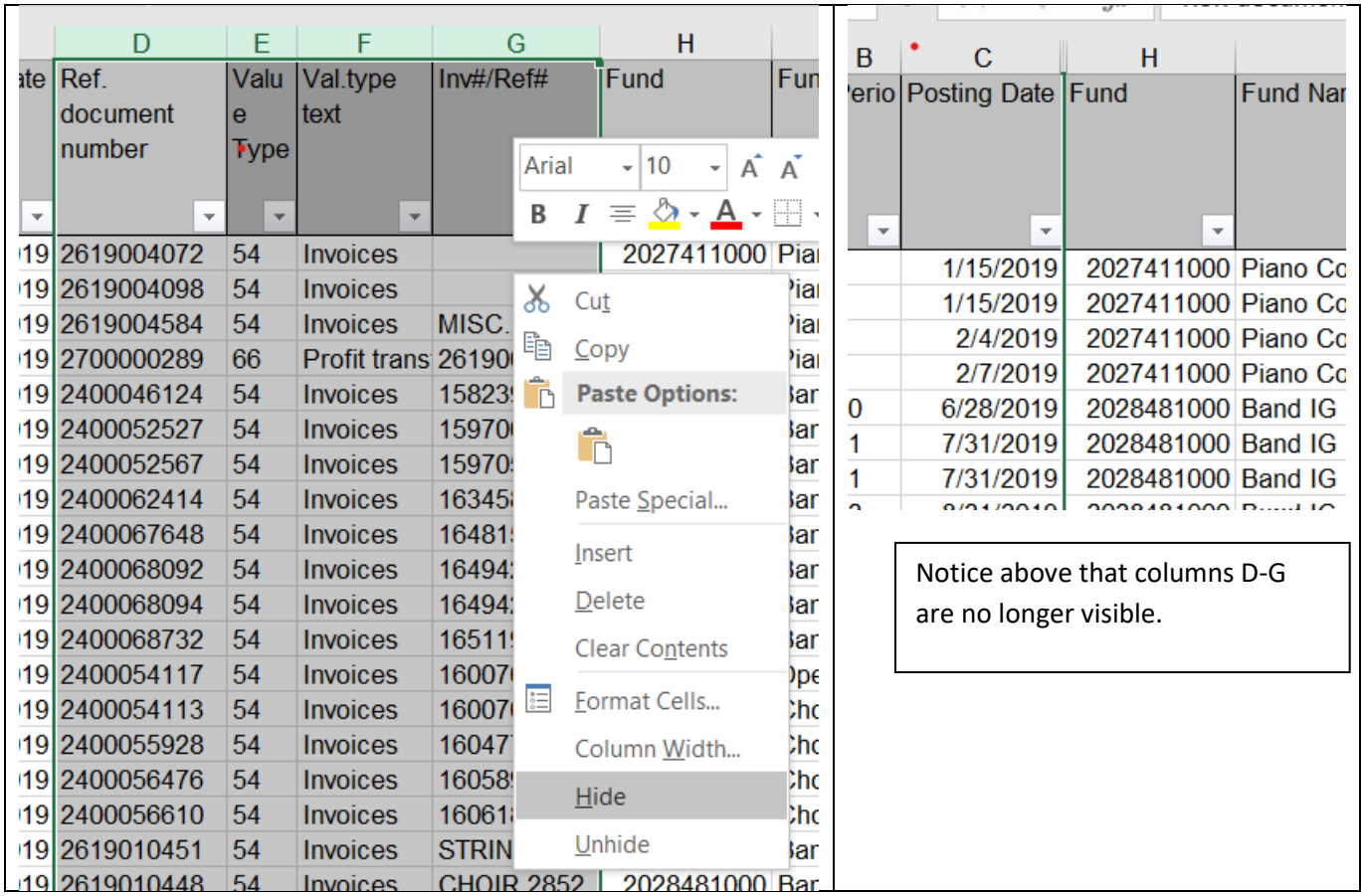
- Make sure all your columns are in the same order in both tabs.
- Create a copy of the tab with the most data and rename it. Example: Combined Data for Pivot.
- In the second tab of data select all the data by placing your cursor in the 1st cell with data (usually A2 and not a header) and hitting (Control+Shift+End) on your keyboard at the same time. This will "grab" all the data in your download. Hit (Control + C-at the same time) on your keyboard to copy the data.
- Then go to the combined data tab and place your cursor in column A under the last row of the data that is already in the tab and do a (Control + V-Paste Data). This copies all the data into the combined tab.

## Hiding Columns:

If your data set is large with a lot of columns it can be helpful to hide some of the columns while you are working on other functions within your data set. This way can you leave only the columns you will need to see so you can do less scrolling back and forth. Reminder: unhide these columns when you have finished manipulating your data set.

To Hide a Column(s):

- Simply use the mouse to place the cursor at the top of the column on the column letter to highlight the entire column. You can drag to select multiple columns or click and hold Control to select specific columns. and then Right Click with your mouse.
- Choose Hide.
- In this example Columns D-G will be hidden because I have them all selected.



## Adding Columns:

When organizing data for use in pivots it may be necessary to add some new columns to your data set to identify data in a different or preferred way and to prepare data for subtotaling in the pivot. Examples include:

- Creating a "short fund" (the term "short fund" denotes the first 6 or 8 digits of a fund number) so the fund will subtotal better in your pivot.
- Grouping data by a higher-level category than what the GL detail from SAP presents.
- Labeling data as an expense or revenue at a high-level based on GL.

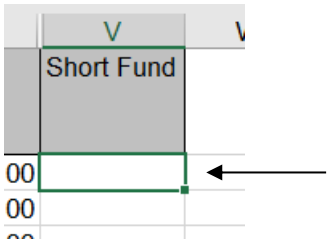
These are just 3 examples but there are many variations to this idea.

Best Practice when setting up data for use in pivot tables is to add any new columns at the end of your data set. This way if you want to add additional data (example future years) to your data set your existing columns will still be in alignment with how the data comes out of the SAP.

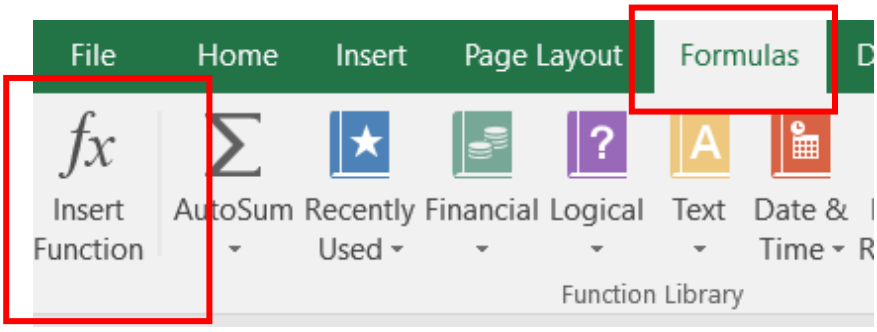
## Short Fund Column using the LEFT Function:

Since data will have funds with the fiscal year designation and you will want to consolidate your funds in your pivot you want to create a column with short funds (6 digits or 8 if you want the banks for state reporting). To do this you simply add a column with the header Short Fund at the end of your data set then do the following:

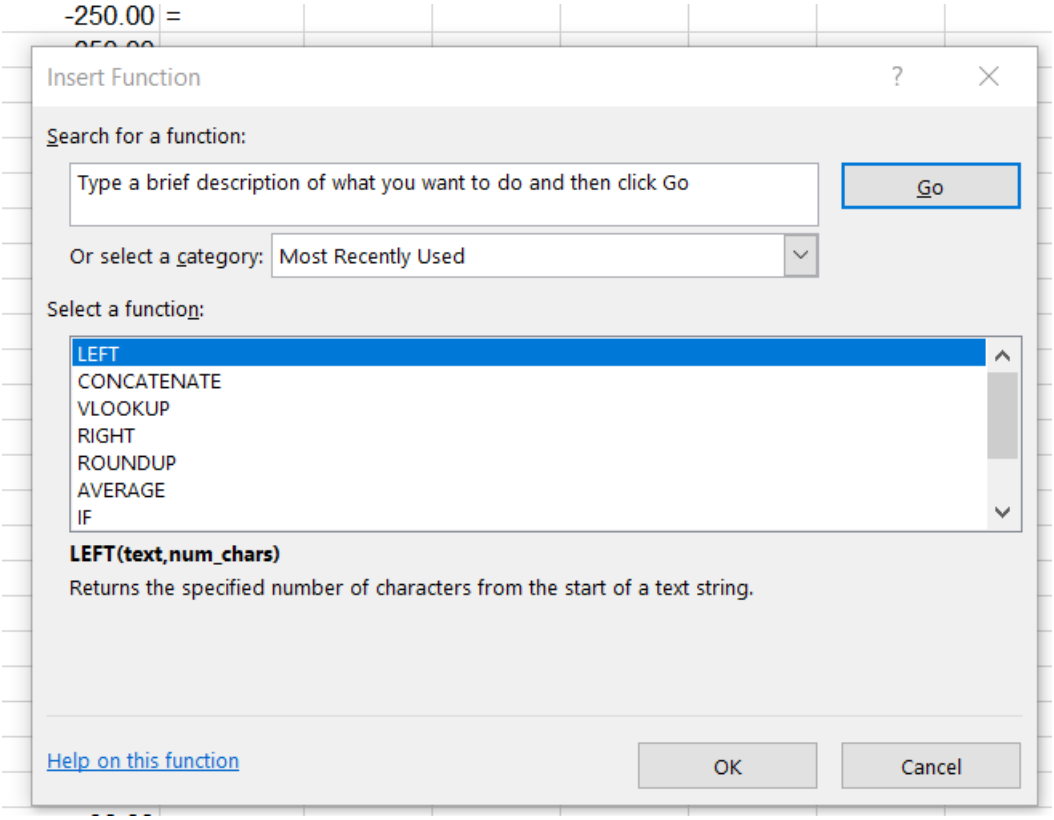
Make sure your data is not filtered on anything.
Insert your pointer in the top cell of the new column under your header.




Then open the Formulas tab in the Excel ribbon and click Insert Function.




This will open a dialog box and you want to search for and choose LEFT, click Go, then click OK.

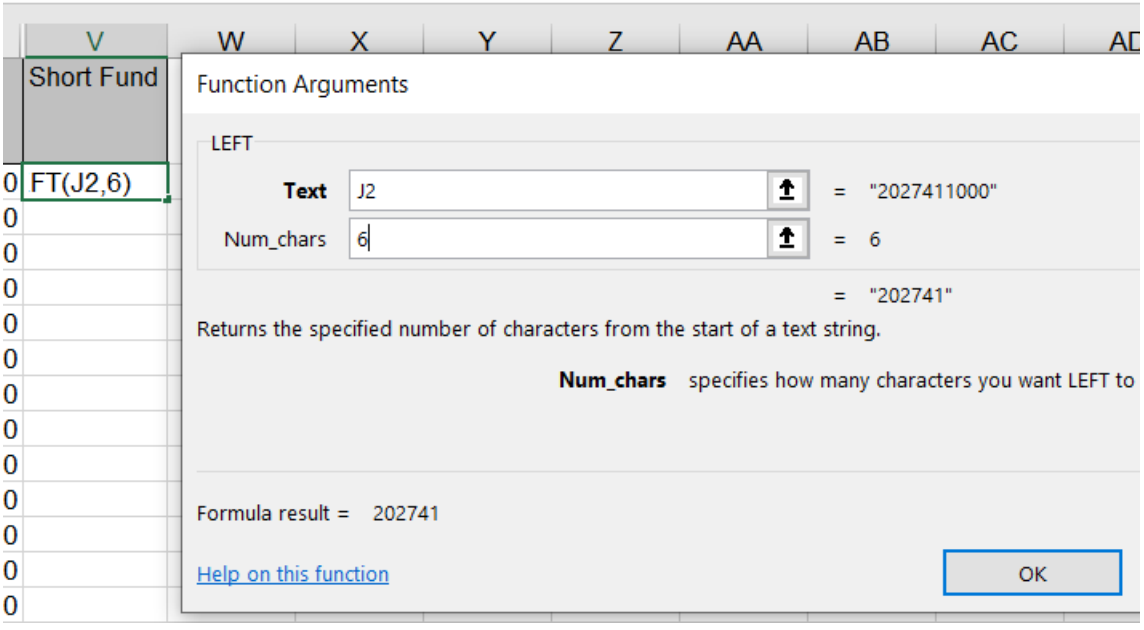



A new dialog box will appear giving you the function arguments.

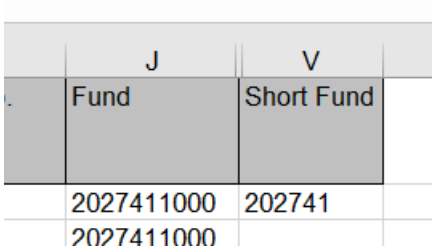
Click in the empty box for Text, then click in the cell in your fund column in the same row. This points the function to the fund you want to shorten.

In the Num_Chars box you want to put 6 for a 6-digit fund or 8 if you want 8 digits.

Click Ok.

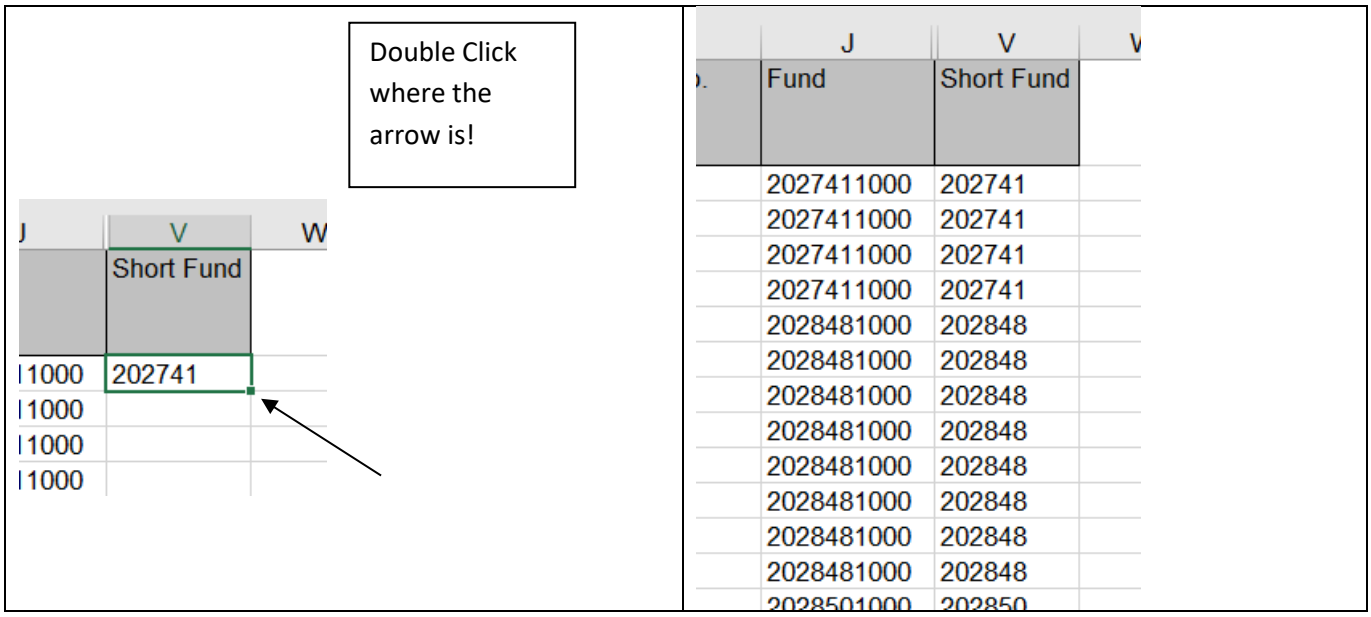


You should now have a value in the short fund column that is a shorter version of the fund in your fund column.



| | J | V |
|---|---|---|
| | Fund | Short Fund |
| | 2027411000 | 202741 |
| | 2027411000 | |

Now click in the cell where you just created the short fund formula. Highlight the cell and double click in the bottom right hand corner. This will run your formula all the way down the column for you so it populates the entire column with the short funds.



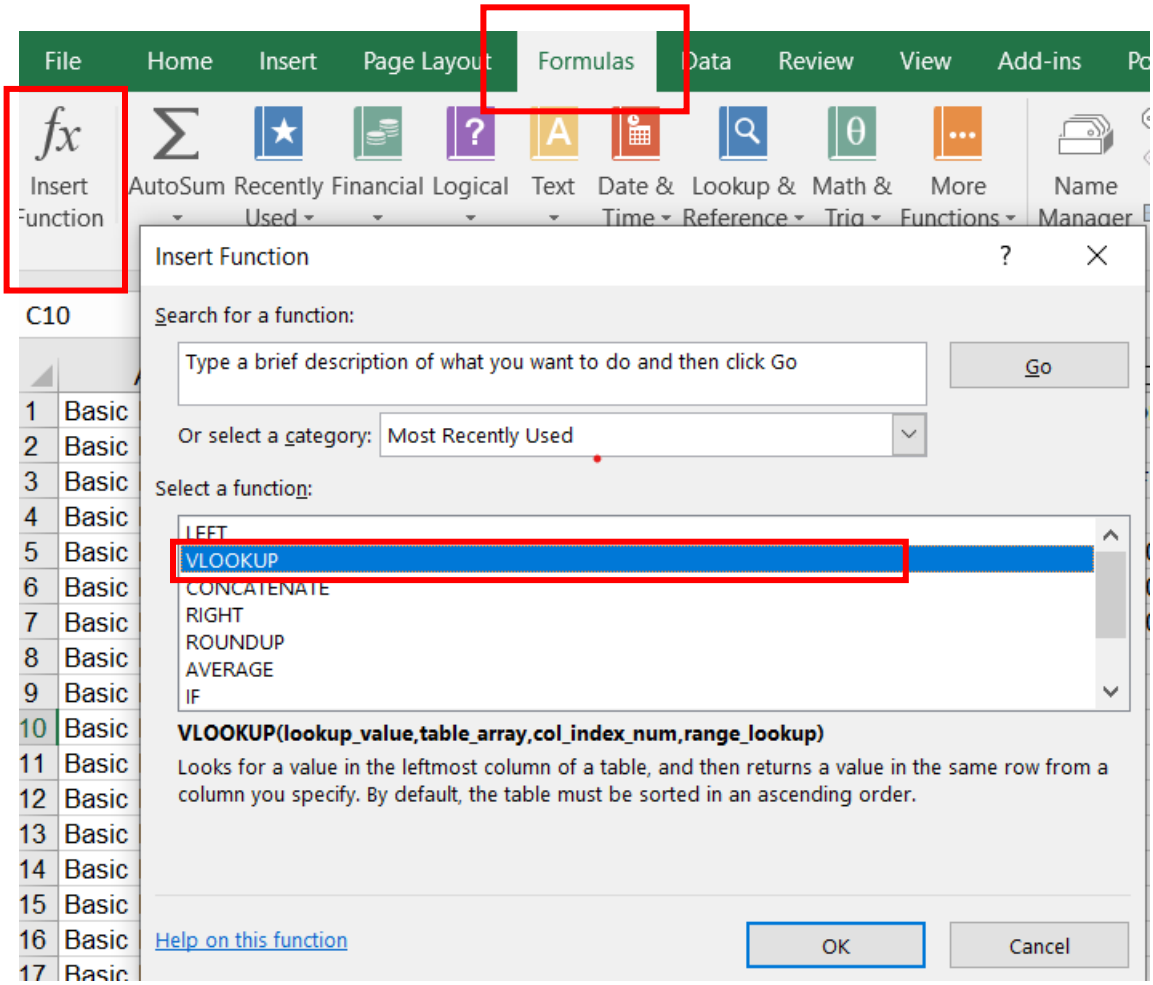

## Performing the VLOOKUP Function:

It is often advantageous to assign values to your data based on other values in the data set.
This can be accomplished by creating a VLOOKUP Master Table in your data set and then performing the VLOOKUP Function. In this example, we are showing you how to assign the word Revenue or Expense to each data line item based on a lookup function on the Commitment Item in your data set.

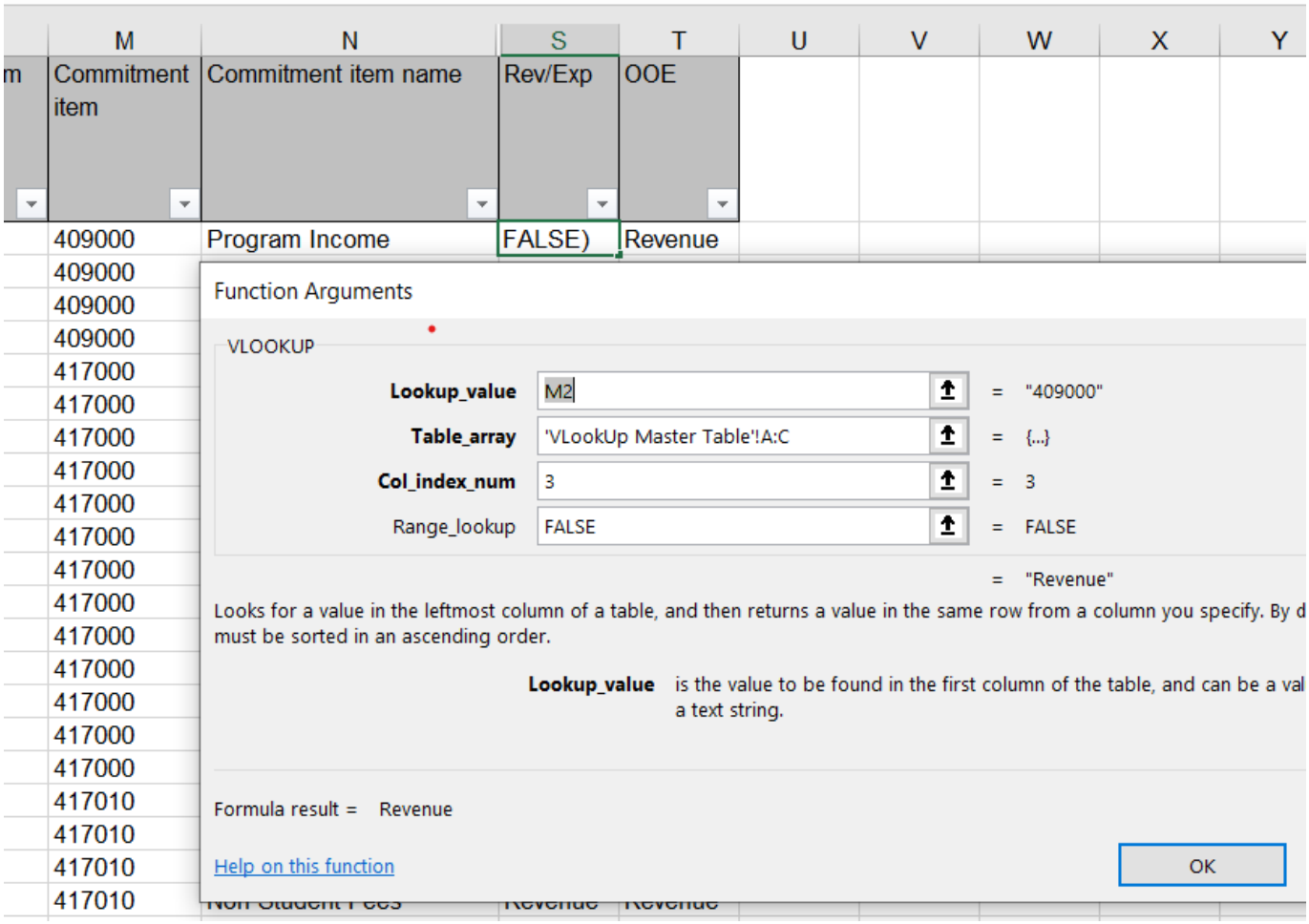
In your data set create a new column called Revenue or Expense.
Make sure your data is not filtered or sorted on anything.
Insert your pointer in the top cell of the new column under your header.

| | P | Q | Y |
|---|---|---|---|
| | Commitment item | Commitment item name | Revenue Expense |
| | 409000 | Program Income | |
| | 409000 | Program Income | |
| | 409000 | Program Income | |

Go to the Formulas Tab and Insert Function. Look for VLOOKUP, click GO, then OK.



A dialog box will appear.  Fill in the appropriate values.

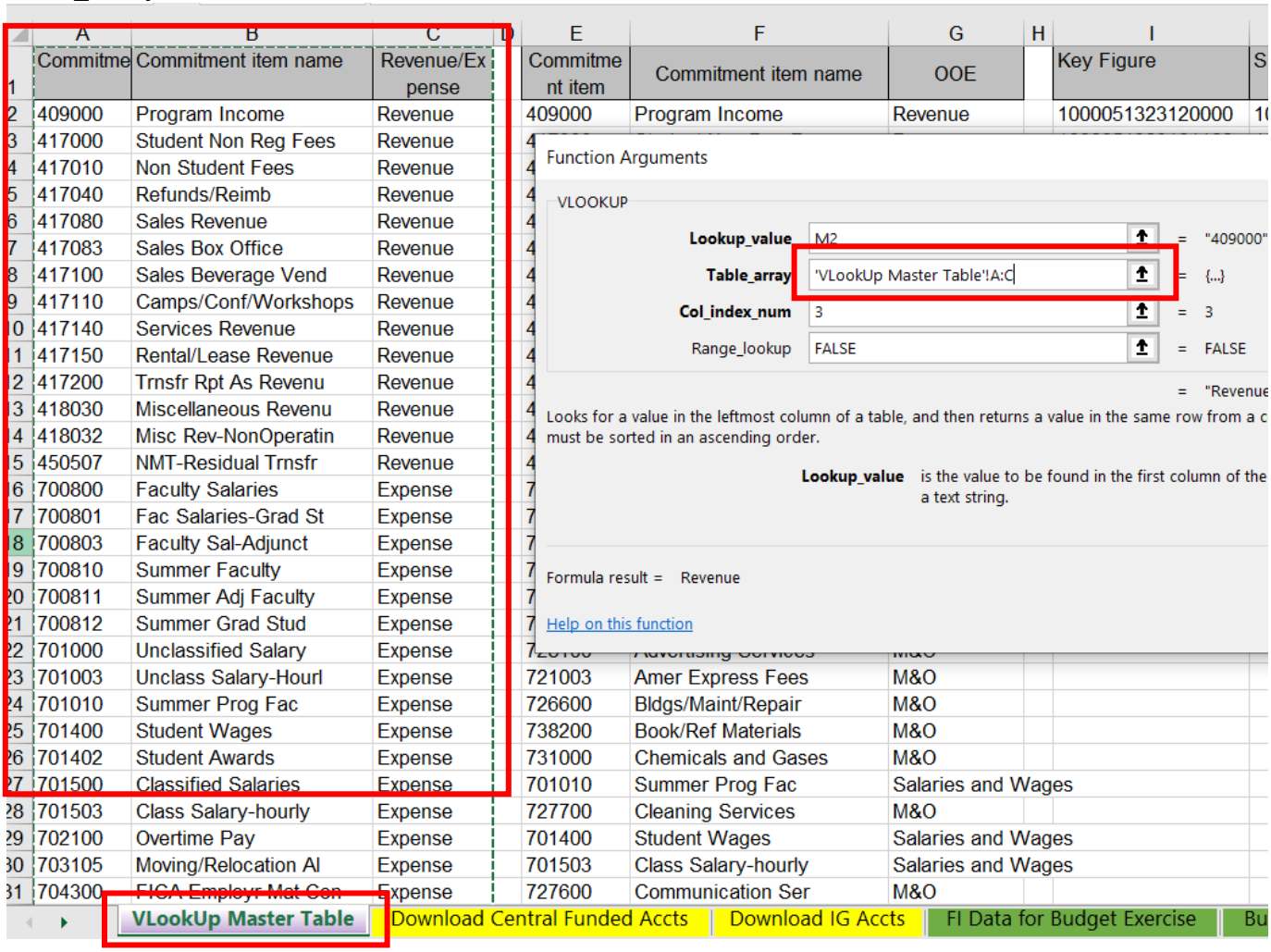



In this example, you are inserting the function in cell S2.

The **lookup value** in this example is the commitment item value in the same row as the revenue expense column cell you are in.  In our example, the lookup value was in cell M2.  You can either go click in that cell or type in the value M2.

You must click in the Table_array cell in the function arguments box, then go to your lookup tab by clicking in the worksheet tab and selecting the appropriate columns.
The **table array** is the data set in your lookup table.

**Table_Array Selection:**




| | A | B | C | E | F | G | I |
|---|---|---|---|---|---|---|---|
| 1 | Commitme | Commitment item name | Revenue/Expense | Commitment item | Commitment item name | OOE | Key Figure |
| 2 | 409000 | Program Income | Revenue | 409000 | Program Income | Revenue | 1000051323120000 |
| 3 | 417000 | Student Non Reg Fees | Revenue | | | | |
| 4 | 417010 | Non Student Fees | Revenue | | | | |
| 5 | 417040 | Refunds/Reimb | Revenue | | | | |
| 6 | 417080 | Sales Revenue | Revenue | | | | |
| 7 | 417083 | Sales Box Office | Revenue | | | | |
| 8 | 417100 | Sales Beverage Vend | Revenue | | | | |
| 9 | 417110 | Camps/Conf/Workshops | Revenue | | | | |
| 10 | 417140 | Services Revenue | Revenue | | | | |
| 11 | 417150 | Rental/Lease Revenue | Revenue | | | | |
| 12 | 417200 | Trnsfr Rpt As Revenu | Revenue | | | | |
| 13 | 418030 | Miscellaneous Revenu | Revenue | | | | |
| 14 | 418032 | Misc Rev-NonOperatin | Revenue | | | | |
| 15 | 450507 | NMT-Residual Trnsfr | Revenue | | | | |
| 16 | 700800 | Faculty Salaries | Expense | | | | |
| 17 | 700801 | Fac Salaries-Grad St | Expense | | | | |
| 18 | 700803 | Faculty Sal-Adjunct | Expense | | | | |
| 19 | 700810 | Summer Faculty | Expense | | | | |
| 20 | 700811 | Summer Adj Faculty | Expense | | | | |
| 21 | 700812 | Summer Grad Stud | Expense | | | | |
| 22 | 701000 | Unclassified Salary | Expense | | | | |
| 23 | 701003 | Unclass Salary-Hourl | Expense | 721003 | Amer Express Fees | M&O | |
| 24 | 701010 | Summer Prog Fac | Expense | 726600 | Bldgs/Maint/Repair | M&O | |
| 25 | 701400 | Student Wages | Expense | 738200 | Book/Ref Materials | M&O | |
| 26 | 701402 | Student Awards | Expense | 731000 | Chemicals and Gases | M&O | |
| 27 | 701500 | Classified Salaries | Expense | 701010 | Summer Prog Fac | Salaries and Wages | |
| 28 | 701503 | Class Salary-hourly | Expense | 727700 | Cleaning Services | M&O | |
| 29 | 702100 | Overtime Pay | Expense | 701400 | Student Wages | Salaries and Wages | |
| 30 | 703105 | Moving/Relocation Al | Expense | 701503 | Class Salary-hourly | Salaries and Wages | |
| 31 | 704300 | FICA Employr Mat Con | Expense | 727600 | Communication Ser | M&O | |

The **Col_index_num** is pointing to the column of data you want it to populate in your new column. The function is matching the value in the Lookup_value cell to the value in the Commitment Item column in the lookup table and then returning a value from the 3rd column in the lookup table since that is what you asked it to do. In this case either the word revenue or expense.

**Range_lookup** is always False. If omitted, the formula looks for a close match only. In this case, you want the exact match, so using "False" is always recommended.

**Hit Ok.**

Once you get the 1st value in correctly you can double click on the bottom right hand corner of the cell and it will copy the function all the way down the column.

## Inserting an Object of Expense (OOE) Column:

Another useful way to assign values and sort data is assigning object of expense values.
This will vary by organization but its a way to group like sets of data into one category so you will have less lines of data showing in your pivot.

Example is M&O Expenses. Instead of having individual GL's in your pivot table you can label all your operating expense type GL's as M&O.

To do this you would create another VLOOKUP data set in your VLOOKUP Master Tab and assign the values that make sense for your organization.
Example below:

| | E | F | G |
|---|---|---|---|
| | Commitment item | Commitment item name | OOE |
| | 704300 | FICA Employr Mat Con | Benefits |
| | 708600 | Optional Reti St Mat | Benefits |
| | 708601 | ORP Excess-G-Lc 2.5 | Benefits |
| | 709901 | Benefits Charge | Benefits |
| | 790900 | Teacher Ret Reimb | Benefits |
| | 790902 | TRS - 90 Day Local | Benefits |
| | 728100 | Advertising Services | M&O |
| | 721003 | Amer Express Fees | M&O |
| | 726600 | Bldgs/Maint/Repair | M&O |
| | 738200 | Book/Ref Materials | M&O |
| | 731000 | Chemicals and Gases | M&O |
| | 727700 | Cleaning Services | M&O |

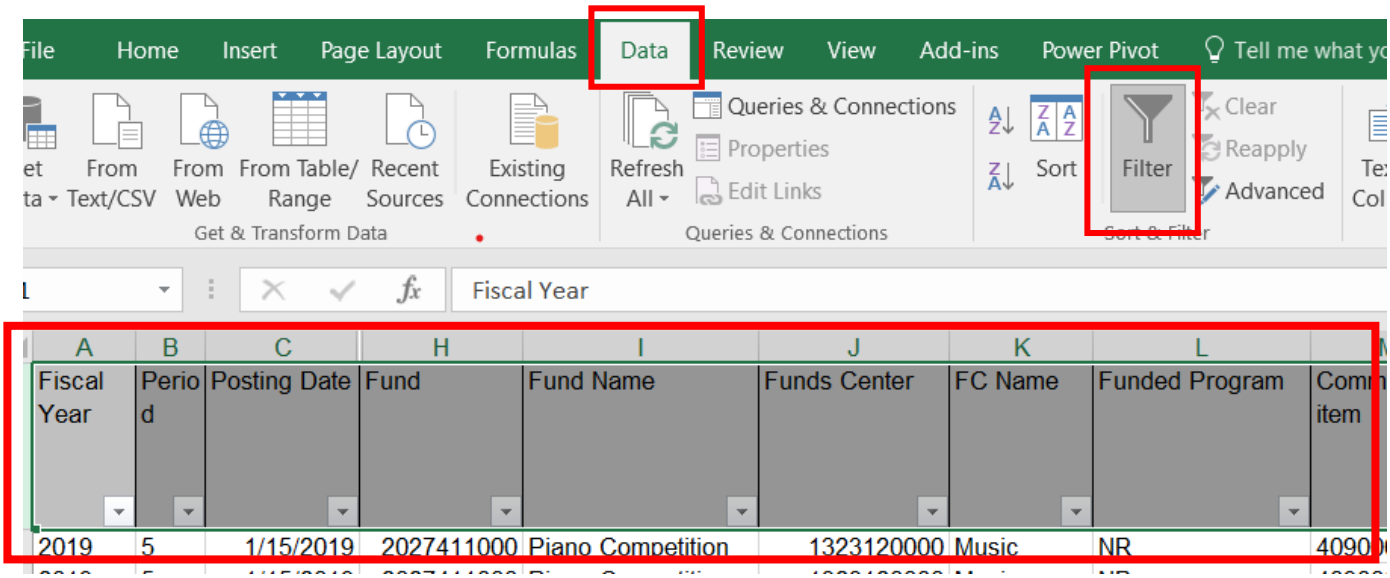
Then you would simply add another column in your data set, perform the VLOOKUP function as outline above and populate your new column with your assigned object of expense values.

You can create lookup tables and assign values to any group of data columns you wish. The examples above are just two useful ways you can organize your data for pivot table analysis.

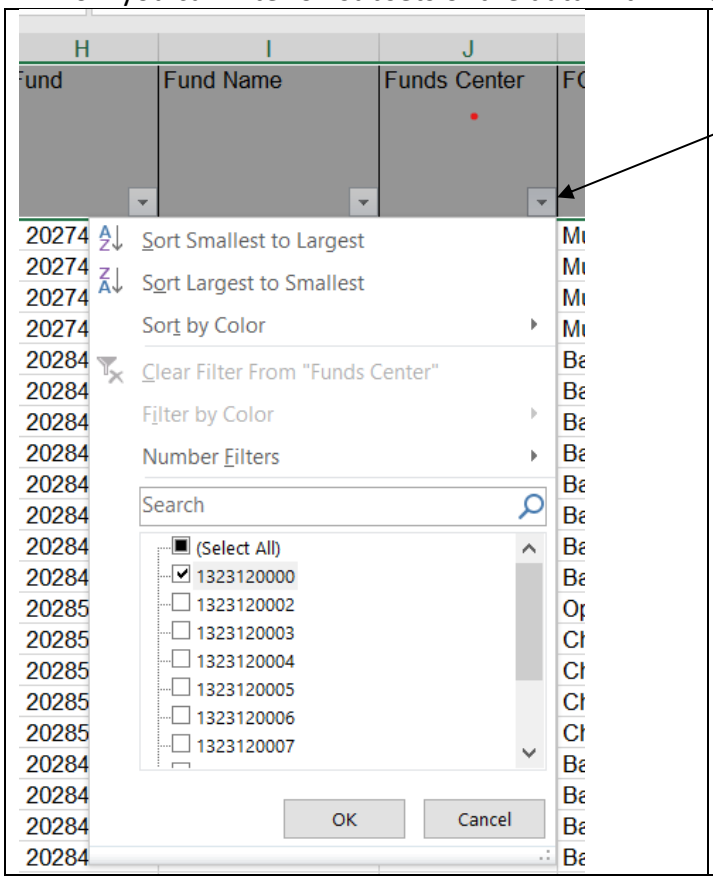
## Turning on Filters in a Worksheet:

Filters allow you to filter on the data set and look at smaller subsets of data within the worksheet.

- To turn on filters you simply highlight the header row in worksheet.
- Go to the DATA ribbon
- Click on the Filter Icon.




- You should now have little arrows in each column of your data set as shown above.
- Now you can filter on subsets of the data within worksheet. Example. Filter on CC 1323120000:



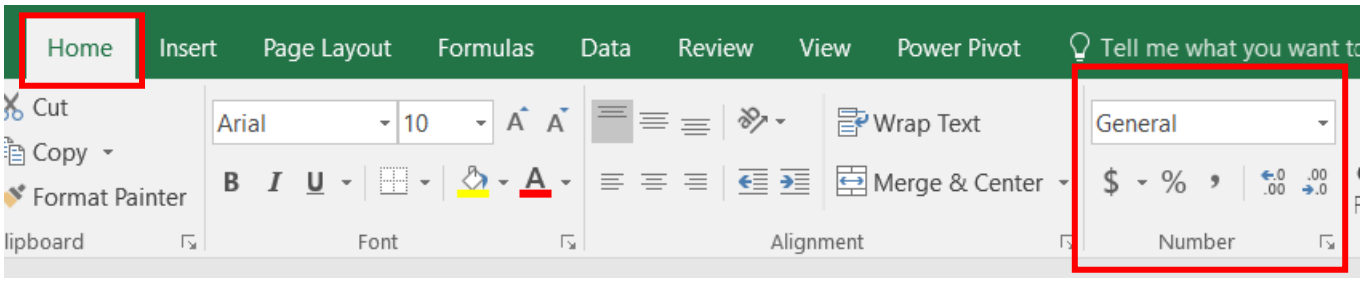

Click here to see drop down

The drop-down box is a list of all the CC's in this column. Chose the Cost Center(s) you want to filter on and click OK.

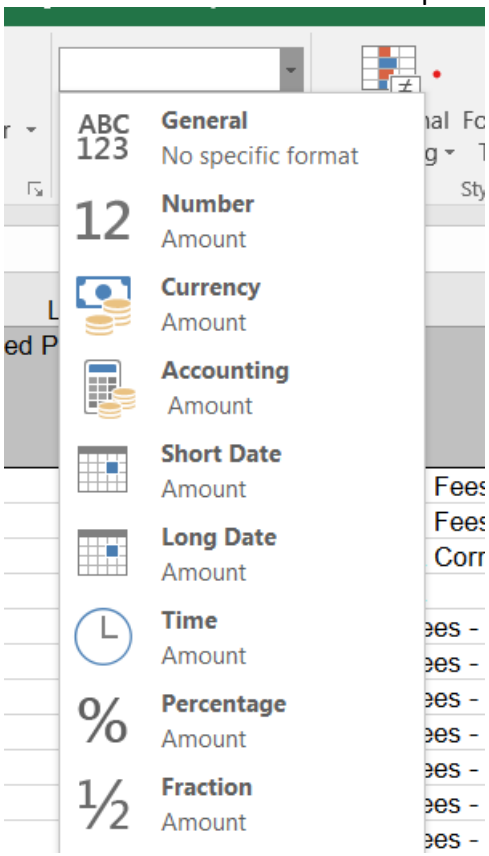
## Formatting Numerical Columns:

Data exported out of SAP is typically in a general format and therefore to make reports more readable it is usually necessary to reformat the numerical columns accordingly.

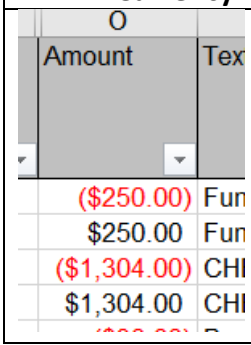
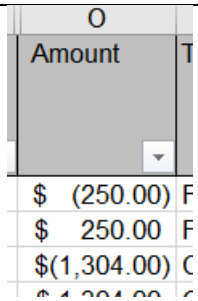
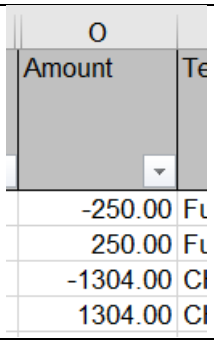
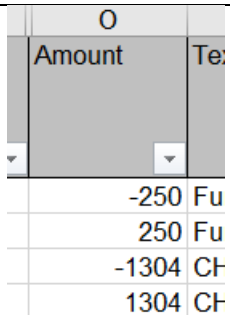
- Highlight the column of numbers you want to format.
- Go to the Home Ribbon and the Number tab.




- On the number tab you can click on the appropriate format:
  - Ex: Clicking the dollar sign will format your column for the accounting number style.
  - Ex: Clicking on the comma will just add a comma to the number etc…..
- You can also click on the dropdown box and it will provide a list of numerical formatting choices.



- Table below shows some common formatting types:

| Currency | Accounting | Number | General |
|---|---|---|---|
|  |  |  |  |









## Creating VLOOKUP Master Tables:

In our examples above on organizing data we introduced the concept of using a VLOOKUP Master Table. It's useful to assign high-level values to some parts of your data set. You accomplish this by assigning values to your data sets in a look up table and then performing the VLOOKUP function in a new column in the data set as outlined in Using VLOOKUP Function in this document.

One way is to download from SAP a set of values and store them all in a Master VLOOKUP table that you can use for multiple projects. Three good applications for this would be:

- Funds using > S_KI4_38000039 - Index of Funds
- Fund Centers using> S_KI4_38000038 - Index of Funds Centers
- Funded Programs using> FM7M - Directory of Funded Programs
- Commitment Items using> S_KI4_38000034 - Commitment Item/GL Account Inquiry

Using the lookup transaction above you can create a separate tab for each (fund, fund center etc.) and have a basic lookup master that will at least give you the spell outs to the individual items.
In addition, you could also assign values in additional columns like Revenue for all GL's that start with 4*, expenses for all GL's that start with 7* etc…..
By creating a master lookup table from SAP downloads, you have a comprehensive list of funds, fund centers, funded programs and commitment items along with any values you assign to them.
You could leave each list in its own worksheet or you could combine all the list into one Master VLOOKUP Table which could then be copied over into other workbooks as you create your financial analysis workbooks for various projects.

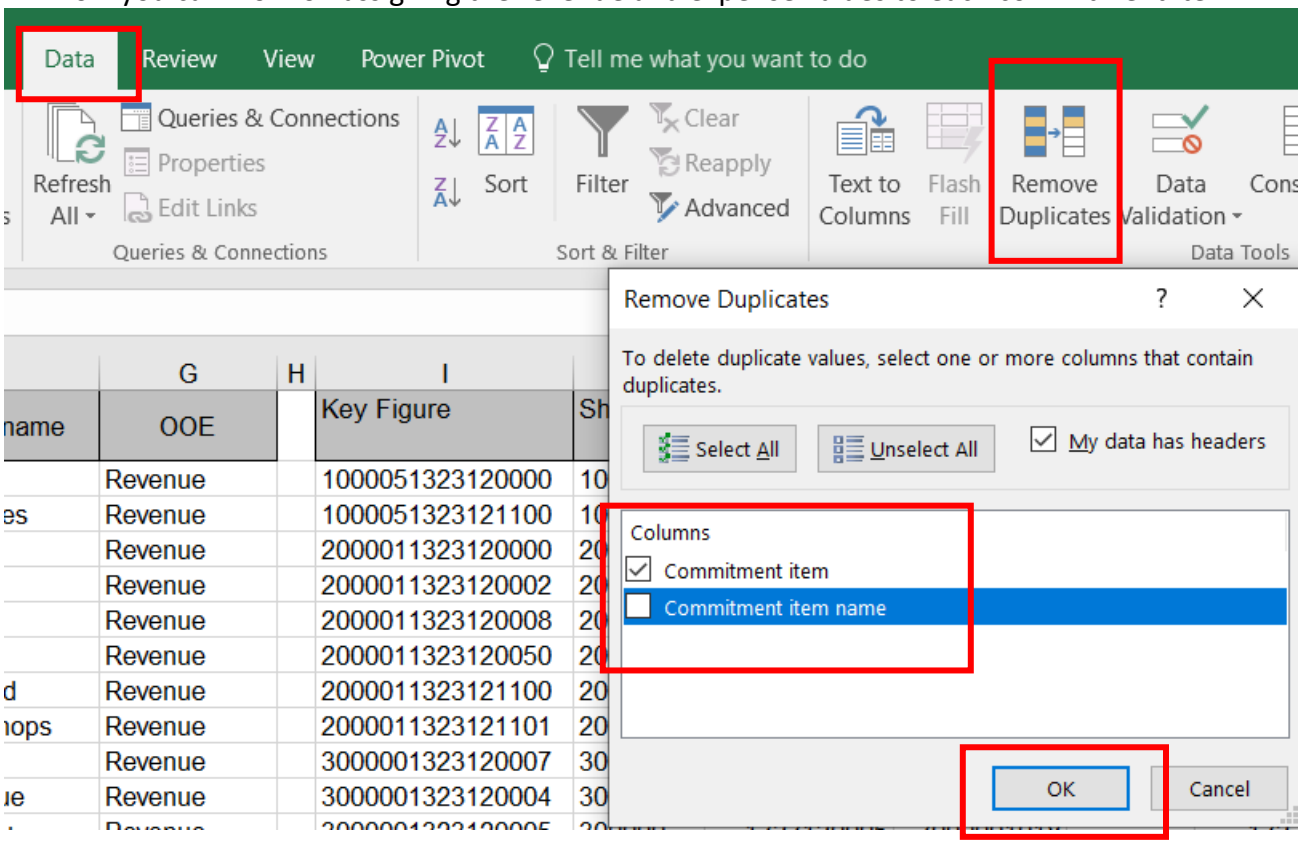
Another approach is to create a VLOOKUP Master Table from the data set in your current workbook. Examples include:

- Creating Revenue/Expense categories
- Objects of Expense (grouping expenses)
- Categorize FI postings (accounting) vs budget postings.
- Creating unique Key Figures as lookup values to bring data together in summary views.

Because you have potentially thousands of rows of data there are a couple of steps to prepare the lookup values.

**Let's assign Revenue and Expense to our Commitment Items:**

- In your master data set highlight the Commitment Item and Commitment Item Name columns
- Hit Copy (Control + C) on your keyboard
- Go to your VLOOKUP Master Table tab
- Insert your cursor in the next available empty column (leave a separator column between data sets if you have more than one lookup table in this tab)
- Paste the data into the VLOOKUP Master Tab (Control + V)
    - You now have thousands of lines of data in the two columns. We only need each value once.
    - It is now necessary to Remove Duplicates
- Remove Duplicates:
    - Highlight the two columns you just inserted into your tab
    - Go to your Data tab and choose Remove Duplicates icon
    - Choose commitment item column as your sort item and click OK
- Excel will then tell you how many duplicates you have and how many remaining values you will have
- Click okay to complete the action
- You now have a reduced list with each value in the list only one time
- Now you can work on assigning the revenue and expense values to each commitment item



**Assign High-Level values to Commitment Items:**

- Create 3rd column and label it Revenue or Expense
- Filter on any value starting with a 4*
  - Assign the word revenue to all these values
- Filter on any values starting with a 7*
  - Assign the word Expense to those values

You have now categorized, by commitment item, whether an item is a revenue or an expense for use in your pivot table for summarizing.

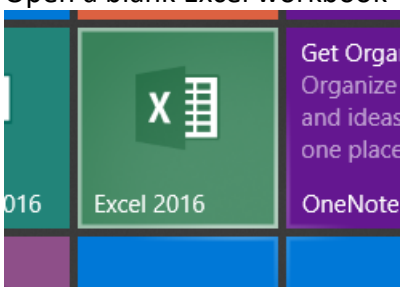
| | A | B | C |
|---|---|---|---|
| 1 | Commitme | Commitment item name | Revenue/Expense |
| 2 | 409000 | Program Income | Revenue |
| 3 | 417000 | Student Non Reg Fees | Revenue |
| 4 | 417010 | Non Student Fees | Revenue |
| 5 | 417040 | Refunds/Reimb | Revenue |
| 6 | 417080 | Sales Revenue | Revenue |
| 7 | 417083 | Sales Box Office | Revenue |
| 8 | 417100 | Sales Beverage Vend | Revenue |
| 9 | 417110 | Camps/Conf/Workshops | Revenue |
| 10 | 417140 | Services Revenue | Revenue |
| 11 | 417150 | Rental/Lease Revenue | Revenue |
| 12 | 417200 | Trnsfr Rpt As Revenu | Revenue |

| | A | B | C |
|---|---|---|---|
| 1 | Commitme | Commitment item name | Revenue/Expense |
| 16 | 700800 | Faculty Salaries | Expense |
| 17 | 700801 | Fac Salaries-Grad St | Expense |
| 18 | 700803 | Faculty Sal-Adjunct | Expense |
| 19 | 700810 | Summer Faculty | Expense |
| 20 | 700811 | Summer Adj Faculty | Expense |
| 21 | 700812 | Summer Grad Stud | Expense |
| 22 | 701000 | Unclassified Salary | Expense |
| 23 | 701003 | Unclass Salary-Hourl | Expense |
| 24 | 701010 | Summer Prog Fac | Expense |
| 25 | 701400 | Student Wages | Expense |

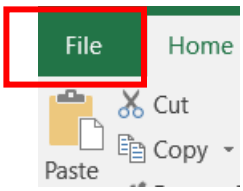
## Creating a Pivot Table:

Once a data set is built for use in a pivot table you are ready to create your pivot table. Excel has built in tutorials available for use. Rather than recreate screen shots we recommend you go to the Excel Tutorials and view those in order to understand how to create pivot tables. Once you have viewed these tutorials, you should be able to use the data set you created to create your pivot table.

To get to the tutorials do the following:
Open a blank Excel workbook




Once inside the workbook go to FILE and then NEW



Once you get to the NEW page type Tutorials in the search box:
For Pivots there are two:

- PivotTable tutorial--Watch this one 1st.
- Get more out of PivotTable--Watch this one 2nd.

Hint: Recommend closing Excel and reopening before opening the 2nd tutorial.