

Budget Office Finance and Support Services Division

# Analyzing Financial and Budget Data with Excel Pivot Tables

<u>Purpose</u>

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

# **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:
  - <u>https://gato-docs.its.txstate.edu/jcr:9a70df76-2cd7-430c-8224-</u> 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:

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	Q	<u>V</u> iew Code			
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lisod	She	Select All Sheets	5		
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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".

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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.



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:	Or right click your mouse on one of your current tabs to get the selection box and click Insert:
Functions Used (+)	Insert
	Delete
	Rename
	Move or Copy
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	Unhide
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Functions Used Sheet27	nsert
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	Worksheet Chart MS Excel 4.0 MS I
	Macio
	Functions Used Sheet28 Sheet27

# 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 1<sup>st</sup> 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.

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19	2619004584	54	Invoices	MISC.	E.	-	)	ia		2/4/2019	2027411000	Piano Co
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# **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.
- Scouping 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.

-250.00 =					
Insert Function				?	$\times$
Search for a function:					
Type a brief description of	what you want to	o do and then d	lick Go	G	o
Or select a <u>c</u> ategory: Most	Recently Used		~		
Select a functio <u>n</u> :					
LEFT CONCATENATE VLOOKUP RIGHT ROUNDUP AVERAGE					
LEFT(text,num_chars) Returns the specified numbe	r of characters f	from the start of	a text string.		
Help on this function			ОК	Car	ncel

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.

V		W	Х	Y	Z	AA	AB	AC	AE
Short F	und	Function Arg	guments						
		LEFT							
0 FT(J2,	6)	Text	J2			1	= "20274	11000"	
0		Num chara	. cl			*	- 6		
0		Num_chars	9 <u>9</u>				= 0		
0							= "20274	11"	
0		Returns the s	pecified num	ber of chara	acters from th	e start of a text	string.		
0		] .							
0					Num_chars	specifies now	many chara	cters you wa	nt LEFT to
0									
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0			202741						
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0									

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.

	Double Click where the arrow is!	).	J Fund	V Short Fund	V
			2027411000	202741	
			2027411000	202741	
Short Fund			2027411000	202741	
Short Fund			2027411000	202741	
			2028481000	202848	
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11000			2028481000	202848	
1000			2028481000	202848	
			2028481000	202848	
			2028481000	202848	
			2028501000	202850	

# 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.

	Р	Q	Y	
	Commitment item	Commitment item name	Revenue Expense	
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	409000	Program Income	•	
	409000	Program Income		
	409000	Program Income		

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

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10	Basic		VLOO	KUP(looku	p_value,table_arra	ay,col_index_r	um,range_	lookup)			
11	Basic		Looks	for a value	in the leftmost col	umn of a table	, and then	returns a value	in the san	ne row from	а
12	Basic		colum	n you speci	fy. By default, the t	able must be	sorted in ar	ascending or	der.		
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	М	Ν	S	Т	U	V		W	Х	Y
m	Commitment item	Commitment item name	Rev/Exp	OOE						
	409000	Program Income	FALSE)	Revenue						
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	409000	Function Arguments								
	409000	• VLOOKUP								
	417000		1.40							
	417000	Lookup_val	ue M2			T	=	"409000"		
	417000	Table_arr	ay 'VLookU	p Master Tabl	e'!A:C	Ť	=	{}		
	417000	Col index nu	<b>m</b> 3			1	=	3		
	417000									
	417000	Range_look	up FALSE			Ţ	=	FALSE		
	417000						=	"Revenue	2"	
	417000	Looks for a value in the leftmost	column of a t	able, and then	returns a val	ue in the same	e row	from a c	olumn you sp	ecify. By d
	417000	must be sorted in an ascending	order.							
	417000		Lookup v	alua is the v	alue to be fou	ind in the first	colu	mn of the	table and ca	n he a val
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	417000				-					
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	417010	Help on this function							ОК	
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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:

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1			pense		nt item	Comm	Communent terri name		UUL						
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3	417000	Student Non Reg Fees	Revenue		4										
4	417010	Non Student Fees	Revenue		4 Function A	arguments									
5	417040	Refunds/Reimb	Revenue												
6	417080	Sales Revenue	Revenue		4	1		1.42							
7	417083	Sales Box Office	Revenue		4	LOC	okup_value	MZ				T	7	-4090	000.
8	417100	Sales Beverage Vend	Revenue		4	Т	able_array	'VLookUp	Master Table'!A:C			1	=	{}	
9	417110	Camps/Conf/Workshops	Revenue		4	Col i	ndex num	3				1	-	3	
0	417140	Services Revenue	Revenue		4			-						-	
1	417150	Rental/Lease Revenue	Revenue		4	Rar	nge_lookup	FALSE				Ĩ	=	FALS	Ē
2	417200	Trnsfr Rpt As Revenu	Revenue		4								=	"Reve	enue
3	418030	Miscellaneous Revenu	Revenue		4 Looks for a	value in the	leftmost col	umn of a tak	ole, and then return	IS a	a va	alue in the sam	ie ro	w from	ac
4	418032	Misc Rev-NonOperatin	Revenue		4 must be so	rted in an as	cending ord	er.							
5	450507	NMT-Residual Trnsfr	Revenue		4			lookun val	us is the value to	br	. fo	und in the first	t col	umn of	the
6	700800	Faculty Salaries	Expense		7			LOOKUP_vai	a text string.	De	- 10	unu in the his	l con		uie
7	700801	Fac Salaries-Grad St	Expense		7				j						
8	700803	Faculty Sal-Adjunct	Expense		7										
9	700810	Summer Faculty	Expense		7 Formula res	sult = Reve	nue								
20	700811	Summer Adj Faculty	Expense		7										
21	700812	Summer Grad Stud	Expense		7 Help on this	s function									
22	701000	Unclassified Salary	Expense		720100	Autoritan	ig ournee	.J	Mido						
23	701003	Unclass Salary-Hourl	Expense		721003	Amer Exp	press Fee	5	M&O						
24	701010	Summer Prog Fac	Expense		726600	Bldgs/Ma	int/Repair		M&O						
25	701400	Student Wages	Expense		738200	Book/Ref	f Materials		M&O						
26	701402	Student Awards	Expense		731000	Chemica	Is and Gas	ses	M&O						
27	701500	Classified Salaries	Expense		701010	Summer	Prog Fac		Salaries and V	Va	ige	es			
28	701503	Class Salary-hourly	Expense		727700	Cleaning	Services		M&O						
29	702100	Overtime Pay	Expense		701400	Student V	Nages		Salaries and V	Va	ige	es			
30	703105	Moving/Relocation Al	Expense		701503	Class Sa	lary-hourly	/	Salaries and V	Va	ige	es			
31	704300	FICA Employr Mat Con	Expense		727600	Commun	ication Se	r	M&O						
	•	VLookUp Master Table	Download (	Cer	ntral Fundeo	Accts	Downlo	ad IG Acc	ts 🔰 FI Data 1	fo	r B	Budget Exer	cise	2	Bu

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 3<sup>rd</sup> 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 <u>exact</u> match, so using "False" is always recommended.

#### Hit Ok.

Once you get the 1<sup>st</sup> 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
-	Commitme	Commitment item name	OOE IT
	704300	FICA Employr Mat Con	Bonofite
	104300	TICA Employ Mat Con	Denenits
	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.

File	Ho	me	Insert Pag	e Layout	Form	ulas	Data	Revie	ew Vie	w Ad	ld-ins	Powe	er Pivot	♀ Tell me	e what yo
et ta 🕶 1	From Text/CS	Froi V We G	m From Table/ b Range et & Transform D	/ Recent Sources Data	Existi Connect • Fiscal	ing R tions Year	Refresh All -	🛛 Qua	eries & Co perties t Links & Connecti	nnection	IS AJ	Z A A Z Sort	Filter	Clear Reapply Advance	d Col
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201	19	5	1/15/2019	20274	11000 F	Piano Co	ompetiti	on	1323	120000	Music		NR		4090)

- > 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:

Н	I	J		
und	Fund Name	Funds Center	FC	Click here to see drop down
		•		
	• •	-		
20274 <b>≜</b> ↓	Sort Smallest to Largest		Mu	
20274 <sub>Z</sub>	Sort Largest to Smallest		Mu	
20274	Cont by Color		Mu	
20274	SOLT DA COLOL	P	MU	
20284	<u>Clear Filter From "Funds (</u>	Center"	Be	
20204	Filter by Color	÷	Be	
20284	Number Filters	•	Be	
20284			Be	
20284	Search	Q	Be	
20284	(Select All)	^	Be	The drop-down box is a list of all the CC's
20284	□ 1323120000		Be	in this column Chose the Cost Center(s)
20285	1323120002		Ot	we want to filter on and click OK
20285	1323120004		Ch	you want to filter on and click OK.
20205			Cł	
20285	1323120006		Cł	
20284	1323120007	~	Be	
20284			Be	
20284	OK	Cancel	Be	
20284		.:	Be	

## **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			
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## **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.
  - o It is now necessary to Remove Duplicates
- Remove Duplicates:
  - o Highlight the two columns you just inserted into your tab
  - o Go to your Data tab and choose Remove Duplicates icon
  - o 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

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

- Create 3<sup>rd</sup> 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.

	Α	В	С		Α	В	С
	Commitme	Commitment item name	Revenue/Ex		Commitme	Commitment item name	Revenue/Ex
1	-	<b>▼</b>	pense 🕂	1	-	<b>•</b>	pense 🖵
2	409000	Program Income	Revenue	16	700800	Faculty Salaries	Expense
3	417000	Student Non Reg Fees	Revenue	17	700801	Fac Salaries-Grad St	Expense
4	417010	Non Student Fees	Revenue	18	700803	Faculty Sal-Adjunct	Expense
5	417040	Refunds/Reimb	Revenue	19	700810	Summer Faculty	Expense
6	417080	Sales Revenue	Revenue	20	700811	Summer Adj Faculty	Expense
7	417083	Sales Box Office	Revenue	21	700812	Summer Grad Stud	Expense
8	417100	Sales Beverage Vend	Revenue	22	701000	Unclassified Salary	Expense
Э	417110	Camps/Conf/Workshops	Revenue	23	701003	Unclass Salary-Hourl	Expense
0	417140	Services Revenue	Revenue	24	701010	Summer Prog Fac	Expense
1	417150	Rental/Lease Revenue	Revenue	25	701400	Student Magoc	Evpopeo
2	417200	Trnsfr Rpt As Revenu	Revenue				

#### **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:



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 1<sup>st</sup>.
- ➢ Get more out of PivotTable--Watch this one 2<sup>nd</sup>.

Hint: Recommend closing Excel and reopening before opening the 2<sup>nd</sup> tutorial.

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