

## PivotTables in Excel

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The first section of this guide will give you some background information important to understanding PivotTables and their use.

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### SUMMARIZING DATA

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Up to this point we've worked mainly with formulas and sorting, and the examples have used *summary data*. For example, the file *citybudget.xlsx* contained total budgeted expenditures by department rather than line items. *Crime2013.xlsx* contained the total crimes reported by city rather than a list of each individual crime.

Figure 1 below shows a table of baseball teams and their total salaries. This is summary data. In order to come up with the grand total for each team someone had to know the individual salary information for each player as shown in Figure 2 for the Los Angeles Dodgers.

Figure 1 Summary data

TEAM	TOTAL SALARY	NUMBER OF PLAYERS
Los Angeles Dodgers	\$230,352,402	30
New York Yankees	\$213,472,857	29
Washington Nationals	\$174,510,977	31
Detroit Tigers	\$172,792,250	26
Boston Red Sox	\$168,691,914	29
San Francisco Giants	\$166,495,942	28
Los Angeles Angels	\$146,449,583	29
Texas Rangers	\$144,816,873	33
Philadelphia Phillies	\$133,048,000	30
San Diego Padres	\$126,619,628	29

Figure 2 Individual records

NAME	POS	SALARY	TEAM
Clayton Kershaw	P	\$31,000,000	Los Angeles Dodgers
Zack Greinke	P	\$27,000,000	Los Angeles Dodgers
Adrian Gonzalez	1B	\$21,857,142	Los Angeles Dodgers
Carl Crawford	LF	\$21,357,142	Los Angeles Dodgers
Andre Ethier	CF	\$18,000,000	Los Angeles Dodgers
Brandon McCarthy	P	\$12,500,000	Los Angeles Dodgers

Jimmy Rollins	SS	\$11,000,000	Los Angeles Dodgers
Brett Anderson	P	\$10,000,000	Los Angeles Dodgers
Howie Kendrick	2B	\$9,850,000	Los Angeles Dodgers
Brandon League	P	\$8,500,000	Los Angeles Dodgers
Juan Uribe	3B	\$7,925,000	Los Angeles Dodgers
Kenley Jansen	P	\$7,425,000	Los Angeles Dodgers
Alex Guerrero	2B	\$6,500,000	Los Angeles Dodgers
Yasiel Puig	CF	\$6,214,285	Los Angeles Dodgers
J.P. Howell	P	\$5,500,000	Los Angeles Dodgers
Hyun-Jin Ryu	P	\$4,833,333	Los Angeles Dodgers
A.J. Ellis	C	\$4,250,000	Los Angeles Dodgers
Darwin Barney	2B	\$2,525,000	Los Angeles Dodgers
Brandon Beachy	P	\$2,500,000	Los Angeles Dodgers
Joel Peralta	P	\$2,500,000	Los Angeles Dodgers
Justin Turner	3B	\$2,500,000	Los Angeles Dodgers
Juan Nicasio	P	\$2,300,000	Los Angeles Dodgers
Yasmani Grandal	C	\$693,000	Los Angeles Dodgers
Chris Hatcher	P	\$522,500	Los Angeles Dodgers
Chris Withrow	P	\$522,500	Los Angeles Dodgers
Paco Rodriguez	P	\$522,500	Los Angeles Dodgers
Scott Van Slyke	LF	\$522,500	Los Angeles Dodgers
Pedro Baez	P	\$512,500	Los Angeles Dodgers
Joc Pederson	CF	\$510,000	Los Angeles Dodgers
Yimi Garcia	P	\$510,000	Los Angeles Dodgers

In this lesson we'll work on turning individual records into summary data using PivotTables.

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## GROUPING

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We're journalists, so we're often concerned with answering questions that lend themselves to simple sorting: Who is paying the most? Which county had the most? Which thing was the most (or least) common?

It's not always going to make sense, though, to answer those questions across all the individual rows in a spreadsheet. Sometimes you'll want to separate the rows into groups based on some detail in the data—a team name, a city, a department—and then count them up, add them together, average them, etc., for each group. PivotTables are designed specifically to do that. It goes back to the example from the previous lesson where you showed students how to filter baseball players by team: you can certainly filter the table to a specific team's name, copy those

records to a new worksheet and then use basic formulas to summarize the salary details for just those players, repeating the process dozens of times for each team. However, it wouldn't be an efficient use of your time, especially when PivotTables can run those summaries across the groups that you choose.

What do groups look like? They are records in your table that all share the same value in a specific column. For a real-world counterpart, think of a deck of playing cards. In one deck, for example, possible groups could be the suit of the card (four different groups with 13 members, one of each rank) or the rank of the card (13 groups with four members, one of each suit).

In our roster of baseball players, any rows that have the same value in one column can be grouped together, like all the players for a specific team, all the players for a specific position—even the players who are paid the exact same salaries.

With direction from us, Excel is going to gather our data into groups and show summaries for the members in each one. Before learning this skill, many journalists have simply used a piece of paper and a pencil to tally up things and report on them. Take, for example, [this listing](#) of individuals and firms barred from doing business with the World Bank (See Figure 3).

One reporter wanted to write a story looking at the number of debarments for his country compared to others. He went through the list of more than 500 records of companies and individuals, keeping a tally of the number of records for each country. The story isn't impossible to do without Excel but analyzing this same information in a spreadsheet can drastically cut down on the time and increase accuracy by doing the math for you. In effect, you're letting Excel do the tallying, and all you have to do is tell it which column contains the different company names that will make up the groups. Follow the steps below to walk through making a basic PivotTable using WorldBank.xlsx.

The data contain the name, address and country of the debarred individuals or firms as well as the ineligibility dates and grounds for debarment.

Figure 3

Debarred Firms and Individuals					
Name: <input type="text"/>		Country: <input type="text" value="All"/>		<input type="button" value="GO"/>	<input type="button" value="Reset"/>
Firm Name	Address	Country	Ineligibility Period		Grounds
			From	To	
C.D.W CONSTRUCTION CO., LTD*221	HOUSE NO. 35B, ST. 476, SANGKAT TOULTOMPOUNG II, KHAN. CHAMKARMORN, PHNOM PENH	Cambodia	24-JUL-2014	23-JUL-2017	Procurement Guidelines, 1.14(a)(ii)
MR. FAUSTO ALEJANDRO LOPEZ CIFUENTES	25A CALLE 18-70, ZONA 11, MINERVA SUR MUNICIPIO DE MXCO, DPTO., GUATEMALA CITY (CIUDAD DE GUATEMALA)	Guatemala	17-JUL-2014	23-JUN-2027	Cross Debarment: IDB
MR. JOHN SARKER	78 SHARAT GUPTA ROAD (2ND FLOOR), NARINDA, DHAKA SADAR, SUTRAPUR, 1100, DHAKA	Bangladesh	17-JUL-2014	30-JUN-2017	Cross Debarment: ADB
ALEXJANDRO GUERRA FEO	EMILIO CAVENECA 210, INTERIOR B, SAN ISIDRO, LIMA	Peru	15-JUL-2014	27-MAY-2024	Cross Debarment: IDB
GROUPE DEC S.A/ DEC GROUP INC.*220	CARRE 3775 QUARTIER FIDJROSSE-KPOTA, BP:131 GODOMEY, COTONOU	Benin	15-JUL-2014	14-JUL-2018	Procurement Guidelines, 1.14(a)(ii)
INFORMATION COMPUTER SYSTEMS, CJSC *219	31-33 SMOLENSKA STR., KYIV, 03005	Ukraine	09-JUL-2014	08-JUL-2017	May 2004 Procurement Guidelines,

Figure 4

Get External Data		Connections	Sort & Filter	Data Tools		
F26		1996 Procurement Guidelines 1.15(a)(i)-(ii)				
	A	B	C	D	E	
	FIRM NAME	ADDRESS	COUNTRY	Ineligibility Period From	Ineligibility Period To	Grounds
1	(MS.) IR. NORMA KUMALAWATI	PRESIDENT DIRECTOR, PT RIFA BESTARI,	Indonesia	9/28/2011	Permanent	Cross Debar
2	1125369 ONTARIO LTD.*150	401 HANLAN ROAD L4L 3TI, VAUGHAN	Canada	4/17/2013	4/17/2023	Consult. Gui
3	1560121 ONTARIO LTD.*150	401 HANLAN ROAD L4L 3TI, VAUGHAN	Canada	4/17/2013	4/17/2023	Consult. Gui
4	3632491 CANADA INC.*150	95, 5TH AVENUE SW, J7V 5K8, PINCOURT	Canada	4/17/2013	4/17/2023	Consult. Gui
5	4246047 CANADA INC.*150	2800 PARK PLACE, 666 BARRARD STREET,	Canada	4/17/2013	4/17/2023	Consult. Gui
6	4246241 CANADA INC.*150	2800 PARK PLACE, 666 BARRARD STREET,	Canada	4/17/2013	4/17/2023	Consult. Gui
7	4470184 CANADA INC.*150	1075 WEST GEORGIA STREET, V6E	Canada	4/17/2013	4/17/2023	Consult. Gui
8	941692 ALBERTA LTD.*150	605, 5TH AVENUE SW, CALGARY	Canada	4/17/2013	4/17/2023	Consult. Gui
9	942064 ALBERTA LTD.*150	1500, 850-2ND STREET SW, T2P	Canada	4/17/2013	4/17/2023	Consult. Gui
10	A PONTUAL - MOTORES E	RUA FREDERICO PEIXOTO S/N, PINHEIRO,	Brazil	11/13/2012	11/12/2015	Procurement
11	ADRIANA ELIZABETH DEL	RETORNO ONCE #2, COLONIA AVANTE,	Mexico	3/19/2012	1/17/2015	Cross Debar
12	AERONAUTICAL RADIO,	1209 ORANGE	United States	1/9/2013	10/9/2015	1999 Procur

To find out the total debarments for each country you'll need to put the countries into "groups" using a PivotTable.

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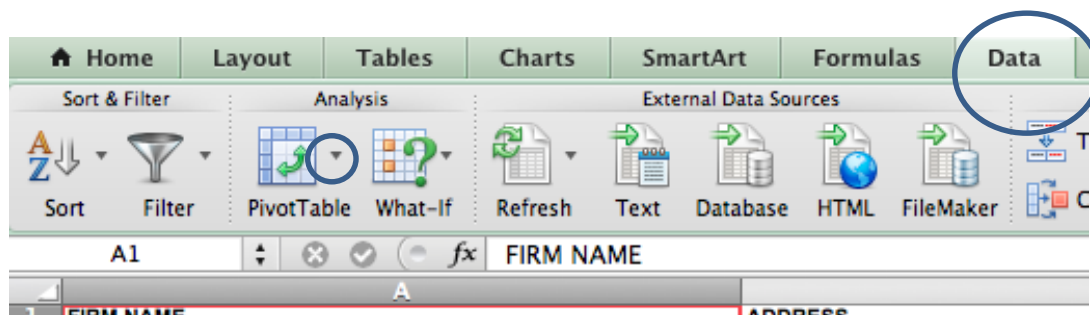
## BUILDING A PIVOTTABLE

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First, highlight all your data: select A1 and hold down Shift + Command, then hit the right arrow (which should highlight all the headers) and the down arrow (which will highlight all the rows).

Next, go to the Data tab and look all the way to the left. You should see "PivotTable." Click the small down arrow and choose "Create Manual PivotTable."

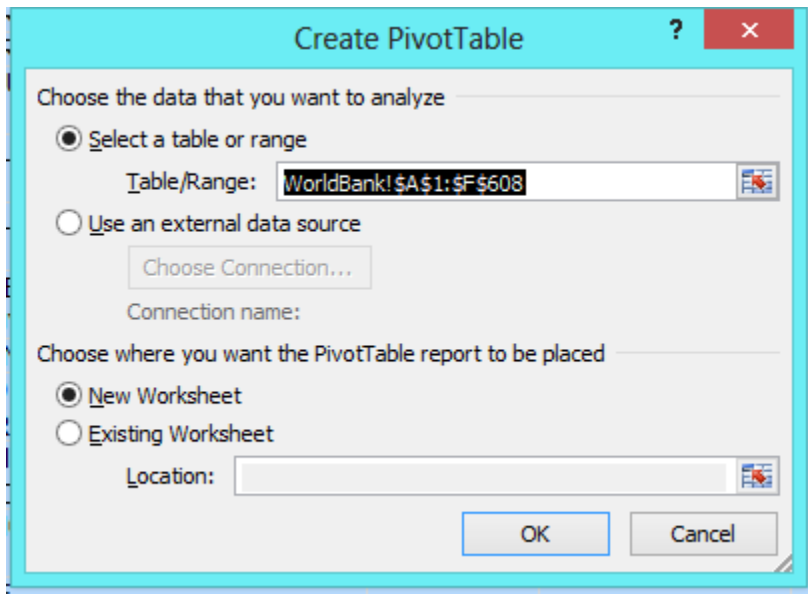
Figure 5



The Create PivotTable window should open. It has two pieces to it:

- 1) You're asked to select the data you'd like to analyze with your PivotTable. We've already done through Shift+Ctrl+8. This is why you should select your data in advance. The "Table/Range:" information in Figure 6 is showing us exactly what we selected. It looks funny, but really it's just saying that we selected cells A1 all the way through F608 in the sheet called "WorldBank" found in this workbook.
- 2) Excel wants us to tell it where we'd like to put the PivotTable. By default it selects "New Worksheet." This is good because we don't want the PivotTable to just appear right on top of our data.

Figure 6



If you follow our steps you should always be able to simply click “OK” in this window, but it’s still good to understand exactly what Excel is doing.

After you click “OK,” Excel pops you into a new sheet with all of the tools you’ll need to build your summary. There are two pieces, the various boxes on the left and the “PivotTable Builder” on the right. The boxes on the left are where your summary or chart will appear and change each time you do something in the task pane on the right. See Figure 8 for more information on this task pane.

Figure 7

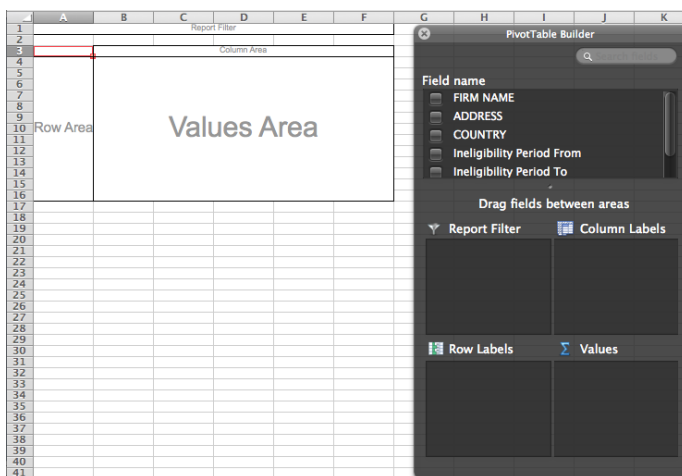


Figure 8: PivotTable Field List Task Pane

The screenshot shows the PivotTable Builder task pane. At the top, there is a search bar labeled 'Search fields'. Below it is a list of fields with checkboxes: FIRM NAME, ADDRESS, COUNTRY, Ineligibility Period From, and Ineligibility Period To. The pane is divided into four main sections: Report Filter, Column Labels, Row Labels, and Values. Arrows from text boxes point to these sections.

We call them column “headings,” but Excel calls them “fields.” This is a list of all of the column headings, or fields, in the data.

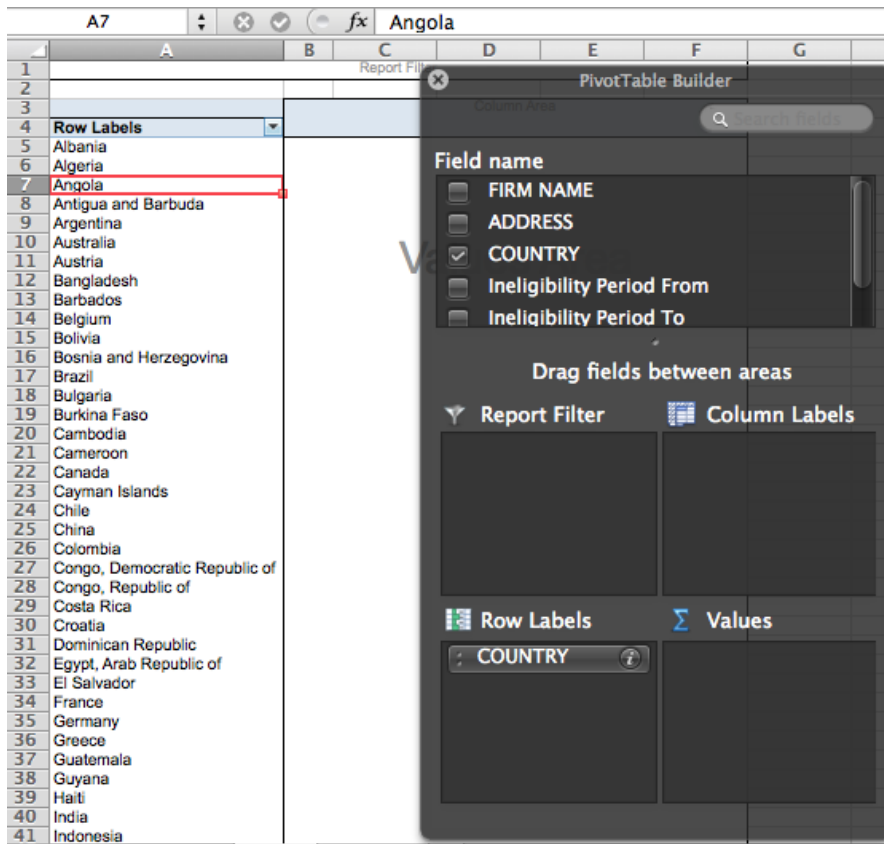
These boxes allow you to do some more complicated things in your PivotTable, including filtering and additional summary options; we’ll discuss them in detail later in the guide.

This is where you put your “groups.” Think of this as the “labels” for your chart. It’s where you’d put countries, team names, cities, etc. – anything that will be the group. We typically start PivotTables in this area. Just drag a column heading from the field list here and the PivotTable box will automatically contain a list of unique values found in the column you chose.

Think of this as the place where math happens. Anytime you want to find the sum, average or total number of records for a category you’ll work in this area.

Just like we’ve done with other datasets, frame your analysis with a question. In this situation we want to know which country has the most firms and/or individuals on the debarred list. To answer that question you’ll move “Country” from the Field name list to the Row Labels box. As soon as you drop “Country” under Row Labels you should see a list of country names appear in the PivotTable box. This list is alphabetical and each country name should be listed only once.

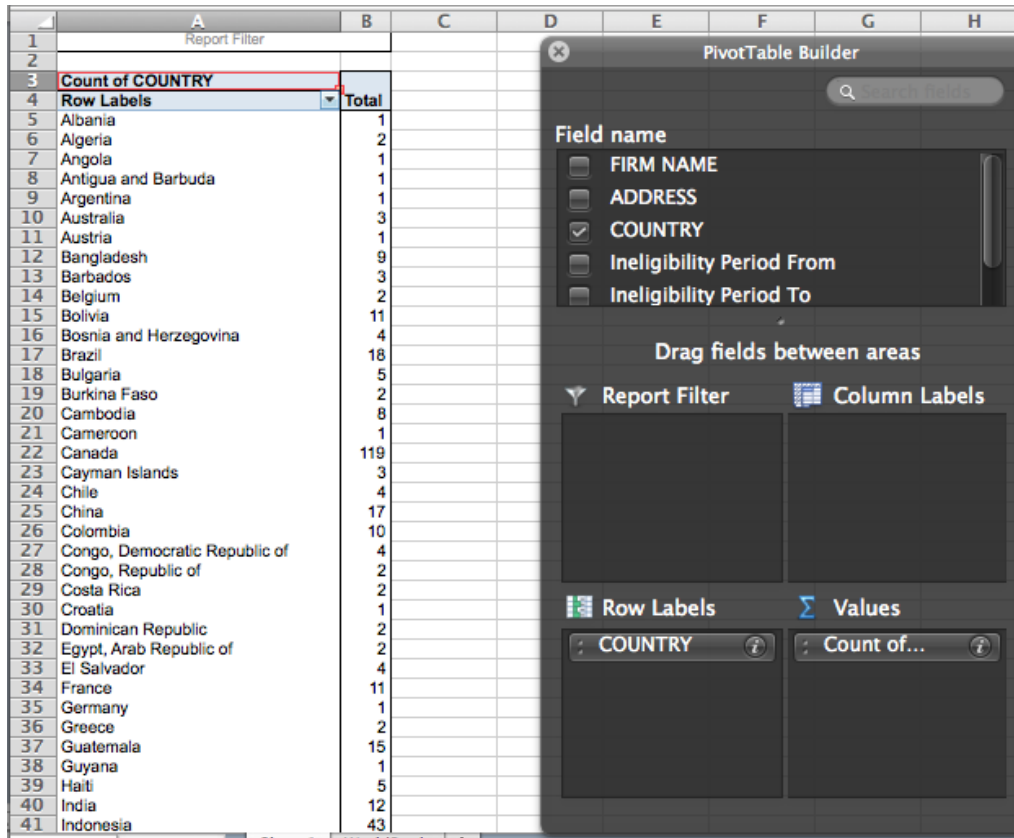
Figure 9



Next, we'll want to count the number of debarments for each country. Remember that each row in the spreadsheet represents one firm or individual debarred. To count up the totals by country, drag "Country" under the Values box. See Figure 10.

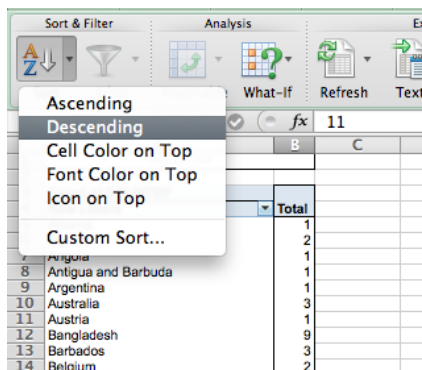


Figure 10



The last step is to get the country with the most debarments on the top of the list. For this we'll need to sort. Sorting is different in PivotTables than sorting in a regular sheet. Here, all you need to do is click on any number next to a country, and use the dropdown tool on the short icon to select "Descending" (Figure 11). You can also sort the records alphabetically by clicking on any one of the country names, selecting the sort icon, then whichever option you prefer.

Figure 11



Sorting by the number of debarments brings Canada to the top of the list, followed by the United States, Indonesia and the United Kingdom. Notice that Excel creates a Grand Total row at the bottom. This total should equal the number of records in your original spreadsheet.

Figure 12

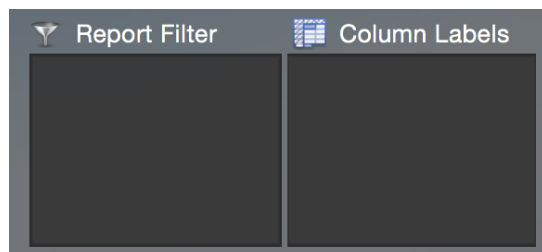
	Row Labels	Count of COUNTRY
4	Canada	119
5	United States	46
6	Indonesia	43
7	United Kingdom	40
8	Peru	22
9	Brazil	18
10	China	17
11	Uganda	15
12	Guatemala	15
13	Mexico	13
14	Russian Federation	12

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## ADVANCED PIVOTTABLE FEATURES

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We've used "Row Labels" to choose our groups and "Values" to select what kind of formulae to run on the records in each, but what about the other two boxes available in the PivotTable builder window?



- **“Report Filter”** works similarly to the Filter feature outside of PivotTables; it allows us to focus our data set on specific rows, removing them from the calculations we see as a result in the PivotTable. Moving a column name to “Report Filter” lets me show or hide records based on the values in that column.

- **“Column Labels”** work like “Row Labels,” except the grouped values are spread horizontally across the PivotTable instead of vertically. This is useful for cross tabulation: Examining summaries for two types of groups at the same time. You may have noticed “Values” appearing in “Column Labels” when doing your analysis previously; it’s because the different summaries you’ve chosen are behaving like groups of values.

Where would these features come in handy? In our baseball player salaries data, let’s say we only wanted to see the averages for players in the pitcher position. By moving the POS column to “Report Filter,” a new dropdown menu option appears one row above my PivotTable. I could use this to limit the contents of my PivotTable so that it only shows me records where the value of POS is P. From there, I could calculate salary totals, averages and player counts only for pitchers; by also moving the TEAM column to “Row Labels,” I could see any of those summary values for pitchers across teams all at once.

Sum of SALARY	Total
Los Angeles Dodgers	116648333
New York Yankees	73112400
Washington Nationals	81074857
Detroit Tigers	92872500
Boston Red Sox	60738666
San Francisco Giants	95711665
Los Angeles Angels	61349000
Texas Rangers	62242400
Philadelphia Phillies	76101500
San Diego Padres	61268695
Seattle Mariners	51873042
St. Louis Cardinals	50180500
Baltimore Orioles	54365602
Cincinnati Reds	55742285
Chicago Cubs	68198500
Toronto Blue Jays	43520500
Kansas City Royals	57125000
Chicago White Sox	54699700
Minnesota Twins	56215000
New York Mets	38145825

Another example: what if we wanted to see salary totals by team and position at the same time? By moving TEAM to “Row Labels,” POS to “Column Labels” and SALARY to the “Values” section of the PivotTable builder, we would have a simple grid set up where we could easily see the total amount the St. Louis Cardinals paid its first basemen or the Arizona Diamondbacks paid its pitchers.

Sum of SALARY	Column Labels				
Row Labels	1B	2B	3B	C	CF
Los Angeles Dodgers	21857142	18875000	10425000	4943000	24724285
New York Yankees	28125000	8020000	35000000	17518700	23642857
Washington Nationals	15043200	20050000	2500000	4750000	14512792
Detroit Tigers	22000000	16508500	525000	5907500	5515000
Boston Red Sox	16000000	12142348	18130500	4522900	514500
San Francisco Giants	3600000	1972500	4800000	18077777	14850000
Los Angeles Angels	24511000	516250	6425000	6512500	7078333
Texas Rangers	24900000	1023350	16000000	1493290	5257500
Philadelphia Phillies	25000000	10510000	517500	9008000	6607500
San Diego Padres	1650000	3024900	1690500	1907400	19819800
Seattle Mariners	2725000	26000000	4500000	1032800	10205000
St. Louis Cardinals	2534000	520000	3750000	15975000	6282500
Baltimore Orioles	12000000	515000	2138000	9304000	13355106
Cincinnati Reds	14000000	12595833	4260000	3925000	1067500
Chicago Cubs	5285714	1923000	520000	16600000	10008500
Toronto Blue Jays	11000000	507500	9492300	12000000	3387000
Kansas City Royals	5650000	7500000	2640000	2282500	4457500
Chicago White Sox	20666666	6017500	555000	4175000	560000
Minnesota Twins	23517000	2000000	4800000	6510000	1550000
New York Mets	4200000	8000000	19347170	1043304	2504111
Milwaukee Brewers	7500000	516500	14508500	3925000	8000000

**PivotTable Builder**

Field name

- NAME
- POS
- SALARY
- TEAM
- LEAGUE

Drag fields between areas

Report Filter

Column Labels

POS

Row Labels

Values

TEAM

Sum of S...