

Excel® 2016

PIVOT TABLE DATA CRUNCHING

QUE®

Bill Jelen
Michael Alexander



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Excel® 2016

PIVOT TABLE DATA CRUNCHING

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Excel® 2016 Pivot Table Data Crunching

Bill Jelen

Michael Alexander

que®

800 East 96th Street,
Indianapolis, Indiana 46240 USA

Excel 2016 Pivot Table Data Crunching

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About the Authors

Bill Jelen, Excel MVP and the host of MrExcel.com, has been using spreadsheets since 1985, and he launched the MrExcel.com website in 1998. Bill was a regular guest on *Call for Help* with Leo Laporte and has produced more than 1,900 episodes of his daily video podcast, Learn Excel from MrExcel. He is the author of 49 books about Microsoft Excel and writes the monthly Excel column for *Strategic Finance* magazine. Before founding MrExcel.com, Bill Jelen spent 12 years in the trenches, working as a financial analyst for the finance, marketing, accounting, and operations departments of a \$500 million public company. He lives in Merritt Island, Florida, with his wife, Mary Ellen.

Mike Alexander is a Microsoft Certified Application Developer (MCAD) and author of several books on advanced business analysis with Microsoft Access and Excel. He has more than 15 years of experience consulting and developing Office solutions. Mike has been named a Microsoft MVP for his ongoing contributions to the Excel community. In his spare time, he runs a free tutorial site, www.datapigtechnologies.com, where he shares basic Access and Excel tips to the Office community.

Dedication

To my friend, the recently departed Professor Simon Benninga
—Bill Jelen

To my 12 fans at datapigtechnologies.com
—Mike Alexander

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—Mike Alexander

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INTRODUCTION

The pivot table is the single most powerful command in all of Excel. Pivot tables came along during the 1990s, when Microsoft and Lotus were locked in a bitter battle for dominance of the spreadsheet market. The race to continually add enhanced features to their respective products during the mid-1990s led to many incredible features, but none as powerful as the pivot table.

With a pivot table, you can transform one million rows of transactional data into a summary report in seconds. If you can drag a mouse, you can create a pivot table. In addition to quickly summarizing and calculating data, pivot tables enable you to change your analysis on the fly by simply moving fields from one area of a report to another.

No other tool in Excel gives you the flexibility and analytical power of a pivot table.

What You Will Learn from This Book

It is widely agreed that close to 60% of Excel users leave 80% of Excel untouched. That is, most users do not tap into the full potential of Excel's built-in utilities. Of these utilities, the most prolific by far is the pivot table. Despite the fact that pivot tables have been a cornerstone of Excel for almost 20 years, they remain one of the most underutilized tools in the entire Microsoft Office suite.

Having picked up this book, you are savvy enough to have heard of pivot tables—and you have perhaps even used them on occasion. You have a sense that pivot tables provide a power that you are not using, and you want to learn how to leverage that power to increase your productivity quickly.

Within the first two chapters, you will be able to create basic pivot tables, increase your productivity, and produce reports in minutes instead of hours. Within the first seven chapters, you will be able to

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output complex pivot reports with drill-down capabilities and accompanying charts. By the end of the book, you will be able to build a dynamic pivot table reporting system.

What Is New in Excel 2016's Pivot Tables

Luckily, Microsoft continues to invest heavily in business intelligence (BI), and pivot tables are the front end that let you access the new features. Some of the features added to Excel 2016 pivot tables include the following:

- Pivot tables now provide auto grouping for date or time columns. If you add a date column to the Rows or Columns area, Excel will automatically group the data up to Months and collapse to Months. If the data spans more than one year, Excel will add Quarters and Years as well. If you add a time column, Excel will automatically group to Seconds, Minutes, and Hours and collapse to show only the top level.
- Pivot charts offer expand and collapse buttons. If you add two or more fields to the Axis or Legend area of a pivot table, you can use the + and – icons on the pivot chart to zoom in and out on the hierarchy.
- Slicers now offer a Multi-Select icon to allow you to choose multiple items without using the Ctrl key. This feature was added for touchscreens.
- If your data has a geographic field such as for addresses or postal codes, you can build a pivot table on a map by using the 3D Maps icon on the Insert tab.
- If you need to import data for a pivot table, the Power Query tools found under Data, Get & Transform will assist you in cleaning and shaping that data.
- Power Pivot has an automatic feature for creating a calendar table.
- If you select Insert PivotTable from a blank cell, and if there is a Data Model in the workbook, Excel will offer to build the pivot table from the model.
- Power Pivot's Auto-Detect Relationships dialog offers a Manage Relationships button that allows you to review or correct any relationship that was detected.

If you skipped right over Excel 2013, you may not know about some of the new features it introduced. Here are some of the best ones:

- Beginning with 2013, Excel offers thumbnails for 10 recommended pivot tables when you choose Insert, Recommended Pivot Tables. If you are not sure how best to summarize your data, you'll find plenty of inspiration in this dialog.
- A timeline slicer enables you to easily filter a pivot table by month, quarter, or year.
- Excel 2013 introduced the Data Model as a way to build a pivot table from two tables. This is for the versions of Excel that do not offer Power Pivot.
- People using Office Professional Plus, Office 365 Pro Plus, or other high-end editions can enable the Power Pivot add-in. Power Pivot provides drag-and-drop functionality to link tables, worksheets, SQL Server, and more. Power Pivot adds better calculated fields.
- Power View enables you to animate pivot tables in an ad hoc query tool.

Figure I.2

If this were the year 2006, the SUMIFS function would have been an uglier SUMPRODUCT function.

	K	L	M	N	O	P	Q
		Gizmo	Gadget	Widget	Doodads	Total	
Midwest		=SUMIFS(\$G\$2:\$G\$564,\$C\$2:\$C\$564,L\$1,\$B\$2:\$B\$564,\$K2)					
Northeast							

If you are adept at using the fill handle, you need just two more mouse drags to copy the formula to the rest of the table.

Enter the heading Total for the total row and for the total column. You can do this in nine keystrokes if you type the first heading, press Ctrl+Enter to stay in the same cell and then use Copy, select the cell for the second heading, and use Paste.

If you select K1:P6 and press Alt+=, you can add the total formulas in three keystrokes.

With this method, which takes 77 clicks or keystrokes, you end up with a nice summary report, as shown in Figure I.3. If you could pull this off in 5 or 10 minutes, you would probably be fairly proud of your Excel prowess; there are some good tricks among those 77 operations.

Figure I.3

A mere 77 operations later, you have a summary report.

	K	L	M	N	O	P
		Gizmo	Gadget	Widget	Doodads	Total
Midwest		652651	544772	537965	6036	1741424
Northeast		751724	714009	620019	38860	2124612
South		918588	839551	844186	0	2602325
West		70057	65382	75349	28663	239451
Total		2393020	2163714	2077519	73559	6707812

You hand the report to your manager. Within a few minutes, he comes back with one of the following requests, which will certainly cause a lot of rework:

- Could you put products down the side and regions across the top?
- Could you show me the same report for only the manufacturing customers?
- Could you show profit instead of revenue?
- Could you copy this report for each of the customers?

Invention of the Pivot Table

When the actual pivot table was invented is in dispute. The Excel team coined the term *pivot table*, which appeared in Excel in 1993. However, the concept was not new. Pito Salas and his team at Lotus were working on the pivot table concept in 1986 and released Lotus Improv in 1991. Before then, Javelin offered functionality similar to that of pivot tables.

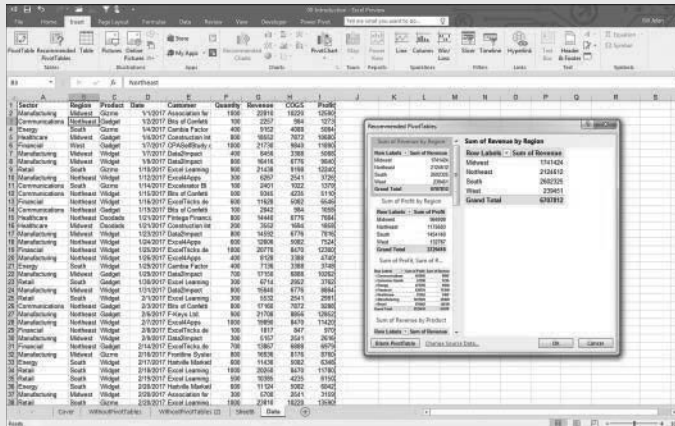
The core concept behind a pivot table is that the data, formulas, and data views are stored separately. Each column has a name, and you can group and rearrange the data by dragging field names to various positions on the report.

CASE STUDY: LIFE AFTER PIVOT TABLES

Say that you're tired of working so hard to remake reports every time your manager wants a change. You're in luck: You can produce the same report as in the last case study but using a pivot table. Excel 2016 offers you 10 thumbnails of recommended pivot tables to get you close to the goal. Follow these steps:

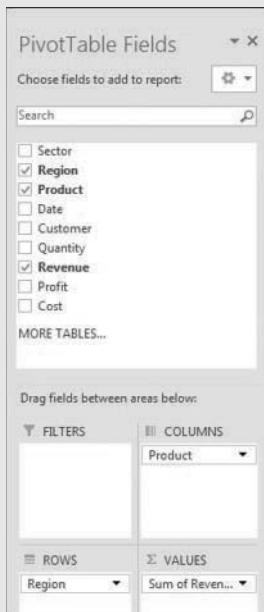
1. Click the Insert tab of the ribbon.
2. Click Recommended PivotTables. The first recommended item is Revenue by Region (see Figure 1.4).

Figure 1.4
The first recommended pivot table is as close as you will get to the required report.



3. Click OK to accept the first pivot table.
4. Drag the Product field from the PivotTable Fields list to the Columns area (see Figure 1.5).

Figure 1.5
To finish the report, drag the Product heading to the Columns area.



5. Unselect Field Headers on the right side of the ribbon.

With just five clicks of the mouse, you have the report shown in Figure I.6.

Figure I.6

It took five clicks to create this report.

	A	B	C	D	E	F
1						
2						
3		Sum of Revenue				
4		Doodads	Gadget	Gizmo	Widget	Grand Total
5	Midwest	6036	544772	652651	537965	1741424
6	Northeast	38860	714009	751724	620019	2124612
7	South		839551	918588	844186	2602325
8	West	28663	65382	70057	75349	239451
9	Grand Total	73559	2163714	2393020	2077519	6707812
10						
11						

In addition, when your manager comes back with a request like the ones near the end of the prior case study, you can easily use the pivot table makes to make the changes. Here's a quick overview of the changes you'll learn to make in the chapters that follow:

- Could you put products down the side and regions across the top? (This change will take you 10 seconds: Drag Product to Rows and Region to Columns.)
- Could you show me the same report for only the manufacturing customers? (15 seconds: Select Insert Slicer, Sector; click OK; click Manufacturing.)
- Could you show profit instead of revenue? (10 seconds: Uncheck Revenue, check Profit.)
- Could you copy this report for each of the customers? (30 seconds: Move Customer to Report Filter, open the tiny drop-down next to the Options button, choose Show Report Filter Pages, click OK.)

Sample Files Used in This Book

All data files used throughout this book are available for download from www.mrexcel.com/pivotbookdata2016.html. You will find one Excel workbook per chapter and should be able to achieve exactly the same results shown in the figures in this book by starting with the raw data on the Data worksheet. If you simply want to work with the final pivot table, you can find it in the workbook as well.

Conventions Used in This Book

This book follows certain conventions:

- **Monospace**—Code and messages you see onscreen appear in a monospace font.
- **Bold**—Text you type appears in a bold font.

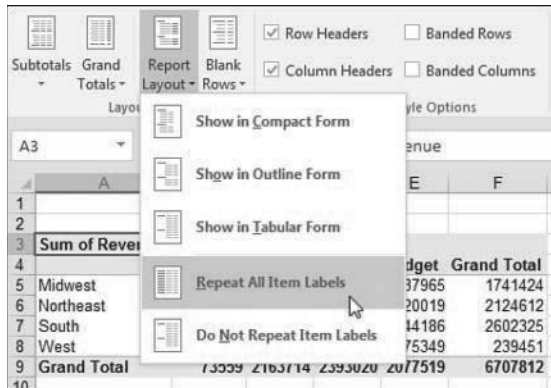
- *Italic*—New and important terms appear in italics.
- Initial Caps—Tab names, dialog names, and dialog elements are presented with initial capital letters so you can identify them easily.

Referring to Ribbon Commands

When the active cell is inside a pivot table, two new tabs appear on the ribbon. In the help files, Microsoft calls these tabs “PivotTable Tools | Analyze” and “PivotTable Tools | Design.” For convenience, this book refers to these elements as the Analyze tab and the Design tab, respectively. The Slicer feature has a ribbon tab that Microsoft calls “Slicer Tools | Options.” This book refers to this as the Slicer tab. Excel 2013 introduced the “Timeline Tools | Options” tab. This book calls this the Timeline tab.

In some cases, the ribbon icon leads to a drop-down with additional choices. In these cases, the book lists the hierarchy of ribbon, icon, menu choice, and submenu choice. For example, Figure I.7 shows what you would select if the book said “select Design, Report Layout, Repeat All Item Labels.”

Figure I.7
For shorthand, instructions might say to select Design, Report Layout, Repeat All Item Labels.



Special Elements

This book contains the following special elements:

CASE STUDY

Case studies provide real-world examples involving topics previously introduced in the chapter.

NOTE

Notes provide additional information outside the main thread of the chapter discussion that might be useful for you to know.

TIP

Tips provide quick workarounds and time-saving techniques to help you do your work more efficiently.

CAUTION

Cautions warn you about potential pitfalls you might encounter. Pay attention to cautions because they alert you to problems that could cause you hours of frustration.

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Customizing a Pivot Table

3

Although pivot tables provide an extremely fast way to summarize data, sometimes the pivot table defaults are not exactly what you need. In such cases, you can use many powerful settings to tweak pivot tables. These tweaks range from making cosmetic changes to changing the underlying calculation used in the pivot table.

In Excel 2016, you find controls to customize a pivot table in myriad places: the Analyze tab, Design tab, Field Settings dialog, Data Field Settings dialog, PivotTable Options dialog, and context menus.

Rather than cover each set of controls sequentially, this chapter covers the following functional areas in making pivot table customization:

- **Minor cosmetic changes**—Change blanks to zeros, adjust the number format, and rename a field. The fact that you must correct these defaults in every pivot table that you create is annoying.
- **Layout changes**—Compare three possible layouts, show/hide subtotals and totals, and repeat row labels.
- **Major cosmetic changes**—Use pivot table styles to format a pivot table quickly.
- **Summary calculations**—Change from Sum to Count, Min, Max, and more. In a pivot table that defaults to Count of Revenue, change it to default to Sum of Revenue instead.
- **Advanced calculations**—Use settings to show data as a running total, percent of total, rank, percent of parent item, and more.
- **Other options**—Review some of the obscure options found throughout the Excel interface.

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Making Common Cosmetic Changes

You need to make a few changes to almost every pivot table to make it easier to understand and interpret. Figure 3.1 shows a typical pivot table. To create this pivot table, open the Chapter 3 data file. Select Insert, Pivot Table, OK. Check the Sector, Customer, and Revenue fields, and drag the Region field to the Columns area.

Figure 3.1
A typical pivot table before customization.

Row Labels	Midwest	Northeast	South	West	Grand Total
Associations		51240	34364		85604
Association for Computers & Taxation			34364		34364
IMA Houston Chapter					
Consultants	89033				
Andrew Spain Consulting					
Cambia Factor					
Construction Intelligence & Analytics, Inc.	42316				
Data2Impact					
Excelerator BI	46717				
Fintega Financial Modelling					
Professional					
Juliet Babcock-Hyde CPA, PLLC					
Serving Brevard Realty					
WM Squared Inc.					
Retail	84740				
Bits of Confetti					
Hartville MarketPlace and Flea Market					
LaFrenier Sons Septic	50030				
New Hope Laundry	34710				
Software	812907				
Excel4Apps	750163				
F-Keys Ltd.					
Frontline Systems	62744				
Vertex42					
Training	754744				

This default pivot table contains several annoying items that you might want to change quickly:

- The default table style uses no gridlines, which makes it difficult to follow the rows and columns across and down.
- Numbers in the Values area are in a general number format. There are no commas, currency symbols, and so on.
- For sparse data sets, many blanks appear in the Values area. The blank cell in B5 indicates that there were no Associations sales in the Midwest. Most people prefer to see zeros instead of blanks.
- Excel renames fields in the Values area with the unimaginative name Sum of Revenue. You can change this name.

You can correct each of these annoyances with just a few mouse clicks. The following sections address each issue.

TIP Excel MVP Debra Dalglish sells a Pivot Power Premium add-in that fixes most of the issues listed here. This add-in is great if you will be creating pivot tables frequently. For more information, visit <http://mrx.c1/pivpow16>.

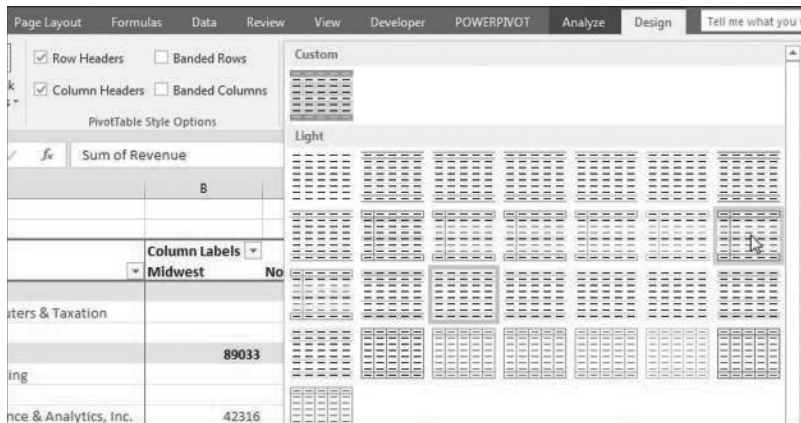
Applying a Table Style to Restore Gridlines

The default pivot table layout contains no gridlines and is rather plain. Fortunately, you can apply a table style. Any table style that you choose is better than the default.

Follow these steps to apply a table style:

1. Make sure that the active cell is in the pivot table.
2. From the ribbon, select the Design tab. Three arrows appear at the right side of the PivotTable Style gallery.
3. Click the bottom arrow to open the complete gallery, which is shown in Figure 3.2.

Figure 3.2
The gallery contains 85 styles to choose from.



4. Choose any style other than the first style from the drop-down. Styles toward the bottom of the gallery tend to have more formatting.
5. Select the check box for Banded Rows to the left of the PivotTable Styles gallery. This draws gridlines in light styles and adds row stripes in dark styles.

It does not matter which style you choose from the gallery; any of the 84 other styles are better than the default style.

NOTE For more details about customizing styles, see “Customizing a Pivot Table’s Appearance with Styles and Themes,” p. 60.

Changing the Number Format to Add Thousands Separators

If you have gone to the trouble of formatting your underlying data, you might expect that the pivot table will capture some of this formatting. Unfortunately, it does not. Even if your underlying data fields were formatted with a certain numeric format, the default pivot table presents values formatted with a general format. As a sign of some progress, when you create pivot tables from PowerPivot, you can specify the number format for a field before creating the pivot table. This functionality has not come to regular pivot tables yet.

NOTE

For more about PowerPivot, read Chapter 10, “Mashing Up Data with Power Pivot.”

3

For example, in the figures in this chapter, the numbers are in the thousands or tens of thousands. At this level of sales, you would normally have a thousands separator and probably no decimal places. Although the original data had a numeric format applied, the pivot table routinely formats your numbers in an ugly general style.

CAUTION

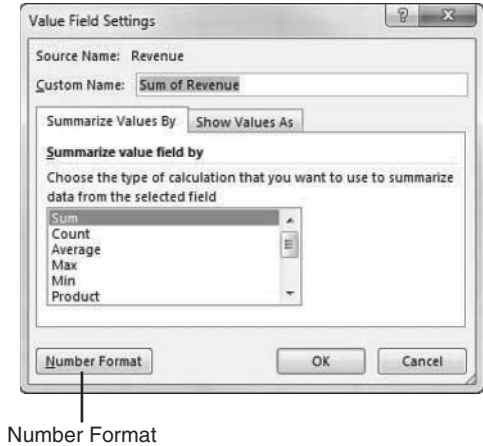
You will be tempted to format the numbers using the right-click menu and choosing Number Format. This is not the best way to go. You will be tempted to format the cells using the tools on the Home tab. This is not the way to go. Either of these methods temporarily fixes the problem, but you lose the formatting as soon as you move a field in the pivot table. The right way to solve the problem is to use the Number Format button in the Value Field Settings dialog.

You have three ways to get to this dialog:

- Right-click a number in the Values area of the pivot table and select Value Field Settings.
- Click the drop-down to the right of the Sum of Revenue field in the areas of the PivotTable Fields list and then select Value Field Settings from the context menu.
- Select any cell in the Values area of the pivot table. From the Analyze tab, select Field Settings from the Active Field group.

As shown in Figure 3.3, the Value Field Settings dialog is displayed. To change the numeric format, click the Number Format button in the lower-left corner.

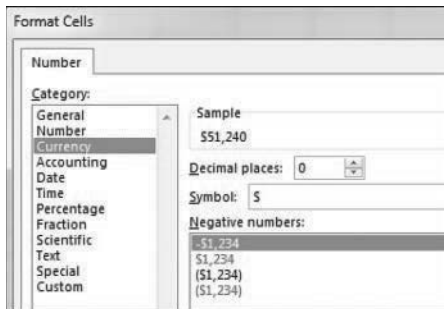
Figure 3.3
 Display the Value Field Settings dialog, and then click Number Format.



3

In the Format Cells dialog that appears, you can choose any built-in number format or choose a custom format. For example, you can choose Currency, as shown in Figure 3.4.

Figure 3.4
 Choose an easier-to-read number format from the Format Cells dialog.



NOTE Although Excel 2016 offers a Live Preview feature for many formatting settings, the Format Cells dialog does not offer one. To see the changes, you must assign the number format, close the Format dialog, and then close the Value Field Settings dialog.

Replacing Blanks with Zeros

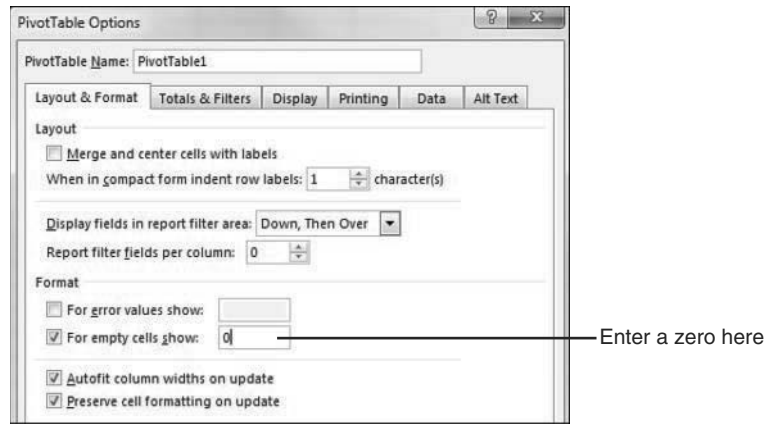
One of the elements of good spreadsheet design is that you should never leave blank cells in a numeric section of a worksheet. Even Microsoft believes in this rule; if your source data for a pivot table contains one million numeric cells and one blank cell, Excel 2016 treats the entire column as if it is text and chooses to count the column instead of sum it. This is why it is incredibly annoying that the default setting for a pivot table leaves many blanks in the Values area of some pivot tables.

A blank tells you that there were no sales for a particular combination of labels. In the default view, an actual zero is used to indicate that there was activity, but the total sales were zero. This value might mean that a customer bought something and then returned it, resulting in net sales of zero. Although there are limited applications in which you need to differentiate between having no sales and having net zero sales, this seems rare. In 99% of the cases, you should fill in the blank cells with zeros.

Follow these steps to change this setting for the current pivot table:

1. Right-click any cell in the pivot table and choose PivotTable Options.
2. On the Layout & Format tab in the Format section, type **0** next to the field labeled For Empty Cells Show (see Figure 3.5).

Figure 3.5
Enter a zero in the For Empty Cells Show box to replace the blank cells with zero.



3. Click OK to accept the change.

The result is that the pivot table is filled with zeros instead of blanks, as shown in Figure 3.6.

Figure 3.6
Your report is now a solid contiguous block of non-blank cells.

	A	B	C	D	E	F	
1							
2							
3	Sum of Revenue		Column Labels				
4	Row Labels		Midwest	Northeast	South	West	Grand Total
5	Associations		\$0	\$51,240	\$34,364	\$0	\$85,604
6	Association for Computers & Taxation		\$0	\$0	\$34,364	\$0	\$34,364
7	IMA Houston Chapter		\$0	\$51,240	\$0	\$0	\$51,240
8	Consultants	\$89,033	\$0	\$926,970	\$115,132	\$0	\$1,131,135
9	Andrew Spain Consulting	\$0	\$0	\$869,454	\$0	\$0	\$869,454
10	Cambia Factor	\$0	\$0	\$57,516	\$0	\$0	\$57,516
11	Construction Intelligence & Analytics, Inc.	\$42,316	\$0	\$0	\$0	\$0	\$42,316
12	Data2Impact	\$0	\$0	\$0	\$59,881	\$0	\$59,881
13	Excelerator BI	\$46,717	\$0	\$0	\$0	\$0	\$46,717
14	Fintega Financial Modelling	\$0	\$0	\$0	\$55,251	\$0	\$55,251
15	Professional	\$0	\$0	\$437,695	\$39,250	\$0	\$476,945
16	Juliet Babcock-Hyde CPA, PLLC	\$0	\$0	\$31,369	\$0	\$0	\$31,369
17	Serving Brevard Realty	\$0	\$0	\$406,326	\$0	\$0	\$406,326
18	WM Squared Inc.	\$0	\$0	\$0	\$39,250	\$0	\$39,250
19	Retail	\$84,740	\$0	\$704,359	\$31,021	\$0	\$820,120

Changing a Field Name

Every field in a final pivot table has a name. Fields in the row, column, and filter areas inherit their names from the heading in the source data. Fields in the data section are given names such as Sum of Revenue. In some instances, you might prefer to print a different name in the pivot table. You might prefer Total Revenue instead of the default name. In these situations, the capability to change your field names comes in quite handy.

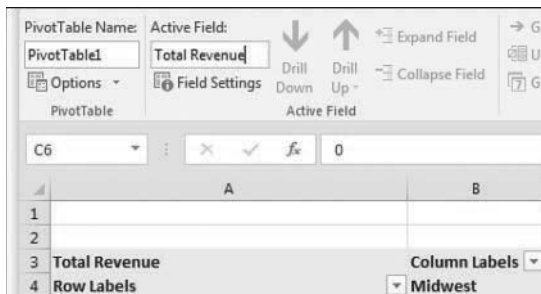
TIP Although many of the names are inherited from headings in the original data set, when your data is from an external data source, you might not have control over field names. In these cases, you might want to change the names of the fields as well.

To change a field name in the Values area, follow these steps:

1. Select a cell in the pivot table that contains the appropriate type of value. You might have a pivot table with both Sum of Quantity and Sum of Revenue in the Values area. Choose a cell that contains a Sum of Revenue value.
2. Go to the Analyze tab in the ribbon. A Pivot Field Name text box appears below the heading Active Field. The box currently contains Sum of Revenue.
3. Type a new name in the box, as shown in Figure 3.7. Click a cell in your pivot table to complete the entry, and have the heading in A3 change. The name of the field title in the Values area also changes to reflect the new name.

Figure 3.7

The name typed in the Custom Name box appears in the pivot table. Although names should be unique, you can trick Excel into accepting a name that's similar to an existing name by adding a space to the end of it.



NOTE One common frustration occurs when you would like to rename Sum of Revenue to Revenue. The problem is that this name is not allowed because it is not unique; you already have a Revenue field in the source data. To work around this limitation, you can name the field and add a space to the end of the name. Excel considers "Revenue" (with a space) to be different from "Revenue" (with no space). Because this change is only cosmetic, the readers of your spreadsheet do not notice the space after the name.

Making Report Layout Changes

Excel 2016 offers three report layout styles. The Excel team continues to offer the newer Compact layout as the default report layout, even though I continually hound them about the fact that people who work in the real world would rather use the Tabular report layout, or at least would like to have a choice about which one to use as a default.

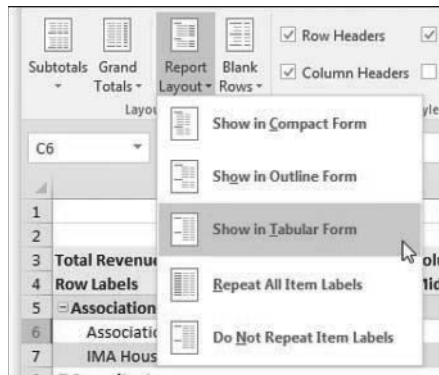
If you consider three report layouts, and the ability to show subtotals at the top or bottom, plus choices for blank rows and Repeat All Item Labels, you have 16 different layout possibilities available.

Layout changes are controlled in the Layout group of the Design tab, as shown in Figure 3.8. This group offers four icons:

- **Subtotals**—Moves subtotals to the top or bottom of each group or turns them off.
- **Grand Totals**—Turns the grand totals on or off for rows and columns.
- **Report Layout**—Uses the Compact, Outline, or Tabular forms. Offers an option to repeat item labels.
- **Blank Rows**—Inserts or removes blank lines after each group.

Figure 3.8

The Layout group on the Design tab offers different layouts and options for totals.



NOTE

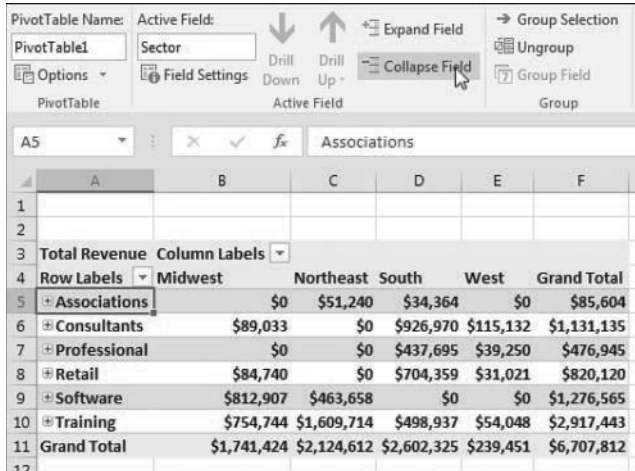
You statisticians in the audience might think that 3 layouts \times 2 repeat options \times 2 subtotal location options \times 2 blank row options would be 24 layouts. However, choosing Repeat All Item Labels does not work with the Compact layout, thus eliminating 4 of the combinations. In addition, Subtotals at the Top of Each Group does not work with the Tabular layout, eliminating another 4 combinations.

Using the Compact Layout

By default, all new pivot tables use the Compact layout that you saw in Figure 3.6. In this layout, multiple fields in the row area are stacked in column A. Note in the figure that the Consultants sector and the Andrew Spain Consulting customer are both in column A.

The Compact form is suited for using the Expand and Collapse icons. If you select one of the Sector value cells such as Associations in A5 and then click the Collapse Field icon on the Analyze tab, Excel hides all the customer details and shows only the sectors, as shown in Figure 3.9.

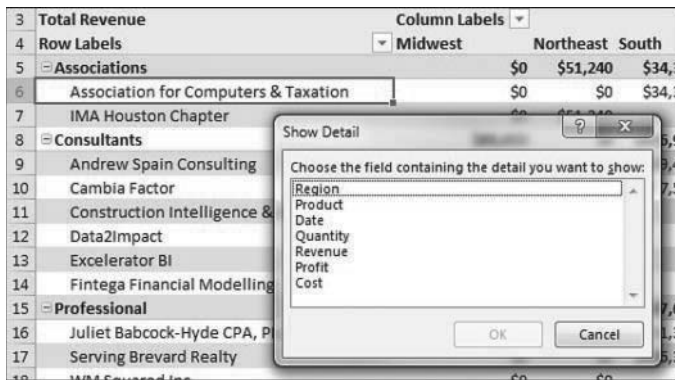
Figure 3.9
Click the Collapse Field icon to hide levels of detail.



After a field is collapsed, you can show detail for individual items by using the plus icons in column A, or you can click Expand Field on the Analyze tab to see the detail again.

TIP If you select a cell in the innermost row field and click Expand Field on the Options tab, Excel displays the Show Detail dialog, as shown in Figure 3.10, to enable you to add a new innermost row field.

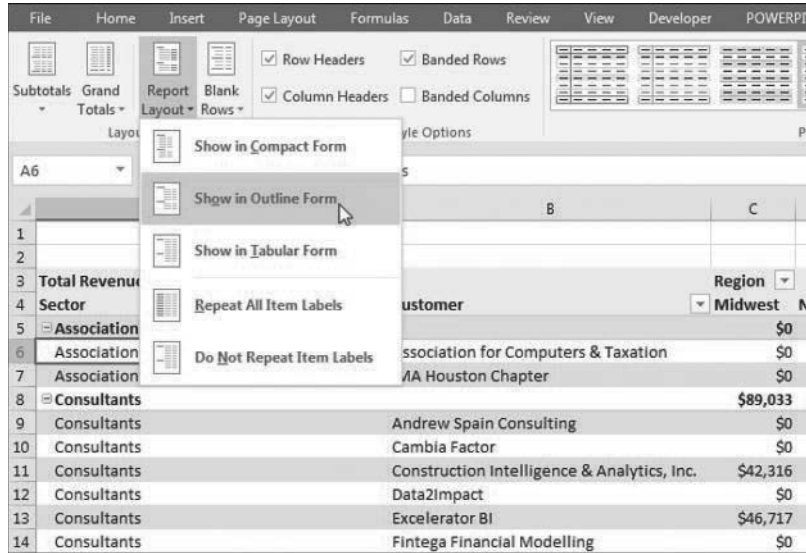
Figure 3.10
When you attempt to expand the innermost field, Excel offers to add a new innermost field.



Using the Outline Layout

When you select Design, Layout, Report Layout, Show in Outline Form, Excel puts each row field in a separate column. The pivot table shown in Figure 3.11 is one column wider, with revenue values starting in C instead of B. This is a small price to pay for allowing each field to occupy its own column. Soon, you will find out how to convert a pivot table to values so you can further sort or filter. When you do this, you will want each field in its own column.

Figure 3.11
The Outline layout puts each row field in a separate column.



The Excel team added the Repeat All Item Labels option to the Report Layout tab starting in Excel 2010. This alleviated a lot of busy work because it takes just two clicks to fill in all the blank cells along the outer row fields. Choosing to repeat the item labels causes values to appear in cells A6:A7, A9:A10, and A12:A15 in Figure 3.11.

Figure 3.11 shows the same pivot table from before, now in Outline form and with labels repeated.

CAUTION

This layout is suitable if you plan to copy the values from the pivot table to a new location for further analysis. Although the Compact layout offers a clever approach by squeezing multiple fields into one column, it is not ideal for reusing the data later.

By default, both the Compact and Outline layouts put the subtotals at the top of each group. You can use the Subtotals drop-down on the Design tab to move the totals to the

bottom of each group, as shown in Figure 3.12. In Outline view, this causes a not-really-useful heading row to appear at the top of each group. Cell A5 contains “Associations” without any additional data in the columns to the right. Consequently, the pivot table occupies 44 rows instead of 37 rows because each of the 7 sector categories has an extra header.

Figure 3.12
With subtotals at the bottom of each group, the pivot table occupies several more rows.



Using the Traditional Tabular Layout

Figure 3.13 shows the Tabular layout. This layout is similar to the one that has been used in pivot tables since their invention through Excel 2003. In this layout, the subtotals can never appear at the top of the group. The new Repeat All Item Labels works with this layout, as shown in Figure 3.13.

Figure 3.13
The Tabular layout is similar to pivot tables in legacy versions of Excel.

	A	B	C
1			
2			
3	Total Revenue		Region ▾
4	Sector ▾	Customer ▾	Midwest ▾
5	[-] Associations	Association for Computers & Taxation	\$0
6	[-] Associations	IMA Houston Chapter	\$0
7	Associations Total		\$0
8	[-] Consultants	Andrew Spain Consulting	\$0
9	Consultants	Cambia Factor	\$0
10	Consultants	Construction Intelligence & Analytics, Inc.	\$42,316

The Tabular layout is the best layout if you expect to use the resulting summary data in a subsequent analysis. If you wanted to reuse the table in Figure 3.13, you would do additional “flattening” of the pivot table by choosing Subtotals, Do Not Show Subtotals and Grand Totals, Off for Rows and Columns.

CASE STUDY: CONVERTING A PIVOT TABLE TO VALUES

Say that you want to convert the pivot table shown in Figure 3.13 to be a regular data set that you can sort, filter, chart, or export to another system. You don't need the Sectors totals in rows 7, 14, 18, and so on. You don't need the Grand Total at the bottom. And, depending on your future needs, you might want to move the Region field from the Columns area to the Rows area. This would allow you to add Cost and Profit as new columns in the final report.

Finally, you want to convert from a live pivot table to static values. To make these changes, follow these steps:

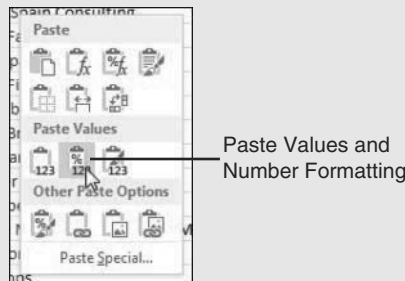
1. Select any cell in the pivot table.
2. From the Design tab, select Grand Totals, Off for Rows and Columns.
3. Select Design, Subtotals, Do Not Show Subtotals.
4. Drag the Region tile from the Columns area in the PivotTable Fields list. Drop this field between Sector and Customer in the Rows area.
5. Check Profit and Cost in the top of the PivotTable Fields list. Because both fields are numeric, they move to the Values area and appear in the pivot table as new columns. Rename both fields using the Current Field box on the Analyze tab. The report is now a contiguous solid block of data, as shown in Figure 3.14.

Figure 3.14
The pivot table now contains a solid block of data.

	A	B	C	D	E	F
1						
2						
3	Sector	Region	Customer	Total Revenue	Total Profit	Total Cost
4	Associations	Northeast	IMA Houston Chapter	\$51,240	22824	28416
5	Associations	South	Association for Computers & Taxation	\$34,364	15576	18788
6	Consultants	Midwest	Construction Intelligence & Analytics, Inc.	\$42,316	18764	23552
7	Consultants	Midwest	Excelerator BI	\$46,717	19961	26756
8	Consultants	South	Andrew Spain Consulting	\$869,454	382170	487284
9	Consultants	South	Cambia Factor	\$57,516	26765	30751
10	Consultants	West	Data2Impact	\$59,881	25913	33968
11	Consultants	West	Fintega Financial Modelling	\$55,251	24632	30619
12	Professional	South	Juliet Babcock-Hyde CPA, PLLC	\$31,369	13730	17639
13	Professional	South	Serving Brevard Realty	\$406,326	178585	227741

6. Select one cell in the pivot table. Press Ctrl+* to select all the data in the pivot table.
7. Press Ctrl+C to copy the data from the pivot table.
8. Select a blank section of a worksheet.
9. Right-click and choose Paste Values to open the fly-out menu. Select Paste Values and Number Formatting, as shown in Figure 3.15. Excel pastes a static copy of the report to the worksheet.

Figure 3.15
Use Paste Values to create a static version of the data.



- If you no longer need the original pivot table, select the entire pivot table and press the Delete key to clear the cells from the pivot table and free up the area of memory that was holding the pivot table cache.
The result is a solid block of summary data. These 27 rows are a summary of the 500+ rows in the original data set, but they also are suitable for exporting to other systems.

Controlling Blank Lines, Grand Totals, and Other Settings

Additional settings on the Design tab enable you to toggle various elements.

The Blank Rows drop-down offers the choice Insert Blank Row After Each Item. This setting applies only to pivot tables with two or more row fields. Blank rows are not added after each item in the inner row field. You see a blank row after each group of items in the outer row fields. As shown in Figure 3.16, the blank row after each region makes the report easier to read. However, if you remove Sector from the report, you have only Region in the row fields, and no blank rows appear (see Figure 3.17).

3

Figure 3.16
The Blank Rows setting makes the report easier to read.

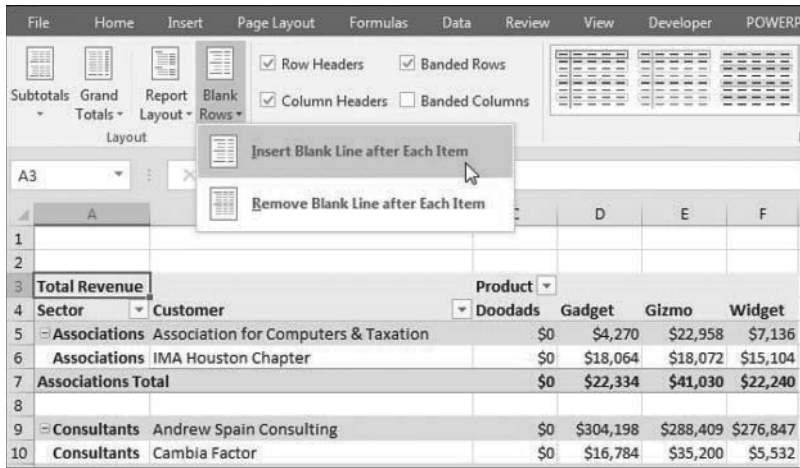


Figure 3.17
Blank rows will not appear when there is only one item in the row field.

	A	B	C	D	E
1					
2					
3	Total Revenue		Product		
4	Customer		Doodads	Gadget	Gizmo Widget
5	599CD.com	\$0	\$185,675	\$245,491	\$191,628
6	Andrew Spain Consulting	\$0	\$304,198	\$288,409	\$276,847
7	Association for Computers & Taxation	\$0	\$4,270	\$22,958	\$7,136
8	Bits of Confetti	\$28,663	\$2,358	\$0	\$0
9	Cambia Factor	\$0	\$16,784	\$35,200	\$5,532
10	Construction Intelligence & Analytics, Inc.	\$6,036	\$18,552	\$17,728	\$0
11	CPASelfStudy.com	\$0	\$190,533	\$200,936	\$177,382
12	Data2Impact	\$0	\$26,484	\$19,544	\$13,853
13	Excel4Apps	\$0	\$233,435	\$235,761	\$280,967

NOTE

For those of you following along with the sample files, you may have noticed quite a leap from the pivot table in Figure 3.14 to the one in Figure 3.16, but it is still the same pivot table. Here is how to make the changes:

1. Uncheck Sector, Customer, Profit, and Cost in the Pivot Table Fields list.
2. Drag the Product field to the Columns area.
3. Recheck the Sector field to move it to the second Row field.
4. Make sure the active cell is in column A.
5. On the Design tab of the ribbon, open Subtotals and choose Show All Subtotals at the Bottom of the Group.
6. As shown in Figure 3.16, open the Blank Rows drop-down and choose Insert Blank Row After Each Item.
7. To get to the pivot table shown in Figure 3.17, uncheck the Sector field.

Grand totals can appear at the bottom of each column and/or at the end of each row, or they can be turned off altogether. Settings for grand totals appear in the Grand Totals drop-down of the Layout group on the Design tab. The wording in this drop-down is a bit confusing, so Figure 3.18 shows what each option provides. The default is to show grand totals for rows and columns, as in Figure 3.17.

Figure 3.18

The wording is confusing, but you can toggle off the grand total column, row, or both.

	A	B	C	D	E	F
1	Grand Totals On For Rows Only					
2	<i>Keeps the Grand Total column</i>					
3	Total Revenue Product					
4	Region	Doodads	Gadget	Gizmo	Widget	Grand Total
5	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
6	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
7	South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
8	West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
9						
10	Grand Totals On For Columns Only					
11	<i>Keeps the Grand Total row</i>					
12	Total Revenue Product					
13	Region	Doodads	Gadget	Gizmo	Widget	
14	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	
15	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	
16	South	\$0	\$839,551	\$918,588	\$844,186	
17	West	\$28,663	\$65,382	\$70,057	\$75,349	
18	Grand Total	\$73,559	\$2,163,714	\$2,393,020	\$2,077,519	
19						
20	Grand Totals Off For Rows and Columns					
21	Total Revenue Product					
22	Region	Doodads	Gadget	Gizmo	Widget	
23	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	
24	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	
25	South	\$0	\$839,551	\$918,588	\$844,186	
26	West	\$28,663	\$65,382	\$70,057	\$75,349	
27						

If you want a grand total column but no grand total at the bottom, choose On for Rows Only, as shown at the top of Figure 3.18. To me, this seems backward. To keep the grand total column, you have to choose to turn on grand totals for rows only. I guess the rationale is that each cell in F5:F8 is a grand total of the row to the left of the cell. Hence, you are showing the grand totals for all the rows but not for the columns. Perhaps someday Microsoft will ship a version of Excel in English-Midwest where this setting would be called “Keep the Grand Total Column.” But for now, it remains confusing.

In a similar fashion, to show a grand total row but no grand total column, you open the Grand Totals menu and choose On for Columns Only. Again, in some twisted version of the English language, cell B18 is totaling the cells in the column above it.

The final choice, Off for Rows and Columns, is simple enough. Excel shows neither a grand total column nor a grand total row.

Back in Excel 2003, pivot tables were shown in Tabular layout and logical headings such as Region and Product would appear in the pivot table, as shown in the top pivot table in Figure 3.19. When the Excel team switched to Compact form, they replaced those headings with Row Labels and Column Labels. These add nothing to the report. To toggle off those headings, look on the far right side of the Analyze tab for an icon called Field Headers and click it to remove Row Labels and Column Labels from your pivot tables in Compact form.

3

Figure 3.19
The Compact form introduced in Excel 2007 replaced useful headings with Row Labels. You can turn these off.

	A	B	C	D	E	F
1						
2	Tabular Form					
3	Revenue	Product				
4	Region	Doodads	Gadget	Gizmo	Widget	Grand Total
5	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
6	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
7	South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
8	West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
9						
10	Compact Form - "Region" becomes "Row Labels"					
11	Revenue	Column Labels				
12	Row Labels	Doodads	Gadget	Gizmo	Widget	Grand Total
13	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
14	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
15	South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
16	West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
17						
18	Compact Form - Toggle Off Field Headers					
19	Revenue					
20		Doodads	Gadget	Gizmo	Widget	Grand Total
21	Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
22	Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
23	South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
24	West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451

CAUTION

When you arrange several pivot tables vertically, as in Figure 3.19, you'll notice that changes in one pivot table change the column widths for the entire column, often causing ##### to appear in the other pivot tables. By default, Excel changes the column width to AutoFit the pivot table but ignores anything else in the column. To turn off this default behavior, right-click each pivot table and choose PivotTable Options. In the first tab of the Options dialog, the second-to-last check box is AutoFit Column Widths on Update. Uncheck this box.

Customizing a Pivot Table's Appearance with Styles and Themes

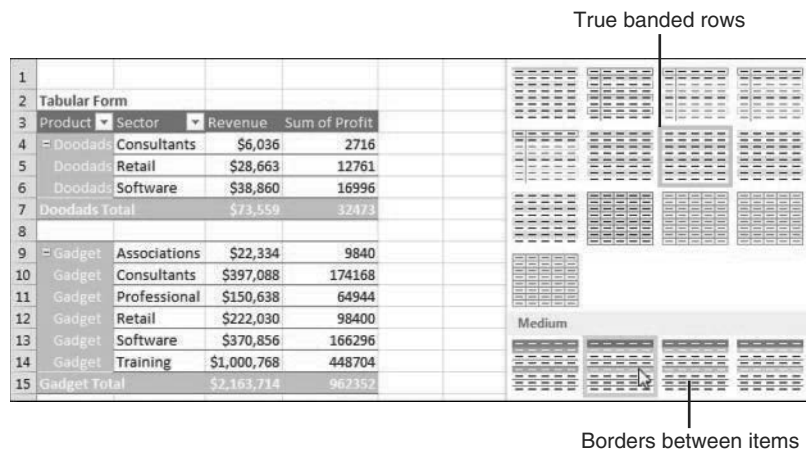
You can quickly apply color and formatting to a pivot table report by using the 85 built-in styles in the PivotTable Styles gallery on the Design tab. These 85 styles are further modified by the four check boxes to the left of the gallery. Throw in the 48 themes on the Page Layout tab, and you have 65,280 easy ways to format a pivot table. If none of those provide what you need, you can define a new style.

Start with the four check boxes in the PivotTable Style Options group of the Design tab of the ribbon. You can choose to apply special formatting to the row headers, column headers, banded rows, or banded columns. My favorite choice here is banded rows because it makes it easier for the reader's eye to follow a row across a wide report. You should choose from these settings first because the choices here will modify the thumbnails shown in the Styles gallery.

As mentioned earlier, the PivotTable Styles gallery on the Design tab offers 85 built-in styles. Grouped into 28 styles each of Light, Medium, and Dark, the gallery offers variations on the accent colors used in the current theme. In Figure 3.20, you can see which styles in the gallery truly support banded rows and which just offer a bottom border between rows.

Figure 3.20

The styles are shown here with accents for row headers, column headers, and alternating colors in the columns.



TIP

Note that you can modify the thumbnails for the 85 styles shown in the gallery by using the four check boxes in the PivotTable Style Options group.

The Live Preview feature in Excel 2016 works in the Styles gallery. As you hover your mouse cursor over style thumbnails, the worksheet shows a preview of the style.

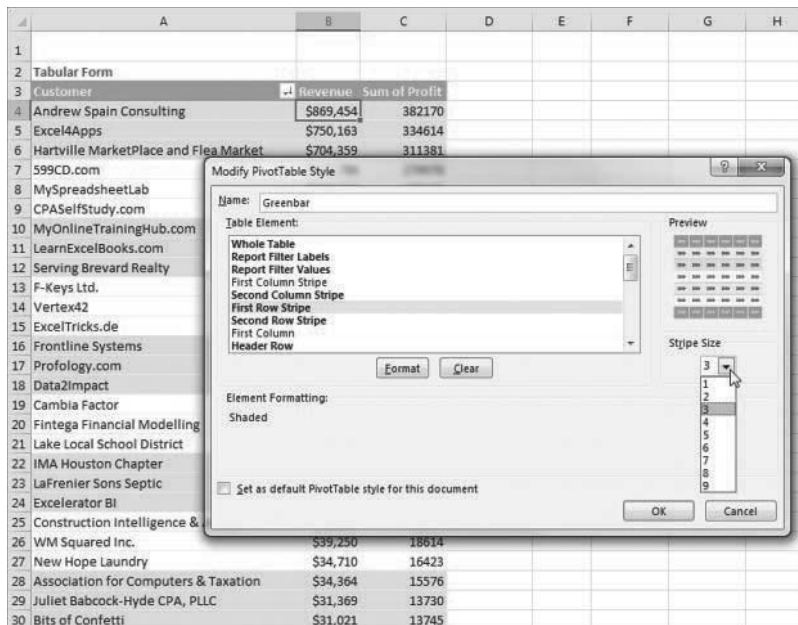
Customizing a Style

You can create your own pivot table styles, and the new styles are added to the gallery for the current workbook only. To use the custom style in another workbook, copy and temporarily paste the formatted pivot table to the other workbook. After the pivot table has been pasted, apply the custom style to an existing pivot table in your workbook and then delete the temporary pivot table.

Say that you want to create a pivot table style in which the banded colors are three rows high. Follow these steps to create the new style:

1. Find an existing style in the PivotTable Styles gallery that supports banded rows. Right-click the style in the gallery and select Duplicate. Excel displays the Modify PivotTable Quick Style dialog.
2. Choose a new name for the style. Excel initially appends a 2 to the existing style name, which means you have a name such as PivotStyleDark3 2. Type a better name, such as **Greenbar**.
3. In the Table Element list, click First Row Stripe. A new section called Stripe Size appears in the dialog.
4. Select 3 from the Stripe Size drop-down, as shown in Figure 3.21.

Figure 3.21
Customize the style in the Modify PivotTable Style dialog.



5. To change the stripe color, click the Format button. The Format Cells dialog appears. Click the Fill tab and then choose a fill color. If you want to be truly authentic, choose More Colors, Custom and use Red=200, Green=225, Blue=204 to simulate 1980s-era greenbar paper. Click OK to accept the color and return to the Modify PivotTable Quick Style dialog.
6. In the Table Element List, click Second Row Stripe. Select 3 from the Stripe Size drop-down. Modify the format to use a lighter color, such as white.
7. If you plan on creating more pivot tables in this workbook, choose the Set as Default PivotTable Style for This Document check box in the lower left.
8. Optionally edit the colors for Header Row and Grand Total Row.
9. Click OK to finish building the style. Strangely, Excel doesn't automatically apply this new style to the pivot table. After you put in a few minutes of work to tweak the style, the pivot table does not change.
10. Your new style should be the first thumbnail visible in the styles gallery. Click that style to apply it to the pivot table.

TIP

If you have not added more than seven custom styles, the thumbnail should be visible in the closed gallery, so you can choose it without reopening the gallery.

Modifying Styles with Document Themes

The formatting options for pivot tables in Excel 2016 are impressive. The 84 styles combined with 16 combinations of the Style options make for hundreds of possible format combinations.

In case you become tired of these combinations, you can visit the Themes drop-down on the Page Layout tab, where many built-in themes are available. Each theme has a new combination of accent colors, fonts, and shape effects.

To change a document theme, open the Themes drop-down on the Page Layout tab. Choose a new theme, and the colors used in the pivot table change to match the theme.

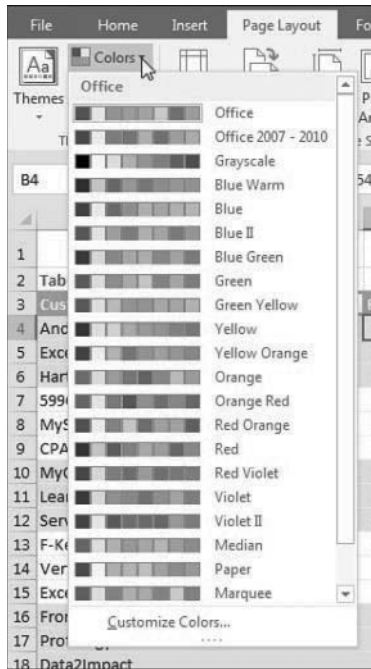
CAUTION

Changing the theme affects the entire workbook. It changes the colors and fonts and affects all charts, shapes, tables, and pivot tables on all worksheets of the active workbook. If you have several other pivot tables in the workbook, changing the theme will apply new colors to all of the pivot tables.

TIP

Some of the themes use unusual fonts. You can apply the colors from a theme without changing the fonts in your document by using the Colors drop-down next to the Themes menu, as shown in Figure 3.22.

Figure 3.22
Choose new colors from the Colors menu.



Changing Summary Calculations

When you create a pivot table report, by default Excel summarizes the data by either counting or summing the items. Instead of Sum or Count, you might want to choose functions such as Min, Max, and Count Numeric. In all, 11 options are available. However, the common reason to change a summary calculation is that Excel has incorrectly chosen to count instead of sum your data.

Understanding Why One Blank Cell Causes a Count

If all the cells in a column contain numeric data, Excel chooses to sum. If just one cell is either blank or contains text, Excel chooses to count.

In Figure 3.23, the worksheet contains mostly numeric entries but has a single blank cell in G2. The one blank cell is enough to cause Excel to count the data instead of summing.

Figure 3.23
The single blank cell in G2 causes problems in the default pivot table.

	A	B	C	D	E	F	G	H	I
1	Sector	Region	Product	Date	Customer	Quantity	Revenue	Profit	Cost
2	Training	Midwest	Gizmo	1/1/2017	599CD.com	1000		10220	12590
3	Software	Northeast	Gadget	1/2/2017	F-Keys Ltd.	100	2257	984	1273
4	Associations	South	Gizmo	1/4/2017	Association for Cor	400	9152	4088	5064
5	Consultants	Midwest	Gadget	1/4/2017	Construction Intell	800	18552	7872	10680
6	Consultants	West	Gadget	1/7/2017	Data2Impact	1000	21730	9840	11890
7	Software	Midwest	Widget	1/7/2017	Excel4Apps	400	8456	3388	5068
8	Software	Midwest	Widget	1/9/2017	Excel4Apps	800	16416	6776	9640

In Excel 2016, the first clue that you have a problem appears when you select the Revenue check box in the top section of the PivotTable Fields list. If Excel moves the Revenue field to the Rows area, you know that Excel considers the field to be text instead of numeric.

CAUTION

Be vigilant while dragging fields into the Values area. If a calculation appears to be dramatically low, check to see if the field name reads Count of Revenue instead of Sum of Revenue.

When you create the pivot table in Figure 3.24, you should notice that your company has only \$562 in revenue instead of millions. This should be a hint that the heading in B3 reads Count of Revenue instead of Sum of Revenue. In fact, 562 is one less than the number of records in the data set; Excel doesn't include the blank cell in the Count function.

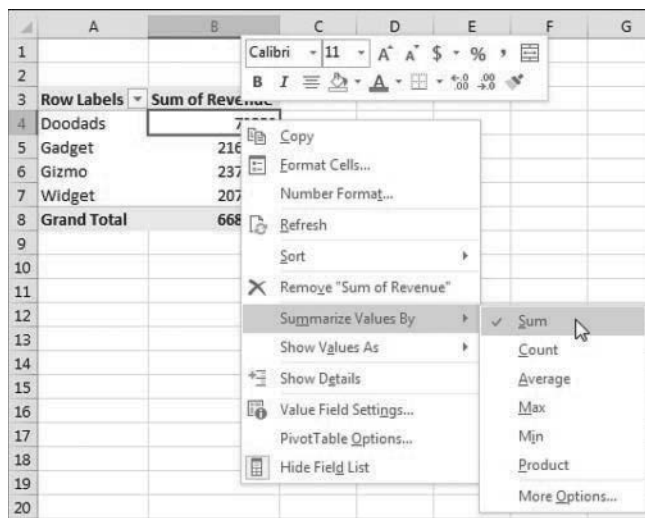
3

Figure 3.24
Your revenue numbers look anemic. Notice in cell B3 that Excel chose to count instead of sum the revenue. This often happens if you inadvertently have one blank cell in your Revenue column.

	A	B
1		
2		
3	Row Labels	Count of Revenue
4	Doodads	7
5	Gadget	178
6	Gizmo	177
7	Widget	200
8	Grand Total	562
9		
10		

To override the incorrect Count calculation, right-click any pivot table cell in the Revenue column. Choose Summarize Values By and then choose Sum (see Figure 3.25).

Figure 3.25
Change the function from Count to Sum in the Summarize Values By drop-down.



Using Functions Other Than Count or Sum

The settings for Summarize Values By and Show Values As were temporarily promoted to drop-downs in the Excel 2010 ribbon, but they are not in the ribbon in Excel 2016. All of the pivot table calculations icons for the Quick Access Toolbar were removed from Excel 2013 and are still gone in 2016. They were apparently removed to make space for Insert Timeline, Drill Down, Drill Up, and Recommended Pivot Tables. If you were a fan of Summarize Values By and Show Values As, you can continue to use them from the right-click menu or by selecting a cell and pressing Shift+F10. These options have always been available in the Value Field Settings dialog.

Excel offers six functions through the Summarize Values By command, plus five more options when you select More Options. The options available are as follows:

- **Sum**—Provides a total of all numeric data.
- **Count**—Counts all cells, including numeric, text, and error cells. This is equivalent to the Excel function =COUNTA().
- **Average**—Provides an average.
- **Max**—Shows the largest value.
- **Min**—Shows the smallest value.
- **Product**—Multiplies all the cells together. For example, if your data set has cells with values of 3, 4, and 5, the product is 60.
- **Count Nums**—Counts only the numeric cells. This is equivalent to the Excel function =COUNT().
- **StdDev and StdDevP**—Calculate the standard deviation. Use StdDevP if your data set contains the complete population. Use StdDev if your data set contains a sample of the population.
- **Var and VarP**—Calculate the statistical variance. Use VarP if your data contains a complete population. If your data contains only a sampling of the complete population, use Var to estimate the variance.

NOTE

Standard deviations explain how tightly results are grouped around the mean.

Adding and Removing Subtotals

Subtotals are an essential feature of pivot table reporting. Sometimes you might want to suppress the display of subtotals, and other times you might want to show more than one subtotal per field.

Suppressing Subtotals with Many Row Fields

When you have many row fields in a report, subtotals can obscure your view. For example, in Figure 3.26, there is no need to show subtotals for each market because there is only one sales rep for each market.

Figure 3.26
Sometimes you do not need subtotals at every level.

3	Region	Market	Rep	Sum of Revenue
4	Midwest	Chicago	Mike Mann	184425
5		Chicago Total		184425
6		Cincinnati	Richard Oldcorn	107016
7		Cincinnati Total		107016
8		Detroit	Anne Troy	1372957
9		Detroit Total		1372957
10		Louisville	John Cockerill	42316
11		Louisville Total		42316
12		Minneapolis	Sabine Hanschitz	34710
13		Minneapolis Total		34710
14	Midwest Total			1741424
15	Northeast	New York	Jade Miller	2124612
16		New York Total		2124612
17	Northeast Total			2124612
18	South	Arkla	Larry Vance	869454
19		Arkla Total		869454

If you used the Subtotals drop-down on the Design tab, you would turn off all subtotals, including the Region subtotals and the Market subtotals. The Region subtotals are still providing good information, so you want to use the Subtotals setting in the Field Settings dialog. Choose one cell in the Market column. On the Analyze tab, choose Field Settings. Change the Subtotals setting from Automatic to None (see Figure 3.27).

Figure 3.27
Use the Subtotals setting in the field list to turn off subtotals for one field.

The screenshot shows a PivotTable with the following data:

3	Region	Market	Rep	Sum of Revenue
4	Midwest	Chicago	Mike Mann	184425
5		Cincinnati	Richard Oldcorn	107016
6		Detroit	Anne Troy	1372957
7		Louisville	John Cockerill	42316
8		Minneapolis	Sabine Hanschitz	34710
9	Northeast	New York	Jade Miller	2124612
10	South	Arkla	Larry Vance	869454
11		Atlanta	Michael Karpfen	530306
12		Charlotte	Ryan Wilson	406326
13		Houston	Jeffrey P. Coulson	796239
14	West	NoCal	John Durran	200201
15		SoCal	Todd A Lesko	35250
16	Grand Total			6707812

The Field Settings dialog box for the Market field is open, showing the Subtotals setting set to None.

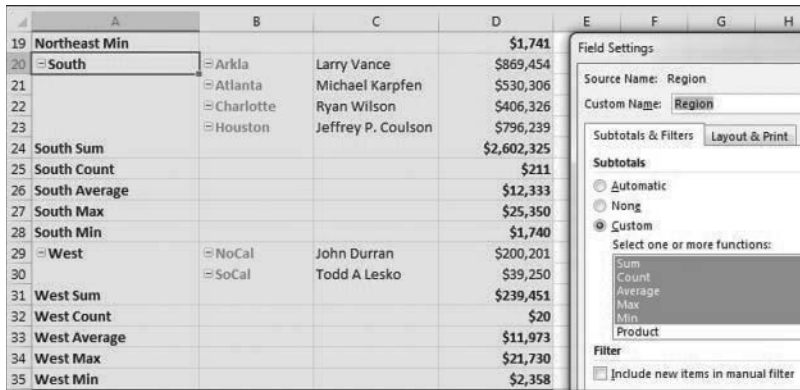
To remove subtotals for the Market field, click the Market field in the bottom section of the PivotTable Fields list. Select Field Settings. In the Field Settings dialog, select None under Subtotals, as shown in Figure 3.27.

Adding Multiple Subtotals for One Field

You can add customized subtotals to a row or column label field. Select the Region field in the bottom of the PivotTable Fields list, and select Field Settings.

In the Field Settings dialog for the Region field, select Custom and then select the types of subtotals you would like to see. The dialog in Figure 3.28 shows five custom subtotals selected for the Region field. It is rare to see pivot tables use this setting. It is not perfect. Note that the count of 211 records automatically gets a currency format like the rest of the column, even though this is not a dollar figure. Also, the average of \$12,333 for South is an average of the detail records, not an average of the individual market totals.

Figure 3.28
By selecting the Custom option in the Subtotals section, you can specify multiple subtotals for one field.



TIP If you need to calculate the average of the four regions, you can do it with the DAX formula language and PowerPivot. See Chapter 10.

Changing the Calculation in a Value Field

The Value Field Settings dialog offers 11 options on the Summarize Values As tab and 15 main options on the Show Values As tab. The options on the first tab are the basic Sum, Average, Count, Max, and Min options that are ubiquitous throughout Excel; the 15 options under Show Values As are interesting ones such as % of Total, Running Total, and Ranks.

For Excel 2010 only, these options appeared as two drop-down menus in the ribbon. They are not on the Excel 2016 ribbon, but they still exist in the right-click menu. Because many of the calculations require one or two additional settings, you end up back in an extra dialog

anyway. If you get in the habit of using the Value Field Settings dialog, you will have access to all the settings in one dialog.

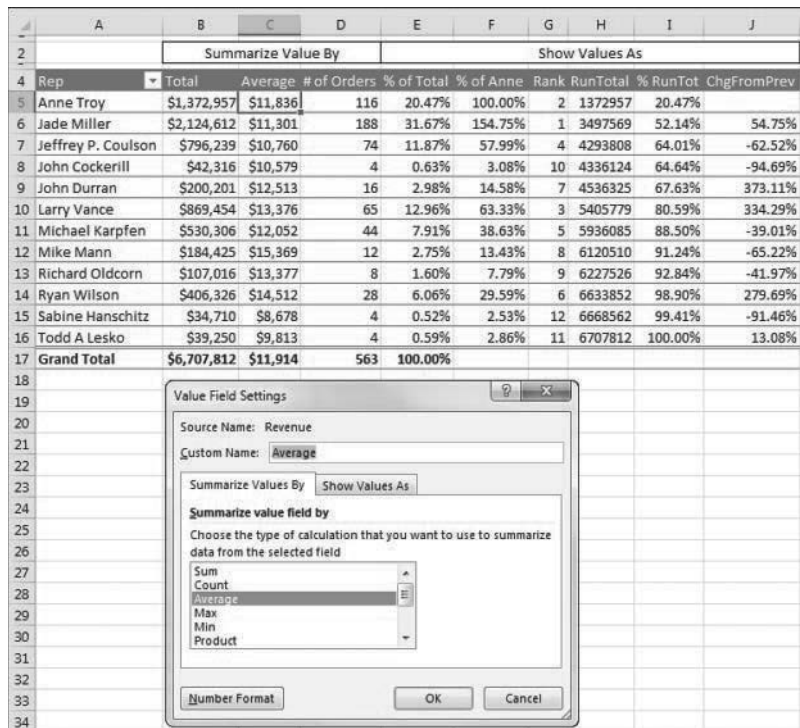
Six of the Show Values As calculations were introduced in Excel 2010, including % of Parent Item, Rank, and % Running Total In.

The following examples show how to use the various calculation options. To contrast the settings, you can build a pivot table where you drag the Revenue field to the Values area nine separate times. Each one shows up as a new column in the pivot table. Over the course of the rest of the chapter, you will see the settings required for the calculations in each column.

To change the calculation for a field, select one value cell for the field and click the Field Settings button on the Analyze tab of the ribbon. The Value Field Settings dialog is similar to the Field Settings dialog, but it has two tabs. The first tab, Summarize Values By, contains Sum, Count, Average, Max, Min, Product, Count Numbers, StdDev, StdDevP, Var, and VarP. You can choose 1 of these 11 calculation options to change the data in the column. In Figure 3.29, columns B through D show various settings from the Summarize Values By tab.

3

Figure 3.29
Choose from the 11 summary calculations on this tab.



Column B is the default Sum calculation. It shows the total of all records for a given market. Column C shows the average order for each item by market. Column D shows a count of the records. You can change the heading to say # of Orders or # of Records or whatever is appropriate. Note that the count is the actual count of records, not the count of distinct items.

NOTE Counting distinct items has been difficult in pivot tables but is now easier using Power Pivot. See Chapter 10 for more details.

Far more interesting options appear on the Show Values As tab of the Value Field Settings dialog, as shown in Figure 3.30. Fifteen options appear in the drop-down. Depending on the option you choose, you might need to specify either a base field or a base item. Columns E through J in Figure 3.29 show some of the calculations possible using Show Values As.

Figure 3.30
Fifteen different ways to show that data is available on this tab.

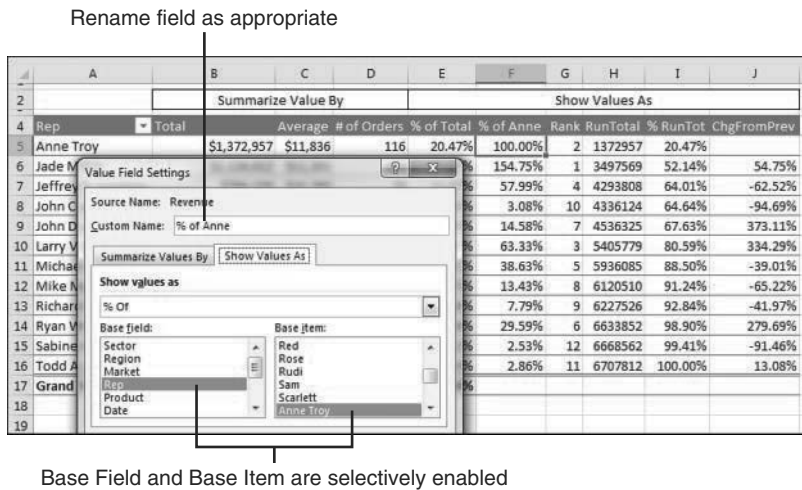


Table 3.1 summarizes the Show Values As options.

Table 3.1 Calculations in Show Value As

Show Value As	Additional Required Information	Description
No Calculation	None	
% of Grand Total	None	Shows percentages so all the detail cells in the pivot table total 100%
% of Column Total	None	Shows percentages that total up and down the pivot table to 100%
% of Row Total	None	Shows percentages that total across the pivot table to 100%
% of Parent Row Total	None	With multiple row fields, shows a percentage of the parent item's total row
% of Parent Column Total	None	With multiple column fields, shows a percentage of the parent column's total
Index	None	Calculates the relative importance of items
% of Parent Total	Base Field only	With multiple row and/or column fields, calculates a cell's percentage of the parent item's total
Running Total In	Base Field only	Calculates a running total
% Running Total In	Base Field only	Calculates a running total as a percentage of the total
Rank Smallest to Largest	Base Field only	Provides a numeric rank, with 1 as the smallest item
Rank Largest to Smallest	Base Field only	Provides a numeric rank, with 1 as the largest item
% of	Base Field and Base Item	Expresses the values for one item as a percentage of another item
Difference From	Base Field and Base Item	Shows the difference of one item compared to another item or to the previous item
% Difference From	Base Field and Base Item	Shows the percentage difference of one item compared to another item or to the previous item

The capability to create custom calculations is another example of the unique flexibility of pivot table reports. With the Show Data As setting, you can change the calculation for a particular data field to be based on other cells in the Values area.

The following sections illustrate a number of Show Values As options.

Showing Percentage of Total

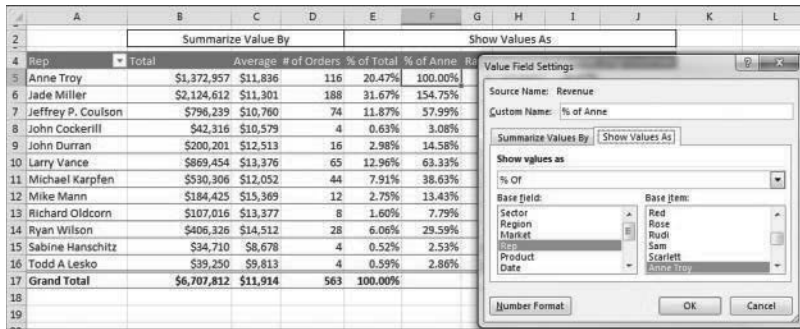
In Figure 3.29, column E shows % of Total. Jade Miller, with \$2.1 million in revenue, represents 31.67% of the \$6.7 million total revenue. Column E uses % of Column Total on the Show Values As tab. Two other similar options are % of Row Total and % of Grand Total.

Choose one of these based on whether your text fields are going down the report, across the report, or both down and across.

Using % Of to Compare One Line to Another Line

The % Of option enables you to compare one item to another item. For example, in the current data set, Anne was the top sales rep in the previous year. Column F shows everyone's sales as a percentage of Anne's. Cell E7 in Figure 3.31 shows that Jeff's sales were almost 58% of Anne's sales.

Figure 3.31
This report is created using the % Of option with Anne Troy as the Base Item.

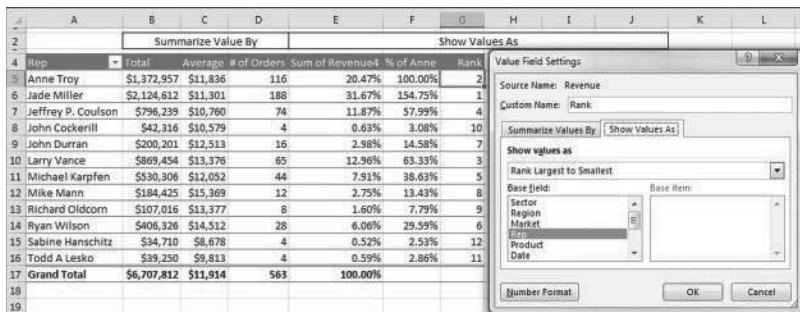


To set up this calculation, choose Show Values As, % Of. For Base Field, choose Rep because this is the only field in the Rows area. For Base Item, choose Anne Troy. The result is shown in Figure 3.31.

Showing Rank

Two ranking options are available. Column G in Figure 3.32 shows Rank Largest to Smallest. Jade Miller is ranked #1, and Sabine Hanschitz is #12. A similar option is Rank Smallest to Largest, which would be good for the pro golf tour.

Figure 3.32
The Rank options were added in Excel 2010.



To set up a rank, choose Value Field Settings, Show Values As, Rank Largest to Smallest. You are required to choose base field. In this example, because Rep is the only row field, it is the selection under Base Field.

These rank options show that pivot tables have a strange way of dealing with ties. I say *strange* because they do not match any of the methods already established by the Excel functions =RANK(), =RANK.AVG(), and =RANK.EQ(). For example, if the top two markets have a tie, they are both assigned a rank of 1, and the third market is assigned a rank of 2.

Tracking Running Total and Percentage of Running Total

Running total calculations are common in reports where you have months running down the column or when you want to show that the top N customers make up $N\%$ of the revenue. The Running Total In calculation has been in Excel for many versions. The % Running Total In setting was added in Excel 2010.

In Figure 3.33, cell I8 shows that the top four sales reps account for 76.97% of the total sales.

Figure 3.33
Show running totals or a running percentage of total.

Rep	Total	Average	# of Orders	% of Total	% of Anne	Rank	RunTotal	% RunTot
Jade Miller	\$2,124,612						\$2,124,612	31.67%
Anne Troy	\$3,497,569						\$3,497,569	52.14%
Larry Vance	\$4,367,023						\$4,367,023	65.10%
Jeffrey P. Coulson	\$5,163,262						\$5,163,262	76.97%
Michael Karpfen	\$5,693,568						\$5,693,568	84.88%
Ryan Wilson	\$6,099,894						\$6,099,894	90.94%
John Durran	\$6,300,095						\$6,300,095	93.92%
Mike Mann	\$6,484,520						\$6,484,520	96.67%
Richard Oldcorn	\$6,591,536						\$6,591,536	98.27%
John Cockerill	\$6,633,852						\$6,633,852	98.90%
Todd A Lesko	\$6,673,102						\$6,673,102	99.48%
Sabine Hanschitz	\$6,707,812						\$6,707,812	100.00%
Grand Total								

NOTE

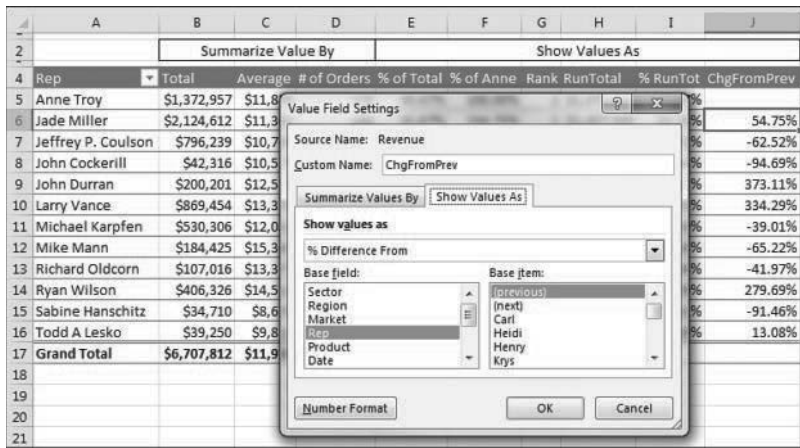
To produce this figure, you have to use the Sort feature, which is discussed in depth in Chapter 4, "Grouping, Sorting, and Filtering Pivot Data." To create a similar analysis with the sample file, go to the drop-down in A4 and choose More Sort Options, Descending, by Total. Also note that the % Change From calculation shown in the next example is not compatible with sorting.

To specify Running Total In (as shown in Column H) or % Running Total In (Column J), select Field Settings, Show Values As, Running Total In. You have to specify a base field, which in this case is the row field: Rep.

Displaying a Change from a Previous Field

Figure 3.34 shows the % Difference From setting. This calculation requires a base field and base item. You could show how each market compares to Anne Troy by specifying Anne Troy as the base item. This would be similar to Figure 3.31, except each market would be shown as a percentage of Anne Troy.

Figure 3.34
The % Difference From options enable you to compare each row to the previous or next row.

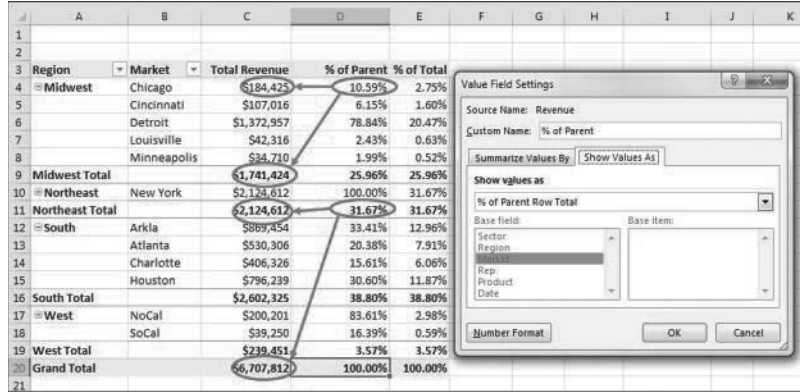


With date fields, it would make sense to use % Difference From and choose (previous) as the base item. Note that the first cell will not have a calculation because there is no previous data in the pivot table.

Tracking the Percentage of a Parent Item

The legacy % of Total settings always divides the current item by the grand total. In Figure 3.35, cell E4 says that Chicago is 2.75% of the total data set. A common question at the MrExcel.com message board is how to calculate Chicago’s revenue as a percentage of the Midwest region total. This was possible but difficult in older versions of Excel. Starting in Excel 2010, though, Excel added the % of Parent Row, % of Parent Column, and % of Parent Total options.

Figure 3.35
An option in Excel enables you to calculate a percentage of the parent row.



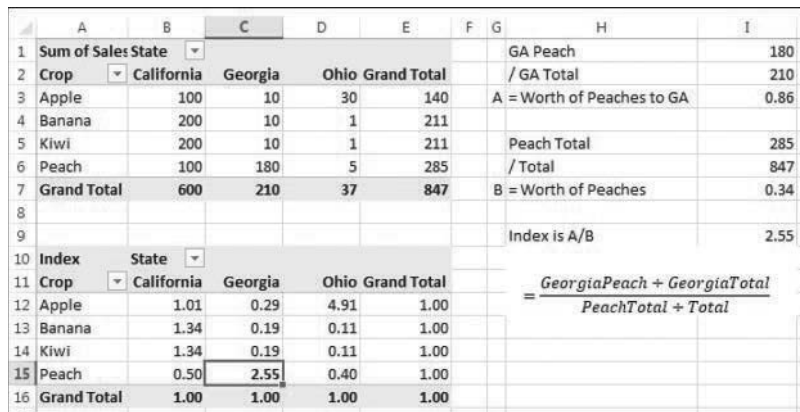
To set up this calculation in Excel 2016, use Field Settings, Show Values As, % of Parent Row Total. Cell D4 in Figure 3.35 shows that Chicago’s \$184,425 is 10.59% of the Midwest total of \$1,741,424.

Although it makes sense, the calculation on the subtotal rows might seem confusing. D4:D8 shows the percentage of each market as compared to the Midwest total. The values in D9, D11, D16, and D19 compare the region total to the grand total. For example, the 31.67% in D11 says that the Northeast region’s \$2.1 million is a little less than a third of the \$6.7 million grand total.

Tracking Relative Importance with the Index Option

The final option, Index, creates a somewhat obscure calculation. Microsoft claims that this calculation describes the relative importance of a cell within a column. In Figure 3.36, Georgia peaches have an index of 2.55, and California peaches have an index of 0.50. This shows that if the peach crop is wiped out next year, it will be more devastating to Georgia fruit production than to California fruit production.

Figure 3.36
Using the Index function, Excel shows that peach sales are more important in Georgia than in California.



Here is the exact calculation: First, divide Georgia peaches by the Georgia total. This is $180/210$, or 0.857. Next, divide total peach production (285) by total fruit production (847). This shows that peaches have an importance ratio of 0.336. Now, divide the first ratio by the second ratio: $0.857/0.336$.

In Ohio, apples have an index of 4.91, so an apple blight would be bad for the Ohio fruit industry.

I have to admit that, even after writing about this calculation for 10 years, there are parts that I don't quite comprehend. What if a state like Hawaii relied on productions of lychees, but lychees were nearly immaterial to U.S. fruit production? If lychees were half of Hawaii's fruit production but 0.001 of U.S. fruit production, the Index calculation would skyrocket to 500.

Next Steps

Note that the following pivot table customizations are covered in subsequent chapters:

- Sorting a pivot table is covered in Chapter 4.
- Filtering records in a pivot table is covered in Chapter 4.
- Grouping daily dates up to months or years is covered in Chapter 4.
- Adding new calculated fields is covered in Chapter 5, "Performing Calculations in Pivot Tables."
- Using data visualizations and conditional formatting in a pivot table is covered in Chapter 4.

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