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# PIVOT TABLE DATA CRUNCHING

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# Excel 2013 Pivot Table Data Crunching

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# Excel 2013 Pivot Table Data Crunching

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## Dedication

*To everyone at Boca Raton Fire Department*

—Bill Jelen

*To my twelve fans at [datapigtechnologies.com](http://datapigtechnologies.com)*

—Mike Alexander

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—Bill Jelen

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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 take 1 million rows of transactional data and transform it 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 percent of Excel users leave 80 percent 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 or even have 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.

### IN THIS INTRODUCTION

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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 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 2013'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 2013 pivot tables include the following:

- Excel offers thumbnails for four possible pivot tables in the Data Analysis Lens. If you happen to need one of these pivot tables, it requires three mouse clicks.
- Excel offers thumbnails for ten 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 new timeline slicer enables you to easily filter your pivot table by month, quarter, or year. Excel 2010 had added visual filters called *slicers*—the timeline in Excel 2013 extends slicers for date fields.
- All people using any version of Excel 2013 (except Excel RT on a tablet) can now jump through a few hoops to build a pivot table using data on multiple worksheets. This functionality replaces the need to join two worksheets using `VLOOKUP`.
- People using the client version of Office 365 or Excel Professional Plus can enable the PowerPivot add-in. PowerPivot provides drag-and-drop functionality to link tables, worksheets, SQL Server, and more. PowerPivot adds better calculated fields.
- PowerView enables you to animate your pivot tables in an ad-hoc query tool.

If you skipped Excel 2010, you missed these new features:

- New calculations for Rank, Percentage of Parent, and Running Percent of Total.
- Repeat Item Labels to fill in the blanks along the outer column fields in a pivot table.
- Slicers to create visual filters.

## Skills Required to Use This Book

We have created a reference that is comprehensive enough for hard-core analysts yet relevant to casual users of Excel. The bulk of the book covers how to use pivot tables in the Excel user interface. Chapter 10, “Mashing up Data with PowerPivot,” delves into the PowerPivot window. Chapter 14, “Advanced PivotTable Tips and Techniques,” describes how to create pivot tables in Excel’s powerful VBA macro language. This means that any user who has a firm grasp of the basics, such as preparing data, copying, pasting, and entering simple formulas, should not have a problem understanding the concepts in this book.

## CASE STUDY: LIFE BEFORE PIVOT TABLES

Your manager asks you to create a one-page summary of a sales database. He would like to see total revenue by region and product. Suppose you do not know how to use pivot tables. You will have to use dozens of keystrokes or mouse clicks to complete this task.

First, you have to build the outline of the report:

1. Copy the Product column to a blank section of the worksheet.
2. Use Data, Remove Duplicates to eliminate the duplicates.
3. Delete the Product heading.
4. Copy the unique list of products and then use Paste Special Transpose to turn the list sideways.
5. Delete the vertical list of products.
6. Copy the Region column to a blank section of the worksheet.
7. Use Data, Remove Duplicates to remove the duplicates.
8. Delete the Region heading.
9. Cut and paste the products so they appear left of and below the regions.

At this point, I count 27 mouse clicks or keystrokes. You've built the shell of the final report, but there are no numbers inside yet, as shown in Figure I.1.

**Figure I.1**

It took 27 clicks to get to this point.

Region	Product	Date	Customer	Quantity	Revenue	COGS	Profit								
Midwest	Gizmo	1/1/2014	Ford	1000	22810	10220	12590								
Northeast	Gadget	1/2/2014	Verizon	100	2257	984	1273								
South	Gizmo	1/4/2014	Valero Energy	400	9152	4088	5064								
Midwest	Gadget	1/4/2014	Cardinal Health	800	18552	7872	10680								
West	Gadget	1/7/2014	Wells Fargo	1000	21730	9840	11890								
Midwest	Widget	1/7/2014	General Motors	400	8456	3388	5068								
Midwest	Widget	1/9/2014	General Motors	800	16416	6776	9640								
South	Gizmo	1/10/2014	Wal-Mart	900	21438	9198	12240								
Northeast	Widget	1/12/2014	IBM	300	6267	2541	3726								
South	Gizmo	1/14/2014	AT&T	100	2401	1022	1379								

Next, you need to build the relatively new SUMIFS function to total the revenue for the intersection of a region and product. As shown in Figure I.2, a formula of =SUMIFS(\$G\$2:\$G\$564,\$C\$2:\$C\$564,L\$1,\$B\$2:\$B\$564,\$K2) does the trick. It takes 52 characters plus the Enter key to finish the formula, but I managed to enter the formula in 36 clicks or keystrokes using some clever navigation tricks I've learned over the years.

**Figure I.2**

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

Region	Product	Date	Customer	Quantity	Revenue	COGS	Profit								
Midwest	Gizmo	1/1/2014	Ford	1000	22810	10220	12590								
Northeast	Gadget	1/2/2014	Verizon	100	2257	984	1273								
South	Gizmo	1/4/2014	Valero Energy	400	9152	4088	5064								
Midwest	Gadget	1/4/2014	Cardinal Health	800	18552	7872	10680								
West	Gadget	1/7/2014	Wells Fargo	1000	21730	9840	11890								
Midwest	Widget	1/7/2014	General Motors	400	8456	3388	5068								

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

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

You have a nice summary report, as shown in Figure I.3. It took 77 clicks or keystrokes. If you could pull all this off in 5 or 10 minutes, you would probably be fairly proud of your Excel prowess—there were 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

Hand the report to your manager. Within a few minutes, your manager will come 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. Although the Excel team coined the term *Pivot Table*, it did not appear in Excel until 1993. 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 pivot tables.

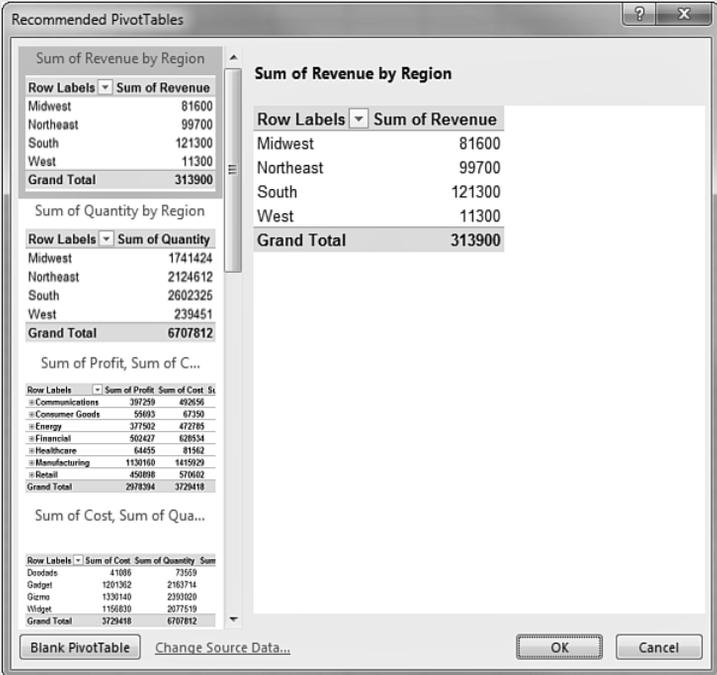
The core concept behind a pivot table is that the data, formulas, and data views are stored separately. Each column has a name, and you can group and rearrange the data by dragging field names to various positions on the report.

CASE STUDY: LIFE AFTER PIVOT TABLES

Say you need to produce the same report in the last case study but you want to use a pivot table. Excel 2013 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 I.4).

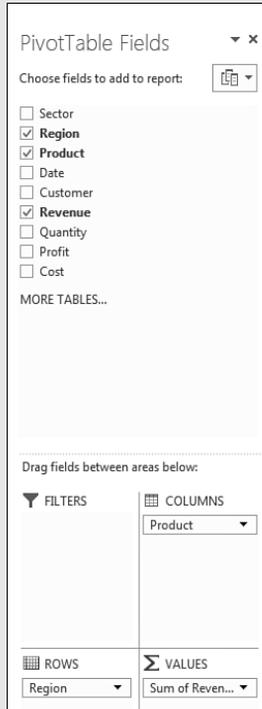
**Figure I.4**  
The first recommended pivot table is as close as you will get to the required report.



3. Click OK to accept the first pivot table.
4. Drag the Product field from the PivotTable Field List to the COLUMNS area (see Figure I.5).

**Figure I.5**

To finish the report, drag the Product heading to the COLUMNS area.



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

After 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	300	24700	28200	28400	81600
6	Northeast	1800	32500	33300	32100	99700
7	South		37700	39500	44100	121300
8	West	1300	2900	3000	4100	11300
9	Grand Total	3400	97800	104000	108700	313900

In addition, when your manager comes back with one of the requests near the end of the prior case study, a pivot table makes it easy for you to make the changes. You find out about all of these methods in the chapters that follow, but here is a quick recap:

- Could you put products down the side and regions across the top? (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/pivotbookdata2013.html](http://www.mrexcel.com/pivotbookdata2013.html). You will find one Excel workbook per chapter and should be able to achieve the exact 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**—Text messages you see onscreen or code appears 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 Versions

From 1997 through 2003, Microsoft released similar versions of Excel known as Excel 97, Excel 2000, Excel 2002/XP, and Excel 2003. This book refers to those versions as “legacy versions” of Excel.

## Referring to Ribbon Commands

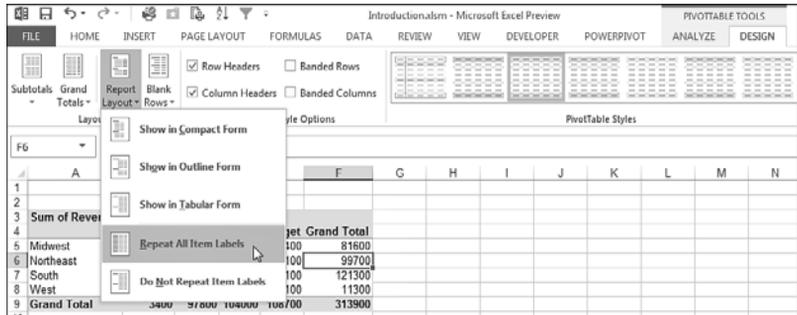
Office 2007 introduced a new interface called the ribbon. The ribbon is composed of several tabs labeled Home, Insert, Page Layout, and so on. When you click the Page Layout tab, you see the icons available on the Page Layout tab.

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, in Figure I.7, the shorthand specifies “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 a real-world look at 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 otherwise 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 this case, you can use many powerful settings to tweak the information in your pivot table. These tweaks range from making cosmetic changes to changing the underlying calculation used in the pivot table.

In Excel 2013, you find controls to customize the 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 seeks to cover 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 table styles to format your table quickly.
- **Summary calculations**—Change from Sum to Count, Min, Max, and more. If you have a table that defaults to Count of Revenue instead of Sum of Revenue, you need to visit the section on this topic.
- **Advanced calculations**—Use settings to show data as a running total, percent of total, rank, percent of parent item, and more.
- **Other options**—Review more 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 and Revenue fields, and drag the Region field to the COLUMNS area.

**Figure 3.1**

A typical pivot table before customization.

3	Sum of Revenue	Column Labels				
4	Row Labels	Midwest	Northeast	South	West	Grand Total
5	Communications		390978	498937		889915
6	AT&T			498937		498937
7	Verizon		390978			390978
8	Consumer Goods	123043				123043
9	Kraft Foods	62744				62744
10	Proctor & Gamble	60299				60299
11	Energy			796239		796239
12	Chevron				57516	57516
13	ConocoPhillips				704359	704359
14	Exxon Mobil				34364	34364
15	Valero Energy					
16	Financial	664754	406326			1071080
17	Bank of America				406326	406326
18	CitiGroup			613514		613514
19	JP Morgan Chase			51240		51240
20	Wells Fargo					
21	Healthcare	42316	72680			115000
22	Cardinal Health	42316				42316
23	McKesson					
24	Pfizer			72680		72680
25	Manufacturing	1494638	996200			2490838

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.
- 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 Communications 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.

### Applying a Table Style to Restore Gridlines

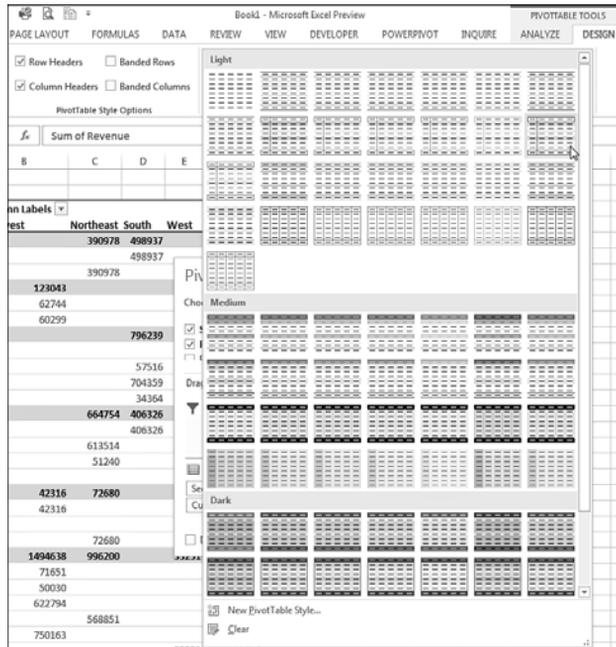
The default pivot table layout contains no gridlines and is rather plain. Fortunately, you can apply a table style. Any table style that you choose is better than the default.

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.
3. Three arrows appear at the right side of the PivotTable Style gallery. 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.

→ For more details about customizing styles, see “Customizing the Pivot Table Appearance with Styles and Themes,” p. 59.

## 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 would 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. For more about PowerPivot, read Chapter 10, “Mashing Up Data with PowerPivot.”

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.

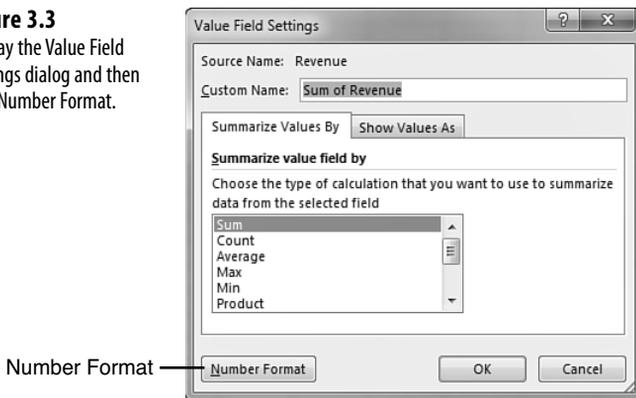
You will be tempted to format the numbers using the right-click menu and choosing Number Format. This is not the best way to go. You will be tempted to format the cells using the tools on the Home tab. This is not the way to go. Either of these methods temporarily fixes the problem, but you lose the 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 on the Sum of Revenue field in the drop zones of the PivotTable Field 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.

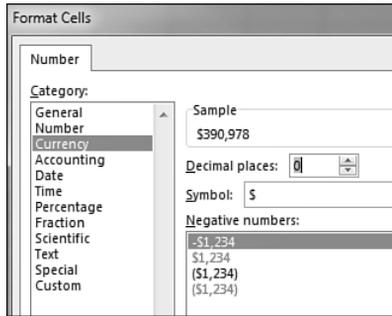
**Figure 3.3**  
Display the Value Field Settings dialog and then click Number Format.



In the Format Cells dialog, you can choose any built-in number format or choose a custom format. For example, 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 2013 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.

## 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 the 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 2013 treats the entire column as if it is text and chooses to Count the column instead of Sum. 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.

The blank tells you that there were no sales for that 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.

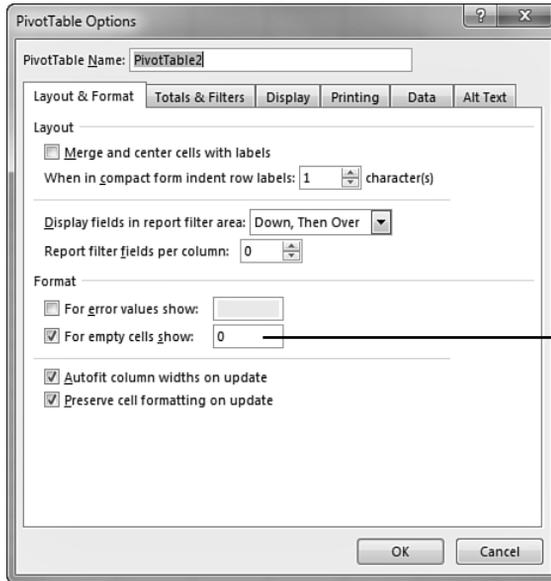
Follow these steps to change this setting for the current pivot table:

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).
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 3.5**

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



Enter a zero here.

**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	Communications	\$0	\$390,978	\$498,937	\$0	\$889,915
6	AT&T	\$0	\$0	\$498,937	\$0	\$498,937
7	Verizon	\$0	\$390,978	\$0	\$0	\$390,978
8	Consumer Goods	\$123,043	\$0	\$0	\$0	\$123,043
9	Kraft Foods	\$62,744	\$0	\$0	\$0	\$62,744
10	Proctor & Gamble	\$60,299	\$0	\$0	\$0	\$60,299
11	Energy	\$0	\$0	\$796,239	\$54,048	\$850,287
12	Chevron	\$0	\$0	\$0	\$54,048	\$54,048
13	ConocoPhillips	\$0	\$0	\$57,516	\$0	\$57,516
14	Exxon Mobil	\$0	\$0	\$704,359	\$0	\$704,359
15	Valero Energy	\$0	\$0	\$34,364	\$0	\$34,364
16	Financial	\$0	\$664,754	\$406,326	\$59,881	\$1,130,961

## Changing a Field Name

Every field in the 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.

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:

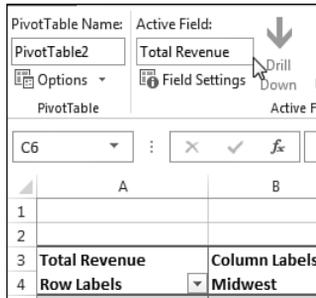
1. Select a cell in the pivot table that contains the appropriate type of value. You might have a pivot table with both Sum of Quantity and Sum of Revenue in the VALUES area. Choose a cell that contains a Sum of Revenue value.
2. Go to the Analyze tab in the ribbon. A Pivot Field Name text box appears below the heading of 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 drop zone also changes to reflect the new name.

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 cosmetic, the readers of your spreadsheet do not notice the space after the 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 similar name by adding a space to the end of it.



## Making Report Layout Changes

Excel 2013 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:

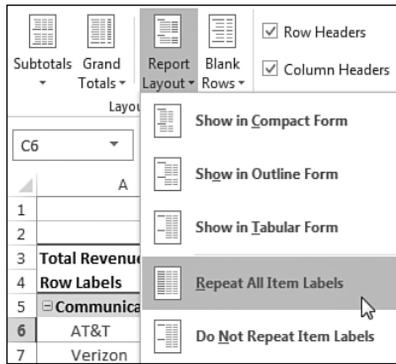
- **Subtotals**—Moves subtotals to the top or bottom of each group or turns them off.
- **Grand Totals**—Turns the grand totals on or off for rows and columns.

- **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.

**NOTE** For the statisticians in the audience, you would think that three layouts × two repeat options × two subtotal location options × two blank row options would be 24 layouts. However, choosing Repeat All Item Labels does not work with the Compact Form, thus eliminating four combinations. In addition, Subtotals at the Top of Each Group does not work with the Tabular layout, eliminating another four combinations.

3

**Figure 3.8**  
The Layout group on the Design tab offers different layouts and options for totals.



### Using the New Compact Layout

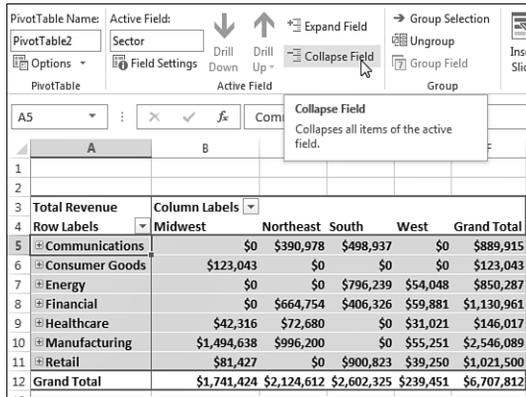
By default, all new pivot tables use the Compact layout shown in Figure 3.6. In this layout, multiple fields in the row area are stacked in column A. Note in the figure that the Communications sector and the AT&T customer are both in column A.

The Compact form is suited for using the Expand and Collapse icons. Select one of the Sector value cells such as Communications in A5. 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.

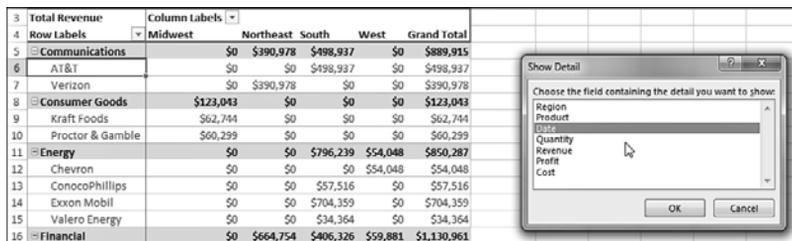
After a field is collapsed, you can show detail for individual items by using the plus icons in column A, or you can click Expand Field on the Analyze tab to see the detail again.

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



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



### Using the Outline Form Layout

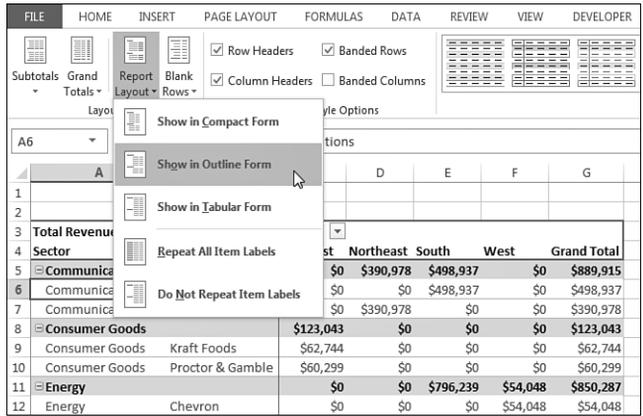
When you select Design, Layout, Report Layout, Show in Outline Form, Excel puts each row field in a separate column. The pivot table shown in Figure 3.11 is one column wider, with revenue values starting in C instead of B. This is a small price to pay for allowing each field to occupy its own column. 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.

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 becomes 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 of Figure 3.11.

Figure 3.11 shows the pivot table in Outline form with labels repeated.

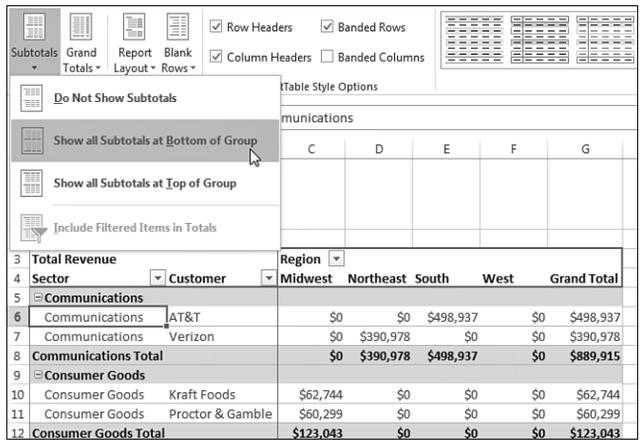
This layout is better suited if you plan to copy the values from the pivot table to a new location for further analysis. Although the Compact layout offers a clever approach by squeezing multiple fields in one column, it is not ideal for reusing the data later.

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



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 “Communications” 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 seven 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

Pivot table veterans will recognize the Tabular layout shown in Figure 3.13. 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.

Communications							
A	B	C	D	E	F	G	
1							
2							
3	Total Revenue		Region				
4	Sector	Customer	Midwest	Northeast	South	West	Grand Total
5	Communications	AT&T	\$0	\$0	\$498,937	\$0	\$498,937
6	Communications	Verizon	\$0	\$390,978	\$0	\$0	\$390,978
7	Communications Total		\$0	\$390,978	\$498,937	\$0	\$889,915
8	Consumer Goods	Kraft Foods	\$62,744	\$0	\$0	\$0	\$62,744
9	Consumer Goods	Proctor & Gamble	\$60,299	\$0	\$0	\$0	\$60,299
10	Consumer Goods Total		\$123,043	\$0	\$0	\$0	\$123,043
11	Energy	Chevron	\$0	\$0	\$0	\$54,048	\$54,048
12	Energy	ConocoPhillips	\$0	\$0	\$57,516	\$0	\$57,516
13	Energy	Exxon Mobil	\$0	\$0	\$704,359	\$0	\$704,359
14	Energy	Valero Energy	\$0	\$0	\$34,364	\$0	\$34,364
15	Energy Total		\$0	\$0	\$796,239	\$54,048	\$850,287

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, 10, 15, 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 Field List. Drop this field between Sector and Customer in the ROWS area.
5. Check Profit and Cost in the top of the PivotTable Field List. Because both fields are numeric, they move to the VALUES area and appear in the pivot table as new columns. The report is now a contiguous solid block of data, as shown in Figure 3.14.
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.
10. 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.

**Figure 3.14**

The pivot table now contains a solid block of data.

	A	B	C	D	E	F	G
3	Sector	Region	Customer	Total Revenue	Total Cost	Total Profit	
4	Communications	Northeast	Verizon	\$390,978	\$213,697	\$177,281	
5	Communications	South	AT&T	\$498,937	\$278,959	\$219,978	
6	Consumer Goods	Midwest	Kraft Foods	\$62,744	\$34,100	\$28,644	
7	Consumer Goods	Midwest	Proctor & Gamble	\$60,299	\$33,250	\$27,049	
8	Energy	South	ConocoPhillips	\$57,516	\$30,751	\$26,765	
9	Energy	South	Exxon Mobil	\$704,359	\$392,978	\$311,381	
10	Energy	South	Valero Energy	\$34,364	\$18,788	\$15,576	
11	Energy	West	Chevron	\$54,048	\$30,268	\$23,780	
12	Financial	Northeast	CitiGroup	\$613,514	\$338,409	\$275,105	
13	Financial	Northeast	JP Morgan Chase	\$51,240	\$28,416	\$22,824	
14	Financial	South	Bank of America	\$406,326	\$227,741	\$178,585	
15	Financial	West	Wells Fargo	\$59,881	\$33,968	\$25,913	

**Figure 3.15**

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

10	\$30,751
59	\$392,978
64	\$18,788
48	\$30,268
14	\$338,409
40	\$28,416
26	\$227,741
81	\$33,968
80	\$40,734
21	\$17,276
371,051	\$39,180

Paste Values and Number Formatting

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.

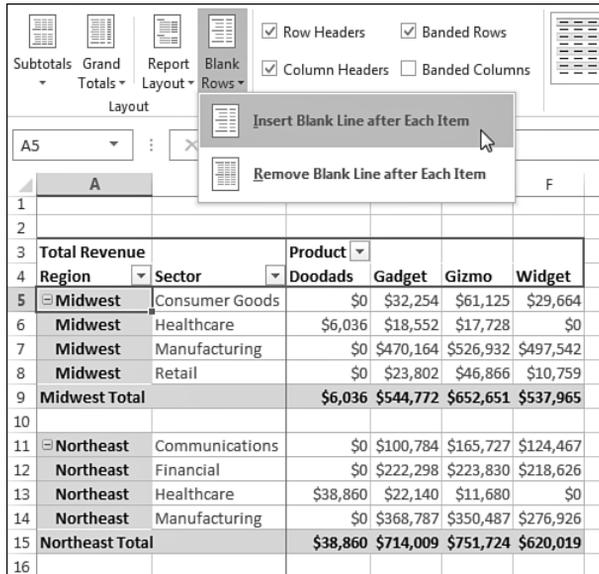
## Controlling Blank Lines, Grand Totals, and Other Settings

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

The Blank Rows drop-down offers a choice for Insert Blank Row After Each Item. This setting only applies 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 would have only Region in the row fields and no blank rows would appear (see Figure 3.17).

**Figure 3.16**

The Blank Rows setting makes the report easier to read.



**Figure 3.17**

However, blank rows will not appear when there is only one item in the row field.

	A	B	C	D	E	F
1						
2						
3	<b>Total Revenue</b>	<b>Product</b>				
4	<b>Region</b>	<b>Doodads</b>	<b>Gadget</b>	<b>Gizmo</b>	<b>Widget</b>	<b>Grand Total</b>
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	<b>Grand Total</b>	<b>\$73,559</b>	<b>\$2,163,714</b>	<b>\$2,393,020</b>	<b>\$2,077,519</b>	<b>\$6,707,812</b>

**NOTE**

For those of you following along with the sample files, there was quite a leap from the pivot table in Figure 3.14 to 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 task pane.
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. Finally, as shown in Figure 3.16, open the Blank Rows drop-down and choose to add blank rows. To get to 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.

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 each row, 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.

**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	G
1	Grand Totals On For Rows Only						
2	<i>Keeps the Grand Total column at the end of each row, deletes the Grand Total row.</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, deletes the Grand Total column.</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	<b>Grand Total</b>	<b>\$73,559</b>	<b>\$2,163,714</b>	<b>\$2,393,020</b>	<b>\$2,077,519</b>		
19							
20	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		

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.

**Figure 3.19**

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

Region	Doodads	Gadget	Gizmo	Widget	Grand Total
Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
<b>Grand Total</b>	<b>\$73,559</b>	<b>\$2,163,714</b>	<b>\$2,393,020</b>	<b>\$2,077,519</b>	<b>\$6,707,812</b>

Revenue	Doodads	Gadget	Gizmo	Widget	Grand Total
Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
<b>Grand Total</b>	<b>\$73,559</b>	<b>\$2,163,714</b>	<b>\$2,393,020</b>	<b>\$2,077,519</b>	<b>\$6,707,812</b>

Revenue	Doodads	Gadget	Gizmo	Widget	Grand Total
Midwest	\$6,036	\$544,772	\$652,651	\$537,965	\$1,741,424
Northeast	\$38,860	\$714,009	\$751,724	\$620,019	\$2,124,612
South	\$0	\$839,551	\$918,588	\$844,186	\$2,602,325
West	\$28,663	\$65,382	\$70,057	\$75,349	\$239,451
<b>Grand Total</b>	<b>\$73,559</b>	<b>\$2,163,714</b>	<b>\$2,393,020</b>	<b>\$2,077,519</b>	<b>\$6,707,812</b>

### 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 the Pivot Table Appearance with Styles and Themes

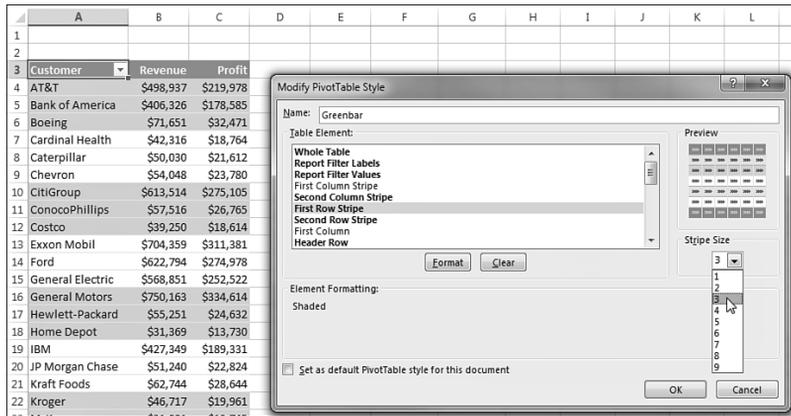
You can quickly apply color and formatting to a pivot table report using the 85 built-in styles in the PivotTable Styles gallery on the Design tab. These 85 styles are further modified by the four checkboxes to the left of the gallery. Combined with the 48 themes on the Page Layout tab, you have 65,280 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



- 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**.
- In the Table Element list, click First Row Stripe. A new section called Stripe Size appears in the dialog.
- 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.



- 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.
- In the Table Element List, click Second Row Stripe. Change the Stripe Size drop-down to be 3. Modify the format to use a lighter color such as white.
- 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.
- Optionally edit the colors for Header Row and Grand Total Row.
- Click OK to finish building the style. It is strange that the Excel team doesn't automatically apply this new style to the pivot table. After a few minutes of work to tweak the style, the pivot table does not change.
- Your new style should be the first thumbnail visible in the styles gallery. Click that style to apply it to the pivot table. (Provided you have not added more than seven custom

styles, the thumbnail should be visible in the closed gallery—you can choose it without reopening the gallery.)

## Modifying Styles with Document Themes

The formatting options for pivot tables in Excel 2013 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 48 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.

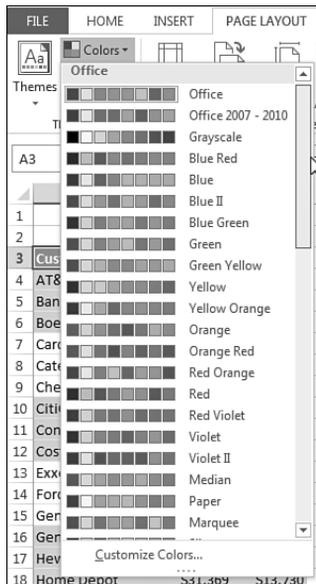
### CAUTION

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.

### 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 creating your pivot table report, by default Excel summarizes your 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 incorrectly chose to count instead of sum your data.

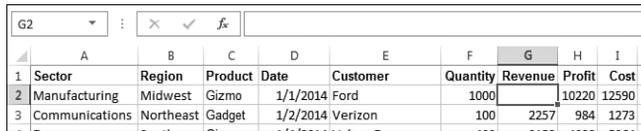
### Understanding Why One Blank Cell Causes a Count

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.



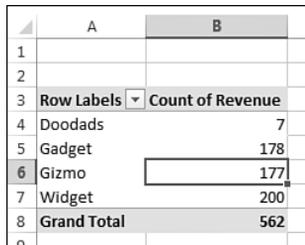
	A	B	C	D	E	F	G	H	I
1	Sector	Region	Product	Date	Customer	Quantity	Revenue	Profit	Cost
2	Manufacturing	Midwest	Gizmo	1/1/2014	Ford	1000		10220	12590
3	Communications	Northeast	Gadget	1/2/2014	Verizon	100	2257	984	1273

In Excel 2013, the first clue that you have a problem appears when you select the check box for Revenue in the Fields section of the PivotTable Field List. If Excel moves the Revenue field to the Rows drop zone, you know that Excel considers the field to be text instead of numeric.

Be vigilant while dragging fields into the Values drop zone. 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.

**Figure 3.24**

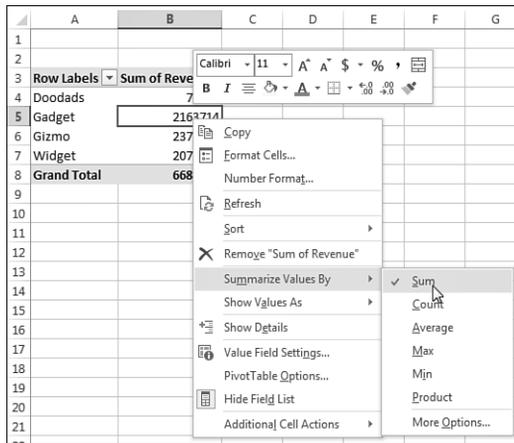
Your revenue numbers look anemic. Notice in cell B3 that Excel chose to count instead of sum the revenue. This often happens if you inadvertently have one blank cell in your Revenue column.



	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

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 no longer in the ribbon in Excel 2013. All of the pivot table calculations icons for the Quick Access Toolbar were removed from Excel 2013. 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.

The 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 would be 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.

### Suppress Subtotals When You Have Many Row Fields

When you have many row fields in your report, subtotals can mire 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**

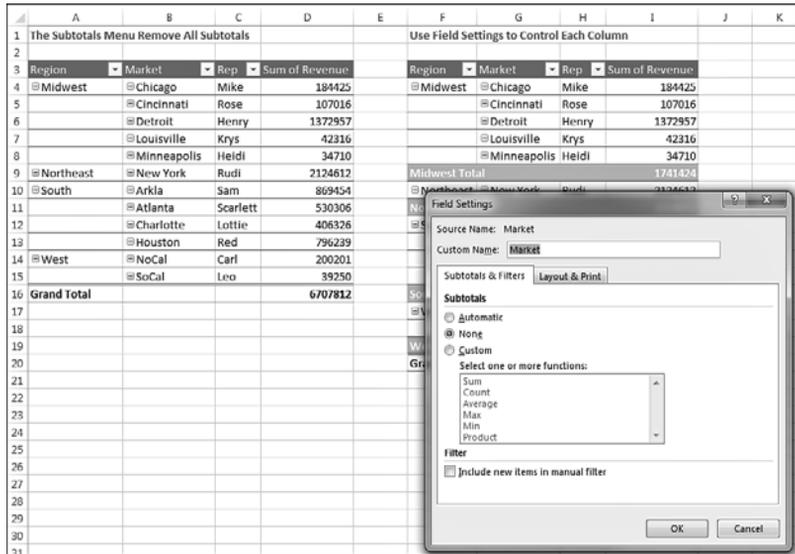
Sometimes you do not need subtotals at every level.

3	Region	Market	Rep	Sum of Revenue
4	Midwest	Chicago	Mike	184425
5		Chicago Total		184425
6		Cincinnati	Rose	107016
7		Cincinnati Total		107016
8		Detroit	Henry	1372957
9		Detroit Total		1372957
10		Louisville	Krys	42316
11		Louisville Total		42316
12		Minneapolis	Heidi	34710
13		Minneapolis Total		34710
14	Midwest Total			1741424
15	Northeast	New York	Rudi	2124612
16		New York Total		2124612
17	Northeast Total			2124612

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.



To remove subtotals for the Market field, click the Market field in the drop zone section of the PivotTable Field 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 Field List and select Field Settings.

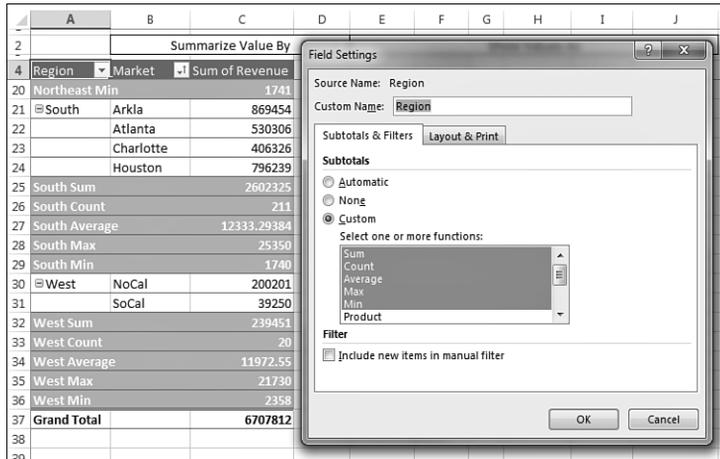
In the Field Settings dialog for the Region field, select Custom and then select the types of subtotals you would like to see. The dialog in Figure 3.28 shows five custom subtotals selected for the Region field. It is rare to see pivot tables use this setting. It is not perfect. Note that the Count of 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.

**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.

**Figure 3.28**

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



## 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. Whereas the options under 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 offer interesting options such as % of Total, Running Total, and Ranks.

For Excel 2010 only, these options appeared as two drop-down menus in the ribbon. They were removed from the 2013 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. These include % of Parent Item, Rank, and % Running Total In.

The following examples show how to use the various calculation options. To contrast the various settings, you can build a pivot table where you drag the Revenue field to the VALUES area nine separate times. Each shows up as a new column in the pivot table. Over the course of the rest of the chapter, you 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. Choosing one of these 11 calculation options changes the data in the column. In Figure 3.29, columns B through D show various settings from the Summarize Values By tab.

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

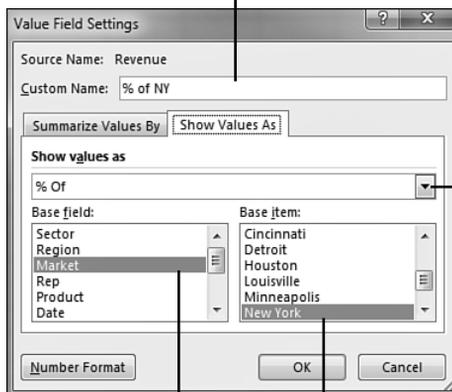
	A	B	C	D	E	F	G	H	I	J
2		Summarize Value By			Show Values As					
4	Market	Total	Average	# Orders	% of Total	% of NY	Rank	RunTotal	% RunTot	ChgFromPrev
5	Arkla	\$869,454	\$13,376	65	12.96%	40.92%	3	\$869,454	12.96%	
6	Atlanta	\$530,306	\$12,052	44	7.91%	24.96%	5	\$1,399,760	20.87%	-39.0%
7	Charlotte	\$406,326	\$14,512	28	6.06%	19.12%	6	\$1,806,086	26.93%	-23.4%
8	Chicago	\$184,425	\$15,369	12	2.75%	8.68%	8	\$1,990,511	29.67%	-54.6%
9	Cincinnati	\$107,016	\$13,377	8	1.60%	5.04%	9	\$2,097,527	31.27%	-42.0%
10	Detroit	\$1,372,957	\$11,836	116	20.47%	64.62%	2	\$3,470,484	51.74%	1182.9%
11	Houston	\$796,239	\$10,760	74	11.87%	37.48%	4	\$4,266,723	63.61%	-42.0%
12	Louisville	\$42,316	\$10,579	4	0.63%	1.99%	10	\$4,309,039	64.24%	-94.7%
13	Minneapolis	\$34,710	\$8,678	4	0.52%	1.63%	12	\$4,343,749	64.76%	-18.0%
14	New York	\$2,124,612	\$11,301	188	31.67%	100.00%	1	\$6,468,361	96.43%	6021.0%
15	NoCal	\$200,201	\$12,513	16	2.98%	9.42%	7	\$6,668,562	99.41%	-90.6%
16	SoCal	\$39,250	\$9,813	4	0.59%	1.85%	11	\$6,707,812	100.00%	-80.4%
17	<b>Grand Total</b>	<b>\$6,707,812</b>	<b>\$11,914</b>	<b>563</b>	<b>100.00%</b>					

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. Counting distinct items has been difficult in pivot tables, but now is possible using PowerPivot. 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.

Rename the field as appropriate.

**Figure 3.30**  
Fifteen different ways to  
show data are available  
on this tab.



Choose 1 of 15 calculations  
from this drop-down.

Base Field and Base Item are selectively enabled.

Table 3.1 summarizes the Show Values As options.

**Table 3.1 Calculations in Show Value As**

<b>Show Value As</b>	<b>Additional Required Information</b>	<b>Description</b>
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 row's percentage of the parent item's total row.
% of Parent Column Total	None	With multiple column fields, shows a column's 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 percent 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 percent 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

Column E of Figure 3.29 shows the % of Total. New York 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

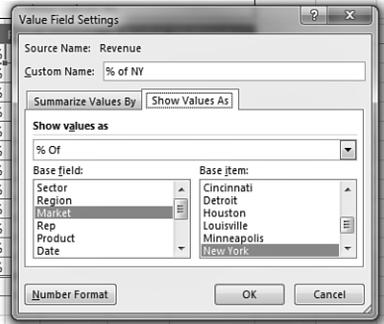
The % Of option enables you to compare one item to another item. For example, the current data set shows that New York is the largest market. Perhaps this company started in New York and has the largest concentration of customers in New York. Perhaps the home office is in New York. The people in New York might have a New York–centric view of the world and want to show how all of the other markets are doing as a percentage of New York. Cell E6 of Figure 3.31 shows that Atlanta is about 25% the size of New York in sales.

To set up this calculation, choose Show Values As, % Of. For the Base Field, choose Market because this is the only field in the ROWS area. For the Base Item, choose New York. The result is shown in Figure 3.31.

**Figure 3.31**

This report is created using the % Of option with New York as the Base Item.

	A	B	C	D	E	F	G	H	I	J	K	L	
2		Summarize Value By											
4	Market	Total	Average	# Orders	% of Total	% of NY							
5	Arkla	\$869,454	\$13,376	65	12.96%	40.92%							
6	Atlanta	\$530,306	\$12,052	44	7.91%	24.96%							
7	Charlotte	\$406,326	\$14,512	28	6.06%	19.12%							
8	Chicago	\$184,425	\$15,369	12	2.75%	8.68%							
9	Cincinnati	\$107,016	\$13,377	8	1.60%	5.04%							
10	Detroit	\$1,372,957	\$11,836	116	20.47%	64.62%							
11	Houston	\$796,239	\$10,760	74	11.87%	37.48%							
12	Louisville	\$42,316	\$10,579	4	0.63%	1.99%							
13	Minneapolis	\$34,710	\$8,678	4	0.52%	1.63%							
14	New York	\$2,124,612	\$11,301	188	31.67%	100.00%							
15	NoCal	\$200,201	\$12,513	16	2.98%	9.42%							
16	SoCal	\$39,250	\$9,813	4	0.59%	1.85%							
17	Grand Total	\$6,707,812	\$11,914	563	100.00%								
18													
19													

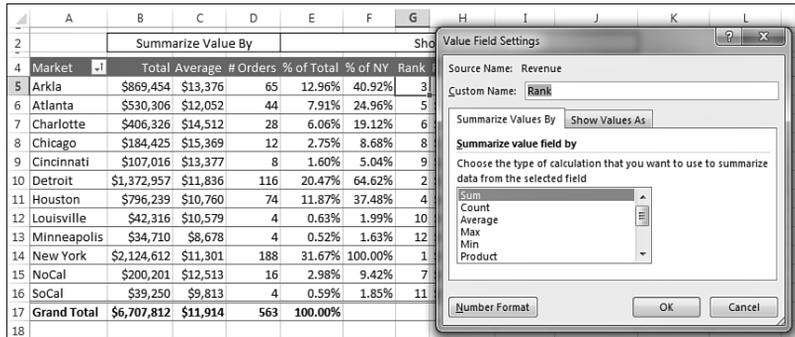


## Showing Rank

Two ranking options were added in Excel 2010. Column G of Figure 3.32 shows Rank Largest to Smallest. New York is ranked #1, Minneapolis is #12. A similar option is Rank Smallest to Largest, which would be good for the pro golf tour.

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

**Figure 3.32**  
The Rank options were added in Excel 2010.



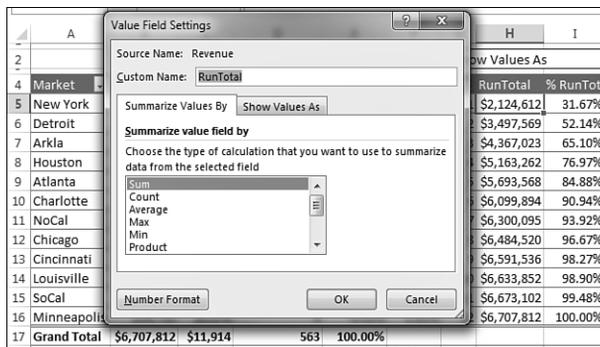
These rank options in Excel 2013 show that pivot tables have a strange way of dealing with ties. I say *strange* because they do not match any of the methods already established by the Excel functions =RANK(), =RANK.AVG(), and =RANK.EQ(). For example, if the top two markets have a tie, they are both assigned a rank of 1, and the third market is assigned a rank of 2.

### Tracking Running Total and Percent of Running Total

Running total calculations is 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 markets account for 76.97% of the total sales.

**Figure 3.33**  
Show running totals or a running percentage of 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 in column J 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: Market.

## Display 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 New York by specifying New York as the base item. This would be similar to Figure 3.31, except each market would be shown as a percentage of New York.

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

Market	Total	% ChgFromPrev
Arkla	\$869,454	6%
Atlanta	\$530,306	7% -39.01%
Charlotte	\$406,326	8% -23.38%
Chicago	\$184,425	7% -54.61%
Cincinnati	\$107,016	7% -41.97%
Detroit	\$1,372,957	4% 1182.95%
Houston	\$796,239	1% -42.01%
Louisville	\$42,316	4% -94.69%
Minneapolis	\$34,710	6% -17.97%
New York	\$2,124,612	3% 6021.04%
NoCal	\$200,201	1% -90.58%
SoCal	\$39,250	0% -80.39%
<b>Grand Total</b>	<b>\$6,707,812</b>	

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

## Tracking Percent of Parent Item

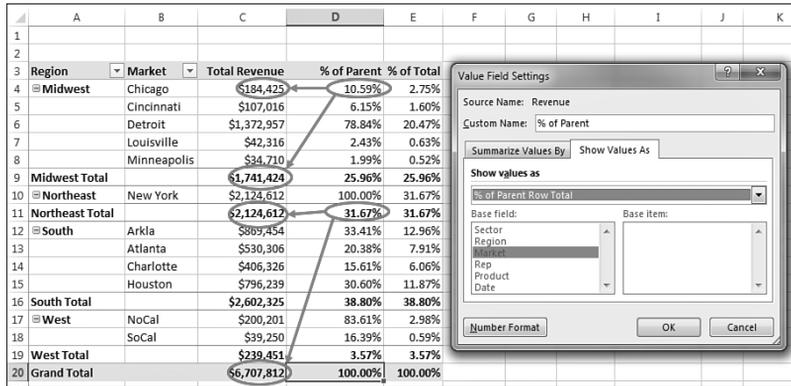
The legacy % of Total settings always divide the current item by the grand total. In Figure 3.35, cell E4 says that Chicago is 2.75% of the total data set. A common question at the MrExcel.com message board is how to calculate Chicago's revenue as a percentage of the Midwest region total. This was possible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

To set up this calculation in Excel 2013, use Field Settings, Show Values As, % of Parent Row Total. Cell D4 in Figure 3.35 shows that Chicago's \$184K is 10.59% of the Midwest Total of \$1,741K.

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 are comparing the region total to the grand total. For example, the 31.67% in D11 is saying that the Northeast region's \$2.1 million is a little less than a third of the \$6.7 million grand total.

**Figure 3.35**

An option in Excel 2013 enables you to calculate a percentage of the parent row.

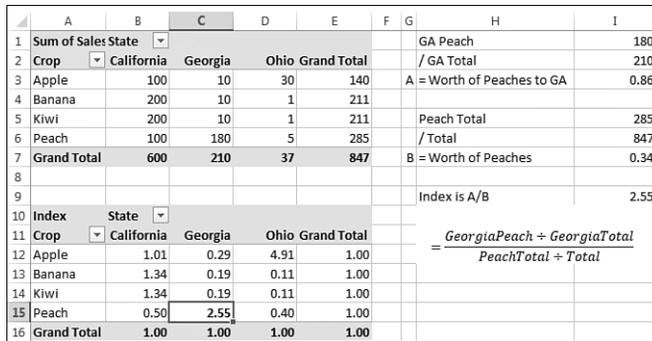


### Track Relative Importance with the Index Option

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. 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 Georgia total. This is 180/210, or 0.86. Next, divide total peach production (285) by total fruit production (847). This shows that peaches have an importance ratio of 0.34. Now, divide the first ratio by the second ratio: 0.86 / 0.34.

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

However, 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 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 Within Your Pivot Tables.”
- Using data visualizations and conditional formatting in a pivot table is covered in Chapter 4.

Using these tools is a great way to focus your pivot table on the largest drivers of success for your business.

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