MrExcel

Bill Jelen
Mike Alexander

PIVOT TABLE DATA CRUNCHING:

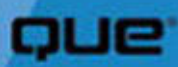
Microsoft® Excel 2010

AD-HOC QUERIES

INSTANT DATA ANALYSIS

CALCULATED FIELDS

TOP 10 RATINGS



MrExcel LIBRARY

Pivot Table Data Crunching

Microsoft® Excel® 2010

Bill Jelen

Michael Alexander

que®

800 East 96th Street,
Indianapolis, Indiana 46240
USA

Contents at a Glance

Pivot Table Data Crunching

ISBN-10: 0-7897-4313-2

ISBN-13: 978-0-7897-4313-8

Printed in the United States of America

Third Printing: January 2013

Executive Editor
Greg Wiegand

Acquistions Editor
Loretta Yates

Development Editor
Sondra Scott

Technical Editor
Bob Umlas

Managing Editor
Sandra Schroeder

Project Editor
Seth Kerney

Copy Editor
Jovana San Nicolas-Shirley

Indexer
Tim Wright

Production
Jake McFarland

Cover Designer
Anne Jones

Book Designer
Anne Jones

Contents

Dedication

To Josh Jelen
—Bill Jelen

To Josh Jelen, too. Hey, this is the third edition...why not?
—Mike Alexander

Acknowledgments

Mike Alexander is one of the two funniest guys doing live Excel seminars. I appreciate him as a coauthor on all three editions of this book, which has earned the #1 spot on the Amazon Computer Book bestseller list (for 54 minutes one day in January). Rob Collie from Microsoft had the unlikely happenstance of transferring to Cleveland. Our regular lunches drove most of my understanding for the PowerPivot chapter. Thanks to Pito Salas, who invented the pivot table concept back at Lotus in the 1980s. Thanks to Allan Foltang and all the pivot table team at Microsoft for continuing to improve pivot tables. Donald Farmer, Amir Netz, and the rest of the PowerPivot team should win a Nobel prize in science for bringing the PowerPivot add-in to 500 million people using Excel. At MrExcel.com, thanks to Schar Oswald, Tracy Syrstad, Wei Jiang, Scott Pearson, and an entire community of people passionate about Excel. Not to be forgotten: My sons Josh and Zeke are picking up a few hours after school each day keeping the podcasts edited and posted. Thanks to VoG and Richard Schollar for teaching me about the UNION function in Excel VBA. You saved the VBA chapter for me. Loretta Yates at Pearson Education is the best editor ever. Finally, thanks to my wife Mary Ellen for her support during the writing process.

—Bill Jelen

Thanks to Bill Jelen for deciding to coauthor this book with me many editions ago. His knowledge of Excel still blows me away to this day. My deepest thanks to Loretta Yates, for all the hours of work put into bringing this book to life. Thanks also to Bob Umlas for making sure Bill and I don't embarrass ourselves with technical errors. Bob suggested numerous improvements to the examples and text in this book. Finally, a special thank you goes to the wife and kids for putting up with all the time spent locked away on this project.

—Mike Alexander

About the Authors

Bill Jelen is Mr. Excel! He is the principal behind the leading Excel website, MrExcel.com. He developed his pivot table wizardry during his 12-year tenure as a financial analyst for a fast-growing public computer firm. He has written 30 books on Excel and produced more than 1,200 podcast episodes. His website hosts more than 20 million page views annually.

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.

We Want to Hear from You!

As the reader of this book, you are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

As an associate publisher for Que Publishing, I welcome your comments. You can email or write me directly to let me know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that I cannot help you with technical problems related to the topic of this book. We do have a User Services group, however, where I will forward specific technical questions related to the book.

When you write, please be sure to include this book's title and author as well as your name, email address, and phone number. I will carefully review your comments and share them with the author and editors who worked on the book.

Email: feedback@quepublishing.com

Mail: Greg Wiegand
Associate Publisher
Que Publishing
800 East 96th Street
Indianapolis, IN 46240 USA

For more information about this book or another Que Publishing title, visit our website at www.quepublishing.com. Type the ISBN (excluding hyphens) or the title of a book in the Search field to find the page you're looking for.

Introduction

Pivot tables are the single most powerful command in all of Excel. They 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 allow 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 pivot tables.

IN THIS INTRODUCTION

What You Will Learn from This Book

It is widely agreed that close to 50 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 more than 15 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 have 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

output complex pivot reports with drill-down capabilities 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 2010's Pivot Tables

Excel 2010 introduces three new features designed to solve common problems with pivot tables. Combined with the two items added to Excel 2007, you have five great improvements to pivot tables.

- Beginning in Excel 2007, multiple items could be selected from the filter drop-down. However, this feature left behind a confusing report because the filters section left the ambiguous words "(Multiple Items)" to explain which items are included in the filter. As shown in Figure I.1, the new Excel 2010 Slicers feature provides a graphical view of which items are selected for the pivot table. Read more about Slicers in Chapter 4, "Grouping, Sorting, and Filtering Pivot Data."

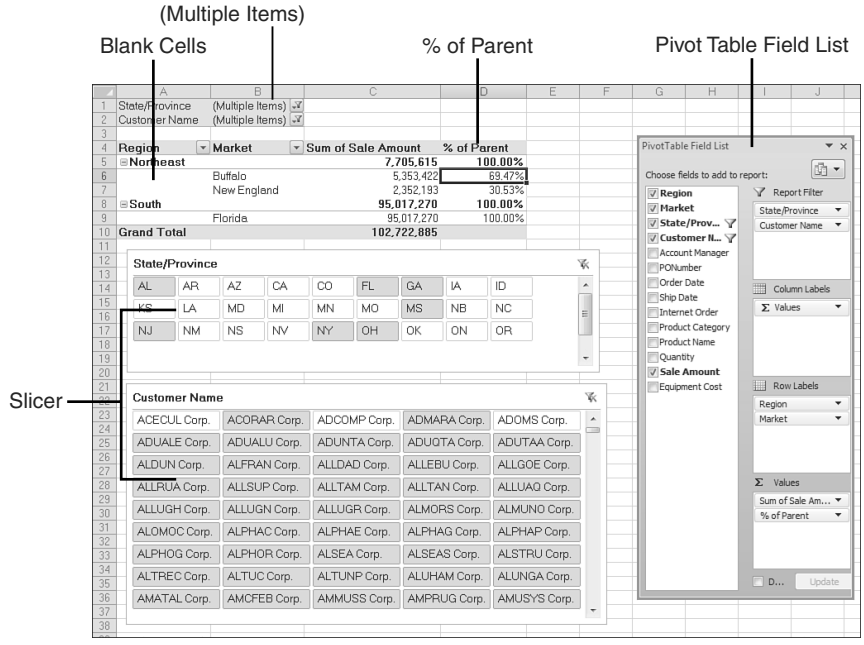


Figure I.1 Slicers visually show which items are included in a filter.

- In legacy versions of Excel, one of the many calculation options available in pivot tables has been "Percentage of Column." This feature was fine when you had only one field along the left side of the pivot table. However, if you had two or more fields, you might want to show the percentage of the next subtotal. In Excel 2010, Microsoft added new

calculation options including % of Parent and Rank. Calculation options are discussed in Chapter 3, "Customizing a Pivot Table."

- A constant annoyance is the blank cells included in the outermost column fields. For an example, see A6:A7 in Figure I.1. At last, Excel 2010 offers the Design, Report Layout, Repeat All Item Labels to fill in those blank cells.
- PowerPivot is a free add-in from Microsoft that allows you to create pivot tables from external data or from separate sheets.
- If you skipped Excel 2007, you notice that the Pivot Table Field List has been expanded. Rather than dragging fields to drop zones on the pivot table itself, beginning with Excel 2007, you drag the fields to the drop zones in the pivot table field list. Excel 2007 also added filtering options.

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. The final chapter describes how to create pivot tables in Excel's powerful VBA macro language. This means that any user who has a firm grasp of 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

Imagine that it is 1992 and you are using Lotus 1-2-3 or Excel 4. You have thousands of rows of transactional data. Your manager asks you to prepare a summary report showing revenue by region and product. The following case study walks you through how this report would have been prepared in 1992.

In 1992, preparing this report was a daunting task. It required superhuman spreadsheet skills that few could master. Here are the steps you needed to take to prepare a summary report showing revenue by region and product:

1. You need to get a list of the unique regions in the data set. Use the Advanced Filter command with Unique Records Only to extract a list of the unique regions (see Figure I.2).

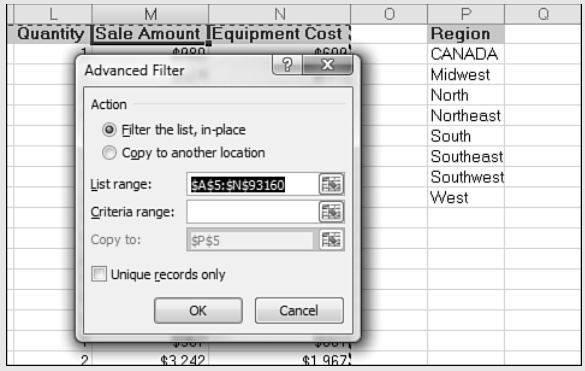


Figure I.2
Even today, the Advanced Filter command is not a lot of fun to use.

2. You also need to get a list of the unique products in the data set. Use the Advanced Filter command with Unique Records Only a second time to extract a list of the unique products.
3. Turn the list of regions sideways so that it runs across the columns. Copy the list of unique regions. Then select Edit, Paste Special, Transpose to arrange the regions as headings going across the report. You now have a skeleton of the report, as shown in Figure I.3.

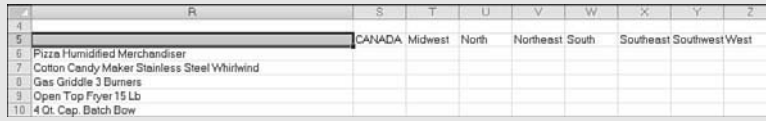


Figure I.3
After using a second Advanced Filter command and selecting Edit, Paste Special, Transpose, you have this skeleton of the final report. You still have a long way to go.

4. Next, you need to build a DSUM formula to get total Sales for one product and region. DSUM requires that you build a criteria range as shown in R1:S2 in Figure I.4.
5. In the corner cell of the report, build the formula to get total sales for the selected product and region: **=DSUM($A$5:$N$93160,$M$5,$R$1:$S$2)**. This is a formula to test whether the region column is Canada and if the product is a Pizza Merchandiser.

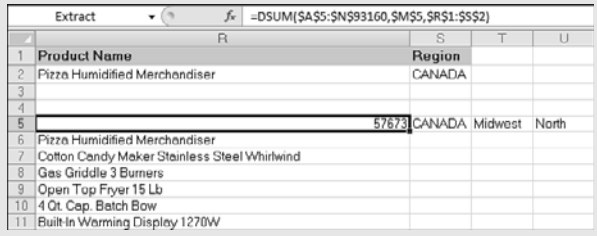


Figure I.4
Use the ancient DSUM function with a four-cell criteria range.

6. You are a long-time, hard-core data analyst if you remember pressing the keystrokes for `/Data Table 2` in Lotus 1-2-3. Figure I.5 shows the equivalent function in Excel. In Excel 2010, this command is found in Data, Data Tools, What If Analysis, Data Table.

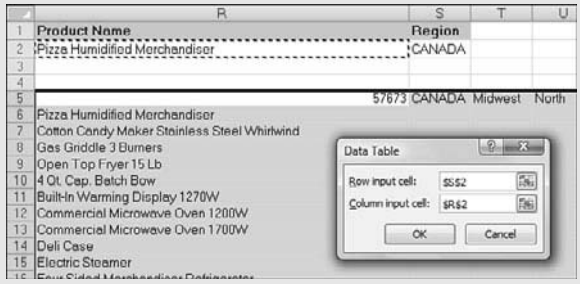


Figure I.5
The Data Table command replicates the formula in the top-left corner of the table, but replaces two references in the formula with the headings at the top and left of the report.

7. Finally, after using two advanced filters and a Paste Tranpose command, writing an obscure DSUM formula, and then using the Data Table command, you have the result your manager is looking for, as shown in Figure I.6. If you could pull off this analysis in 10 minutes, you were doing an amazing job.

	57673 CANADA	Midwest	North	Northeast
Pizza Humidified Merchandiser	57673	44345	73108	43267
Cotton Candy Maker Stainless Steel Whirlwind	23525.2	41364.8	62212	41736.6
Gas Griddle 3 Burners	56192.4	40299.6	97343.4	74450.2
Open Top Fryer 15 Lb	43214.1	31667.7	60830.85	42959.4
4 Qt. Cap. Batch Bow	6704	39075.7	33057.1	26816
Built-In Warming Display 1270W	4956	43736.7	43365	39235
Commercial Microwave Oven 1200W	18947.8	34983.8	67435.6	47601.6

Figure I.6
After displaying knowledge of obscure spreadsheet commands in 10 minutes, you have produced the needed report.

Now, if your manager looks at the report and asks you to add Market to the analysis, you are nearly back at square one because it will take an additional 10 minutes to produce the new report.

Invention of the Pivot Table

The concept that led to today's pivot table came from the halls of the Lotus Development Corporation with a revolutionary spreadsheet program called Lotus Improv. Improv was envisioned in 1986 by Pito Salas of the Advanced Technology Group at Lotus (see Figure I.7). Realizing that spreadsheets often have patterns of data, Salas concluded that if a user could build a tool that could recognize these patterns, then he could build enhanced data models. Lotus ran with the concept and started developing the next-generation spreadsheet.

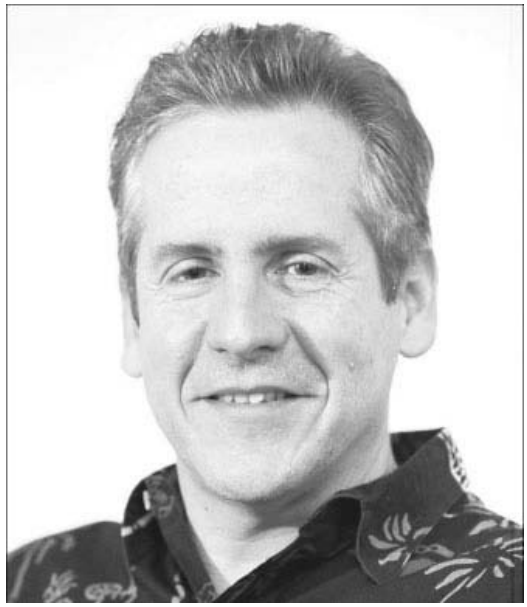


Figure I.7
Salas, inventor of the pivot table concept, is always working on cutting-edge products at `www.salas.com`.

Throughout 1987, Lotus demonstrated its new program to a few companies. In 1988, Steve Jobs saw the program and immediately wanted it developed for his upcoming NeXT computer platform. The program, finally named Lotus Improv, was eventually shipped in 1991 for the NeXT platform. A version for Windows was introduced in 1993.

The core concept behind Improv was that data, data views, and formulas should be encapsulated as separate entities and treated as different animals. For the first time in a spreadsheet program, a data set was given a name that could be grouped into larger categories. This naming and grouping capability paved the way for the most powerful feature in Improv: rearranging data. With Improv, a user could define and store a set of categories and then change the view by simply dragging the category names with the mouse. The user could also create totals and group summaries.

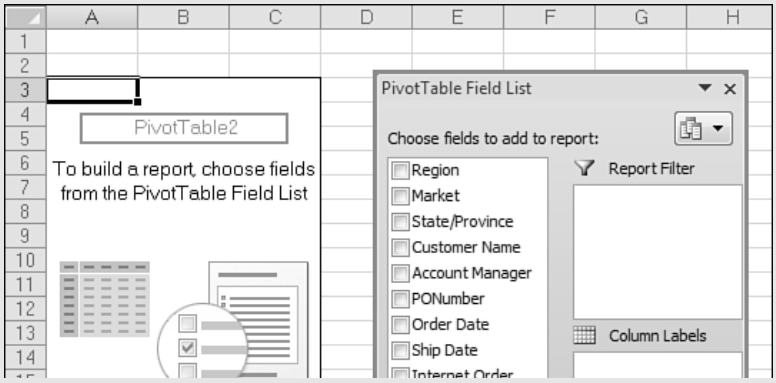
Microsoft eventually incorporated this concept in its pivot table functionality in Excel 5. Years later, with the release of Excel 97, Microsoft offered users an enhanced pivot table wizard and key improvements to pivot table functionality such as the capability to add calculated fields. Excel 97 also opened the pivot cache to developers, fundamentally changing the way pivot tables are created and managed. Microsoft introduced the pivot chart with Excel 2000, providing users a way to represent pivot tables graphically. Excel 2002 added the GetPivotData function. Excel 2007 added new filters such as selecting dates in the "last quarter" or "this year." Excel 2010 continues improving pivot tables with new features described previously.

CASE STUDY LIFE AFTER PIVOT TABLES

Say you have 100,000 rows of transactional data, as discussed in the previous case study. Your manager asks you to prepare a summary report showing revenue by Region and Product. Fortunately, you have pivot tables at your disposal. Here are the steps you would follow today using Excel 2010:

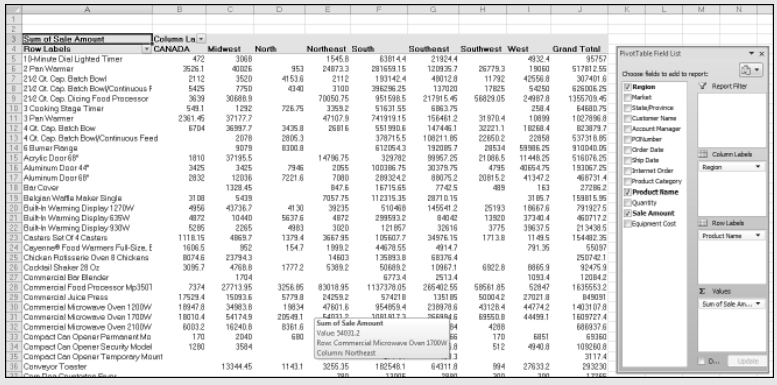
1. Select a single cell in your data set. Select PivotTable from the Insert tab. Click OK. You are given a blank pivot table, as shown in Figure I.8.

Figure I.8
After three mouse clicks, you have a blank pivot table report. Three more mouse clicks to go.



2. From the Pivot Table Field List, select the Product Name check box. Excel adds a unique list of products to the left side of the pivot table. Select the Sale Amount check box. Excel adds total sales by product to the report. Click the Region field in the Field List and drag it to the Column Labels drop zone. After six mouse clicks, you have the required report, as shown in Figure I.9.

Figure I.9
Add three fields to the report.



If you are racing, you can actually create the report shown in Figure I.9 in exactly 10 seconds. This is an amazing accomplishment. Realistically, it would take you about 50 seconds at normal speed to create the report. If you are a spreadsheet wizard following the steps in the previous case study, the nonpivot table solution would take you at least 12 times longer.

To see the creation of a pivot table, search for Pivot Table Data Crunching Intro at YouTube.

In addition, when your manager comes back with the request to add Market to the analysis, you need just seconds to drag the Market field to the Column Labels drop zone in the PivotTable Field List to add it to the report, as shown in Figure I.10.

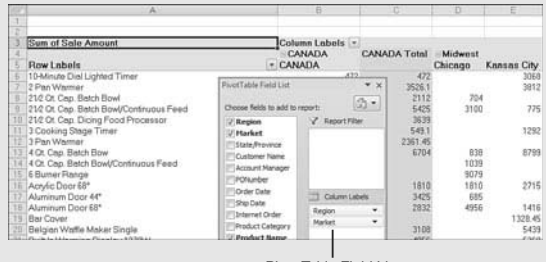


Figure I.10
To create a new report with the Market field, simply drag the field to a drop zone.

Sample Files Used in This Book

All data files used throughout this book are available for download from `www.mrexcel.com/pivotbookdata2010.html`.

Conventions Used in This Book

This book follows certain conventions:

- `Monospace`—Text messages you see onscreen or code that appears in a `monospace` font.
- **`Bold Monospace`**—Text you type appears in a **bold, monospace** font.
- *Italic*—New and important terms appear in *italics*.
- Initial Caps—Tab names, dialog box names, and dialog box 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 will refer 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 on 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, Options" and "PivotTable Tools, Design." For convenience, this book refers to these elements as the Options tab and the Design tab, respectively. The new Slicer feature introduces a new Ribbon tab that Microsoft calls "Slicer Tools, Options." This book refers to this as the Slicer 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.11, the shorthand specifies "Select Design, Report Layout, Repeat All Item Labels.".

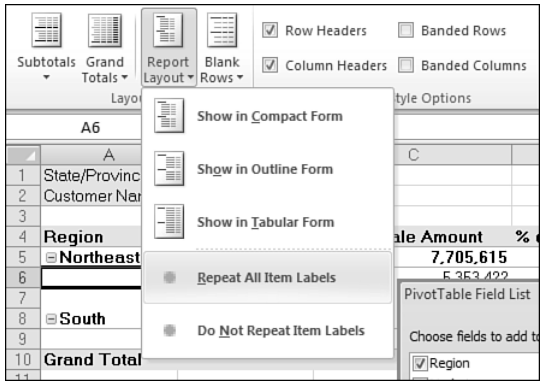


Figure I.11
For shorthand, instructions might say Select Design, Report Layout, Repear All Item Labels.

Special Elements

This book contains the following special elements:

Some topics will be demonstrated in a short video cast at YouTube.

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 you with 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.

Pivot Table Fundamentals

1

What Is a Pivot Table?

Imagine that Excel is a large toolbox that contains different tools at your disposal. The pivot table is essentially one tool in your Excel toolbox. If a pivot table were indeed a physical tool that you could hold in your hand, a kaleidoscope would most accurately represent it.

When you look through a kaleidoscope at an object, you see that object in a different way. You can turn the kaleidoscope to move around the details of the object. The object itself does not change, and it is not connected to the kaleidoscope. The kaleidoscope is simply a tool that you use to create a unique perspective on an ordinary object.

Think of a pivot table as a kaleidoscope that is pointed at your data set. When you look at your data set through a pivot table, you have the opportunity to see details in the data you might not have noticed before. Furthermore, you can turn your pivot table to see your data from different perspectives. The data set itself does not change, and it is not connected to the pivot table. The pivot table is simply a tool you are using to create a unique perspective on your data.

A pivot table allows you to create an interactive view of your data set. We call this view a *pivot table report*. With a pivot table report, you can quickly and easily categorize your data into groups, summarize large amounts of data into meaningful information, and perform a wide variety of calculations in a fraction of the time it takes by hand. But the real power of a pivot table report is that you can interactively drag and drop fields within your report, dynamically changing your perspective and recalculating totals to fit your current view.

IN THIS CHAPTER

1

Why Should You Use a Pivot Table?

As a rule, your dealings in Excel can be split into two categories: calculating data and shaping or formatting, data. Although many built-in tools and formulas facilitate both of these tasks, the pivot table is often the fastest and most efficient way to calculate and shape data.

Let's look at one simple scenario that illustrates this point. Say you have just given your manager some revenue information by month, and he has predictably asked for more information. He adds a note to the worksheet and emails it back to you. As you can see in Figure 1.1, your manager wants you to add a line that shows credits by month.

Figure 1.1
Your manager predictably changes his request after you provide the first pass of a report.

	A	B	C	D	E	F	G	H
1		Jan	Feb	Mar	Apr	May	Jun	Jul
2	Revenues	66,427,076	68,619,453	69,444,496	67,669,316	69,572,075	67,196,220	66,884,77
3	Please add a "credits" line and show the amount of credits for each month							
4								

To meet this new requirement, you run a query from your legacy system that provides the needed data. As usual, the data is formatted specifically to make you suffer. Instead of data by month, the legacy system provides detailed transactional data by day, as shown in Figure 1.2.

Figure 1.2
The data from the legacy system is by day instead of by month.

	A	B	C
1	Document Number	In Balance Date	Credit Amount
2	D29210	01/03/03	(34.54)
3	D15775	01/03/03	(313.64)
4	D46035	01/03/03	(389.04)
5	D45826	01/03/03	(111.56)
6	D69172	01/03/03	(1,630.25)
7	D25388	01/03/03	(3,146.22)
8	D49302	01/03/03	(1,217.37)
9	D91669	01/03/03	(197.44)
10	D14289	01/03/03	(33.75)
11	D38471	01/03/03	(6,759.20)
12	D18645	01/03/03	(214.54)

Your challenge is to calculate the total dollar amount of credits by month and shape the results into an extract that fits the format of the original report. The final extract should look like the data shown in Figure 1.3.

Figure 1.3
Your goal is to produce a summary by month and transpose the data to a horizontal format.

	A	B	C	D	E	F	G	
1								
2	-3,695,319	-3,698,537	-3,833,977	-3,624,967	-3,800,526	-3,603,367	-3,746,754	-3
3								

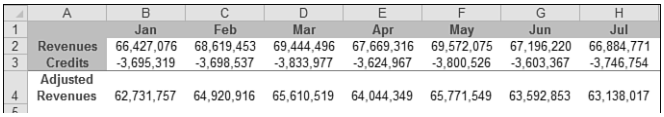
Creating this extract manually takes 18 mouse clicks and three keystrokes:

- Format dates to month: three clicks
- Create subtotals: four clicks
- Extract subtotals: six clicks, three keystrokes
- Transpose vertical to horizontal: five clicks

By contrast, creating this extract with a pivot table takes nine mouse clicks:

- Create the pivot table report: five clicks
- Group dates into months: three clicks
- Transpose vertical to horizontal: one click

Both methods produce the same extract, which can be pasted into your final report, as shown in Figure 1.4.



	A	B	C	D	E	F	G	H
1		Jan	Feb	Mar	Apr	May	Jun	Jul
2	Revenues	66,427,076	68,619,453	69,444,496	67,669,316	69,572,075	67,196,220	66,884,771
3	Credits	-3,695,319	-3,698,537	-3,833,977	-3,624,967	-3,800,526	-3,603,367	-3,746,754
4	Adjusted Revenues	62,731,757	64,920,916	65,610,519	64,044,349	65,771,549	63,592,853	63,138,017

Figure 1.4
After adding credits to the report, you can calculate net revenue.

However, using a pivot table to accomplish this task not only cuts down the number of actions by more than half, but also reduces the possibility of human error. Above that, using a pivot table enables for quick and easy shaping and formatting of the data.

What this example shows is that using a pivot table is not just about calculating and summarizing your data. Instead, pivot tables can often help you do a number of tasks faster and better than using conventional functions and formulas. For example, you can use pivot tables to instantly transpose large groups of data vertically or horizontally. You can use pivot tables to quickly find and count the unique values in your data. You can also use pivot tables to prepare your data to be used in charts.

The bottom line is that pivot tables can help you dramatically increase your efficiency and decrease errors on a number of tasks you may have to accomplish with Excel. Even though pivot tables cannot do everything for you, understanding how to use just the basics of pivot table functionality can take your data analysis and productivity to a new level.

When Should You Use a Pivot Table?

Large data sets, ever-changing impromptu data requests, and multilayered reporting are absolute productivity killers if you have to tackle them by hand. Doing hand-to-hand combat with one of these tasks is not only time consuming, but it also opens the possibility of

an untold number of errors in your analysis. So how do you recognize when to use a pivot table before it is too late?

Generally, a pivot table serves you well in any of the following situations:

- You need to find relationships and groupings within your data.
- You need to find a list of unique values for one field in your data.
- You need to find data trends using various time periods.
- You anticipate frequent requests for changes to your data analysis.
- You need to create subtotals that frequently include new additions.
- You need to organize your data into a format that is easy to chart.

Anatomy of a Pivot Table

Because the anatomy of a pivot table is what provides its flexibility and, ultimately, its functionality, truly understanding pivot tables is difficult without understanding their basic structure.

A pivot table is composed of the following four areas:

- Values area
- Row area
- Column area
- Filter area

The data you place in these areas defines both the utility and appearance of the pivot table. Keeping in mind that you will go through the process of creating a pivot table in the next chapter, let's prepare by taking a closer look at the four areas and the functionality around them in the following sections.

Values Area

The *values area* is shown in Figure 1.5. It is a large rectangular area below and to the right of the headings. In this figure, you can see that the values area contains a sum of the revenue field.

Figure 1.5
The heart of the pivot table is the values area. This area typically includes a total of one or more numeric fields.

	A	B	C	D	E	F
1	REGION	(All)				
2						
3	Sum of REVENUE	MONTH				
4	MODEL	January	February	March	April	May
5	2500P	$33,073	$29,104	$25,612	$22,538	$19,834
6	3002C	$35,880	$31,574	$27,785	$24,451	$21,517
7	3002P	$90,258	$79,427	$69,896	$61,508	$54,127
8	4055T	$13,250	$11,660	$10,261	$9,030	$7,946
9	4500C	$100,197	$88,173	$77,593	$68,281	$60,088

The values area is the area that calculates. The values area is required to have at least one field and one calculation of that field within this area. The data fields that you drop into the values area are those that you want to measure or calculate. The values area might include Sum of Revenue, Count of Units, and Average of Price.

It is also possible to have the same field dropped in the values area twice, but with different calculations. For example, a marketing manager might want to see Minimum of Price, Average Price, and Maximum of Price.

Row Area

The *row area* is shown in Figure 1.6. This area is composed of the headings that go down the left side of the pivot table.

Figure 1.6
The headings down the left side of the pivot table make up the row area of the pivot table.

	A	B	C	D	E	F
1	REGION	(All)				
2						
3	REVENUE	MONTH				
4	MODEL	January	February	March	April	May
5	2500P	$33,073	$29,104	$25,612	$22,538	$19,834
6	3002C	$35,880	$31,574	$27,785	$24,451	$21,517
7	3002P	$90,258	$79,427	$69,896	$61,508	$54,127
8	4055T	$13,250	$11,660	$10,261	$9,030	$7,946
9	4500C	$100,197	$88,173	$77,593	$68,281	$60,088

Dropping a field into the row area displays the unique values from that field down the rows of the left side of the pivot table. The row area typically has at least one field, although it is possible to have no fields. Recall the example presented earlier in this chapter, in which you needed to produce a one-line report of credits. This report is an example of when there are no row fields in the row area.

The types of data fields that you drop into the row area include those that you want to group and categorize such as Products, Names, and Locations.

Column Area

The *column area* is composed of headings that stretch across the top of columns in the pivot table. For example, in the pivot table in Figure 1.7, the month field is in the column area.

Figure 1.7
The column area stretches across the top of the columns. In this example, it contains the unique list of months in your data set.

	A	B	C	D	E	F
1	REGION	(All)				
2						
3	Sum of REVENUE	MONTH				
4	MODEL	January	February	March	April	May
5	2500P	$33,073	$29,104	$25,612	$22,538	$19,834
6	3002C	$35,880	$31,574	$27,785	$24,451	$21,517
7	3002P	$90,258	$79,427	$69,896	$61,508	$54,127
8	4055T	$13,250	$11,660	$10,261	$9,030	$7,946
9	4500C	$100,197	$88,173	$77,593	$68,281	$60,088

Dropping fields into the column area displays your items in column-oriented perspective. The column area is ideal to show trending over time. The types of data fields that you drop into the column area include those you want to trend or show side by side such as Months, Periods, and Years.

Report Filter Area

The *Report Filter area* is an optional set of one or more drop-downs located at the top of the pivot table. In Figure 1.8, the filter area contains the Region field. In this case, the pivot table is set to show all regions.

Figure 1.8
Filter fields are great for quickly filtering a report. The Region drop-down in Cell B1 allows you to print this report for one particular region manager.

	A	B	C	D	E	F
1	REGION	(All)				
2						
3	Sum of REVENUE	MONTH				
4	MODEL	January	February	March	April	May
5	2500P	$33,073	$29,104	$25,612	$22,538	$19,834
6	3002C	$35,880	$31,574	$27,785	$24,451	$21,517
7	3002P	$90,258	$79,427	$69,896	$61,508	$54,127
8	4055T	$13,250	$11,660	$10,261	$9,030	$7,946
9	4500C	$100,197	$88,173	$77,593	$68,281	$60,088

Dropping fields into the filter area allows you to filter the data items in your fields. Even though the filter area is optional, it comes in handy when you need to filter results dynamically. The types of data fields that you drop into the filter area include those that you want to isolate and focus on such as Regions, Line of Business, and Employees.

Pivot Tables Behind the Scenes

It is important to understand that pivot tables come with a few file space and memory implications for your system. To get a better idea of what this means, let's look at what happens behind the scenes when you create a pivot table.

When you initiate the creation of a pivot table report, Excel takes a snapshot of your data set and stores it in a *pivot cache*. A pivot cache is nothing more than a special memory subsystem in which your data source is duplicated for quick access. Although the pivot cache is not a physical object that you can see, you can think of it as a container that stores the snapshot of the data source.

CAUTION

Any changes you make to your data source are not picked up by your pivot table report until you take another snapshot of the data source or "refresh" the pivot cache. Refreshing is easy; you simply right-click the pivot table and then click Refresh Data. You can also select the large Refresh button on the Options tab.

Each pivot table report you create from a separate data source creates its own pivot cache, which increases your memory usage and file size. The increase in memory usage and file size depends on the size of the original data source that is being duplicated to create the pivot cache.

Your pivot table report is essentially a view that gets its data solely from the pivot cache. This means that your pivot table report and your data source are disconnected.

The benefit of working against the pivot cache and not your original data source is optimization. Any changes you make to the pivot table report, such as rearranging fields, adding new fields, or hiding items, are made rapidly and with minimal overhead.

Limitations of Pivot Table Reports

Before discussing the limitations of pivot table reports, it is important to note that beginning with Excel 2007, Microsoft introduced a dramatic increase in the number of rows and columns allowed in one worksheet. However, increasing limits had a ripple effect on several of the tools and functions in Excel, which forced limitation increases in many areas including pivot tables.

Table 1.1 highlights the changes in pivot table limits from Excel 2000 to Excel 2010. Whereas some of these limitations remain constant, others are highly dependent on available system memory.

Table 1.1 Pivot Table Limitations

Category	Excel 2000	Excel 2002/2003	Excel 2007/2010
Number of Row Fields	Limited by available memory	Limited by available memory	1,048,576 (Might be limited by available memory)
Number of Column Fields	256	256	16,384
Number of Page Fields	256	256	16,384
Number of Data Fields	256	256	16,384
Number of Unique Items in a Single Pivot Field	8,000	32,500	1,048,576 (Might be limited by available memory)
Number of Calculated Items	Limited by available memory	Limited by available memory	Limited by available memory
Number of Pivot Table Reports on One Worksheet	Limited by available memory	Limited by available memory	Limited by available memory

A Word About Compatibility

If you are working in an environment where legacy versions of Excel are still being used, you should be aware of the compatibility issues between legacy versions of Excel and Excel 2010. As you can imagine, the extraordinary increases in pivot table limitations lead to some serious compatibility questions. For instance, what if you create a pivot table that contains more than 256 column fields and more than 32,500 unique data items? How are users with legacy versions of Excel affected? Fortunately, Excel comes with some precautionary measures that can help you avoid compatibility issues.

The first precautionary measure is *Compatibility mode*, which is a state that Excel automatically enters when opening an `.xls` file. When Excel is in Compatibility mode, it artificially takes on the limitations of legacy versions of Excel. For example, while you are working with an `.xls` file, you cannot exceed any of the Excel 2003 pivot table limitations shown in Table 1.1. This effectively prevents you from unwittingly creating a pivot table that is not compatible with legacy versions of Excel. If you want to get out of Compatibility mode, you have to save the `.xls` file as one of Excel's new file formats, which are `.xlsx` or `.xlsm`.

> **CAUTION**
>
> Beware of the Convert option found under Info section of the File menu. Although this command is designed to convert a file from Excel 2003 to Excel 2010, it actually deletes the Excel 2003 copy of the file.

The second precautionary measure is Excel's Compatibility Checker. The Compatibility Checker is a built-in tool that checks for any compatibility issues when you try to save an Excel workbook as an `.xls` file. For example, if your pivot table exceeds the bounds of Excel 2003 limitations, the Compatibility Checker alerts you with a dialog box similar to the one shown in Figure 1.9.

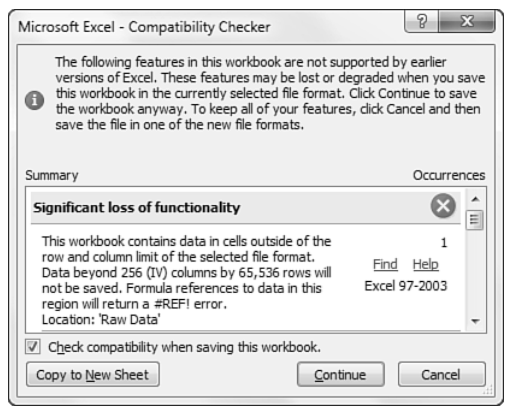


Figure 1.9
The Compatibility Checker alerts you of any compatibility issues before you save to a legacy version of Excel.

With this dialog box, Excel gives you the option to save your pivot data as hard values in the new `.xls` file. If you choose to do so, the data from your pivot table is saved as hard values, but the pivot table object and the pivot cache are lost.

> **NOTE**
>
> For information on Excel's compatibility tools, pick up Que Publishing's *Excel 2010 In Depth* (ISBN 978-0789743084) by Bill Jelen.

Next Steps

In the next chapter, you learn how to prepare your data to be used by a pivot table. Chapter 2, "Creating a Basic Pivot Table," also walks through creating your first pivot table report using the Pivot Table Wizard.

This page intentionally left blank

INDEX

Symbols

A

B

C

D

E

F

G

H

I

J-K-L

Q-R

S

T

U

V

W