Excel® 2007
PivotTables and
PivotCharts

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Introduction

Microsoft Excel is a powerful and popular program for organizing and analyzing data. One of its most powerful capabilities is PivotTables, which enable you to pull meaningful information from huge masses of seemingly meaningless data. The name PivotTable comes from one of the most powerful features of Excel—the ability to quickly and easily “pivot” the data to view them in different ways.

Given all their power, PivotTables (and the related PivotCharts) are necessarily somewhat complex. You can’t get something for nothing, after all, and in order to make the most of these powerful tools you need a good understanding of what they are and how they work. That’s where this book comes in. Excel PivotTables and Charts covers the topic from A to Z, starting with the basics and moving on to the most advanced and sophisticated aspects of PivotTables. The book uses a lot of illustrations and real-world examples to make it easier for you to relate the information to your own work.

Who Should Read This Book

This book does not assume that the reader has any prior experience with PivotTables. It starts at square one and moves on from there. However, even those who do have previous PivotTable experience may well find the book useful for dealing with the more arcane aspects of PivotTables or with the many changes that are present in the latest version of Excel. The book is written specifically for Excel 2007.

How This Book Is Organized

The book is divided into chapters, with each chapter providing a number of sections that cover some specific aspect of PivotTables or PivotCharts.

- **Chapter 1** explains the principles behind PivotTables and shows you the steps required to create a simple PivotTable and chart from your worksheet data.
- **Chapter 2** explains the various data sources that you use to create a PivotTable.
- **Chapters 3–5** get into the nitty-gritty details of PivotTables including formatting, filtering, grouping, and custom calculations.
- **Chapter 6** is devoted to creating PivotCharts from the data in your PivotTables.
- **Chapter 7** explores the advanced topic of using PivotCharts with multidimensional data.
- **Chapter 8** shows you how to extract hard data from a PivotTable for further analysis in your worksheet.
Chapter 9 explores some other Excel analysis methods, such as subtotals and database functions, that may be preferable to PivotTables for some data analysis needs.

Chapter 10 covers the use of the VBA programming language to create and manipulate PivotTables.

The book includes three appendixes:

- Appendix A discusses troubleshooting some common PivotTable problems.
- Appendix B details the PivotTable-related differences between Excel 2007 and the previous version of Excel.
- Appendix C provides a primer of Excel charts for those who need to brush up their knowledge.

The workbooks that you'll need for many of the book's exercises are available for download at www.wiley.com/go/excel07pivottables.
Part I

PivotTable Fundamentals

Chapter 1
Understanding PivotTables and Charts

Chapter 2
Understanding Data Sources for PivotTables

Chapter 3
Using PivotTable Tools and Formatting
Chapter 1

Understanding PivotTables and Charts

In this chapter, you learn about PivotTables and PivotCharts, which are powerful data-analysis tools in Excel. They are invaluable for pulling meaning from huge masses of seemingly meaningless data. Given their power, PivotTables and PivotCharts are surprisingly easy to use, but using them still involves many unavoidable complexities. This book teaches you how to use PivotTables and PivotCharts efficiently and effectively. As the first step, you need to understand what these tools are and when you might want to use them.

In This Chapter

- Understanding how PivotTables work
- Working with PivotTables
- Creating a PivotTable report
- Creating a PivotTable report with multiple columns
- Using the PivotTable and PivotChart Wizard
- Creating a PivotChart

Understanding How PivotTables Work

PivotTables enable you to extract meaning from large amounts of data. This description is deceptively simple because in fact PivotTables are powerful and
sophisticated tools that enable you to do things that would be impossible or difficult to do any other way. A PivotTable enables you to take what seems to be an indecipherable mass of facts and extract any trends and patterns buried in the data. You can organize and summarize your data, perform comparisons, and extract meaningful information that can be invaluable to you and your organization. A PivotTable can work with data that is located in an Excel workbook and also with data from an external database. This is an important factor because it enables you to analyze data sets that are much too large to be contained in a workbook. Now that Excel 2007 is here, this point seems less important than in the past. With a capability of one million rows, it seems probable that most data sets will fit into a workbook easily. A more compelling reason to work with an external database is that it ensures data integrity throughout an organization—not to mention that it is easier than importing the data into Excel just to create a PivotTable.

Why the term pivot? It comes from an analogy between the way PivotTables work and the way you investigate a physical object. Imagine that you have been handed a complex device and asked to figure out what it does. You don’t just look at it from one angle; rather you turn it in your hands, examining it from all possible perspectives to be sure you do not miss any important clues. PivotTables work the same way, enabling you to turn or pivot the raw data and examine it from various perspectives to extract the information you need. Then you also have the option of creating a PivotChart, a graphical representation of the information in a PivotTable.

Suppose you work for a chain of sporting-goods stores. Every day you receive a report from each store that includes complete details on that day’s activities, such as number of customers each hour, sales in each of 30 categories, items returned for refund or exchange, and number of employees on duty at different times of the day. It won’t be long before your Excel workbook is chock-full of this raw data, but what good does it do you? You could stare at this information for hours without gaining any useful insights from it. But with a PivotTable you can quickly and easily answer the following types of questions:

- Which days of the week show the highest sales?
- Which categories of merchandise sell best at different times of the year?
- Are more employees scheduled to work during periods of the highest customer load?
- Do certain categories of merchandise suffer from unusually high rates of return or exchange?

These are the kinds of questions that a business needs to answer in order to operate efficiently. These are also the kinds of questions that PivotTables are designed to answer. The same kinds of analysis are appropriate for almost any kind of data you can imagine, from political surveys to weather patterns, from quality control in a manufacturing plant to test scores in a high school. That’s the beauty of PivotTables—they are powerful and flexible.
Working with PivotTables

I could talk about PivotTables until I am blue in the face, but it’s much better to actually show an example. By looking at the kind of data that PivotTables are used for, and seeing the resulting PivotTable in action, you will get a good understanding of the what and why of this powerful tool.

Figure 1-1 shows some data that are typical of the kind you would analyze using a PivotTable. These data are based on the sporting-goods store example I mentioned earlier. As with other examples in this book I have intentionally simplified the data to illustrate the points I am trying to make without confusing you with unnecessary details. You should not think that PivotTables are limited to relatively simple data such as these.

What questions might you want to ask about these data? Here are a few that come to mind:

• What are the sales for the Camping category for each region?
• In each store, which days of the week see the most customers?
• In each store, which category has the highest sales?
• Which day of the week has the lowest total sales?

In the following demonstration, you explore the first question. You create a PivotTable report that shows the total sales of goods in the Camping category subtotaled by region.

Changes to Excel PivotTables and Charts

If you worked with PivotTables and PivotCharts in earlier versions of Excel you will find lots of changes in the current program. The tables and charts have not themselves changed much, but the procedures you use to create and work with them have been streamlined and simplified. I think you’ll find these changes to be great improvements—but some of the older techniques are still supported for those users who are accustomed to using them.
Creating a PivotTable Report

In this section I will guide you through the steps required to create a report that answers the question posed above: What are the sales for the Camping category for each region?

To begin, you must start Excel and open the workbook that contains the raw data, SportingGoodsRawData.xlsx. This workbook is provided for download from www.wiley.com/go/excel07pivottables/.

After you have opened the workbook, make sure that the cell pointer is on any cell in the table of data. Then, start by clicking the PivotTable button on the Insert ribbon. Excel displays the Create PivotTable dialog box as shown in Figure 1-2.
In this dialog box, you can see that the address of the data range—A2:K44 in this example—is already entered in the Table/Range box. Make sure that the options are selected as shown in Figure 1-2 and described here:

- Select a table or range
- New Worksheet

Then click the OK button to close the dialog box and create the PivotTable—or, to be more accurate, the shell of the PivotTable because there are a few more steps required. At this stage Excel will look as shown in Figure 1-3.
Please note two things about Figure 1-3. On the left is the shell of the PivotTable; this is where it will be displayed after you have finished defining it. On the right is the PivotTable Field List, and it’s here that you define what data will be in the PivotTable and how it will be arranged. Later in the book you’ll learn all the details of using the PivotTable Field List, but for now just follow along.

In the PivotTable Field List, click the Region item to place a check mark next to it. You’ll see that Region is displayed in the Row Labels section of the PivotTable Field List, and that the PivotTable itself changes to display the three regions—Midwest, Northeast, and South—in column A.

Next, click the Camping item to place a check mark next to it. Sum of Camping will be displayed in the Values box at the bottom of the dialog box, and the sums for the Camping category will be displayed in column B of the PivotTable, along with a grand total for all regions.

Finally, click the down arrow next to Sum of Camping in the Values box and then select Value Field Settings from the context menu. Excel displays the Data Field Settings dialog box. Click the Number Format button to open the Format Cells dialog box. Select the Currency format; then click OK twice to close all dialog boxes. At this point your PivotTable will look like Figure 1-4.
I hope that you are suitably impressed with how easy it is to create this PivotTable report. Yes, it’s a simple one, but the same principles apply for more complex requirements. At this time, I want to point out a couple of other aspects of PivotTable reports.

When the report is active, the PivotTable Field List is displayed. Fields that are part of the report are displayed in boldface and with a check mark in this list. They are also displayed in the various boxes at the bottom of the dialog box showing what role they have in the report. To make the PivotTable active, click anywhere in it. To make it inactive, click somewhere else in the worksheet.

Note that the Region heading in the report has a drop-down arrow next to it. If you click this arrow, Excel displays a list of all the row values as shown in Figure 1-5—in this case, the names of the three regions, Midwest, Northeast, and South. By selecting or clearing individual items in this list, including the Select All option, you can change what the PivotTable displays. You can also perform other actions here, such as sorting—these will be covered in a later chapter.

For example, by selecting only the Midwest item and then clicking OK, you modify the report to show the Camping category sales for the Midwest region only, as shown in Figure 1-6.
Creating a PivotTable Report with Multiple Columns

The example PivotTable presented in the previous section was just about the simplest PivotTable you can create. It will be useful to go through the process of creating a somewhat more sophisticated PivotTable report, one that has multiple columns as well as rows. The data you will use is shown in Figure 1-7. It is inventory data for a chain of video-rental stores.

These raw data are organized differently from the data in the previous example. Each row in this table represents a specific category of video for a specific store. The number is the count of titles in stock for that category. The goal is to create a PivotTable report that presents this information in an easy-to-read form and to display summary information.

To begin, open the workbook VideoStoreRawData.xlsx. Make sure the cell pointer is on a cell in the table; it does not matter which one. Then click the PivotTable button on the
Insert ribbon to display the Create PivotTable dialog box (shown earlier in Figure 1-2). Make sure the following options are selected:

- Select a table or range (and verify that the correct range, A4:C28, is entered in the Table/Range box)
- New Worksheet

Click OK to create the shell of the PivotTable and display the PivotTable Field List. The list contains Store, Category, and Titles. Select all three field names. Excel will:

- Move Store and Category to the Row Labels box.
- Move Sum of Titles to the Values box.
- Create the PivotTable.

The results are shown in Figure 1-8.

![Figure 1-8: The initial PivotTable created for the video rental store data.](image)

Although this is a perfectly legitimate PivotTable, it is not what you want. You can see that both the Store and Category fields are used as row headings—you want a report where Category is a column heading. This is easily fixed: In the PivotTable Field List, go to the
Row Labels box and click the down arrow next to Category. From the context menu, select Move To Column Labels. The field will move to the Column Labels box and the PivotTable will change to the desired format, as shown in Figure 1-9. This is an example of pivoting the table so the data is arranged differently.

If you are working along in Excel, be sure to save your workbook after creating the PivotTable and pivoting it. You’ll use this PivotTable again later in this chapter.

**Figure 1-9:** The final PivotTable has Store as a row field and Category as a column field.

In Figure 1-9, notice that Excel automatically creates totals for each category and each store, as well as an overall total.

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### Using the PivotTable and PivotChart Wizard

Before Excel 2007 (the current version of Excel), you used the PivotTable and PivotChart Wizard to create PivotTables. Even though Excel 2007 provides a new and simpler way to create PivotTable, as described in the previous sections, the PivotTable and PivotChart Wizard is still available. Some people may prefer the wizard, particularly those who have experience with it. For this reason, I have included it in this book. However, if you are happy with the new techniques for creating a PivotTable, you can ignore these sections.

If you want to work along with this walk-through, open the file *SportingGoodsRawData*. This worksheet contains data for a sporting goods chain and gives customer count and sales in various categories for three stores over a week. It is shown in Figure 1-10.

Make sure the cell pointer is on a cell in the table, and then press Alt+D followed by P to open the PivotTable and PivotChart Wizard. Figure 1-11 shows the first step of the wizard.

In this dialog box, make sure that the options are selected as shown in Figure 1-11:

- Select Microsoft Office Excel List or Database
- Select PivotTable
Chapter 1: Understanding PivotTables and Charts

Figure 1-10: The worksheet containing the sporting goods sales data.

Figure 1-11: The first step of the PivotTable and PivotChart Wizard.
Then click the Next button to move to Step 2 of the wizard, shown in Figure 1-12. Here you specify the range where the data is located. If you placed the cell pointer in the table before starting the wizard, Excel will automatically select the range for you, A2:K44 in this example, as shown in Figure 1-11. Otherwise you can type the range into the Range box or select it with the mouse as follows:

1. Click the Select button (at the right end of the Range box). The dialog box collapses to a single line.
2. Drag the mouse over the desired data range. The range will be surrounded by an animated dashed border.
3. Click the Select button again. The dialog box expands to its normal size with the address of the selected data range entered in the Range field.

Figure 1-12: In the second step of the PivotTable and PivotChart Wizard you select the data that the PivotTable will be based on.
When you have the data range entered, click the Next button to move to the third and final step of the wizard, shown in Figure 1-13.

In this dialog box you specify where to place the PivotTable, either on a new worksheet or an existing worksheet. You can also specify the table layout and set some options using the Layout and Options buttons, but that’s a topic for a future chapter. For now, just select the New Worksheet option, and then click Finish to create the PivotTable report (see Figure 1-14).

Figure 1-13: In the third and final step of the PivotTable and PivotChart Wizard you select the location for the new PivotTable.
Notice that the screen in Figure 1-14 looks identical to the one in Figure 1-3. That’s right—if you use the PivotTable and PivotChart Wizard to create a PivotTable, the result is just the same as if you had used the newer tools in Excel 2007. You then follow the same steps to define the PivotTable columns and rows or to create a multi-column report, as described in the previous two sections.

Creating a PivotChart

A PivotChart is nothing more than a standard Excel chart created from the data in a PivotTable report. In fact there are a few features in PivotCharts that you will not find in charts based on other data—that is, data not in a PivotTable. For the most part, however, a PivotChart is like any other Excel chart and can be manipulated and formatted in the same way. The few differences will be covered as they come up.

Table and Chart in One Step?

If you know that you will want a PivotChart, you can create the PivotTable and PivotChart in one step. Instead of clicking the PivotTable button on the Insert ribbon, click the arrow underneath it and then select PivotChart from the menu. You’ll then follow the usual procedures for creating a PivotTable, but when Excel creates the PivotTable it will automatically create a PivotChart as well.