# CHAPTER 30

# Using PivotTables and PivotCharts

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# HOW PIVOTTABLE AND PIVOTCHART REPORTS WORK

PivotTables and PivotCharts are powerful tools for automatically summarizing and analyzing data without ever having to add a formula or function. As the name implies, you start with a list in table format, snap the rows and columns into position on a grid, and end up with a sorted, grouped, summarized, totaled, and subtotaled report. PivotTable reports are best for cross-tabulating lists—the more categories, the better. You can reduce a list of thousands of items to a single line, showing totals by category or quarter. Or you can create complex, multilevel groupings that show total sales by employee, grouped by product category and by quarter. You can hide or show detail for each group with a quick double-click. You can change the view or grouping in literally seconds, just by dragging items on or off the sheet and moving them between row, column, and page fields.

Start with a list that contains multiple fields, and then use Excel's PivotTable Wizard to set up a blank PivotTable page with just a few clicks. Instead of sorting your list and entering formulas and functions, you drag fields around on the PivotTable page to create a new view of your list—Excel groups the data and adds summary formulas automatically. PivotCharts are the visual equivalent of PivotTables, letting you create killer charts just as quickly, by dragging fields on a chart layout page.

- → For more details on how to create and work with lists, see Chapter 28, "Working with Lists and Databases," p. 783.
- → PivotCharts add a new dimension to PivotTable reports, see "Creating and Editing PivotCharts," p. 850.

The mechanics of PivotTables have remained basically unchanged since Excel 2000, although usability tweaks in Excel 2002 and Excel 2003 have made them easier to work with. Anyone upgrading from Excel 97 will find the process of creating and editing PivotTables dramatically easier, especially when it comes to changing a PivotTable on-the-fly. PivotCharts were introduced in Excel 2000.

Unlike subtotals and outlines, which modify the structure of your list to display summaries, PivotTables and PivotCharts create new, independent elements in your workbook. When you add or edit data in a list, the changes show up in your PivotTables and PivotCharts as well; because they're separate elements, you can easily change the structure of a PivotTable or PivotChart, too, and your changes won't mess up the data in the underlying list. Using *interactive Web components*, you can also make PivotTables available to other people via a Web browser.

Figure 30.1 shows the four main *drop zones* on a blank PivotTable page. The PivotTable toolbar includes buttons for every field in your list. Use row fields and column fields to define how you want Excel to group your list. Data items define which fields contain the information you want to summarize. Page fields let you further refine your view by displaying a separate PivotTable for each item in a group, as though the table were on its own virtual page. You can use multiple row fields, column fields, or both, and you can specify which

summary action you want Excel to perform on data items—the sum, average, or count of all related values, for instance.



Figure 30.1 Drag field buttons from the toolbar and drop them on the layout to build a PivotTable on-the-fly.

> What can you do with a PivotTable? The number of uses is limited only by your imagination. Despite their dramatically different structures, for example, each of the following four PivotTables started with the same list of information about publicly traded stocks. In its raw form, with its grand total of 106,224 separate data points, the list is a prescription for information overload. Each of the 6,639 rows contains 16 data fields for an individual publicly traded company, including its name, ticker symbol, and industry category, the exchange on which it trades, its high and low stock price for the past year, and financial measurements such as net profit margin and return on equity.

> Figure 30.2 shows a simple PivotTable that lets you see at a glance how many companies are in each industry category, along with the average increase or decrease in stock price from companies in that category over the past year. This PivotTable consists of a single row field and two data items.

In Figure 30.3, more detail is added, displaying individual statistics for each company, and grouping the detail rows in alphabetical order by industry name. For this PivotTable, the data is arranged in report format, similar to the banded database reports Access and other database management programs produce. Note that this PivotTable includes four data items instead of two, and a slew of Excel formatting options are used to make the report more readable—changing fonts and font sizes, aligning type and adding background shading, and standardizing the number of decimal points in each column.

#### Figure 30.2

With no column fields and only one row field, this PivotTable quickly counts the number of companies in each category and calculates the average price change for the vear.

	A	В	С
		Number of	% Price Chg Last Yr
3	Industry Name 📃	Companies	(Avg)
4	Closed-End Fund - Debt	360	-1.00
5	Savings & Loans	237	18.94
6	Business Software & Services	164	-38.23
7	Internet Software & Services	133	-22.66
8	Business Services	128	-21.35
9	Biotechnology	120	-45.73
10	Scientific & Technical Instruments	119	-24.45
11	Regional - Northeast Banks	116	14.96
12	Drug Manufacturers - Other	111	-33.29
13	Independent Oil & Gas	106	-7.48
14	Medical Appliances & Equipment	103	-18.11
15	Regional - Mid-Atlantic Banks	99	19.95
16	Communication Equipment	94	-31.54
17	Medical Instruments & Supplies	88	-24.90
18	Application Software	85	-27.05
19	Property & Casualty Insurance	75	-13.30
20	Restaurants	71	-19.31
21	Closed-End Fund - Foreign	71	-11.76

#### Figure 30.3

To hide gridlines and group-related items in bands such as these, choose a report format instead of the default table layout.

	A	В	С	D	E	F
1						
2						
3	Industry Name] <del>-</del>	Company Name	Avg of Net Profit Margin	Avg of % Price Change Last Year	52-Week Low	52-Week High
127 128		Petroleum Helicopters, Inc.	3.7	5.8	23.9	31.0
129	Aluminum		2.3	(34.6)	71.4	155.4
130		Alcan Inc.	3.0	(25.1)	23.2	40.1
131		Alcoa Inc.	1.9	(41.0)	17.6	39.1
132		ALUMINUM CP CHIN ADS	9.9	(17.5)	9.4	22.8
133		Century Aluminum Company	(2.6)	(50.9)	5.6	17.5
134		Commonwealth Industries, Inc.	0.9	(26.2)	4.2	8.1
135		Pechiney	0.8	(46.6)	11.4	27.8
136						
137	Apparel Stores		3.0	(22.8)	492.0	1,130.0
138		Abercrombie & Fitch Co.	12.2	0.7	15.0	33.9
139		American Eagle Outfitters, Inc.	6.1	(41.1)	9.8	27.2
140		AnnTaylor Stores Corporation	5.8	(28.1)	17.1	33.2
141		bebe stores, inc.	7.4	(48.3)	9.6	24.8
142		Big Dog Holdings, Inc.	3.4	(35.0)	1.8	5.6
143		Buckle, Inc.	8.0	(26.4)	15.5	25.5
144		Burlington Coat Factory Warehouse Corpora	2.7	(11.7)	15.4	23.5

#### → For details on how to create similar reports from an Access database, see "Building Great Forms and Reports," p. 1006.

To slice the data even more finely and add an extra analytical dimension, you can drag more buttons from the PivotTable toolbar to the row and column fields. Each row in the PivotTable is grouped using unique values in two categories, and there are two column headings as well, one for each unique value in the "Split in Last Year" column field. (To make the PivotTable easier to read, the column headings were renamed from Yes and No to Split and No Split.) At the intersection of each row and column in the PivotTable, Excel counts the number of companies and calculates the average income per employee for all rows that match the row and column fields.

The resulting PivotTable, shown in Figure 30.4, is a concise and crystal-clear cross-tabulation, giving you a side-by-side analysis of the number of stocks that split in the past year versus those that didn't, broken down by industry category and exchange.

#### Figure 30.4

Add a column field to quickly compare related data points. Notice that the worksheet pane is frozen to keep headings visible when scrolling, just as with an ordinary worksheet.

	A323	-	∱ Regional	- N	lid-Atlantic Banks							
		A			В	С			D	E		F
						Split in						
3						Last Year	•	Data	•			
4						Split				No Split		
						Number of	of	Ave	lncome	Number of	A	wg Income
5	Industry	Name		-	Exchange 🖵	Companie	s	PerB	Employee	Companies	Pe	r Employee
140	Drugs Wh	olesale			AMEX		0	\$	-	2	\$	(174,500)
141					NASDAQ		1	\$	7,000	2	\$	54,000
142	1				NYSE		1	\$	22,000	2	\$	17,000
143	Education	& Training	Services		NASDAQ		1	\$	21,000	4	\$	16,500
144					NYSE		1	\$	12,000	2	\$	4,000
145	Electric Uti	ilities			AMEX		0	\$		3	\$	55,000
146					NASDAQ		0	\$	-	2	\$	18,000
147	1				NYSE		3	\$	53,333	34	\$	31,618
148	Electronic	Equipmer	it		AMEX		0	\$		3	\$	21,000
149					NASDAQ		1	\$	34,000	5	\$	(400)
150	1				NYSE		0	\$	-	1	\$	12,000
151	Electronics	s Stores			NASDAQ		0	\$	-	3	\$	-
152					NYSE		1	\$	6,000	3	\$	4,667
153	Electronics	s Wholesa	ile		NASDAQ		0	\$		5	\$	6,200
154					NYSE		0	\$	-	2	\$	(2,000)
155	Entertainm	ent - Dive	rsified		AMEX		0	\$	-	2	\$	6,000
156					NYSE		2	\$	151,000	2	\$	24,500
157	Farm & Co	nstruction	Machinery		AMEX		1	\$	13,000	0	\$	-
158	1		-		NASDAQ		0	\$	-	2	\$	12,500

There are literally hundreds of options in even a modestly complex PivotTable, but a PivotTable doesn't have to be large or complex to be effective. The PivotTable in Figure 30.5, for example, neatly summarizes more than 100,000 data points in just a few rows and columns.

#### Figure 30.5

Notice the grand totals under the rows in this PivotTable. Use the page field in the top-left corner to filter the entire list.

	B1	•	f≈ (All)		
	A		В	С	D
1	Industry Na	me	(AII)		
2					
3	Exchange		Dow Jones Membership 토	Net Profit Margin (Avg.)	Price Change Last Yr (Avg)
4	4 AMEX		(blank)	0.85	-10.85
5	5 NASDAQ		DJ Industrials	21.30	-25.15
6			DJ Transports	-0.48	-12.93
7	1		(blank)	-3.35	-17.26
8	NYSE		DJ Industrials	6.43	-21.29
9	9		DJ Transports	2.05	-27.24
10	10		DJ Utilities	-4.83	-34.26
11	11		(blank)	6.25	-16.25
12	Grand Tot	al		0.56	-16.32

To produce this example, we used two column fields, two row fields, and one page field—a drop-down list that lets us filter the records in the entire table. Choosing (All) from the page field shows a summary of all data in the list; by selecting a different entry from the drop-down list, you can show the same breakdown for each industry name. Select one category at a time to flip through a series of otherwise identical PivotTables that focus on each category.

The layout Excel produced automatically included totals for each row and column; we kept only the grand total at the bottom of the PivotTable. We had to modify other default settings as well, including changing the default formula to calculate the average of our data items. To make the headings and totals easier to read, we did some rewording, and then changed fonts and alignment, added shading, and wrapped text.

# WHEN SHOULD YOU USE A PIVOTTABLE?

PivotTables have several advantages over other worksheet models. Using the PivotTable Wizard, it's easy to create a PivotTable that summarizes all or part of a list in dozens of different ways. Trying to accomplish the same task by entering formulas manually would take days. Also, because PivotTables and PivotCharts do not change your existing data or its arrangement on the worksheet, you can freely experiment with different PivotTable layouts. Use the Undo button to roll back any changes you make in a PivotTable layout. If you want to start over, you can delete the PivotTable page and run the wizard again.

PivotTables are the correct choice when all your data is in a list or in an external database you can query from Excel. PivotTables are not appropriate for structured worksheet models that include data-entry cells, subtotals, and summary rows. A PivotTable won't do much good on an annual budget worksheet, for example, because it already includes rows, columns, and subtotals. On the other hand, if you enter the raw data in a list (or import it from an external database), with each row containing a month, department, budget category, and amount, you can easily re-create that same layout in PivotTable form—and you'll have many more analytical options available to you later.

→ For more details on how to use Microsoft Query to pull data from an external database, see "Creating Links to External Databases," p. 806.

## **CREATING A PIVOTTABLE**

To create a PivotTable from an existing list, start with Excel's PivotTable Wizard. In this simple three-step process, Excel prompts you for basic details about the PivotTable you want to create, including the location of the data source and where you want the PivotTable to appear. After you finish with the wizard, you'll be able to lay out your data directly on the worksheet.

Excel 2000 introduced the capability to create and edit a PivotTable layout directly on the sheet—an enormous improvement over the same feature in Excel 97, which required that you edit PivotTable layouts in a dialog box. The Layout dialog box is still available, however, and on slow machines or with extremely large lists, you might prefer to use this technique, because it doesn't actually begin rearranging data until you click OK. To open the Layout dialog box, click the Layout button in Step 3 of the PivotTable and PivotChart Wizard.

To build a new PivotTable, open the workbook that contains the list on which you plan to base the PivotTable. Then follow these steps:

- 1. Click anywhere in your list. To build a PivotTable from a subset of the data in your list, select the range that contains the data.
- 2. Choose Data, PivotTable and PivotChart Report. The PivotTable Wizard appears, as shown in Figure 30.6.

#### Figure 30.6 If you don't select a range first, the

PivotTable Wizard assumes you want to base the new PivotTable on the entire list. Change the selection, if necessary, in the next step.



**3.** Specify the location of your data—typically an Excel list. If you choose the Multiple Consolidation Ranges option, Excel lets you select a group of data ranges from one or more worksheets. Click Next to move on.

#### **Using External Databases with PivotTables**

In a corporate setting, it's often useful to base a PivotTable on the result of a query to an external database. If you choose the External Data Source option, Excel starts the Query Wizard and prompts you for details about the format and location of the database. Excel then uses this query as the source for the PivotTable or PivotChart. Each time you refresh the data in the PivotTable, Excel runs the saved query and updates the PivotTable with the most recent information.

Excel 2003 also offers the option to build PivotTables from special data structures called On-Line Analytical Processing (OLAP) databases. Instead of rows and columns, these files organize data into dimensions and levels. Instead of forcing Excel to chug through massive amounts of data, the server does the summarizing first and sends the summary values directly to your report.

When you connect to an OLAP database, Excel lets you save your data in local files called *OLAP cubes* and use them as the source for a PivotTable. There are some substantial differences in the way PivotTables based on OLAP data work compared with those based on Excel lists or non-OLAP databases.

To learn more about building PivotTables from an OLAP database, pick up a copy of *Special Edition Using Microsoft Office Excel 2003* (ISBN 0-7897-2953-9), also published by Que.

**4.** The wizard asks you to specify the range in which your data is located. The default selection is your current list, or any range you selected before starting the wizard. Adjust the selection, if necessary, and click Next.



If the wizard starts in Step 3 instead of Step 1, see "Adding Extra PivotTables" in the "Troubleshooting" section at the end of this chapter.

**5.** In its final step, the wizard asks you where you want to place the PivotTable. Choose the default option, New Worksheet.

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#### CAUTION

The PivotTable Wizard offers the option to place a PivotTable or PivotChart on an existing worksheet. In general, you should always choose to place a PivotTable on its own sheet. Adding a PivotTable to a sheet that contains data exposes you to the risk that changes you make to the list design will affect your PivotTable, or vice versa.

- 6. Click Finish to close the wizard and create a blank PivotTable page. Excel jumps to the new worksheet you just created and displays the PivotTable toolbar.
- 7. Drag field buttons from the PivotTable Field List and drop them into the appropriate regions in the layout. You must have at least one row or column field, and you must specify a data item.

#### TIP FROM



If you're uncertain about exactly where to drop field buttons, watch the screen for two important clues. As the mouse pointer passes over each region of the PivotTable, Excel displays informative ScreenTips. When dragging fields around, watch the mouse pointer—it changes shape to match the PivotTable layout, and a blue highlight in the pointer shows which of the four regions (row, column, data, or page) is under the pointer at any given moment. If you can't figure out where to drop the selected field button, use the Add To list at the bottom of the PivotTable Field List window.

Don't be surprised if the PivotTable doesn't display properly at first. In particular, summary fields in the data area default to the SUM function. If you want to use COUNT, AVERAGE, or another summary function instead, see the next section.

### **EDITING AND UPDATING A PIVOTTABLE**

After you create a PivotTable, it's easy to rearrange fields and data items. Drag fields from one place to another to change the display of data—from a row field to a column field, for example, if you want to see values side by side rather than one above the other. Right-click to display shortcut menus that let you adjust formatting and other options for each field. This section describes common procedures for editing PivotTables.

If you've upgraded from Excel 2000, you should notice a significant change in the arrangement of PivotTable editing tools. The assortment of menu options on the PivotTable toolbar is expanded, and the PivotTable Field List is now a separate control, as shown in Figure 30.7.

If you're uncomfortable with drag-and-drop operations, use the Add To drop-down list to choose where you want the field to appear. If the Field List isn't visible, right-click the PivotTable layout area and choose View Field List from the bottom of the shortcut menu. To make changes to the PivotTable report, use any or all of these techniques:

To change the list or data source on which the PivotTable is based, click the PivotTable Wizard button on the PivotTable toolbar. Click Back twice to return to the beginning of the wizard and make the required changes, and then click Finish. If you add new rows or columns to a list, you might need to perform this step before the data or fields will be available.

#### If you've added new fields or data to a list, but your PivotTable doesn't reflect the changes, see "Refresh to Update a PivotTable" in the "Troubleshooting" section at the end of this chapter.

• To add a new field to the layout, drag a field button from the PivotTable toolbar and drop it on the layout. If you're replacing an existing field, remove the old field first to reduce unnecessary calculations. When you drop a new field in the row or column area, Excel adds it as part of the hierarchy of fields that are already there and automatically groups items in the order in which they appear. Be careful to arrange these fields in the proper order. For example, if you have a list of product categories, each of which contains multiple products, place the category field to the left of the product name field, or the results will be nonsense.



#### TIP FROM

E & Wood

If your list includes two fields that have an absolute one-to-one correspondence, such as part numbers and part names, you can add them to the row area in either order and your list will appear correctly.

- To remove a field from any part of the PivotTable layout, drag the field button off the layout; when the pointer icon changes to include a red X, release the mouse button.
- To change the order of fields in rows, columns, or the data area, drag the field button and drop it in the correct location on the layout. Make sure you're pointing to the field button and not its label; you'll know you've aimed correctly when the mouse button turns to a four-headed pointer. Drag to another location and watch the mouse pointer and thick black lines for feedback on the correct "drop" location.

#### TIP FROM

E L & Wood

Using the mouse to rearrange the order of data items on a PivotTable can be frustrating. It's usually easier to right-click the field button you want to move, and then choose any of the options on the Order menu. Typically, you can move the item left or right one position, or move it to the beginning or end of the list.

To change the summary function used in the data area (from SUM to COUNT or AVERAGE, for example), right-click the field button in the PivotTable and choose Field Settings from the shortcut menu. That action opens the PivotTable Field dialog box, shown in Figure 30.8. Select a function from the Summarize By list; if you want to change the name from its default, do so in the Name box, and then click OK to save the change.

PivotTable Field 🛛 🕅							
Source field:	Income Per Employ	ОК					
Name: Awglin	icome Per Employee	Cancel					
Sum Count	^	Hide					
Average Max		Number					
Min Product		Options >>					
Count Nums	~						

#### Figure 30.8

When you drag and drop buttons to arrange fields on a PivotTable page, Excel makes all sorts of decisions on your behalf. If these defaults aren't correct, the following sections will help you change them.

#### **CHANGING SORT ORDER AND OTHER DISPLAY OPTIONS**

The *default sort order* for rows and columns is usually alphanumeric. You can change the order of individual items by dragging them up or down (in the case of rows) or left or right (for columns). In other cases, you might want to adjust the default sort order. For example, if your PivotTable counts the number of items in each category, you might want to see categories with the highest number of items at the top of the list. To change the sort order, follow these steps:

- Right-click the PivotTable button for the row or column field and choose Field Settings.
- Click the Advanced button to display the dialog box shown in Figure 30.9.
- Choose a sort order and the column by which to sort. The settings in Figure 30.9, for example, produce the list shown earlier in Figure 30.2, moving categories that contain the largest

number of companies to the top of the list.

Page field options	
Retrieve external data for all page field items (fage)	ster performance)
<ul> <li>Query external data source as you select each p.</li> <li>Disable pivoting of this field (recommended)</li> </ul>	age field item (requires less memory)
AutoSort options	Top 10 AutoShow
$\bigcirc$ Manual (you can drag items to rearrange them)	⊙ off
	Oon
© Descending	Show: Top 🗸 10 🔅
Using field:	Using field:
Number of Companies 🗸	Number of Companies
Number of Companies	Number of Companies



- 4. To show a specific number of records, choose Automatic from the AutoShow options section. This is a good way to create a "top 10" list, for example, showing only the categories that have the most items. Choose Top or Bottom from the Show drop-down list, and select a number between 1 and 255. Excel chooses records based on the sort order you defined in step 3.
- → AutoFilter can save a tremendous amount of time, if you know how to use it properly; see "Using AutoFilter to Find Sets of Data," p. 794.
  - 5. Click OK to close the Advanced Options dialog box, and click OK again to close the PivotTable Field dialog box and return to the worksheet.

#### ADDING AND REMOVING COLUMN AND ROW SUBTOTALS

You can add subtotals to rows, columns, or both in a list. In some cases, Excel adds them automatically, even if they're not appropriate. Subtotals can add a useful way to see the impact of groupings in your PivotTable, or they can add clutter between rows and columns. Depending on the design of your PivotTable and what Excel did automatically, you might need to add or remove these subtotals. In some cases, you can remove subtotals with the right-click shortcut menu. Right-click any of the subtotals and choose Hide. To add subtotals, you need to use the dialog boxes. To work with subtotals, follow these steps:

1. Right-click the PivotTable button for the row or column heading that contains the subtotal, and choose Field Settings from the shortcut menu. Excel displays the PivotTable Field dialog box, as shown in Figure 30.10.

Figure 30.10	PivotTable Fiel	d		$\mathbf{X}$
options to add, edit, or hide subtotals for a	N <u>a</u> me: Industry	Name		OK Cancel
row or column.	Automatic Custom None	Sum Count Average Max Min Product	<	Hide Adyanced
	Show items with	h no data		

- 2. In the Subtotals section, choose Automatic to let Excel create subtotals for all items. Choose Custom and click a summary function to add one or more specific type of subtotals, such as Count and Average. Click None to remove all subtotals.
- 3. Click OK to exit the dialog box and make the changes you specified.

#### SWITCHING BETWEEN TABLE AND OUTLINE LAYOUTS

The default layout for a PivotTable, as the name implies, is a tabular format. But that gridstyle arrangement is not always the most effective way to present data. When you're grouping a PivotTable by one row field and displaying data for a second row field, you probably

want to use outline format instead; in that layout, the top-level row field appears in its own row, followed by each group of items. Which one should you choose? The question is partly dictated by the data in your table and partly by aesthetics; there is no right answer. Figure 30.11, for example, shows a table format. Figure 30.12 shows the same data arranged in outline format. In this case, the outline format is probably more appropriate, because each break in the grouping functions as a header for the list of details beneath it.

#### **Figure 30.11**

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In tabular format view, the categories are arranged in a column to the left of the items to which they belong.

	A	В	С	D	E	F
1	Industry Name	Company Name	Avg of Net Profit Margin	Avg of % Price Change Last Year	52- Week Low	52- Week High
2		AFLAC Incorporated	8.0	15.8	24.2	33.5
3		American Independence Corp.		34.9	5.2	8.7
4		Aon Corporation	5.3	(40.1)	13.3	39.6
5	Accident &	Citizens Financial Corporation	(8.7)	(40.0)	3.4	8.9
6	Health	Everest Re Group Ltd.	9.0	(17.1)	42.6	72.2
7	Insurance	FPIC Insurance Group, Inc.	6.7	(40.8)	3.5	16.0
8		MIIX Group, Incorporated	(68.8)	(75.4)	0.6	2.9
9		Torchmark Corporation	15.1	(6.7)	30.0	41.8
10		UNUMProvident	6.2	(67.8)	6.1	29.5
11						
12		Catalina Marketing Corporation	12.8	(45.6)	15.8	37.0
13		Cordiant Communications Group plc	(51.9)	(70.2)	1.9	7.7
14		Digital Generation Systems, Inc.	7.1	110.9	0.7	2.4
15		Grey Global Group Inc.	(1.7)	(5.3)	508.0	832.0
16		Havas	(2.9)	(66.9)	2.3	9.4
17	Advertising	Interpublic Group of Companies, Inc.	1.6	(70.2)	7.2	35.0
18	Aronaian	Obie Media Corporation	(4.5)	(29.5)	2.0	4.2
10	Agencies	Omnicom Group (nc	85	(38.4)	36.5	95.5

#### **Figure 30.12**

In Outline view, the categories appear more like headers, and you can use space on the page or screen more efficiently.

	A	В	С	D	E	F
1	Industry Name 🖵	Company Name	Avg of Net Profit Margin	Avg of % Price Change Last Year	52-Week Low	52-Week High
2	Accident & Healt	h Insurance	(3.4)	(26.4)	128.8	253.1
3		AFLAC Incorporated	8.0	15.8	24.2	33.5
4		American Independence Corp.		34.9	5.2	8.7
5		Aon Corporation	5.3	(40.1)	13.3	39.6
6		Citizens Financial Corporation	(8.7)	(40.0)	3.4	8.9
7		Everest Re Group Ltd.	9.0	(17.1)	42.6	72.2
8		FPIC Insurance Group, Inc.	6.7	(40.8)	3.5	16.0
9		MIIX Group, Incorporated	(68.8)	(75.4)	0.6	2.9
10		Torchmark Corporation	15.1	(6.7)	30.0	41.8
11		UNUMProvident	6.2	(67.8)	6.1	29.5
12						
13	Advertising Ager	icies	(3.8)	(33.4)	625.5	1,156.9
14		Catalina Marketing Corporation	12.8	(45.6)	15.8	37.0
15		Cordiant Communications Group plc	. (51.9)	(70.2)	1.9	7.7
16		Digital Generation Systems, Inc.	7.1	110.9	0.7	2.4
17		Grey Global Group Inc.	(1.7)	(5.3)	508.0	832.0
18		Havas	(2.9)	(66.9)	2.3	9.4
19		Interpublic Group of Companies, Inc.	1.6	(70.2)	7.2	35.0
20		Obie Media Corporation	(4.5)	(29.5)	2.0	4.2
21		Omnicom Group Inc.	8.5	(38.1)	36.5	95.5

To switch between tabular and outline formats, follow these steps:

- 1. Right-click the PivotTable button for the row field that's farthest to the left, and choose Field Settings from the shortcut menu.
- **2.** In the PivotTable Field dialog box, click the Layout button to display the dialog box shown in Figure 30.13.

- **3.** To use a tabular layout, select the Show Items in Tabular Form option. To use an outline-style layout, select the Show Items in Outline Form option.
- **4.** Adjust any other options—to add a blank line or a page break after each group, for example—and click OK.

To make the tabular view in Figure 30.11 easier to read, a hidden option was used. Right-click anywhere on the table, choose Table Options, and then check the Merge Layout



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option. The effect is to merge all cells for the outside row and column labels.

#### TIP FROM



Excel includes a broad selection of PivotTable AutoFormats, divided more or less equally between table and outline (report) layouts. Use AutoFormats to quickly switch between table and outline layouts while also adjusting formatting options.

#### **REMOVING BLANK CELLS AND ERROR MESSAGES**

Because PivotTables automatically summarize all data, it's common to see blank cells and error messages in the data area. #DIV/0 errors, for example, are especially common when calculating averages because in a long list, it's almost certain that some items will have no matches in a particular row-and-column intersection. For example, if you're calculating average sales with regions in the column area and product categories in the row area, some regions will have no sales for a particular category. These aren't really errors; instead, you want the table to display a label such as NA, for "Not Applicable."

Careful attention to blanks and error messages can make your PivotTable easier to read and make it look more professional. Here's how to adjust the appearance of blank cells and errors:

- 1. Right-click any part of the PivotTable and choose Table Options from the shortcut menu. Excel displays the PivotTable Options dialog box, as shown in Figure 30.14.
- **2.** Select the For Error Values, Show check box. Click in the box to the right and fill in the information you want to display instead of the error message, such as NA.
- **3.** Select the For Empty Cells, Show check box. If the field contains numeric data, enter 0 here; for a text field, enter the value you want Excel to display (NA, for instance) instead of leaving the cell blank.
- 4. Click OK to save your changes.



#### **REFRESHING DATA IN A PIVOTTABLE**

When you change the layout of a PivotTable, Excel automatically recalculates the resulting display of data. If you add or edit data in the underlying list, however, your changes do not appear immediately in the associated PivotTable. For PivotTable reports based on Excel lists, you must manually refresh the data in the PivotTable whenever you add, remove, or edit data. To be certain that the PivotTable reflects all recent changes, click the Refresh Data button on the PivotTable toolbar. If this toolbar isn't visible, choose Data, Refresh Data.

OK

Cancel

#### TIP FROM

For PivotTable reports based on external data queries, you should refresh the query every time you open the workbook to make sure the report is using the most current data. To automate the process of refreshing external queries, right-click anywhere on the PivotTable and choose Table Options from the shortcut menu. Select the Refresh on Open option to update the query every time you open the workbook that contains the PivotTable. Use the Refresh Every *n* Minutes option to automatically update the query at regular intervals.

## **CREATING AND EDITING PIVOTCHARTS**

A PivotChart is a chart based on data in a PivotTable. Like its row-and-column-based counterpart, you can rearrange a PivotChart by dragging field labels on a chart sheet. When you change the layout of a PivotChart, Excel automatically rearranges the corresponding data in your PivotTable, and vice versa.

PivotCharts were introduced in Excel 2000, and they're a welcome addition. In general, any time you can use a PivotChart instead of a conventional chart, you should jump at the opportunity, because they're so much easier to create and edit.

PivotCharts follow almost exactly the same rules as charts you create from a conventional worksheet. The default chart type for a PivotChart is a stacked column chart, but you can change this to any chart type except X-Y (scatter) charts, bubble charts, and stock chart types. Chart options are identical to those found in regular charts, although you'll discover that it's impossible to move certain items, including the plot area, chart title, and axis titles.

NOTE

ate area.

Every PivotChart requires a PivotTable, which it uses as its data source. You cannot create a PivotChart without adding a PivotTable to your worksheet as well.

To instantly create a PivotChart from an existing PivotTable, first click in the PivotTable, and then click the Chart Wizard button. (You'll find this button on Excel's Standard toolbar and on the PivotTable toolbar.) The PivotChart appears on a new chart sheet. If you prefer to start from scratch, start the PivotTable and PivotChart Wizard and choose the PivotChart Report option. Excel docks the field list on the right side of the screen and displays the blank PivotTable chart, as shown in Figure 30.15.



Of course, a chart doesn't include rows or columns, so the available drop zones on a blank PivotChart page are slightly different from their counterparts on a PivotTable. When you create a PivotChart from a PivotTable, row fields become category fields, and column fields 30

become series fields. To change the arrangement of data in the PivotChart, drag field buttons from the PivotTable toolbar and drop them in one of four areas on the PivotChart. Category fields go below the chart, and series fields appear at the right of the chart. Drop data items directly into the body of the chart. If you want to add a page field, drag it to the region above the chart. Page fields are especially effective on a PivotChart, because they allow you to chart a subset of your data without having to remove or change data series. Click the drop-down arrow to the right of the page field to choose which item you want to display in the chart. The chart shown in Figure 30.16, for example, allows you to quickly compare data for each company within an industry category. If you used the All option for this chart, the display of more than 2,200 companies would be gibberish.

#### **Figure 30.16**

This PivotTable chart is a tremendous improvement over an ordinary chart, because you can use the page field (Industry Name) to quickly filter and redisplay the information.



#### **TIP FROM**



There's no way to hide field buttons on a PivotTable, but you can remove clutter from a PivotChart. If you're happy with the chart layout, click the PivotChart button on the PivotTable toolbar and choose Hide PivotChart Field Buttons. Use the same menu choice to display the buttons again.

With PivotCharts, you can use the same formatting and editing options as with conventional charts. In particular, use right-click shortcut menus to choose a different chart type; format data series, axes, and the plot area; and add or edit colors and backgrounds to your chart.

→ For instructions on how to edit charts, see "Editing and Formatting Chart Elements," p. 772.

# FORMATTING AND PRINTING PIVOTTABLES

When you first create a PivotTable, it picks up the generic look of a default worksheet, with plain 10-point Arial formatting for details and headings alike. To make your PivotTable more compelling, use Excel's formatting features to add emphasis to text and backgrounds or shading to cells, rows, and columns. You can also adjust the number format of data items.

For an overview of Excel's many formatting options, see Chapter 25, "Advanced Worksheet Formatting," p. 683.

You can format numbers and text in the data area of a PivotTable by selecting cells individually and choosing formatting options as you would in a normal worksheet. However, if you redefine your PivotTable later, you will lose this formatting. That can be exasperating if you're constantly losing, say, the number of decimal places you want to see in each data item. To apply number formatting that lasts, right-click any cell in the data items area and choose Field Settings from the shortcut menu. Click the Number button and choose a format from the dialog box.

#### TIP FROM



When you create a PivotTable or PivotChart on a new worksheet, Excel assigns a generic name to the new sheet. To make your worksheets easier to understand, right-click the tab, choose Rename, and give the sheet a new name that helps identify it. (You can also double-click the existing tab name to make it available for editing.) Right-click the PivotTable itself and choose Table Options to give the PivotTable itself a name, which you can use in dialog boxes and in the PivotTable Wizard.

Sometimes you need to adjust other formatting options as well. For example, you might want to change the alignment of a column of numbers, change to a new font, or add a background shade behind the column. Here, too, you have two options: If you right-click the cells in question and choose Format Cells, you'll have access to all common cell formatting options—Number, Alignment, Font, and so on. But as soon as you rearrange your PivotTable, those custom formats vanish.

To lock cell formatting in place regardless of what you do with your PivotTable, right-click the PivotTable button for the field you want to format and choose Format Cells from the shortcut menu. Adjust desired formatting options and click OK.

To make PivotTables look their best, take advantage of Excel's AutoFormat capability. After you've created a PivotTable, click the Format Report button on the PivotTable toolbar. You see a dialog box containing more than 20 ready-made formats. Select any format and click OK to apply the changes to your PivotTable.

If you don't like the AutoFormat you've applied to a PivotTable, it's easy to undo the changes. First, right-click any cell in the PivotTable, choose Table Options from the shortcut menu, and clear the check mark from the AutoFormat Table check box. Next, click the Format Report button to open the AutoFormat dialog box again. Scroll to the bottom of the list. Select the None option and click OK.

# TROUBLESHOOTING

#### **ADDING EXTRA PIVOTTABLES**

I wanted to create a new PivotTable, so I chose Data, PivotTable and PivotChart Report. Instead of starting at the beginning of the wizard, however, Excel started at the third step. Why is this happening?

You've already created a PivotTable in your worksheet. Because the active cell is within that PivotTable, Excel assumes you want to use the wizard to modify the existing table. To create a new PivotTable, switch to the sheet that contains the list of data you want to use. If you want to create a second or third PivotTable based on the same data as another PivotTable, choose the Another PivotTable or PivotChart option in Step 1; doing so conserves memory and improves performance.

#### **REFRESH TO UPDATE A PIVOTTABLE**

I've updated data in the list on which my PivotTable is based, but when I view the PivotTable, I don't see the changes. What's wrong?

Click in the PivotTable, rerun the PivotTable Wizard, and check the data source shown in Step 1 to make sure the data source is specified correctly. If you've changed data in the table, you might need to refresh the PivotTable manually—PivotTables don't automatically update with those changes. Position the insertion point anywhere in the PivotTable, rightclick, and choose Refresh Data from the shortcut menu. When the data updates, Excel displays a dialog box warning you that the data has changed.

If you've added new fields to the list, those fields might not show up on the PivotTable toolbar until you refresh.

# Secrets of the Office Masters: Grouping Items in a PivotTable

Excel PivotTables are capable of splitting data into groups, even when you haven't organized your data in advance. This is a powerful feature that's useful in a variety of circumstances. When you choose to group data in a PivotTable, Excel analyzes the field you've chosen and displays a dialog box with choices that are appropriate for that type of data. For example, if you have a year's worth of daily sales figures, you might want to group them by week, by month, or by quarter. If you have a product catalog in which each row contains a product name, its category, and a price, you might want to group the list of products by category, and then by price within groups: \$1.00–\$10.00, \$10.01–\$20.00, and so on.

In the example shown here, a simple worksheet has just two columns: Date and Sales Volume. Each row contains a date and the total sales for that date, in dollars. In total, the sheet contains three years' worth of data. Here's how to create a report that shows monthly trends for all three years:

- 1. Create a PivotTable using the Date field in the Row area and the Sales Volume field in the Data area.
- 2. Right-click any entry in the Date column and choose Group and Show Detail, Group from the shortcut menu. As Figure 30.17 shows, Excel correctly determines these are dates and offers to group by month. Because the sample extends over several years, choose Months and Years, and then click OK.
- 3. Drag two more copies of the Sales Volume button into the Data area and format each one to show a different summary: Sum, Average, and Min. Adjust the names of each summary as well. This step allows you to see the total sales,



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average sales, and minimum daily sales for each month during the three-year period.

**4.** Use the AutoFormat option to choose one of the Report formats. Adjust column formatting and number formats for each summary cell.

The results, shown in Figure 30.18, give a month-by-month snapshot of total sales, even though we started with nothing more than a daily list.

Notice the final frill in this useful table: We hid the taskbar and chose View, Full Screen to make as much information as possible visible on the screen, hiding distracting toolbars and title bars.

:0	Eile Edit	View Insert	Format <u>T</u> ools <u>D</u> ata <u>W</u>	<u>M</u> indow <u>H</u> elp		- 8
	A	B	С	D	E	F
			Total Mont	hly Average Sales	Lowest Sales	
3	Years	Date		Volume	Volume	
25		Sep	\$464,2	223.20 \$23,211.16	\$9,009.95	
26	1	Oct	\$568,3	339.70 \$24,710.42	\$15,596.55	
27		Nov	\$394,8	895.51 \$19,744.78	\$12,960.00	
28		Dec	\$456,4	434.69 \$21,734.99	\$10,853.24	
29	2002					
30		Jan	\$317,1	149.96 \$13,789.13	\$9,768.17	
31		Feb	\$202,2	268.42 \$10,645.71	\$6,525.70	
32		Mar	\$234,0	080.11 \$11,146.67	\$6,532.98	
33		Apr	\$227,	703.68 \$10,843.03	\$5,759.57	
34		May	\$243,8	800.32 \$11,081.83	\$4,896.18	
35		Jun	\$305,4	455.98 \$14,545.52	\$7,367.43	
36		Jul	\$340,6	685.31 \$16,223.11	\$3,055.83	
37		Aug	\$176,8	851.06 \$9,307.95	\$3,482.60	
38		Sep	\$218,2	260.78 \$10,393.37	\$5,037.27	
39		Oct	\$220,6	647.72 \$9,593.38	\$5,587.43	
40		Nov	\$141,	770.64 \$7,461.61	\$4,579.93	
41		Dec	\$170,2	299.96 \$7,740.91	\$4,801.81	
42	2003					
43		Jan	\$195,6	676.80 \$8,894.40	\$5,798.83	
44		Feb	\$114,3	255.88 \$8,161.13	\$5,964.33	
45	Grand	Total	\$9,922,7	62.40 \$13,090.72	\$1,754.56	
4 4	▶ N\ Dat	a / Chart2 \	)aily CrossTah Report //	Sheet2 / Chart1 / Sheet3 &	101	2

#### **Figure 30.18**