Microsoft

Microsoft Excel
Pivot Table
Data Crunching

Including *Dynamic* Arrays, Power Query, *and* Copilot

Bill Jelen

Practice and solution
files on the web

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Rules specific to calculated items

To use calculated items effectively, it is important that you understand a few ground rules:

- You cannot use calculated items in a pivot table that uses averages, standard deviations, or variances. Conversely, you cannot use averages, standard deviations, or variances in a pivot table that contains a calculated item.

- You cannot use a filter field to create a calculated item, nor can you move any calculated item to the report filter area.

- You cannot add a calculated item to a report that has a grouped field, nor can you group any field in a pivot table that contains a calculated item.

- When building your calculated item formula, you cannot reference items from a field other than the one you are working with.

As you think about the pages you have just read, don't be put off by these shortcomings of pivot tables. Despite the clear limitations highlighted, the capability to create custom calculations directly into your pivot table remains a powerful and practical feature that can enhance your data analysis.

Now that you are aware of the inner workings of pivot table calculations and understand the limitations of calculated fields and items, you can avoid the pitfalls and use these features with confidence.

Managing and maintaining pivot table calculations

In your dealings with pivot tables, you will find that sometimes you don't keep a pivot table for more than the time it takes to say, "Copy, Paste Values." Other times, however, it will be more cost-effective to keep a pivot table and all its functionality intact.

When you find yourself maintaining and managing pivot tables through changing requirements and growing data, you might find the need to maintain and manage your calculated fields and calculated items as well.

Editing and deleting pivot table calculations

When a calculation's parameters change, or you no longer need a calculated field or calculated item, you can activate the appropriate dialog to edit or remove the calculation.

Simply activate the Insert Calculated Field or Insert Calculated Item dialog and select the Name dropdown, as demonstrated in Figure 5-37.

As you can see in Figure 5-38, after you select a calculated field or item, you have the option of deleting the calculation or modifying the formula.
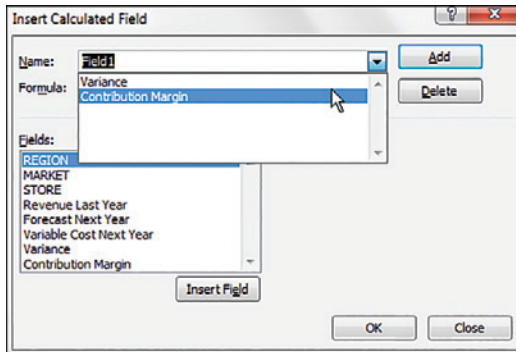
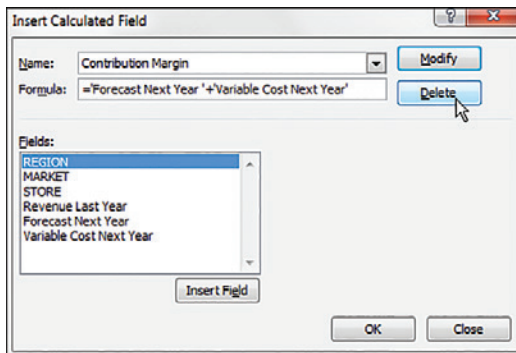**FIGURE 5-37** Opening the dropdown under Name reveals all the calculated fields or items in the pivot table.

FIGURE 5-38 After you select the appropriate calculated field or item, you can either delete or modify the calculation.

Changing the solve order of calculated items

If the value of a cell in your pivot table is dependent on the results of two or more calculated items, you have the option of changing the solve order of the calculated items. That is, you can specify the order in which the individual calculations are performed.

To specify the order of calculations, you need the Solve Order dialog. To get there, place your cursor anywhere in the pivot table, select Fields, Items, & Sets from the Calculations group, and then select Solve Order.

The Solve Order dialog, shown in Figure 5-39, lists all the calculated items that currently exist in the pivot table. The order in which the formulas are listed here is the order in which the pivot table will perform the operations. To make changes to this order, select any of the calculated items you see and then click Move Up, Move Down, or Delete, as appropriate.
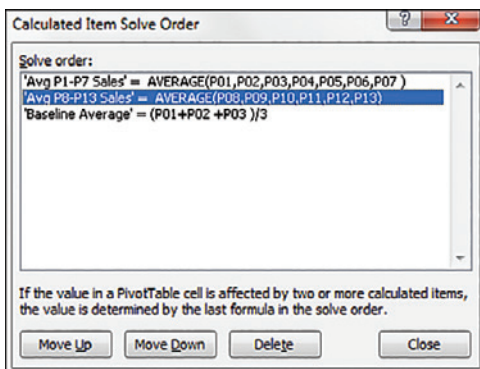
FIGURE 5-39 After you identify the calculated item you are working with, simply move the item up or down to change the solve order. You also have the option of deleting items in this dialog.

Documenting formulas

Excel provides a nice little function that lists the calculated fields and calculated items used in a pivot table, along with details on the solve order and formulas. This feature comes in especially handy if you need to quickly determine what calculations are being applied in a pivot table and which fields or items those calculations affect.

To list your pivot table calculations, simply place your cursor anywhere in the pivot table, select Fields, Items, & Sets, and then select List Formulas. Excel creates a new tab in your workbook that lists the calculated fields and calculated items in the current pivot table. Figure 5-40 shows an example of a tab created by the List Formulas command.

FIGURE 5-40 The List Formulas command documents the details of your pivot table calculations quickly and easily.

Next steps

In Chapter 6, "Using pivot charts and other visualizations," you will discover the fundamentals of pivot charts and the basics of representing your pivot data graphically. You'll also get a firm understanding of the limitations of pivot charts and alternatives to using pivot charts.

Using pivot charts and other visualizations

In this chapter, you will:

■ Learn about pivot charts

■ Create a pivot chart

■ Keep pivot chart rules in mind

■ Examine alternatives to using pivot charts

■ Use conditional formatting with pivot tables

■ Create custom conditional formatting rules

What is a pivot chart…really?

When sharing your analyses with others, you will quickly find that there is no getting around the fact that people want charts. Pivot tables are nice, but they show a lot of pesky numbers that take time to absorb. Charts, on the other hand, enable people to make split-second determinations about what the data is actually revealing. Charts offer instant gratification, allowing people to immediately see relationships, point out differences, and observe trends. The bottom line is that managers today want to absorb data as fast as possible, and nothing delivers that capability faster than a chart. This is where pivot charts come into play. Whereas pivot tables offer the analytical, pivot charts offer the visual.

A common definition of a pivot chart is a graphical representation of the data in a pivot table. Although this definition is technically correct, it somehow misses the mark on what a pivot chart truly does.

When you create a standard chart from data that is not in a pivot table, you feed the chart a range made up of individual cells holding individual pieces of data. Each cell is an individual object with its own piece of data, so your chart treats each cell as an individual data point and thus charts each one separately.

However, the data in a pivot table is part of a larger object. The pieces of data you see inside a pivot table are not individual pieces of data that occupy individual cells. Rather, they are items inside a larger pivot table object that is occupying space on your worksheet.

When you create a chart from a pivot table, you are not feeding it individual pieces of data inside individual cells; you are feeding it the entire pivot table layout. Indeed, a *pivot chart* is a chart that uses a PivotLayout object to view and control the data in a pivot table.

Using the PivotLayout object allows you to interactively add, remove, filter, and refresh data fields inside a pivot chart, just like in a pivot table. The result of all this action is a graphical representation of the data you see in a pivot table.

Creating a pivot chart

There are (at least) five different ways to create a pivot chart:

■ On the Insert tab, to the right of regular charts, a PivotChart dropdown offers the first two methods: PivotChart and PivotChart & PivotTable, as shown in Figure 6-1. The odd thing is that both of these options do the exact same thing—insert a blank pivot table and a blank pivot chart. The PivotTable Fields pane is now called PivotChart Fields. The Columns area is renamed as Legend (Series), and the Rows area is called Axis (Categories). As you start to add fields to the pivot table, Excel automatically starts creating a Clustered Column chart. If you wish to use a different chart type, you have to go to the Design tab in the ribbon and choose Change Chart Type. (For those of you counting, I could use these two icons as two different methods for creating a pivot chart, even though both icons appear to do the same thing.)

■ You can use the Analyze Data tool on the Home tab. Most charts suggested in the Analyze Data pane offer a button to Insert PivotChart. While these charts are often Pie, Bar, or Column charts, you are still somewhat limited to the chart types that the algorithm happens to offer.

■ The fourth method is to create any pivot table. With one cell in the pivot table selected, go to the Insert tab in the ribbon and choose a valid chart type. The resulting chart will be a pivot chart.

■ The fifth method is the only way to create a pivot chart without an accompanying pivot table. If you add your data to the Data Model as described in Chapter 10, "Unlocking features with the Data Model and Power Pivot," you can use the Data Model window and choose to add a Pivot Chart. This creates a pivot chart without the underlying pivot table.
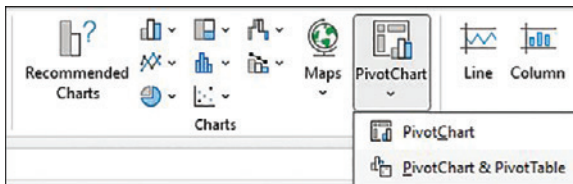

FIGURE 6-1 Using the PivotChart icon always leads to a clustered column chart. It seems simpler to create a pivot table and then convert it to a pivot chart.

> **Note** In Chapter 9, "Using cube formulas with the Data Model or OLAP data," you will find out how to create pivot charts that are completely decoupled from any pivot table.

For the first pivot chart in this chapter, you will start with a pivot table and then add a pivot chart.

The pivot table in Figure 6-2 provides a simple view of the revenue by market. The Business_ Segment field in the report filter area lets you parse out revenue by line of business.

> **Note** The pivot table in Figure 6-2 is shown in Tabular layout. The Sum Of Sales_Amount heading in B3 has been replaced by typing **Sales Amount** in B3.

	A	B	C
1	Business_Segment (All)		
2			
3	Market	Sales Amount	
4	CALIFORNIA	$2,254,735	
5	FLORIDA	$1,450,392	
6	MICHIGAN	$678,705	
7	BUFFALO	$450,478	
8	CANADA	$776,245	
9	CHARLOTTE	$890,522	
10	DALLAS	$467,089	
11	DENVER	$645,583	
12	KANSASCITY	$574,899	
13	NEWORLEANS	$333,454	
14	NEWYORK	$873,581	
15	PHOENIX	$570,255	
16	SEATTLE	$179,827	
17	TULSA	$628,405	
18	Grand Total	$10,774,172	
19			

FIGURE 6-2 This basic pivot table shows revenue by market and allows for filtering by line of business.

Creating a pivot chart from this data would not only allow for an instant view of the performance of each market but would also permit you to retain the ability to filter by line of business.

To start the process, place your cursor anywhere inside the pivot table and click the Insert tab on the ribbon. On the Insert tab, you can see the Charts group displaying the various types of charts you can create. Here, you can choose the chart type you would like to use for your pivot chart. For this example, click the Column chart icon and select the first 2-D column chart.

Figure 6-3 shows the chart Excel creates after you choose a chart type.