

Microsoft Excel 2010 Step-by-Step Exercises

PivotTables and PivotCharts: Exercise 3

In this exercise you will:

- Nest fields in the PivotTable
- Experiment with the layout of PivotTable fields
- Apply some PivotTable Options
- Expand and collapse groups

Introduction

This exercise assumes that you have completed the steps in Exercise 2 and continues from the point where you saved the workbook after *Step 34*. If you didn't save your work, or wish to omit the previous exercises, you can download a copy of the completed Exercise 2 workbook *CommodityShipments (PivotTables PivotCharts).xlsx* from my web site at <http://www.fontstuff.com/training/excel/stepbystep.htm>

The Project So Far

In Exercise 2 you added a field to the PivotTable, experimented with custom labels and added grouping to the *CountryFrom* field. The elements of the *CountryFrom* field make up the *Row Labels* and are divided into two groups, *South America* and *North America*. The elements of the *CountryTo* field make up the *Column Labels*. The main captions for the *Row Labels* and *Column Labels* have been changed to *Exporter* and *Destination* respectively. Where the fields intersect the *Values* represent *Total Tonnes* being the total tonnage of shipments made during the period of the data. The PivotTable worksheet currently looks like this (*Fig. 1*):

Total Tonnes	Destination										
	Exporter	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK	Grand Total
South America		237,612	96,707	383,941	594,506	299,822	671,001	252,984	415,454	481,005	3,433,032
North America		153,824	86,987	196,895	366,858	247,833	534,641	103,794	212,922	371,433	2,275,187
Grand Total		391,436	183,694	580,836	961,364	547,655	1,205,642	356,778	628,376	852,438	5,708,219

Fig. 1 The PivotTable created in Exercise 2.

Adding a Third Field

When a PivotTable contains only two fields the most obvious arrangement is to show the elements of one field across the worksheet (as *Column Labels*) and those of the other field down the worksheet (as *Row Labels*), forming a grid in which the intersecting elements can display a value. Where, then, would you display a third (or fourth or more) field? One way to do this is to “nest” the field inside one of the existing ones. Let’s see how this works...

Step 35: In the **PivotTable Field List** click the checkbox next to **Year** to place a tick in it.

Excel places the field in the *Values* box and labels it *Sum of Year*. This is obviously the wrong place, but Excel saw that the column of data consisted entirely of numbers and therefore assumed that it was a numerical value to be calculated. Let’s move it to a more suitable place.

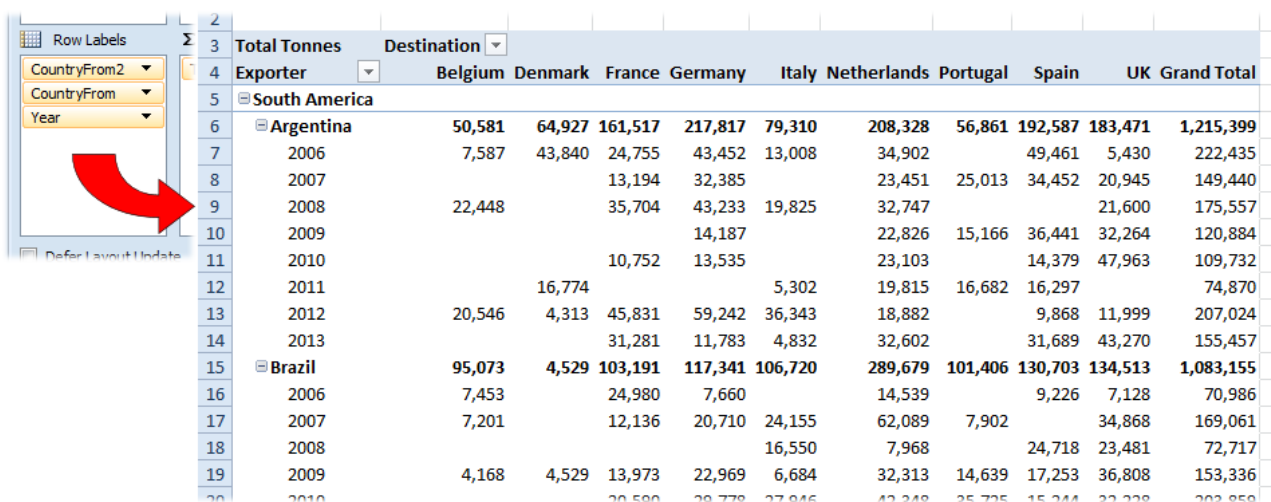
Step 36: In the **PivotTable Field List**, drag the button marked **Sum of Year** from the **Values** box to the **Row Labels** box and drop it underneath the **CountryFrom** button.

Note: Instead of dragging you could have clicked the down-arrow on the **Sum of Year** button and choose **Move to Row Labels** from the menu.

Excel changes the button’s caption to *Years* indicating that its values are no longer being calculated. Your PivotTable probably doesn’t look any different yet because at the end of the last exercise we left the groups collapsed (i.e. showing only the group headings). If that is the case...

Step 37: Click the plus buttons adjacent each group heading (**South America** and **North America**) to expand the groups and reveal their contents.

Now you can see how the PivotTable has included the *Year* field, showing a *Total Tonnes* value for each *Year* for each *CountryFrom* (Fig. 2). The *Year* field is shown nested inside the *CountryFrom* field.



Total Tonnes	Destination	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK	Grand Total
CountryFrom											
Year											
South America											
Argentina											
2006		7,587	43,840	24,755	43,452	13,008	34,902		49,461	5,430	222,435
2007				13,194	32,385		23,451	25,013	34,452	20,945	149,440
2008		22,448		35,704	43,233	19,825	32,747			21,600	175,557
2009					14,187		22,826	15,166	36,441	32,264	120,884
2010				10,752	13,535		23,103		14,379	47,963	109,732
2011			16,774			5,302	19,815	16,682	16,297		74,870
2012		20,546	4,313	45,831	59,242	36,343	18,882		9,868	11,999	207,024
2013				31,281	11,783	4,832	32,602		31,689	43,270	155,457
Brazil											
2006		7,453		24,980	7,660		14,539		9,226	7,128	70,986
2007		7,201		12,136	20,710	24,155	62,089	7,902		34,868	169,061
2008						16,550	7,968		24,718	23,481	72,717
2009		4,168	4,529	13,973	22,969	6,684	32,313	14,639	17,253	36,808	153,336

Fig. 2 The *Year* field is nested inside the *CountryFrom* field.

Alternatively you could have the PivotTable show a *Total Tonnes* value for each *CountryFrom* for each *Year*. Do this simply by changing the arrangement of the fields in the PivotTable field List.

Step 38: Click the down-arrow on the **Year** button in the **Row Labels** box and choose **Move Up** from the menu.

Note: Instead of using the menu you could drag the **Year** button and drop it above the **CountryFrom** button.

Now the *CountryFrom* field is nested inside the *Year* field (Fig. 3).

Total Tonnes	Destination	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK	Grand Total
South America											
2006											
15,040	43,840	49,735	56,662	30,872	68,444	15,582	83,875	29,712	393,762		
7,587	43,840	24,755	43,452	13,008	34,902	49,461	5,430	222,435			
7,453	24,980	7,660	14,539	9,226	7,128	70,986					
5,550	17,864	19,003	15,582	25,188	17,154	100,341					
2007											
20,499	6,192	42,861	66,203	36,424	110,305	44,914	34,452	72,362	434,212		
13,194	32,385	23,451	25,013	34,452	20,945	149,440					
7,201	12,136	20,710	24,155	62,089	7,902	34,868	169,061				
13,298	6,192	17,531	13,108	12,269	24,765	11,999	16,549	115,711			
2008											
22,448	43,090	71,932	42,896	73,769	17,497	57,053	60,279	388,964			
22,448	35,704	43,233	19,825	32,747	16,550	7,968	24,718	23,481	72,717		
7,386	28,699	6,521	33,054	17,497	32,335	15,198	140,690				
2009											
28,781	4,529	21,437	69,221	33,714	112,512	42,473	68,950	120,108	501,725		
14,187	22,826	15,166	36,441	32,264	120,884						

Fig. 3 The CountryFrom field is nested inside the Year field.

When dealing with multiple fields in a PivotTable the placement of fields in the PivotTable Field List dictates the layout of the PivotTable. As long as you choose an arrangement that is logical (unlike that when Excel decided to put the Year field in the Values box) you can use whatever arrangement suits your purpose or presents your data in the most pleasing way.

Try this: Experiment with different arrangements of fields. Move the Year field from the Row Labels box to the Column Labels box. The same data is displayed but in a different way, making the PivotTable very wide. Now move the CountryTo field from the Column Labels box to the Row Labels box. Again the appearance of the PivotTable changes. Return the fields to their former locations with Year above CountryFrom in the Row Labels box and CountryTo in the Column Labels box.

When fields are nested in a PivotTable, Excel displays subtotals for all but the innermost of the nested fields. For example, when Year was nested inside CountryFrom, (Fig. 2) individual values were shown for each Year with a subtotal for each CountryFrom. When CountryFrom was nested inside Year individual values were shown for each CountryFrom with a subtotal for each Year.

Try this: Place a tick in the checkbox next to Commodity in the PivotTable Field List. Excel adds this field to the Row Labels box so that it is nested inside CountryFrom. Take a look at the values. Individual values are shown for each Commodity and subtotals are shown for CountryFrom and Year. Remove the Commodity field by unchecking the box or by clicking the down-arrow on its button and choosing Remove Field from the menu.

PivotTable Options: Show Empty Cells as Zeroes

Excel offers a wide range of options for how the PivotTable's data is displayed. Let's change a couple of them.

When plotting one field against another, it is possible that there is no data for a particular combination of field elements. For example, in this set of data there were no shipments from Mexico to Belgium in the year 2006. The default in such an event is to leave the cell empty. As a result the cell where these two columns intersect (cell B9) is blank. Excel allows you to enter any value of your choice into such cells.

Step 39: Go to the **Options** tab of the **PivotTable Tools** section of the Ribbon and click the **Options** button (at the left end of the Ribbon). On the **Layout & Format** tab of the **PivotTable Options** dialog box make sure there is a tick in the checkbox next to **For empty cells show:** and type a **zero (0)** in the textbox next to it. Click the **OK** button to confirm your instruction and close the dialog box.

Now all the cells in the Values section of the PivotTable that contain no data show a zero (Fig. 4).

Note: This may or may not be a desirable thing to do depending upon the nature of your data. There is a difference between there being a value of zero (we know we didn't make any shipments that year) and there being an absence of data (we don't know whether or not we made any shipments because we don't have that year's data). However, on a PivotTable it makes no difference to the calculations because the results it displays are based on the source data (and any filters that may have been applied) and not necessarily

on what you can see on the PivotTable. Take a look at the data (Fig. 4) for *South America, 2006, Belgium*. The values displayed are 7,587 (*Argentina*), 7,453 (*Brazil*) and 0 (*Mexico*). If these three values were calculated on a regular worksheet the Sum of the three cells (15,040) would be the same regardless of whether or not the *Mexico* value was a zero or an empty cell, because when calculating a Sum Excel treats an empty cell as zero. But if Excel were calculating an Average there would be a difference. The average of the three cells 7,587, 7,453 and 0 would be 5,013 but if instead of the cell containing a zero it were blank the Average would be 7,520, because when calculating an Average Excel ignores empty cells. However, if you were to change the *Value Field Settings* for the *Tonnes* field from Sum to Average you would see that the result displayed on the PivotTable would be the same whether the cells contained zeroes or were left empty. This shows that the PivotTable is calculating the source data and not necessarily what you see on screen.

Total Tonnes	Destination	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK	Grand Total
South America											
2006		15,040	43,840	49,735	56,662	30,872	68,444	15,582	83,875	29,712	393,762
	Argentina	7,587	43,840	24,755	43,452	13,008	34,902	0	49,461	5,430	222,435
	Brazil	7,453	0	24,980	7,660	0	14,539	0	9,226	7,128	70,986
	Mexico	0	0	0	5,550	17,864	19,003	15,582	25,188	17,154	100,341
2007		20,499	6,192	42,861	66,203	36,424	110,305	44,914	34,452	72,362	434,212
	Argentina	0	0	13,194	32,385	0	23,451	25,013	34,452	20,945	149,440
	Brazil	7,201	0	12,136	20,710	24,155	62,089	7,902	0	34,868	169,061
	Mexico	13,298	6,192	17,531	13,108	12,269	24,765	11,999	0	16,549	115,711
2008		22,448	0	43,090	71,932	42,896	73,769	17,497	57,053	60,279	388,964
	Argentina	22,448	0	35,704	43,233	19,825	32,747	0	0	21,600	175,557
	Brazil	0	0	0	0	16,550	7,968	0	24,718	23,481	72,717
	Mexico	0	0	7,386	28,699	6,521	33,054	17,497	32,335	15,198	140,690
2009		28,781	4,529	21,437	69,221	33,714	112,512	42,473	68,950	120,108	501,725
	Argentina	0	0	0	14,187	0	22,826	15,166	36,441	32,264	120,884
	Brazil	4,168	4,529	13,972	22,969	6,684	22,313	14,629	17,253	36,808	153,236

Fig. 4 The empty cells now contain zeroes.

PivotTable Options: Show Group Subtotals

Now that the PivotTable has groups, notice that in addition to the grand totals at the foot of the table, Excel has added subtotals to the innermost (*Years*) group values. The outer group values (*South America* and *North America*) do not initially show subtotals. When groups are collapsed Excel automatically shows subtotals for each grouping level but if you want all these subtotals to be displayed when the groups are expanded you need to ask for them. Here's how...

Step 40: Go to the **Design** tab of the **PivotTable Tools** section of the Ribbon, click the button marked **Subtotals** in the **Layout** group, then choose **Show all Subtotals at Top of Group** (Fig. 5).

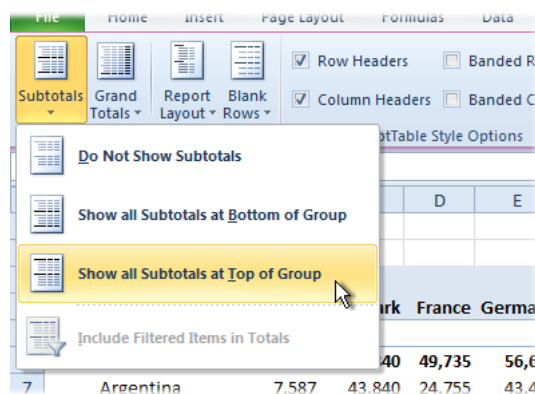


Fig. 5 Ask Excel to display Subtotals.

Now in addition to the *Year* subtotals the PivotTable displays subtotals for the major group (*South America* and *North America*) (Fig. 6).

Total Tonnes	Destination										Grand Total
Exporter	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK		
South America	237,612	96,707	383,941	594,506	299,822	671,001	252,984	415,454	481,005	3,433,032	
2006	15,040	43,840	49,735	56,662	30,872	68,444	15,582	83,875	29,712	393,762	
Argentina	7,587	43,840	24,755	43,452	13,008	34,902	0	49,461	5,430	222,435	
Brazil	7,453	0	24,980	7,660	0	14,539	0	9,226	7,128	70,986	
Mexico	0	0	0	5,550	17,864	19,003	15,582	25,188	17,154	100,341	
2007	20,499	6,192	42,861	66,203	36,424	110,305	44,914	34,452	72,362	434,212	
Argentina	0	0	13,194	32,385	0	23,451	25,013	24,452	20,945	149,440	

Fig. 6 The PivotTable displays subtotals for all the grouping levels.

Expanding and Collapsing Groups

As you have already seen, you can collapse or expand a group by clicking the plus or minus buttons adjacent to the group member's name. Doing this allows you to hide or show the contents of individual group members but if you want to do this for the whole group there's an easier way. In fact, as usual with Excel, there's more than one way. Take your choice...

Step 41: Right-click on one of the **Year** numbers in the leftmost column of the PivotTable then point to **Expand/Collapse** and choose **Collapse Entire Field** from the submenu (Fig. 7).

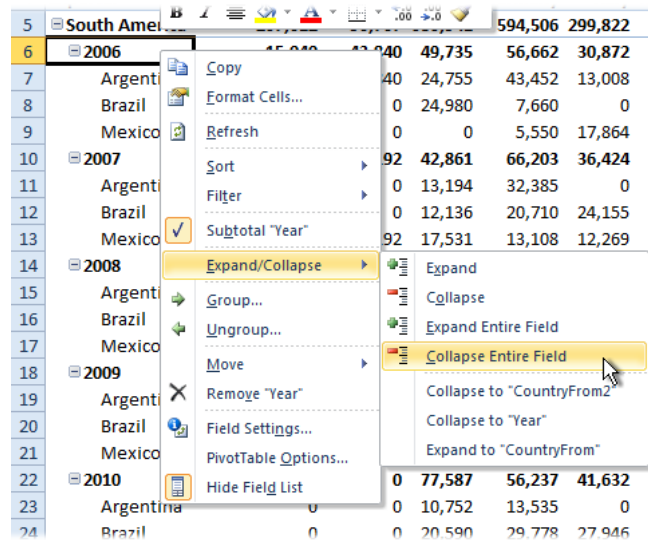


Fig. 7 Collapse the entire field.

In one step Excel collapses all the members of the *Year* field to display only their subtotals (Fig. 8).

Total Tonnes	Destination										Grand Total
Exporter	Belgium	Denmark	France	Germany	Italy	Netherlands	Portugal	Spain	UK		
South America	237,612	96,707	383,941	594,506	299,822	671,001	252,984	415,454	481,005	3,433,032	
2006	15,040	43,840	49,735	56,662	30,872	68,444	15,582	83,875	29,712	393,762	
2007	20,499	6,192	42,861	66,203	36,424	110,305	44,914	34,452	72,362	434,212	
2008	22,448	0	43,090	71,932	42,896	73,769	17,497	57,053	60,279	388,964	
2009	28,781	4,529	21,437	69,221	33,714	112,512	42,473	68,950	120,108	501,725	
2010	19,875	0	77,587	56,237	41,632	77,894	51,268	29,623	110,390	464,506	
2011	28,519	16,774	16,128	83,684	5,302	113,161	33,312	57,676	12,080	366,636	
2012	66,103	11,211	83,650	127,250	49,034	35,153	16,246	23,944	25,139	437,730	
2013	36,347	14,161	49,453	63,317	59,948	79,763	31,692	59,881	50,935	445,497	
North America	153,824	86,987	196,895	366,858	247,833	534,641	103,794	212,922	371,433	2,275,187	
2006	48,078	0	18,086	24,628	5,397	118,255	24,642	40,558	62,013	341,657	
2007	17,835	0	11,408	38,012	48,690	41,997	14,666	33,818	15,286	221,712	

Fig. 8 The Year field has been collapsed.

If you had instead right-clicked on, for example, *South America* and given the same instruction then that field would have collapsed and only the subtotals for *South America* and *North America* would show.

Step 42: Right-click on one of the **Year** numbers in the leftmost column of the PivotTable then point to **Expand/Collapse** and choose **Expand Entire Field** from the submenu.

This returns the PivotTable to its previous state with all the data on show. Now let's try doing it a different way...

Step 43: With one of the **Year** numbers selected, go to the **Options** tab of the **PivotTable Tools** section of the Ribbon, and click the **Collapse Entire Field** button in the **Active Field** group (Fig. 9).

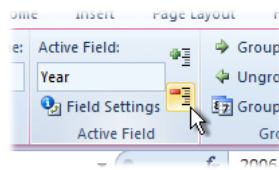


Fig. 9 Click the Collapse Entire Field button.

All the members of the *Year* group have been collapsed. Notice that the selection has not changed.

Step 44: Click the **Collapse Entire Field** button in the **Active Field** group again.

Although the selected cell contained a member of the *Year* group, since that group was already collapsed, Excel collapsed the next group above it to return the PivotTable to the condition it was in at the start of this exercise (Fig. 1).

Note: Both the right-click menu and the ribbon offer *Expand Entire Field* commands to reverse the process.

You might be wondering what would happen if you tried to expand or collapse a field that wasn't grouped.

Try this: Select one of the **Value** field cells in the centre of the PivotTable. You will see that the *Collapse* and *Expand* buttons on the Ribbon are disabled because Excel does not know which field you might want to expand or collapse. Right-click the cell. See that the *Expand/Collapse* option does not appear on the right-click menu.

Step 45: Select one of the country names (such as **Germany**) and either by right-clicking or using the Ribbon button ask Excel to **Expand Entire Field**. Excel doesn't know exactly what you want to do but it offers you a list of fields to choose from (Fig. 10). You can probably guess what would happen if you chose an existing field so choose **Month**, a field we haven't included yet, and click **OK**.

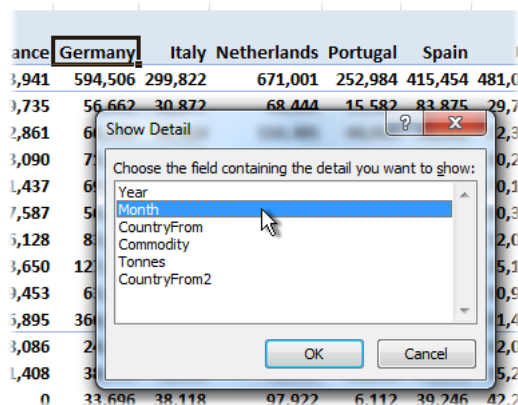


Fig. 10 Excel asks which field you want to expand.

Because the *Month* field wasn't already shown on the PivotTable Excel added it and expanded it (Fig. 11) and, since we had previously asked for subtotals to be shown it also added subtotals for the *Month* field.

2																
3	Total Tonnes	Destination														
4		Belgium												Belgium Total	Denmark	
5	Exporter	1	2	3	4	5	6	7	8	9	10	11	12		1	
6	South America	37,591	7,548	7,201	25,237	33,144	21,994	16,441	10,980	19,348	8,651	29,757	19,720	237,612	0	21
7	2006	0	0	0	0	0	7,587	0	0	7,453	0	0	0	15,040	0	14
8	2007	5,638	0	7,201	0	7,660	0	0	0	0	0	0	0	20,499	0	0
9	2008	0	0	0	0	0	0	0	0	0	0	16,724	5,724	22,448	0	0
10	2009	0	0	0	15,300	9,313	4,168	0	0	0	0	0	0	28,781	0	0
11	2010	10,875	0	0	0	0	0	0	0	0	0	0	0	10,875	0	0

Fig. 11 Excel added the Month field and inserted subtotals for it.

Conclusion

This concludes Exercise 3. In this exercise you have learned how to rearrange fields on the PivotTable, to apply PivotTable options to show group subtotals and to display zeroes in empty cells, and discovered different ways to expand and collapse groups to show or hide information on the PivotTable. The next exercise will continue from this point so if you wish to proceed to the next exercise you should save the file in its current state.