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Chapter 8

Array Formulas

Let's talk about ARRAY formulas, these are a fairly complex type of formula. I prefer not to use ARRAY formulas if I can possibly get away with it, because the best sort of financial model is one that is simple, clear and easy to understand.

ARRAY formulas are not simple, clear or easy to understand. They are quite complicated and most people in fact people who come across in an ARRAY formula usually don't know what one is or how to deal with one. What I want to do is show you what they are, show you how to build them or show you how to at least recognise them and mostly so that you can remove them from your models.

In my experience, majority of ARRAY formulas are used by consultants to confound and make models really complicated so that their clients have to keep coming back to them all the time because they can't understand the ARRAY formulas. I am not a huge fan of ARRAY formulas, there is a couple of situations where they are useful and we will talk about that. But generally ARRAY formulas are really more complicated than they need to be.

Before we go into it I will just show you what an ARRAY formula is and then we can look at how they can be useful. It shows you how to do this in chapter 8 of your book. An ARRAY formula in this example so we have got and this is a very simple one. I am just doing this to show you what an ARRAY formula is, I wouldn't recommend using an ARRAY formula in this example. But you've got a whole pile of quantities and prices ordinarily you would just go like this one and you just say that multiplied by that. But if you were going to use an ARRAY formula, if you wanted to make this a much harder than it really needs to be, what you would do is to highlight the whole column, go into the formula bar like that, go EQUALS highlight the whole lot MULTIPLIED by, highlight the whole lot and then you need to go

CONTROL-SHIFT ENTER. Not that simple, they call them CSE formulas, CONTROL-SHIFT ENTER. You need to hit CONTROL-SHIFT ENTER to get it to work.

That is treating the whole lot like an ARRAY and your tip that this is an ARRAY formula are those little curly brackets that you see around the outside. I guess here you can't change part of an ARRAY; it is bit like a pivot table in that way. You won't be able to change a section of it. If you want to get rid of an ARRAY, in this case if you see somebody building a formula like this, you would just remove it as it is really not adding anything to your model at all. You would highlight the whole lot and then delete the lot like that. That's how you would get rid of an ARRAY formula.

Let's look next at a really useful example of an ARRAY formula that was not a particularly useful example. We are going to look at one of my favourite's which is TRANSPOSING and that is where you take some DATA and move it the other way around. That's probably one of the best uses of an ARRAY formula in my experience.

A lot of ARRAY formulas are quite often used as legacies as well. They often hangover from the 2003 days where you didn't have access to some of the handy new functions that we have for example SUMIFS, when you have a multiple criteria there is a work around and that's using an ARRAY formula which is quite complicated but it works and a lot of people are still using those same models that were converted back from 2003 and they are using something that worked in 2003 but there is a much better formula now available which is SUMIFS for example but they are still using the old ones. ARRAY formula used to be used a lot more commonly in the old 2003 days but with these clever new functions in the later version of 2010, they are not as commonly used.

This is an example of one that still is very useful and that is when you are trying to TRANSPOSE a block of data around the other way and if you wanted move something. In this example we have got a list of months across the top and temperatures, some different locations, highlight the whole lot and if I wanted to TRANSPOSE it, I would just RIGHT HAND click go into PASTE SPECIAL, TRANSPOSE and PASTE it the other way like that. The problem with that of course is that it is not a LIVE link, with financial models we always tried to have everything linking and dynamic and moving around all the time and this is not dynamic. So if I change that it is not going to change. So what I am going to do is to use a TRANSPOSE-ARRAY formula that is going to make it a LIVE dynamic link.

Probably a good idea to do what I just did then which is to COPY and TRANSPOSE, because this is an ARRAY formula you would need to highlight the destination first of all. It is really hard to do that free hand, it is really hard to work out the exact number of cells that you need, so what I usually do is to COPY and PASTE, TRANSPOSE it like that and that way you know the exact number of cells. In this case I can see that's the DATA that's the destination

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where I want the DATA to appear and then I go into EQUALS, TRANSPOSE open bracket, highlight the DATA, close bracket and because it is an ARRAY formula I have to hit CONTROL-SHIFT-ENTER. That puts in the curly bracket, so we can see that it's worked. Then if you changed something here, so if that number changed there, you can see that it links through.

That's a really handy situation or handy use of an ARRAY formula

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