



Microsoft Excel Features For The Financially Literate

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Microsoft Office Excel is a great computer program that is widely used throughout the financial industry. Excel is an invaluable tool for portfolio managers, traders and accountants. Billion dollar portfolios and positions can be managed and traded using Excel spreadsheets. Management reports and risk management tools can be created and run in this program. In short, Microsoft Excel has created incredible efficiencies in the finance and accounting industries.

In this article, we'll demonstrate some of Excel's functions and features that a financial professional can use to make the job more efficient. This article does not discuss Visual Basic for Applications (VBA), but instead focuses on Excel features that non-programmers can deploy. Only basic knowledge of Excel is needed to make use and benefit from this program, so read on to learn about how it can make your job easier.

Inserting Functions

Excel comes with a wide array of functions that can easily be inserted into a spreadsheet. Adding a function is as easy as clicking on the "Insert Function" button on the top tool bar.



Insert Function Button

Figure
1

If you don't see the "Insert Function" button on your tool bar, you can easily add it by clicking:

Tools > Customize > Commands > Find and click on Insert in the left-hand scroll-down menu. Then, find "Insert Function" in the right-hand scroll-down menu and click and drag it to your tool bar.

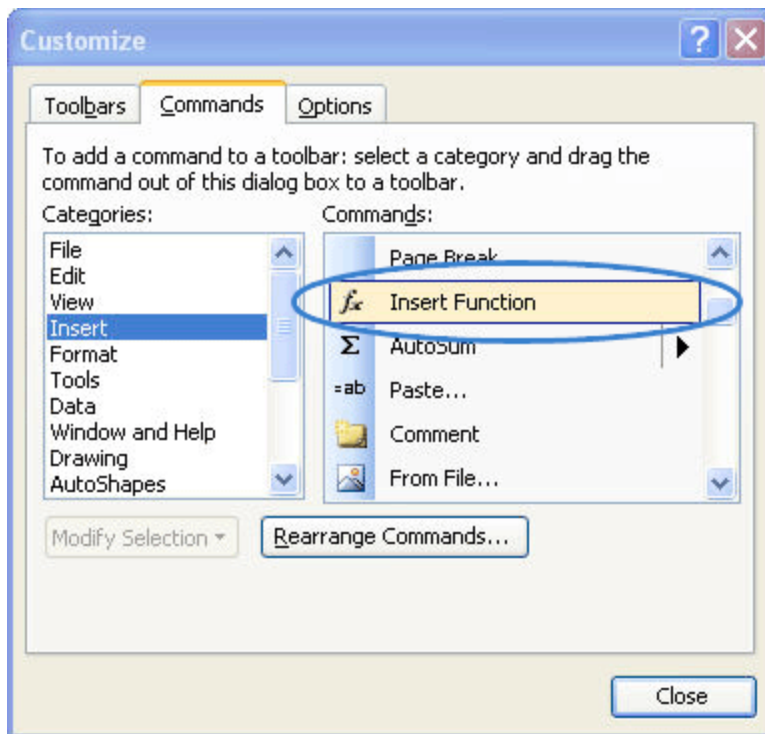


Figure 2

Clicking on the "Insert Function" button allows you to search for a function by typing a brief description of what you want, or by category.

For example, if you click on the "Function" icon, the following window will be displayed:

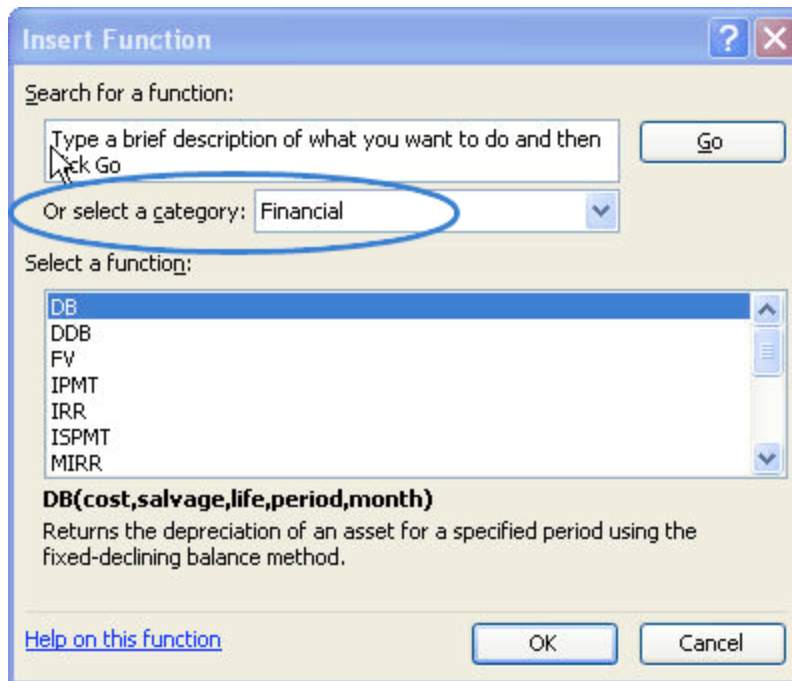


Figure 3

Adding a particular function to your spreadsheet is then as simple as following the on-screen commands, but if you are ever in doubt, press the F1 key on your keyboard to access Excel's "Help" program.

In addition to financial functions – such as [present value](#), [future value](#), payment and internal rate of return – that are of use to financial professionals, Excel has many functions that are useful in cleaning up and reconciling large data sets, a task frequently encountered by many in finance. Some of these functions are:

- *EXACT* – Checks whether two strings of text are precisely the same and will return either True or False.
- *LEFT, RIGHT or MID* – Returns the characters from a text string given a starting position and length, such as the left side, middle of the text string or the right side.
- *TRIM* – Will remove, with the exception of single spaces in between different words, all spaces in a text string.
- *TRANSPOSE* – This function will convert a range of cells aligned vertically to a range of cells aligned horizontally, or vice versa.

The above is just a very brief list of what some of the functions that Excel offers. The best way to discover what functions are available and what can be done to make spreadsheets and data manipulation more efficient is simply to play around with Excel's "Insert Function" feature or to take one of Microsoft's courses or tutorials. If you browse by the Text or Lookup & Reference categories, you will have a great head start on using Excel's features to their fullest potential.

Look-Up tables

Look-up tables are usually a part of any financial spreadsheet or model. The "Look-Up" function in Excel searches for values in a table based on a certain condition. For example, if you use [on-the-run Treasury](#) yields as a [benchmark](#) pricing for other bonds, a "Look-Up" table could be used to pull in the appropriate Treasury yield. (To help you learn this function we suggest you open up your own Excel spreadsheet and follow along).

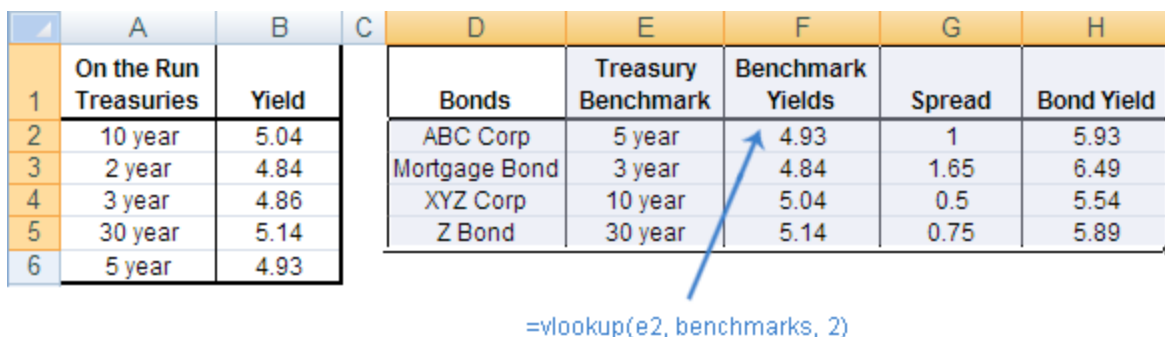


Figure 4

In the example above, Column F contains the "Look-Up" formula in each cell, and pulls the

appropriate on-the-run Treasury yield from the "Look-Up" table to the left. In this example, the "Look-Up" table runs from Cell A2 to Cell B6. The first value within the "(" of the formula is a cell reference to the value in the "Look-Up" table that is searched for. This means that the value the "Vlookup" function will search for in the "Look-Up" table is a 10-year on-the-run Treasury. The second value in the "Vlookup" function is the name of the "Look-Up" table ("Look-Up" Tables must be named prior to using the "Vlookup" function and are described below). The third value in the "Vlookup" function is the column in the "Look-Up" table that is returned (there can be multiple columns in a "Look-Up" table).

Creating a "Look-Up" table is a simple, two-step process.

1. A "Look-Up" table must be sorted in ascending order by the first column.
 - a. Using the cursor, highlight the entire data table.
 - b. Click on "Data".
 - c. Click on "Sort".
2. You must give the "Look-Up" table a name.
 - a. Using the cursor, highlight the entire data table.
 - b. Click on "Insert".
 - c. Click on "Name".
 - d. Click on "Define".
 - e. Key in a name

Using this example to create your "Look-Up" table, sort cells A2:B6 using the instructions above. Now, when the same cells are highlighted, you can name the "Look-Up" table to "Benchmarks", which is the name included in the example above.

"Look-Up" tables have many uses beyond pulling in information for securities prices. However, we note that a simple securities pricing spreadsheet, as shown in the example above, can be made even more efficient by using the features offered by most pricing services, such as Bloomberg, which allow spreadsheets to link directly to live price feeds. For example, the Treasury yields in the benchmark "Look-Up" table above could be pulled directly into the table as a live link from a pricing service.

Looking Up a Value Based on Two Conditions

As demonstrated above, a "Look-Up" table can be used to pull in values based on a certain condition. The user must identify that condition and provide the column in which to find the value that is to be returned. (In the example above, the condition was the name of an on-the-run [Treasury bond](#), and the column was the second column, which contained that particular bond's yield). There is a way to use a "Look-Up" table to return values when the column to be returned is not constant. In other words, based on certain variables, you might want to return the second, third, fourth, etc., columns of a "Look-Up" table. To do this, you must create a "Look-Up" table function within a "Look-Up" table function.

For example, the table below shows the value of mortgage servicing based on loan size

and loan-to-value ratios (LTV). Let us call this table the "Servicing Table".

What if you wanted to pull the value of servicing into a spreadsheet for multiple loans with varying sizes and LTVs? In other words, the column number of the data you want to retrieve is not constant.

	A	B	C	D	E	F	G
1	Loan Size /LTV	50%	60%	70%	80%	90%	100%
2	90,000	1	0.85	0.75	0.65	0.55	0.45
3	100,000	1.1	0.95	0.85	0.75	0.65	0.55
4	110,000	1.2	1.05	0.95	0.85	0.75	0.65
5	120,000	1.3	1.15	1.05	0.95	0.85	0.75
6	130,000	1.4	1.25	1.15	1.05	0.95	0.85

Figure 5

You must first create a separate "Look-Up" table that identifies the column number for a given LTV. Let's create a "Look-Up" table using the following:

	A	B
1	LTV	Column
2	50	2
3	60	3
4	70	4
5	80	5
6	80	6
7	100	7

Figure 6

This "Look-Up" table is named "LTV" in the formula shown below. The servicing value "Look-Up" table (the original table in our example) is named "Servicing".

Now you can write a formula to find serving values based on both the variable of loan size and the variable of LTV as shown below.

	A	B	C	D
1	Borrower	Loan Size	LTV	Servicing Value
2	Smith	130,000	70	1.15
3	Jones	100,000	90	0.65
4	Nielsen	120,000	60	1.15
5	Anderson	110,000	90	0.75
6				
7				
8				

=vlookup(B2, servicing,(vlookup(c2, LTV 2)))

Figure 7

As you can see from this example, the "Vlookup" function will work when using two different

conditions. Keep this information handy, as we will use it in our next section.

The "Exact" Statement

The "Exact" statement (or function) is very useful in working with large sets of data such as securities where values within a spreadsheet vary by small amounts (for example, [CUSIP numbers](#)). You can use the "Exact" function to ensure that you are pulling in the actual value that you need, or to identify why you might not be able to find a value that you believe should be in the data set.

For example, when using the "Look-Up" function as described above, you must sort the "Look-Up" table by the first column in ascending order. The "Look-Up" function then searches for values in that first column. If a value in the "Look-Up" function cannot be found in the "Look-Up" table, the "Look-Up" function will find the next closest value – this is generally not good in financial spreadsheets, as exact figures are usually required.

For example, if the "Look-Up" function is searching for CUSIP number 912833WZ3, which is not found in the "Look-Up" table, but 912833WZ4 is in the "Look-Up" table, the "Look-Up" function will return the value in the specified column number for the 912833WZ4 CUSIP number. This is simply not the correct CUSIP number.

To avoid pulling the closest value when the actual value is not found, use the "Exact" function as shown below.

	A	B	C	D	E
1	Bonds	Treasury Benchmark	Benchmark Yields	Spread	Bond Yield
2	ABC Corp	5 year	4.93	1	5.93
3	Mortgage Bond	3 year	4.84	1.65	6.49
4	XYZ Corp	10 year	5.04	0.5	5.54
5	Z Bond	30 year	5.14	0.75	5.89

=if(exact(B2,vlookup(B2,benchmark,1))=true,vlookup(b2, benchmark,2),"not found")

Figure 8

The "Exact" function shown above says: If the value in Cell B2 is exactly the same as a value found in the "Look-Up" table called "Benchmark", then it will return the value in column two from the table. If there is no value in the "Look-Up" table called "Benchmark" that is exactly the same as the value in Cell B2, then it will return the words "not found".

Another common use of the "Exact" function is to figure out why you cannot find a value in a set of data when you "know" it is there. For example, you might be trying to reconcile two sets of data by CUSIP number. You know a certain CUSIP number is in both sets of data, but the formulas you have written aren't recognizing one of the CUSIP numbers as being the same as the other. Simply key the CUSIP number into both spreadsheets, and use the "Exact" function to let Excel tell you whether they are the same – there could be an unseen character in the data such as a space before the CUSIP number that is causing the problems, which the "Exact" function will help you

identify.

	A	B	C	D
1	Cusip	Maturity	Ask	Bid
2	912833C40	7/15/2007	99.9555	99.9455
3	9128334D9	7/31/2007	99.7564	99.7464
4	912833CS7	8/15/2007	99.5666	99.5566
5				
6	912833C40	FALSE		
7				
8		=exact(A2,A6)		

Figure 9

As shown above, the "Exact" function is returning a "FALSE". Upon looking closer, the two CUSIPs are different. The CUSIP in A2 ends in "zero" while the CUSIP in A6 ends in "O".

Using Arrays

"Arrays" is a powerful feature in Excel that allows you to make calculations within large sets of data based on multiple conditions. For example, using "Arrays", you can sum the value of integrated oil stocks with a certain market cap within a large set of data that consists of stocks from many different industries and with many different [market caps](#), and you can calculate the [weighted average](#) price of those stocks. Creating "Arrays" is a simple process, and the first step is to name the "Arrays".

1. Name the "Arrays".
 - a. Using the cursor, highlight the entire set of data, including the column headers (the data must have column headers as they become the names of each "Array").
 - b. Click "Insert" on the tool bar.
 - c. Click "Name".
 - d. Click "Create".
 - e. Mark the "Top Row" check box only and click "OK".

Writing "Array" functions is also relatively simple. The examples below show "Array" functions that sum the market value of stocks within several industries by market capitalization and calculate the weighted average prices of those stocks based on the data set shown immediately below.

	A	B	C	D
1	Company	Industry	Market Cap	Current Price
2	ABC	Oil Exploration and Production	\$100	\$95.250
3	Off Shore	Oil Exploration and Production	\$5,000	\$36.750
4	Rocky Mountain	Integrated Oil	\$3,000	\$12.500
5	Salt Dome	Oil Exploration and Production	\$200	\$57.000
6	Bay View	Integrated Oil	\$300	\$43.625
7	XYZ	Mining	\$2,500	\$29.125
8	Black Gold	Mining	\$100	\$77.500
9	Sure Thing	Integrated Oil	\$200	\$6.750
10	Right Way	Integrated Oil	\$600	\$36.375
11	Gold Dust	Mining	\$6,000	\$84.250
12	Freedom	Oil Exploration and Production	\$2,000	\$91.500
13	Sunrise	Integrated Oil	\$4,000	\$62.500
14	Sure Venture	Integrated Oil	\$1,200	\$33.250

Figure 10

1	Industry Totals				
2	Industry	Market Cap Greater Than \$1 billion	Weighted Average Price	Market Cap Less Than \$1 billion	Weighted Average Price
3	Oil Exploration and Production	\$7,000.00	\$52.393	\$300.00	\$69.750
4	Integrated Oil	\$8,200.00	\$39.927	\$1,100.00	\$32.966
5	Mining	\$8,500.00	\$68.037	\$100.00	\$77.500

(=SUM(IF((Industry=A3)*(Market_Cap>=1000),Market_Cap),0))
 (=SUM(IF((Industry=A3)*(Market_Cap>=1000),Market_Cap*Current_Price),0))/
 (SUM(IF((Industry=A3)*(Market_Cap>=1000),Market_Cap),0))
 (=SUM(IF((Industry=A3)*(Market_Cap<=1000),Market_Cap),0))
 (=SUM(IF((Industry=A3)*(Market_Cap<=1000),Market_Cap*Current_Price),0))/
 (SUM(IF((Industry=A3)*(Market_Cap<=1000),Market_Cap),0))

Figure 11

The "Array" functions are not as complex as they might look at first glance. First, we named the "Arrays" as described above, then we simply use a combination of "If" and "Sum" statements to return values based on the conditions that we set. The weighted average calculation is simply embedded in the "Array" function. The best way to gain expertise using "Arrays" is to practice. Once you master the use of "Arrays", they can be used very effectively to create many different efficiencies.

Important: The "{ }" brackets shown in the formulas are not keyed into the "Array" function, but once the "Array" function has been created, you must simultaneously hit Shift, Control, Enter on your keyboard to activate the "Array" – this creates the "{ }" brackets.

"Array" Tips:

1. "Array" names that consist of more than one word are automatically named with a "—" to separate each word. For example, market cap becomes "Market—Cap", as shown above.
2. The vertical ranges of each "Array" used in an "Array" function must be identical. In other words, one column of data in a table of "Arrays" cannot be longer than the others.

3. You are not limited to conditions as shown in the examples above. You can create up to seven conditions using the "IF" function. Each condition is separated by a "*", as shown above.

Conclusion

Microsoft Excel has many features and functions that can add value and be used to create great efficiencies. One of the best ways to learn about and master these features and functions is to use the "Insert Function" feature. Creating "Look-Up" tables can create efficiencies, and mastering the use of "Arrays" can create vast efficiencies. Finally, don't forget about the simple functions like "Exact" or "Trim", as they can save you hours of frustration when reconciling data.

Note: All images for this article were taken from Microsoft's Office Excel program. Microsoft holds all copyrights to these images.

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G. Barry Nielsen is a homeowner with a large household of six children. Nielsen holds the Chartered Financial Analyst (CFA) designation and has worked for several large mortgage lenders and financial institutions, including Freddie Mac, American General, Washington Mutual and Countrywide Home Loans. Nielsen owns and operates MortgageGraphics, Inc., a web-based [mortgage calculator](#) designed to help consumers make educated, risk-based mortgage decisions.

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