

Financial Modeling Workshop by Leon Shpaner

Lesson 1

- [Financial Modeling Introduction](#)
- [Graphs & Pivot Tables](#)
- [VLOOKUP Function - Working with Historical Prices](#)
- [Time Value of Money - NPV, IRR](#)

Lesson 2

- [Pro Forma Financials](#)

Lesson 3

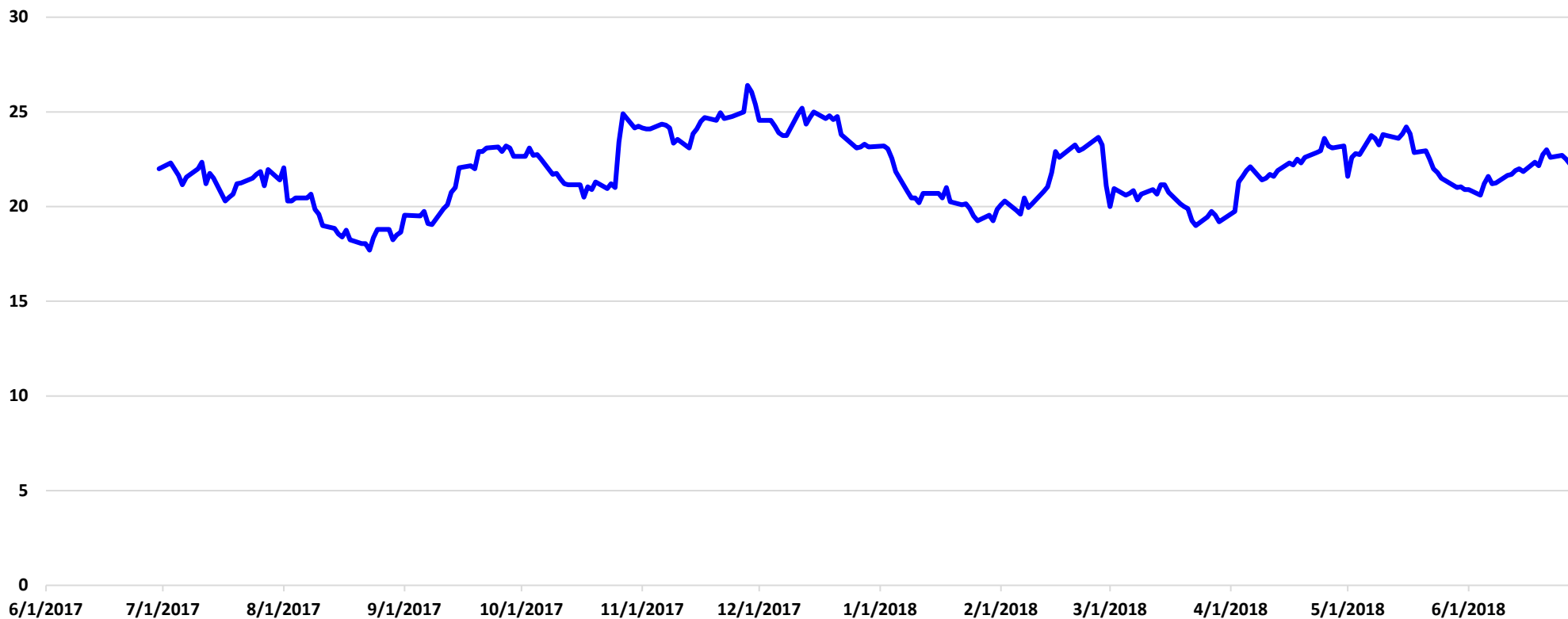
- [Weighted Average Cost of Capital \(WACC\) & Capital Asset Pricing Model \(CAPM\)](#)

Lesson 4

- [Valuation](#)

Historical Prices (2017 - YTD)

IMAX®



What is Financial Modeling?

The task of building an abstract financial representation of real world financial data

Why is it helpful/ necessary?

It helps narrow down large data sets and condense them into one simple spreadsheet that can be used as a template for gaining relevant insight into a company's performance.

Where can one find the financials (proforma) for a publicly traded company?

- Yahoo Finance
- Wall Street Journal
- The investor relations section of the corporation's website

What tools will we be using?

- Microsoft Excel
- Visual Basic for Applications (VBA)

The following sample historical pricing data was imported directly from Yahoo Finance into Excel

Once any set of data is in Excel it is [EASY](#) to manipulate it by removing or expanding what is already there.

For example, we can add % changes in prices over time and averages

Adding these statistics involves the use of [formulas](#)

However, removing irrelevant data can be done by hiding [or](#) deleting columns and/or rows.

FINANCIAL MODELING INTRODUCTION
AUTHOR: LEON SHPANER

Date	Open	High	Low	Close	Adj Close	Volume
6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156
6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700
6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800
6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000
6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600
6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800
6/21/2018	22.85	23.6	22.65	23	23	448,200
6/20/2018	22.3	23	22.3	22.75	22.75	455,700
6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900
6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800
6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200
6/14/2018	21.9	22	21.7	22	22	261,700
6/13/2018	21.8	22	21.6	21.9	21.9	337,500
6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500
6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200
6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300
6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500
6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800
6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500
6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500
6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200
5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100
5/30/2018	21.2	21.3	20.85	21.05	21.05	947,100
5/29/2018	21.3	21.45	20.85	21	21	1,153,800
5/25/2018	21.85	21.88	21.35	21.5	21.5	671,600
5/24/2018	21.95	22.03	21.48	21.8	21.8	672,600
5/23/2018	22.45	22.73	22	22	22	540,500
5/22/2018	22.95	23.1	22.45	22.5	22.5	731,000
5/21/2018	23.05	23.15	22.55	22.95	22.95	716,300
5/18/2018	23.9	23.9	22.85	22.85	22.85	667,300
5/17/2018	24.3	24.3	23.68	23.85	23.85	343,400
5/16/2018	23.9	24.38	23.8	24.2	24.2	371,100

FINANCIAL MODELING INTRODUCTION

AUTHOR: LEON SHPANER

When looking at the percent change between 2 values, subtract the old value from the new value and divide the result by the old value as shown:

AutoSave Off IMAX Corporation (WSJ) - Excel Sign in

File Home Insert Page Layout Formulas Data Review View Developer Help ACROBAT Power Pivot Tell me what you want to do Share

Clipboard Font Alignment Number Styles Cells Editing

EXACT X ✓ fx =(E2-E3)/E3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC								
2	6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	=(E2-E3)/E3											
3	6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700												
4	6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800												
5	6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000												
6	6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600												
7	6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800												
8	6/21/2018	22.85	23.6	22.65	23	23	448,200												
9	6/20/2018	22.3	23	22.3	22.75	22.75	455,700												
10	6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900												
11	6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800												
12	6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200												
13	6/14/2018	21.9	22	21.7	22	22	261,700												
14	6/13/2018	21.8	22	21.6	21.9	21.9	337,500												
15	6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500												
16	6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200												
17	6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300												
18	6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500												
19	6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800												
20	6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500												
21	6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500												
22	6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200												
23	5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100												
24	5/30/2018	21.2	21.2	20.85	21.05	21.05	847,100												

Historical Prices

Edit 100%

FINANCIAL MODELING INTRODUCTION

AUTHOR: LEON SHPANER

To get the Open, High, Low, Close (OHLC), we take the average of the cells B2:E2 as shown by the excel formula **=AVERAGE(B2:E2)** below. Then we bring the formula down to the rest of the cells by clicking on the right corner of cell J2. In turn, we do the same procedure for HLC, starting in cell K2

AutoSave Off IMAX Corporation (WSJ) - Excel Sign in

File Home Insert Page Layout Formulas Data Review View Developer Help ACROBAT Power Pivot Tell me what you want to do Share

Clipboard Font Alignment Number Styles Cells Editing

EXACT X ✓ fx =AVERAGE(B2:E2)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC						
2	6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	-0.23%	0.45%	=AVERAGE(B2:E2)							
3	6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700	-0.22%	-0.67%								
4	6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800	-1.11%	-1.32%								
5	6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000	-0.88%	0.22%								
6	6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600	0.44%	-1.74%								
7	6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800	-1.74%	0.88%								
8	6/21/2018	22.85	23.6	22.65	23	23	448,200	1.10%	2.47%								
9	6/20/2018	22.3	23	22.3	22.75	22.75	455,700	2.71%	0.90%								
10	6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900	-0.89%	1.84%								
11	6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800	2.29%	-0.91%								
12	6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200	-0.68%	0.00%								
13	6/14/2018	21.9	22	21.7	22	22	261,700	0.46%	0.46%								
14	6/13/2018	21.8	22	21.6	21.9	21.9	337,500	0.92%	0.93%								
15	6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500	0.23%	2.13%								
16	6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200	1.88%	0.24%								
17	6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300	0.24%	-1.86%								
18	6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500	-1.85%	1.42%								
19	6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800	1.89%	2.91%								
20	6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500	2.91%	-2.14%								
21	6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500	-1.44%	0.48%								
22	6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200	0.00%	-0.71%								
23	5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100	-0.71%	-0.47%								
24	5/30/2018	21.2	21.2	20.85	21.05	21.05	947,100	0.24%	0.47%								

Historical Prices

Edit 100%

FINANCIAL MODELING INTRODUCTION

AUTHOR: LEON SHPANER

Let's not forget to adjust the formula in the HLC and the OHLC averages by locking in these absolute references.

Excel interface showing a spreadsheet for IMAX Corporation (WSJ) with a formula bar and a data table. The formula bar displays `=AVERAGE(C2:E2)`. A red arrow points to the formula in cell K2, which is `=AVERAGE(C2:E2)`. A red text box states: "Absolute references are denoted by \$ symbols".

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Date	Open	High	Low	Close	Adj Close	Volume	% Change Close	% Change Open	OHLC	HLC						
2	6/29/2018	22.35	22.4	21.9	22.15	22.15	292,156	-0.23%	0.45%	22.2	=AVERAGE(\$C\$2:\$E\$2)						
3	6/28/2018	22.25	22.55	22.2	22.2	22.2	319,700	-0.22%	-0.67%	22.3							
4	6/27/2018	22.4	22.85	22.2	22.25	22.25	732,800	-1.11%	-1.32%	22.3							
5	6/26/2018	22.7	22.8	22.33	22.5	22.5	439,000	-0.88%	0.22%	22.4							
6	6/25/2018	22.65	22.85	22.35	22.7	22.7	571,600	0.44%	-1.74%	22.4							
7	6/22/2018	23.05	23.1	22.43	22.6	22.6	2,449,800	-1.74%	0.88%	22.5							
8	6/21/2018	22.85	23.6	22.65	23	23	448,200	1.10%	2.47%	22.6							
9	6/20/2018	22.3	23	22.3	22.75	22.75	455,700	2.71%	0.90%	22.6							
10	6/19/2018	22.1	22.3	21.6	22.15	22.15	319,900	-0.89%	1.84%	22.5							
11	6/18/2018	21.7	22.5	21.7	22.35	22.35	280,800	2.29%	-0.91%	22.5							
12	6/15/2018	21.9	21.95	21.6	21.85	21.85	578,200	-0.68%	0.00%	22.4							
13	6/14/2018	21.9	22	21.7	22	22	261,700	0.46%	0.46%	22.4							
14	6/13/2018	21.8	22	21.6	21.9	21.9	337,500	0.92%	0.93%	22.3							
15	6/12/2018	21.6	21.8	21.1	21.7	21.7	564,500	0.23%	2.13%	22.3							
16	6/11/2018	21.15	21.95	21.15	21.65	21.65	253,200	1.88%	0.24%	22.2							
17	6/8/2018	21.1	21.45	20.65	21.25	21.25	510,300	0.24%	-1.86%	22.1							
18	6/7/2018	21.5	21.75	20.85	21.2	21.2	778,500	-1.85%	1.42%	22.1							
19	6/6/2018	21.2	21.75	20.7	21.6	21.6	706,800	1.89%	2.91%	22.1							
20	6/5/2018	20.6	21.25	20.5	21.2	21.2	760,500	2.91%	-2.14%	22.0							
21	6/4/2018	21.05	21.2	20.35	20.6	20.6	619,500	-1.44%	0.48%	21.9							
22	6/1/2018	20.95	21.2	20.65	20.9	20.9	639,200	0.00%	-0.71%	21.9							
23	5/31/2018	21.1	21.45	20.75	20.9	20.9	1,029,100	-0.71%	-0.47%	21.8							

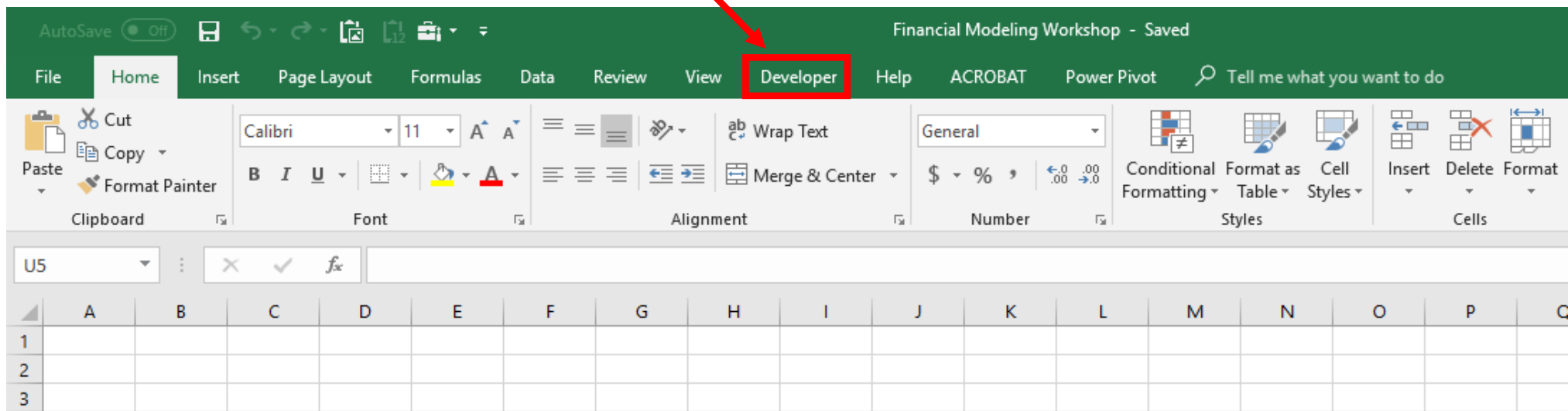
Historical Prices

FINANCIAL MODELING INTRODUCTION
AUTHOR: LEON SHPANER

Before we proceed with more built-in Excel formulas, let us delve into a little bit of VBA (Visual Basic for Applications)

VBA is the back-end programming language of Microsoft Excel and other Microsoft Office programs.

It is important to ensure that our Microsoft Excel package has the Developer Tab added onto it.

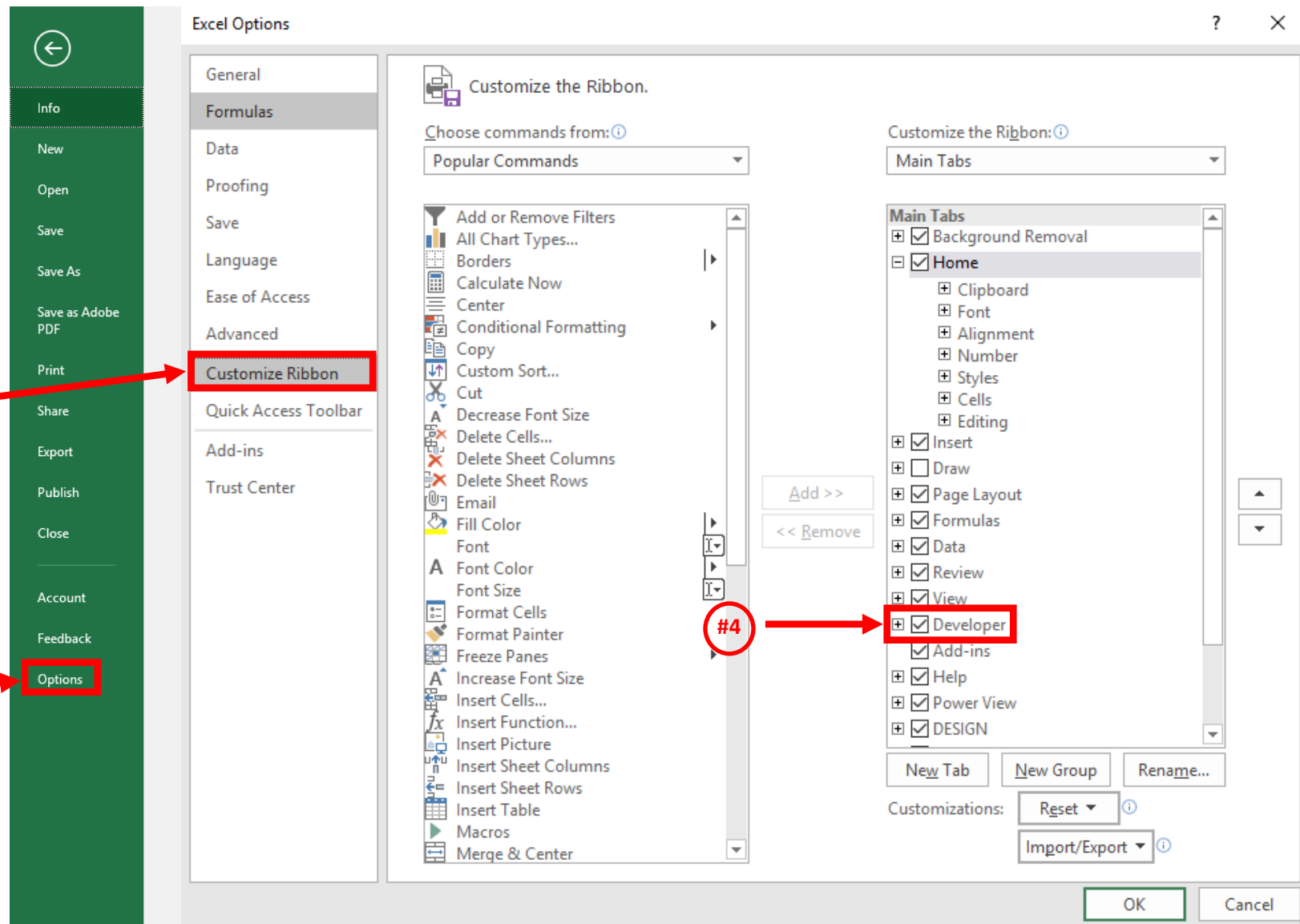


This step is **NOT** mandatory for entering the visual basic editor, but is necessary if you are recording macros to automate various processes.

If you are just writing code (i.e. coding a function), you can enter the VBA environment simply by pressing ALT + F11 on your keyboard

1. Click on "File"
2. Click on "Options."
3. Click on "Customize Ribbon"
4. Make Sure there is a check mark next to "Developer"

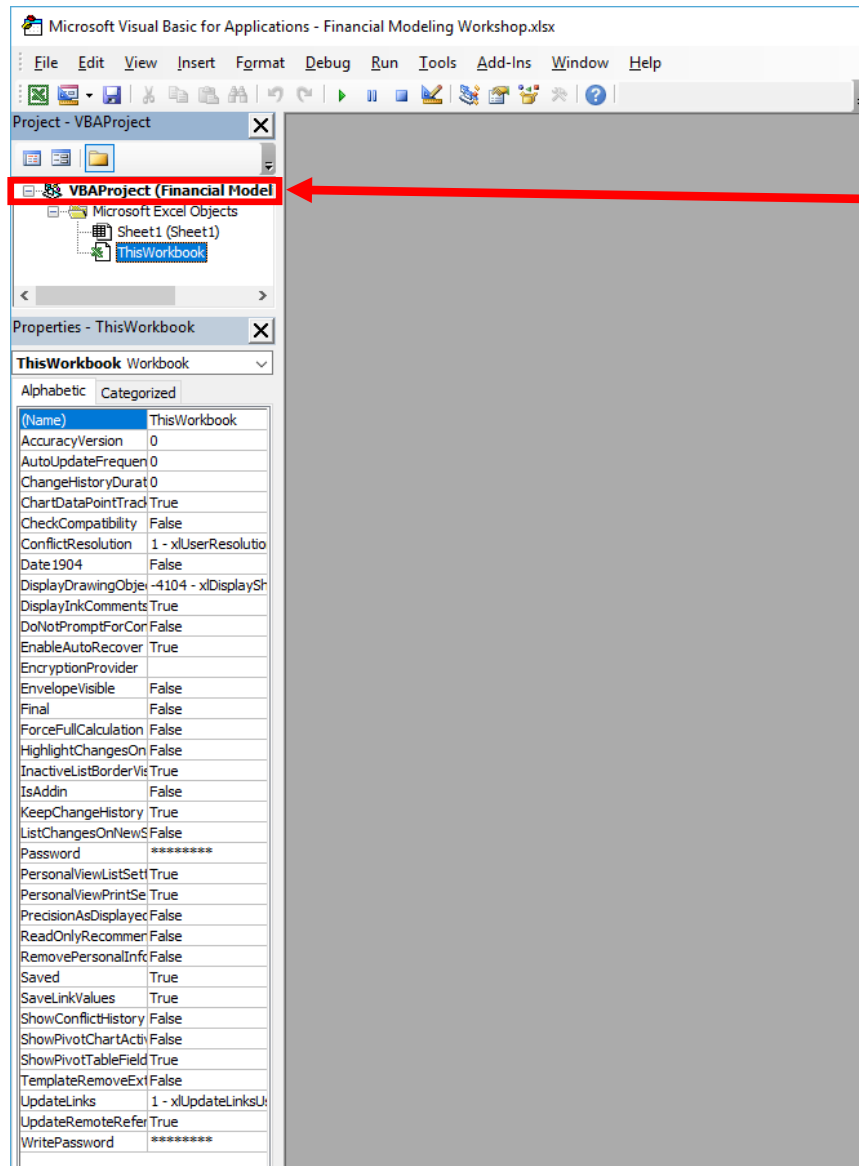
FINANCIAL MODELING INTRODUCTION
AUTHOR: LEON SHPANER



FINANCIAL MODELING INTRODUCTION

AUTHOR: LEON SHPANER

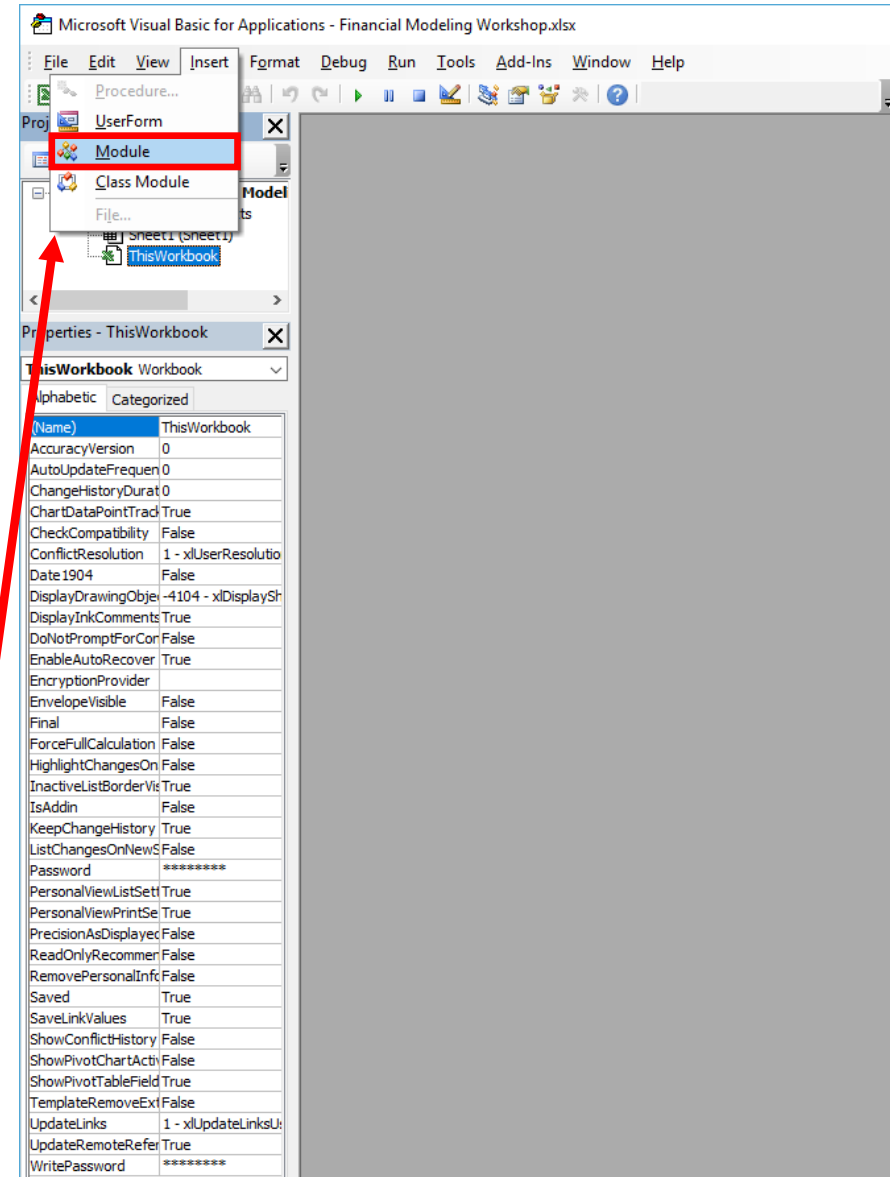
We're not going to cover the entirety of VBA programming, but will work with the basics



We want to ensure that we are looking at the correct VBAPROJECT.

The project name is the name of the Excel File that you are working within. In this case, it is called: "Financial Modeling Workshop."

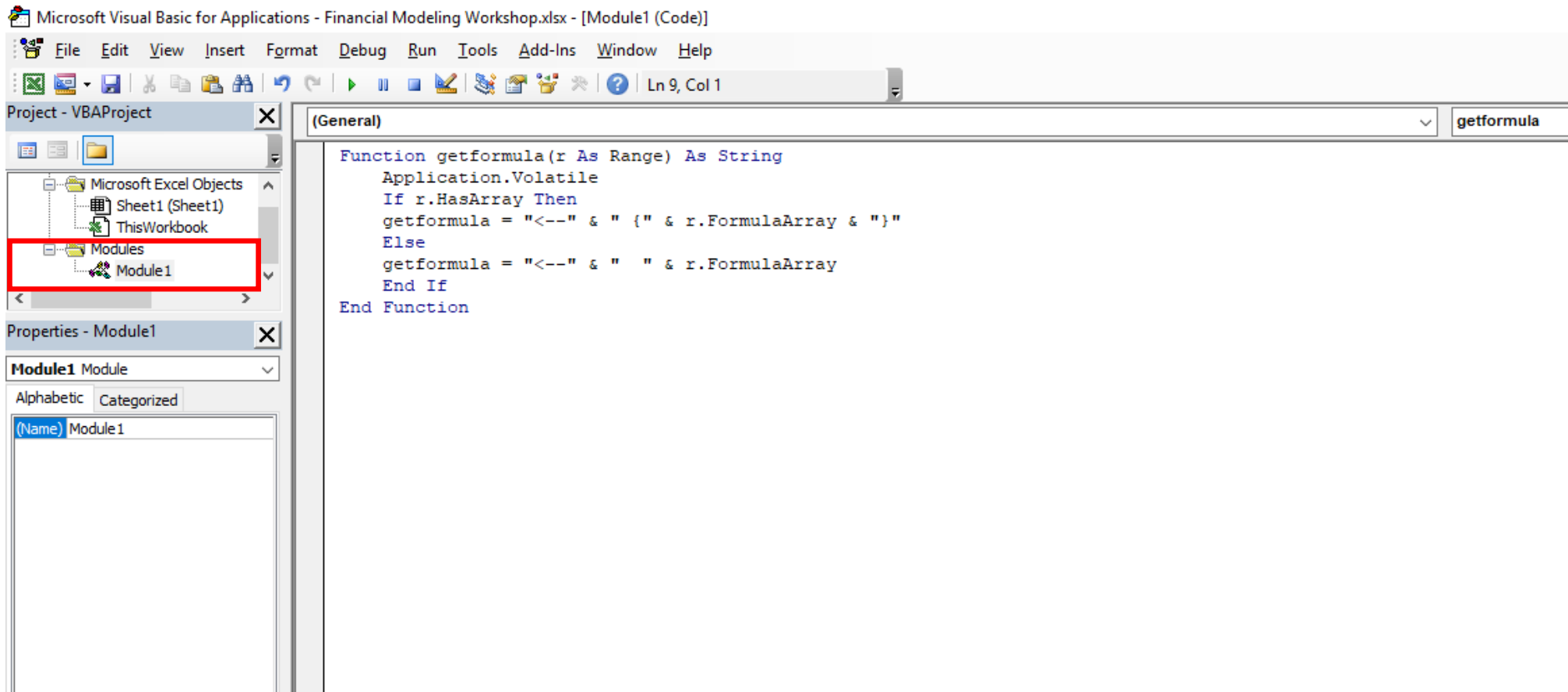
We will begin by inserting a module.



FINANCIAL MODELING INTRODUCTION
AUTHOR: LEON SHPANER

Let's start by writing a function.

The function most commonly used in Financial Modeling is known as "getformula." It simply tells us what formula we plugged into any given cell, but... excel does not have this built in, so we have to code it.



Application.Volatile: this function is recalculated when any given cell in any workbook in the application window changes value
If r.HasArray Then: if, then statement stating that if the range ® has an array, then the formula (getformula) = the following...

As we have seen in our introduction, historical pricing inquiries (HPI) can be pulled from reliable data sources like Yahoo Finance and Wall Street Journal. We're going to go ahead and pull this data for IMAX from WSJ

<https://quotes.wsj.com/IMAX/historical-prices>

IMAX Corporation (WSJ) - Excel

FileHomeInsertPage LayoutFormulasDataReviewViewTell me what you want to do...

ClipboardCutCopyFormat Painter

Calibri18Font

Wrap TextAlignment

GeneralNumber

Conditional FormattingFormat as Table

NormalBadGoodNeutralCalculation

Check CellExplanatory...InputLinked CellNote

InsertDeleteFormat

AutoSumFillClearSort & Find & Filter & Select

E1Close

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1	Date	Open	High	Low	Close	Volume																						
2	6/22/2018	23.1	23.1	22.4	22.6	2459797																						
3	6/21/2018	22.9	23.6	22.7	23	448238																						
4	6/20/2018	22.3	23	22.3	22.8	455694																						
5	6/19/2018	22.1	22.3	21.6	22.2	320106																						
6	6/18/2018	21.7	22.5	21.7	22.4	281471																						
7	6/15/2018	21.9	22	21.6	21.9	578295																						
8	6/14/2018	21.9	22	21.7	22	261974																						
9	6/13/2018	21.8	22	21.6	21.9	337505																						
10	6/12/2018	21.6	21.8	21.1	21.7	564502																						
11	6/11/2018	21.2	22	21.2	21.7	253487																						
12	6/8/2018	21.1	21.5	20.7	21.3	510298																						
13	6/7/2018	21.5	21.8	20.9	21.2	778530																						
14	6/6/2018	21.2	21.8	20.7	21.6	706764																						
15	6/5/2018	20.6	21.3	20.5	21.2	760456																						
16	6/4/2018	21.1	21.2	20.4	20.6	620079																						
17	6/1/2018	21	21.2	20.7	20.9	641601																						
18	5/31/2018	21.1	21.5	20.8	20.9	1029061																						
19	5/30/2018	21.2	21.3	20.9	21.1	947104																						
20	5/29/2018	21.3	21.5	20.9	21	1154800																						
21	5/25/2018	21.9	21.9	21.4	21.5	671646																						
22	5/24/2018	22	22	21.5	21.8	672656																						
23	5/23/2018	22.5	22.7	22	22	541724																						
24	5/22/2018	23	23.1	22.5	22.5	731018																						
25	5/21/2018	23.1	23.2	22.6	23	716658																						

HPI

Average: 21557.10837Count: 504Sum: 10821668.4

and we're going to:

- graph date vs. close price
- examine different ways we can arrange this data (PIVOT TABLE)

1. Click Insert
2. Click on Recommended Charts
3. Click on "All Charts" tab in the pop-up dialog box and select the "Line" graph on the left hand side; click "OK."

The screenshot shows the Microsoft Excel interface with the **Insert** tab selected. The **Recommended Charts** task pane is open, showing the **All Charts** tab. The **Line** chart type is highlighted in the list on the left. A preview of a line chart is shown on the right. A red box highlights the **Line** option in the list. Another red box highlights the **Recommended Charts** pop-up on the right side of the screen.

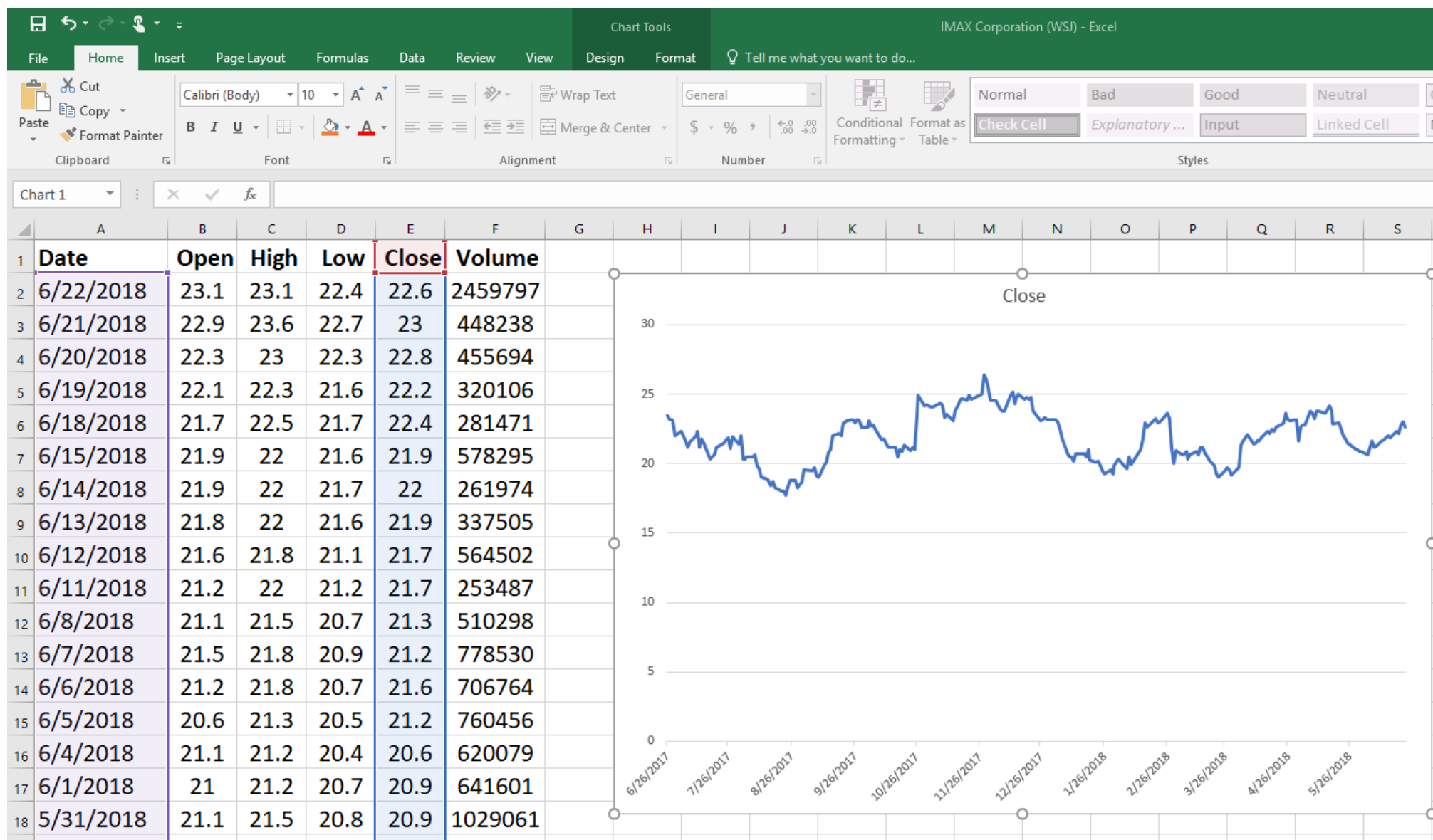
Recommended Charts

Want us to recommend a good chart to showcase your data?

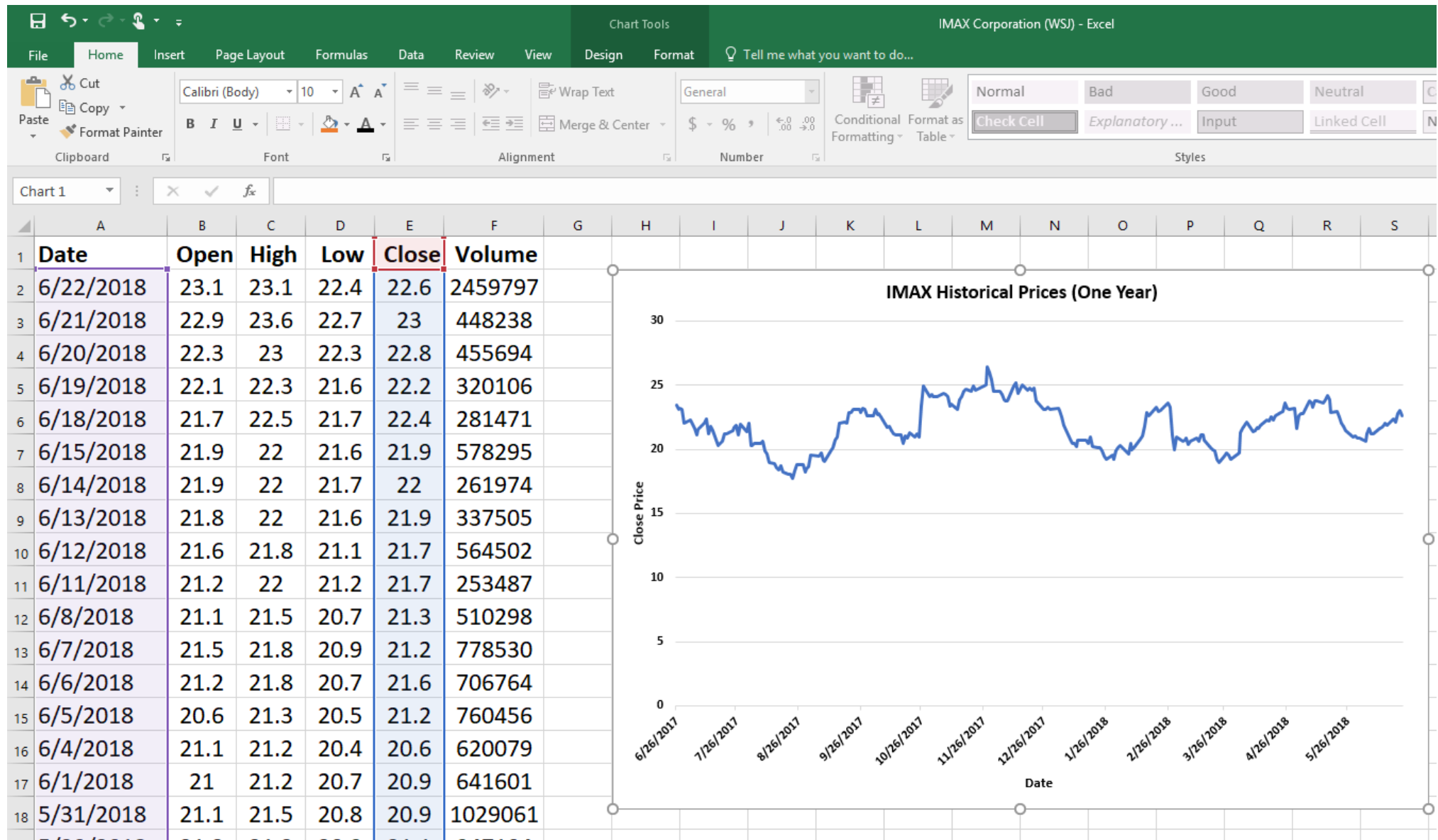
Select data in your worksheet and click this button to get a customized set of charts that we think will fit best with your data.

Date	Close
6/22/2018	25.0
6/21/2018	24.5
6/20/2018	24.0
6/19/2018	23.5

The following graph pops up, and as you can see, when clicking inside the graph, columns A and E are auto-selected to represent that the data is pulled from those two columns.

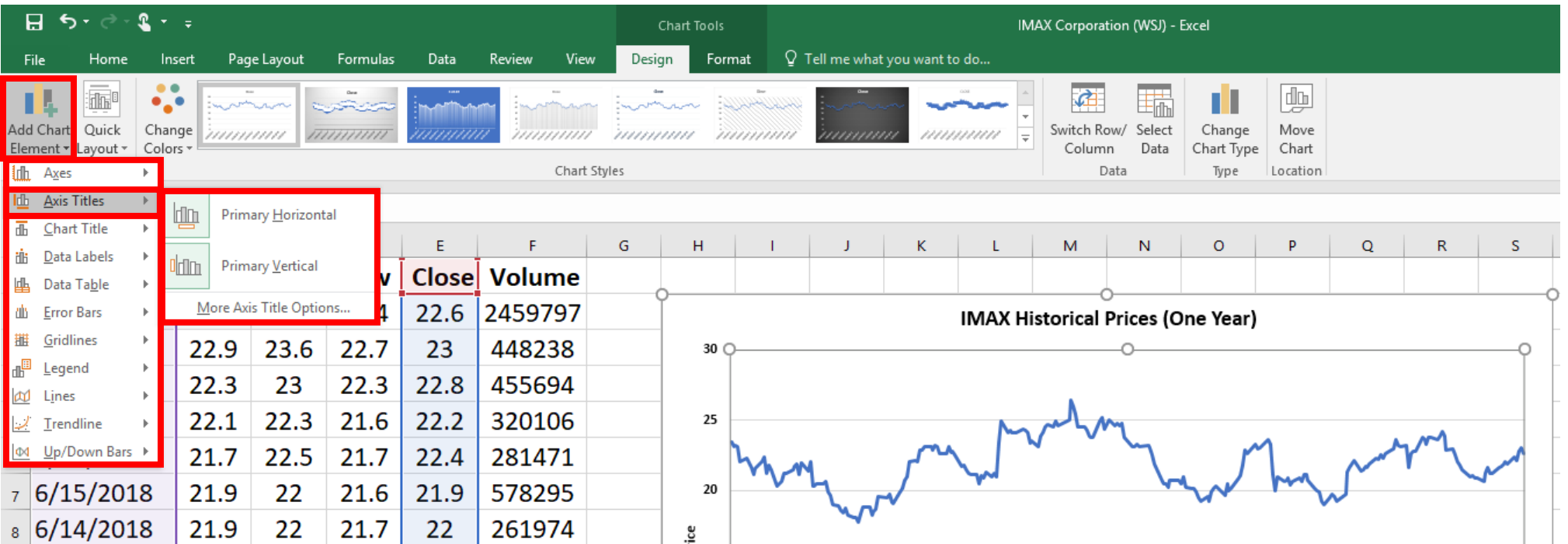


Now, let's rename the graph to "IMAX Historical Prices (One Year), and add the x-axis, and y-axis titles. To add the axis labels, click on the graph, and go to the design tab on the menu above, and select the "Add Chart Element" drop-down menu. There, you will further select "Axis Titles," and respectively add "Primary Horizontal," and "Primary Vertical."

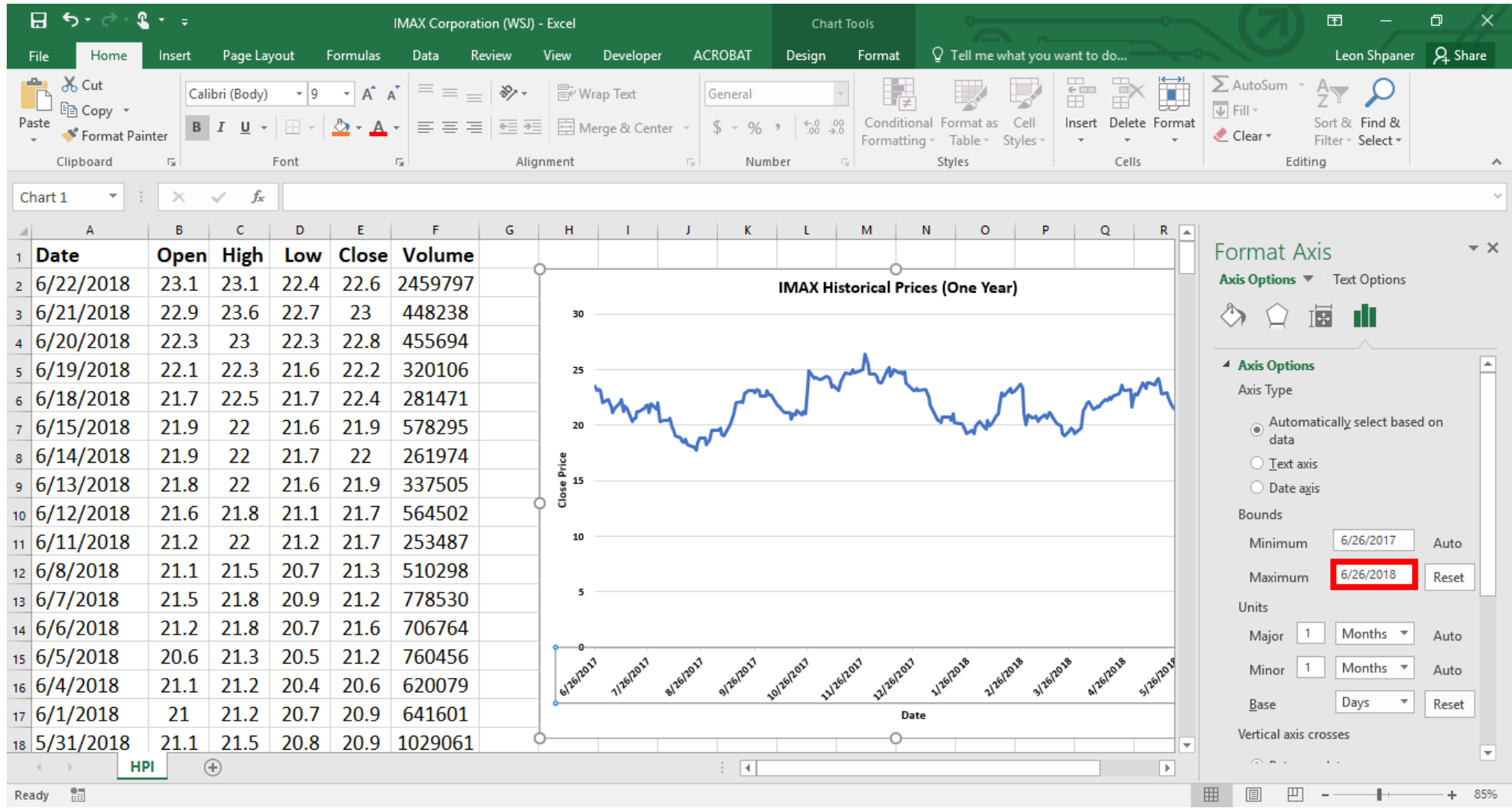


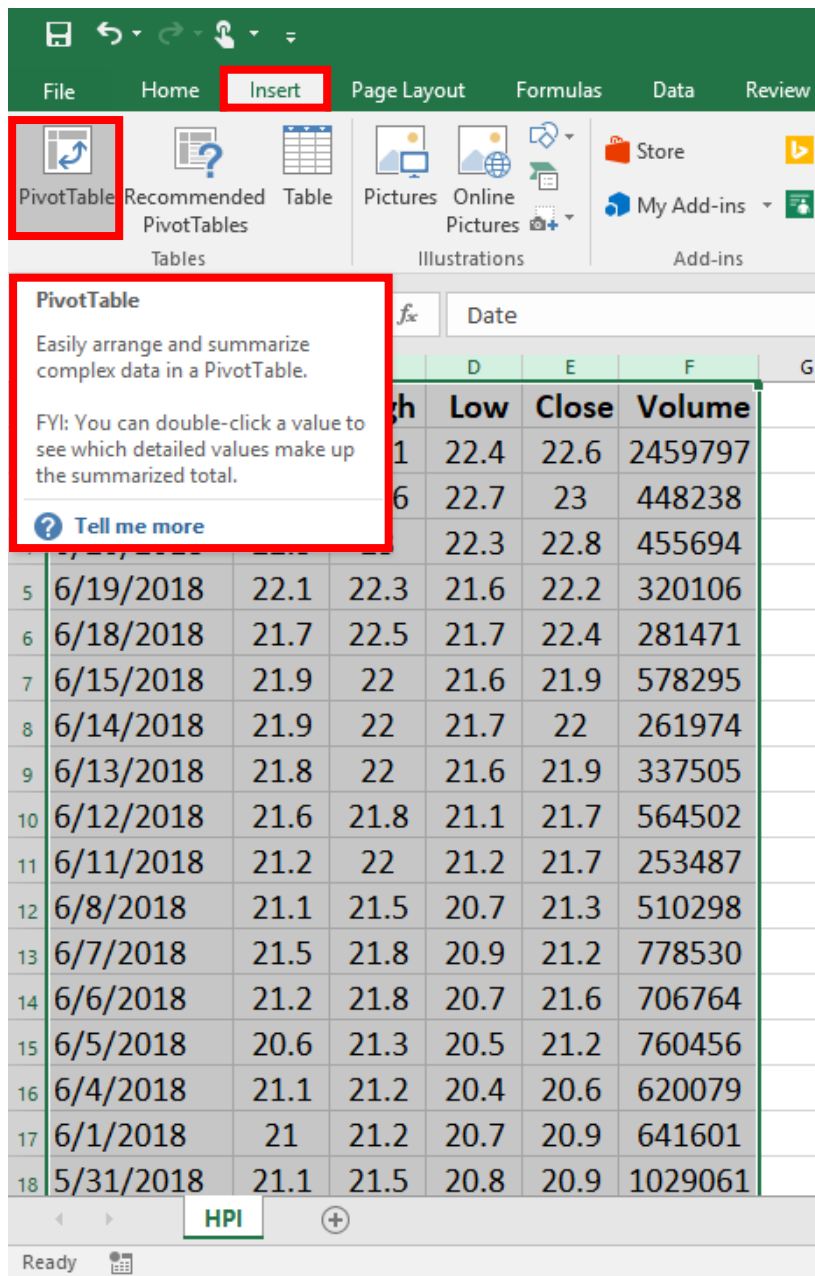
Below are the steps for selecting axis titles:

1. Click on "Add Chart Element."
2. Click on "Axis Titles."
3. Select "Primary Horizontal"
4. Select "Primary Vertical."



Right click on the graph and select “Format Axis.” There you will see multiple options for setting such parameters as minimum, maximum, axis alignment, etc. The data, for instance, auto-defaults to span the range of 6/26/17 – 6/22/17, so we want to adjust the maximum value to capture the entire year (through 6/26/17).





PivotTable
Easily arrange and summarize complex data in a PivotTable.

FYI: You can double-click a value to see which detailed values make up the summarized total.

[Tell me more](#)

		D	E	F	G	
		Low	Close	Volume		
5	6/19/2018	22.1	22.3	21.6	22.2	320106
6	6/18/2018	21.7	22.5	21.7	22.4	281471
7	6/15/2018	21.9	22	21.6	21.9	578295
8	6/14/2018	21.9	22	21.7	22	261974
9	6/13/2018	21.8	22	21.6	21.9	337505
10	6/12/2018	21.6	21.8	21.1	21.7	564502
11	6/11/2018	21.2	22	21.2	21.7	253487
12	6/8/2018	21.1	21.5	20.7	21.3	510298
13	6/7/2018	21.5	21.8	20.9	21.2	778530
14	6/6/2018	21.2	21.8	20.7	21.6	706764
15	6/5/2018	20.6	21.3	20.5	21.2	760456
16	6/4/2018	21.1	21.2	20.4	20.6	620079
17	6/1/2018	21	21.2	20.7	20.9	641601
18	5/31/2018	21.1	21.5	20.8	20.9	1029061

HPI

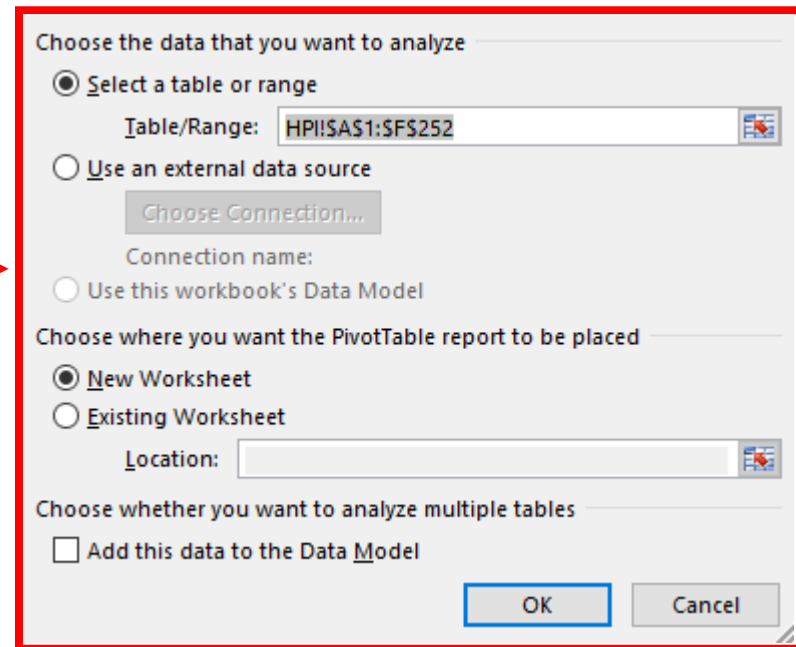
Ready

Now that we've explored the graphical aspects of Historical Prices, let's take a look at how we can re-organize this data into a Pivot Table.

This feature is built into excel and is very easy to implement.

The basic steps are outlined below:

1. Select range of data
2. Click on "Insert" tab in excel
3. Select Pivot Table
4. The resulting dialog box pops open



Choose the data that you want to analyze

☒ Select a table or range

Table/Range:

☐ Use an external data source

Connection name:

☐ Use this workbook's Data Model

Choose where you want the PivotTable report to be placed

☒ New Worksheet

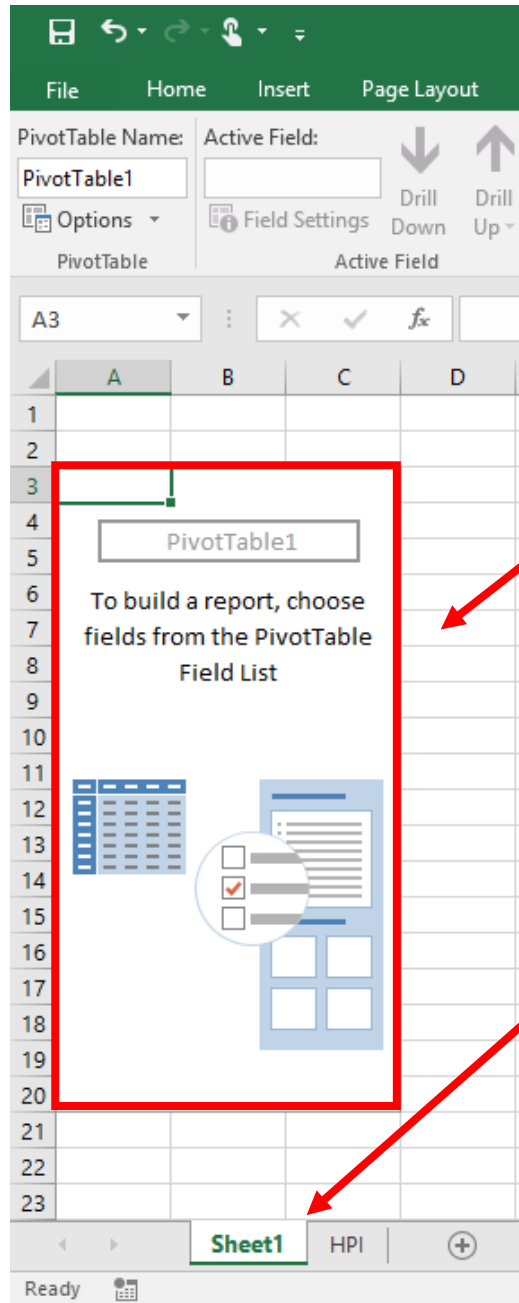
☐ Existing Worksheet

Location:

Choose whether you want to analyze multiple tables

☐ Add this data to the Data Model

As you can see from the Table/Range in the Pivot Table dialog box above, the Table/Range is set to **\$A\$1:\$F\$252**, which is exactly the range of data we need. As such, we want to ensure to capture the entire range of data so that the resulting pivot table does not omit anything of value. For our purposes, we want the PivotTable report to be placed in a New Worksheet (so we select the **"New Worksheet" radio button**), but we can also have the data in our existing worksheet

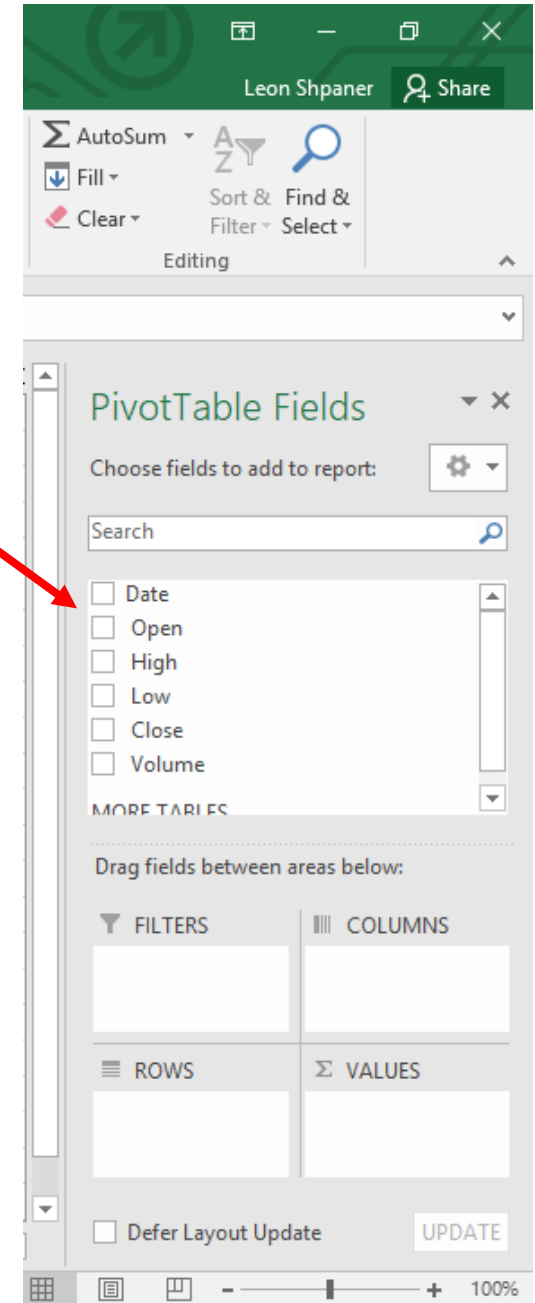


The resulting Pivot Table appears as blank because we have not yet set the parameters, otherwise known as "Pivot Table Fields."

Please also note that this Pivot Table was inserted into a new Worksheet auto-labeled as "Sheet1." We may choose to rename it later on. This will not affect the Pivot Table data.

Suppose we want to summarize the HPI close price data by month and year as opposed to the standardized day to day variable data-set we've extracted from the Wall Street Journal.

We will thus select our fields accordingly.



1. Let's go ahead and put a check mark next to "Date." Notice how Quarters and Years are auto-selected as a result, because they are all tied in. We will uncheck quarters because we don't want to see the quarterly data. 2. Let's now go ahead and put a check mark next to "Close" since close price is a variable of interest to us.

PivotTable Fields

Choose fields to add to report:

Search

☒ Date
☐ Open
☐ High
☐ Low
☐ Close
☐ Volume
☒ Quarters

Drag fields between areas below:

FILTERS

COLUMNS

ROWS

Years
Quarters

VALUES

Sum of Close

Defer Layout Update UPDATE

100%

Row Labels	Sum of Close
2017	2897.1
2018	2582.3
Grand Total	5479.4

Context Menu:

- Move Up
- Move Down
- Move to Beginning
- Move to End
- Move to Report Filter
- Move to Row Labels
- Move to Column Labels
- Move to Values
- Remove Field
- Field Settings...

PivotTable Fields

Choose fields to add to report:

Search

☒ Date
☐ Open
☐ High
☐ Low
☒ Close
☐ Volume
☒ Quarters

Drag fields between areas below:

FILTERS

COLUMNS

Years

ROWS

Date

VALUES

Sum of Close

Defer Layout Update UPDATE

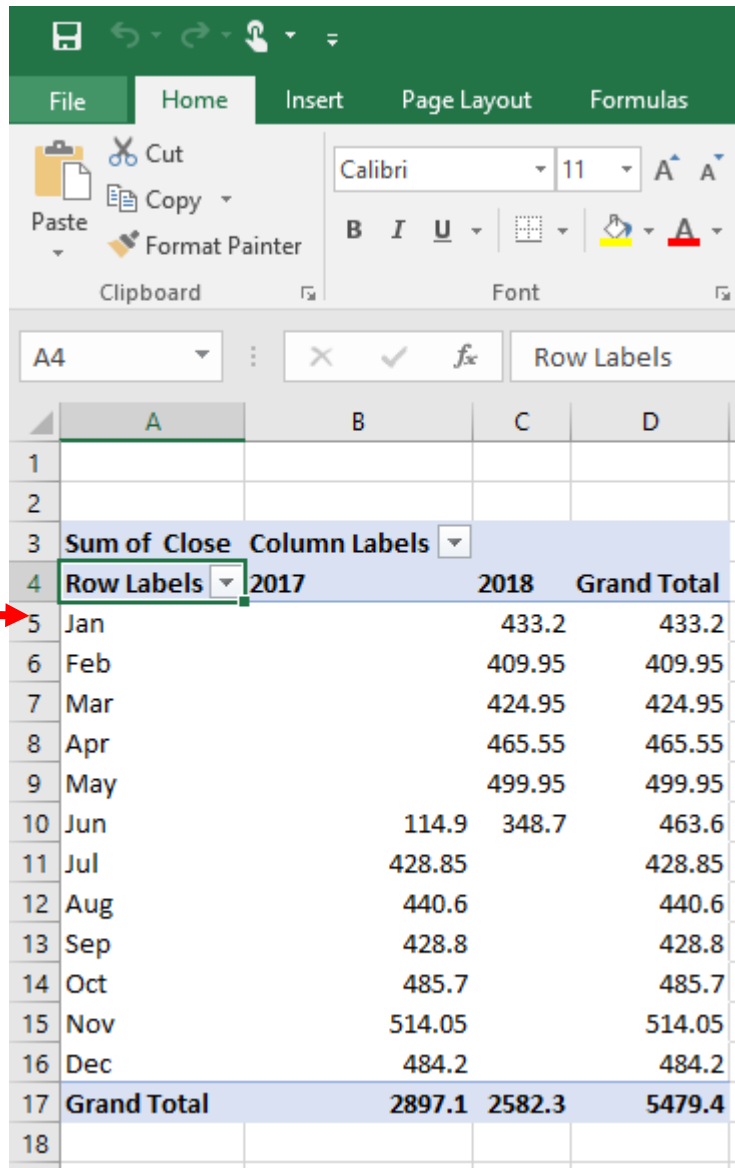
100%

3. Now, let's take "Years" from the "Rows" field list and drag it to columns.

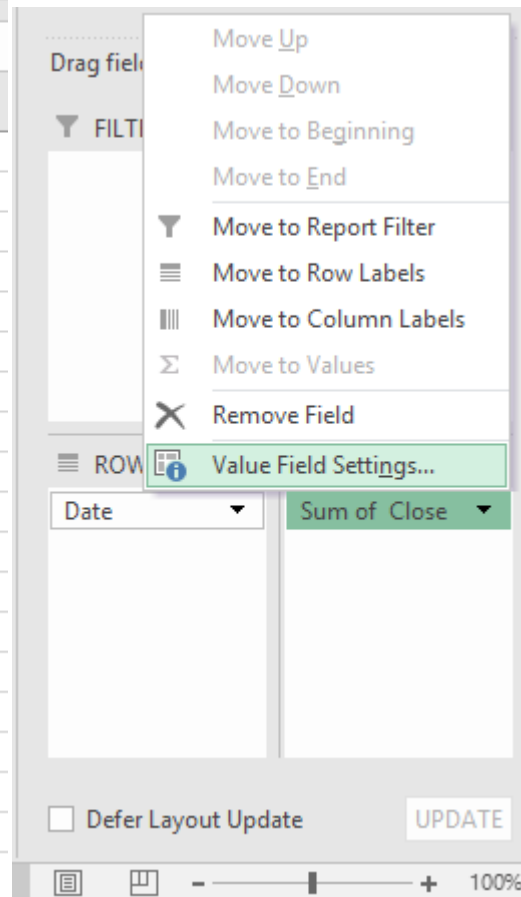
The resulting pivot table looks like this

The data is now arranged precisely as we want it – with closing prices organized by months. There's one problem, though: The pivot table

automatically summed the data as opposed to giving us the average close price for the month and year. This is an easy fix. We will adjust it manually. **1. Let's do a drop down on "Sum of Close" in the "Values" area and select "Value Field Settings."** **2. Then proceed to change the calculation from "Sum" to "Average."**



	Sum of Close	Column Labels		
Row Labels	2017	2018	Grand Total	
Jan		433.2	433.2	
Feb		409.95	409.95	
Mar		424.95	424.95	
Apr		465.55	465.55	
May		499.95	499.95	
Jun	114.9	348.7	463.6	
Jul	428.85		428.85	
Aug	440.6		440.6	
Sep	428.8		428.8	
Oct	485.7		485.7	
Nov	514.05		514.05	
Dec	484.2		484.2	
Grand Total	2897.1	2582.3	5479.4	



Drag field

Move Up

Move Down

Move to Beginning

Move to End

Move to Report Filter

Move to Row Labels

Move to Column Labels

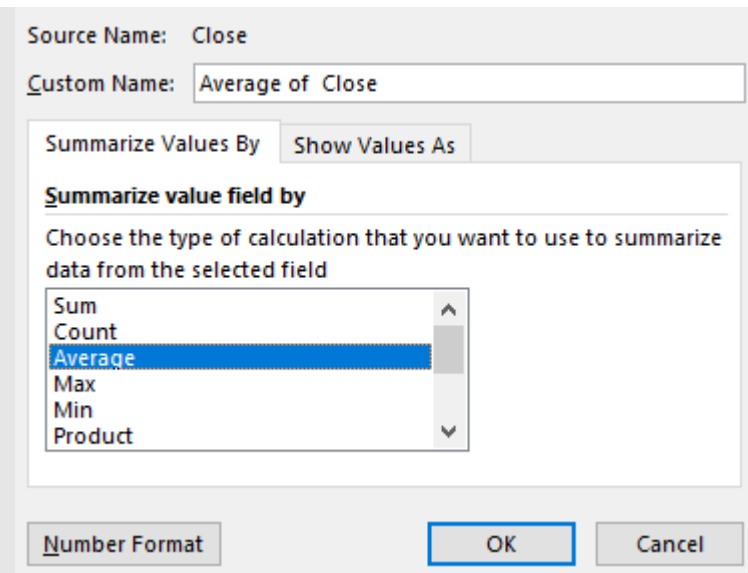
Move to Values

Remove Field

Value Field Settings...

Defer Layout Update

UPDATE



Source Name: Close

Custom Name: Average of Close

Summarize Values By Show Values As

Summarize value field by

Choose the type of calculation that you want to use to summarize data from the selected field

Sum

Count

Average

Max

Min

Product

Number Format

OK

Cancel

GRAPHS & PIVOT TABLES - HPI

AUTHOR: LEON SHPANER

1. The resulting pivot table now looks like this, with average values as opposed to summed values:

Average of Close	Column Labels		
Row Labels	2017	2018	Grand Total
Jan		20.62857143	20.62857143
Feb		21.57631579	21.57631579
Mar		20.23571429	20.23571429
Apr		22.16904762	22.16904762
May		22.725	22.725
Jun	22.98	21.79375	22.07619048
Jul	21.4425		21.4425
Aug	19.15652174		19.15652174
Sep	21.44		21.44
Oct	22.07727273		22.07727273
Nov	24.47857143		24.47857143
Dec	24.21		24.21
Grand Total	22.11526718	21.51916667	21.83027888

2. A simple rounding of decimal points (down to 2 decimals) gives us a better looking data set:

Source Name: Close

Custom Name: Average of Close

Summarize Values By Show Values As

Summarize value field by

Choose the type of calculation that you want to use to summarize data from the selected field

Sum
Count
Average
Max
Min
Product

Number Format

Category: General Number Currency Accounting Date Time Percentage Fraction Scientific Text Special Custom

Sample: 20.24

Decimal places: 2

Use 1000 Separator (,)

Negative numbers: -1234.10 1234.10 (1234.10) (1234.10)

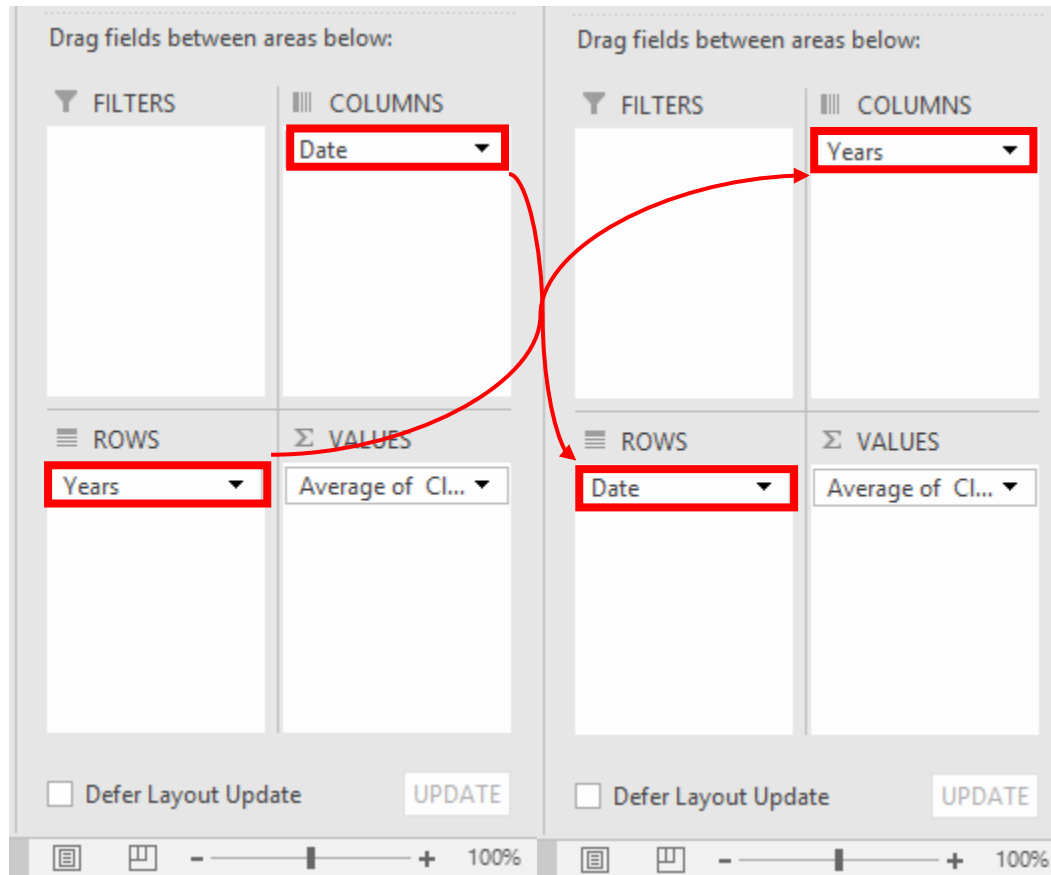
Number is used for general display of numbers. Currency and Accounting offer specialized formatting for monetary value.

OK Cancel

Average of Close	Column Labels		
Row Labels	2017	2018	Grand Total
Jan		20.63	20.63
Feb		21.58	21.58
Mar		20.24	20.24
Apr		22.17	22.17
May		22.73	22.73
Jun	22.98	21.79	22.08
Jul	21.44		21.44
Aug	19.16		19.16
Sep	21.44		21.44
Oct	22.08		22.08
Nov	24.48		24.48
Dec	24.21		24.21
Grand Total	22.12	21.52	21.83

We can also switch (move around) data in the different areas. For instance, we now have “Years” in columns and “Date” in Rows.

Let’s switch them around see what happens.



The resulting Pivot Table now looks like this:

Average of Close		Column Labels												
Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total	
2017						22.98	21.44	19.16	21.44	22.08	24.48	24.21	22.12	
2018		20.63	21.58	20.24	22.17	22.73	21.79						21.52	
Grand Total		20.63	21.58	20.24	22.17	22.73	22.08	21.44	19.16	21.44	22.08	24.48	24.21	21.83

As we have seen in our introduction, historical pricing inquiries (HPI) can be pulled from reliable data sources like Yahoo Finance and Wall Street Journal. We're going to go ahead and pull this data for IMAX from WSJ

<https://quotes.wsj.com/IMAX/historical-prices>

and we're going to see what happens when some of this data is missing and piece it back together using the VLOOKUP formula

THE WALL STREET JOURNAL.

Subscribe Now | Sign In

\$1 FOR 3 MONTHS

U.S. Edition | June 25, 2018 | Today's Paper

Home World U.S. Politics Economy Business Tech Markets Opinion Life & Arts Real Estate WSJ. Magazine

Search

QUOTES & COMPANIES

VIEW ALL COMPANIES

Imax Corp.

IMAX (U.S.: NYSE)

REAL TIME 12:01 PM EDT 06/25/18

\$**22.425** USD

-0.175 -0.77% ▼

Volume

150,694

65 Day Avg Vol

695,003

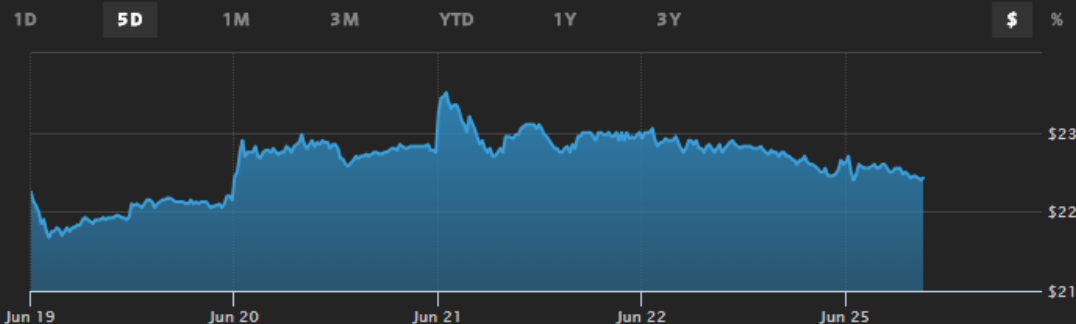
1 Day Range

22.40 - 22.85

52 Week Range

17.575 - 26.70

(08/23/17 - 11/28/17)



ADVANCED CHARTING

COMPARE ▼

Open 22.65 Prior Close 22.60 (06/22/18)

1 Day IMAX -0.77% ▼ DJIA -1.62% ▼ S&P Mid Cap 400 -1.60% ▼ Leisure/Arts/Hospitality -0.25% ▼

Select data range from
exactly one year back

OVERVIEW » RESEARCH & RATINGS » HISTORICAL PRICES

ALL SECTIONS

06/25/2017 to 06/25/2018

GO

Click "Go."

Click "Download A Spreadsheet."

DOWNLOAD A
SPREADSHEET



DATE	OPEN	HIGH	LOW	CLOSE	VOLUME
06/22/18	23.05	23.10	22.425	22.60	2.46 M
06/21/18	22.85	23.60	22.65	23.00	448,238
06/20/18	22.30	23.00	22.30	22.75	455,694
06/19/18	22.10	22.30	21.60	22.15	320,106

So upon downloading the historical prices based upon the date range of 06/25/2017 - 06/25/2018, we get the following spreadsheet directly exported into excel. Highlighting Column A automatically brings up Excel's built in summary statistics dashboard at the very bottom of the screen, and we can instantly see that the count is 253. What this tells us, simply put, is that this column of data contains **253 cells**. Without the header cell, **A1**, it's 252 dates from (6/25/17 – 6/25/2018). So this is our master list of data because it holds the original integrity of the report. Let's now say, for example, that some of the data in this list was breached/ lost and several rows went missing. How would we tackle the problem of finding these missing rows? That's precisely when the **Vlookup function** comes in handy. Let's look at what happens when we receive this data partially (with only 216 rows of data). Let's find out what happened to the 36 missing rows of data.

A	B	C	D	E	F	A	B	C	D	E	F
1 Date	Open	High	Low	Close	Volume	1 Date	Open	High	Low	Close	Volume
2 6/25/2018	22.65	22.85	22.35	22.7	571611	2 6/25/2018	22.65	22.85	22.35	22.7	571611
3 6/22/2018	23.05	23.1	22.425	22.6	2459797	3 6/22/2018	23.05	23.1	22.425	22.6	2459797
4 6/21/2018	22.85	23.6	22.65	23	448238	4 6/21/2018	22.85	23.6	22.65	23	448238
5 6/20/2018	22.3	23	22.3	22.75	455694	5 6/20/2018	22.3	23	22.3	22.75	455694
6 6/19/2018	22.1	22.3	21.6	22.15	320106	6 6/19/2018	22.1	22.3	21.6	22.15	320106
7 6/18/2018	21.7	22.5	21.7	22.35	281471	7 6/18/2018	21.7	22.5	21.7	22.35	281471
8 6/15/2018	21.9	21.95	21.6	21.85	578295	8 6/15/2018	21.9	21.95	21.6	21.85	578295
9 6/14/2018	21.9	22	21.7	22	261974	9 6/14/2018	21.9	22	21.7	22	261974
10 6/13/2018	21.8	22	21.6	21.9	337505	10 6/13/2018	21.8	22	21.6	21.9	337505
11 6/12/2018	21.6	21.8	21.1	21.7	564502	11 6/12/2018	21.6	21.8	21.1	21.7	564502
12 6/11/2018	21.15	21.95	21.15	21.65	253487	12 6/11/2018	21.15	21.95	21.15	21.65	253487
13 6/8/2018	21.1	21.45	20.65	21.25	510298	13 6/8/2018	21.1	21.45	20.65	21.25	510298
14 6/7/2018	21.5	21.75	20.85	21.2	778530	14 6/7/2018	21.5	21.75	20.85	21.2	778530
15 6/6/2018	21.2	21.75	20.7	21.6	706764	15 6/6/2018	21.2	21.75	20.7	21.6	706764
16 6/5/2018	20.6	21.25	20.5	21.2	760456	16 6/5/2018	20.6	21.25	20.5	21.2	760456
17 6/4/2018	21.05	21.2	20.35	20.6	620079	17 6/4/2018	21.05	21.2	20.35	20.6	620079
18 6/1/2018	20.95	21.2	20.65	20.9	641601	18 6/1/2018	20.95	21.2	20.65	20.9	641601
19 5/31/2018	21.1	21.45	20.75	20.9	1029061	19 5/31/2018	21.1	21.45	20.75	20.9	1029061
20 5/30/2018	21.2	21.3	20.85	21.05	947104	20 5/30/2018	21.2	21.3	20.85	21.05	947104
21 5/29/2018	21.3	21.45	20.85	21	1154800	21 5/29/2018	21.3	21.45	20.85	21	1154800
22 5/25/2018	21.85	21.875	21.35	21.5	671646	22 5/25/2018	21.85	21.875	21.35	21.5	671646
23 5/24/2018	21.95	22.025	21.475	21.8	672656	23 5/24/2018	21.95	22.025	21.475	21.8	672656
24 5/23/2018	22.45	22.725	22	22	541724	24 5/23/2018	22.45	22.725	22	22	541724
25 5/22/2018	22.95	23.1	22.45	22.5	731018	25 5/22/2018	22.95	23.1	22.45	22.5	731018
26 5/21/2018	23.05	23.15	22.55	22.95	716658	26 5/21/2018	23.05	23.15	22.55	22.95	716658
27 5/18/2018	23.9	23.9	22.85	22.85	667451	27 5/18/2018	23.9	23.9	22.85	22.85	667451
28 5/17/2018	24.3	24.3	23.675	23.85	343757	28 5/17/2018	24.3	24.3	23.675	23.85	343757
29 5/16/2018	23.9	24.375	23.8	24.2	371058	29 5/16/2018	23.9	24.375	23.8	24.2	371058
30 5/15/2018	23.5	24.1	23.4	23.85	474177	30 5/15/2018	23.5	24.1	23.4	23.85	474177
31 5/14/2018	23.8	23.95	23.5	23.6	394516	31 5/14/2018	23.8	23.95	23.5	23.6	394516
32 5/11/2018	23.8	24.05	23.4	23.75	743421	32 5/11/2018	23.8	24.05	23.4	23.75	743421
33 5/10/2018	23.25	24.025	23.2	23.8	424654	33 5/10/2018	23.25	24.025	23.2	23.8	424654
34 5/9/2018	23.55	23.6	23	23.25	616828	34 5/9/2018	23.55	23.6	23	23.25	616828
35 5/8/2018	23.55	23.925	23.525	23.6	702431	35 5/8/2018	23.55	23.925	23.525	23.6	702431
36 5/7/2018	22.95	23.8	22.95	23.75	652141	36 5/7/2018	22.95	23.8	22.95	23.75	652141
37 5/4/2018	22.6	23.15	22.55	22.75	592618	37 5/4/2018	22.6	23.15	22.55	22.75	592618
38 5/3/2018	22.7	23	22.6	22.8	755528	38 5/3/2018	22.7	23	22.6	22.8	755528
39 5/2/2018	21.85	22.85	21.5	22.6	1221994	39 5/2/2018	21.85	22.85	21.5	22.6	1221994

Let's say, for whatever reason, you received this data only partially, but need to piece it back together in its entirety.

First and foremost, let's notice that the data set in column A is counted at 217 cells. What happened to the other 36 cells?

Also, let's draw attention to the fact that it's not just the cells that are missing. In fact, 36 entire rows of data are missing as well.

We know this to be true because if only cells were missing, blanks would show up in the midst of the data-set.

What do we know about the data?

1. Dates in column A are in reverse chronological order
2. The rest of the columns B-F are quantitative variables tied in with column A.

So if we have the dates, we can find the corresponding info? Well, almost...

We are going to tell excel to search the data up and down until an exact match is found. **VLOOKUP** tells excel to vertically lookup values in one data set, and find it in another.

1. We're going to go back to the HistoricalPrices (2) workbook and add columns G-L and label them to reference that the data is coming from the HPI workbook. This is the workbook that contains only the partial data.
2. We're going to enter the VLOOKUP function in cell G2:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

The value we want to look up (find)

The range of data where the lookup value is located

The column # in the range that has the value you are looking for

We want to specify FALSE for an exact match, otherwise, if we omit or put in TRUE, we only get an approximate match

SUM							
							=VLOOKUP(A2,'HPI (partial)'!A\$1:F\$217,2,FALSE)
	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Open (HPI partial)
2	6/25/2018	22.65	22.85	22.35	22.7	571611	=VLOOKUP(A2,'HPI (partial)'!A\$1:F\$217,2,FALSE)

In cell G2, we are telling Excel to vertically lookup cell A2 (which is the first value on this sheet) in workbook 'HPI (partial)' that spans the range of A\$1:F\$217 (we want to absolute reference this range with the \$ sign in the middle to lock in the ROWS ONLY), where the open price is located in column #2, and we want an EXACT match! Closing the parenthesis and pressing enter returns the value of 22.65, which is the exact match. Let's bring this formula in cell G2 down to the bottom, to populate column G with the full range of data. However, in this process, we find that some of the values in column G are returned as #N/A. What this tells us is exactly where the data is missing. We can leave the formula as is, but prefer to clean up the #N/A's for aesthetic reasons, and amend the formula to replace these errors as hyphens (-). In so doing, we modify the VLOOKUP function to the following:

=IFERROR(VLOOKUP(A2,'HPI(partial)'!A\$1:F\$217,2,FALSE), "-")

If there is an error...

Return values as hyphens

Now that the formula is modified to account for #N/A errors, as a shortcut to the process, we apply the same formula across columns G-L, remembering to ONLY change the column index numbers (as this corresponds to our respective columns of interest within the partial list we are looking up the values from).

VLOOKUP FUNCTION - WORKING WITH HPI

AUTHOR: LEON SHPANER

Once we run the formula across columns G-L, we can proceed to do a dropdown filter on row 1, choosing column G as a baseline, unselecting all, and re-selecting ONLY the hyphens. One the filter is applied, this shows us (in columns A-F) exactly the data that was missing from our partial list. The dashboard at the bottom of the screen also shows us that 36 records were found. In our original problem, we were missing exactly 36 rows of data! We are done!

Excel screenshot showing the initial data table with columns A through G. The formula bar shows the formula for cell G1: `=Open (HPI partial)`. The table contains 30 rows of data, including dates, open, high, low, close, and volume values.

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Open (HPI partial)
2	6/25/2018	22.65	22.85	22.35	22.7	571611	22.65
3	6/22/2018	23.05	23.1	22.425	22.6	2459797	23.05
4	6/21/2018	22.85	23.6	22.65	23	448238	22.85
5	6/20/2018	22.3	23	22.3	22.75	455694	22.3
6	6/19/2018	22.1	22.3	21.6	22.15	320106	-
7	6/18/2018	21.7	22.5	21.7	22.35	281471	-
8	6/15/2018	21.9	21.95	21.6	21.85	578295	-
9	6/14/2018	21.9	22	21.7	22	261974	-
10	6/13/2018	21.8	22	21.6	21.9	337505	-
11	6/12/2018	21.6	21.8	21.1	21.7	564502	-
12	6/11/2018	21.15	21.95	21.15	21.65	253487	-
13	6/8/2018	21.1	21.45	20.65	21.25	510298	-
14	6/7/2018	21.5	21.75	20.85	21.2	778530	-
15	6/6/2018	21.2	21.75	20.7	21.6	706764	-
16	6/5/2018	20.6	21.25	20.5	21.2	760456	-
17	6/4/2018	21.05	21.2	20.35	20.6	620079	-
18	6/1/2018	20.95	21.2	20.65	20.9	641601	-
19	5/31/2018	21.1	21.45	20.75	20.9	1029061	21.1
20	5/30/2018	21.2	21.3	20.85	21.05	947104	21.2
21	5/29/2018	21.3	21.45	20.85	21	1154800	21.3
22	5/25/2018	21.85	21.875	21.35	21.5	671646	21.85
23	5/24/2018	21.95	22.025	21.475	21.8	672656	21.95
24	5/23/2018	22.45	22.725	22	22	541724	22.45
25	5/22/2018	22.95	23.1	22.45	22.5	731018	22.95
26	5/21/2018	23.05	23.15	22.55	22.95	716658	23.05
27	5/18/2018	23.9	23.9	22.85	22.85	667451	23.9
28	5/17/2018	24.3	24.3	23.675	23.85	343757	24.3

Excel screenshot showing the filtered data table. The formula bar shows the formula for cell G1: `=Open (HPI partial)`. The table contains 36 rows of data, including dates, open, high, low, close, and volume values. The status bar at the bottom indicates "36 of 252 records found".

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close	Volume	Open (HPI partial)
6	6/19/2018	22.1	22.3	21.6	22.15	320106	-
7	6/18/2018	21.7	22.5	21.7	22.35	281471	-
8	6/15/2018	21.9	21.95	21.6	21.85	578295	-
9	6/14/2018	21.9	22	21.7	22	261974	-
10	6/13/2018	21.8	22	21.6	21.9	337505	-
11	6/12/2018	21.6	21.8	21.1	21.7	564502	-
12	6/11/2018	21.15	21.95	21.15	21.65	253487	-
13	6/8/2018	21.1	21.45	20.65	21.25	510298	-
14	6/7/2018	21.5	21.75	20.85	21.2	778530	-
15	6/6/2018	21.2	21.75	20.7	21.6	706764	-
16	6/5/2018	20.6	21.25	20.5	21.2	760456	-
17	6/4/2018	21.05	21.2	20.35	20.6	620079	-
18	6/1/2018	20.95	21.2	20.65	20.9	641601	-
94	2/12/2018	20.25	21.05	20.15	20.8	972831	-
95	2/9/2018	20	20.3	19.55	20.15	742147	-
96	2/8/2018	20.5	20.575	19.9	19.95	786891	-
97	2/7/2018	19.65	20.6	19.35	20.45	1224607	-
98	2/6/2018	19.4	19.85	19.06	19.6	915097	-
99	2/5/2018	20.25	20.44	19.8	19.8	911927	-
100	2/2/2018	19.95	20.775	19.85	20.3	1198374	-
101	2/1/2018	19.85	20.45	19.6	20.1	781948	-
102	1/31/2018	19.4	20.025	19.3	19.85	1470131	-
103	1/30/2018	19.5	19.6	19	19.25	1183142	-
168	10/25/2017	21.35	21.35	20.65	21	790822	-
169	10/24/2017	21.05	21.4	20.75	21.2	687540	-
170	10/23/2017	21.25	21.35	20.85	20.95	566498	-
171	10/20/2017	21.05	21.4	20.95	21.3	498153	-

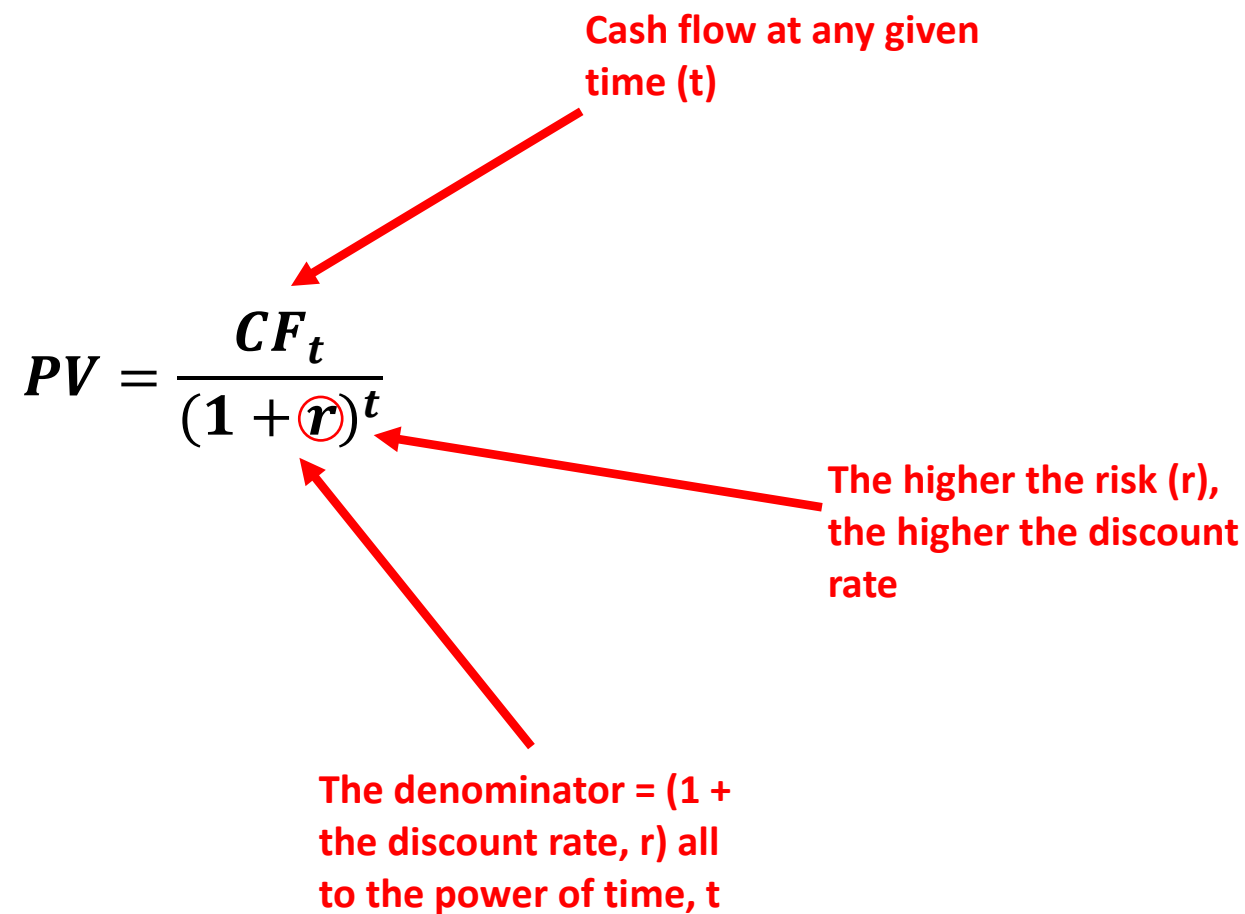
Present Value: the value (today) of a set of anticipated cash flows (future)

$$PV = \frac{CF_t}{(1 + r)^t}$$

Cash flow at any given time (t)

The higher the risk (r), the higher the discount rate

The denominator = (1 + the discount rate, r) all to the power of time, t

The diagram shows the Present Value formula: $PV = \frac{CF_t}{(1 + r)^t}$. Three red arrows point from explanatory text to parts of the formula. One arrow points from 'Cash flow at any given time (t)' to the numerator CF_t . Another arrow points from 'The higher the risk (r), the higher the discount rate' to the variable r in the denominator. A third arrow points from 'The denominator = (1 + the discount rate, r) all to the power of time, t' to the entire denominator $(1 + r)^t$.

Net Present Value: The present value of acquiring the asset – the cost of acquiring the asset (negative cash flow) at $t = 0$.

Usually < 0 , because it is the cost of acquiring the asset

Cash flow at initial time ($t=0$)

Cash flow at any given time (t)

$$NPV = \sum_{t=0}^N \frac{CF_t}{(1+r)^t} = CF_0 + \sum_{t=1}^N \frac{CF_t}{(1+r)^t}$$

Present Value = PV

Though the concept of *opportunity cost* is omnipresent in the study of Micro Economics, ceteris paribus, the exact financial cost of any endeavor must be met with the value(s) of the ensuing alternative(s).

Going further, if we are to look at the value of an investment, we must look at its return and stack it up against other feasible investment alternatives. From a purely technical standpoint, adjusting the discount rate, r , will obviously affect the net present value.

If a disciplined investor was to consider two different investments with an equal amount of risk and forego one investment's rate of return for another, this is the cost of capital of the investment decision, or, once again, opportunity cost.

As we cover valuation, we will see that some returns do not stack up against the company's cost of capital, thereby increasing risk, and ultimately decreasing valuation.

Finance, as opposed to theoretical economics delves deeper into opportunity costs, and quantifies these costs as real dollar figures.

In the ensuing excel demo, we will show how NPV is calculated step by step.

In this example, assuming the cash flow is static at time t, we can also use **Excel's PV function** to calculate NPV; however, in the ensuing example, Excel's PV function CANNOT be used to calculate NPV when the cash flows vary across time t.

	A	B	C	D
1	CALCULATE PRESENT VALUE			
2				
3	Discount Rate	0.03		
4				
5	Year	Cash Flow	Present Value	Formula
6	1	\$ 100.00	\$ 97.09	<-- =B6/(1+\$B\$3)^A6
7	2	\$ 100.00	\$ 94.26	<-- =B7/(1+\$B\$3)^A7
8	3	\$ 100.00	\$ 91.51	<-- =B8/(1+\$B\$3)^A8
9	4	\$ 100.00	\$ 88.85	<-- =B9/(1+\$B\$3)^A9
10	5	\$ 100.00	\$ 86.26	<-- =B10/(1+\$B\$3)^A10
11				<--
12	NPV		\$ 457.97	<-- =SUM(C6:C10)
13	NPV (Excel Function)		\$457.97	<-- =NPV(B3,B6:B10)
14	PV		\$457.97	<-- =PV(B3,5,-100)

In the example below, an initial investment of \$250.00 is made at $t = 0$. From $t = 1$ through 5, cash flow increases by \$100.00/ year. We calculate Present Value for each year starting in cell C6, by using the

classic formula $=B6/(1+\$B\$3)^{A6} = PV = \frac{CF_t}{(1+r)^t}$

	A	B	C	D
1	CALCULATE PRESENT VALUE			
2				
3	Discount Rate	0.03		
4				
5	Year	Cash Flow	Present Value	Formula
6	0	\$ (250.00)	\$ (250.00)	<-- =B6/(1+\$B\$3)^A6
7	1	\$ 100.00	\$ 97.09	<-- =B7/(1+\$B\$3)^A7
8	2	\$ 200.00	\$ 188.52	<-- =B8/(1+\$B\$3)^A8
9	3	\$ 300.00	\$ 274.54	<-- =B9/(1+\$B\$3)^A9
10	4	\$ 400.00	\$ 355.39	<-- =B10/(1+\$B\$3)^A10
11	5	\$ 500.00	\$ 431.30	<-- =B11/(1+\$B\$3)^A11
12				<--
13	NPV		\$ 1,096.85	<-- =SUM(C6:C11)
14	NPV (Excel Function)		\$ 1,096.85	<-- =B6+NPV(B3,B7:B11)
15				

In this example, we get the IRR by using Excel's built-in IRR function **=IRR(values, [guess])**. IRR (the internal rate of return) is the rate of return where **NPV = 0**. The higher the IRR, the healthier the investment.

	A	B	C	D
1	CALCULATE PRESENT VALUE			
2				
3	Discount Rate	0.03		
4				
5	Year	Cash Flow	Present Value	Formula
6	0	\$ (250.00)	\$ (250.00)	<-- =B6/(1+\$B\$3)^A6
7	1	\$ 100.00	\$ 97.09	<-- =B7/(1+\$B\$3)^A7
8	2	\$ 200.00	\$ 188.52	<-- =B8/(1+\$B\$3)^A8
9	3	\$ 300.00	\$ 274.54	<-- =B9/(1+\$B\$3)^A9
10	4	\$ 400.00	\$ 355.39	<-- =B10/(1+\$B\$3)^A10
11	5	\$ 500.00	\$ 431.30	<-- =B11/(1+\$B\$3)^A11
12				<--
13	NPV		\$ 1,096.85	<-- =SUM(C6:C11)
14	NPV (Excel Function)		\$ 1,096.85	<-- =B6+NPV(B3,B7:B11)
15	IRR		75%	<-- =IRR(B6:B11)

The Wall Street Journal is an excellent resource for data mining, albeit, not all reports are downloadable into excel (only the Historical Prices are). For this reason, we must copy and paste the income statement, balance sheet, and statement of cash flow separately into Excel in order to build an all-encompassing pro-forma statement. However, in so doing, we build an automated process (macro) that takes the pasted data and arranges it in such a way that helps our efforts and is aesthetically sound.

What is a pro-forma statement?

Pro- Forma Financial Analysis

Latin term literally translating to: "for the sake of form"

- Income Statement
- Balance Sheet
- Statement of Cash Flows

Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Income Statement					
Sales/Revenue	287,937.00	290,541.00	373,805.00	377,334.00	380,767.00
Income Tax - Current Domestic	1,068.00	3,495.00	10,862.00	1,396.00	6,898.00
Net Income After Extraordinaries	44,733.00	38,600.00	55,075.00	28,788.00	2,344.00
Net Income Available to Common	44,115.00	39,310.00	55,075.00	28,788.00	2,344.00
EPS (Basic)	0.66	0.58	0.79	0.43	0.04
EPS (Basic) Growth	-	-12.85%	37.34%	-45.57%	-90.70%
EBIT	64,854.00	65,066.00	95,864.00	66,257.00	46,571.00
Balance Sheet					
Assets					
Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Accounts Receivables, Net	73,074.00	76,051.00	97,981.00	96,349.00	130,546.00
Accounts Receivables, Gross	73,961.00	76,998.00	99,695.00	97,599.00	132,513.00
Total Equity	319,585.00	426,687.00	677,157.00	626,554.00	603,610.00
Liabilities & Shareholders' Equity	481,145.00	621,533.00	931,020.00	857,334.00	866,612.00
Cash Flow					
Fiscal year is January-December. All values USD Thousands.	2013	2014	2015	2016	2017
Net Income before Extraordinaries	44,115.00	42,169.00	64,624.00	39,320.00	12,518.00
Depreciation, Depletion & Amortization	36,685.00	32,930.00	40,887.00	45,953.00	66,245.00
Net Financing Cash Flow / Sales	-1.52%	17.99%	54.90%	-33.33%	-15.11%
Exchange Rate Effect	-163	-54	842	106	-267
Net Change in Cash	8,210.00	76,957.00	210,946.00	-112,690.00	-46,034.00
Free Cash Flow	42,017.00	46,501.00	40,428.00	62,594.00	61,223.00

As we discussed in our introduction, we can obtain the financials of any publicly traded company via:

- Yahoo Finance
- The Wall Street Journal
- The investor relations section of the corporation's website

Piecing together a pro-forma from the investor relations section of the company's website can prove to be quite cumbersome.

- Some companies don't have exportable excel files
- Makes the workload more tedious and time consuming
- It confuses certain line items that are available in other reliable sources

First, let's examine the financials for IMAX via Yahoo Finance:

<https://finance.yahoo.com/quote/IMAX/financials?p=IMAX>

IMAX Corporation (IMAX)

NYSE - NYSE Delayed Price. Currency in USD

☆ Add to watchlist

Quote Lookup



22.90 +0.25 (+1.10%)

At close: July 6 4:02PM EDT

Buy

Sell

[Summary](#) [Chart](#) [Conversations](#) [Statistics](#) [Profile](#) **[Financials](#)** [Options](#) [Holders](#) [Historical Data](#) [Analysis](#) [Sustainability](#) NEW

Thank you for helping us improve your Yahoo experience

[Learn more about your feedback.](#)

Show: **Income Statement** | [Balance Sheet](#) | [Cash Flow](#)

Annual | [Quarterly](#)

Income Statement

All numbers in thousands

Revenue


Total Revenue

Cost of Revenue

Gross Profit

Let's go ahead and click on the first financial report "income statement," highlight the relevant information from top to bottom, and subsequently copy and paste it into a blank excel spreadsheet which we will later save as a macro-enabled workbook.

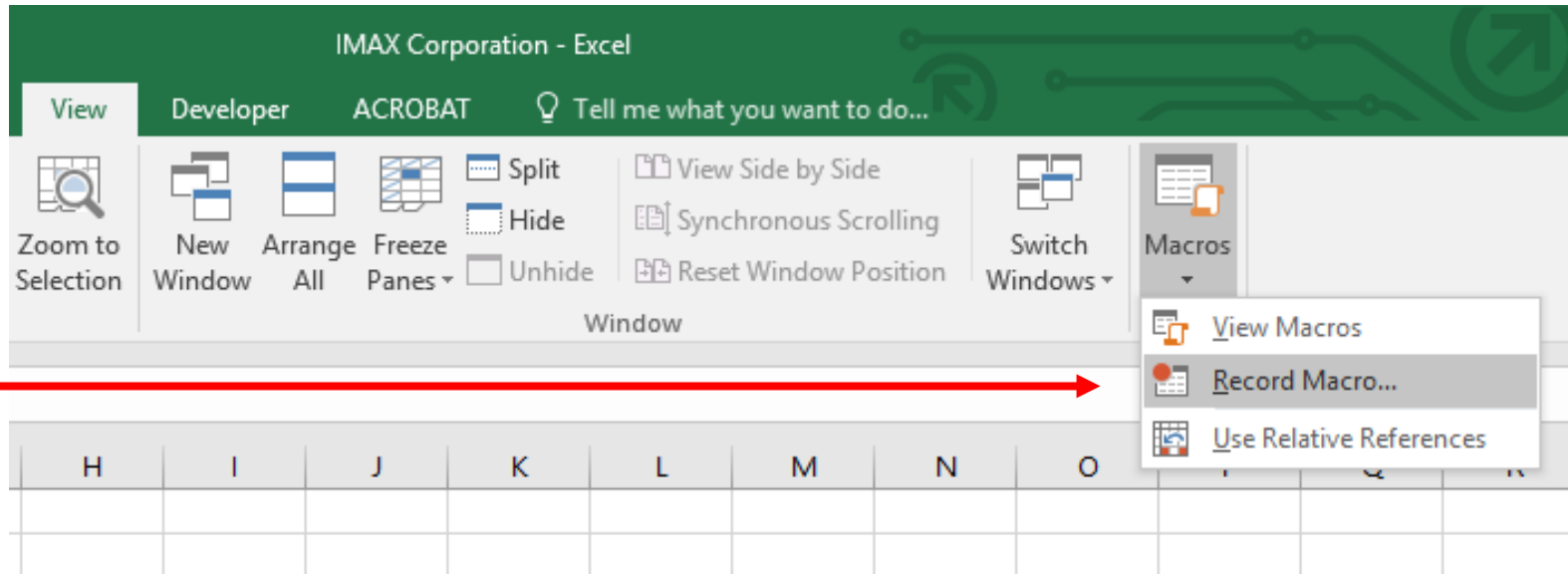
1. Highlight "Columns A-D."
2. Right click into the resulting highlighted area and click "Format Cells."
3. Go to the "Fill tab" of the pop-up dialog box, select "No color," and click "OK."
4. Now Select All cells by clicking on the top left corner OR by hitting CTRL + A on your keyboard.
5. Once all cells are selected, hover your mouse pointer between any 2 columns until the pointer

appears like this:  and proceed to double click. All columns will thus automatically adjust and resize (*except for column A – because there are some cells that are merged – so let's take care of that problem*). Select (Highlight) Column A and unselect "Wrap Text" on the "Home" tab.

6. Unselect "Merge & Center."
7. Now go back and select all cells (as in step 4 above) and repeat step 5.
8. Highlight "Columns "B-D."
9. Center the content of those columns in one click by clicking on center alignment.
Change the number format to accounting, but remember, in so doing, you are also changing the dates on row 3 to dollar figures. We want to change that format back to "date," otherwise, we are calculating that towards revenue and that's serious overstatement of revenue, and that is a BIG NO-NO!
10. Let's go ahead and re-center the alignment on "Columns B-D" for aesthetic reasons, and...

We are all set!

In Excel, click on “View,” then “Macros,” and click on “Record Macro.”



Macro name:
ProFormaAlign

Shortcut key:
Ctrl+

Store macro in:
This Workbook

Description:
custom format for proforma

OK Cancel

1

Ensure that you name your macro such that it DOES NOT contain any spaces

2

Make sure that you have your steps mapped out such that you do not make any mistakes in the process (i.e., accidentally click or type somewhere that was not intended).

Write-up an optional description

Click "OK"

Once you are finished going through the process of recording a macro, go back to "View," "Macros," and ensure to click on "Stop Recording."

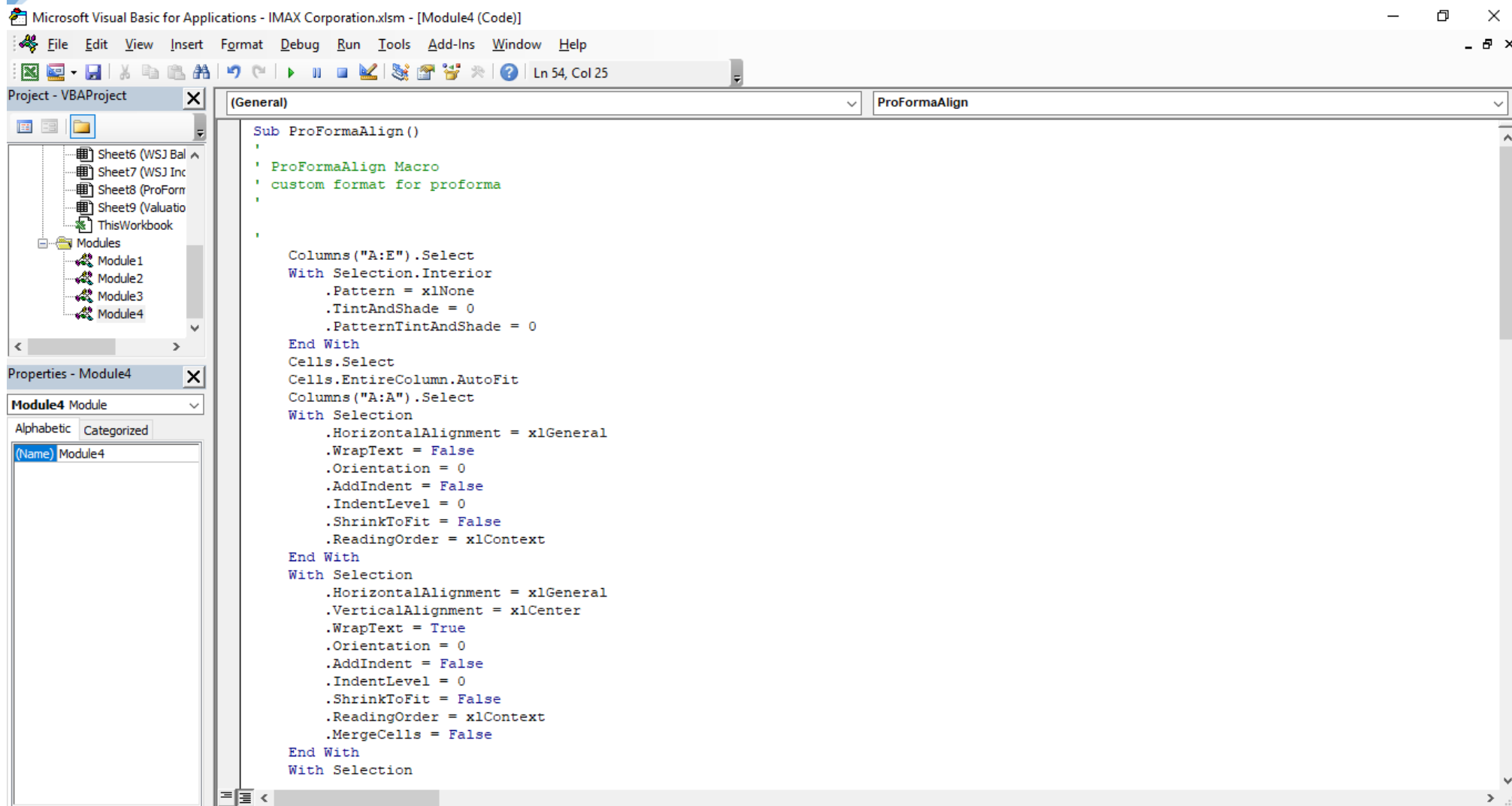
The screenshot shows the Microsoft Excel interface with the 'View' tab selected. The 'Macros' dropdown menu is open, showing options: 'View Macros', 'Stop Recording', and 'Use Relative References'. A red arrow points from the 'Stop Recording' option to the 'Stop Recording' dialog box. The dialog box contains the text: 'Stop Recording', 'Record a macro.', and 'Each of the commands you perform will be saved into the macro so that you can play them back again.' Below the dialog box, the 'Macro name:' field is set to 'ProFormaAlign'. The 'Macros in:' dropdown is set to 'All Open Workbooks'. The 'Description' field contains 'custom format for proforma'. The 'Edit' button is highlighted with a red box.

To view the resulting script, go back to the process in the diagram above.

This time, ensure to click "View Macros." The resulting dialog box pops up:

1. Click "Edit."

This takes us to the VBA Editor. On the back end, the script for the macro was written as such:



Yahoo Finance periodically updates its site, so when we originally started this process, IMAX Corporation only had financial statements going back to 2014. Now, we have data going back to 2013.

Great, right? More data means better forecasting!

But... REMEMBER, our original macro only accounted for "Columns A-D," therefore, we must edit the macro to account for A NEW RANGE in COLUMNS "A-E."

All we have to do now is simply view our macro, click on edit, do a search and fix the range. How do we do that?

We know that our original data spanned the range of “Columns A-D.” So now, all we have to do is go into the VBA editor, and change any ranges that end with :D to :E. We can do that via searching CTRL + F (find) and replace.

The screenshot shows the Microsoft Visual Basic for Applications editor window titled "Microsoft Visual Basic for Applications - IMAX Corporation.xlsm - [Module4 (Code)]". The left pane shows the Project - VBAPROJECT and Properties - Module4. The main pane displays the VBA code for the ProFormaAlign macro. A Find & Replace dialog box is open over the code, with the following settings:

- Find What:** :D (indicated by a red arrow and text "Type in ':D' in Find What:")
- Replace With:** :E (indicated by a red arrow and text "Type in ':E' in Replace With:")
- Search:** Current Module (selected)
- Direction:** All
- Find Whole Word Only:** unchecked
- Match Case:** unchecked
- Use Pattern Matching:** unchecked
- Buttons:** Find Next, Cancel, Replace (highlighted with a red box and text "Click 'Replace All'"), Replace All, Help

The VBA code in the background is as follows:

```
Sub ProFormaAlign()
    ' ProFormaAlign Macro
    ' custom format for proforma
    '
    Columns("A:E").Select
    With Selection.Interior
        .Pattern = xlNone
        .TintAndShade = 0
        .PatternTintAndShade = 0
    End With
    Cells.Select
    Cells.EntireColumn.AutoFit
    Columns("A:A").Select
    With Selection
        .HorizontalAlignment = xlGeneral
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
    End With
    With Selection
        .HorizontalAlignment = xlGeneral
        .VerticalAlignment = xlCenter
        .WrapText = True
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
    With Selection

```

Let's save the file as a macro enabled workbook and copy and paste the remaining pro-forma statements into our excel file into separate sheets. So, in effect, we will have 3 sheets:

1. Income Statement
2. Balance Sheet
3. Cash Flow

We will now run the macro on #2 and #3, respectively. The script for the macro created in this exercise is pasted below for your reference.

```
Sub ProFormaAlign()
```

```
' ProFormaAlign Macro  
' custom format for proforma
```

```
  
Columns("A:E").Select  
With Selection.Interior  
    .Pattern = xlNone  
    .TintAndShade = 0  
    .PatternTintAndShade = 0  
End With  
Cells.Select  
Cells.EntireColumn.AutoFit  
Columns("A:A").Select  
With Selection  
    .HorizontalAlignment = xlGeneral  
    .WrapText = False  
    .Orientation = 0  
    .AddIndent = False  
    .IndentLevel = 0  
    .ShrinkToFit = False  
    .ReadingOrder = xlContext  
End With  
With Selection  
    .HorizontalAlignment = xlGeneral  
    .VerticalAlignment = xlCenter  
    .WrapText = True  
    .Orientation = 0  
    .AddIndent = False  
    .IndentLevel = 0  
    .ShrinkToFit = False  
    .ReadingOrder = xlContext  
    .MergeCells = False  
End With  
With Selection  
    .HorizontalAlignment = xlGeneral  
    .VerticalAlignment = xlCenter  
    .WrapText = True  
    .Orientation = 0
```

```
.AddIndent = False  
.IndentLevel = 0  
.ShrinkToFit = False  
.ReadingOrder = xlContext  
.MergeCells = False
```

```
End With
```

```
With Selection
```

```
.HorizontalAlignment = xlGeneral  
.VerticalAlignment = xlCenter  
.WrapText = True  
.Orientation = 0  
.AddIndent = False  
.IndentLevel = 0  
.ShrinkToFit = False  
.ReadingOrder = xlContext  
.MergeCells = False
```

```
End With
```

```
With Selection
```

```
.HorizontalAlignment = xlGeneral  
.VerticalAlignment = xlCenter  
.WrapText = True  
.Orientation = 0  
.AddIndent = False  
.IndentLevel = 0  
.ShrinkToFit = False  
.ReadingOrder = xlContext  
.MergeCells = False
```

```
End With
```

```
Selection.UnMerge
```

```
Cells.Select
```

```
Cells.EntireColumn.AutoFit
```

```
Columns("B:E").Select
```

```
With Selection
```

```
.HorizontalAlignment = xlCenter  
.Orientation = 0  
.AddIndent = False  
.IndentLevel = -1  
.ShrinkToFit = False  
.ReadingOrder = xlContext  
.MergeCells = False
```

```
End With
```

```
Selection.Style = "Currency"
Range("B3:E3").Select
Selection.NumberFormat = "m/d/yyyy"
Selection.Font.Bold = True
With Selection.Font
    .ColorIndex = xlAutomatic
    .TintAndShade = 0
End With
Columns("B:E").Select
With Selection
    .HorizontalAlignment = xlLeft
    .Orientation = 0
    .AddIndent = False
    .IndentLevel = 0
    .ShrinkToFit = False
    .ReadingOrder = xlContext
    .MergeCells = False
End With
With Selection
    .HorizontalAlignment = xlCenter
    .Orientation = 0
    .AddIndent = False
    .IndentLevel = 0
    .ShrinkToFit = False
    .ReadingOrder = xlContext
    .MergeCells = False
End With
With Selection
    .HorizontalAlignment = xlLeft
    .Orientation = 0
    .AddIndent = False
    .IndentLevel = 0
    .ShrinkToFit = False
    .ReadingOrder = xlContext
    .MergeCells = False
End With
End Sub
```

Income Statement

- A company's performance measured by revenues and expenses
- In Economics:
$$\text{Profit} = TR - TC = \pi = TR - TC$$
- In Finance/ Accounting:
$$\text{Profit} = \text{Revenue} - \text{Cost}$$
- Operating Income (or Loss) = Total Revenue – Total Operating Expenses
- EBIT = Earnings Before Interest and Taxes
- Net Income from Continuing Operations = Total Other Income (and/or Expenses) Net + EBIT – Income Tax Expense

Balance Sheet

- Assets = Liabilities + Shareholder's Equity
- Cash Flow Statement:
 - Cash from Operating Activities
 - Cash from Investing Activities
 - Cash from Financing Activities
- In The ensuing slides, we are going to compute Free Cash Flow (FCF) and use the discounted cash flow model (DCF) to value a company.
- Before we compute the FCF, let's remember that financing activities of the cash flow statement can be disregarded.
- $$\text{FCF} = \text{Operating activities} - \text{Capital Expenditures (CAPEX)}$$

		Actual			
	Formula (Column C)	Year 2014	Year 2015	Year 2016	Year 2017
Income Statement					
All numbers in thousands					
Revenue					
Total Revenue		\$290,541.00	\$ 373,664.00	\$ 376,059.00	\$ 380,767.00
Cost of Revenue		\$117,153.00	\$ 153,417.00	\$ 174,056.00	\$ 195,521.00
Gross Profit	--> =C6-C7	\$173,388.00	\$ 220,247.00	\$ 202,003.00	\$ 185,246.00
% Change (Revenue Growth)			29%	1%	1%
Conservative Revenue Growth Forecast	--> =AVERAGE(D9:F9)	10%			
Optimistic Revenue Growth Forecast	--> =D9-E9-F9	27%			
Operating Expenses					
Research Development		\$ 16,096.00	\$ 12,730.00	\$ 16,315.00	\$ 20,855.00
Selling General and Administrative		\$ 93,260.00	\$ 115,345.00	\$ 124,745.00	\$ 110,400.00
Non Recurring		-	-	-	-
Others		\$ (141.00)	\$ (141.00)	\$ (1,275.00)	-
Total Operating Expenses		\$229,151.00	\$ 283,963.00	\$ 316,874.00	\$ 332,442.00
Operating Income or Loss	--> =C6-C17	\$ 61,390.00	\$ 89,701.00	\$ 59,185.00	\$ 48,325.00
Income from Continuing Operations					
Total Other Income/Expenses Net		\$ (5,110.00)	\$ (5,025.00)	\$ (3,653.00)	\$ (19,017.00)
Earnings Before Interest and Taxes		\$ 61,390.00	\$ 89,701.00	\$ 59,185.00	\$ 48,325.00
Interest Expense		\$ (924.00)	\$ (1,661.00)	\$ (1,805.00)	\$ (1,942.00)
Income Before Tax	--> =C20+C21	\$ 56,280.00	\$ 84,676.00	\$ 55,532.00	\$ 29,308.00
Income Tax Expense		\$ 14,466.00	\$ 20,052.00	\$ 16,212.00	\$ 16,790.00
Minority Interest		\$ 43,912.00	\$ 53,266.00	\$ 64,542.00	\$ 75,864.00
Net Income From Continuing Ops	--> =(C20+C21)-C24	\$ 41,814.00	\$ 64,624.00	\$ 39,320.00	\$ 12,518.00
Non-recurring Events					
Discontinued Operations		\$ 355.00	-	-	-
Extraordinary Items		-	-	-	-
Effect Of Accounting Changes		-	-	-	-
Other Items		-	-	-	-
Net Income					
Net Income		\$ 39,736.00	\$ 55,844.00	\$ 28,788.00	\$ 2,344.00
Preferred Stock And Other Adjustments		-	-	-	-
Net Income Applicable To Common Shares		\$ 39,310.00	\$ 55,075.00	\$ 28,788.00	\$ 2,344.00

Balance Sheet

All numbers in thousands

Period Ending**Current Assets**

Cash And Cash Equivalents	\$106,503.00	\$ 317,449.00	\$ 204,759.00	\$ 158,725.00
Short Term Investments	-	-	-	-
Net Receivables	\$108,115.00	\$ 136,688.00	\$ 134,753.00	\$ 260,040.00
Inventory	\$ 17,063.00	\$ 38,753.00	\$ 42,121.00	\$ 30,788.00
Other Current Assets	\$ 8,174.00	\$ 9,064.00	\$ 15,208.00	-

Total Current Assets	\$244,801.00	\$ 508,452.00	\$ 403,467.00	\$ 457,102.00
-----------------------------	---------------------	----------------------	----------------------	----------------------

Long Term Investments	\$ 3,384.00	\$ 2,198.00	\$ 3,389.00	-
Property Plant and Equipment	\$183,424.00	\$ 218,267.00	\$ 245,415.00	\$ 276,781.00
Goodwill	\$ 39,027.00	\$ 39,027.00	\$ 39,027.00	\$ 39,027.00
Intangible Assets	\$ 27,551.00	\$ 28,950.00	\$ 30,416.00	\$ 31,211.00
Accumulated Amortization	-	-	-	-
Other Assets	\$123,346.00	\$ 133,735.00	\$ 135,620.00	\$ 62,491.00
Deferred Long Term Asset Charges	\$ 23,058.00	\$ 25,766.00	\$ 20,779.00	\$ 30,708.00

Total Assets	\$621,533.00	\$ 930,629.00	\$ 857,334.00	\$ 866,612.00
---------------------	---------------------	----------------------	----------------------	----------------------

Current Liabilities

Accounts Payable	\$ 26,145.00	\$ 23,455.00	\$ 19,990.00	\$ 24,235.00
Short/Current Long Term Debt	\$ 4,710.00	\$ 29,276.00	\$ 27,316.00	\$ 25,357.00
Other Current Liabilities	\$ 8,366.00	\$ 9,423.00	\$ 6,606.00	-

Total Current Liabilities	\$ 79,047.00	\$ 78,947.00	\$ 71,715.00	\$ 124,375.00
----------------------------------	---------------------	---------------------	---------------------	----------------------

Long Term Debt	\$ 4,710.00	\$ 29,276.00	\$ 27,316.00	\$ 25,357.00
Other Liabilities	\$111,089.00	\$ 145,249.00	\$ 131,749.00	\$ 113,270.00
Deferred Long Term Liability Charges	\$ 5,568.00	\$ 6,180.00	\$ 5,065.00	-
Minority Interest	\$ 43,912.00	\$ 53,266.00	\$ 64,542.00	\$ 75,864.00
Negative Goodwill	-	-	-	-

Total Liabilities	\$194,846.00	\$ 253,472.00	\$ 230,780.00	\$ 263,002.00
--------------------------	---------------------	----------------------	----------------------	----------------------

Stockholders' Equity

Misc. Stocks Options Warrants	-	-	-	-
Redeemable Preferred Stock	-	-	-	-
Preferred Stock	-	-	-	-

PRO-FORMA FINANCIALS
AUTHOR: LEON SHPANER

	\$344,862.00	\$ 448,310.00	\$ 439,213.00	\$ 445,797.00
Common Stock				
Retained Earnings	\$ (6,259.00)	\$ 19,930.00	\$ (47,366.00)	\$ (87,592.00)
Treasury Stock	\$ 44,172.00	\$ 155,651.00	\$ 170,165.00	\$ 169,541.00
Capital Surplus	-	-	-	-
Other Stockholder Equity	\$ 44,172.00	\$ 155,651.00	\$ 172,104.00	\$ 174,674.00
Total Stockholder Equity	\$382,775.00	\$ 623,891.00	\$ 562,012.00	\$ 527,746.00
Net Tangible Assets	\$316,197.00	\$ 555,914.00	\$ 492,569.00	\$ 457,508.00
Net Debt	\$ (97,083.00)	\$ (258,897.00)	\$ (150,127.00)	\$ (108,011.00)

IMAX CORPORATION
CONSOLIDATED BALANCE SHEETS
(In thousands of U.S. dollars)

	As at December 31,	
	2017	2016
Assets		
Cash and cash equivalents	\$158,725	\$204,759
Accounts receivable, net of allowance for doubtful accounts of \$1,613 (December 31, 2016 — \$1,250)	130,546	96,349
Financing receivables (notes 4 and 19(c))	129,494	122,125
Inventories (note 5)	30,788	42,121
Prepaid expenses	7,549	6,626
Film assets (note 6)	5,026	16,522
Property, plant and equipment (note 7)	276,781	245,415
Other assets (notes 8 and 19(e))	26,757	33,195
Deferred income taxes (note 9)	30,708	20,779
Other intangible assets (note 10)	31,211	30,416
Goodwill	39,027	39,027
Total assets	\$866,612	\$857,334
Liabilities		
Bank indebtedness (note 11)	\$ 25,357	\$ 27,316
Accounts payable	24,235	19,990
Accrued and other liabilities (notes 6, 12, 13, 14(c), 19(b), 19(d), 20 and 22)	100,140	93,208
Deferred revenue	113,270	90,266
Total liabilities	263,002	230,780
Commitments and contingencies (notes 12 and 13)		
Non-controlling interests (note 21)	1,353	4,980
Shareholders' equity		
Capital stock (note 14) common shares — no par value. Authorized — unlimited number. 64,902,201 — issued and 64,695,550 — outstanding (December 31, 2016 — 66,224,467 — issued and 66,159,902 — outstanding)	445,797	439,213
Less: Treasury stock, 206,651 shares at cost (December 31, 2016 — 64,565)	(5,133)	(1,939)
Other equity	175,300	177,304
Accumulated deficit	(87,592)	(47,366)
Accumulated other comprehensive loss	(626)	(5,200)
Total shareholders' equity attributable to common shareholders	527,746	562,012
Non-controlling interests (note 21)	74,511	59,562
Total shareholders' equity	602,257	621,574
Total liabilities and shareholders' equity	\$866,612	\$857,334

The Balance Sheet from IMAX's corporate website is more comprehensive and itemized. It balances out, where Total Assets = Total Liabilities + Shareholder's Equities

Cash Flow

All numbers in thousands

Period Ending

Net Income	--> =C33	\$ 39,736.00	\$ 55,844.00	\$ 28,788.00	\$ 2,344.00
Operating Activities, Cash Flows Provided By or Used In					
Depreciation		\$ 21,379.00	\$ 25,430.00	\$ 29,629.00	\$ 66,807.00
Adjustments To Net Income		\$ 7,056.00	\$ 21,616.00	\$ 33,473.00	\$ 25,356.00
Changes In Accounts Receivables		\$ (4,318.00)	\$ (22,521.00)	\$ (1,414.00)	-
Changes In Liabilities		\$ 6,916.00	\$ 25,425.00	\$ (18,093.00)	-
Changes In Inventories		\$ (7,603.00)	\$ (21,070.00)	\$ (3,825.00)	-
Changes In Other Operating Activities		\$ 11,362.00	\$ (17,892.00)	\$ (7,542.00)	\$ (9,141.00)
Total Cash Flow From Operating Activities		\$ 86,905.00	\$ 84,205.00	\$ 77,872.00	\$ 85,366.00
Investing Activities, Cash Flows Provided By or Used In					
Capital Expenditures		\$ (56,942.00)	\$ (71,731.00)	\$ (58,188.00)	\$ (66,777.00)
Investments		\$ (1,993.00)	\$ (2,000.00)	\$ (1,911.00)	\$ (1,606.00)
Other Cash flows from Investing Activities		-	-	-	-
Total Cash Flows From Investing Activities		\$ (61,853.00)	\$ (78,796.00)	\$ (64,886.00)	\$ (73,597.00)
Financing Activities, Cash Flows Provided By or Used In					
Dividends Paid		-	-	-	-
Sale Purchase of Stock		\$ 10,834.00	\$ 35,609.00	\$ 13,113.00	\$ 16,668.00
Net Borrowings		\$ 4,710.00	\$ 24,957.00	\$ (2,000.00)	\$ (2,000.00)
Other Cash Flows from Financing Activities		\$ 39,478.00	\$ 178,405.00	\$ (18,381.00)	\$ (20,931.00)
Total Cash Flows From Financing Activities		\$ 51,959.00	\$ 204,695.00	\$ (125,782.00)	\$ (57,536.00)
Effect Of Exchange Rate Changes		\$ (54.00)	\$ 842.00	\$ 106.00	\$ (267.00)
Change In Cash and Cash Equivalents		\$ 76,957.00	\$ 210,946.00	\$ (112,690.00)	\$ (46,034.00)

As you can see from the Balance Sheet summary alone, the pro-forma from Yahoo Finance does not balance out (**assets \neq liabilities + shareholder's equity**). So for this reason, let's look at The Wall Street Journal as a potential source of pro-forma data.

Much like we did with the financials pulled from Yahoo Finance, we will start with the income statement for IMAX on the Wall Street Journal website and copy and paste it into a blank workbook in excel:

<https://quotes.wsj.com/IMAX/financials>

Once again, we will record a macro (automated process) that will create a script on the back-end (in VBA).

Steps:

1. Let's name our macro: "WSJProForma."
2. Let's add the following description: "re-format of WSJ ProForma."
3. Select All Data in range: (Column A – Column K).
4. Unselect "Wrap Text."
5. With the data still selected, click on "Unmerge Cells."
6. Get rid of the border surrounding the data set (you want to ensure to remove all borders in columns A-K).
7. Insert a blank column in front of Column B (where the header is marked as 2017).
8. Repeat step 7 (above) 4 times until 4 blank columns are created in front of 2017. You can do this by pressing down CTRL+Y on your keyboard 3 more times as a shortcut. The reason for creating 4 more columns to the front of 2017 is so that we can proceed to re-arrange the years in chronological order.
9. Highlight column J (where the header is marked as year 2013), copy the data, and paste the data into column A. Do the same for columns I – F, until all of the dates are re-arranged in chronological order.
10. If there is any data in column K: such as "5 year-trend, etc.," ensure to delete it. You can do this by deleting column K in its entirety. Data in column K is what was left over from the copying and pasting of original data.
11. Go back to Column A, highlight it, and align it to the left.
12. This concludes the steps for this macro. Ensure to go back to the View tab on top of the Excel menu, go to "Macros," and click on "Stop Recording."

The script for this macro should look like this:

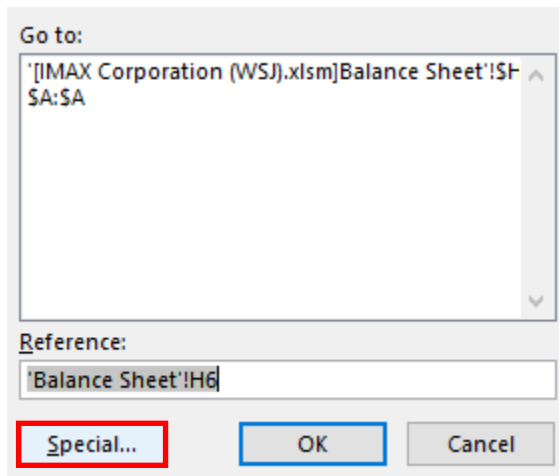
```

Sub WSJProForma()
'
' WSJProForma Macro
' re-format of WSJ ProForma
'
'
    With Selection
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = -1
        .ShrinkToFit = False
        .ReadingOrder = xlContext
    End With
    Selection.UnMerge
    Selection.Borders(xlDiagonalDown).LineStyle = xlNone
    Selection.Borders(xlDiagonalUp).LineStyle = xlNone
    Selection.Borders(xlEdgeLeft).LineStyle = xlNone
    Selection.Borders(xlEdgeTop).LineStyle = xlNone
    Selection.Borders(xlEdgeBottom).LineStyle = xlNone
    Selection.Borders(xlEdgeRight).LineStyle = xlNone
    Selection.Borders(xlInsideVertical).LineStyle = xlNone
    Selection.Borders(xlInsideHorizontal).LineStyle = xlNone
    Columns("B:B").Select
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Selection.Insert Shift:=xlToRight, CopyOrigin:=xlFormatFromLeftOrAbove
    Columns("A:A").EntireColumn.AutoFit
    Columns("J:J").Select
    Selection.Cut
    Range("B1").Select
    ActiveSheet.Paste
    Columns("I:I").Select
    Selection.Cut
    Range("C1").Select
    ActiveSheet.Paste
    Columns("H:H").Select
    Selection.Cut
    Range("D1").Select
    ActiveSheet.Paste
    Columns("G:G").Select
    Selection.Cut
    Range("E1").Select
    ActiveSheet.Paste
    Columns("K:K").Select
    Selection.Delete Shift:=xlToLeft
    Columns("A:A").Select
    With Selection
        .HorizontalAlignment = xlGeneral
        .WrapText = False
        .Orientation = 0
        .AddIndent = False
        .IndentLevel = 0
        .ShrinkToFit = False
        .ReadingOrder = xlContext
        .MergeCells = False
    End With
End Sub

```

After the macro has been recorded, there is one last step to do manually, and that is to remove blank rows from our statements. The reason why we cannot include this process as apart of our macro is because when new data is brought in, rows fluctuate more than columns, and too many adjustments would have to be done on the back-end later , essentially rendering the macro useless. It would take more work adjusting the script after it is run, so for this reason we will leave this part out of the script and just do it manually. Let's look at the balance sheet as an example:

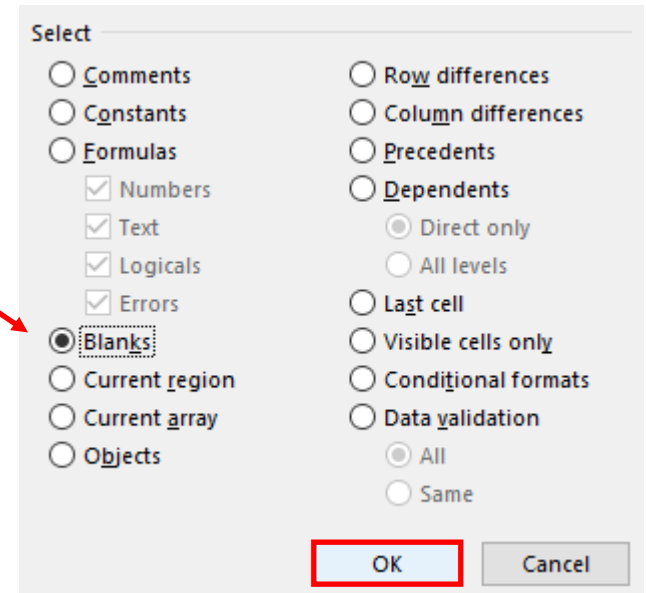
Select all data (Columns A-F), enter CTRL + G on your keyboard. This takes you to the Go to: dialog box:



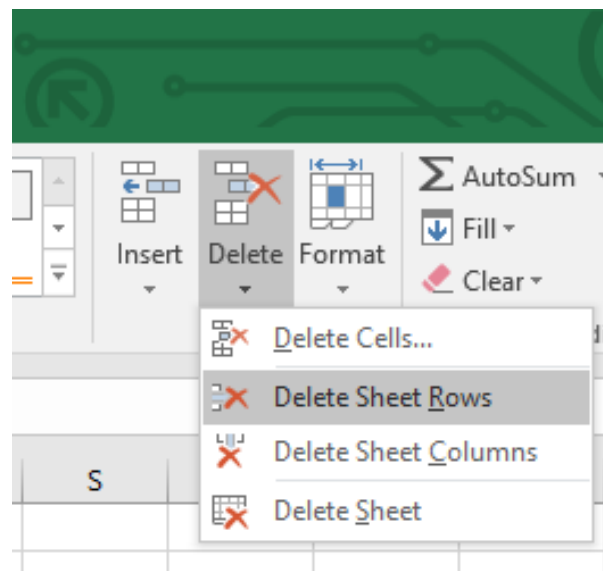
Click Special

Finally, go to the "Home" tab on top of Excel, click on Delete, and select "Delete Sheet Rows."

A new dialog box pops up. Select the "Blanks" radio button.



Click "OK."



In this section we are going to cover the key components of valuation, and effectively set up the valuation worksheet. Based upon the cash flow statement,

free cash flow = operating activities – capital expenditures.

FCF = free cash flow = Cash flow that is available (left over) after operations and fixed investments are taken care of

$$\text{Enterprise Value} = EV = \sum_{t=1}^N \frac{FCF_t}{(1 + WACC)^t} \longrightarrow \frac{\text{free cash flow at time } (t)}{(1 + \text{Weighted average cost of capital})^t}$$

where WACC = discount rate

$$= \sum_{t=1}^N \frac{FCF_t}{(1 + WACC)^{t-0.5}} + \frac{\text{Terminal value}}{(1 + WACC)^{N-0.5}}$$

$$= \sum_{t=1}^N \frac{FCF_t}{(1 + WACC)^{t-0.5}} + \frac{\text{Terminal value}}{(1 + WACC)^{N-0.5}}$$

$$\text{where } WACC = \frac{E}{V} R_e + \frac{D}{V} R_d (1 - T_c)$$

$$\text{and } V = (E + D) = (\text{Equity} + \text{Debt})$$

Rearranging the terms gives us the following:

$$= \left[\sum_{t=1}^N \frac{FCF_t}{(1 + WACC)^t} + \frac{\text{Terminal Value}}{(1 + WACC)^N} \right] (1 + WACC)^{0.5}$$

$$= \left[\sum_{t=1}^N \frac{FCF_t}{\left(1 + \frac{E}{E+D} R_e + \frac{D}{E+D} R_d (1 - T_c)\right)^t} + \frac{\text{Terminal Value}}{\left(1 + \frac{E}{E+D} R_e + \frac{D}{E+D} R_d (1 - T_c)\right)^N} \right] \left(1 + \frac{E}{E+D} R_e + \frac{D}{E+D} R_d (1 - T_c)\right)^{0.5}$$

Terms:

Equity: looking at the share price in consideration of buying or selling shares and/or looking at the company's equity as a whole when looking at acquiring the company

Debt: when the company's liabilities are substantial, this factors into a lower valuation based on higher risk.

WACC: weighted average cost of capital: Debt and equity are proportionally weighted in determining the cost of capital, and ultimately risk. The higher the WACC, the higher the risk.

$$WACC = \frac{E}{E + D} R_e + \frac{D}{E + D} R_d (1 - T_c)$$

Where:

R_e = cost of equity

R_d = cost of debt

E = market value of the firm's equity

D = market value of the firm's debt

V = E + D = total market value of the firm's financing (equity and debt)

E/V = percentage of financing that is equity

D/V = percentage of financing that is debt

T_c = corporate tax rate

Equity (market cap): share price (x) shares outstanding

Ex. (=23.8 (x) 65,380.00) → shares outstanding is found on the income statement of the last fiscal year = \$1,556,044.00 (in thousands)

Debt: the formal way of calculating this is to subtract the sum of cash and short term investments from short-term debt and current portion of long-term debt

However, we will simplify this process to look at the long-term debt and capitalized leases on the company's balance sheet and average the last 3 years' worth of data:

Fiscal year is January-December. All values USD Thousands.

	Debt	2013	2014	2015	2016	2017
Long-Term Debt		-	\$ 4,710.00	\$ 27,667.00	\$ 27,316.00	\$ 23,357.00
Latest 3-year Average	\$ 26,113.33					

To calculate the cost of equity in WACC, we will use the CAPM (capital asset pricing model).

However, please note that while there are other methods of valuation and modeling such as the Gordon Model, we are refraining from such complexities and keeping our model simple using the principle of Occam's Razor.

CAPM (Capital Asset Pricing Model)

Developed by William F. Sharpe, Jack Treynor, John Lintner, and Jan Mossin.

- Exceptional tool for making decisions in portfolio investments.

William F. Sharpe is a professor of Finance (Emeritus) at UCLA

<https://economics.ucla.edu/2017/05/25/william-f-sharpe/>

- Developed Sharpe Ratio for investment performance analysis
- Received 1990 Nobel Prize in Economics

CAPM (Capital Asset Pricing Model)**(risk-free rate of return) + beta of asset (x) (Expected Return of market – risk free rate of return)**

We use the CAPM to calculate the

Cost of Equity

$$= \frac{E(R_i) - R_f}{\beta_i} = E(R_m) - R_f$$

$$= E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

 $E(R_i)$ = *expected return of capital asset* R_f = *risk free rate of return* β_i = *beta of asset (sensitivity)* $E(R_m)$ = *expected return of market* R_f = <https://fred.stlouisfed.org/series/DGS10/> β_i = <https://finance.yahoo.com/quote/IMAX/key-statistics?p=IMAX> $E(R_m)$ = <https://finance.yahoo.com/quote/SPY/performance/>

We can get the risk free rate of return by taking the average of the 10-year Treasury Bond yields; an excellent resource for this endeavor is the St. Louis Federal Reserve: <https://fred.stlouisfed.org/series/DGS10/>. Select a 10-year date range, and download the report into Excel

FRED® Economic Data Information Services Publications Working Papers Economists About St. Louis Fed Home

Categories > Money, Banking, & Finance > Interest Rates > Treasury Constant Maturity

☆ 10-Year Treasury Constant Maturity Rate (DGS10)

Observation: 2018-07-17: 2.86 (+ more)
Updated: Jul 18, 2018

Units: Percent, Not Seasonally Adjusted

Frequency: Daily

1Y | 5Y | 10Y | Max

2008-07-18 to 2018-07-17

DOWNLOAD

- Excel (data)
- CSV (data)
- Image (graph)
- PowerPoint (graph)
- PDF (graph)

The average rate is 2.44%

The beta of the asset can be found on Yahoo Finance: <https://finance.yahoo.com/quote/IMAX/key-statistics?p=IMAX>

IMAX Corporation (IMAX)

NYSE - Nasdaq Real Time Price. Currency in USD

22.83 -0.02 (-0.11%)

As of 3:54PM EDT. Market open.

Buy

Sell

Summary

Chart

Conversations

Statistics

Profile

Financials

Options

Holders

Historical Data

Analysis

Sustainability

Currency in USD

Valuation Measures

Market Cap (intraday) ⁵	1.46B
Enterprise Value ³	1.34B
Trailing P/E	137.35
Forward P/E ¹	21.51
PEG Ratio (5 yr expected) ¹	0.67

Trading Information

Stock Price History

Beta	0.99
52-Week Change ³	10.65%
S&P500 52-Week Change ³	13.82%
52 Week High ³	26.70

β_i = beta of asset (sensitivity) = 0.99

The expected return of the market ($E(R_m)$) can be measured by looking at the average of the S&P 500 via Yahoo Finance as such:

Performance Overview

2.52%

Year-to-Date Return (Mkt)

14.28%

1-Year Total Return (Mkt)

11.86%

3-Years Total Return (Mkt)

Trailing Returns (%) Vs. Benchmarks

Return	SPY	Category
YTD	2.52%	7.50%
1-Month	0.58%	-0.25%
3-Month	3.55%	3.20%
1-Year	14.28%	13.45%
3-Year	11.86%	10.14%
5-Year	13.30%	15.76%
10-Year	10.06%	7.33%
Last Bull Market	0.00%	0.00%
Last Bear Market	0.00%	0.00%

$E(R_m) = \text{Average} = 8.02$

Cost of Debt = interest expense/debt

**= latest fiscal year's interest expense from income statement
latest 3 year average of long term debt from balance sheet**

$$\text{For IMAX} = \frac{\$1,942.00}{\$26,113.33} = 0.07$$

$$\text{Weight of Equity} = \frac{E}{E + D} = \frac{\$1,556,044.00}{(\$1,556,044.00 + \$26,113.33)}$$

$$\text{Weight of Debt} = \frac{D}{E + D} = \frac{\$26,113.33}{(\$1,556,044.00 + \$26,113.33)}$$

$$\text{Tax Rate} = \frac{\text{income tax expense}}{\text{income before tax}}$$

We pull this data on the company's income statement:

	2013	2014	2015	2016	2017	Average Tax Rate
Income Before Tax	\$63,810.00	\$57,351.00	\$87,078.00	\$57,853.00	\$ 30,011.00	
Income Tax Expense	\$16,629.00	\$14,466.00	\$20,052.00	\$16,212.00	\$ 16,790.00	
5 Year Tax Rate	26%	25%	23%	28%	56%	32%
Latest 2 Year Tax Rate						41.984%

EQUITY

Shares Outstanding

*in thousands***Formula**

65,380.00 <-- =ProForma!F47

Share price

23.8 <-- 23.8

Equity value ("market cap")**\$ 1,556,044.00** <-- =B3*B2**DEBT****\$ 26,113.33** <-- =ProForma!H114**Cost of Equity (based on CAPM)****7.94** <-- =B11+(B10*B22)

Risk-Free Rate of Return + Beta of Asset * (Expected Return of the Market - Risk-Free Rate of Return)

Beta

0.99 <-- 0.99

10 year Treasury Rate

0.02 <-- ='10 year Treasury Rate'!B2622*0.01

Expected Market Return

S&P500 Rate of Return

SPY <-- SPY

YTD

2.52 <-- 2.52

1-Month

0.58 <-- 0.58

3-Month

3.55 <-- 3.55

1-Year

14.28 <-- 14.28

3-Year

11.86 <-- 11.86

5-Year

13.3 <-- 13.3

10-Year

10.06 <-- 10.06

Average

8.02 <-- =AVERAGE(B14:B20)

Market Premium

8.00 <-- =B21-B11

Cost of Debt**0.07** <-- =B25/B26

Interest Expense

1,942.00 <-- =ProForma!F23

Latest 3 Year Average Debt

\$ 26,113.33 <-- =B6

Weight of Equity (E/(E+D))

0.98349511 <-- =B4/(B4+B6)

Weight of Debt (D/(E+D))

0.01650489 <-- =B6/(B4+B6)


Tax Rate

0.419844502 <-- ='Tax Rate'!H6

WACC**7.811097432** <-- =(B28*B8)+(B29*B24)*(1-B31)

Building on the previous section, let's further breakdown the Enterprise Value formula.

$$EV = \left[\sum_{t=1}^N \frac{FCF_t}{(1+WACC)^t} + \frac{Terminal\ Value}{(1+WACC)^N} \right] (1+WACC)^{0.5}$$

$$EV = \left[\sum_{t=1}^N \frac{FCF_t}{\left(1 + \frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c)\right)^t} + \frac{Terminal\ Value}{\left(1 + \frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c)\right)^N} \right] \left(1 + \frac{E}{E+D}R_e + \frac{D}{E+D}R_d(1-T_c)\right)^{0.5}$$


Use Excel's NPV function

The reason we take $(1+WACC)^{0.5}$ is due to the underlying assumption that incoming cash flows continuously at any given year, and as such, it would be a misguided effort to calculate this value at year end.

Effectively, the formula breaks down to $=NPV(rate, value\ range) * (1+WACC)^{0.5}$ in Excel.

Enterprise Value = \$4,622,473.15 <-- = NPV(B6,D11:H11)*(1+B6)^0.5

Based upon the WACC we calculated in the previous section, we are going to create our valuation workbook as follows:

IMAX Corporation - Valuation

Free cash flow (FCF) year ending 31 Dec. 2017

Growth rate of FCF, years 1-5 (optimistic)

Long-term FCF growth rate (pessimistic)

Long-term FCF growth rate (more pessimistic)

WACC

The reason why we have to re-forecast our long-term pessimistic growth rate is because if it is not less than the WACC, we will effectively calculate a terminal value of less than "0." The company CANNOT reinvest beyond the discount rate (past 100%)

	2018	2019	2020	2021	2022	Formula
FCF (Forecast)	\$ 77,336.29	\$ 97,690.44	\$ 123,401.60	\$ 155,879.69	\$ 196,905.69	<-- =G\$9*(1+\$B\$3)
Terminal value					\$ 5,748,961.66	<-- =H9*(1+B5)/(B6-B5)
Total	\$ 77,336.29	\$ 97,690.44	\$ 123,401.60	\$ 155,879.69	\$ 5,945,867.36	<-- =SUM(H9:H10)

$$\text{Terminal Value} = \frac{FCF_t(x)(1+g)}{(WACC - g)}; \text{ where } t = 5 \rightarrow \text{last year} = 5$$

$$\text{Terminal Value} = \frac{\text{Last year of forecasted cash flow (x) (1 + long term growth rate)}}{WACC - \text{long term growth rate}}$$

Enterprise value	\$ 4,622,473.15	<-- =NPV(B6,D11:H11)*(1+B6)^0.5
Add back initial cash and marketable securities	\$ 158,725.00	<-- =ProForma!F58
Subtract out 2017 financial liabilities	\$ 263,002.00	<-- =ProForma!F119
Equity Value	\$ 4,518,196.15	<-- =B13+B14-B15
Per Share (1 million shares outstanding)	4.52	<-- =B16/1000000

We will use the ROIC approach to:

- compute normalized earnings and/or cash flow instantaneously
- Map out the variables of these calculations and reference them back to the Pro Forma
- Estimate pessimistic cash flows
- Estimate optimistic cash flows

ROIC: return on investment capital

$$ROIC = \frac{EBIT (1 - tax\ rate)}{Total\ Assets}$$

Normalized Return assets (pre – tax)

$$= \frac{EBIT}{Total\ Assets}$$

This method takes into account historic averages, market cap, and makes assumptions based upon other variables to drive calculations. We discussed equity and cost of equity while covering WACC and CAPM, but let us refresh here:

$$Equity = market\ cap = \frac{share\ price}{shares\ outstanding}$$

Cost of Equity = Risk Free Rate of Return + Beta * (Expected Return of Market (-) Risk-Free Rate of Return)
= US Treasury Rate + Beta * (Market Premium)

FCFE = free cash flow to equity = $Net\ Income - (CAPEX - Depreciation) (x) (1 - Debt\ Ratio)$

To gain a more visual insight into IMAX's performance, we will graph sales vs. free cash flow from 2013 – 2018:

	2013	2014	2015	2016	2017
Revenue	\$287,937.00	\$290,541.00	\$373,805.00	\$377,334.00	\$380,767.00
FCF	\$42,017.00	\$46,501.00	\$40,428.00	\$62,594.00	\$61,223.00

Sales vs. FCF

