Using the Morningstar Excel Add-In

Onboarding Guide



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Using the Morningstar Excel Add-In

The Morningstar[®] Excel Add-In allows users to retrieve data points from the Morningstar databases within Microsoft[®] Excel[®] for further calculation, formatting, or charting. Think of it as an alternative to exporting data from Morningstar DirectSM.

This guide offers information about the Add-In and a series of exercises showing users how to leverage some of its key features. Note that this tool must be installed separately from the Morningstar Direct application.

The Morningstar Excel Add-In allows users to retrieve data from Morningstar Direct using the commands described in the following table:

Use this command	To retrieve this type of data from the desktop version of Morningstar Direct
MSMEMBER	Investments included as part of a saved list or search
MSDP	The current value of a data point
MSTS	Historical values for a data point, over a time period you define
MSHOLDING	The holdings of a investment's portfolio
MSDATE	Dynamic time periods

What basic formulas does the Morningstar Excel Add-In offer?

Overview

This guide includes the following lessons:

- ► Installing and Configuring the Morningstar Excel Add-In (page 5)
- ► Retrieving the Members of a Saved List or Search (page 11)
- Retrieving Supplementary Data for Investments (page 15)
- ► Retrieving a Historical Series of Data Points for Investments (page 20)
- ► Retrieving a Portfolio's Holdings (page 36)
- ► Retrieving Ownership Information for an Investment (page 40)

Installing and Configuring the Morningstar Excel Add-In

Before using the Morningstar Excel Add-In, it must be installed. Additionally, it will be worthwhile to spend a few minutes configuring both the settings within the Add-In, as well as Microsoft[®] Excel itself to optimize the use of this tool.

If you do not have installation rights on your computer, work with your firm's IT department to have the Morningstar Excel Add-In installed for you. If you do have installation rights on your computer, you can install it by doing the following:

- 1. Visit http://addin.morningstarcommodity.com/.
- 2. To the right of the Latest Version, click **Download**.
 - Note: Users will need to regularly visit this page to download updated versions of the application as new features and capabilities are introduced for the Add-In.

	*				
Home	Templates	Data Dictior	hary	FAQs	
About			Downloads		
Morningstar Add-In allows you to retri within Microsoft Excel for further calcu per investment type are available. Cur	ieve various types of data points from the l ulation, formatting or charting. Thousands rently. Morninostar Excel Add-In can supp	Morningstar databases of widely used data points ort the following databases:	To use Morningstar E should have Morning first.	Excel Add-In functions, you gstar Excel Add-in installed	1
Mutual funds, closed-end funds, stock market indices, categories and accoun	ks, ETFs, money market funds, hedge funds its/model portfolios/custom benchmarks. I	s, separate accounts, Economic data is also	Latest Version 7.17	Download	Use this button to access
available and will continue to grow.			User Guide	Download	the download files for the latest version of the Add-In.
Direct Users			Quick Reference Guid	de Download	
As a Morningstar Direct user, you can and research. Utilize this powerful tool	dynamically retrieve Morningstar's indust I to easily extract data from one of the indu	ry leading data, analytics ustry's most comprehensive	VBA Guide	Download	

3. Under the Executable package (.exe), click Download.

Executable package (.exe)	Download	Use this button to downloa
 After downloading this package, right click on the .exe file and select "Run as administrator". Select an installation folder for the package and click "next". Finish installation and open a new Excel worksheet to start. 		the installation wizard that walk you through adding the Add-In to Microsoft® Excel
Windows Installer (.msi)	Download	
1. If the Excel Add-In is already installed, on to Windows Control Panel and uninstall it		
 Double click on the .ms file to begin installation. Select an installation folder for the package and click "next". Go to the download folder and run the MorningstarAddIn7.17.12.msi file as Administrator. Finish installation and open a new Excel worksheet to start. 		

4. **Open** the .exe file and follow the prompts to install it.

Morningstar Excel Add-In

Exercise 1: Install the

5. To see that the Add-In appears as expected, **open Microsoft**[®] **Excel**[®].

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File	Hom	e In	sert Dra	w Page	e Layout	Formulas	Data	Review	View	Help	Morningst	ar	Once installed, the Morningsta
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1													
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5													
7													

When accessing the Morningstar Excel Add-In for the first time, only the following icons are seen under the **Morningstar** tab:

Exercise 2: Log in to the Morningstar Excel Add-In

File	Home	Insert	Draw	Page Layout	Formulas	Data	Review	View	Developer	Morningstar
Profile	Templates	(?) Help								

To use the Morningstar Excel Add-In, users must enter their Morningstar Direct login credentials. To login, do the following:

 Under the Morningstar tab, click Profile > Direct. The Morningstar Add-In login dialog box opens.

AutoSa	ive 💽 🖁		⊴~ ®~ ;						Book2 - Ex	cel		
File	Home Ins	sert Dra	aw Page	e Layout	Formulas	Data	Review	View	Help	Mornings	tar	
Profile	Investments	Economic Data Ir	Key	Cell S	heet Workboo	the schedule	Templa	tes Help				
Pr	references	unctions	laicators		Refresh		Res	ources				Select this option to access the features of the Add-In.
Pr	roxy Settings	× v	f_{x}									
Di	irect	с	D	E	F	G	н	I.	J	К	L	
C	ommodities											
		-										
	AutoSa File Profile P P D C	AutoSave Off F ile Home In: Profile Investments Preferences Proxy Settings Direct Commodities	AutoSave AutoSave Image: Control of the section of	AutoSave The line linert Draw Page The Home Insert Draw Page The Home Insert Draw Page The Investments Economic Key Data Indicators Preferences Proxy Settings Direct C D Commodities	AutoSave AutoSave Image: Control of the second	AutoSave Image: Corr	AutoSave AutoSave Image: Construction of the sector of	AutoSave Image: Comparison of the comp	AutoSave Image: Construction of the second seco	AutoSave Image: Comparison of the comp	AutoSave Image: Construction of the sector of the sect	AutoSave Image: Construction of the second seco

2. Enter the **e-mail address** and **password** used to access Morningstar Direct, then click **Log In**.

Morningstar Add-In		×	
M RNINGS	TAR°		
Login			
Already a Mornin Log in below	gstar account holder?		The login details entered here are saved, and will not be required again.
E-mail Address Password	joe.smith@morningstar.com	Forget your password? Click here to reset.	
		Log in	

The complete Morningstar Excel Add-In toolbar is now available.

File	Home	Insert	Draw	Page La	yout	Formulas	Data	Review	View	Develope	er	Morningstar	
Profile	Investmen	its Econom Data	ic Cell	Sheet	Workbo	ok Schedule	Template	(?) s Help					Note the additional icons now available.
Connection	Fur	nctions		F	Refresh		Reso	urces					

The Morningstar Excel Add-In has its own settings to control the following items:

- ► What should be displayed when no data or value is available for an item?
- When the Morningstar Rating and Morningstar Style Box are displayed, should they appear as symbols, or numbers?
- How do you want to save data in your computer's memory when using the Morningstar Excel Add-In for the sake of optimizing performance?
- When a change is made to a formula in a worksheet, do you want the tool to automatically recalculate values, or do you want to manually control this update?

To configure these settings, do the following:

1. From the **Morningstar** tab, click **Profile** > **Preferences**. The Morningstar Add-In dialog box opens.

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File	Home Ins	sert Dr	aw Pa <u>c</u>	ge Layout	Formulas	Data	Review	View	Help	Mornings	star	
Profile ~	Investments	Economic Data I	Key ndicators ~	Cell	Sheet Workbo	ok Schedule	Templa	tes Help				Select this option to configur certain aspects of the Add-In
C) Pre	eferences	unctions			Refresh		Res	ources				
Pro	oxy Settings	X V	f_{x}									
Dir	rect	с	D	E	F	G	н	I.	J	к	L	
: Co	ommodities											
3		-										
1												

Exercise 3: Change the settings for the Morningstar Excel Add-In

- 2. Under No Value Displayed, choose one of the following options:
 - ► N/A to show N/A when data is not available
 - Blank to show a blank cell when data is not available, or
 - ► to fill a cell with a dash when data is not available.
- 3. Under the Morningstar Ratings and Style Box section, choose whether to display the data as **number or text** or as a **symbol**.
- 4. Under the Data Retrieval Settings section, leave these settings unchanged.
 - Note: Leaving the box for Enable Local Cache checked allows for faster performance and data retrieval by saving data in your computer's local memory.
- 5. To automatically recalculate all data when a formula is changed or added, leave the Auto calculate box selected. To manually control when data in the spreadsheet is updated, de-select this checkbox. Think about the impact of this option if you plan to use other fields/cells in Microsoft[®] Excel[®] with your own formulas, which would also be impacted by this setting.

Morningstar Add-In X	
No Value Displayed	
Choose a character to display when no value is -N/A 💌 retrieved	
Morningstar Rating and Style Box	
 Show Morningstar Rating and Morningstar Style Box as number or text 	
 Show Morningstar Rating and Morningstar Style Box as symbol 	Set what options you would prefer to use here
Data Retrieval Settings ✓ Enable Local Cache 🕢	
✔ On Refresh Cell	
✔ On Refresh Sheet	
🗹 On Refresh Workbook	
☑ Auto calculate	
Ok Cancel	

6. Click **OK**.

The Morningstar Excel Add-In allows each user to retrieve 500,000 data points per day; this daily limit is reset at the end of the day. Setting the formulas you create to Manual calculation saves your data while creating your work. You can decide to switch back to Automatic calculation at a later stage from the Formula tab or by going back to File > Options > Formulas.

Exercise 4: Update the settings for Microsoft[®] Excel[®]

To avoid calculating the same data points several times while working on a template, do the following:

1. In Microsoft Excel select, File > Options. The Excel Options dialog box opens.

	Book2 - Excel		• • ?	- 0	×	
©	Good morning					
û Home					<u> </u>	
🗅 New	A P C		Create a			
▷ Open	2 3 4 5 0	Take a tour	Drop-down lis	t P		
Info	Blank workbook	Welcome to Excel	Drop-down tut	orial		
Save			Mara tar	anlatar 🔿		
Save As	O Grant		wore ter	nplates 7		
Save as Adobe PDF	Recent Pinned Shared with	Me				
Print	🗋 Name		Date modified			
Share						
Export						
Publish						
Close						
Account					Select this optio	in enu.
Feedback						
Options						
					v	

- 2. In the left-hand pane, click **Formulas**.
- 3. Under Calculation Options, select Manual.
- 4. Deselect the Recalculate workbook before saving checkbox.

Excel Options			8 ×	
General Formulas		ion, performance, and error handling.		
Proofing	Calculation options			
Save	Workbook Calculation ()	Enable iterative calculation		Note the
Language	<u>A</u> utomatic <u>A</u> utomatic except for data tables	Maximum Iterations: 100 ‡]	selections here.
Advanced	Manual	Maximum <u>C</u> hanger 0.001		
Customize Ribbon	Recalculate workbook before saving			

5. Click **OK**.

Retrieving the Members of a Saved List or Search

This section provides practice for using the MSMEMBER formula in the Morningstar Excel Add-In. This command allows users to see which investments are included as part of a saved list or search from the desktop version of Morningstar Direct. This is often the first step before using other Add-In commands to retrieve additional data points for these items.	Overview
Before retrieving data into any spreadsheet, it will help to see one set up with specific column headers, so you have some perspective on what is being added. Download this Excel file for use with these exercises, then open it.	Exercise 5: Download the sample spreadsheet
To retrieve the holdings of the saved investment list named Multiple Investments, do the following in the Excel Add-In Template worksheet: 1. On the Data worksheet, select cell A4 . 2. On the Morningstar tab, click Investments . The Morningstar Add-In window opens.	Exercise 6: Retrieve an existing list of investments
File Hanne Jacobie Danne Jacobie Formulas Data Daview Mary Halm Ma	



- 3. Under the Securities options, select Identifiers.
- 4. Under Layout, confirm that **Column** is selected.
- 5. Under Output, **deselect** the Show Headers checkbox.
- 6. Ensure the **Source** drop-down field has **Investment List** selected.
- 7. From the List/Search name drop-down field, select Multiple Investments.
- 8. From the Security ID drop-down field be sure SecId is selected.

Morningstar Add-In				
Securities Attributes/Time series Holdings	Layout Row Oclumn	Output Show Headers		
Ownership Identifiers Portfolio Management Attributes/Time series	Source Investment list Security ID SecId	List/Search name Multiple Investmen	its	Note the highlighted selections for this formula
Holdings	Security	Data Point Fo	ormula	

- 9. Click Add.
- 10. Click Submit.

Morningstar Add-In	
Securities Layout Output Attributes/Time series Row © Column Show Headers Holdings	
Identifiers Source List/Search name	
Portfolio Management O Investment list O My Selection	Add When a
AttributesTime series Security ID	formula is
Holdings Sector M	complete,
Security Data Point Formula 🔶 A 🗸 😸	click Add,
X My Selection SECID =MSMEMBER("L","My Selection","SECID","CORR=C, HEADERS=FALSE")	then Submit
	to return
	lu liie spreadsbeet
	sproductioet.
	v.
Cancel	Submit

The Add-In formula used in a given cell appears in the Formula bar at the top of the spreadsheet.

What are the component parts of the MSMEMBER formula?

F	ile H	lome	Insert	I	Draw	Page La	yout Fo	rmulas	Data	Review	View	Help	Mori	
P	rofile	Investme	ents Ecor	omic nomic Data	Key Indicate	ors ~	Cell Sheet	Workbo	ok Schedule	Templates	? Help			
Con	nection		Fun	ctions	;		F	efresh		Resour	tes			
A	1	•	×	~	f _x	=MSM	EMBER("L",	"Multip	le Investm	ents","SECID	","COR	R=C, HEA	ADERS=	The formula can be seen here when selecting the cell where it was designed.
	A				в		L		U	E		F		
2		Er	10 date											
3	SecID	N	ame				Morningst Rating Ove	ar Mo erall An Ra	orningstar alyst ting	Morningstar Sustainabili Rating	Mor ty	rningstar	Catego	
4	FOUSAO	DCEO												
5	FOUSA0	585A												
6	FOUSAO	DC3M												

In this case, the following formula is being used:

=MSMEMBER("L","Multiple Investments","SecId","CORR=C","HEADERS=FALSE")

The following table parses each part of this formula:

☞ Note: The structure of other Morningstar Excel Add-In formulas are also similar to this one.

ltem	Description
MSMEMBER	A data retrieval function used to pull members of an investment list or current results of a search criteria from the desktop version of Morningstar Direct.
	Note: Any list created in the web-based version of Morningstar Direct is also available in the desktop version, so those lists can also be retrieved in the Add-In.
"L"	Identifies that an Investment List is being retrieved from the desktop version of Morningstar Direct. (In contrast, "S" would identify a Search Criteria being retrieved.)
"My Selection"	The name of the list.
"SECID"	Specifies which security identifier should be displayed. Instead, ISIN or Ticker could be used.
"CORR=C"	Displays the identifiers in a either a column or row. Read this as "C or R = C." In this instance, identifiers will be displayed in a column.
"HEADERS=FALSE"	Indicates that a header row has been excluded from showing.

Once the formula is understood, it can easily be modified by selecting the correct cell and making changes directly in the Formula bar. Do the following:

- 1. Use the mouse to place the cursor in the Formula bar.
- 2. Change **SECID** to **TICKER**.



- 3. Press < ENTER>. Note the update to the content in column A.
- 4. Change the **column header** for Column A from SecId to **Ticker**.
- 5. Save the workbook.

Retrieving Supplementary Data for Investments

The MSDP (Morningstar Supplementary Data Point) formula is designed to retrieve **Overview** current data points such as fund name, Morningstar Category, and so on. It requires the following parameters:

- ► Security identifier, and
- ► Data attribute identifier.

To obtain the Ticker for the list of securities, do the following:

- 1. Copy cell A4.
- 2. From the **Morningstar** tab, click **Investments**. The Morningstar Add-In dialog box opens.
- 3. Under the Securities options, select Attributes/Time Series.
- 4. Under Layout, confirm that **Column** is selected.
- 5. Under Output, ensure the Show Headers checkbox is deselected.
- 6. In the **Security** field, **paste** the **ticker**.
- 7. Click the security **name** that appears.

Morningstar Add-In Securities Attributes/Time series Holdings	Layout Row O Column	Output	eaders		
Ownership Identifiers Name	Security FCNTX	Data Point	Exchange	Domicile	When the name of the func appears, click it to select it.
Fidelity® Contrafund®	Jecony	FO	NAS	USA	
	Multiple Investments	TICKER	=MSMEN	ИВЕR("L","Multiple I	Inve

Exercise 7: Retrieve supplementary data points

- 8. Under Data Point, type Name.
- 9. Click the data point to select it.

Fil	e	Home	Insert	Draw	Page	Layout	Formulas	Data	Review	View	Help	Morni	ingstar	
Pro	ofile	Inves	tments Econo Da	omic Ko ta Indica	ey tors ~	Cell	Sheet Workbool	k Schedule	Templates	(?) Help				
Conn	nection	_	Funct	ions			Refresh		Resou	irces				
A4		-	Morning:	star Add-In										
1		A	Securities Attributes/T Holdings	ïme series	0	Layout	v 🔘 Colu	mn	Output	aders				
2			Ownership			Security	,	Data Point						Click the name of a
	Ticker		Identifiers			Fidelit	γ® Contrafund®	Name					data point to select it	
		me					Short Name		<u> </u>					
2	Name						Name					()		
	Analyst	t Name					Analyst_Name	2				0		
	Brandi	ng Nam	ne				Branding_Nar	ne				0	ple Inve	
	Branding Name ID						Branding_Nar	ne_ID				0		
	Certific	ation N	lame				Certification_1	Certification_Name 0						
	EMT Pr	oducer	r Name				EMT_Produce	:MT_Producer_Name 1						
	Firm N	ame					Firm_Name					0		

- 10. Click **Add**. The resulting formula appears within the dialog box.
- 11. Click **Submit**. The security's name now displays in the Excel table in cell B4.

Morningstar Add-In			-		
Securities Attributes/Time series	Layout Outpr Row Column	t ow Headers			
Ownership Identifiers	Security Data	loint	Save	Add	
Attributes/Time series Holdings	Security Data Point	Formula	* * * *		
	X Multiple Investments TICKE X NASJCNTX ISIN	= MSMERNER(1)," Multiple Investments" T	ICCERE"(COIR=C, HEADERS=FALSE") DERS=FALSE")	A .	After clicking Add, two data points should now appear here.
			Cancel	Submit	

The same formula (in cell B4) should apply to all rows in that column, but before copying the formula down it will be useful to modify it to ensure the formula copied serves as a general reference for any security and data point referenced in the formula.

Exercise 8: Apply a formula to additional investments

To make these changes, do the following:

- 1. Select cell **B4**.
- 2. In the **Formula** bar, replace **"NAS:FCNTX"** with **\$A4** to reference the cell containing the security's ticker.
 - ☞ Note: Whenever a cell reference is used in a formula, be sure to remove the quotation marks.
- 3. To reference the discrete data point name in the header, replace **"Name"** with **B\$3**, then press **<ENTER**>.

F	File	Home	Insert	Draw	Page Lay	out Formul	as Data	Review \	liew	Help Mor	ningstar	
F	Profile	Investr	ments Econo Dat	mic Ke a Indicat	n- ry Co tors ~	ell Sheet Work	kbook Schedule	Templates	?) Help			
Cor	nnection		Functio	ons		Refres	h	Resourc	es			
В	4	Ŧ	: ×	$\checkmark f_x$	=MSDP	(\$A4,B\$3, ["] COR	R=C, HEADERS	=FALSE")				Note that a cell reference does not take quotation mark
	0	A		В		с	D	E		F		
1			End date									
2												
3	Ticker		Name			Morningstar Rating Overall	Morningstar Analyst Rating	Morningstar Sustainabilit Rating	Morn Y	ingstar Catego	ry Prima Prosp Bencl	
4	FCNTX		Fidelity [®] Cor	ntrafund®								
5	POAGX					-						
6	DODIX											
7	MSSFX											
8	MWTR)	<										
9	VFINX	,							_			
10	CSP	(

4. **Drag** the formula down to the last row the column. Each security's corresponding ISIN displays in the table.

5. If you are using Automatic calculation mode, the data points automatically refresh. If you are using Manual calculation mode, select the cells to be calculated and click **Cell** from the **Morningstar** tab.

_										
F	ile Hon	ne Insert	Draw	Page La	yout Formul	as Data	Review Vi	ew Help	Mornir	ngstar
Con B ²	nection	restments Econor Data Function	mic Ke a Indicat ons	tors ~	Cell Sheet Wor Refres	kbook Schedule h R=C, HEADERS	Templates H Resource: =FALSE")	?) Help š		
	Α		В		с	D	F	F		G
1		End date	-			_	_			-
2		Linu uate								
3	Ticker	Name			Morningstar Rating Overall	Morningstar Analyst Rating	Morningstar Sustainability Rating	Morningstar	Category	Primary Prospect Bench <u>ma</u>
4	FCNTX	Fidelity® Con	ntrafund®							
5	POAGX	Fidelity [®] Con	itrafund®							
6	DODIX	Fidelity® Con	itrafund®							
7	MSSFX	Fidelity® Con	itrafund®							
8	MWTRX	Fidelity [®] Con	trafund®							
9	VFINX	Fidelity® Con	itrafund®							
10	OARMX	Fidelity [®] Con	itrafund®							
11	CSB	Fidelity® Con	itrafund®							
12	FCPVX	Fidelity® Con	itrafund®							
13	FRVLX	Fidelity [®] Con	itrafund®							
14	JSIVX	Fidelity® Con	itrafund®							
15	NDVIX	Fidelity® Con	itrafund®							
16	ANSIX	Fidelity® Con	itrafund®							
17	QUSVX	Fidelity® Con	itrafund®							
18	UBVLX	Fidelity [®] Con	itrafund®							
19	VSSVX	Fidelity® Con	itrafund®							
20	VISVX	Fidelity® Con	itrafund®							
21	GOGFX	Fidelity® Con	itrafund®							
22	ESPAX	Fidelity® Con	itrafund®		1					

6. Save the workbook.

Per the column headers on the worksheet, the following discrete data points should also be retrieved:

- ► Name
- ► Morningstar Rating Overall
- Morningstar Analyst Rating
- Morningstar Sustainability Rating
- Morningstar Category
- ► MPT Benchmark, and
- ► MPT Benchmark ID.

Using these discrete data point names, the same formula from the previous exercise can easily be used to populate the values for all discrete data point columns at once.

To retrieve values for multiple data points at once, do the following:

- 1. Select cell B4.
- 2. **Click-and-drag** the formula to the right to select the cell in the first row under the **MPT Benchmark ID** column.

	A	B	C	D	E	F	G	H	1.1	
1		End date								
2										
	Ticker	Name	Morningstar	Morningstar	Morningstar	Morningstar Category	Primary	Primary	1 Year	
			Rating Overall	Analyst	Sustainability		Prospectus	Prospectus		
3				Rating	Rating		Benchmark	Benchmark ID		
4	FCNTX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	f Fidelity® Contrafund®	Fidelity® Contrafu	nc Fidelity® Contrafi	hd ^e	
5	POAGX	PRIMECAP Odyssey Aggressive Growth							.	Be sure to drag the
6	DODIX	Dodge & Cox Income								De sule to ulay the
7	MSSFX	Litman Gregory Masters Smlr Coms Instl								tormula from cell B4
8	MWTRX	Metropolitan West Total Return Bd M								all the way to HA
9	VFINX	Vanguard 500 Index Investor								all the way to 114.
10	OARMX	Oakmark Service								
11	CSB	VictoryShares US SmCp Hi Div Vol Wtd ETF								
12	FCPVX	Fidelity® Small Cap Value								
13	FRVLX	Franklin Small Cap Value A								
14	JSIVX	Janus Henderson Small Cap Value L								
15	NDVIX	MFS New Discovery Value I								
16	ANSIX	Ancora Special Opportunity I								
17	QUSVX	Quaker Small/Mid-Cap Impact Val Advisor								
18	UBVLX	Undiscovered Managers Behavioral Val L								
19	VSSVX	VALIC Company Small Cap Special Val								
20	VISVX	Vanguard Small Cap Value Index Inv								
21	GOGFX	Victory Sycamore Small Company Opp R								1
22	ESPAX	Wells Fargo Special Small Cap Value A								1
23										1

3. **Click-and-drag** the formula down to the last row.

	A	B	С	D	E	F	G	Н		
1		End date								
2										
	Ticker	Name	Morningstar	Morningstar	Morningstar	Morningstar Category	Primary	Primary	1 Year	
			Rating Overall	Analyst	Sustainability		Prospectus	Prospectus		
3				Rating	Rating		Benchmark	Benchmark ID		
4	FCNTX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity [®] Contrafund [®]	Fidelity [®] Contrafun	Fidelity [®] Contraft	nd®	
5	POAGX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contrat	Fidelity [®] Contrafund [®]	Fidelity® Contrafun	Fidelity® Contraft	nd®	
6	DODIX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity [®] Contrafund [®]	Fidelity [®] Contrafun	Fidelity® Contraft	nd ^e	
7	MSSFX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity [®] Contrafund [®]	Fidelity [®] Contrafun	Fidelity® Contraft	nd ^e	
8	MWTRX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contrat	Fidelity® Contrafund®	Fidelity® Contrafun	Fidelity® Contraft	nd®	
9	VFINX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity [®] Contrafund [®]	Fidelity® Contrafun	c Fidelity® Contraft	nd ^e	
10	OARMX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity® Contrafund®	Fidelity [®] Contrafun	Fidelity® Contraft	nd®	
11	CSB	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity® Contrafund®	Fidelity [®] Contrafun	Fidelity® Contraft	nd ^e	
12	FCPVX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity [®] Contrafund [®]	Fidelity® Contrafun	c Fidelity® Contraft	nd®	
13	FRVLX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity® Contrafund®	Fidelity® Contrafun	Fidelity® Contraft	nd®	
14	JSIVX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity [®] Contrafund [®]	Fidelity [®] Contrafun	c Fidelity® Contraft	nd ^e	
15	NDVIX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity® Contrafund®	Fidelity® Contrafun	c Fidelity® Contraft	nd®	
16	ANSIX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity® Contrafund®	Fidelity® Contrafun	Fidelity® Contraft	nd®	Drag the formula
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18	UBVLX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity® Contrafund®	Fidelity® Contrafun	Fidelity® Contraft	nd®	down to this con.
19	VSSVX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contra	Fidelity® Contrafund®	Fidelity [®] Contrafun	Fidelity® Contraft	nd ^e	1
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22	ESPAX	Fidelity® Contrafund®	Fidelity® Contraft	Fidelity® Contra	Fidelity® Contrat	Fidelity [®] Contrafund [®]	Fidelity [®] Contrafun	c Fidelity® Contrafi	ind ^e	1

- 4. If you are in Automatic calculation mode, the data points will refresh. If you are in Manual calculation mode, click **Cell** from the Morningstar tab.
- 5. Save the workbook.

Retrieving a Historical Series of Data Points for Investments

The MSTS (Morningstar Time Series) formula is designed to retrieve such data points as historical prices for stocks, NAVs for mutual funds, historical calendar period returns for securities, or historical portfolio data. Pulling in time series data requires the following parameters in a formula:

- ► Security identifier
- ► Data attribute identifier
- ► Start date, and
- ► End date.
 - Note: When using custom calculations, other parameters are required, such as currency, benchmark, source, and so on.

To retrieve performance over trailing time periods, do the following:

- 1. Copy cell A4.
- 2. Select cell 14.
- 3. From the **Morningstar** tab, click **Investments**. The Morningstar Add-In window opens.

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						Rating Overall	Analyst	Sustainability			Prospectus			
3							Rating	Rating		Benchmark	Benchmark ID			
4	FCNTX	Fi	delity® Conti	rafund®		****	Silver	Average	US Fund Large Growth	S&P 500 TR USD	XIUSA04G92			
5	POAGX	PI	RIMECAP Od	yssey Aggre	essive Growth	****	Gold	Average	US Fund Mid-Cap Growth	S&P 500 TR USD	XIUSA04G92		-	
6	DODIX	D	odge & Cox I	ncome		****	Gold	-	US Fund Intermediate Cor	BBgBarc US Agg Bor	XIUSA000MC			
7	MSSFX	Lit	tman Gregor	y Masters S	mir Coms Insti	**	-	Average	US Fund Small Blend	Russell 2000 TR USE	XIUSA00005			
8	MWTRX	M	letropolitan \	West Total I	Return Bd M	***	Silver	÷	US Fund Intermediate Cor	BBgBarc US Agg Bor	XIUSA000MC			
9	VFINX	Ve	anguard 500	Index Inves	stor	****	Gold	Average	US Fund Large Blend	S&P 500 TR USD	XIUSA04G92			
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20

Exercise 10: Retrieve time series data points

- 4. Under the Securities options, be sure Attributes/Time Series is selected.
- 5. Under Layout, confirm that **Column** is selected.
- 6. Under Output, ensure the Show Headers checkbox is deselected.
- 7. In the Security field, paste the ticker, then select the security that appears.
- 8. In the **Data Point** field, type **Return** and select the first choice in the list.

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9 Vangua	rd 500 Inde	x Identi	ifiers			Security			Da	ta Point				De sure de selectedeix des
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9. To set dynamic dates for the last year from the latest month end, from the **Start Date** drop-down field select **Enter Dash Codes**.

Morningstar Add-In			
Securities 🔘	Layout	Output	
Attributes/Time series	Row Oclumn	Show Headers	
Holdings	L		
Ownership	Security	Data Point	
Identifiers	Fidelity® Contrafund®	Return	
Portfolio Management	Start Date	End	Select this option from the
Attributes/Time series	1 month ago	12/16/2019	Start Date drop-down field.
Holdings	Enter Date	Retu	
	Enter Dash Codes	Show Dates	
	0 day ago		
	1 day ago	Frequency Fill	
	2 days ago	Day to Day	
	3 days ago		
	1 week ago		
	1 month ago		
	1 quarter ago		
	1 semi year ago	Annualize Skip Holiday	

- 10. In the field to the right, type **ed-1y** (end date -1 year).
- 11. From the End Date drop-down field, select Enter Dash Codes.
- 12. In the field to the right, type Imend (latest month end).
 - Note: For more information on using dash codes, see A short note on using Dash Codes on page 42.
- 13. From the Return Type drop-down field, be sure Total is selected.

Morningstar Add-In							-	
Securities Attributes/Time series Holdings	Layout Row Column	Output Show Headers						
Ownership Identifiers	Security Fidelity® Contrafund®	Data Point Return		[S	ive	A	
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Holdings	Sort		Č	Return Period		_ ~	·	values for those fields
	O Descend Ascend	Show Dates		Standard OR Rolling				values for these heros.
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	Security Data	a Point Formula			*	^	~ ¥	

- 14. Click Add, then click Submit.
- 15. Select cell **14**.
- 16. As before, in the **Formula** bar, replace the ticker symbol (including the quotation marks) with **\$A4**, then press **<ENTER**>.

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2 Ticker		Name			Morningstar Rating Overal	Morningstar Analyst	Morningstar Sustainability	Morningstar Category	Primary Prospectus	Primary Prospectus	1 Year	Return 3 Years	5	
3 4 FCNTX 5 POAGX 6 DODIX 7 MSSFX 8 MWTRD 9 VFINX 10 OARM2 11 CSB	к к	Fidelity® Contra PRIMECAP Ody. Dodge & Cox In Litman Gregory Metropolitan W Vanguard 500 I Oakmark Servic VictoryShares U	ifund® ssey Aggre come Masters Sr fest Total F ndex Inves e S SmCp Hi	ssive Growth mir Coms insti leturn Bd M tor Div Vol Wtd ET	**** **** *** ** ** ** **	Rating Silver Gold Gold - Silver Gold Gold -	Rating Average - Average - Average Below Average Average	US Fund Large Growth US Fund Mid-Cap Growth US Fund Intermediate Cor US Fund Intermediate Cor US Fund Large Blend US Fund Large Blend US Fund Small Value	Benchmark S&P 500 TR USD S&P 500 TR USD BBgBarc US Agg Bor Russell 2000 TR USI (BBgBarc US Agg Bor S&P 500 TR USD S&P 500 TR USD NASDAQ Victory US	Benchmark ID XIUSA04G92 XIUSA04692 XIUSA000MC XIUSA000MC XIUSA04692 XIUSA04G92 F00000WFR1	ŞA4,			

- 17. Click-and-drag the formula down the list to apply the formula to all securities.
- 18. If needed, click **Cell** to calculate the values.

Exercise 11: Manually

modify a formula

Now that the 1-year return column is set, how can the other return columns be easily updated? To manually modify a formula via the Formula bar, do the following:

- 1. Copy cell I4.
- 2. Paste the value in cell J4. (The first row under the 3-year return column.)
 - Note: Rather than copying and pasting, you can instead select the cell J4 and simply drag it to cell K4. If so, be sure only cell K4 is selected before proceeding.
- 3. In the Formula bar, change ed-1y to ed-3y (that is, end date 3 years).
- 4. To ensure the return value is annualized (and not cumulative), change **ANN=FALSE** to **ANN=TRUE**.

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		с	D	E	F	G	н	1	J	к	L	highlighted parts of the formula.
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4	Mornir	ogstar	Morningstar	Morningstar	Morningstar Category	Primany	Primany	1 Vear	3 Vears	5 years	Std De	
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4	****		Silver	Average	US Fund Large Growth	S&P 500 TR USD	XIUSA04G92	29.98	ANN=TRUE,			
5	****		Gold	Average	US Fund Mid-Cap Growth	S&P 500 TR USD	XIUSA04G92	23.50				
6	****		Gold	-	US Fund Intermediate Con	BBgBarc US Agg Bon	XIUSA000MC	9.75				
7	**		-	Average	US Fund Small Blend	Russell 2000 TR USE	XIUSA00005	23.72				
8	***		Silver	-	US Fund Intermediate Core	BBgBarc US Agg Bon	XIUSA000MC	8.94				
9	****	r i i	Gold	Average	US Fund Large Blend	S&P 500 TR USD	XIUSA04G92	31.33				

- 5. Press <**ENTER**>.
- 6. Drag the formula down the list to apply to all securities.
- 7. If necessary, click **Cell** to recalculate the values.
- 8. Repeat steps 1-7 to set up the **5-year return** (change ed-1y to **ed-5y** here) under column K.
- 9. Save the workbook.

Exercise 12: Retrieve

standard deviation values

The next step is to retrieve data for the three risk statistics. The first of these is standard deviation, but all three will be added at once in the Morningstar Add-In window (via subsequent exercises). Note that while all three risk statistics are for the trailing three-year period, the following exercises do not call for the use of the data points specific to that time period (for example, Std Dev 3-Yr (Mo-End)).

Instead, the generic versions of standard deviation, tracking error, and Sharpe ratio will be used. This allows users to set flexible start and end dates for the data points, which will be automatically updated when the workbook is refreshed. Do the following:

- 1. Copy cell A4.
- 2. Select cell L4.
- 3. From the Morningstar tab, click Investments. The Morningstar Add-In window opens.

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1	В	с	D	E	F	G	н	1	J	к	L	м
	Name	Morningstar Rating Overall	Morningstar Analyst	Morningstar Sustainability		Primary Prospectus	Primary Prospectus	1 Year		5 years	Std Dev	Tracking Error
3			Rating	Rating		Benchmark	Benchmark ID					
4	Fidelity® Contrafund®	****	Silver	Average	US Fund Large Growth	S&P 500 TR USD	XIUSA04G92	29.98	18.94	13.1		
5	PRIMECAP Odyssey Aggressive Growth	****	Gold	Average	US Fund Mid-Cap Growth	S&P 500 TR USD	XIUSA04G92	23.50	15.38	12.40		-
6	Dodge & Cox Income	****	Gold	-	US Fund Intermediate Con	BBgBarc US Agg Bor	XIUSA000MC	9.75	4.53	3.70		
/	Litman Gregory Masters Smir Coms Insti	**	-	Average	US Fund Small Blend	Russell 2000 TR USE	XIUSA00005	23.72	8.21	5.49		
8	Metropolitan West Total Return Bd M	***	Silver	-	US Fund Intermediate Con	BBgBarc US Agg Bor	XIUSA000MC	8.94	3.93	2.80		
9	Vanguard 500 Index Investor	****	Gold	Average	US Fund Large Blend	S&P 500 TR USD	XIUSA04G92	31.33	15.13	11.55		
10	Oakmark Service	**	Gold	Below Average	US Fund Large Blend	IS&P 500 TR USD	XIUSA04G92	26.65	10.03	8.51		

- 4. Under the Securities options, be sure **Attributes/Time Series** is selected.
- 5. Under Layout, confirm that **Column** is selected.
- 6. Under Output, ensure the Show Headers checkbox is deselected.
- 7. In the **Security** field, **paste** the **ticker**, then select the **security** that appears.
- 8. In the **Data Point** field, type **std dev** and select **Std Dev** from the list of results. Additional fields are now available in the Settings section.

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- 9. To set dynamic dates for the last year from the latest month end, from the **Start Date** drop-down field select **Enter Dash Codes**.
- 10. In the field to the right, type ed-3y (end date -3 years).
- 11. From the End Date drop-down field, select Enter Dash Codes.
- 12. In the field to the right, type Imend (latest month end).
- 13. In the bottom-right corner of the dialog box, select the Annualize checkbox.

Layout Row Column Security Fidelity® Contrafund®	Output Show Headers Data Point						
Security Fidelity® Contrafund®	Data Point						
ridency - contratand -	Std Dev				Save Add		
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14. Click **Add**. Do not yet click Submit; the other two risk statistics will be added before returning to the worksheet.

To add the 3-year tracking error data point to the Morningstar Add-In window, do the following:

Exercise 13: Add the tracking error

1. In the Morningstar Add-In window, click the **Standard Deviation formula**. The fields for the formula appear in the window.

Morningstar Add-In	– 🗆 X	
Securities Attributes/Time series Holdings	Layout Output Opposition Opposition	
Ownership Identifiers	Security Data Point Fidelity® Contrafund® Std Dev Add	
Portfolio Management Attributes/Time series Holdings	Start Date End Date Enter Dash Codes Ed-3y @ Enter Dash Codes Imend @ Sort ODescend @ Ascend Show Dates Currency	
	Base Currency Image: Continuous Source Data Req Continuous Source Data Image: Compounding Method Source Data Compounding Method Monthly Return Image: Standard	Click this formula to see its content populate in the fields within the window; be careful not to click the red X to the left of the row.
	Security Data Point Formula A Security Data Point Formula A Security Basis For X Std Dev MSSECNTX Std Dev	

2. In the **Data Point** field, replace **Std Dev** with **Tracking Error**.

Morningstar Add-In				- 🗆 X	
Securities O Attributes/Time series Holdings	Layout Row Column	Output Show Headers			
Ownership Identifiers	Security Fidelity® Contrafund®	Data Point Track		Save Add	Be sure to select this data point.
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Tracking Error 1 Yr (Mo-End) Tracking Error 1 Yr (Qtr-End) Tracking Error 20 Yr (Pastated	H Load Adi Pot/(Mo End)	Tracking_Error_1Yr_ME Tracking_Error_1Yr_QE Tracking_Error_1Q Vr_Restated Load Adi Bet Mo End	0		

- 3. To set dynamic dates for the last year from the latest month end, from the **Start Date** drop-down field select **Enter Dash Codes**.
- 4. In the field to the right, type **ed-3y** (end date -3 years).
- 5. From the End Date drop-down field, select Enter Dash Codes.
- 6. In the field to the right, type **Imend** (latest month end).
- 7. In the bottom-right corner of the dialog box, select the **Annualize** checkbox.
- 8. In the Benchmark field, type S&P 500 TR USD, then select that index.
 - Note: In Exercise 15 on page 30, you will see how to change the reference for this data point's calculation.

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		F00000X8SB;XI	S&P 500 0-3 Y HY Corp Bd TR USE)	XI		USA			index; it will be awa
		F00000X8S4;XI	S&P 500 0-3 Y IG Corp Bd TR USD		XI		USA			index, it will be swa
		F00000X8SF;XI	S&P 500 10+ Y HY Corp Bd TR US	D	XI		USA			out in a later exercis
		F00000X8S8:XI	S&P 500 10+ Y IG Corp Bd TR USE)	XI		USA		Ψ.	
							La com a			
	_	F00000MUD3;XI	S&P 500 2x Inverse Daily TR USD		XI		USA	cel	Submit	
	_	F00000MUD3;XI F00000X8SV;XI	S&P 500 2x Inverse Daily TR USD S&P 500 3+ Y Bd TR USD		XI XI		USA	cel	Submit	
		F00000MUD3;XI F00000X8SV;XI F00000X8SE;XI	S&P 500 2x Inverse Daily TR USD S&P 500 3+ Y Bd TR USD S&P 500 3-5 Y HY Corp Bd TR USD)	XI XI XI		USA USA USA	cel	Submit	
		F00000MUD3;XI F00000X8SV;XI F00000X8SE;XI F00000X8S6;XI	S&P 500 2x Inverse Daily TR USD S&P 500 3+ Y Bd TR USD S&P 500 3-5 Y HY Corp Bd TR USD S&P 500 3-5 Y HG Corp Bd TR USD)	XI XI XI XI		USA USA USA USA	cel	Submit	
		F00000MUD3;XI F00000X8SV;XI F00000X8SE;XI F00000X8S6;XI F00000X8S6;XI	S&P 500 2x Inverse Daily TR USD S&P 500 3+ Y Bd TR USD S&P 500 3-5 Y HY Corp Bd TR USD S&P 500 3-5 Y IG Corp Bd TR USD S&P 500 3-5 Y IG Corp Bd TR USD S&P 500 3-7 Y HY Corp Bd TR USD		XI XI XI XI XI XI		USA USA USA USA USA	cel	Submit	
		F00000MUD3;XI F00000X8SV;XI F00000X8SE;XI F00000X8SE;XI F00000X8SE;XI F00000X8SD;XI F00000X8S5;XI	S&P 500 2x Inverse Daily TR USD S&P 500 3+ Y Bd TR USD S&P 500 3-5 Y HY Corp Bd TR USD S&P 500 3-5 Y IG Corp Bd TR USD S&P 500 3-5 Y IG Corp Bd TR USD S&P 500 5-7 Y HY Corp Bd TR USD S&P 500 5-7 Y IG Corp Bd TR USD		XI XI XI XI XI XI XI		USA USA USA USA USA USA	cel	Submit	

9. Click **Add**. Do not yet click Submit; Sharpe ratio will be added before returning to the worksheet.

To add the 3-year Sharpe Ratio, do the following:

1. In the Morningstar Add-In window, click the **tracking error formula**.

Exercise 14: Add the Sharpe Ratio

Morningstar Add-In	- 🗆 X	
Securities C Attributes/Time series Holdings	Layout Output O Row O Column Show Headers	
Ownership Identifiers	Security Data Point Fidelity® Contratund® Tracking Error Save Add	
Portfolio Management Attributes/Time series Holdings	Start Date End Date [Enter Dash Codes Enter Dash Codes Enter Dash Codes Sort Sort Descend @ Ascend Show Dates	
	Currency Base Currency	
	Noting window window shit	Click this formula to see its content populate in the fields within the windows have
	Source Data Compounding Method Benchmark Risk-Free Proxy Monthly Return Standard Standard Standard	careful not to click the red X to the left of the row.
	Security Data Point Formula A V X NASFCNTX Std_Dev =MSTS("NASFCNTX,"Std_Dev","1/1/2017","12/31/2019","CORR=C, DATES=FALSE, ASCENDING=TRUE	

2. In the Data Point field, replace Tracking Error with Sharpe Ratio.

•	Morningstar Add-In					
	Securities	Layout		Output		
	Attributes/Time series	Row	Column	Show Headers		
End date	Holdings		0			
	Ownership	Security		Data Point		
Name	Identifiers	Fidelity	Contrafund S	Sharpe Ratio		
Full Name	-		Short Name			
Sharpe Ratio	0		Sharpe_Ratio		0	
Sharpe Ratio	o (arith)		Sharpe_Ratio_arith		0	
Sharpe Ratio	o (geo)		Sharpe_Ratio_geo		0	
Sharpe Ratio	o 1 Yr (Mo-End)		Sharpe_Ratio_1Yr_M	E	0	
Sharpe Ratio	o 1 Yr (Qtr-End)		Sharpe_Ratio_1Yr_Q	E	0	
Sharpe Ratio	o 1 Yr (Restated Load-Adj Ret)(Mo-	End)	Sharpe_Ratio_1_Yr_R	Restated_Load-Adj_Ret_Mo-End	0	
Sharpe Ratio	o 1 Yr (Restated Load-Adj Ret)(Qtr-	End)	Sharpe_Ratio_1_Yr_R	Restated_Load-Adj_Ret_Qtr-End	0	mai
Sharpe Ratio	n 10 Vr (Mo-End)		Sharpe Ratio 10Vr M	MF		500

- 3. To set dynamic dates for the last year from the latest month end, from the **Start Date** drop-down field select **Enter Dash Codes**.
- 4. In the field to the right, type **ed-3y** (end date -3 years).
- 5. From the End Date drop-down field, select Enter Dash Codes.
- 6. In the field to the right, type **Imend** (latest month end).
- 7. In the bottom-right corner of the dialog box, select the Annualize checkbox.
- 8. In the **Risk-Free Proxy** field, type **USTREAS T-bill Auction Ave 3 Mon**, then select that option.

Morningstar Add-In								- 0	×	
Securities Attributes/Time series Holdings	Layout Row Column	Output Show Headers								
Ownership Identifiers	Security Fidelity® Contrafund®	Data Point Sharpe Ratio				Save		Add		
Portfolio Management	Start Date		_	End Date						
Attributes/Time series	Enter Dash Codes	ed-3y	?	Enter Dash Codes	1	Imend	0			
Holdings	Sort									
	Descend O Ascend	Show Dates								
	Currency									
	Base Currency									
	Rolling Window months	Window Shift months								
	🕅 Req Continuous Source Data	Annualize #days in annuali	ized	years	_					
	Source Data	Compounding Method	_	Benchmark	F	Risk-Free Proxy	_			
	Monthly Return	Standard			L	USTreas T-bill Auction Ave 3 1	Mon			
	Security Na	me	_	Universe Type		Exchange Domicile		×		
	XIUSA0000C;XI US	TREAS T-Bill Auction Ave 3 Mon		K		USA	- D	ING=TRUE	≙ ▲	Select this provy
	► X NAS:FCNTX Tra	cking_Error =MSTS("NAS:F		TX","Tracking_Error","ed-3y","Imend					a	ocioce tino proxy
									*	
							Cancel	Subr	nit	

9. Click Add, then click Submit.

The three risk statistics now have a value for the first row, but the following important steps still need to be taken:

- 1. The formulas need to be modified to point to a reference cell.
- 2. The formulas need to be copied to all rows in a column.
- 3. The Tracking Error formula needs to be changed so it looks to the Primary Prospectus Benchmark ID cell for each row's calculation, rather than simply using the S&P 500 for all investments.

The first two items should be familiar from previous exercises. To address the last item, this exercise shows users how to insert a reference within a part of a formula with multiple parameters contained within the same set of quotation marks. Specifically, quotation marks and ampersands (&) are used to offset the column and row designation to effect this change within a formula.

To make these three changes, do the following:

- 1. Select cell L4.
- 2. In the Formula bar, change "NAS:FCNTX" to \$A4, then press <ENTER>.
- 3. Click-and-drag the formula down the list to apply them to all rows in column L.
- 4. If necessary, click **Cell** to recalculate the values.
- 5. Select cell M4.
- 6. In the Formula bar, change "NAS:FCNTX" to \$A4, then press <ENTER>.
- 7. In the Formula bar, do the following:
 - A. Change "NAS:FCNTX" to \$A4
 - B. Change BENCHMARK=XIUSA04G92 to BENCHMARK="&H4&"
 - C. Press <**ENTER**>.

Note the two parts of the formula to change, and how to change them.

=MST<mark>9(\$A4,</mark>"Tracking_Error","ed-3y","Imend","CORR=C, DATES=FALSE, ASCENDING=TRUE<mark>, BENCHMARK="&H4&"</mark>XI, COMP=S, SOURCE=HP010, ANN=TRUE, CONTI=TRUE, CURR=BASE, HEADERS=FALSE")

- 8. Click-and-drag the formula down the list to apply them to all rows in column M.
- 9. If necessary, click Cell to recalculate the values.
- 10. Select cell N4.
- 11. Click-and-drag the formula down the list to apply them to all rows in column N.
- 12. If necessary, click **Cell** to recalculate the values.
- 13. Save the workbook.

Exercise 15: Link formulas to a reference cell The MSTS formula also allows users to extract a historical series of data, such as historical prices, returns, Morningstar Ratings, and so on. To extract the historical returns for the list of funds, do the following:

Exercise 16: Retrieve Historical Series data

- 1. Select the **Returns** tab.
- 2. Select cell **B2**, then click **Investments** from the Morningstar tab.

Profile Investment Economic Key Data Indicators* Refresh Resources B2 I A B C 1 2 Ticker 3 Name 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Esure this Be sure this	File	Home Insert Draw Pag	ge Layout Formulas Data	Review View	
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· ·	3 Name				Select this cell, then click Investments.
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Be sure this worksheet is sele	10				
20 worksheet is sele	10				Be sure this
	20				worksheet is selected
	21				
Data Returne Holdings		Data Returns Holdi			

- 3. Click Identifiers.
- 4. Under Layout, select **Row**.
- 5. Under Output, deselect the **Show Headers** checkbox.
- 6. From the **Source** drop-down field, be sure **Investment Lists** is selected.
- 7. From the List/Search name drop-down field, select Multiple Investments.

8. Under Settings > Security ID, select Ticker.

Morningstar Add-In		
Securities Attributes/Time series Holdings	Layout Output Row Column Show Headers	Be sure to mirror the
Ownership Identifiers Portfolio Management Attributes/Time series	Source List/Search name Investment list Multiple Investments Security ID Ticker	selections shown here.
Holdings	Security Data Point Formula	

- 9. Click Add, then Submit. The tickers for the members of the list appear in a row.
- 10. To to add the name underneath each fund, do the following:
 - A. Select cell **B3**.
 - B. In the cell, type =MSDP(B3,"Name"), then press <ENTER>.
 - C. Click-and-drag this formula to the last cell in the row to the right.
 - D. If needed, click **Cell** to recalculate.

File	Home	Insert	Draw	Pag	e Layout	Form	nulas	Data	R	
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Connection		Functio	ons			Ref	resh			
B3	•	×	√ f _x	=N	ISDP(B2,	"Name")			
A			В			С				Type the formula directly
1										into the cell (or Formula ba
2 Ticker	FCN	TX			POAGX				00	
3 Name	Fidel	ity® Cont	trafund®		PRIMEC	AP Odyss	ey Aggr	essive G D	000	

- 11. To see daily returns for the first investment over the past year, start by **copying** the ticker in cell **B2**.
- 12. Select cell A4, then click Investments.

File	Home Insert	Draw	Page Layout	Formulas	Data	Review	View	
Profile	Investments Econom Data	nic Key Indicators	Cell	Sheet Workbook	1 Schedule	e Templates	? Help	
Connection	Functio	ns		Refresh		Resou	rces	
A4	• : ×	✓ f _x		~				
A	D			L		U		Select this cell before
2 Ticker	IFCNTX	PO	AGX			DODIX		clicking Investments.
3 Name	Fidelity® Contr	afund⊗ PR	IMECAP Odys	sey Aggressive (Growth	Dodge & Co	(Incom	
4								
5								
6								

- 13. Attributes/Time Series should be selected, as should the option for Column. The checkbox for Show Headers should be deselected.
- 14. **Paste** the ticker into the **Security** field, then click the security name when it appears to select it.
- 15. In the **Data Point** field, type **Return** then select that data point.

—										
	File	Home I	nsert	Morningstar Add-In						
c	Profi	le Investment	s Eco	Securities Attributes/Time series Holdings	Layout O Row	Column	Output			
	onnes		T GI	Ownership	Security		Data Point			
			\times	Identifiers	Fidality® Con	trafund ®	Pature			
	_				Fidelity Con	traitund ©	Return			
		Full Name			Short Name					
	•	Return			Return			i		Select this data point
	1	Return Date (Daily	y)		Return_Date_E	aily		0		
	1	Return Date (Mo-	End)		Return_Date_N	ΛE		0		
	2	Return Date (Qtr-	End)		Return_Date_C)E		0		
		Return on Assets	ттм		Return_on_Ass	ets_TTM		0		
	6	Return on Equity	TTM		Return_on_Equ	uity_TTM		0		
	e	Return Profile - G	rowth		Return_Profile	Growth		0		
	7 Return Profile - Hedging			Return Profile Hedging						
				-						

- 16. Start by using the Frequency field to select Daily.
- 17. From the Start Date field, select Enter Dash Codes and type ed-1y.
- 18. From the End Date field, select Enter Dash Codes and type Imend.
- 19. Select Show Dates.

Morningstar Add-In					-	
Securities O Attributes/Time series Holdings	Layout Row Column	Output	rs			
Ownership Identifiers	Security Fidelity® Contrafund®	Data Point Return]	Save	Add
Portfolio Management Attributes/Time series Holdings	Start Date Enter Dash Codes	ed-1y	0	End Date Enter Dash Codes Return Period	Imend 0	
	Descend O Ascend	Show Dates		Standard Rolling	Days	
	Base Currency Return Type	Daily		Blank	Trading days/Activity days	
	Total Annualize					
	Security [Data Point	Formula		* ~ ~ *	

- 20. Click Add, then click Submit.
- 21. Cell A4 should be selected. In the Formula bar, replace the ticker with **\$B2**.

														_
	4		: ×	1	f_{x}		=MSTS	(\$B2.	'Return"	."ed-1	v"."Imer	nd"."C		-
								(+/		,	, ,	, -	Replace t with this	he ticker reference link.
									Formu	ıla Bar				
4	A			В					U	_				
1														
2	Ticker	FC	NTX			PO	AGX					DODI		
3	Name	Fic	lelity® C	ontrafun	d⊗	PR	IMECAP	Odyss	sey Aggr	essive	Growth	Dodge		
4	1/2/20	019		1	0.18									
5	1/3/20	019		-	2.81									
6	1/4/20	019			3 92									

- 22. To modify and apply the same formula to the second fund, do the following:
 - A. Copy cell A4.
 - B. Paste the value in cell C4.
 - C. In the formula bar, change **\$B2** to **\$C2** for the identifier, and modify the setting **DATES = FALSE**. This removes the dates (which are already displayed in column A).
 - D. Press <**ENTER**>.



F	ile Home	e Insert Draw Page L	ay Formulas Data Review View Help	Morning Acrobat	♀ Search					
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1										
2	Ticker	FCNTX	POAGX	DODIX	MSSFX					
3	Name	Fidelity® Contrafund®	PRIMECAP Odyssey Aggressive Growth	Dodge & Cox Income	Litman Gregory Masters Sm					
4	1/2/2019	0.18	"CORR=C, DATES=FALSE,							
5	1/3/2019	-2.81								
6	1/4/2019	3.92								
7	1/7/2019	1.17								
8	1/8/2019	1.06								

- 23. **Click-and-drag** this formula to the right, to the last cell in the row.
- 24. If needed, click **Cell** to recalculate the spreadsheet.
- 25. Save the workbook.

Retrieving a Portfolio's Holdings

The MSHOLDING formula is designed to retrieve holdings of portfolios. It requires at least the following parameters to retrieve the latest holdings:

- ► Portfolio IDs (for example, Ticker, ISIN, CUSIP, or SecID), and
- Position IDs to define how you would like to see the holdings. For example, you could elect to see the Ticker, ISIN, CUSIP, or SecID of the holdings.

To retrieve portfolio holdings for a fund, do the following:

- 1. In the Excel file provided, select the Holdings worksheet. Notice the ticker in cell B1.
- 2. Copy cell B1.
- 3. Select cell A3, where the data will display.
- 4. From the Morningstar toolbar, click **Investments**.



5. Under the Securities heading, select Holdings.

Exercise 17: Retrieve portfolio holdings for a fund using the MSHOLDING formula

Overview

6. In the **Security** field, **paste** the ticker, then select the security when it appears.

File	Home	Inser	Morningstar Add-In						
Profile	Investme	nts Eco [Securities C Attributes/Time series Holdings	Layout Row	() Column	Output 🗹 Show Hea	aders		
A3	• i	×	Ownership Identifiers	Security FCNTX		Position ID SecId			
Se NA	curity AS:FCNTX		Name Fidelity® Contrafund®		Unive FO	rse Type Exchange NAS	e Domicil USA	e E	Coloret the fired
1 Identi 2	ifier FC	CNTX	monings	Descend	Ascend	Show hole	ding name		when it appears
3 4 5				Holding type Stocks	Bonds	O Funds	ETFs) Ali	
6 7				Frequency All		Top N holdin	g		

- 7. The option for **Column** should be selected, and the check box for **Show Headers** should also be selected.
- 8. From the **Position ID** drop-down field, select **Ticker**.
- 9. From the Data type section, the option for Weight (%) should be selected.
- 10. Leave all other settings as is and click Add, then click Submit.

The MSHOLDING formula can easily be modified to see only the top 10 positions. To do so, do the following:

Exercise 18: Retrieve only the top 10 holdings for a fund

- 1. Cell A3 should be selected.
- 2. From the **Morningstar** toolbar, click **Investments**.
- 3. In the Top N Holdings field, type 10.

			Note the entry i	n this field.		
Morningstar Add-In						- 0
Securities 💽 Attributes/Time series	Layout Row Column	Output	Headers			
Holdings Ownership						
Identifiers	Security Fidelity® Contrafund®	Position I Ticker	, 			Save Add
Portfolio Management	Start Date			End Date		
Attributes/Time series	Enter Date	▼		Enter Date		
Holdings	Sort Descend Ascend	Show	holding name	Show detail holding type	Show Country	
	Holding type			Data type		
	Stocks Bonds	O Funds	🔵 ETFs 🛛 🔘 All	Weight(%)	 Market value 	Number of shares
	Frequency	Top N ho	lding			
	Security	Data Point	Formula			* ^ ~ ¥
	► × NAS:FCNTX	TICKER	=MSHOLDING(*1	IAS:FCNTX","TICKER","CORR=0	;, ASCENDING=TRUE, HT	T=ALL, WEIGHT=TRUE, FREQ= f

- 4. Click Add.
- 5. To the left of the top row, click **X** to delete the first formula.

	Click here to	delete this row.	
Morningstar Add-In			- 🗆 X
Securities C Attributes/Time series Holdings	Layout Row Oclumn	Output ☑ Show Headers	
Ownership Identifiers Portfolio Management Attributes/Time series	Security Start Date Enter Date	Position ID SecId End Date End Date	Save Add
Holdings	Sort De.cend Ascend Holding type Stocks Bonds	Show holding name Show detail holding type Show Country Data type Funds ETFs All Weight(%) Market value) Number of shares
	Frequency All Security AS:FCNTX X NAS:FCNTX	Top N holding Data Point Formula TICKER =MSHOLDING("NAS:FCNTX,"TICKER","CORR=C, ASCENDING=TRUE, HT=A TICKER =MSHOLDING("NAS:FCNTX,"TICKER","CORR=C, ASCENDING=TRUE, HT=A	Reget Reget ALL, WEIGHT=TRUE, FREQ= ALL, WEIGHT=TRUE, FREQ=

6. Click **Submit**. Notice how **top=10** has been added to the formula.

Note this addition to the formula.

=MSHOLDING("NAS:FCNTX","TICKER","CORR=C, ASCENDING=TRUE, HT=ALL, WEIGHT=TRUE, FREQ=A, TOP=10 NAME=TRUE, SHOWHT=FALSE, SHOWCOUNTRY=FALSE") ^

Amending the formula further allows users to retrieve historical positions for a fund, rather than merely seeing current positions. To see past positions, do the following:

- 1. Cell A3 should be selected.
- 2. From the Morningstar toolbar, click Investments.
- 3. From the Start Date field, select Enter Dash Codes, then, type ed-1y.
- 4. From the End Date field, select Enter Dash Codes, then type Imend.

Exercise 19: Retrieve historical positions for a fund

				Update the values	for the date fiel	ds.
Morningstar Add-In						- 0
Securities Attributes/Time series Holdings	Layout Row Column	Output 🗹 Show Headers				
Ownership Identifiers	Security Fidelity® Contrafund®	Position ID Ticker				Save
Portfolio Management	Start Date		En	nd Date		
Attributes/Time series	Enter Dash Codes	ed-1y	2 E	nter Dash Codes	Imend	\mathbf{O}
Holdings	Sort Descend O Ascend Holding type	🗹 Show holding name		Show detail holding type	Show Countr	у
	Stocks Bonds	O Funds O ETFs) All	Weight(%)	Market value	O Number of shares
	Frequency	Top N holding 10				

- 5. Click Add.
- Delete the top formula. 6.
- 7. Click Submit.

8. In the Formula bar for cell A3, replace the ticker a link to cell \$B1.

By setting a reference (to cell B1) within the formula, this worksheet can be used as a template. Typing a different ticker in cell B1 will retrieve data for that new security.

Fi	le	Hon	ne	Insert	Draw	Page Layout	Formu	ılas Data	Э	Review	View H	elp Morn	ingstar
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2													
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4	4 FB Facebook Inc A					6.	46	6.17	6.28	7.01			
5	AMZN Amazon.com Inc				6.	88	6.37	6.78	7.05				
6	5 BRK.A Berkshire Hathaway Inc A				5.	40	5.16	5.09	5.28				
7	MSFT			Microsoft (Corp			4.	01	4.23	4.35	4.62	
0	V Vica Inc Class A				2	02	2.20	2.4.2	2.40				

9. Save the workbook.

Retrieving Ownership Information for an Investment

The MSOWNER formula retrieves ownership data for investments. This formula can be used, for instance, to identify funds investing in a specific security (for example, a stock, open-end fund, or ETF) over time and the market value of that investment.

Using this formula automatically includes the following columns of data for the owners of the investment:

- ► Name
- ► SecId, and
- ► Position Market Value.

Users merely need to decide which data point to show (for instance, Portfolio Weight%, or Shares), and over what time period. To avoid seeing too many rows, users can also limit the results to only the top N number of owners for the investment.

To retrieve the historical portfolio weights of managed investments owning Kraft Heinz over the past year, do the following:

- 1. In the template provided, select the **Owners** worksheet. Note the ticker in cell A1.
- 2. Copy cell A1.
- 3. Select cell A2, where the data will display.
- 4. From the Morningstar toolbar, click Investments.

Exercise 20: Retrieve ownership data for a stock

File Home Draw Page Layout Morningstar Insert Formulas Data Review View Help ╢╓ 1 in a fill a fil Ħ Profile Economic Key Cell Sheet Workbook Schedule Templates Help Indicators ~ Data Functions Connection Refresh Resources A2 ÷ | \times $f_{\mathcal{K}}$ Note the cell to select before 4 clicking Investments. 5 6 7 8 9 10 11 12 13 14 15 Be sure this 16 worksheet is selected. 17 18 Data Returns Holdings Ownership (+)

- 5. Select the option for **Ownership**.
- 6. In the **Security** field, **paste** the ticker from cell A1, then select the correct security when its name appears.

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File Home	Securities Attributes/Time series Holdings Ownership Identifiers	Layout Row Security KHQ	Olumn	Output Show Heade Ownership Data	ers 9 Point	-
Security	Name	<u> </u>	Universe T	ype Exchange	Domicile	
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MEX:KHC	The Kraft Heinz Co		ST	MEX	MEX	Be sure to select t
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WBO:KHC	The Kraft Heinz Co		ST	WBO	AUT	, in the second s
BSP:KHCB34 The Kraft Heinz Co ADR			ST	BSP	BRA	
ВАН:КНСВ	Khaleeji Commercial Bank BSC		ST	BAH	BHR	
DFM:KHCB	Khaleeji Commercial Bank BSC		ST	DFM	ARE	

7. In the **Ownership Data Point** field, type **Portfolio Weighting %**, then select it when it appears.

AutoSave Off	Morningstar Add-In				
Profile Investme	Securities Attributes/Time series Holdings	Layout Row O Column	Output 🗹 Show Headers		
Connection	Ownership Identifiers	Security The Kraft Heinz Co	Ownership Data Point Weight		Typing even a portion of a data point's name can allow it to be
Full Name		Short Name			found and selected.
Portfolio Weighting	1%	Portfolio_Weighting_%		i	
A B 1 KHC 2 3 4	(rioramys	Security	Data Point Formula	3	

- 8. From the Start Date field select Enter Dash Codes, then type ed-1y.
- 9. From the End Date field, select Enter Dash Codes, then type Imend.
- 10. Click Add, then click Submit.
- 11. Save the workbook.

MSTS formulas can handle both static and dynamic dates. Entering a date in formulas keeps them static. Using dynamic codes ensures they update when the calendar rolls to a new month, quarter, or year, depending on the data point settings.

A short note on using Dash Codes

The following codes can be used for end dates:

Name	Dash Code
Last market close	Imktclose
Last week end	lwend
Last month end	Imend
Last quarter end	lqend
Last semi-year end	lsyend
Last year end	lyend

For start dates, use **ed-[frequency]**. The frequency can be defined in days, weeks, months, quarters, etc. To define one week, use either **w1** or **1w**. The letter used for those frequencies are based on the English language (**d** for day, **w** for week, **m** for month, and so on).

The following table offers a few examples of the dash codes to use for a variety of time periods:

To cover this time period	Enter this dash code for the Start Date	And this dash code for the End Date
One year prior to the latest month end	ed-1y	Imend
Year-to-date, up to the latest month end	ed-x0	Imend
Month-to-date through the latest market close	ed-m0 @ -m0 always reverts to the start of the month	Imktclose