Using the Morningstar Excel Add-In

Onboarding Guide

MORNINGSTAR Direct

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Using the Morningstar Excel Add-In

Overview

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 Direct℠.

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.

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

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

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

Overview

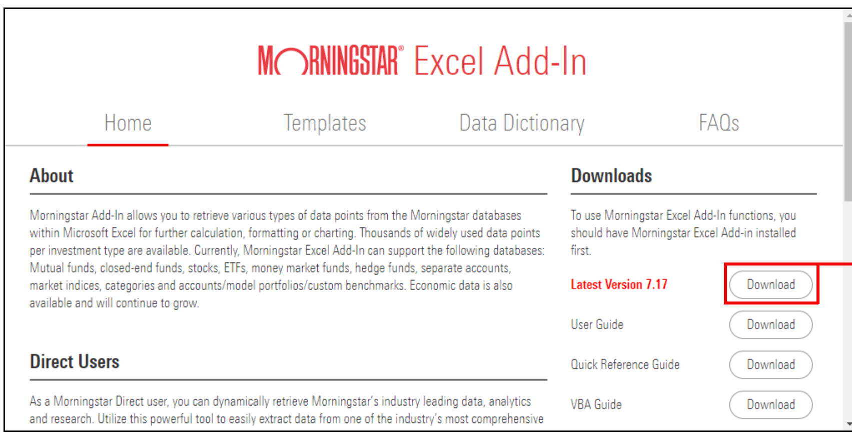
Before using the Morningstar Excel Add-In, it must be installed. Additionally, it will be worthwhile to spend a few minutes configuring both the settings within the Add-In, as well as Microsoft® Excel itself to optimize the use of this tool.

Exercise 1: Install the Morningstar Excel Add-In

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:

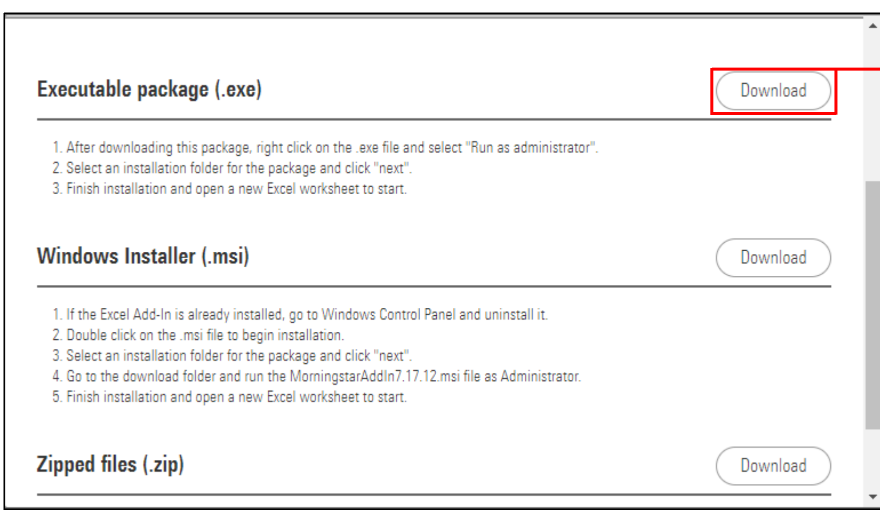
1. Visit http://addin.morningstarcommodity.com/.
2. To the right of the Latest Version, click **Download**.

   ☞ 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.



Use this button to access the download files for the latest version of the Add-In.

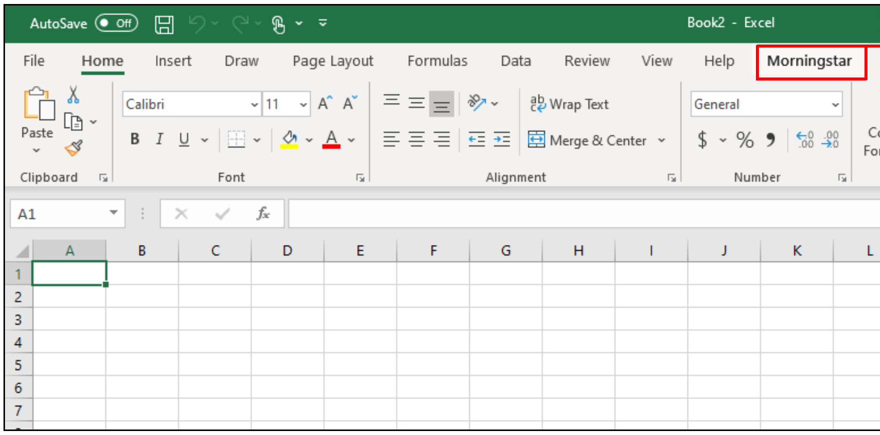
3. Under the Executable package (.exe), click **Download**.



Use this button to download the installation wizard that will walk you through adding the Add-In to Microsoft® Excel®.

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

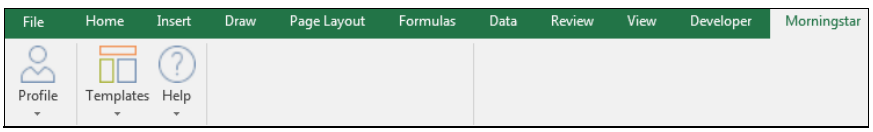
5. To see that the Add-In appears as expected, **open Microsoft® Excel®**.



Once installed, the Morningstar Add-In capabilities can be accessed from this tab.

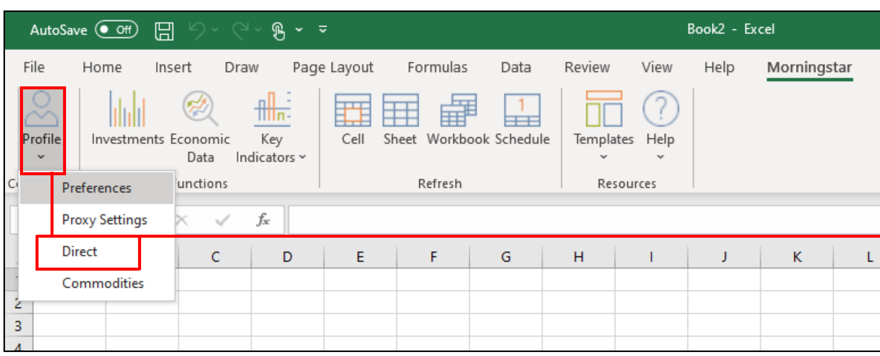
Exercise 2: Log in to the Morningstar Excel Add-In

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



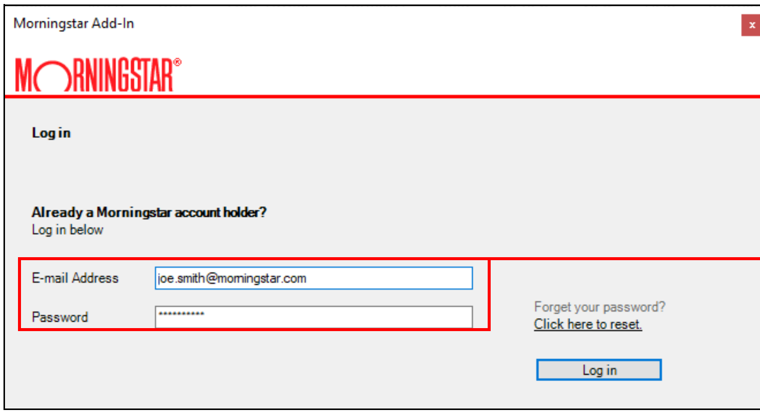
To use the Morningstar Excel Add-In, users must enter their Morningstar Direct login credentials. To login, do the following:

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



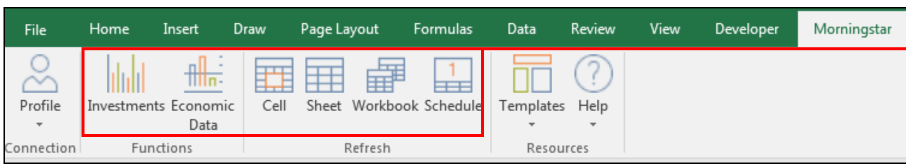
Select this option to access the features of the Add-In.

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



The login details entered here are saved, and will not be required again.

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



Note the additional icons now available.

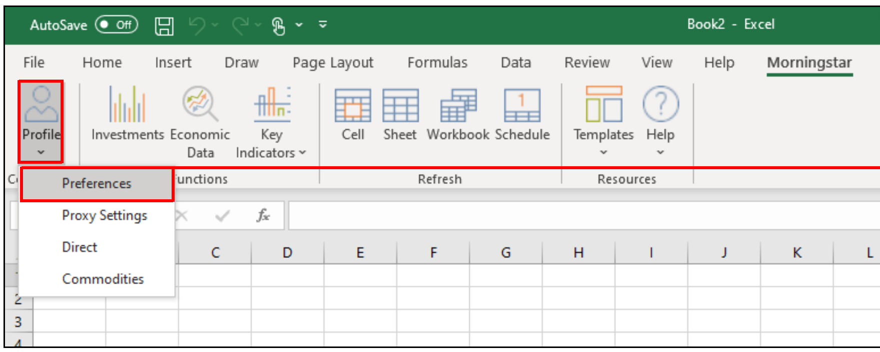
Exercise 3: Change the settings for the Morningstar Excel Add-In

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.

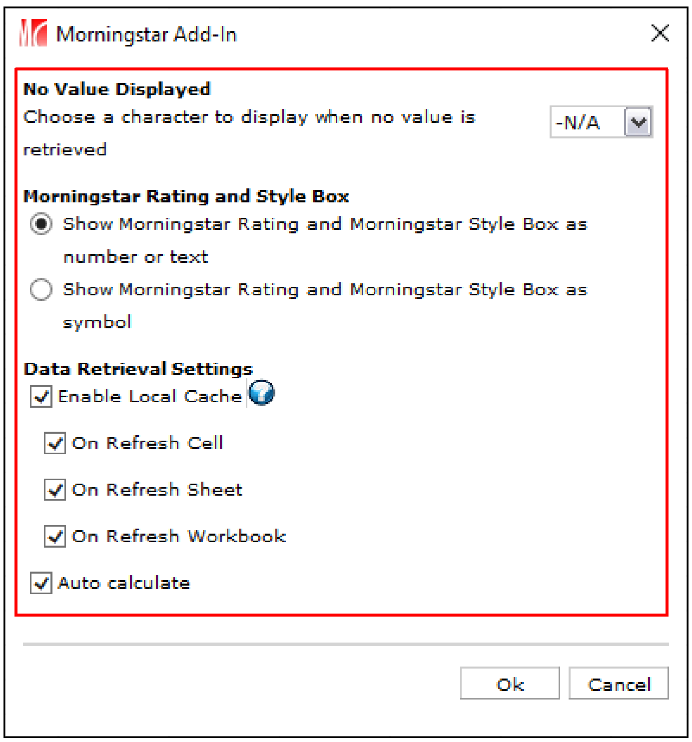


Select this option to configure certain aspects of the Add-In.

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.



Set what options you would prefer to use here.

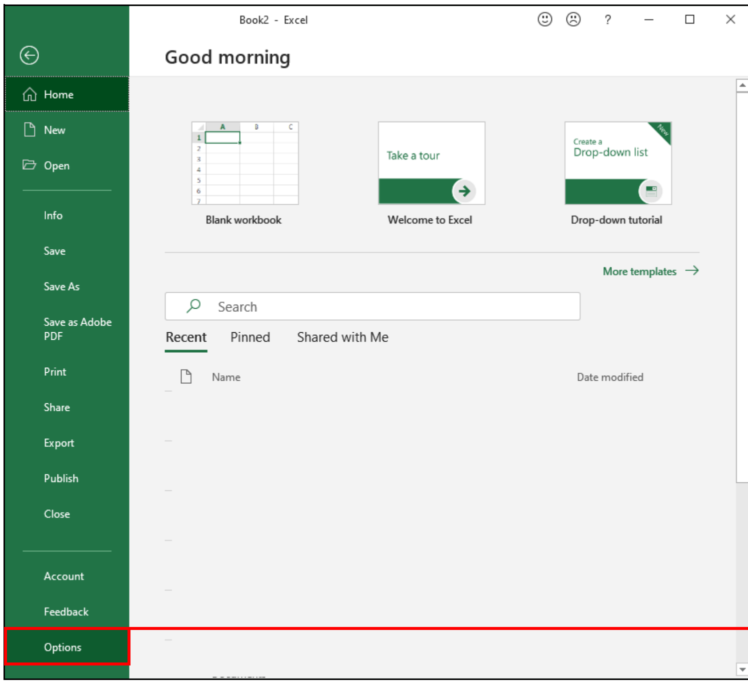
6. Click **OK**.

Exercise 4: Update the settings for Microsoft® Excel®

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.

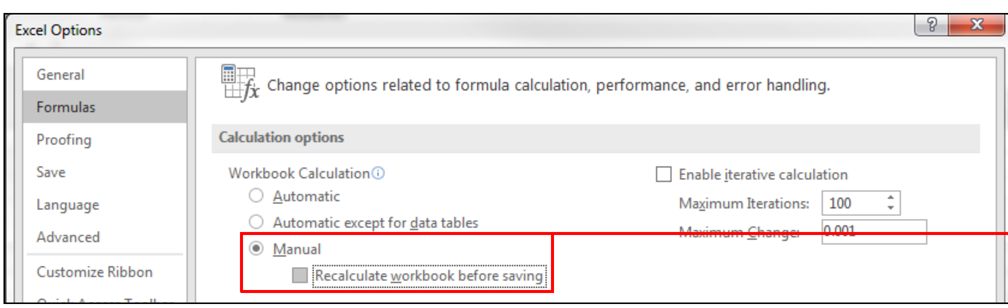
To avoid calculating the same data points several times while working on a template, do the following:

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



Select this option from the File menu.

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



Note the selections here.

5. Click **OK**.

Retrieving the Members of a Saved List or Search

Overview

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.

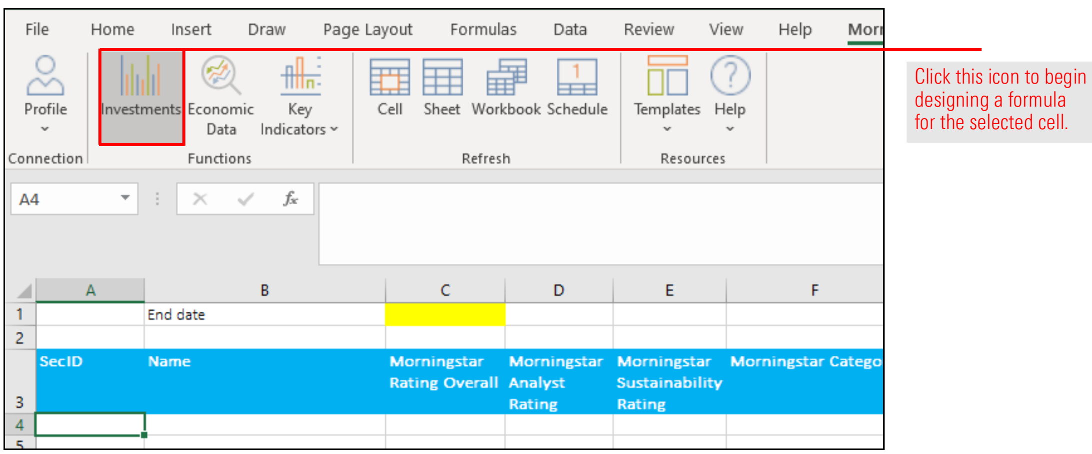
Exercise 5: Download the sample spreadsheet

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.

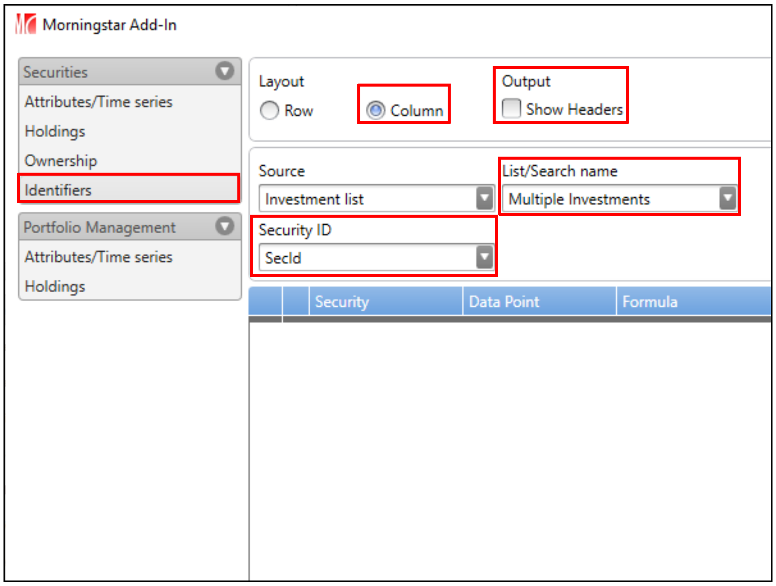
Exercise 6: Retrieve an existing list of investments

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.

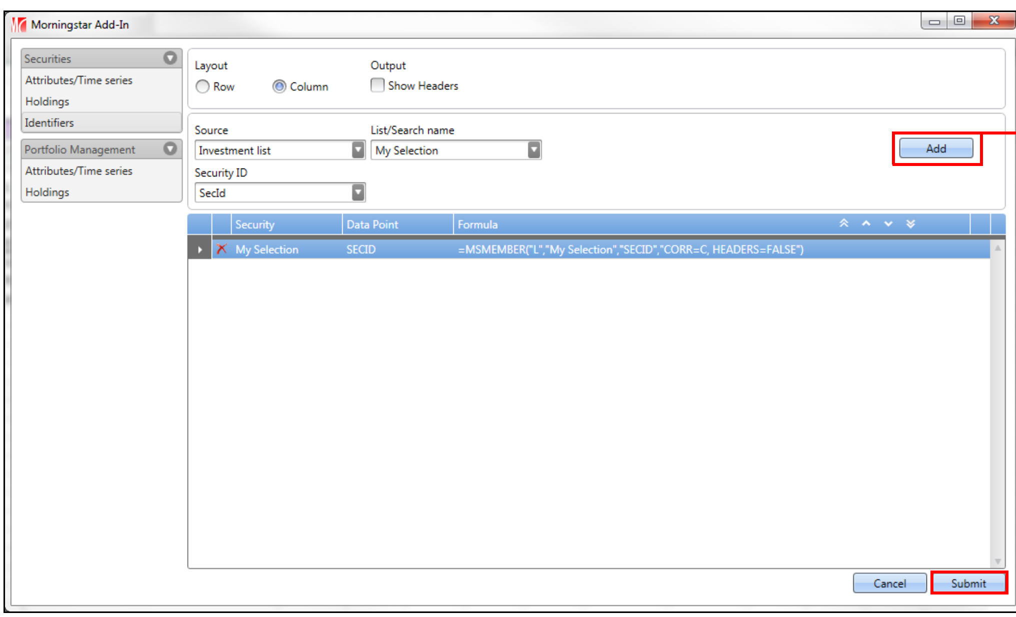


3. Under the Securities options, select **Identifiers**.
4. Under Layout, confirm that **Column** is selected.
5. Under Output, **deselect** the Show Headers checkbox.
6. Ensure the **Source** drop-down field has **Investment List** selected.
7. From the **List/Search name** drop-down field, select **Multiple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



Note the highlighted selections for this formula.

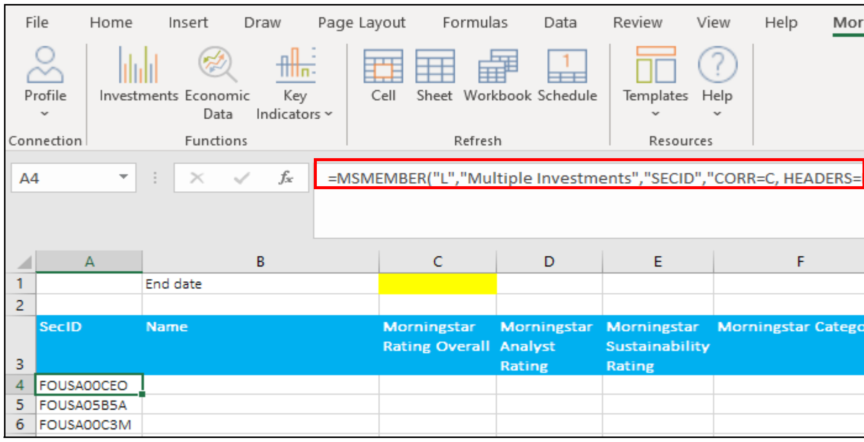
9. Click **Add**.
10. Click **Submit**.



When a formula is complete, click **Add**, then **Submit** to return to the spreadsheet.

What are the component parts of the MSMEMBER formula?

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



The formula can be seen here when selecting the cell where it was designed.

In this case, the following formula is being used:

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

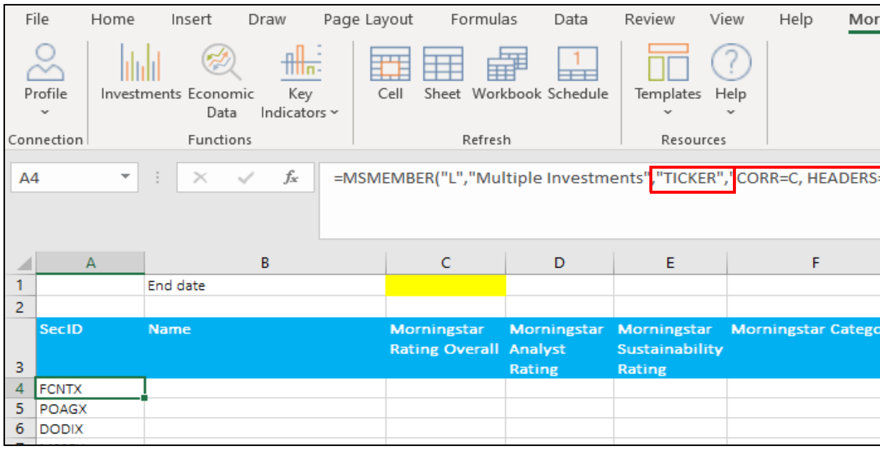
The following table parses each part of this formula:

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

Item	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**.



When replacing SECID with TICKER, be sure to preserve the quotation marks.

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

Overview

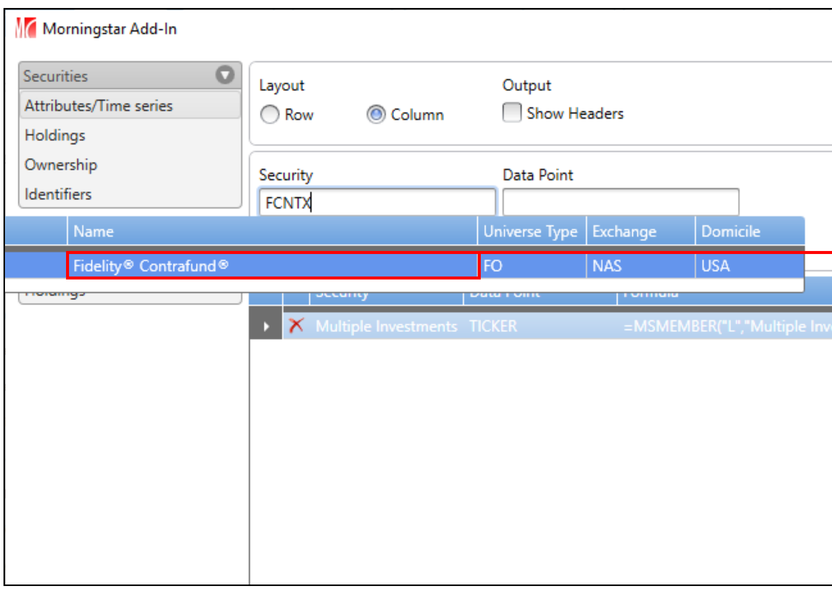
The MSDP (Morningstar Supplementary Data Point) formula is designed to retrieve current data points such as fund name, Morningstar Category, and so on. It requires the following parameters:

- Security identifier, and
- Data attribute identifier.

Exercise 7: Retrieve supplementary data points

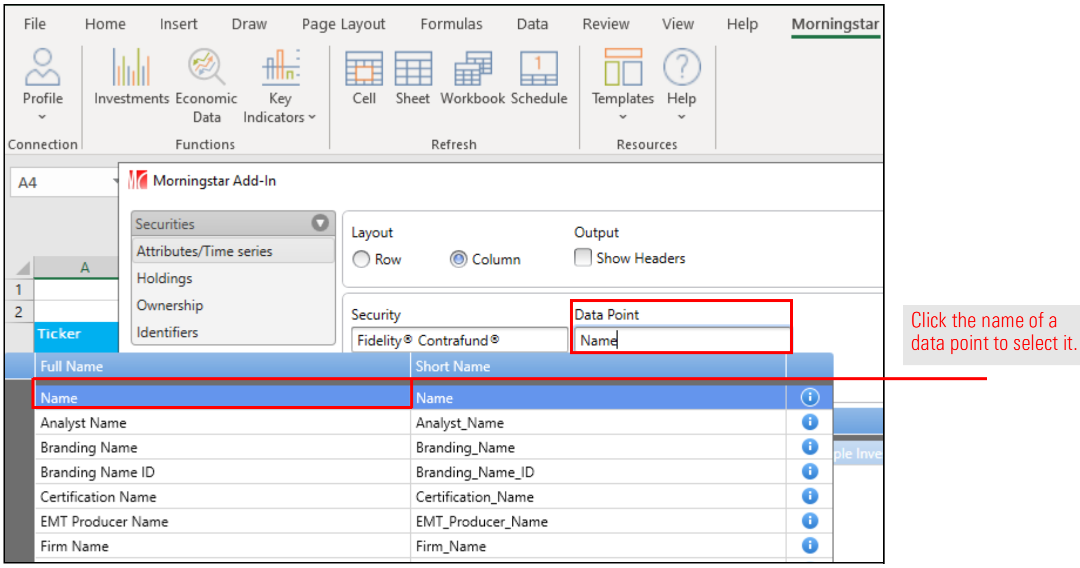
To obtain the Ticker for the list of securities, do the following:

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.

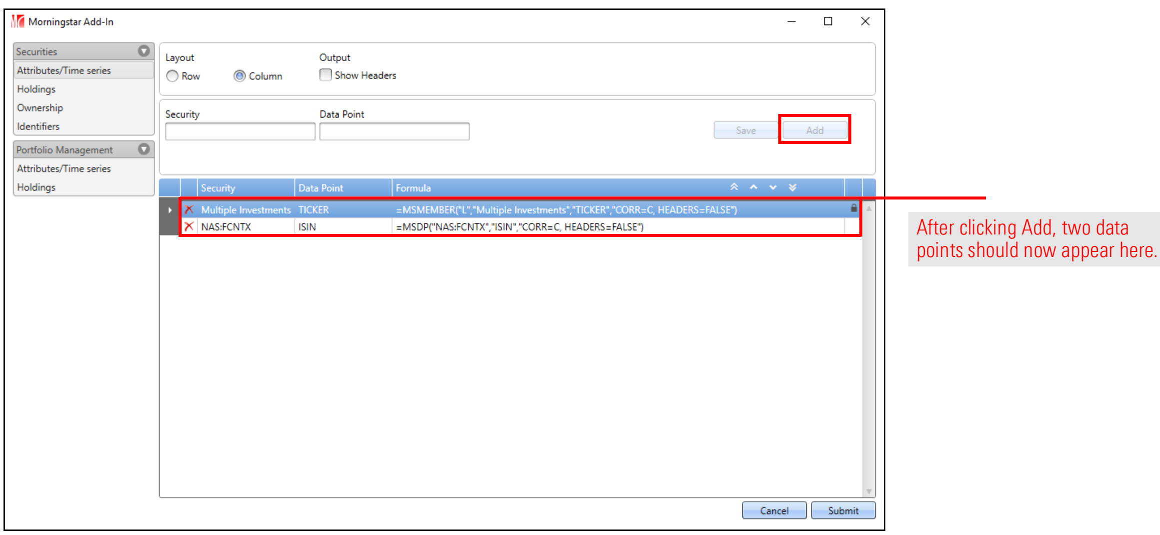


When the name of the fund appears, click it to select it.

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



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.



Exercise 8: Apply a formula to additional investments

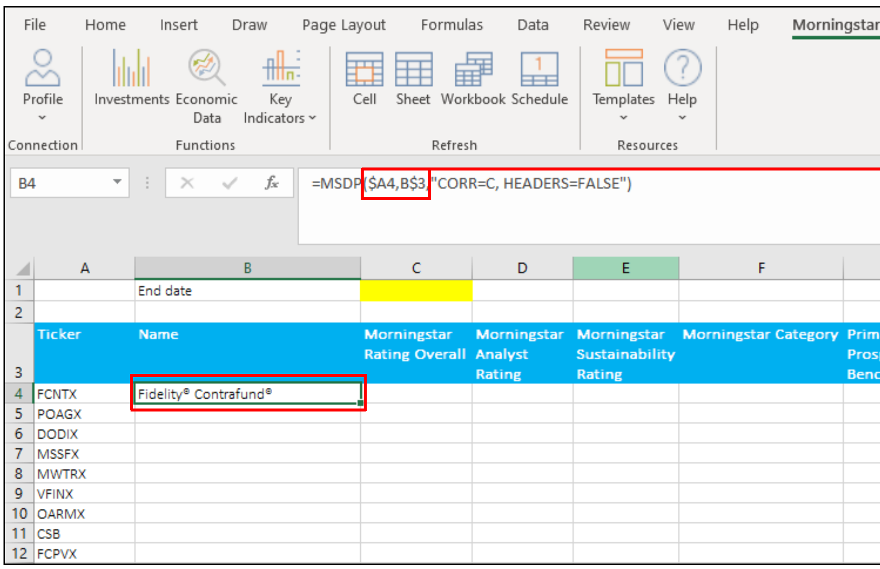
The same formula (in cell B4) should apply to all rows in that column, but before copying the formula down it will be useful to modify it to ensure the formula copied serves as a general reference for any security and data point referenced in the formula.

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.

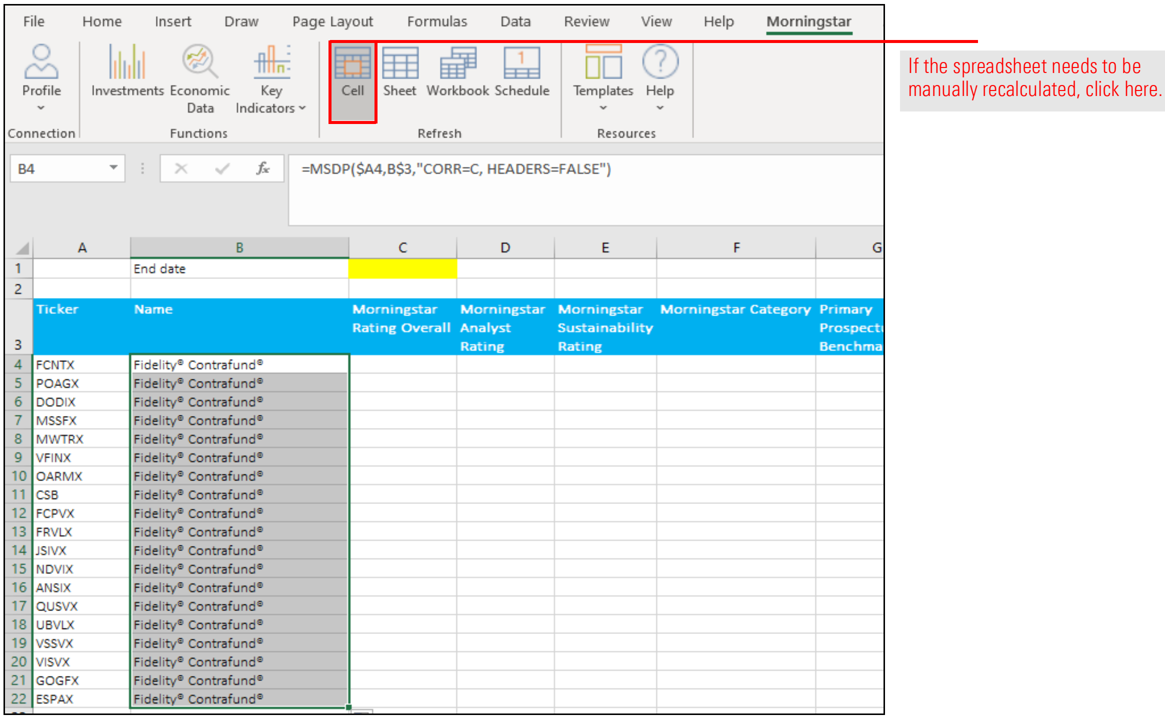
3. To reference the discrete data point name in the header, replace **"Name"** with **B$3**, then press <**ENTER**>.



Note that a cell reference does not take quotation marks.

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.



6. **Save** the workbook.

Exercise 9: Retrieve multiple data points at once

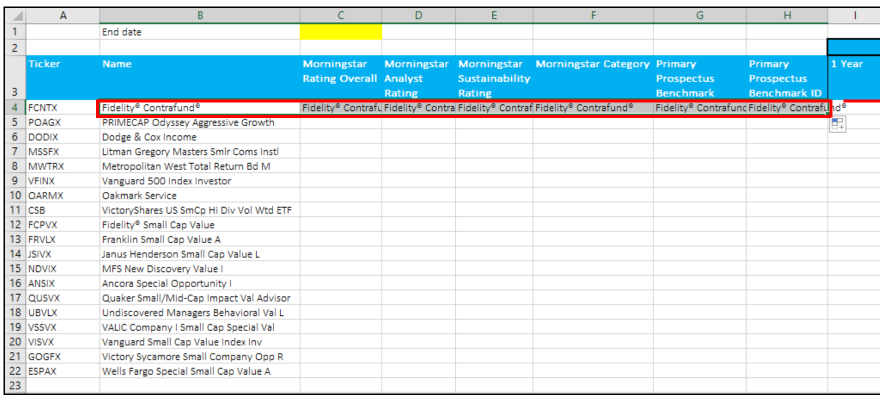
Per the column headers on the worksheet, the following discrete data points should also be retrieved:

- 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:

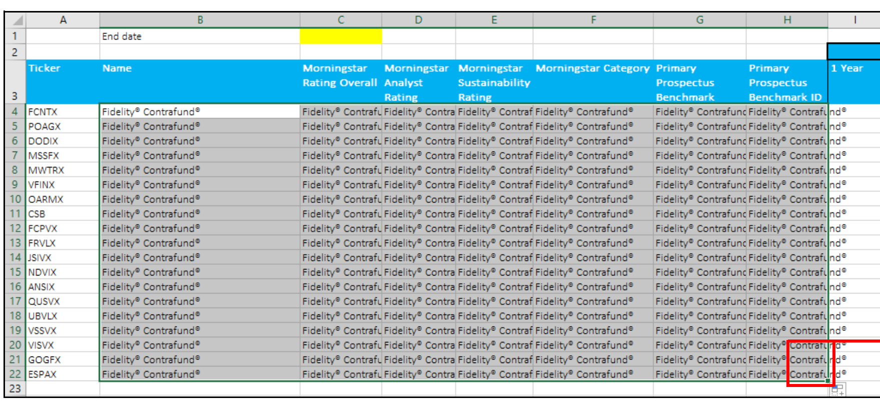
1. Select cell **B4**.
2. **Click-and-drag** the formula to the right to select the cell in the first row under the **MPT Benchmark ID** column.



	A	B	C	D	E	F	G	H	I
1		End date							
2									
3	Ticker	Name	Morningstar Rating Overall	Morningstar Analyst Rating	Morningstar Sustainability Rating	Morningstar Category	Primary Prospectus Benchmark	Primary Prospectus Benchmark ID	1 Year
4	FCNTX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
5	POAGX	PRIMECAP Odyssey Aggressive Growth							
6	DODIX	Dodge & Cox Income							
7	MSSFX	Litman Gregory Masters Smlr Coms Instl							
8	MWTRX	Metropolitan West Total Return Bd M							
9	VFINX	Vanguard 500 Index Investor							
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 I Small Cap Special Val							
20	VISVX	Vanguard Small Cap Value Index Inv							
21	GOGFX	Victory Sycamore Small Company Opp R							
22	ESPAX	Wells Fargo Special Small Cap Value A							
23									

Be sure to drag the formula from cell B4 all the way to H4.

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



	A	B	C	D	E	F	G	H	I
1		End date							
2									
3	Ticker	Name	Morningstar Rating Overall	Morningstar Analyst Rating	Morningstar Sustainability Rating	Morningstar Category	Primary Prospectus Benchmark	Primary Prospectus Benchmark ID	1 Year
4	FCNTX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
5	POAGX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
6	DODIX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
7	MSSFX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
8	MWTRX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
9	VFINX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
10	OARMX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
11	CSB	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
12	FCPVX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
13	FRVLX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
14	JSIVX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
15	NDVIX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
16	ANSIX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
17	QUSVX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
18	UBVLX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
19	VSSVX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
20	VISVX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
21	GOGFX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
22	ESPAX	Fidelity® Contrafund®	Fidelity® Contrafu	Fidelity® Contra	Fidelity® Contraf	Fidelity® Contrafund®	Fidelity® Contrafunc	Fidelity® Contrafu	nd®
23									

Drag the formula down to this cell.

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

Overview

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:

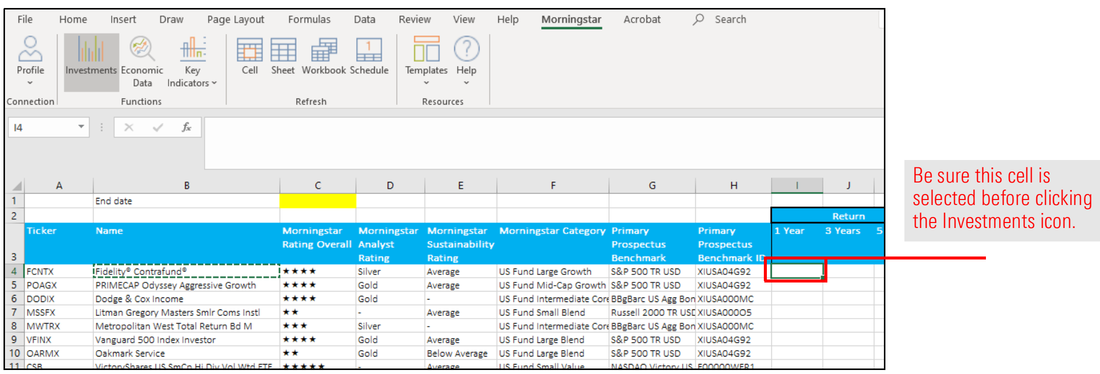
- Security identifier
- Data attribute identifier
- Start date, and
- End date.

☞ Note: When using custom calculations, other parameters are required, such as currency, benchmark, source, and so on.

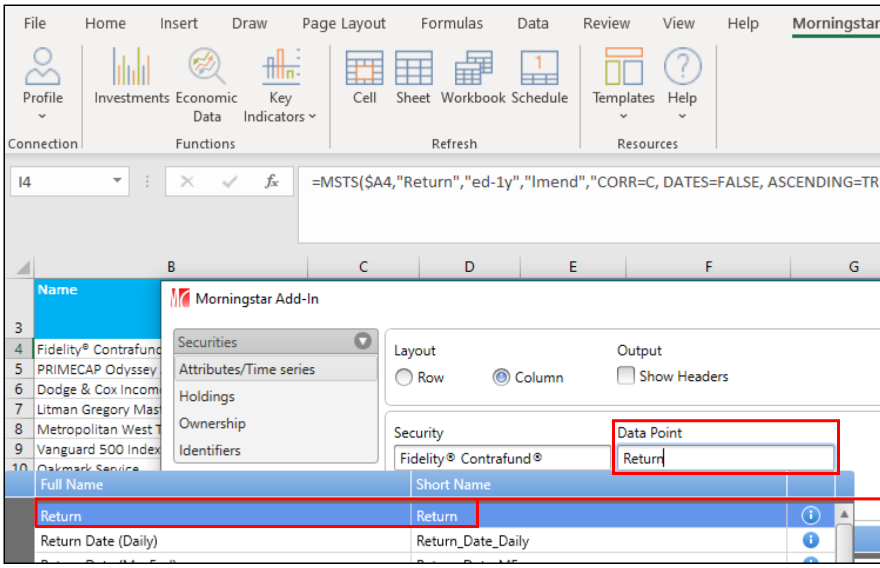
Exercise 10: Retrieve time series data points

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

1. **Copy** cell **A4**.
2. Select cell **I4**.
3. From the **Morningstar** tab, click **Investments**. The Morningstar Add-In window opens.

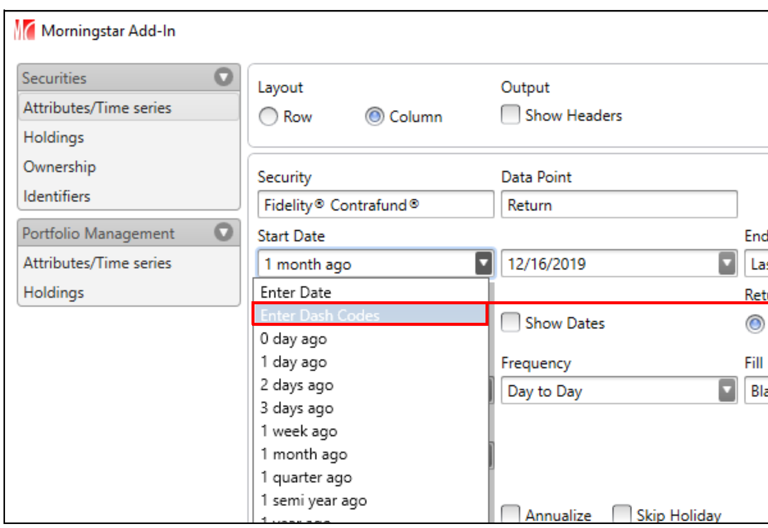


4. Under the Securities options, be sure **Attributes/Time Series** is selected.
5. Under Layout, confirm that **Column** is selected.
6. Under Output, ensure the Show Headers checkbox is deselected.
7. In the **Security** field, **paste** the **ticker**, then select the **security** that appears.
8.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



Be sure to select this data point.

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**.

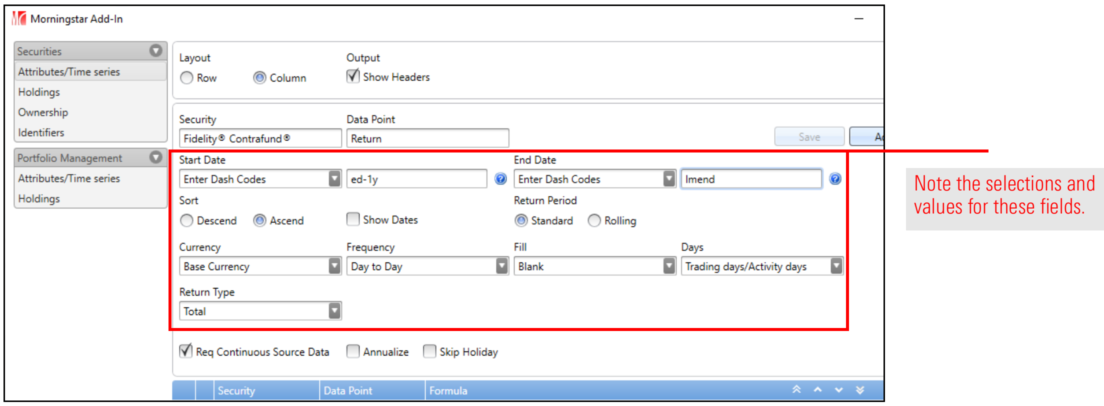


Select this option from the Start Date drop-down field.

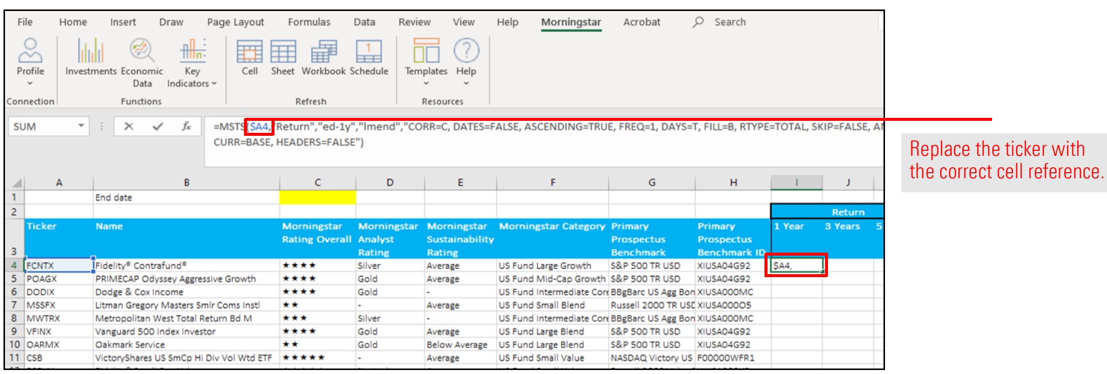
10. In the field to the right, type **ed-1y** (end date – 1 year).
11. From the **End Date** drop-down field, select **Enter Dash Codes**.
12. In the field to the right, type **lmend** (latest month end).

   ☞ 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.



14. Click **Add**, then click **Submit**.
15. Select cell **I4**.
16. As before, in the **Formula** bar, replace the ticker symbol (including the quotation marks) with **$A4**, then press <**ENTER**>.



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.

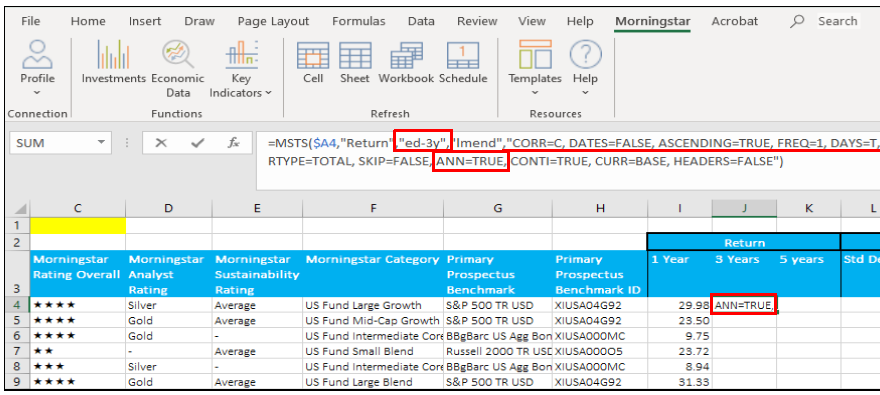
Exercise 11: Manually modify a formula

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**.



Change the values of the two highlighted parts of the formula.

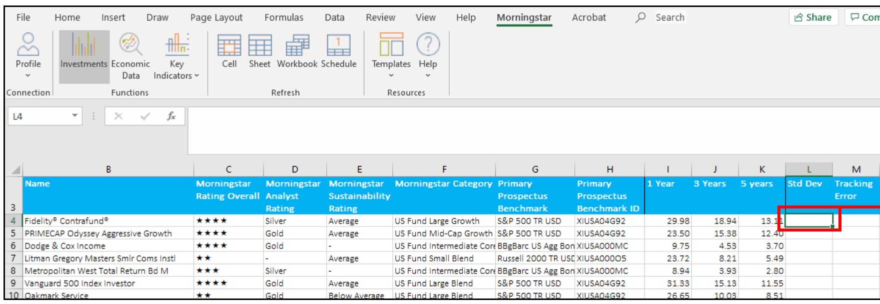
5. Press <**ENTER**>.
6. Drag the formula down the list to apply to all securities.
7. If necessary, click **Cell** to recalculate the values.
8. Repeat steps 1-7 to set up the **5-year return** (change ed-1y to **ed-5y** here) under column K.
9. **Save** the workbook.

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)).

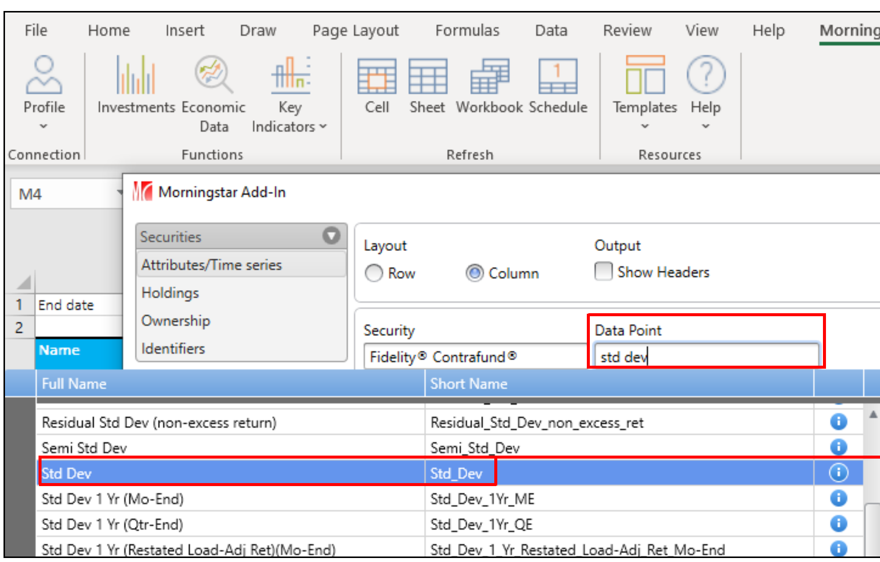
Instead, the generic versions of standard deviation, tracking error, and Sharpe ratio will be used. This allows users to set flexible start and end dates for the data points, which will be automatically updated when the workbook is refreshed. Do the following:

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



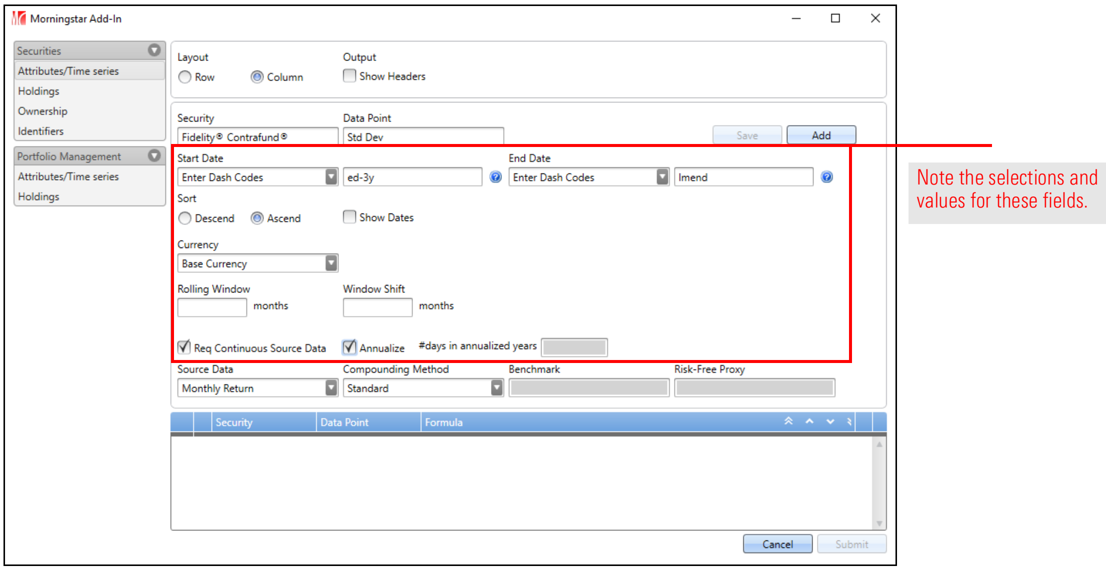
Be sure this cell is selected before clicking the Investments icon.

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.



Be sure to select this data point.

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 **lmend** (latest month end).
13. In the bottom-right corner of the dialog box, select the **Annualize** checkbox.

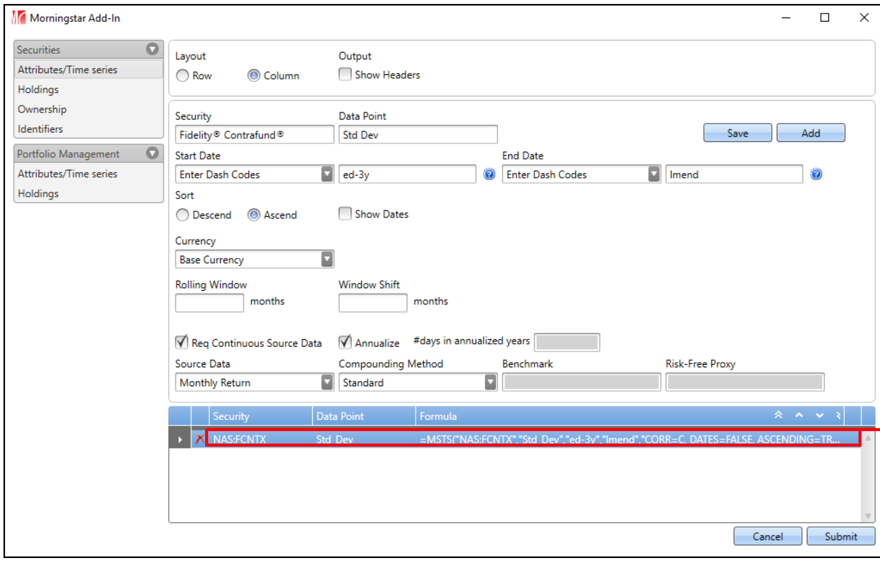


14. Click **Add**. Do not yet click Submit; the other two risk statistics will be added before returning to the worksheet.

Exercise 13: Add the tracking error

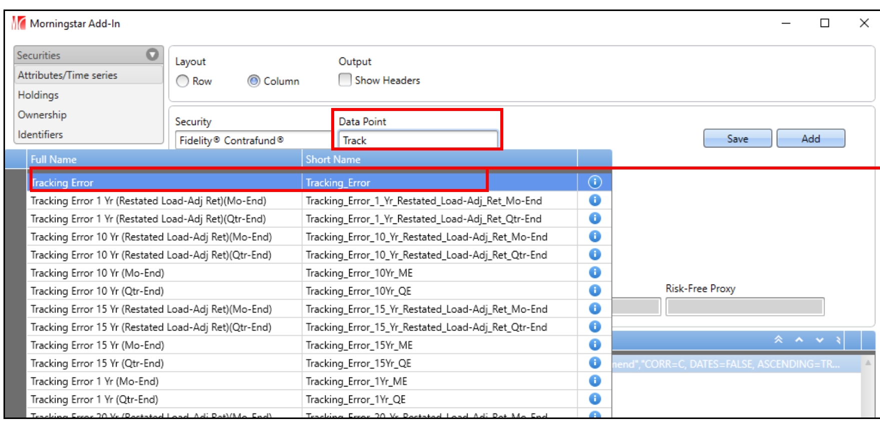
To add the 3-year tracking error data point to the Morningstar Add-In window, do the following:

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



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.

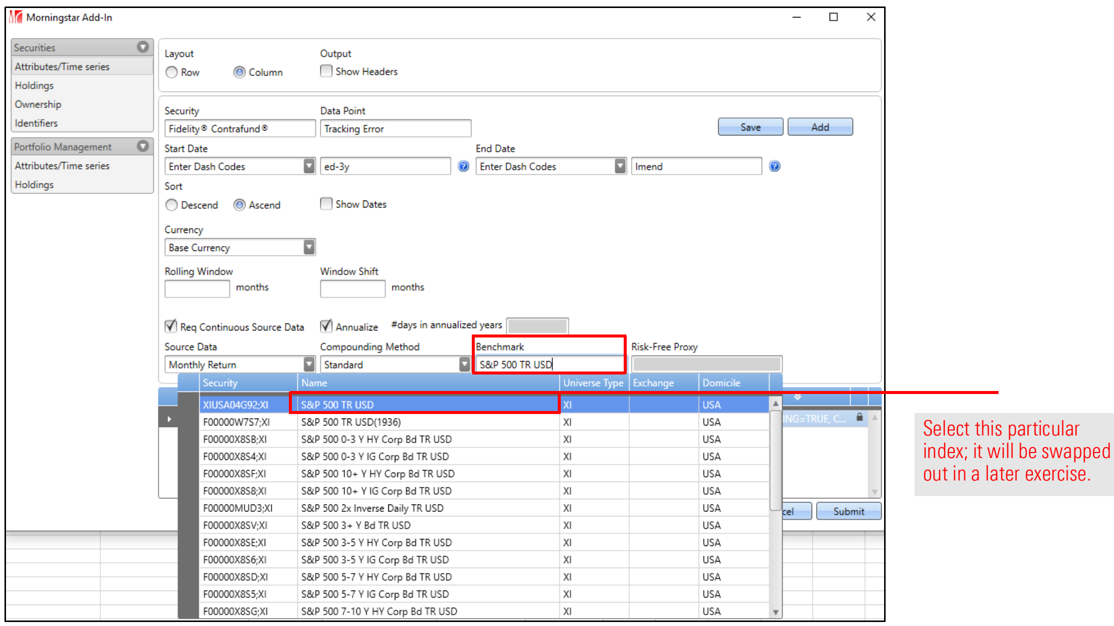
2. In the **Data Point** field, replace **Std Dev** with **Tracking Error**.



Be sure to select this data point.

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 **lmend** (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.

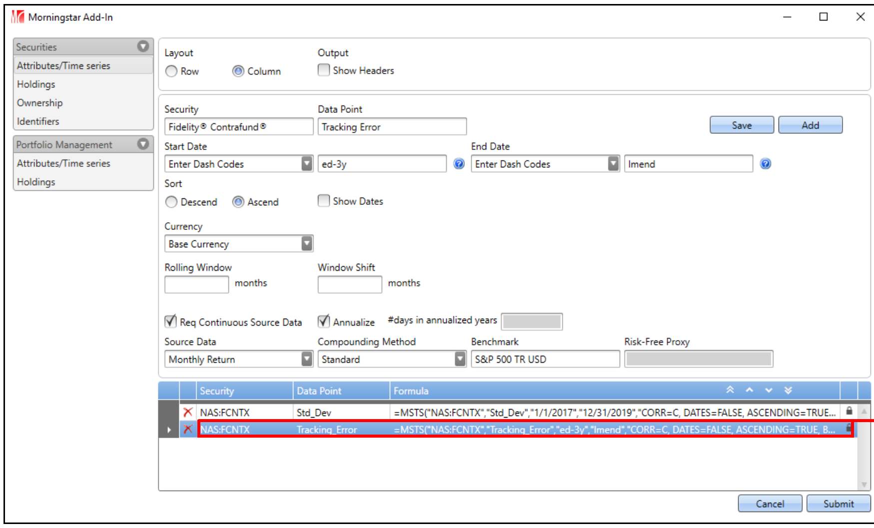


9. Click **Add**. Do not yet click Submit; Sharpe ratio will be added before returning to the worksheet.

Exercise 14: Add the Sharpe Ratio

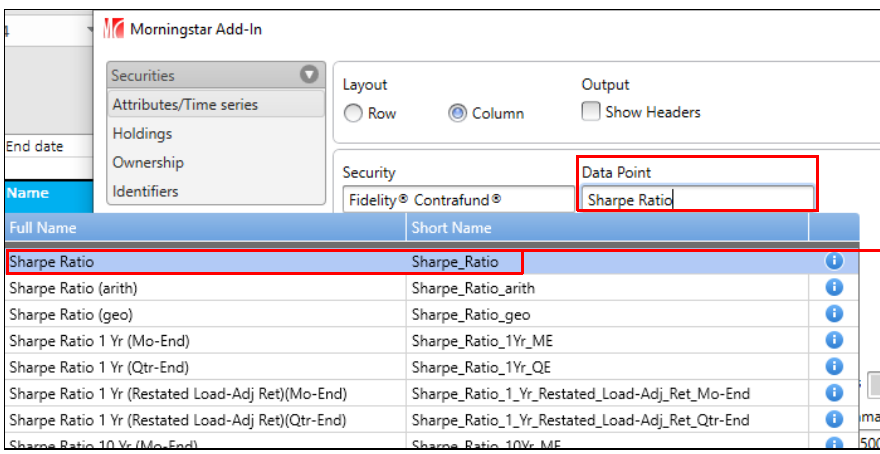
To add the 3-year Sharpe Ratio, do the following:

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



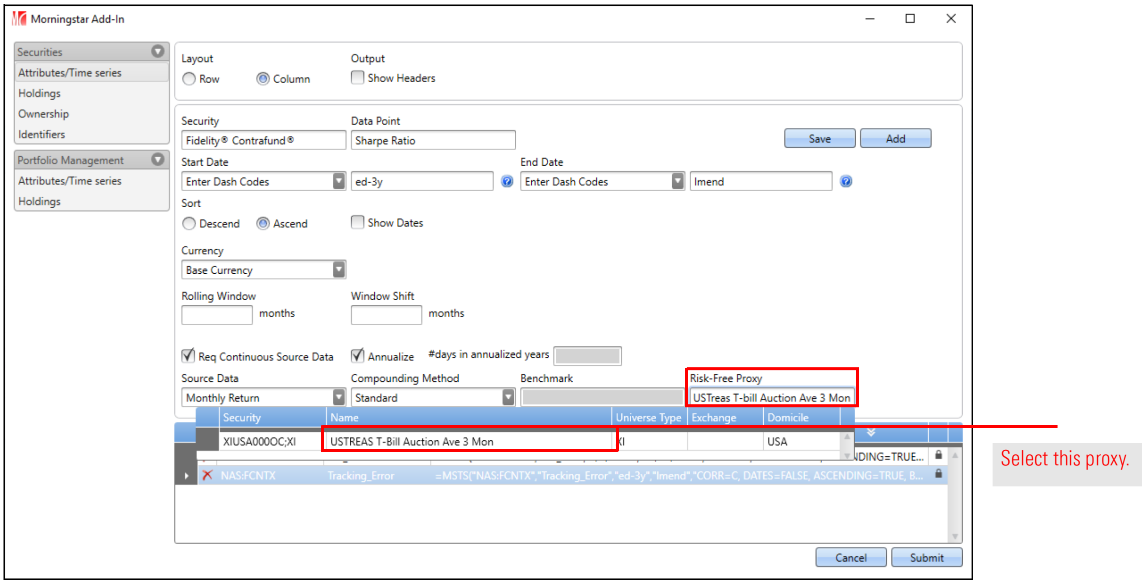
Click this formula to see its content populate in the fields within the window; be careful not to click the red X to the left of the row.

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



Be sure to select this data point.

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 **lmend** (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.



9. Click **Add**, then click **Submit**.

Exercise 15: Link formulas to a reference cell

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

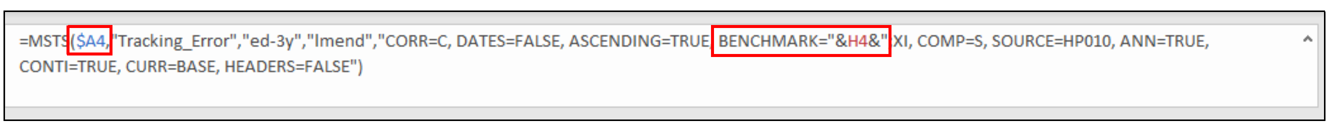
1. The formulas need to be modified to point to a reference cell.
2. The formulas need to be copied to all rows in a column.
3. The Tracking Error formula needs to be changed so it looks to the Primary Prospectus Benchmark ID cell for each row's calculation, rather than simply using the S&P 500 for all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

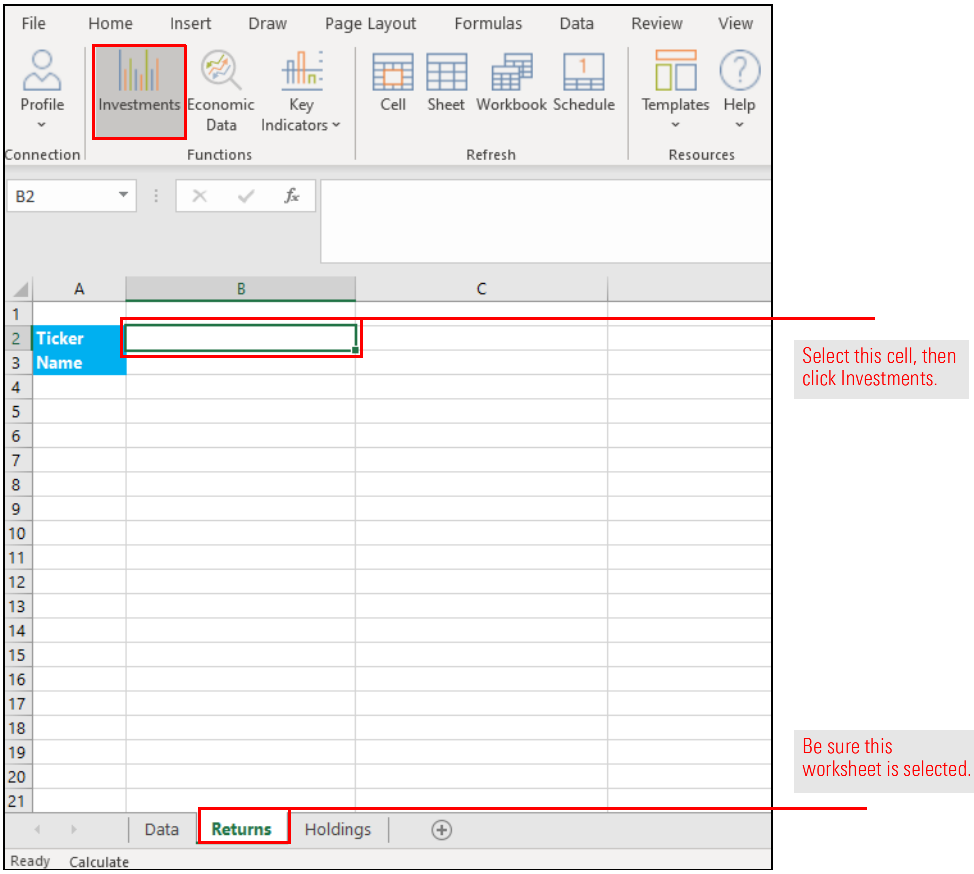


8. **Click-and-drag** the formula down the list to apply them to all rows in column M.
9. If necessary, click **Cell** to recalculate the values.
10. Select cell **N4**.
11. **Click-and-drag** the formula down the list to apply them to all rows in column N.
12. If necessary, click **Cell** to recalculate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

Exercise 16: Retrieve Historical Series data

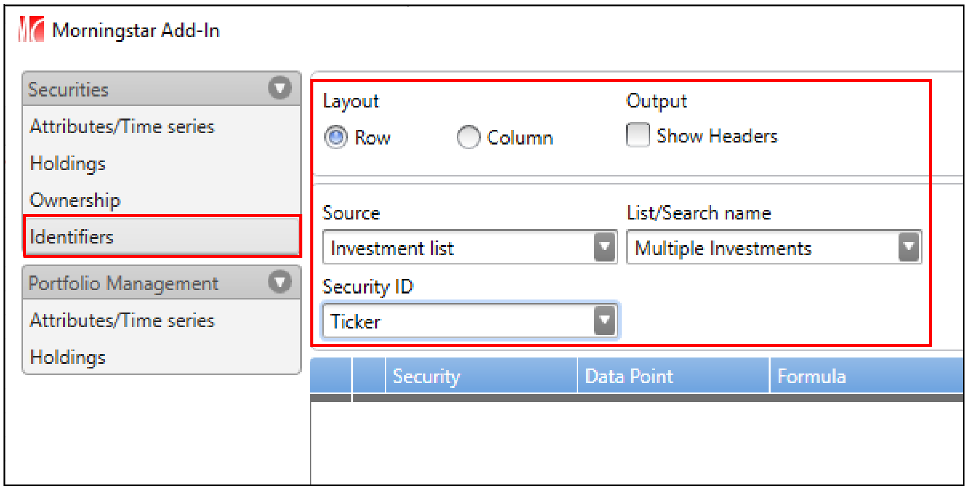
The MSTS formula also allows users to extract a historical series of data, such as historical prices, returns, Morningstar Ratings, and so on. To extract the historical returns for the list of funds, do the following:

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



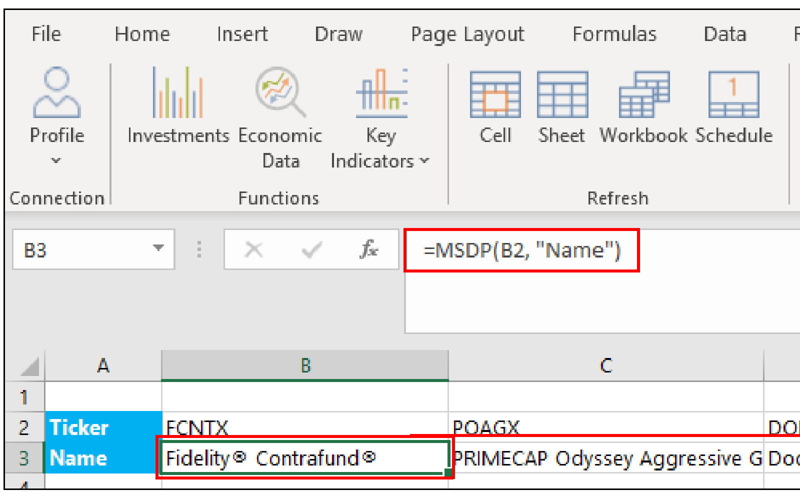
3. Click **Identifiers**.
4. Under Layout, select **Row**.
5. Under Output, deselect the **Show Headers** checkbox.
6. From the **Source** drop-down field, be sure **Investment Lists** is selected.
7. From the **List/Search name** drop-down field, select **Multiple Investments**.

8. Under **Settings** > **Security ID**, select **Ticker**.



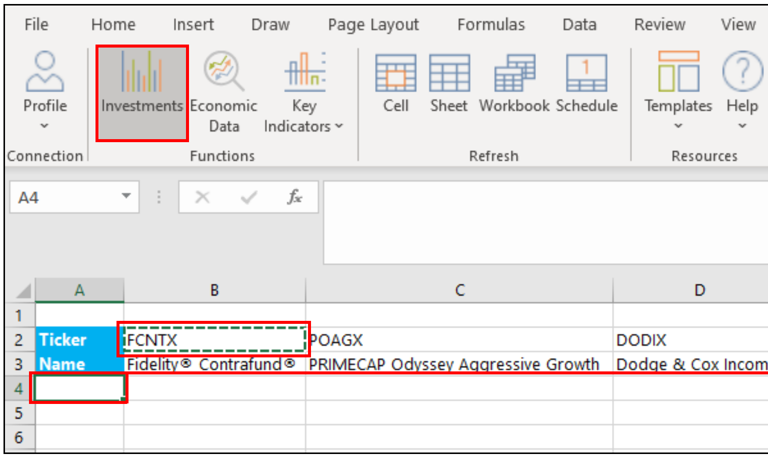
Be sure to mirror the selections shown here.

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.



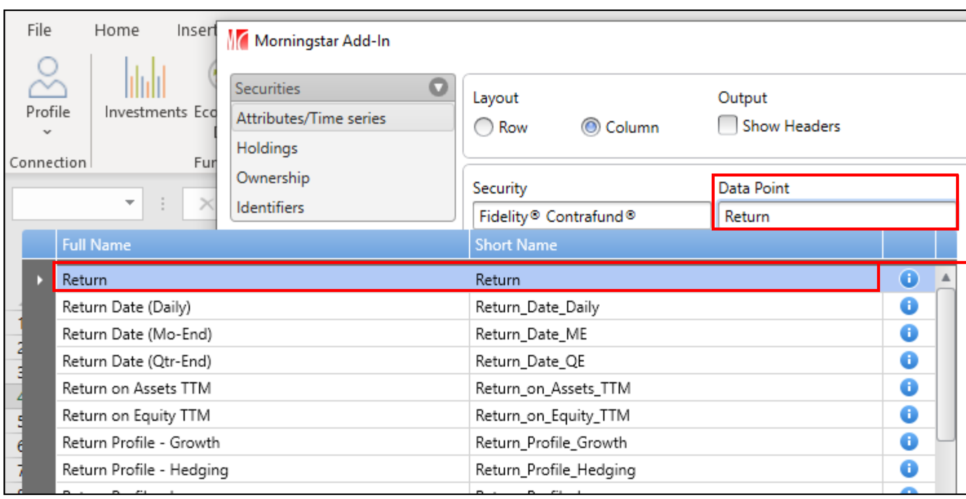
Type the formula directly into the cell (or Formula bar).

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**.



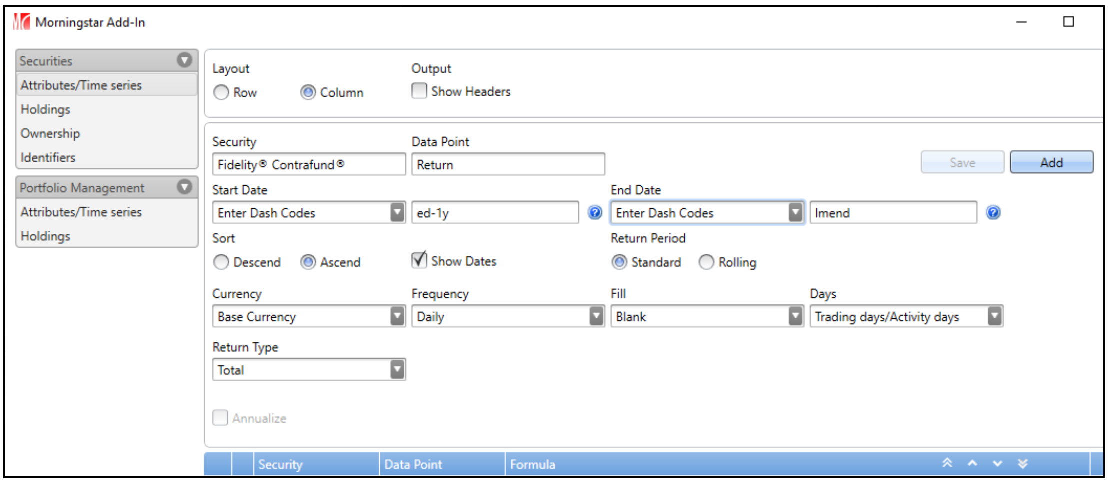
Select this cell before clicking Investments.

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.

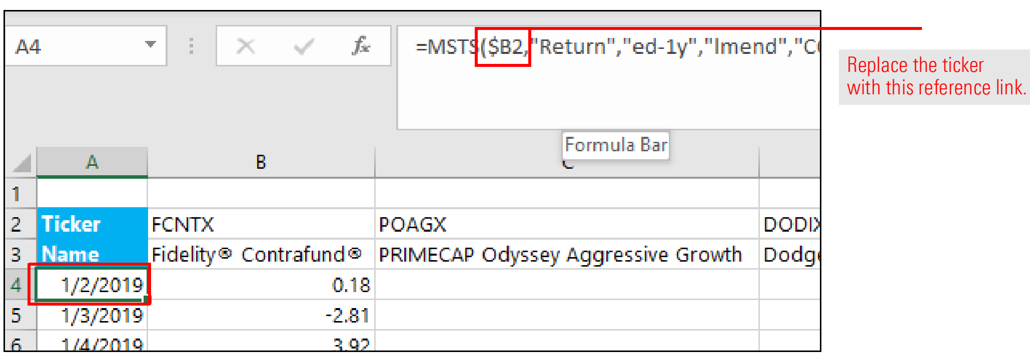


Select this data point.

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 **lmend**.
19. Select **Show Dates**.



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



22. To modify and apply the same formula to the second fund, do the following:

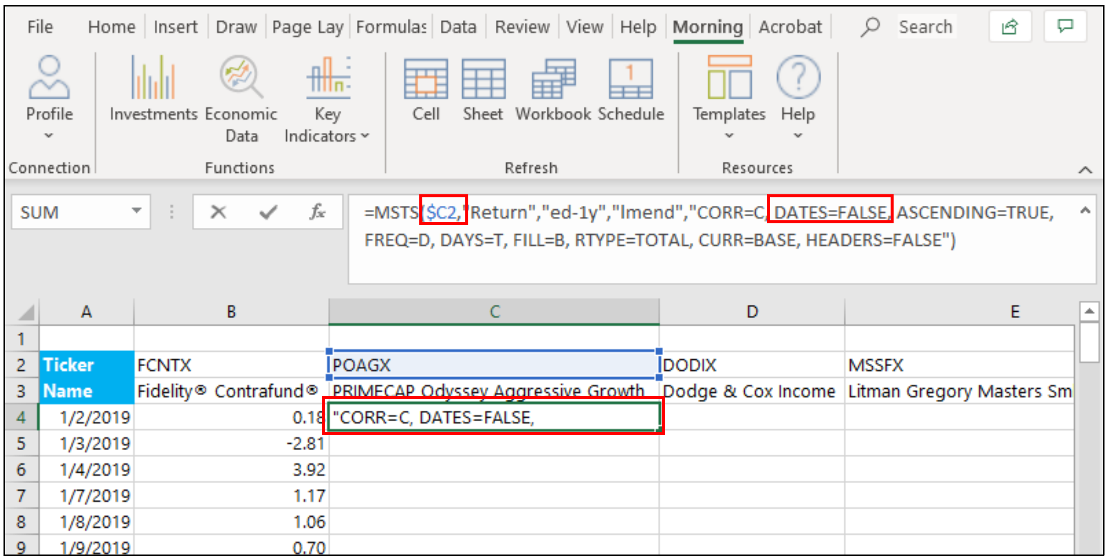
    A. **Copy** cell **A4**.

    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**>.

Note the changes to make for the formula in this cell.



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

Overview

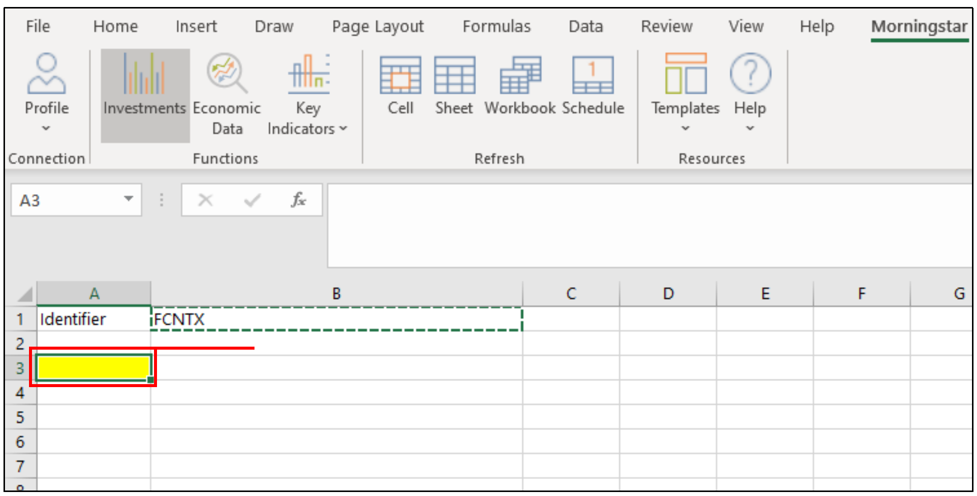
The MSHOLDING formula is designed to retrieve holdings of portfolios. It requires at least the following parameters to retrieve the latest holdings:

- 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.

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

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

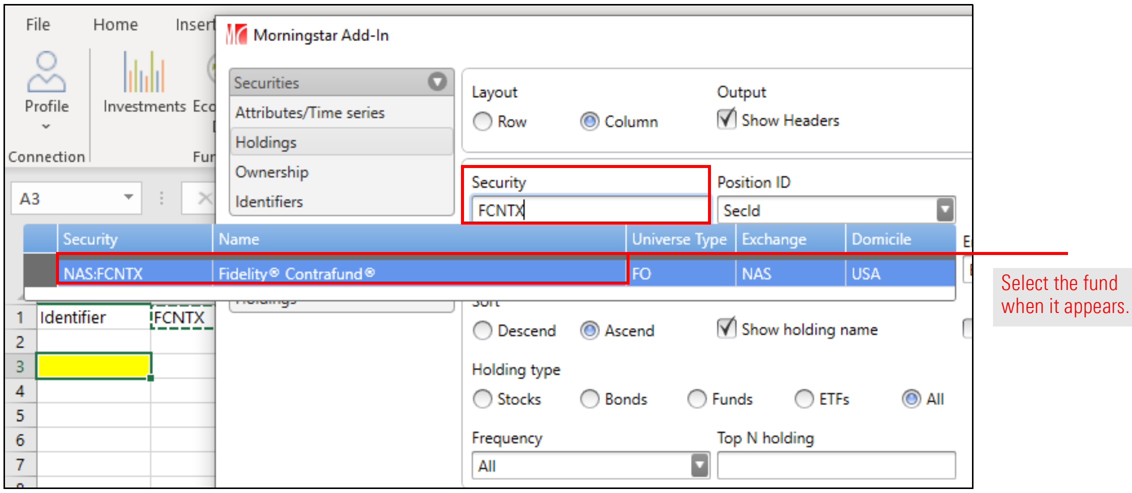
1. In the Excel file provided, select the **Holdings** worksheet. Notice the ticker in cell B1.
2. **Copy** cell **B1**.
3. Select cell **A3**, where the data will display.
4. From the Morningstar toolbar, click **Investments**.



Callout

5. Under the Securities heading, select **Holdings**.

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



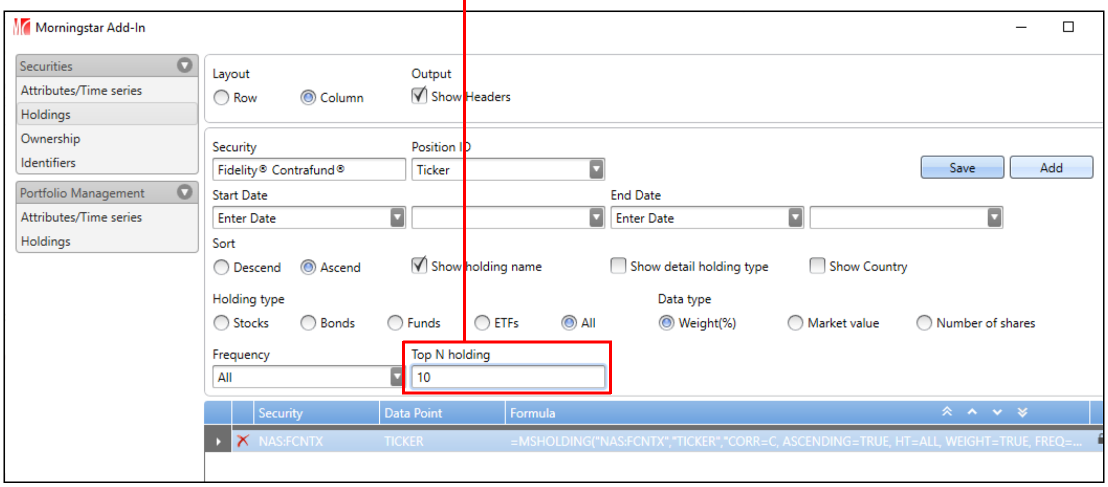
7. The option for **Column** should be selected, and the check box for **Show Headers** should also be selected.
8. From the **Position ID** drop-down field, select **Ticker**.
9. From the Data type section, the option for **Weight (%)** should be selected.
10. Leave all other settings as is and click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

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

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

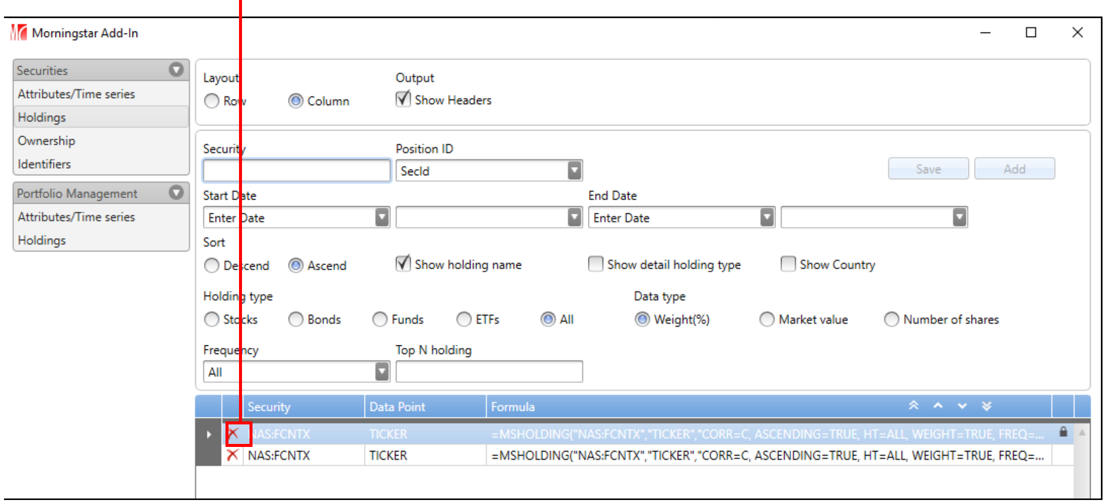
1. Cell **A3** should be selected.
2. From the **Morningstar** toolbar, click **Investments**.
3. In the **Top N Holdings** field, type **10**.

Note the entry in this field.



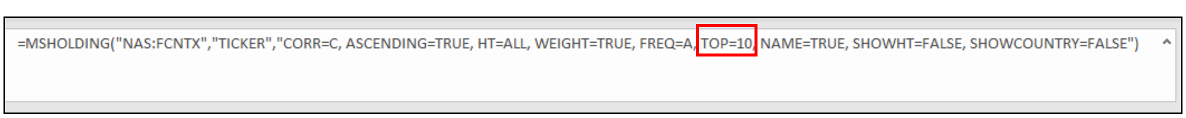
4. Click **Add**.
5. To the left of the top row, click **X** to delete the first formula.

Click here to delete this row.



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

Note this addition to the formula.

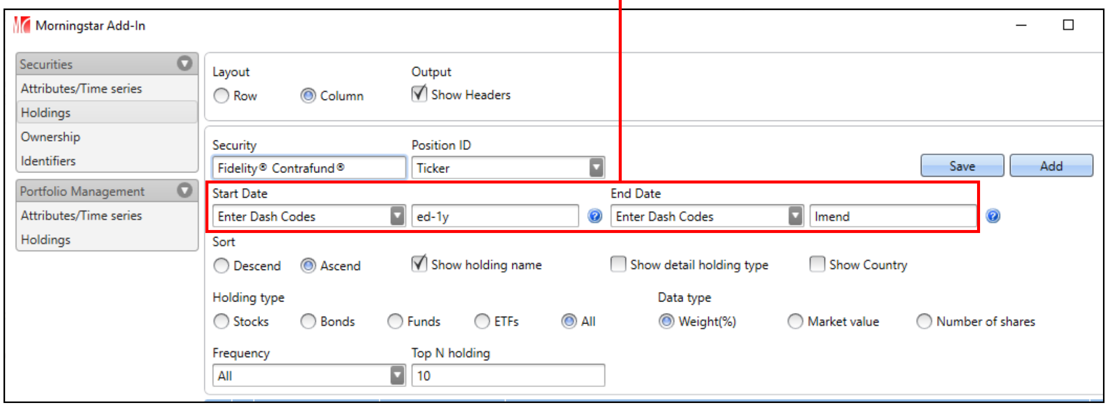


Exercise 19: Retrieve historical positions for a fund

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:

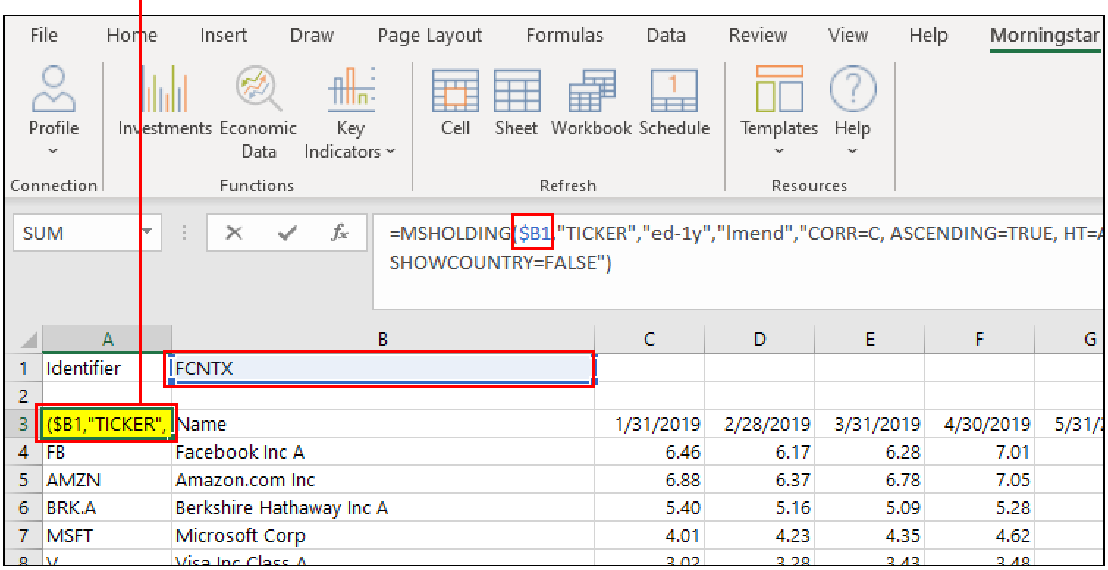
1. Cell **A3** should be selected.
2. From the **Morningstar** toolbar, click **Investments**.
3. From the **Start Date** field, select **Enter Dash Codes**, then, type **ed-1y**.
4. From the **End Date** field, select **Enter Dash Codes**, then type **lmend**.

Update the values for the date fields.



5. Click **Add**.
6. **Delete** the top formula.
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.



9. **Save** the workbook.

Retrieving Ownership Information for an Investment

Overview

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:

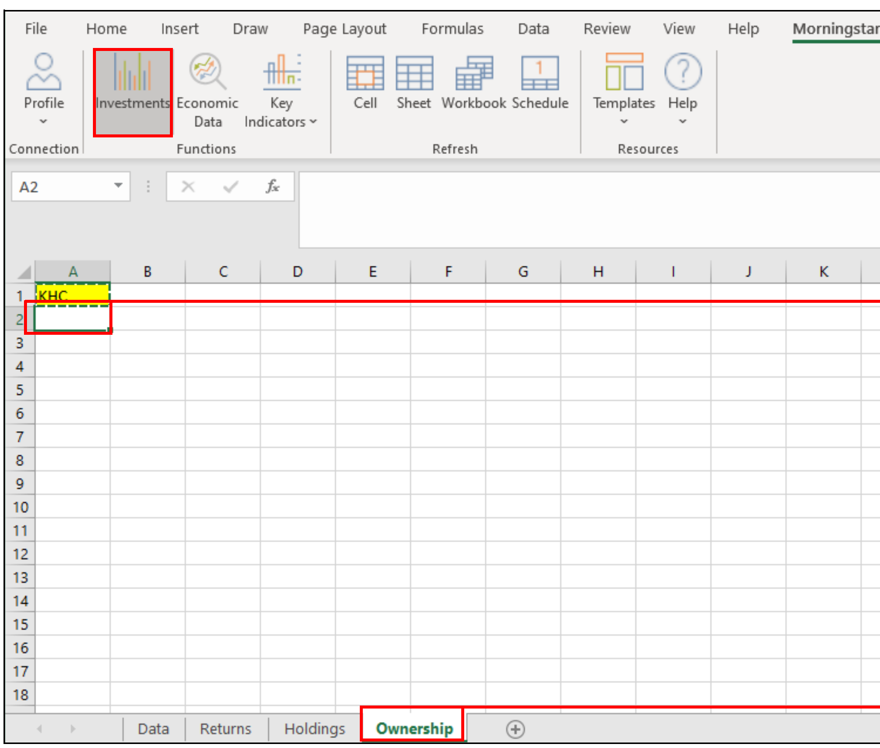
- Name
- SecId, and
- Position Market Value.

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.

Exercise 20: Retrieve ownership data for a stock

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

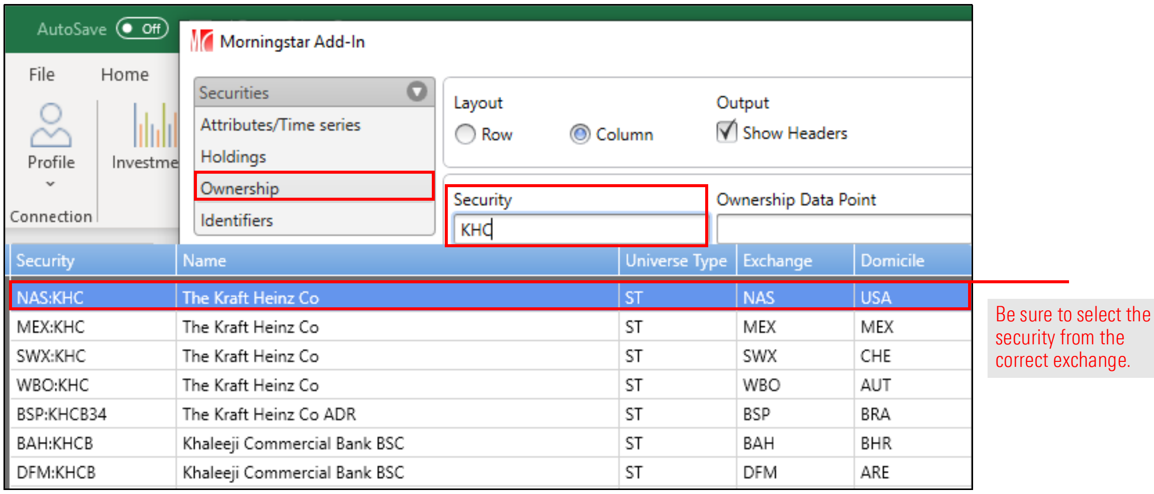
1. In the template provided, select the **Owners** worksheet. Note the ticker in cell A1.
2. **Copy** cell **A1**.
3. Select cell **A2**, where the data will display.
4. From the **Morningstar** toolbar, click **Investments**.



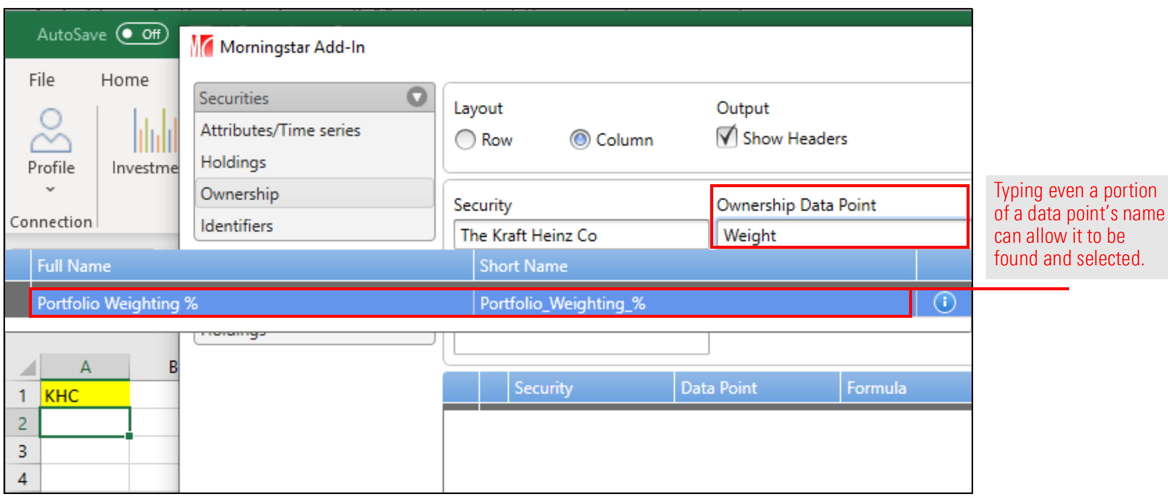
Note the cell to select before clicking Investments.

Be sure this worksheet is selected.

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.



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



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 **lmend**.
10. Click **Add**, then click **Submit**.
11. **Save** the workbook.

A short note on using Dash Codes

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.

The following codes can be used for end dates:

Name	**Dash Code**
Last market close	lmktclose
Last week end	lwend
Last month end	lmend
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	lmend
Year-to-date, up to the latest month end	ed-x0 ☞ -x0 always reverts to the start of the year	lmend
Month-to-date through the latest market close	ed-m0 ☞ -m0 always reverts to the start of the month	lmktclose