

# OmniFunds v3

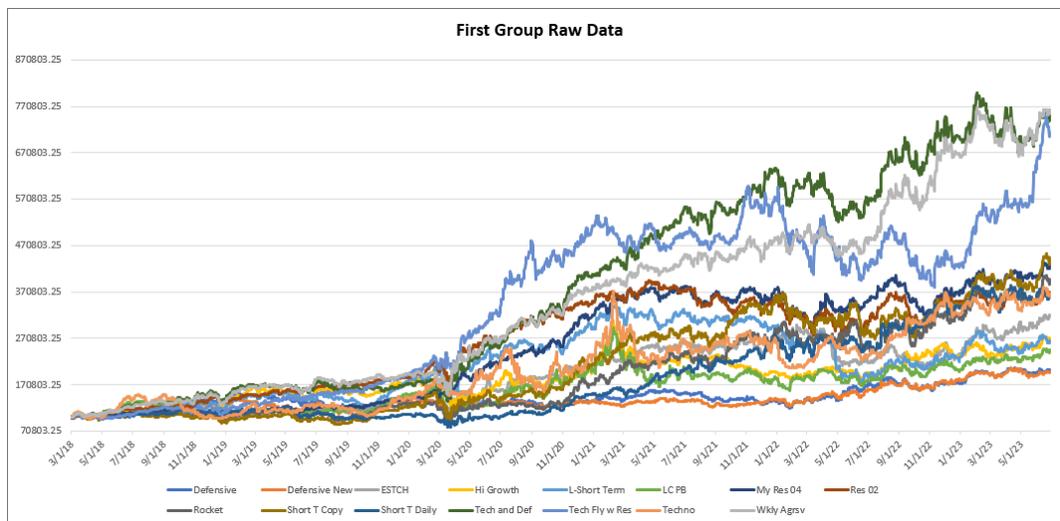
## Functional Specification v1.1

### Overview

OmniFunds is comprised of Portfolios, which are Trading Methods that have a List, Filtering, Ranking and Allocation defined. Two Portfolios are combined to define an OmniFund. Exits occur on the switching interval, when new Symbols pass the Filter AND have a higher Rank than existing trades within a Portfolio.

### Historical Trading Observations:

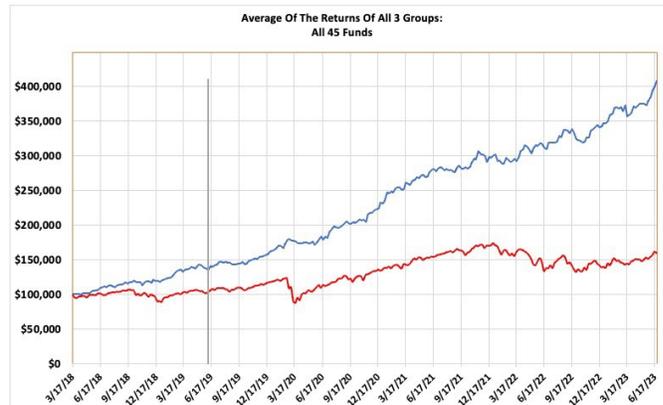
Studying historical Portfolio curves since 2018, it has been determined that a consistent return can be achieved by switching into the best Portfolios based on an analysis of recent returns. Here is a graph showing 15 “randomly” selected Portfolios from Omnifunds, showing tremendous variability of returns. This leads to losses and draw downs if only 2 Portfolios are chosen and left to run.



This one trades the middle 5 ranked Portfolios each week using Standard Deviation of Returns as the ranking function. **30%/year w 5% MDD**

Average Of All Groups (45 Funds)		
Equity \$	\$408,044.23	MDD Date:
MDD	-6.55%	6/8/19
CAGR	30.59%	
CALMAR	4.67	
Longest DD in Wks	20	4/2/22
Avg DD in Wks	2.5	
% Wks Profitable	62.5%	

62.5% (of the 275 weeks in the data) were profitable week to week



# Implementation

## Overall Goal:

Reconfigure OmnFunds to allow users to select the N Portfolios they want considered for trading in the future, to be selected using the algorithm.

## Primary Changes:

1. N Portfolios: Rather than “Conservative” and “Aggressive”, OmniFunds v3 will use N Portfolios for each OmniFund. Check boxes are used on the list to select those considered.
2. Switching: On a common switching interval (typically weekly), select M Portfolios (out of the N available) based on an analysis of recent past performance (Standard Deviation of Returns, per Holstius) to achieve a ranked order. Start from point R. That is, if R=5, then select Portfolio R, R+1, ... R+M-1.

## Secondary Changes

1. Preserve History: Preserve Trade History after a Fund is “published” regardless of changes made to the Fund after that point. Any trades that are available at the Open on any day are kept. Changes do NOT affect prior Trade History.
2. Speed of Analysis: Defer analysis of any Portfolios that are “dormant” – i.e., not being used in actual or simulated trading. Run analysis on dormant Portfolios after the Open each day. Consider archiving if unused for more than X Months.

## Interface Changes

1. Add CALMAR Metric: Portfolio List shows CALMAR metric (Avg APR/ Avg MDD) which can be used for sorting.
2. Select N Portfolios: Remove the Aggressive/Conservative control. Add check boxes to the List of Portfolios for the user’s selections.

## Important Additional Changes

1. Add Exit on Condition: If Flag is set, Exit when the Filter for any in-trade Symbol becomes False (in addition to the switching interval). This helps OmniFunds take profits on positions that have significantly advanced.

# Existing Pages

## Existing Portfolio List Page

omnifunds | How it Works | About Us | Products | FAQ | Blog | Explore | Lab | My Omnifunds | Logout | Haskell Downs

OmniFunds | Portfolios | Library | Experiments

### Portfolios Lab

Mine  All Owners  Nirvana Published

ID	Owner	Portfolio Name	YTD	1Y	3Y	5Y	Start	End	Action
4228	Jeff Drake	Tech Flyers w/ Resilient	37.5%	37405.6%	41.1%	15.9%	9/17/2022 4:03:53 PM	8/12/2023 11:06:01 PM	view debug
4229	Jeff Drake	Tech Flyers w/ Resilient 2 DAYS MOO	38.3%	41886.7%	36.2%	14.0%	10/26/2020 12:57:33 PM	8/12/2023 11:06:46 PM	view debug
238	Jeff Drake	US Industry ETFs	8.6%	363.9%	37.3%	14.0%	12/1/2017 5:29:46 PM	8/12/2023 10:00:50 PM	view
224	Jeff Drake	US Stocks ETFs 02	8.7%	372.0%	41.1%	15.5%	12/1/2017 5:29:48 PM	8/12/2023 10:00:34 PM	view

Add Portfolio

### Historical Performance: Tech Flyers w/ Resilient 2 DAYS MOO

Nas100, WDAY, Workday, Inc, ASML, Asml Holdings NV, WLTW, Willis Towers Watson Public Ltd Co, ADSK, AUTODESK, NVDA, NVIDIA, GILD, GILEAD SCIENCES, ALXN, ALEXION PHARMACEUTICALS, GOOG, ALPHABET INC CL C, COST, COSTCO WHOLESALE, SIRI, SIRIUS XM HOLDINGS INC, COMMON

Compare:  U.S. Stocks,  U.S. Bonds,  U.S. Robos

\$100k to \$40M

'05 '06 '07 '08 '09 '10 '11 '12 '13 '14 '15 '16 '17 '18 '19 '20 '21 '22 '23

01 Month 03 Months 06 Months 01 Year 05 Year All

Log Scale

Equity Curve Stop Level: 20

Stop re-entry type: No Stop

- No Stop
- Stop Percent
- Stop Percent - Re-enter on Monthly Boundary only
- High Watermark
- SMA(3)>SMA(21)
- SMA(7)>SMA(55)
- SMA(3)>SMA(21) Trade SMA Crossover
- SMA(7)>SMA(55) Trade SMA Crossover

Notes on the current implementation:

1. Columns can be sorted but headers do not stay at top.
2. A percent stop level is defined here.
3. A re-entry condition is also specified here.

## Existing Page to View Portfolio (from right side of Portfolio List)

omnifunds    How it Works    About Us    Products    FAQ    Blog    Explore    Lab    My Omnifunds    [Logout](#)    Haskell Downs

OmniFunds    Portfolios    Library    Experiments

### Portfolio

#### Details

Title: Tech Flyers w/ Resilient 2 DAYS MOO  
Internal Comment:  
Long Description:  
Last Calculated: 8/12/2023 11:06:46 PM (1 minute)

---

Allocation Method: Fixed Allocation  
Switching Method: Market-on-Open: Formula: Close at end of interval using MOC  
Flat Formula: C >50   
Flat Symbol: \$VIX   
Interval: 2 Days  
Minimum Avg Volume: 0  
Invest Fully: Allow Cash   
Classification: Aggressive  
R&D: Debug Dump Enabled

### Sectors

Sector	Filter	Ranking	MarketState	actions
Nas100	V	V	V	
Resilient		V		

#### Sector

Symbols: AAL, AAPL, ADBE, ADI, ADP, ADSK, ALGN, ALXN, AMAT, AMD, AMGN, AMZN, ASML, ATVI, AVGO, BIDU, BIIB, BKNG

Filter:  $EMA(100) > EMA(100)[2]$  AND  $C > EMA(20)$   
Rank:  $-1 * (AVG(V,60) * AVG(C,60))$   
MarketState:  $QQQ: C > SMA(20)$   
Max Concurrent Positions: 2  
Max Allocation: 100

### Notes:

1. Verify that “Flat Formula” and “Flat Symbol” create a Market State on the entire Portfolio. (Each sector has its own MS as well).
2. For “Invest Fully” selected, what is the behavior if “Allow Cash” is selected?

## Existing Page to Create an OmniFund

Selecting “Add OmniFund” from OmniFunds List shows this screen.

The screenshot displays the "OmniFund Setup" window, which is divided into two main sections: "Conservative Portfolios" and "Aggressive Portfolios".

Conservative Portfolios				Aggressive Portfolios			
ID	Name	Return	MDD	ID	Name	Return	MDD
○138	Cash	0.0%	0.0%	○2913	Resilient US	3242.0%	38.1%
○145	Conservative ETFs	172.2%	15.5%	○4228	Tech Flyers w/ Resilient	37405.6%	41.1%
●175	Defensive Stocks NEW	4221.0%	32.1%	●4229	Tech Flyers w/ Resilient 2 DAYS MOO	41886.7%	36.2%
○224	US Stocks ETFs 02	372.0%	41.1%	○4817	Resilient V2	4460.4%	34.9%
○231	Global Market ETFs	338.4%	42.5%	○4818	Tech Flyers w/ Resilient V2	28555.5%	48.0%
○233	Bear Market ETFs	177.8%	22.7%	○5535	Tech and Defense	37524.9%	32.1%

Below the portfolio lists is a performance chart with two lines: a black line for "Conservative" and a blue line for "Aggressive". The y-axis represents value from \$100k to \$50M, and the x-axis shows years from '05 to '23. The chart shows the aggressive portfolio significantly outperforming the conservative one over the period.

At the bottom of the window, there are input fields for "Name:", "Internal Comment:", and "Long Description:". A blue callout box labeled "Conservative" points to the "Name:" field, and another blue callout box labeled "Aggressive" points to the "Internal Comment:" field. The "Allocation Adj:" section has a checked box for "Invest Fully". "Cancel" and "Create" buttons are located at the bottom right.

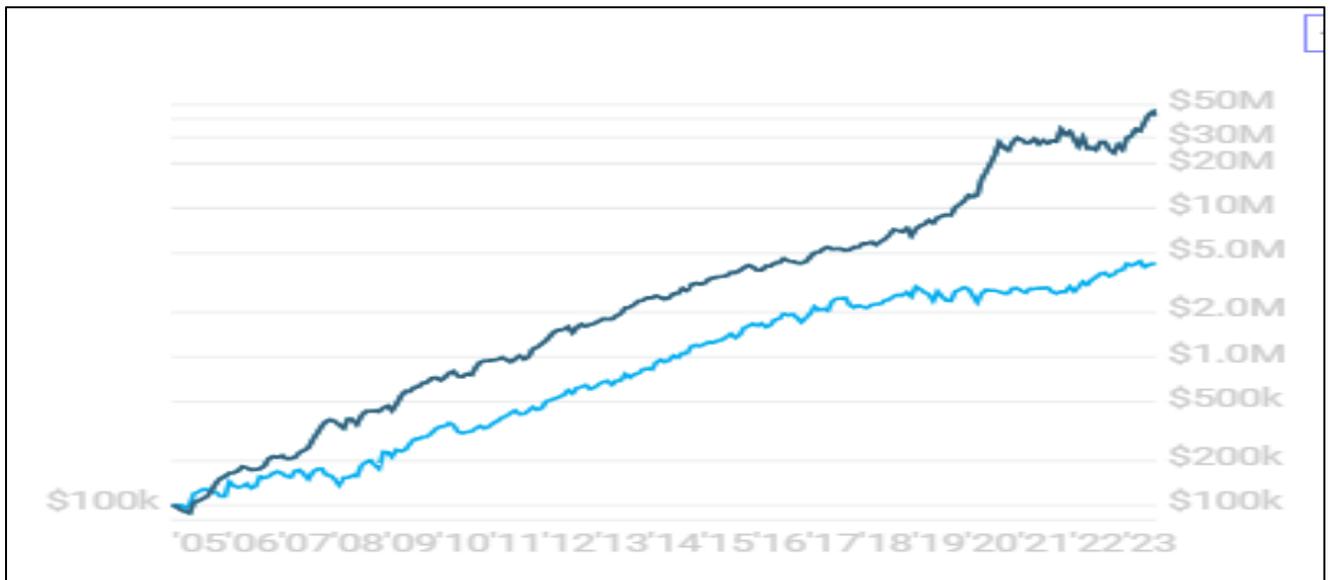
Notes:

1. Cannot Sort on the Portfolio Columns. Need to add CALMAR column and allow sorting with fixed header.
2. Investigate where the “Internal Comment” is used
4. The Symbol List for each Portfolio takes up a lot of space, and the fields (symbol, name) are staggered because there isn't enough space

# The NEW OmniFunds Creation Page

Show Portfolio List with Statistics and Check Boxes

OmniFund Name:



Data: (o) All ( ) 10 years ( ) 5 Years ( ) 1 Year ( ) 6 months ( ) 3 Months ( ) 1 Month ( ) YTD  
 Curves: (o) Individual Portfolios ( ) Composite Curve [ ] Stock Market

Available Portfolios (2 selected):

Filter: Average Return >  Average Draw Down <  Calmar >

S	ID	Portfolio	APR	AMD	Calmar
<input type="checkbox"/>	138	Conservative ETFs	72	10	7.2
<input checked="" type="checkbox"/>	145	Defensive Stocks	35	6	5.8
<input type="checkbox"/>	175	US Stocks	125	16	7.8
<input type="checkbox"/>	132	Global ETFs	72	10	7.2
<input type="checkbox"/>	231	Bear Market ETFs	102	23	4.4
<input checked="" type="checkbox"/>	102	Tech Stocks	65	5	13.0
<input type="checkbox"/>	271	Consumer Stocks	40	10	4.0



Switching Method:

Automatic

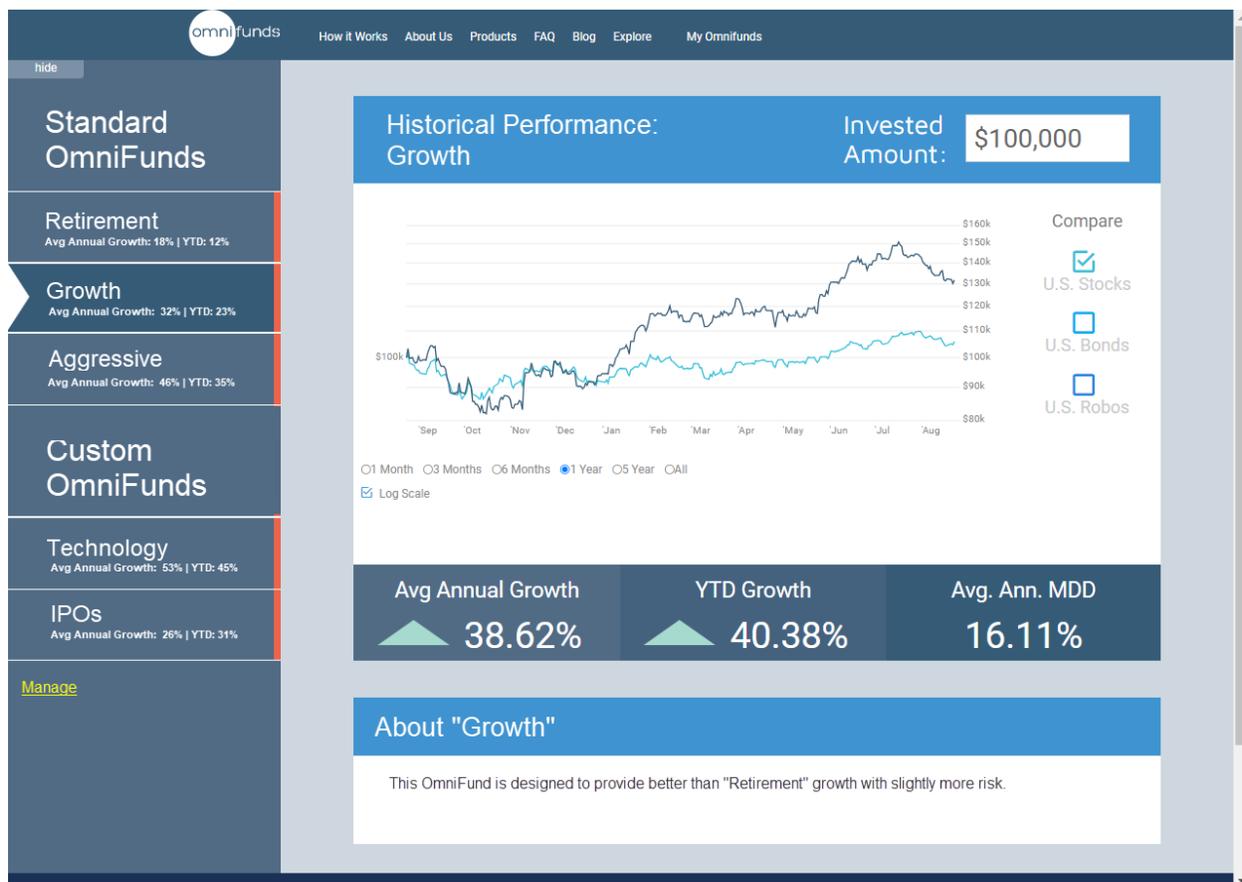
Max Portfolios to Trade:

Max Positions:

Clicking any Portfolio shows its curve **to the right**.

We MAY provide multiple methods, but they will not be user configurable.

# OmniFunds Catalog Changes



## Change Summary:

- Remove Conservative-Aggressive Control.
- Provide a list of Standard OmniFunds
  - Retirement (Target 20% Return, 5% MDD)
  - Growth (Target 30% Return, 8% MDD)
  - Aggressive (Target 40%+ Return, 12% MDD)
- User (Custom) OmniFunds
  - Users can select their own Portfolio mix in the Lab (as shown in the Spec), save and use them for a custom solution.

# Switching Algorithm Notes

The idea of OmniFunds 2 is to detect when a Portfolio is working well vs. when it is not, and trade the ones that are working well.



There are 3 separate lists with 15 different OmniFund portfolios in each one.

1. To the right are the raw curves.
2. In the middle, the results are compared against SPY.
3. To the left are the controls.

It's easy to experiment with different ranking and allocation schemes. The center (yellow) column is "1" if the ranked Portfolio should be used. The % allocated to the portfolio is automatically calculated to the right.

Rank During Past Return Period	Weight Assigned To Rank	% Of Invest
1	0	0.00%
2	0	0.00%
3	0	0.00%
4	0	0.00%
5	0	0.00%
6	1	20.00%
7	1	20.00%
8	1	20.00%
9	1	20.00%
10	1	20.00%
11	0	0.00%
12	0	0.00%
13	0	0.00%
14	0	0.00%
15	0	0.00%

# Days in Past Return Period: 21

0 = Descending (Highest % is #1)  
1 = Ascending (Lowest % is #1)

Ranking Choice If > Avg % Limit: 0  
Ranking Choice If < Avg % Limit: 1

Standard Deviation: 3.00%

Note: To Get A 0.5% Limit, You Must Enter .005 in D27 Above

Below the ranks are the # of days in the lookback (21), and the MAX Standard Deviation (3%). If 3 out of 5 Portfolios are above this value, it will only trade the remaining 2. So in Mark's spreadsheet, the system is often NOT 100% allocated.

## Method Coded in the Spreadsheet

- a) Each week, the Standard Deviation of (Daily) Returns is measured over the prior period (he used 21 days) for each selected Portfolio.
- b) Portfolios are ranked, ascending or descending based on this value.
- c) It switches into the selected Portfolios each week (except those whose 21-day STDEV is more than 3%), and trades the middle ranked portfolios because that is what worked best in the spreadsheet.

## Implementation

The spreadsheet only has access to equity curve data. It simply switches 100% into all the trades of the “best ranked” Portfolio each week. Therefore, it does not evaluate the actual trades in this process (it doesn’t have that data).

OmniFunds could do the same thing – closing all open positions at the switching interval and enter all trades in the Portfolios with the desired rank. But if (say) 5 Portfolios are selected in a given week, that could be 30 to 50 trades.

After implementing the spreadsheet method, we need to investigate trade selection methods that Mark was not able to test...

- (a) Keep any trade open as long as the Portfolio Filter is TRUE.
- (b) Evaluate the Portfolio Ranks on a faster interval than Weekly, to more accurately align with the individual Portfolio behavior.
- (c) Select trades from each Portfolio in sequence up to Max Trades. The spreadsheet assumes all trades are taken from each Portfolio according to rank and the value of MAX Stdev.

---

## Implementation Sequence

Matching the spreadsheet:

1. Be able to select N Portfolios in the interface.
2. Evaluate each selected Portfolio equity curve using standard deviation of returns each week (across the entire equity curve), select M Portfolios to trade.
3. Switch 100% into the trades of the selected portfolios Modifications to

Improving Performance:

1. Evaluate Daily or every 3 Days rather than Weekly.
2. Close any trades where the Portfolio Filter is False.
3. Replace closed trades with trades from the selected Portfolios.

This is illustrated in the **Switching Algorithm** (next.)

---

## Portfolio Switching Algorithm

For each Interval (Daily, Every N days, Weekly, ...)

- **Close Prior Trades:**
  - Close All Trades from prior interval (what the spreadsheet does)  
OR...
  - Check each Portfolio traded in the prior interval for Filter violations on the individual trades. Close those trades.
- **Portfolio Ranking:**

Calculate STDEV.S for all Selected Portfolios over the prior 21 Bars for all Selected Portfolios. Sort the result descending on STDEV.S
- **Set Starting Portfolio:**

Calculate first portfolio to use based on the formula (Selected Portfolios – Portfolios to be traded)/2. For example, if we have 15 Portfolios selected and are going to use 5 of them,  $(15-5)/2=5$ . So the first Portfolio we will use is #5, followed by #6, etc. in the ranked list.
- **Check STDEV maximum**

If any Portfolio has Standard Deviation above the maximum, skip that Portfolio in the selection process. Note that if no Portfolio has a Standard Deviation less than the Max STDEV, no trades will be taken. \*\*
- **Select Trades**

Select trades starting with the portfolio in the first rank position, in Round Robin fashion, up to MAX Trades. Note that some portfolios may have Market States that are turned off. These portfolios won't have any trades and allocation will be less overall. \*\*

Next Interval

---

### \*\* Portfolio Filtering:

Due to logic constraints, the spreadsheet always evaluates the entire population (15 Portfolio) and ranks within it without removing from consideration those Portfolios that have a high STDEV or whose Market States would inhibit trading. Once coded in .Net, the population could be filtered first to remove those with a high STDEV or Null Market State. So instead of 15 Portfolios to consider, there might only be 5.

## Notes: Excel Standard Deviation Formulas

The spreadsheet uses STDEV.S of daily returns from points on the equity curve, which provides standard deviation for a sample. STDEV.P is used when the samples represent an entire population. This makes STDEV.S slightly larger standard deviation because it attempts to compensate for the fact that not all samples are used.

Since we are looking at STDEV over the prior 21 bars of data, in a population spanning many years, STDEV.S is the correct formula. But we asked ChatGPT to clarify the difference for more insight:

### Question to ChatGPT:

*If I use STDEV.S(A1:A255) and STDEV.P(A1:A255) how and why will the results differ?*

ChatGPT

When you use the STDEV.S function and the STDEV.P function on the same dataset, such as A1:A255, the results will differ due to how they calculate the standard deviation and the underlying assumptions they make:

### **STDEV.S (Sample Standard Deviation):**

Calculation: The STDEV.S function calculates the standard deviation based on a sample of data. It uses the formula:

$$\text{Standard Deviation (sample)} = \sqrt{[\sum(xi - \bar{x})^2 / (n - 1)]}$$

Where:

- $x_i$  represents each individual data point in the sample.
- $\bar{x}$  is the sample mean (average).
- $n$  is the number of data points in the sample.
- $(n - 1)$  is used as the denominator (degrees of freedom) to adjust for estimating population parameters from a sample.

Assumption: The STDEV.S function assumes that the data provided represents a sample from a larger population. It uses  $(n - 1)$  in the denominator to provide a better estimate of the population standard deviation.

## STDEV.P (Population Standard Deviation):

Calculation: The STDEV.P function calculates the standard deviation based on the entire population dataset. It uses the formula:

$$\text{Standard Deviation (population)} = \sqrt{[\sum(xi - \mu)^2 / n]}$$

Where:

- $x_i$  represents each individual data point in the population.
- $\mu$  is the population mean (average).
- $n$  is the total number of data points in the population.

Assumption: The STDEV.P function assumes that you have data for the entire population, and **it calculates the standard deviation without any correction factor (no  $(n - 1)$  in the denominator).**

### Key Difference:

The key difference between STDEV.S and STDEV.P is the assumption they make regarding the data. STDEV.S assumes you have a sample and applies a correction factor  $(n - 1)$  to account for the fact that you are estimating population parameters from that sample. In contrast, STDEV.P assumes you have data for the entire population and calculates the population standard deviation directly.

### Resulting Difference:

Due to the different calculations and assumptions, **STDEV.S tends to produce a slightly larger standard deviation than STDEV.P when applied to the same dataset.** This is because the correction factor in STDEV.S increases the standard deviation estimate to account for the variability in the sample.

In summary, if you have data for the entire population, you should use STDEV.P to calculate the population standard deviation. If you have a sample from a larger population, you should use STDEV.S to calculate the sample standard deviation, and keep in mind that the results will differ due to the different calculation methods and assumptions.