

THE PORTFOLIO DIVERSIFICATION OPTIMIZER “FREE LUNCH” Toolbox

<https://DivToolBox.com>

TOOLBOX, using an exponentially increasing number of computations, combines the diversification metrics of your portfolio's core holdings, weights with those of a number of AI-selected index proxies and selects from our pre-selected universe of 57 Alternative Index ETF proxies. TOOLBOX then uses this information to build six alternative portfolios each with lower Uncompensated Risk remaining.

TOOLBOX is not a stand-alone solution. It is an AI tool well-suited for analyzing and using its massive collection of computer-generated diversification data to build six new portfolios that meet the fiduciary requirements of the 3rd Restatement of Trusts. Human judgment is still necessary, as creating customized portfolios is not yet something a computer can do on its own. Financial Advisers need to be involved in the process, using their own experience and knowledge with TOOLBOX's forward-looking recommendations.

Run TOOLBOX multiple times for more options to consider, especially if your legacy portfolio is not well-diversified. Be sure to clear the cache between runs.

BACKGROUND AND HISTORY OF DIVERSIFICATION

Since the earliest days of diversification research and related removal of uncompensated risk from portfolios, peer reviewed, academic studies identified the number of assets it takes to remove various percentages of uncompensated risk from various portfolios. Quantifying the correct number of assets was always based on how uncorrelated and equally weighted the assets were. Real world portfolios are not usually constructed with equally weighted assets. So, while the lessons learned from academe couldn't be applied to actual investment portfolios, they proved that risk adjusted investment performance could be significantly improved by increasing diversification.

The concept that added investment return delivered from diversification was emphasized by Nobel Prize Laureate Harry Markowitz (1928-2023) in 1952 when he identified this phenomenon as the only FREE LUNCH in investing. The “Free Lunch” mantra gained in popularity when another Nobel Prize Laureate, William Sharpe, declared: ***“The FREE LUNCH is there for the taking, let's eat!”*** at an economist luncheon.

Without high-speed computers, internet access, and Artificial Intelligence (AI) capabilities feasting on a “Free Lunch” remains elusive. TOOLBOX uses AI to bridge this divide by quantifying the equivalent number of assets driving a portfolio's diversification by:

1. Reducing the total number of securities held in the account to their Idiosyncratic Concentration Coefficient (ICC) number, and then
2. Applying intra-portfolio correlation factors to reduce the ICC number to its' Fiduciary Diversification Score (FDS), a/k/a Intrinsic Dimensionality.

For an in-depth explanation of the technical aspects of a portfolio's Fiduciary Diversification Score see our [AICPA webcast deck slides 52-72.](#)

TIP for best results.

Important reminder: As was mentioned in the [Data Entry Instructions](#) link: **Initially, enter only the legacy portfolio's risk assets onto the TOOLBOX platform. 70%-90% of a portfolio's Uncompensated Risk resides in its risk asset component. Fixed income and cash will be re-entered later.** (Brealey at the bottom of page 647 *THE UNIFORM PRUDENT INVESTOR ACT AND THE FUTURE OF TRUST INVESTING*, 1-1-1996, page 646-7)

TOOLBOX'S PRUDENT PROCEDURAL PROCESS

TOOLBOX's capabilities are employed as an 'IA' (Intelligent Assistant) by using its 'AI' capabilities for suggesting alternatives. Here is how it works:

TOOLBOX constructs six new portfolios by decreasing the weighting allocations to the entered portfolio in increments of 10%, 20%, 30% 40%, 50% and 60% pro-rata, respectively. In 3-4 minutes TOOLBOX fills the non-legacy space allocated to each new portfolio with suggested sector and sub-sector proxies selected from its pallet of 57 proxies. Every 6-months the legacy portion is re-balanced, and the non-legacy portion is re-optimized to achieve best fit diversification (based only on data known before the period being re-optimized).

Those diversification optimization outcomes are presented in an 8-part comparison report referred to as the Multi-Portfolio report, which includes 2 graphs and 6 tables. The report compares the performance metrics, risk statistics, benchmark data, and diversification efficacy of the original legacy portfolio to back-tested outcomes that would have been achieved had TOOLBOX's recommendations been followed throughout the trailing 48-month default observation period. Outcome comparisons spotlighting superior historical portfolio performance can be used as the starting point for customizing improvements to a legacy portfolio's diversification.

TIP for removing excess clutter from the graphs
<ol style="list-style-type: none">1. A left-click on a color-coded portfolio key removes its corresponding line or bubble from the graph.2. To re-insert a removed line or bubble back into its graph, left-click on its color-coded key line.

USING AND INTERPRETING INDIVIDUAL PORTFOLIO REPORTS

PERFORMANCE METRICS, RISK STATISTICS, AND BENCHMARK DATA, tables use common financial terms well known to investment professionals, but the DIVERSIFICATION MEASUREMENTS TABLES utilize specialized terminology that may be unfamiliar. Accordingly, we recommend you keep a copy of the [Glossary](#) nearby when working with TOOLBOX.

The system's toggle feature allows easy access to detailed reports of all individual portfolio listed on the Multi Portfolio Report screen; simply follow these 4-steps:

1. Hover cursor over the SELECT PORTFOLIO PANEL.
2. Left-click on the dropdown symbol.
3. Left-click on the desired portfolio.
4. The selected portfolio's detailed report will appear on your screen.

3-D Diversification Visualization:

1. Locate the PORTFOLIO VISUALIZATION panel.
2. Left-click in the center of the 4 red arrows to project an enlarged 3-D visualization of the selected portfolio's diversification.
3. Click Vector Length/ Show Diversification Potential, and a 3-D view of the diversification achievable if all 57 of TOOLBOX'S proxy sectors were combined with the original portfolio's constituents, and were equally weighted.
4. Explore options and make adjustments, by clicking the Options dropdown then selecting different choices while switching between different vector length choices.

Access Different Profit and Loss Chart Views:

1. Locate and open View Options box
2. Select desired P&L chart type

Match the Fiduciary Diversification Score to a portfolio’s size:

The Fiduciary Diversification Score (FDS) is an absolute number. But it is gauged to the degree of risk found in portfolios having risk asset values from \$250k to \$600k. Because the fiduciary efficacy of a portfolio’s diversification risk depends on the total value of its risk assets, FDS scores must be matched to a portfolio’s size when using the dials or the Diversification Source Matrix.

For example, if a portfolio containing \$500k in risk assets scored a FDS of 10, it would be considered adequately diversified. On the other hand, if a \$5M portfolio had the same FDS score of 10; it would be deemed cautionary.

To accurately assess the adequacy of a portfolio's Fiduciary Diversification Score, it must be compared to the size of the portfolio being analyzed using the Diversification Sources matrix provided below. This ensures that the evaluation takes into account the proportionate value of the portfolio and provides a meaningful assessment of its diversification risk.

Risk Assets	Grossly Inadequate	Inadequate	Caution	Adequate	Excellent	Superior
\$ 250,000	1-2	2-4	5-6	7-8	9 & UP	N/A
\$ 750,000	1-2	3-5	6-9	10-18	19-35	36 & UP
\$ 1,000,000	1-3	3-6	7-13	14-24	25-49	50 & UP
\$ 7,500,000	1-4	4-8	8-14	15-28	29-51	51 & UP
\$ 25,000,000	1-5	6-9	9-16	17-31	32-51	52-300
\$ 50,000,000	1-6	7-12	12-18	20-40	41-75	76-300
\$ 75,000,000	1-7	8-15	16-25	26-50	51-100	101-300
\$ 100,000,000	1-9	10-18	19-30	31-60	61-200	201-300

The Geneses of all states & US fiduciary statutes

All states and U.S. Courts interpret fiduciary statutes through lens of The Restatement 3rd of Trusts and in the Commentary to Sec. 90 (Formerly Sec. 227 it unequivocally states:

***“Failure to diversify on a reasonable basis
In order to reduce uncompensated risk is
Ordinarily a violation of both the duty of
Caution and the duties of care and skill”***

STEPS TO CUSTOMIZE-ANALYZE & FINALIZE

Customization is a powerful feature of TOOLBOX, adding significant value to its functionality. It gives you the ability to create and manage multiple portfolio variations by making edits as needed. Select portfolios to review and analyze that have higher returns and/or Sharpe Ratios as well as lower correlations.

To access each individual portfolio's detailed report listed in the multiple portfolio view:

1. Navigate to the SELECT PORTFOLIO panel.
2. Left-click on the dropdown symbol.
3. Highlight and left-click on the desired portfolio.
4. Explore all of that individual portfolio's charts and data.

To return to the Multi-Portfolio Report screen and select another portfolio:

1. Navigate to the RECOMMENDATION panel.
2. Left-click on the dropdown symbol.
3. Left-click: RETURN TO MULTI PORTFOLIO VIEW box.
4. Repeat process detailed above to access another portfolio's detailed report.

If TOOLBOX elevates your legacy portfolio's FDS to the "Caution" or "Adequate" levels with its 80%, 70%, or 60% portfolio solutions, carefully proceed with your custom changes then feast on the "Free Lunch".

If none of TOOLBOX's recommended portfolio solutions raise FDS above the "Inadequate" level, it may be best to construct a new legacy portfolio from scratch.

In cases where only TOOLBOX's larger carve-out portfolios (50% or 60%) solutions elevate FDS levels above "Inadequate" proceed carefully, as it may not be feasible to implement all of the recommended changes all at once. Instead, make smaller changes to one of the recommended portfolios and over time gradually increase the changes.

CAPTURING INDIVIDUAL PORTFOLIO METRICS

Exporting individual portfolio data to Excel and then reviewing performance metrics, allocations, and intra-portfolio correlations are an essential part of portfolio analysis and customization. That data is obtained from the boxes entitled "Export to Excel" appearing in the upper right corner of certain charts and reports. Locate panels with boxes entitled "Export to Excel", and left click in the Export to Excel box. Open the file and view the data. There is a lot of data to capture and manage. See the TIP for doing so.

TIP for managing exported Excel data

1. Create a separate Excel workbook for each portfolio candidate on your hard drive.
2. Copy and paste each panel's exported data onto a separately labeled tab in the Excel workbook established according to step 1, above.
3. Then, erase the downloaded Toolbox Excel File.

Toggle back to the multiple portfolio view, and select another portfolio by:

1. Opening the Recommendation panel and clicking on Return to Multi Portfolio View, or
2. Click on backspace arrow in your browser.
3. Repeat the above process with a different portfolio until the downloaded data from all meaningful alternative portfolios has been captured and saved to your computer.

EXCEL DOWNLOADS

The following Excel reports contain the essential information for review and analysis:

1. **Rolling Allocation Chart:** The Excel download of this chart's data provides the allocation changes that occurred at 6 month intervals due to modeled re-balancing and re-optimization based only on knowledge available on that date, beginning 3-years ago. The latest allocation represents the "FORWARD LOOKING" allocation that is currently suggested.
2. **Performance Metrics:** These Excel downloads capture the metrics of how the last recommended Forward Looking investments would have performed over the observation period, and provides valuable insights into the recommended portfolio's future performance. Metrics included are: Sharpe Ratio, Sortino Ratio, Calmar Ratio, Ulcer Ratio, Dividend & Total Return, Standard Deviation, Semi-Variance, Max Drawdown, and Ulcer. Sort and analyze these metrics individually on each Excel sheet, starting with the Sharpe Ratio/Sortino Ratio, Dividends/Total Return, and Standard Deviation/Semi-Variance.
3. **Portfolio Position Report:** This Excel report presents suggested "FORWARD-LOOKING" portfolio on the latest date the TOOLBOX program was accessed.
4. **Correlation Table:** Combined with the previous reports, this table allows you to easily identify "bad apples" based on high correlations, high standard deviations, and low Sharpe Ratios. Use the data to make informed decisions regarding which holdings to adjust or eliminate. To further augment diversification, consider adding low or non-correlated proxies with positive momentum and recommended Sharpe Ratios.

Run these reports over multiple time periods to review changes to correlation and Sharpe Ratio data under different market conditions.

TOOLBOX can assist you with validating any unique (in addition to its 57 proxies and allocation constraints) investment choices for building a more customized portfolio. Simply add your new custom ticker symbols and/or custom weights and re-run TOOLBOX, and evaluate the results. It may take several iterations before you find a portfolio you like. But you can repeat this process as often as you wish.

FIXED INCOME COMPONENT

Make a fresh run of TOOLBOX combining your newly determined risk asset components with different mixes of fixed income and cash (e.g. 60% risk and 40% cash-fixed income, or 70% risk and 30% cash-fixed income). Returning the risk reduction asset component back into the portfolio will not significantly change the portfolio's uncompensated risk, but because mixed risk portfolios satisfy cash flow requirements and reduce compensated risk, it is a needed step.

ON-GOING MONITORING AND MANAGEMENT

Ongoing monitoring and management are crucial elements of fiduciary compliance. At regular periodic intervals, and more frequently if warranted, use TOOLBOX's algorithms to measure, manage, and monitor your portfolio's compliance. Maintain copies of all TOOLBOX monitoring reports and Excel downloads to document your compliance with fiduciary standards.

TIP: USE TOOLBOX TO LAND NEW CLIENTS

Use TOOLBOX as a demonstration tool to show potential new clients how you can help them gain the advantages of the Diversification FREE LUNCH. But be sure to consult your compliance team about how to make presentations and what written material should OR should not accompany the presentation.

NOTE ABOUT PRIVACY & DATA RETENTION. To better protect client privacy, all portfolio information is erased from the Institute's server when a user logs off. Sole retention of the user's client's information rests with the user and is achieved by Excel file downloads to the user's hard drive. This feature allows users to make off-line changes and easily re-load their modified updates for diversification optimization testing. We strongly encourage members to code their clients' files in a manner designed to maintain the confidentiality the portfolio's owner.

Link to Contact form

By telephone

Mon-Sat

9 a.m. ET to 4 p.m. ET: 1-248-227-8208

1 p.m. PT to 5 p.m. PT: 1-831-688-6000