



GSPHERE PRODUCT TOUR

Contents

VIEW PAGE	3
DIVERSIFICATION DASHBOARD	4
DETAILED P&L	5
ROLLING ALLOCATION CHART	6
HISTORICAL ALLOCATIONS	7
PORTFOLIO MONITOR	8
BENCHMARKS	9
DIVERSIFICATION SOURCE CHART	10
POSITION PERFORMANCE	11
RETURNS AND CMATRIX	12
POLICY TREE	13
POLICY TREE 2	14
POLICY GUIDELINES	15
PORTFOLIO EDIT	21
POSITION GRID	22
CONSTRAINT TAB	23
RETURN ESTIMATION GRID	24
ADVISOR PAGE	25
GUEST EDIT	26
VIEW CONTROLS	27
VECTORS	28
FRAME	29
SPHERE	30
ALLOCATIONS	31
BOXES	32
COMPARE	33
COMPARISON PROFIT AND LOSS CHART	34
COMPARISON DIVERSIFICATION GAUGES	35
COMPARISON DIVERSIFICATION SOURCES	36
COMPARE RISK & RETURN	37
CONTACT	38
OBJECTIVES	39

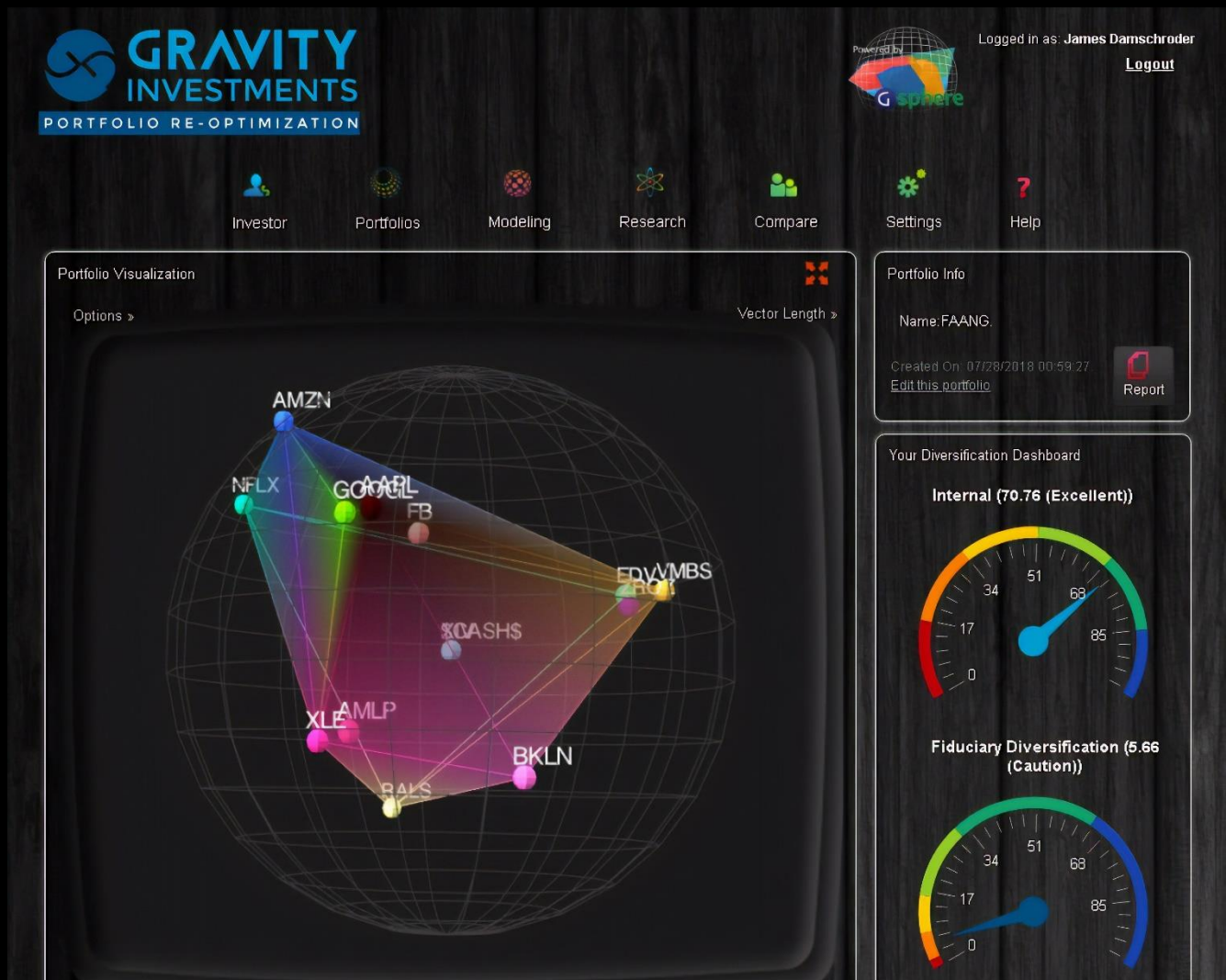
RECOMMENDATION	40
EXCEL IMPORT.....	41
VERSIONS	42
RESEARCH	43
RESEARCH	45
REPORT CONFIG.....	46
SETTINGS.....	47
HELP	48

VIEW PAGE

Welcome to the Gsphere Product
Tour

Gsphere is a Portfolio Re-
Optimization system featuring
visualizations and patented
diversification measurements

In this guide we will show many of
the system features. Note that not
all user types have access to all the
features described in this guide



DIVERSIFICATION DASHBOARD

Internal Diversification (59.65 (Good))

The Internal Diversification is the Gini Co-Efficient of the KL expansion (AKA energy spectrum or Eigenvalues) of a weighted correlation matrix



It gives a percentage values from 0 to 100 which may be interpreted such as: this 8-asset portfolio is 70% diversified. A score of 100% means that there is no observable systemic commonalities inside the portfolio.

Fiduciary Diversification (7.75 (Caution))

Fiduciary Diversification is measured by the portfolios intrinsic dimension multiplied by the Gini-Co-efficient



Because the Fiduciary diversification fully accounts for both the quantity and commonality of investments it is the best singular measure for diversification and thus the best evaluator for the fiduciary obligations to diversify for U.S investors.

Systemic Diversification is measured as the Intra Portfolio Correlation or IPC. This is a weighted average intra portfolio correlation which then scales the range of the correlation spectrum to a percentage scale. Note that good values start around 40%. Seldom do any portfolio achieve a value greater than 70% since all values greater than 50% provide that the average correlation is negative.

Systemic Diversification (49.02 (Good))



Idiosyncratic Diversification (11.94 (Adequate))



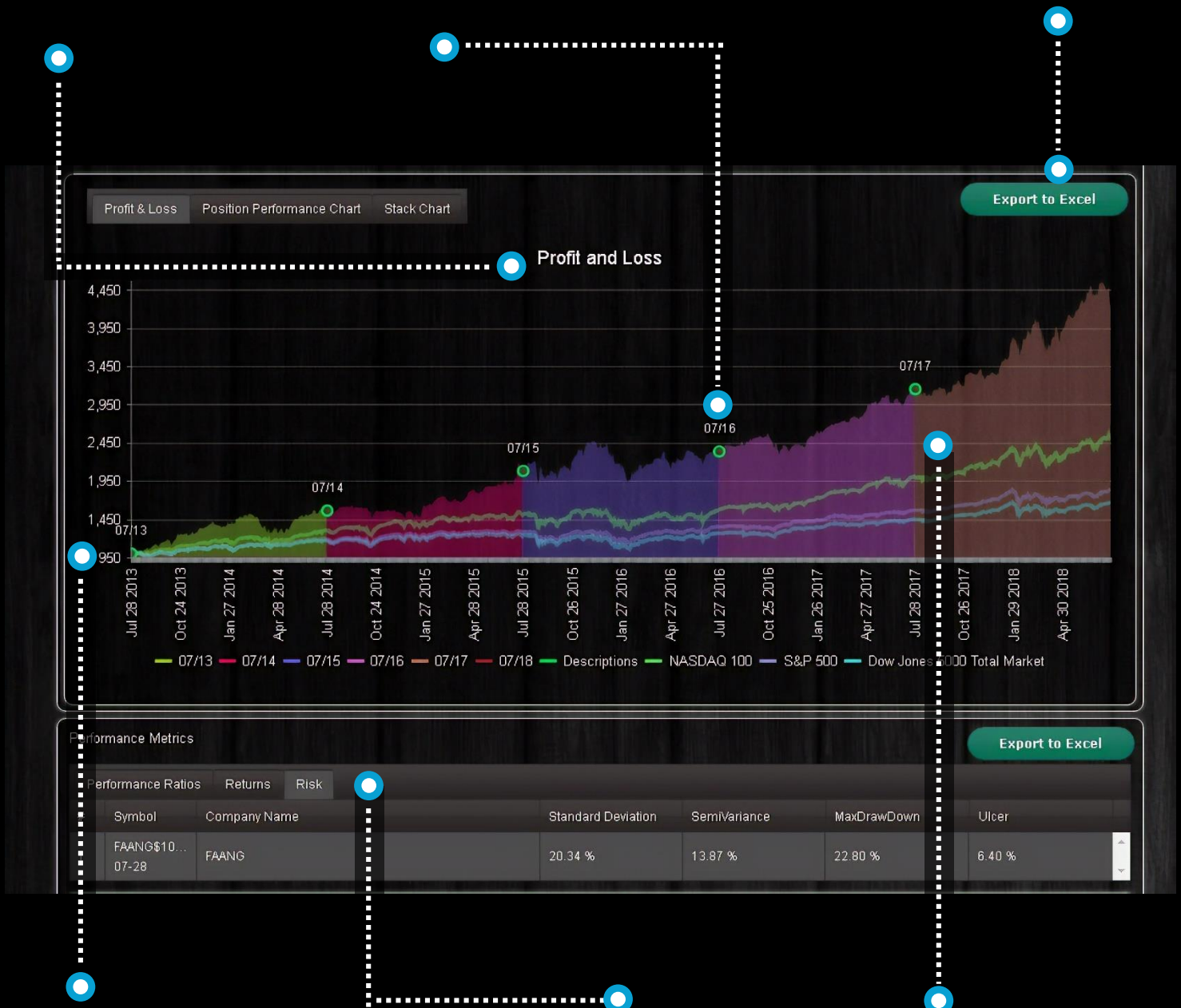
The Idiosyncratic diversification is the portfolio's intrinsic dimensionality. This value is like the portfolios Concentration Co-efficient (CC), but further subtracts any perfect redundancy. More Simply it is the number of asset in the portfolio adapted for the weighting scheme. This value is generally equivalent to the holding quantity for equally weighted portfolios.

DETAILED P&L

P&L history chart is created anytime a strategy includes multiperiod Re-Optimizations in the backtest.

Can display when rebalancing actions and stop loss protection

Export the P&L chart data to Excel for other projects



Always based on a \$1000 invested, dividends are reinvested

Portfolio metrics for your designated period appear here in the three tabs

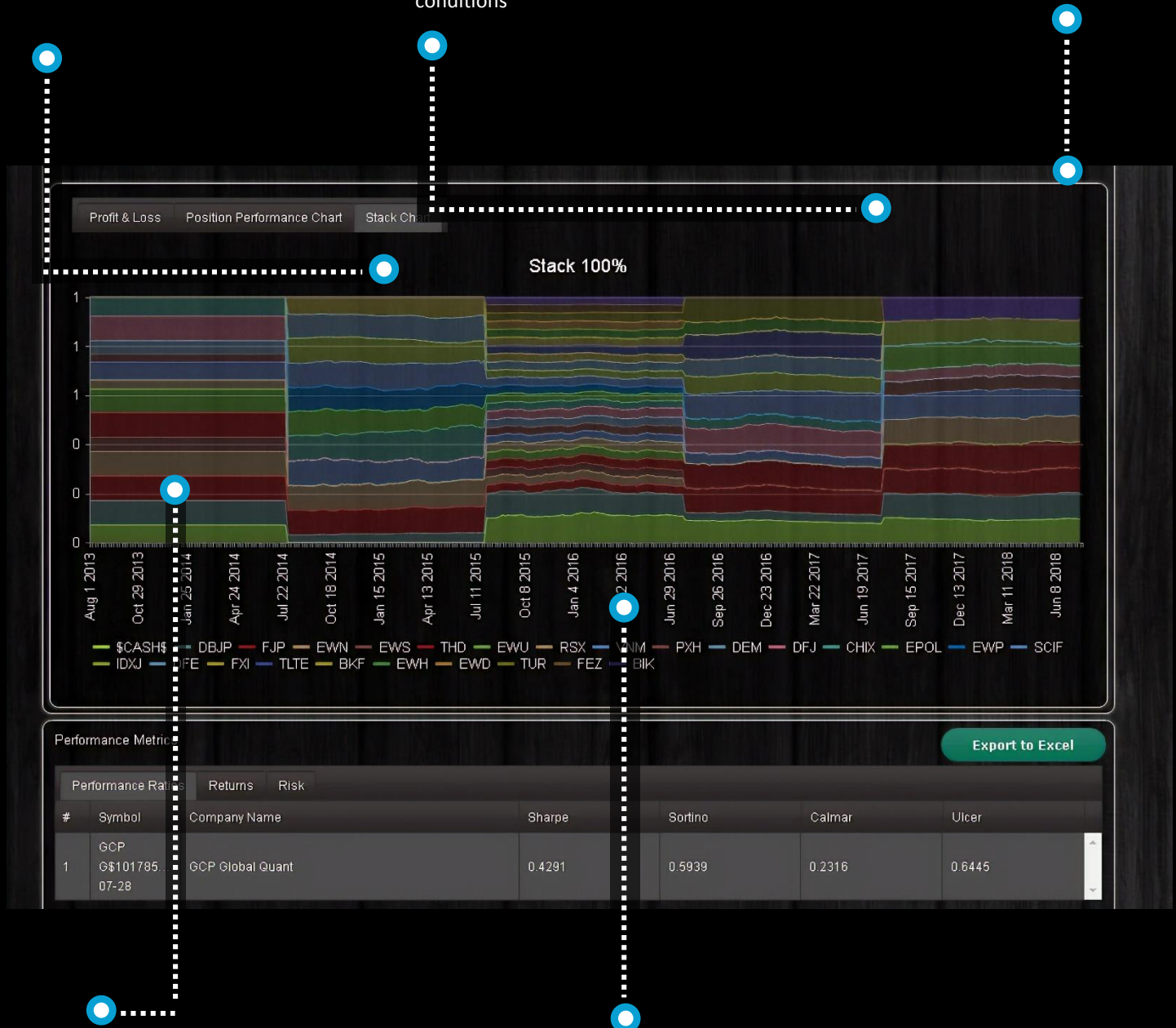
Profit and Loss details shows historical events, each color segment is a different Re-Optimization segment

ROLLING ALLOCATION CHART

The Rolling allocation chart (stack chart) shows how allocations vary over time

This is especially interesting to see how the optimization and rules engine combine to produce different portfolio allocations across market conditions

This chart is produced automatically for optimized backtests



A nice way to illustrate added value to investors

Often you can see how in Diversification Optimization disfavored investments grow in allocation

HISTORICAL ALLOCATIONS

Control to activate display options
for portfolio history when available

Navigate the date tabs to see the
corresponding allocation and risk
return chart



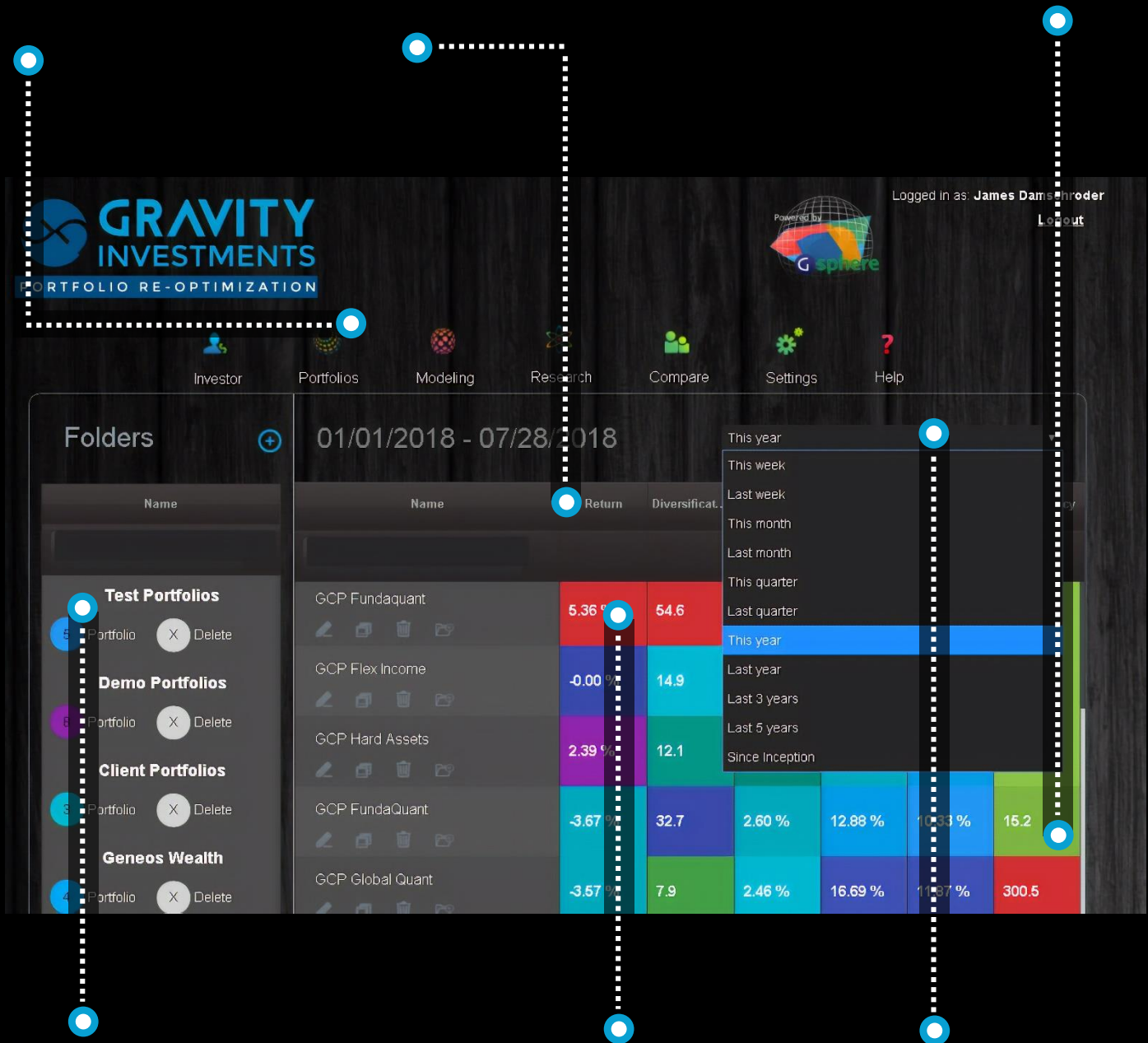
Light, interactive HTML5 charts
render great on any screen or device

PORTFOLIO MONITOR

This page lives here on the portfolio page

Measures for Return, Diversification, Income, Risk, Capital, Preservation and Consistency

Color coded for issue spotting



Organize portfolios into folder

See portfolio performance

Update to any desired period

BENCHMARKS

Add any benchmarks you would like to see with the portfolio

Set as many as would like



Graph the portfolio vs benchmark

Mark a benchmark as default for it to always show with the portfolio

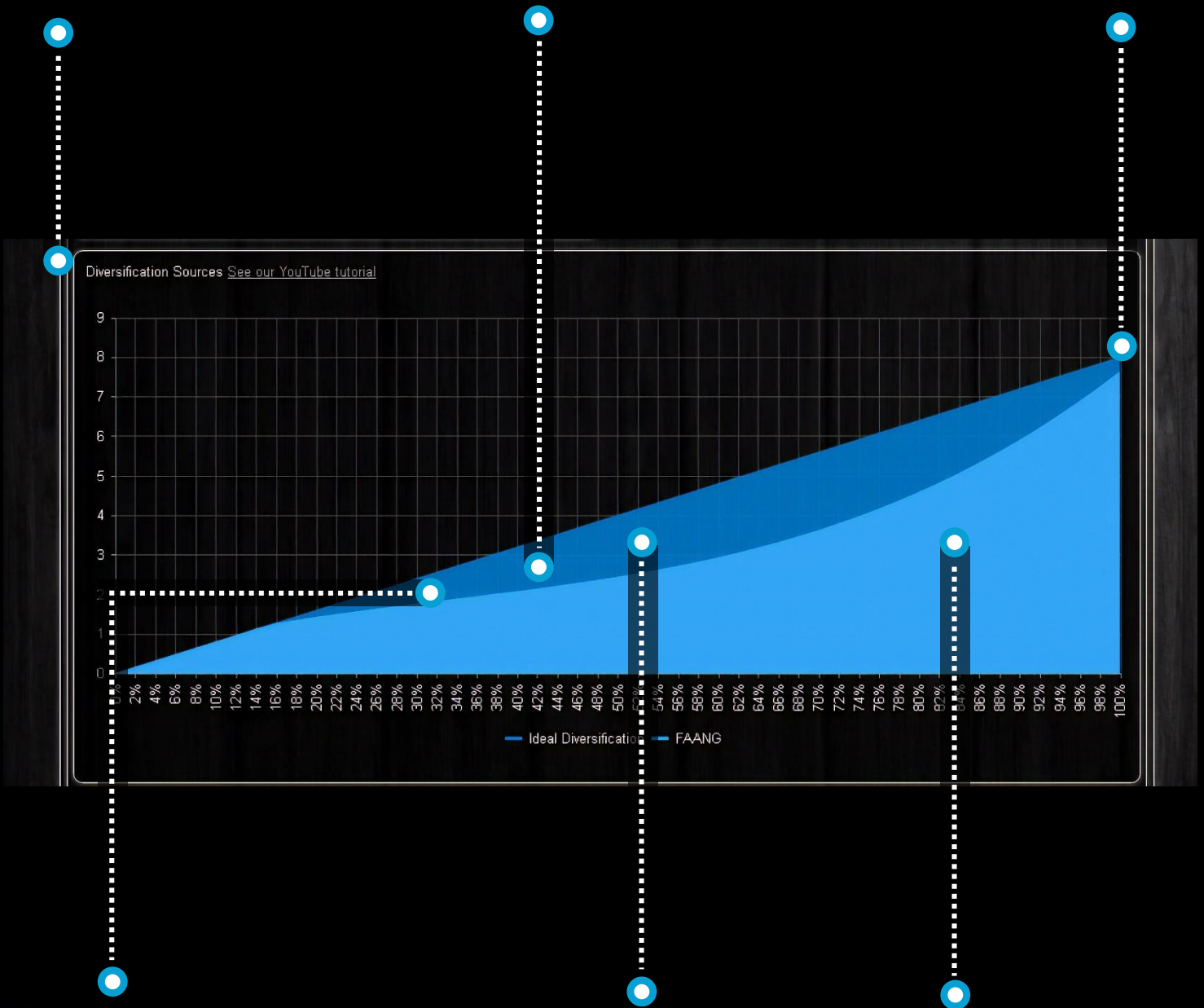
Analyze MPT and relative performance stats

DIVERSIFICATION SOURCE CHART

This chart shows how much diversification may be in any portfolio.

The extent to which the portfolio fills the space under the diagonal line provides for how much diversification the portfolio has for a given number of investments.

The peak value shows how many dimensions it takes to span the portfolio with 100% of the information included. More dimension = more diversification. If the top value is less than the diagonal, then there is some amount of complete redundancy in the portfolio. This is often greater in larger portfolio especially index strategies



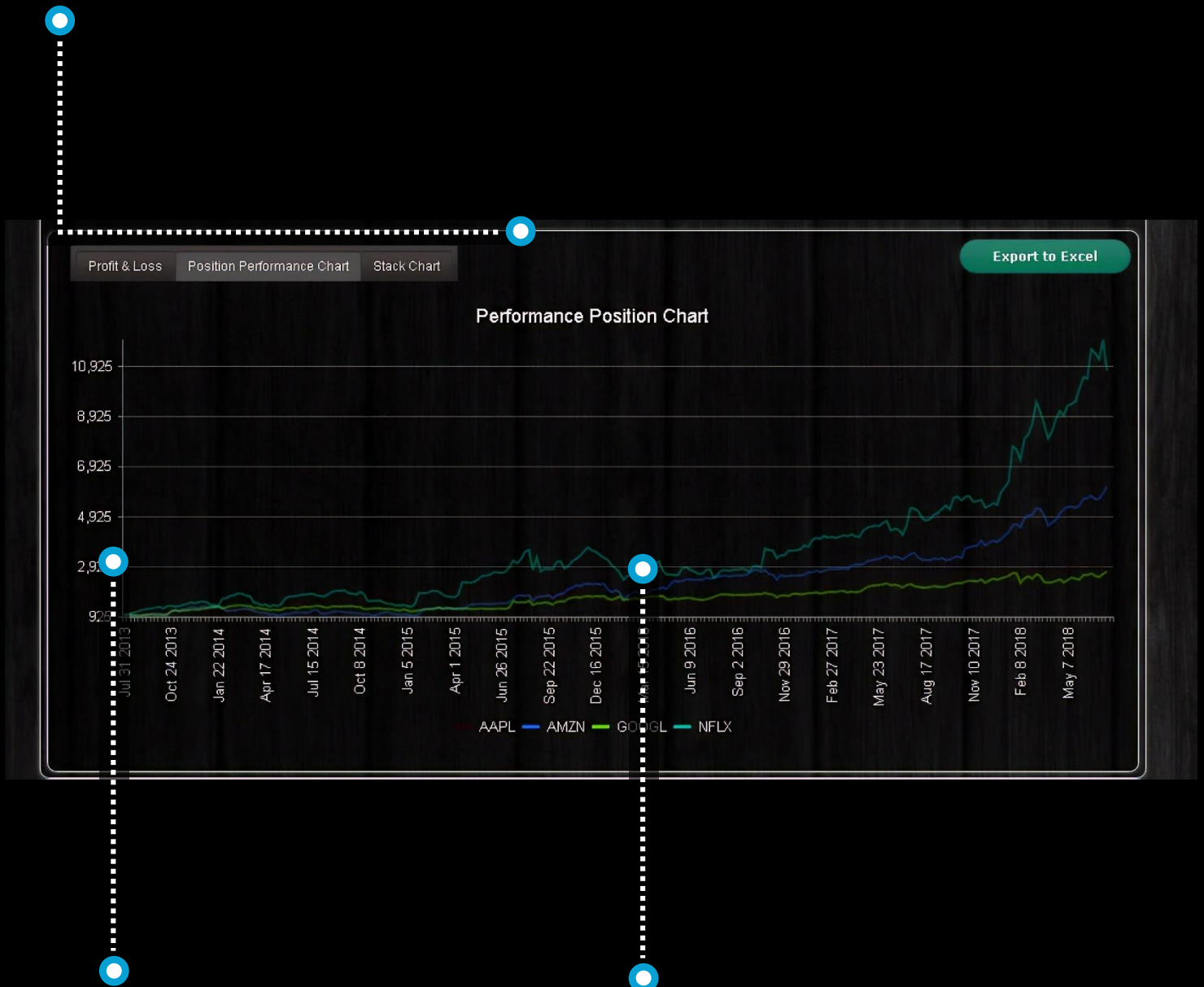
The graph would fill the diagonal exactly if all of the assets were uncorrelated and equally weighted. As systemic and weighting concentrations pervade the strategy the graph will dip

The extent which the graphs fills the diagonal is called the Gini Co-efficient. This is the % used in the internal diversification gauge.

The chart integrates idiosyncratic (asset specific) diversification (AKA holding quantity) with the systemic commonality of the positions (the Gini Co-efficient)

POSITION PERFORMANCE

See the individual performance of each asset



All assets are normalized for an initial 1000\$ invested

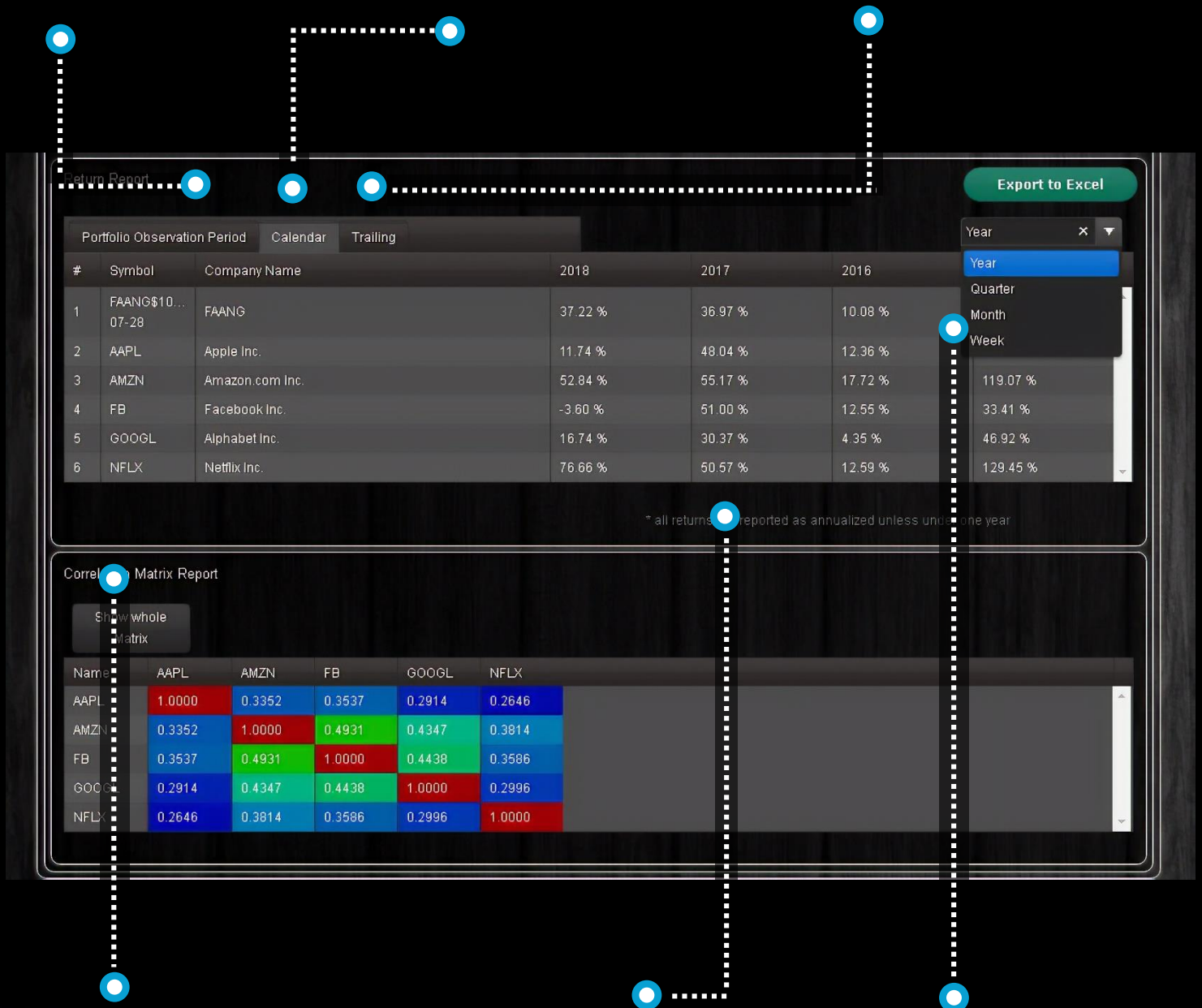
Mouseover the graph to see dates and prices

RETURNS AND CMATRIX

The return report gives portfolio and position returns including in cell charts

Calendar returns available here on this tab

Trailing returns available here on this tab



See the correlation matrix color coded to spot opportunities and risks

Sort any of the rows to spot issues

Set your own timescale

POLICY TREE

The policy tree is the rule set that govern how any strategy is optimized, backtested and automated

Policies can be saved and shared

Govern not just the rebalancings, but the Re-Optimization so that the portfolio adapts with the market.

The screenshot shows the 'POLICY TREE' application window with the following settings:

- Save Policy Tree** | **Open Existing Policy Tree** | **Apply Tree Settings**
- ReOptimization**
 - # of months: [dropdown]
 - Choose mode of Reoptimization: BackTest [dropdown]
 - Choose Reoptimization Period: 12.00
 - Choose Backtest Period Length: 60.00
- Weighting Policy**
 - Optimization Policy**
 - Diversification Optimization**
 - Computation Dimension
 - Select Type of Computational Domain: Default [dropdown]
 - Simulation**
 - Capital Market Assumptions**
 - Sample Periods
 - Sample Period 1
 - Return
 - Shrinkage [dropdown]
 - Hurdle Rate [dropdown]
 - Ceiling [dropdown]
 - Floor [dropdown]
 - Risk
 - Risk Definition
 - Risk Definition: Semi-Deviation [dropdown]
 - Shrinkage [dropdown]

Set the method for how to optimize the portfolio

Set the rules to govern how to set the capital market assumptions and sample data. Add and weight multiples samples following our best practice guidelines for best performance

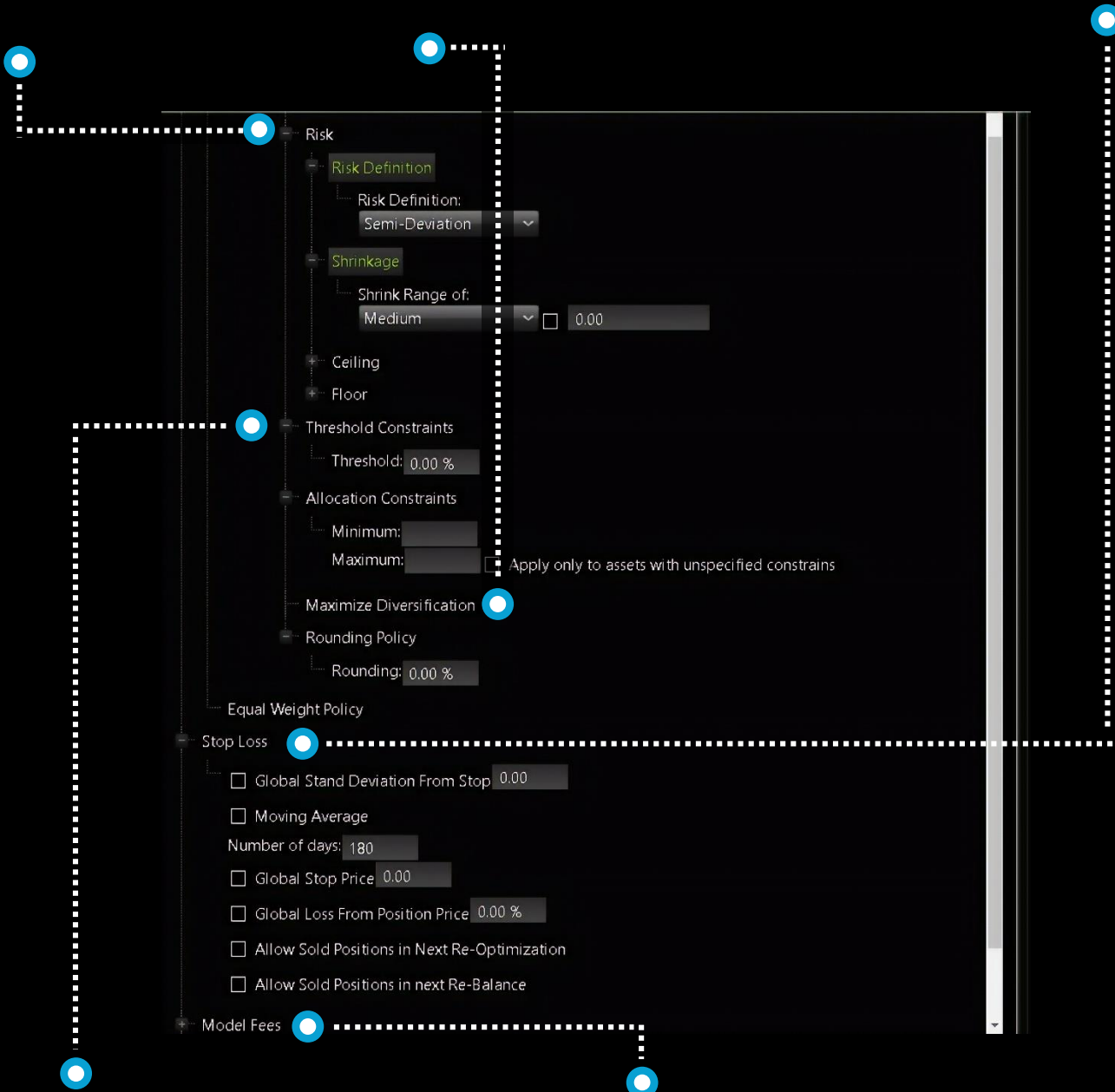
Control the risk, return and diversification. Throttle up or back the importance of each variable to the strategy.

POLICY TREE 2

Policies to define and control risk estimation

Maximum diversification policy not only works well, but ensures investor or advisor stays on the tracks

Stop Loss polices to govern in position risk management. Never let a loss become a bad story



Constraint policies applied to entire portfolio

Add any fee to display performance net fees

POLICY GUIDELINES

DIVERSIFICATION MANAGEMENT

Threshold Constraint

The Threshold Policy is applied to both a portfolio and any recommendation report built including that portfolio. The purpose of the threshold is to remove very small allocation weights that are so small as to be a nuisance due to the transaction costs outweighing the portfolio benefit given the value of a portfolio. The value is expressed as a percentage and any allocation given to any assets less than the designated percentage will be reset to zero and the capital reallocated to the remaining assets.

Constraint Policy

This policy when activated incorporates the global minimum and maximum constraints as part of the policy tree

Rounding Policy

rounds any optimized positions to desired integer or decimal

Computation Dimension

The computational Dimension relates to the number of assets being optimized. Generally the more assets being optimized the higher the computation dimension. A rule of thumb is the square root of the number of assets. Three is the minimum value, while there is no formal maximum, the computational demands grow exponentially with every added dimension so we generally cap the values at 10. The computational dimension is also used as a concentration control function, the smaller the computation dimension the more Gsphere will "cherry pick" a smaller subset of the most efficient and optimal assets.

SIMULATION

Simulation

The Simulation is used to generate a "SuperPosition" this represents the average allocation produced by each simulated iteration. The simulation works effectively as a blender and generally normalizes the allocations in the direction of equal weight while maintaining the principal tenets of Diversification Optimization. The simulation policy is preferred to using constraints to ensure a pragmatic, diversification portfolio that balances both systematic and non-systematic risks. The simulation is a Monte Carlo method which means simulated values are drawn from a probability distribution. This helps the simulation maintain a realistic posture.

Simulation Count

The greater the simulation count the greater the blending. Values should generally be set in the range 0-100. Simulation counts greater than 100 will have only a marginal effect and will take more time to compute.

Simulation ND

ND simulations combines the monte carlo simulation method with Gsphere own genetic algorithm. The resulting combination produces the same superposition allocation but one that is a little less randomly fluctuated and more in tune with the optimization inputs. Generally speaking it is the preferred simulation option.

Allow Existing Assets to Vary

An existing position refers to an allocation, share of value that has been defined to the system. This position will not vary in its portfolio weight unless checked

WEIGHTING

Equal Weight

An equal weight policy distributed the portfolio evenly

Equal Vector

An equal vector policy overrides any risk or return assumption because it assumes equal utility among all the assets. The resulting portfolio is a diversification maximizing portfolio. This policy will result in all assets receiving some allocation weight with the possible exception of cash. This is a very simple, yet effective policy, especially for those seeking greater diversification and not having any preferences for one security versus another.

ReOptimization

The Reoptimization unit and interval is set and applies to a backtested portfolio or automated portfolio through the robo advisory service.

ReBalancing

The Rebalancing unit and interval is set and applies to a backtested portfolio or automated portfolio through the robo advisory service.

SAMPLING

Sample Period

Gsphere supports any number of sample periods. The portfolio manager is free to set any sample period(s) of their choice. The decision to

Sample Period is Trailing

If the sample period is marked as trailing then the sample will roll forward in any future reoptimization, both in a backtest or with automation.

Correlation Type

The correlation type is a property unique to any sample period.

Sample Weight

The weight assigned to any sample puts the risk, return and correlation forecasts produced by that sample in the designated proportion to the values produced by other samples. It is the relative weights that matter and it is irrelevant if there is only one sample period created. Weights to sample periods should generally be in proportion to the portfolio managers belief in the predictive efficacy of that sample.

OBSERVATION

Observation Period

The observation period is the period of time that the results of the optimization will be reviewed. If running a backtest, we strongly recommend that the observation period be fully distinct from the sample period as not to introduce any biases. For portfolios built to be put traded on now the observation period shows how that strategy would have done in the past.

Walk Forward

By selecting the walk forward option the portfolio manager is building a backtest. The observation period will walk forward from the latest data in any of the sample periods and follow the rules set by the reoptimization and rebalancing policies.

Auto-Update

When active this policy gives that the portfolio will always open with latest performance data

Observation Period is Relative

If the observation period is relative then as time passes the observed period will advance with time.

CAPITAL MARKET ASSUMPTIONS

Return Shrinkage

Return shrinkage is a normalization technique that helps to clean up outliers in the data. Shrinkage preserves the rank of the data (so that your lowest return position will remain your lowest return position etc) but it decreased the dispersion of return values among your portfolio positions. In the end, we want to produce estimated return values that are a fair yardstick of how much we value that assets, typically the actual range of financial data is much greater than the range of preference that investors would ascribe. Shrinkage is based on an algorithm called James Stein Estimation. It is demonstrated that using any level of shrinkage will produce more accurate estimates. The relative Shrinkage used between the risk and return variables is also used to make the portfolio more aggressive or conservative. For example shrinking risk values to the average would effectively eliminate the risk static from impacting the asset allocation, accordingly the portfolio tips in the direction of returns and favors greater returning assets without regard to the risk involved, becoming more aggressive. Generally some minimum level of shrinkage is recommended as more shrinkage allows diversification to take a more prominent role in portfolio construction.

Return Floor

The return floor will elevate any return value to the set floor. The floor is applied before shrinkage. It is used to correct historical anomalies.

Return Ceiling

The return ceiling will lower any return value to the set ceiling. The ceiling is applied before shrinkage. It is used to correct historical anomalies. Generally we apply return ceilings in the range of 20-35 %

Return Shrinkage

Rather than shrinking the dispersion of positions returns estimations to the population mean you can override that value. Generally, a return shrinkage target would be set to a long term portfolio level return and the use of the target is more appropriate if the sample period provides useful return rank data but may be of an inappropriate magnitude.

Hurdle Rate

The hurdle rate is the minimum rate at which any risky investment must be expected to make. Hurdle rates can be higher in more aggressive portfolios and lower in conservative portfolios. Gsphere will exclude from the optimization any asset failing to outperform the hurdle rate. Hurdle rates can also be negative which is often used to enable assets with negative historical performance to be included to the optimization. The hurdle rate can be a return on a money market fund, or treasury bill or it can be the margin rate for a leveraged portfolio or it can be the rate of expected inflation.

Risk Definition

Changes to the risk definition change the risk metric that is associated to each asset. Gravity has developed significant best practices with the risk definition. Recall that any risk metric is a surrogate for the probability and magnitude of future losses. The standard deviation from "modern Portfolio theory" is easily improved on with metrics that better correspond to what risk actually is and that have a more predictive quality.

Risk Shrinkage

Risk shrinkage is a normalization technique that helps to clean up outliers in the data. Shrinkage preserves the rank of the data (so that your lowest risk position will remain your lowest risk position etc) but it decreased the dispersion of risk values in your portfolio positions. In the end we want to produce estimated risk values that are a fair yardstick of how much we value that assets, typically the actual range of financial data is much greater than the range of preference that investors would ascribe. Shrinkage is based on an algorithm called James Stein Estimation. It is demonstrated that using any level of shrinkage will produce more accurate estimates. The relative Shrinkage used between the risk and return variables is also used to make the portfolio more aggressive or conservative. For example shrinking risk values to the average would effectively eliminate the risk static from impacting the asset allocation, accordingly the portfolio tips in the direction of returns and favors greater returning assets without regard to the risk involved. Generally some minimum level of shrinkage is recommended as more shrinkage allows diversification to take a more prominent role in portfolio construction.

Risk Floor

The risk floor will elevate any risk value to the set floor. The floor is applied before shrinkage. It is used to correct historical anomalies.

Risk Ceiling

The risk ceiling will lower any risk value to the set ceiling. The ceiling is applied before shrinkage. It is used to correct historical anomalies.

Risk Shrinkage Target

Rather than shrinking the dispersion of positions risk estimations to the population mean you can override that value. Generally, a risk shrinkage target would be set to a long term portfolio level risk metric and the use of the target is more appropriate if the sample period provides useful return rank data but may be of an inappropriate magnitude.

RISK MANAGEMENT

Global Stop from Positions Price

This stop loss policy sells off any position at an absolute price threshold.

Global Stop %

The Stop loss policy will sell off any position in a given optimization interval that has a daily closing value sufficient to attain a loss in the position greater than the threshold specified. Stop loss policy can be used for tax loss harvesting. Stop loss is a trader's technique in accordance with the philosophy "let your winners run and cut your profits short." Additionally, it can prevent psychologically damaging losses to impact the portfolio manager or investor's psyche.

Global Stop # of Standard Deviations

The Stop loss policy will sell off any position in a given optimization interval that has a daily closing value sufficient to attain a loss in the position greater than the threshold specified by calculating the asset's standard deviation and entering some multiplier of that standard deviation. For example, if a position has an annualized standard deviation of 20% and the portfolio manager enters a value of 1.5 then $1.5 * 20 = 30\%$ and when that position loses 30% a stop loss order is triggered. This applies to backtests and portfolio automation.

Allow Stopped Positions to Reinvest in next Re-Optimization

After a position has been sold because a stop loss sale rule, this contingent policy governs if that position will be allowed in a subsequent reoptimization.

Allow Stopped Positions to Reinvest in Next Rebalance

After a position has been sold because a stop loss sale rule, this contingent policy governs if that position will be allowed in a subsequent rebalancing.

UPCOMING POLICIES

Volume Weighting

It is often regarded that price movements associated with greater volume have greater predictive merit. Volume weighting any sample captures this belief.

Profit Taking

rules to govern how positions can lock in gains.

Sample Inversion

Inverting a sample is a technique that a portfolio manager applies when she believes that the sample period offers material negative predictive efficacy.

Stambaugh Extrapolation

Stambaugh Extrapolation uses the relationship information for assets with shorter histories to interpolate a longer history than better enables an apples to apples estimation with other assets

Rip Cord Policy

The Rip Cord Policy when triggers sells the entirety of the portfolio and goes to cash.

FEE POLICY

Fee Policy

Sets a fee that will be subtracted from all illustrated performance metrics and charts

PORTFOLIO EDIT

This page lives here on the modeling link

Use this page to optimize a portfolio with unallocated capital or just calculate an existing portfolio

Tags support portfolio display, sharing, automation and performance options

The screenshot shows the GRAVITY INVESTMENTS PORTFOLIO RE-OPTIMIZATION interface. The top navigation bar includes links for Investor, Portfolios, Modeling (highlighted), Research, Compare, Settings, and Help. The main content area is divided into three sections: Portfolio Info, Policy Tree, and Portfolio Tags. The Portfolio Info section contains fields for Portfolio Name (New Portfolio) and Amount to Invest (\$1,000,000), with Calculate and Optimize buttons. The Policy Tree section explains that it enables users to set variables for how the portfolio is backtested and re-optimized, with an Open Policy Tree button. The Portfolio Tags section allows users to add tags related to their portfolio in a text box. Below these sections is a Positions table with tabs for Positions, Risk, Return, Utility, Constraints, and Version History. The Positions tab is active, showing a table with columns for #, Symbol, Company Name, Price, Allocation, Shares, Value, and Short Sell. The table contains one row with the symbol \$CASH and the company name Cash and Equivalents. Callouts point to various elements: the top left corner, the Modeling link, the Optimize button, the Open Policy Tree button, the Portfolio Tags text box, the Positions tab, the Add Symbols button, the Or Search by Company name field, the Or Upload an Excel file field, and the Select button.

This row of tabs supports the methods to enter assets or lists into the system

The model tab allows for already created portfolios to be included to a strategy. This supports a model-of-models approach

Enter tickers, or enters names of companies or funds, or import from outside sources

POSITION GRID

This is the position grid which the user can declare any known or fixed weighting to any position

If the user declares no positions then the optimization runs 'naked', if the grid is filled in, gsphere is just a calculator. But partial optimizations support complex client scenarios, core – satellite strategies and overlays.

Take a short position in any desired asset by checking the box, forecasted inputs will invert

The screenshot shows the 'Positions' tab of a software interface. At the top, there are buttons for 'Assets', 'Import Candidate Set', 'Add Model', and 'Import Time Series'. Below these are input fields for 'Enter your Stock or Fund Ticker Symbols:', 'Or Search by Company name:', and 'Or Upload an Excel file (XLS or XLSX) containing the symbols:'. A table with 9 rows and 8 columns is displayed, with columns: '#', 'Symbol', 'Company Name', 'Price', 'Allocation', 'Shares', 'Value', and 'Short Sell'. The rows list various assets including \$CASH\$, AAPL, AMZN, FB, GOOGL, NFLX, BND, ZROZ, and GLD. At the bottom, there are radio buttons for 'Retain', 'Allocations', 'Shares', and 'Values', and two buttons: 'Kick Out Zeros' and 'Clear All Weights'. A note at the bottom left explains the calculation logic.

#	Symbol	Company Name	Price	Allocation	Shares	Value	Short Sell
1	\$CASH\$	Cash and Equivalents	1				
2	AAPL	Apple Inc.	194.21	10.00 %	2534.98	378980.00	<input type="checkbox"/>
3	AMZN	Amazon.com Inc.	1808				<input type="checkbox"/>
4	FB	Facebook Inc.	214.67	18.20 %	4000.00	689800.00	<input type="checkbox"/>
5	GOOGL	Alphabet Inc.	1285.5				<input type="checkbox"/>
6	NFLX	Netflix Inc.	363.09				<input type="checkbox"/>
7	BND	Vanguard Total Bond Market ETF	78.97	2.64 %	1219.51	100000.00	<input type="checkbox"/>
8	ZROZ	PIMCO 25+ Year Zero Coupon U.S. Treasury Index Exchange-Traded Fund	111.7				<input checked="" type="checkbox"/>
9	GLD	SPDR Gold Trust ETF	115.77				<input type="checkbox"/>
				30.84 %		\$1,168,780	
				of			
				3,789,800.00			

Please Note: When you enter in quantity of Shares or Values, asset Allocations will get recalculated based on Value's Running Total. On the other hand, when you enter in Allocation or change the "Amount to Invest", Allocations will get recalculated based on the "Amount to Invest".

Retaining previously optimized results, then adding additional capital to the model supports a contextual optimization of the investors existing, optimized or held away accounts.

Enter an allocation, share or value and the value entered will persist through optimizations, edits and future events

Removing unallocated positions and clearing all assigned or derived weights support various workflows

CONSTRAINT TAB

Constraints can be set globally from the policy tree or individually in this tab

Create any combination of position and group min and max constraint

You can apply a group schema here to use as a category constraint

The screenshot shows the 'Constraint' tab in a software interface. At the top, there are tabs for 'Positions', 'Risk', 'Return', 'Utility', and 'Constraints' (which is selected), and a 'Version History' tab. Below these is a dropdown menu for 'Select Group Constraint Classification Schema' set to 'Industry', with an 'Apply' button. The main area is a table with columns: '#', 'Symbol', 'Company Name', 'Minimum', 'Maximum', and 'Group Name'. The table is organized into groups: 'CONSUMER GOODS' (containing AAPL), 'FINANCIAL' (containing BND, ZROZ, GLD), 'N/A' (containing \$CASH\$), 'SERVICES' (containing AMZN, NFLX), and 'TECHNOLOGY' (containing FB, GOOGL). Each group has a 'Group Allocation Constraint Min' and 'Max' field. Individual assets also have 'Minimum' and 'Maximum' constraint fields. A 'Set Global Maximum Allocation' button is at the bottom right. Callouts with blue dots and dashed lines point to various elements: the 'Constraints' tab, the 'Select Group Constraint Classification Schema' dropdown, the 'Group Name' column, the 'Group Allocation Constraint Min/Max' fields, the individual 'Minimum/Maximum' constraint fields, and the 'Set Global Maximum Allocation' button.

#	Symbol	Company Name	Minimum	Maximum	Group Name
Group Name: CONSUMER GOODS					
Group Allocation Constraint Min: [] Max: []					
2	AAPL	Apple Inc.	[]	[]	CONSUMER GOODS
Group Name: FINANCIAL					
Group Allocation Constraint Min: [] Max: []					
7	BND	Vanguard Total Bond Market ETF	7.00 %	15.00 %	FINANCIAL
8	ZROZ	PIMCO 25+ Year Zero Coupon U.S. Treasury Index Exchange-Traded Fund	[]	15.00 %	FINANCIAL
9	GLD	SPDR Gold Trust ETF	5.00 %	10.00 %	FINANCIAL
Group Name: N/A					
Group Allocation Constraint Min: [] Max: []					
1	\$CASH\$	Cash and Equivalents	[]	2.00 %	N/A
Group Name: SERVICES					
Group Allocation Constraint Min: 10.00 % Max: 15.00 %					
3	AMZN	Amazon.com Inc.	[]	[]	SERVICES
6	NFLX	Netflix Inc.	[]	[]	SERVICES
Group Name: TECHNOLOGY					
Group Allocation Constraint Min: 10.00 % Max: 35.00 %					
4	FB	Facebook Inc.	[]	20.00 %	TECHNOLOGY
5	GOOGL	Alphabet Inc.	[]	20.00 %	TECHNOLOGY

Set individual asset minimum and maximum constraints

Use the groupings here or click-in to make up your own groups

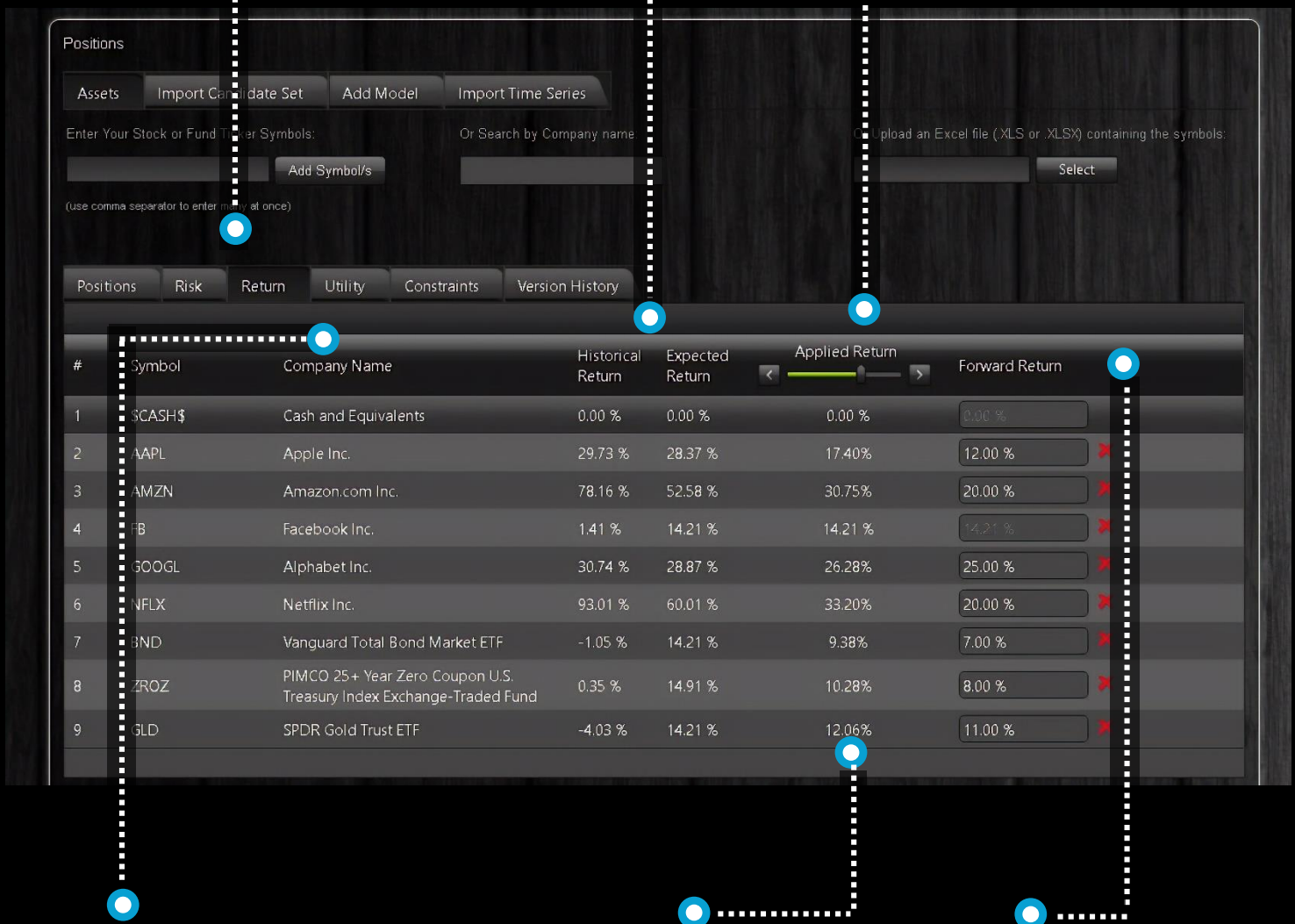
Set group min and max constraints

RETURN ESTIMATION GRID

Inspect and manage your risk and return estimations

Track the return estimations as they go from historical to projected

Applied returns are what is fed to the optimizer



The Utility tab gives the final utility function (numerator and denominator)

Blend Gravity's quantitative forecasts with a manual or outside source

Forward returns can be manually entered or imported


ADVISOR PAGE

The portfolio edit page for the advisor user type offers a streamline interface





users workflow is to enter portfolio into the system to get portfolio analysis and create the basis for a recommendation






GRAVITY
INVESTMENTS
PORTFOLIO RE-OPTIMIZATION







Investor




Portfolios




Modeling



Compare



Settings



Help

Portfolio Info

Portfolio Name:

Amount to Invest:

Calculate

Positions

Assets

Add Model

Enter Your Stock or Fund Ticker Symbols:

Add Symbols

Or Search by Company name:


Or Upload an Excel file (XLS or XLSX) containing the symbols:

Select


(use comma separator to enter many at once)

#	Symbol	Company Name	Price	Allocation	Shares	Value
1	\$CASH\$	Cash and Equivalents	1	<input type="text"/>	<input type="text"/>	<input type="text"/>
				<div><div>0</div><div>%</div></div>		
				<div>of</div>	<div>\$0</div>	
				<div>1,000,000.00</div>		


© 2018 Gravity Investments. All Rights Reserved.
Protected by United States Patents 9,156,030 & 7,472,084




Home



About Us



Contact Us



GUEST EDIT

The guest user edit is designed to be custom branded and embedded, usually as part of a free portfolio analysis

Prompt web visitors with a strong call to action that sends them here

Most investors are less diversified than they think they are so this will expose the investors true diversification and can inspire corrective action

The screenshot shows the 'GRAVITY INVESTMENTS PORTFOLIO RE-OPTIMIZATION' interface. At the top, there is a header with the Gravity Investments logo and a 'Logout' button. Below the header, the main content area is titled 'Positions' and 'Please enter your portfolio'. It features three input methods: 'Enter Your Stock or Fund Ticker Symbols' with an 'Add Symbol/s' button, 'Or Search by Company name:' with a search bar, and 'Or Upload an Excel file (XLS or XLSX) containing the symbols:' with a 'Select' button. A table below these inputs shows a single entry for '\$CASH\$' with a value of '\$0'. At the bottom, there are two buttons: 'Get help with my portfolio' (red) and 'Get My Portfolio Analytics' (green). Annotations with blue dots and dashed lines point to various elements: the top left logo, the top right 'Logout' button, the 'Please enter your portfolio' title, the 'Add Symbol/s' button, the search bar, the 'Select' button, the table, the 'Get help with my portfolio' button, and the 'Get My Portfolio Analytics' button.

GRAVITY INVESTMENTS
PORTFOLIO RE-OPTIMIZATION

Logout

Positions

Please enter your portfolio

Enter Your Stock or Fund Ticker Symbols: Add Symbol/s

Or Search by Company name:

Or Upload an Excel file (XLS or XLSX) containing the symbols: Select

(use comma separator to enter many at once)

#	Symbol	Company Name	Price	Allocation	Shares	Value
1	\$CASH\$	Cash and Equivalents	1	<input type="text"/>	<input type="text"/>	<input type="text"/>

Get help with my portfolio

Get My Portfolio Analytics

the investor enters their portfolio

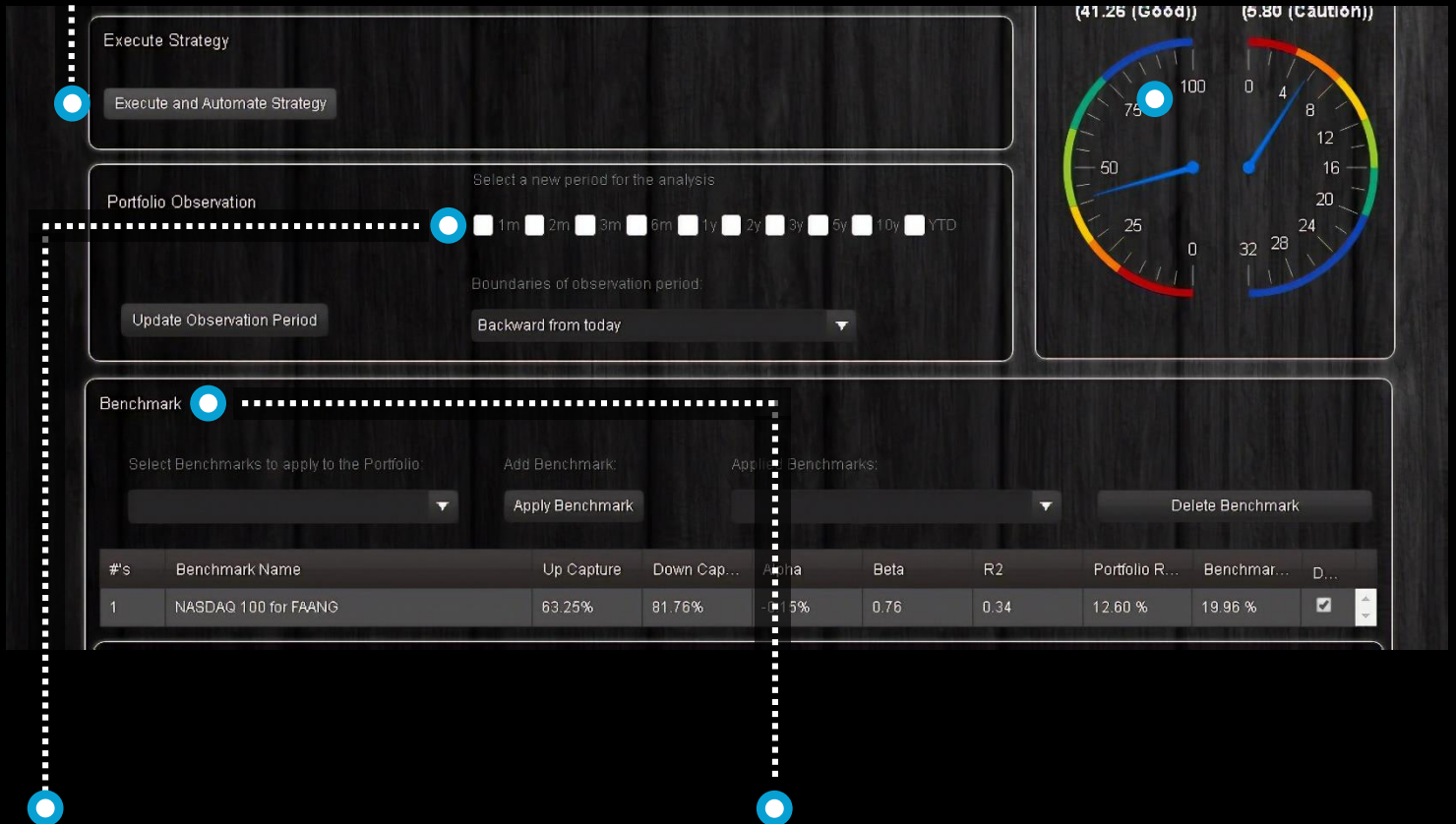
the users is taken to the portfolio view page

VIEW CONTROLS

When the portfolio manager is ready to execute and automate the strategy the portfolio is sent to the trading system with our API

The portfolio is tagged with Automated tag which turns on the portfolio monitor and triggers activated investment policies as they become executable

Updates to the portfolio are pushed to the trading system



User can select any time period to view the portfolio for, and all charts, graphs and analytics update to the reset period.

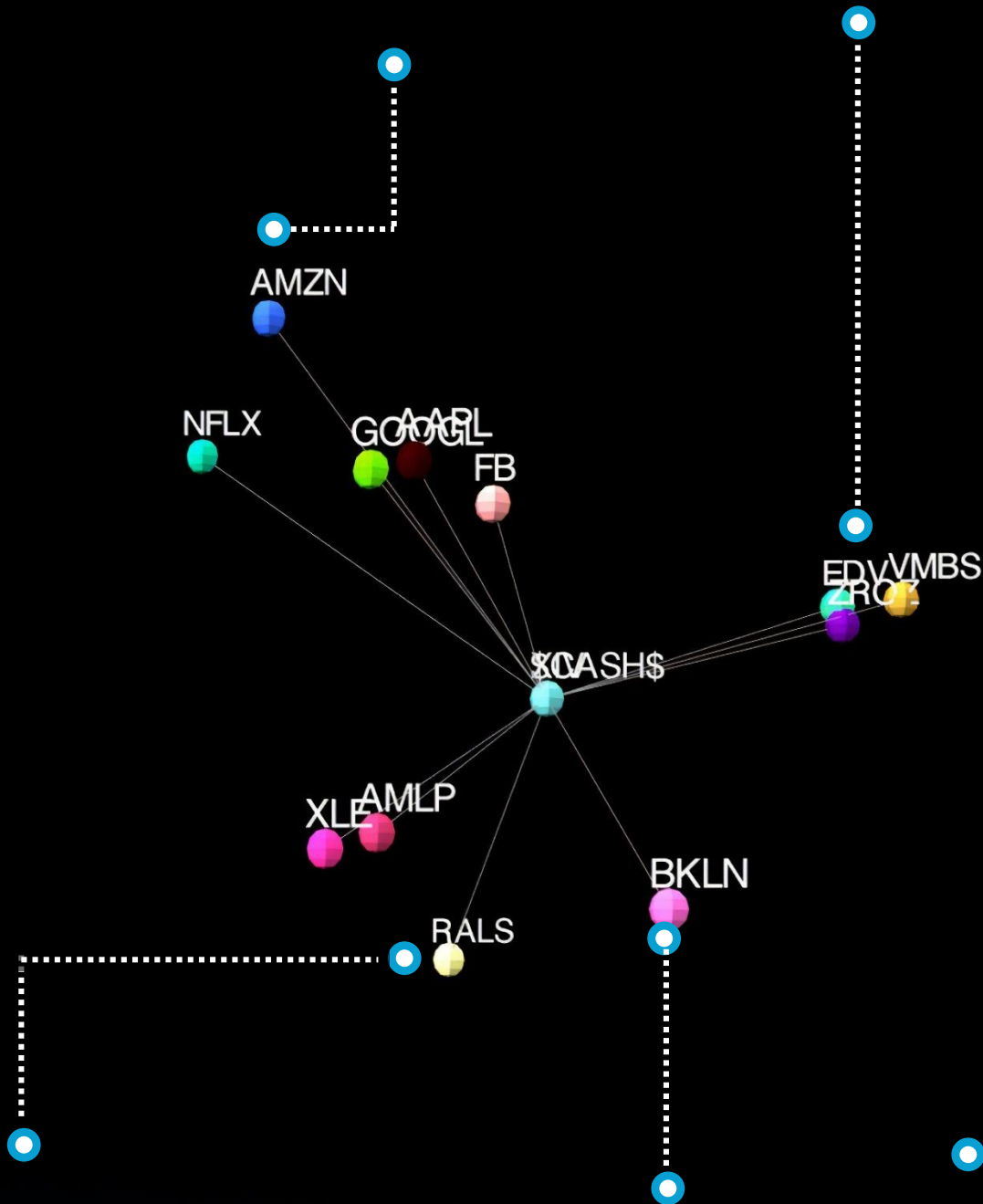
User can set multiple benchmarks for stats and charting

VECTORS

Gsphere maps correlations of assets to angles of separation in the 3D polar chart

Assets with more attractive metrics (greater utility) have longer vectors

Highly correlation assets cluster together



Uncorrelated assets are graphed 90 degrees apart

Opposite correlations are graphed opposite one another

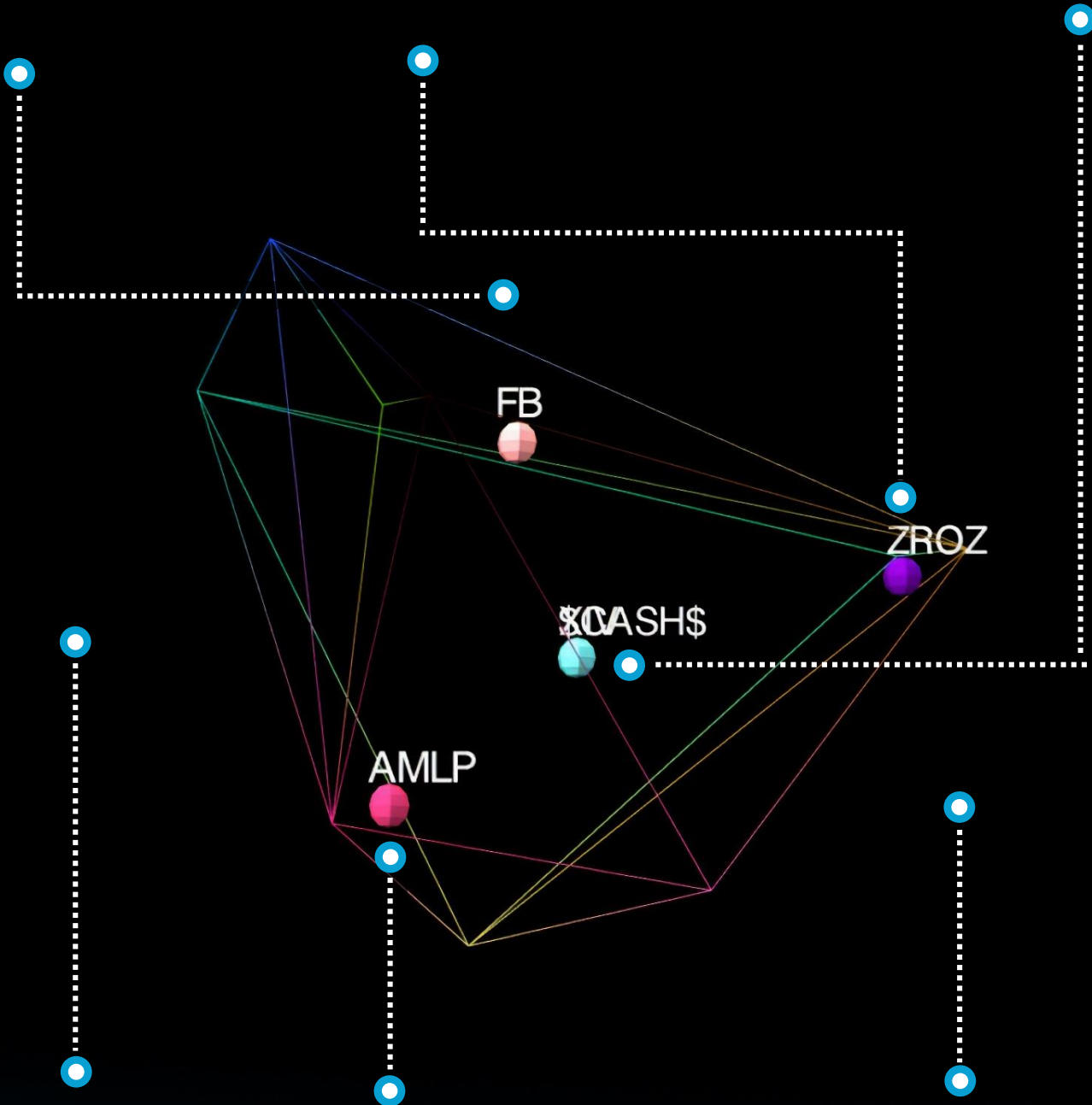
In this way, we translate economic balance to physical balance

FRAME

The frame is the portfolios 3D, holistic efficient frontier

The best investments combine to create the frame

Inefficient assets are trapped inside



Inefficient assets will be outperformed by some combination of other assets for any market direction

We can visualize nearly efficient vs. deeply inefficient assets and be more forgiving for nearly efficient assets with a simulation induced superposition

The frame and graphics are always displayed in 3 dimensions, but the mathematics can be set in higher dimensions. The lower the calculation dimension the more discriminating the algorithm

SPHERE

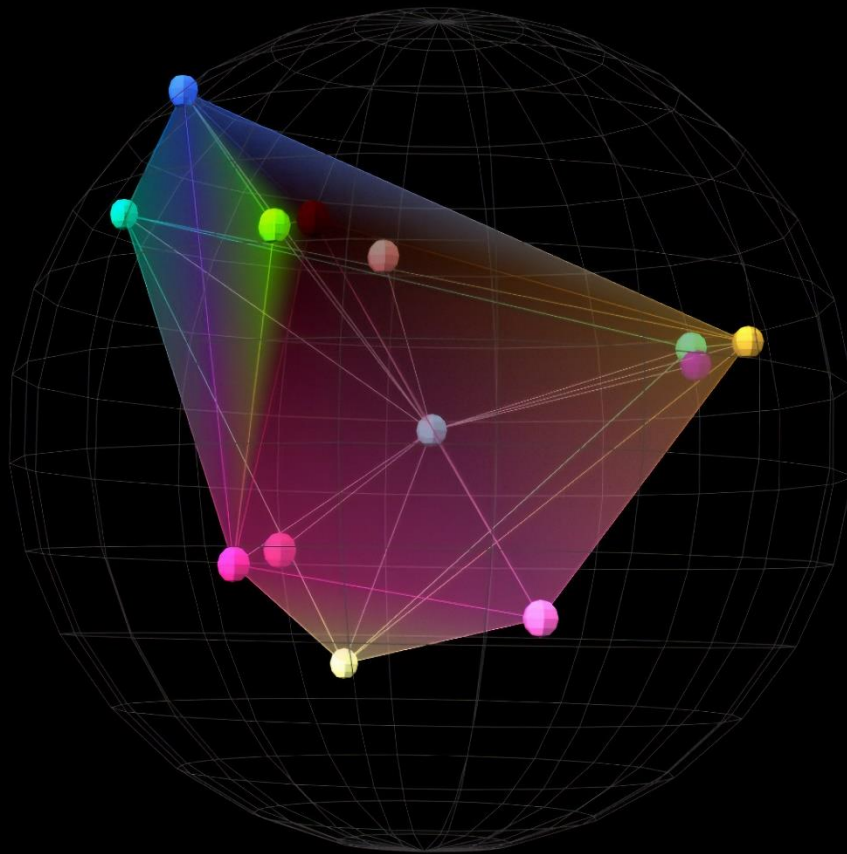
The symmetry of the volume this process induces is the portfolios diversification visualization



this visualization is great to objectively educate clients about diversification



This is the source of many investors "aha moment"



the 3d graphics are interactive: both on the webpage and inside the pdf reports

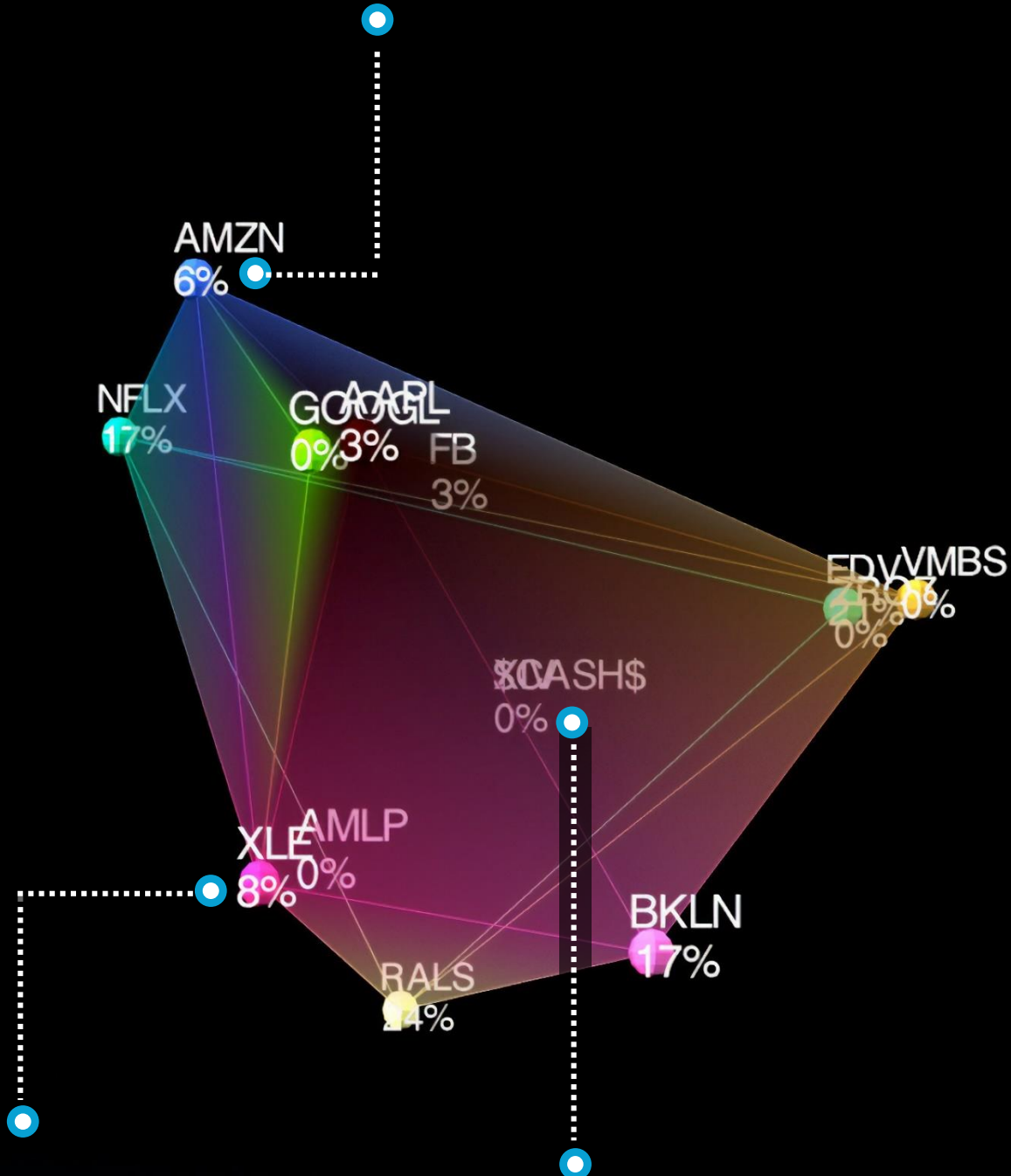


The sphere is just a visual reference model to depict what perfect symmetry looks like against the portfolio. Portfolios do not need perfect sphericity to have great diversification, but huge risk reduction align with major improvement to symmetry.

ALLOCATIONS

With the portfolio modeled geometrically, we can calculate the optimal allocations for each asset

The weights are equal to the assets' relative volume contribution



It is like a smart pie chart, containing the assets relative information and the sum of the whole; the very definition of holistic

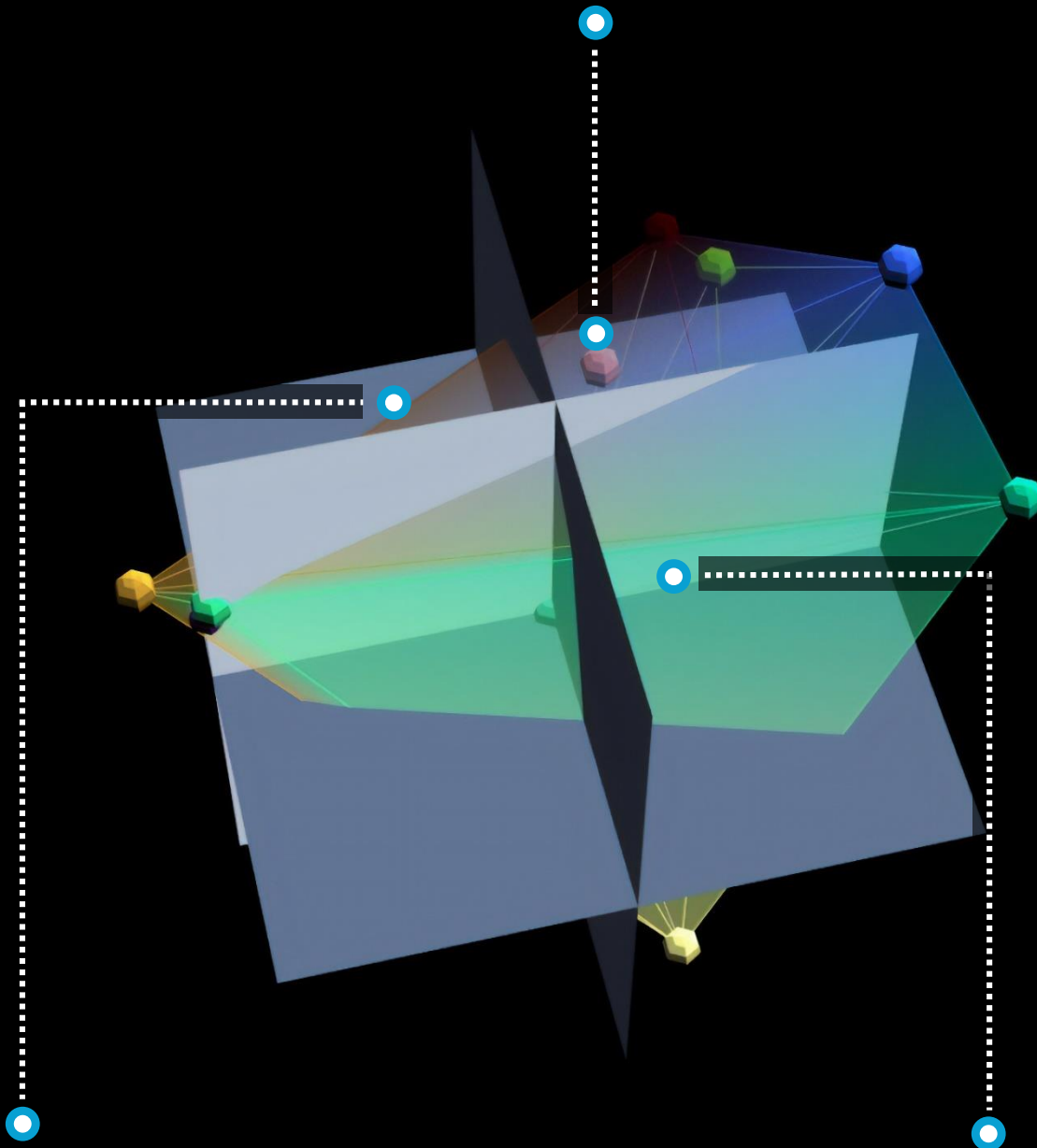
Inefficient assets have zero weight

BOXES

The diversification boxes cut the 3D space into 8 boxes

Each box represents diversification potential

Box exposure or lack of it is very tangible and easy to understand



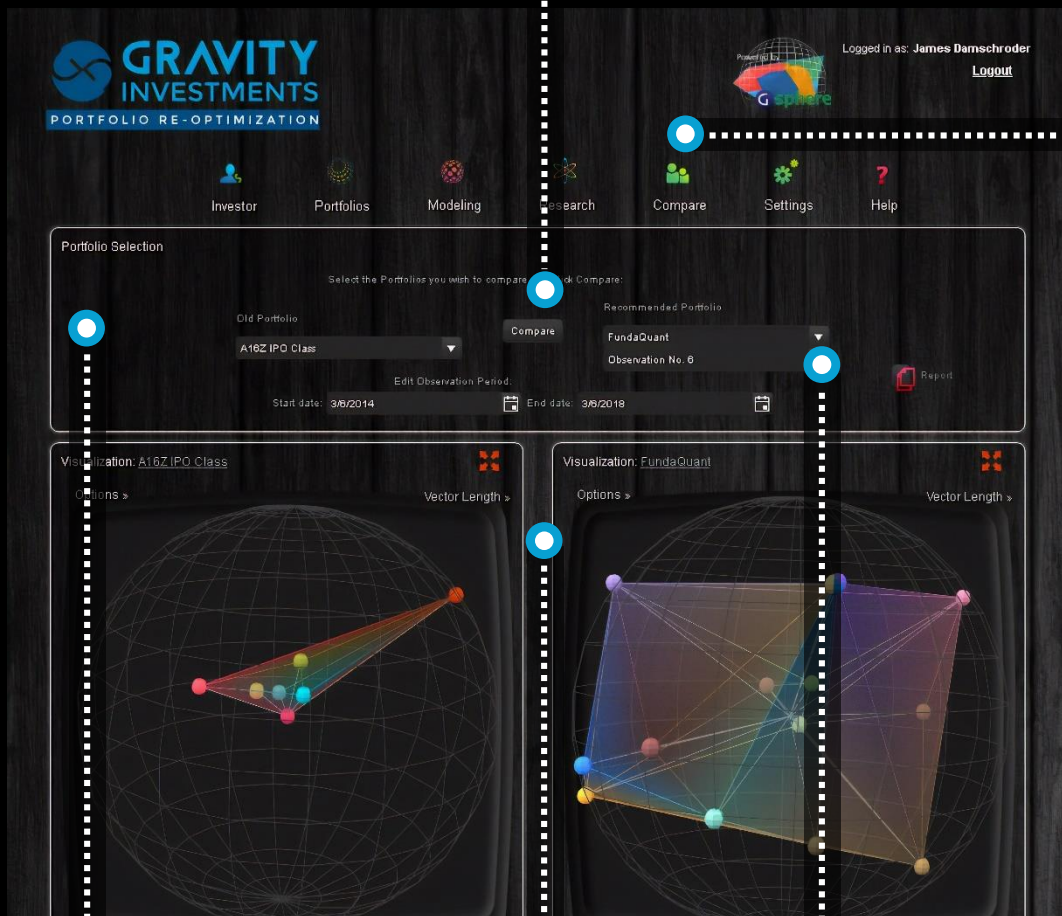
An empty box is an opportunity to obtain better diversification for the investor.

The boxes are another visual reference like the globe

COMPARE

Gsphere offers a full comparison of any two portfolio

The comparison is available in the compare link



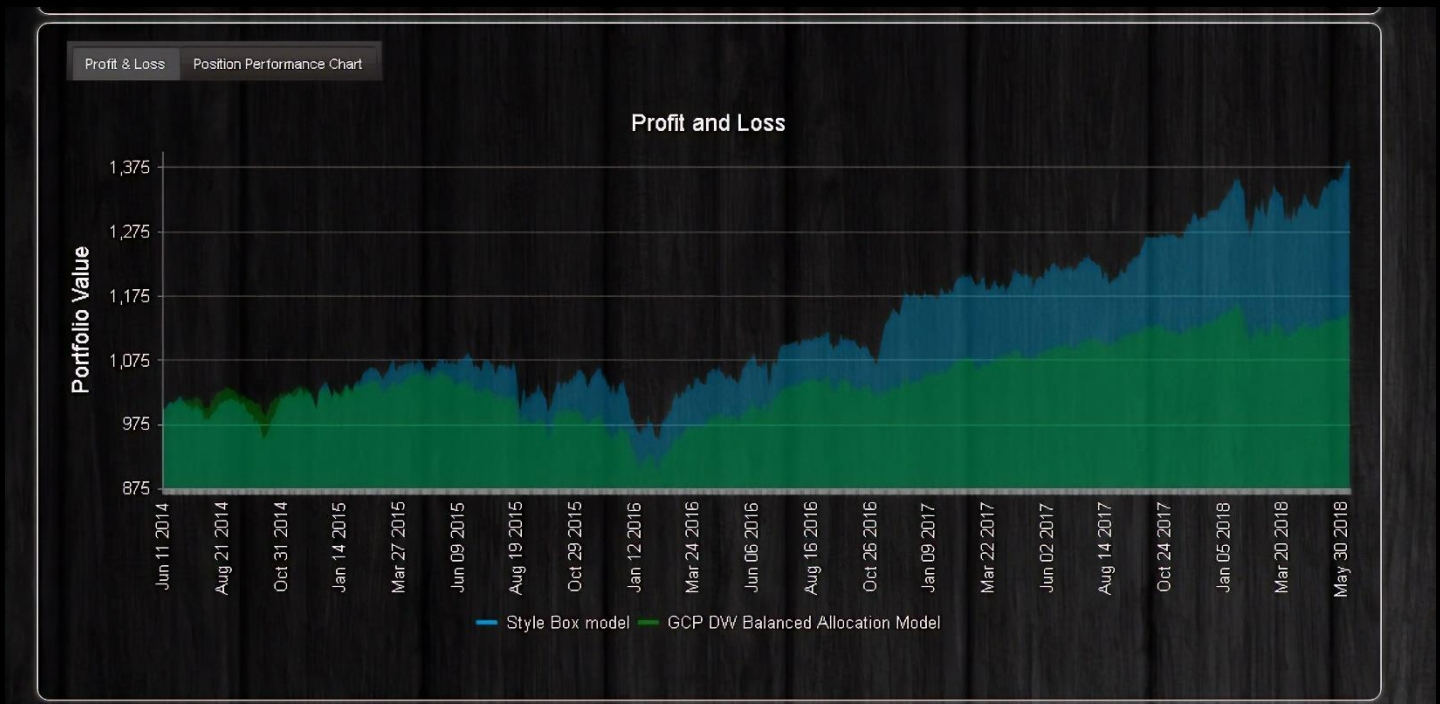
Select the portfolio to compare and adjust the data range if desired

The differences in the 3D views can be striking when investors have poor diversification

Advanced users can compare multiple versions of the same portfolio

COMPARISON PROFIT AND LOSS CHART

The relative profit and loss of the two portfolios is often an important influence in investor acceptance



COMPARISON DIVERSIFICATION GAUGES

Comparative diversification gauges remove any shred of subjectivity in the comparison

Each color code and scale is unique to that measure; red is danger, orange is caution, yellow is adequate, green is good, dark green is excellent and blue is abundant



Fiduciary Diversification is the standard for evaluating fiduciary appropriateness of diversification

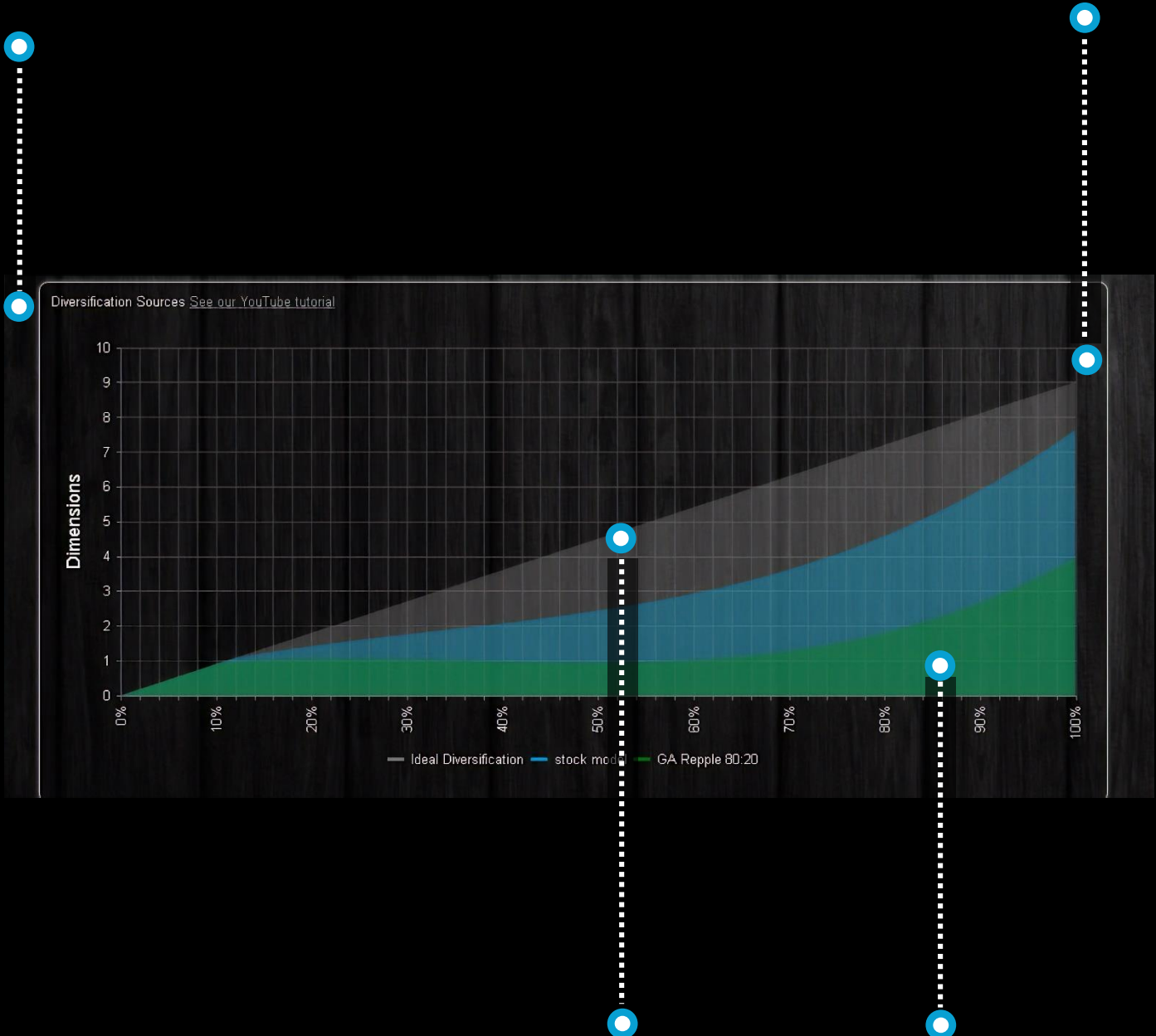
While there is no limit to some diversification values, further increases in values do little to help, but also do not hurt unless it causes other values to retract

Often, we see a trade off in idiosyncratic diversification and systematic diversification. To have strong total fiduciary diversification one needs both.

COMPARISON DIVERSIFICATION SOURCES

This chart illustrates the totals dimensionality for each portfolio

More important that the total dimensionality (the right most value for each graph) is the path it takes to get there. This is the diversification of your diversification

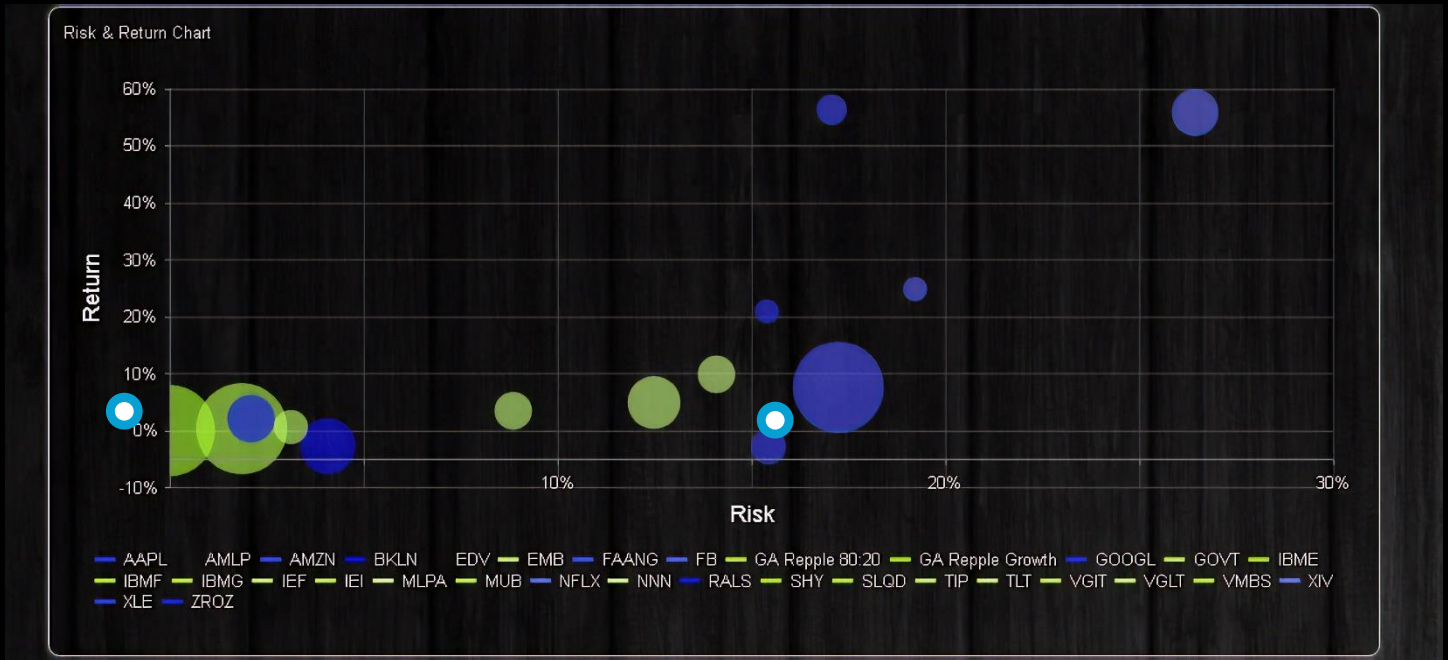


A linear increase is vastly superior to hyperbolic increase

This green graph shows that despite all of the holdings, statistically this portfolio has 70% of its variation governed by one single thing. This is the insidious systemic risk that many investors bare without awareness.

COMPARE RISK & RETURN

Comparative risk and returns
illustrates both the portfolios and
their components



CONTACT

Enter investor details and KYC /
profile data here

The screenshot displays the Gravity Investments web application interface. At the top left is the Gravity Investments logo with the tagline 'PORTFOLIO RE-OPTIMIZATION'. At the top right, it shows 'Powered by Gsphere' and 'Logged in as: James Damschroder' with a 'Logout' link. A navigation bar contains icons for Investor, Portfolios, Modeling, Research, Compare, Settings, and Help. The 'Investor' tab is active, showing a form titled 'Investors and Portfolios'. The form has two columns of input fields: the left column includes Email, First Name, Telephone, Address Line 2, State, Age, and Net Worth; the right column includes Last Name, Address, City, Zip, and Marginal Tax Rate. There is a 'Promote to Advisor' checkbox and 'Insert' and 'Cancel' buttons at the bottom of the form. An 'Add New Investor' button is located at the bottom left of the form area. A table at the bottom of the page has columns for 'Profile', 'Proposals', 'Actions', and 'Contact Information'. A dotted line with blue circular markers connects the text annotations to specific parts of the interface: one marker points to the top left of the form, another to the 'Investor' tab icon, a third to the 'Email' input field, and a fourth to the 'Contact Information' column header in the table.

Investors and their portfolios are
kept separate from your models for
privacy

keep investor objective, proposals,
contact data and analytics here

OBJECTIVES

These portfolio objectives may be set by the advisor or sent to the investors

The investor must prioritize what is important to her

Each objective is competing with the others for her preference

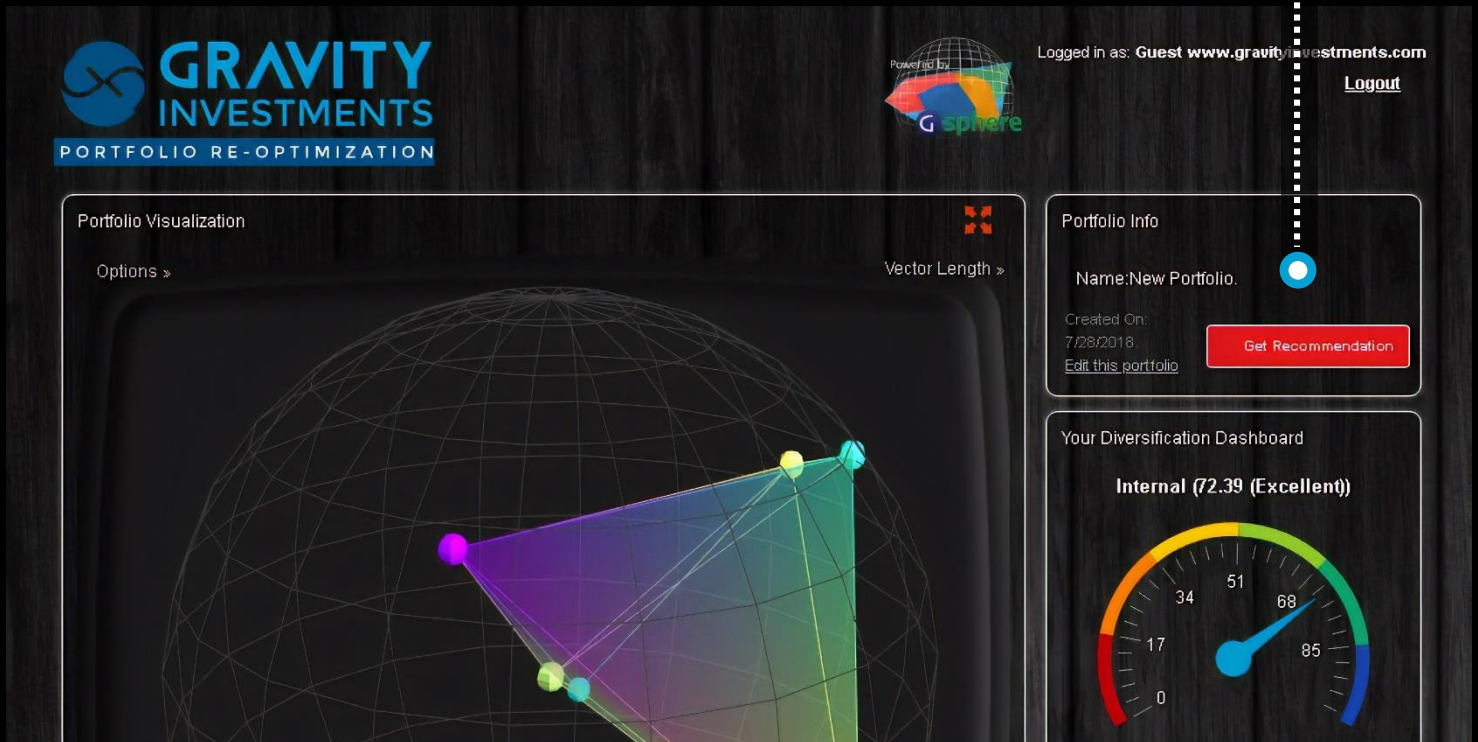
The image shows a screenshot of a software interface titled "Investor Objectives". The interface is a dark-themed dialog box with a close button (X) in the top right corner. Inside the dialog, there is a section titled "Set the Objectives you want to apply" with a subtext: "Please prioritize what portfolio attributes are important to you. These portfolio objectives compete with each other for your preference. Portfolios can't be great at everything. Tell Gsphere what you want your portfolio to be great at." Below this text are eight sliders, each representing a different portfolio objective. Each slider has a blue bar indicating the selected value and a grey dot for the slider handle. The objectives and their current settings are: Total Return (set to approximately 70% between Not Important and Essential), Capital Preservation (set to approximately 70% between Not Important and Essential), Current Income (set to approximately 80% between Not Important and Essential), Stability (set to approximately 70% between Not Important and Essential), Minimizing Tax (set to approximately 10% between Not Important and Essential), Minimizing Market Exposure (set to approximately 50% between Not Important and Essential), Diversification (set to approximately 10% between Not Important and Essential), and Time Horizon (set to approximately 30% between Short term and Long term). A green "Save" button is located at the bottom right of the dialog box. The dialog box is surrounded by a network of dotted lines and blue circular nodes, which are connected to the explanatory text blocks on the page.

The objectives will be used to either select the model that is the best fit from the firms designated model lineup or are used to reparametrize the utility functions of the investment candidates used in the custom recommendation

Each position is evaluated against each objective and multiplied by the investors preference

RECOMMENDATION

The recommendation button is a major call to action that appears on the portfolio view page after getting her portfolio analytics back



The logic behind the recommendation is set in the brand settings page

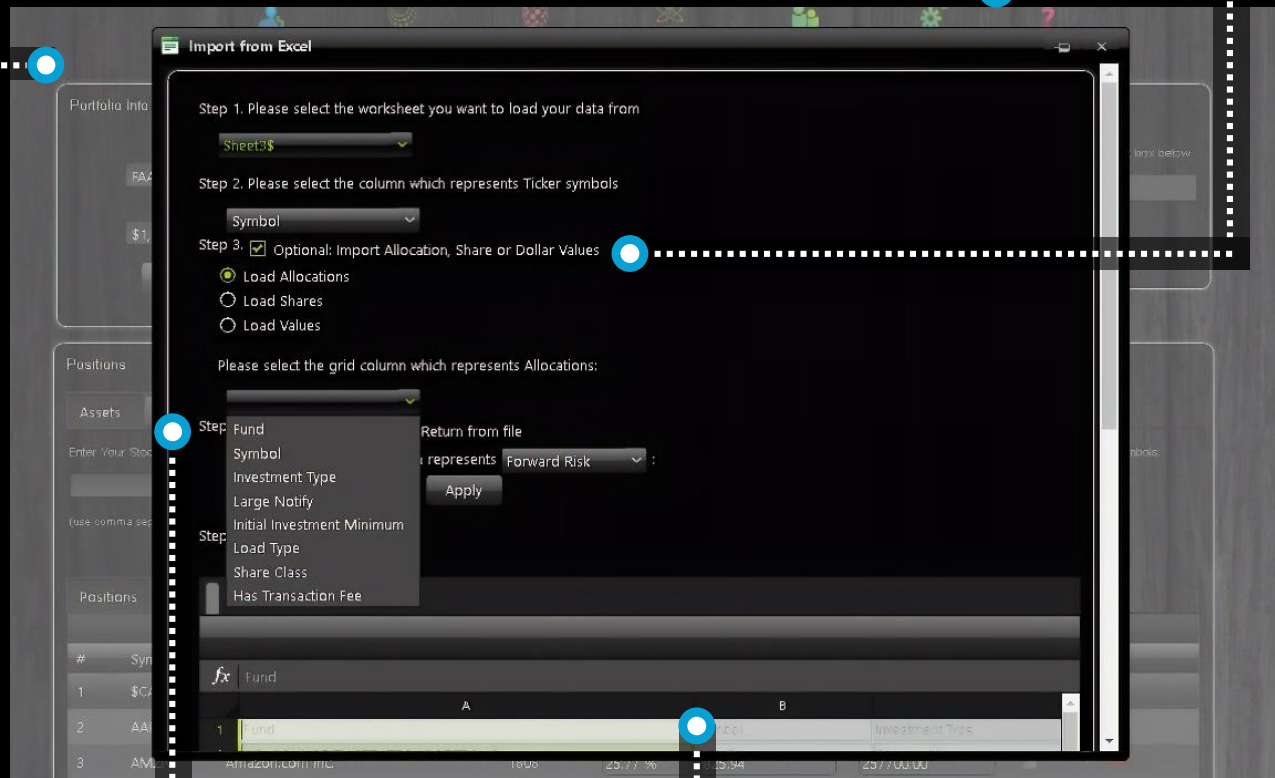
The recommendation may be a selection of a model portfolio, or an optimization of existing holdings, or a custom implementation of the firm's candidate sets and the investors objectives.

EXCEL IMPORT

Import positions for a quick analysis

Flexible formats to minimize excel manipulations

Import allocation, shares or values depending on your workflow and data availability, or just import the positions to optimize



Import risk and / or return assumptions

Preview the import data

Support for importing outside time series allows inclusion of private assets, hedge funds etc. into model

VERSIONS

Use this to compare returns across various iterations of the strategy

For any strategy you can keep track of the version history

Track the history of the live strategy

The screenshot shows the 'Positions' interface with several callouts:

- Callout 1 (Top Left):** Points to the 'Add Symbols' button, used for comparing returns across iterations.
- Callout 2 (Top Middle):** Points to the 'Version History' tab, used for tracking the history of the live strategy.
- Callout 3 (Top Right):** Points to the 'Show Returns' button, used for comparing returns across iterations.
- Callout 4 (Bottom Left):** Points to the 'Risk' tab, used for complying with DOL standards to document and manage uncompensated risk.
- Callout 5 (Bottom Right):** Points to the 'Active' status in the version history table, used for rolling back to any previous version to set that version as the active instance.

Version Name	Created On	Start Date	End Date	Return	Actions	Status
First Instance	6/11/2015 6:12:37 PM	6/11/2014	6/11/2015	10.43 %	Set as Active Observation	✗
Instance No. 2	6/11/2015 6:17:00 PM	6/11/2014	6/11/2015	10.79 %	Set as Active Observation	✗
Instance No. 3	8/3/2017 9:53:33 AM	6/11/2014	6/11/2015	2.91 %	Set as Active Observation	Active ✗

Comply with DOL standards to document and manage uncompensated risk

Rollback to any previous version to set that version as the active instance

RESEARCH

Log, audit and track your researched positions

Manage individual positions here, we call investments that are sent to the optimization “candidates”

Candidate sets are groups like a watch list or a buy list that are sent to the optimizer, these are building blocks of your strategies

The screenshot displays the 'Research' interface. At the top, there are tabs for 'Candidates' and 'Candidate Sets'. Below these, a table lists various investment candidates. The table has columns for Ticker, Name, Candidate Sets, Price When Added, Target Price, Expected Return, and an 'edit' button. Below the table, there is an 'Edit Candidate' form for the selected candidate 'IVW'. The form includes fields for Asset Symbol, Asset Name, Exchange, Industry, Price When Added, Note, Target Price, and Expected Return. To the right of the form, there is a section for 'Available Candidate Sets' with a list of sets and checkboxes to select or deselect them. The interface is dark-themed with blue accents.

Ticker	Name	Candidate Sets	Price When Added	Target Price	Expected Return	edit
IVE	iShares S&P 500 Value Index Fund	ETF.com A Grade Ishare	86.14	0	0.00 %	edit
IVV	iShares S&P 500 Index Fund	ETF.com A Grade Ishare	185.41	0	0.00 %	edit
EOAIX	Eaton Vance Special Investment Trust	ETF.com A Grade Ishare	9.76	0	0.00 %	edit
IJK	iShares S&P MidCap 400 Growth Index Fund	Gravity Dynamic Curati	148.03	0	0.00 %	edit
IJH	iShares S&P MidCap 400 Index Fund	ETF.com A Grade Ishare	133.97	0	0.00 %	edit

Edit Candidate IVW

Enter the symbol: Search Symbol

Asset Symbol:

Asset Name:

Exchange:

Industry:

Price When Added:

Note:

Target Price:

Expected Return(%):

Available Candidate Sets

Candidates Set Name

- ☒ Equity Styles
- ☐ Liquid Alt overlay
- ☐ GIC Sectors
- ☐ Strategic Alpha ETF
- ☐ Aggressive Income

See position details.

Researches may set the target price or expected return here which will inure as an optimization input

Manage what candidate sets any positions may be included to

RESEARCH 3

The list candidate sets created by or shared to the user

Candidate sets can be centrally managed and shared with advisors or teams

Candidates **Candidate Sets**

Add New Candidates Set

Candidates Set Name	Note	List of Candidates	Candidate Set Creator		
Equity Styles	uses Ishare ETF's	IVE - iShares S&P 500 Val	James Damschroder	See Respective Candidates	Edit ✖
Liquid Alt overlay	perfect complement to stock and bond portfolios	BGCIX - BlackRock Funds	James Damschroder	See Respective Candidates	Edit ✖
GIC Sectors		XLP - Consumer Staples S	James Damschroder	See Respective Candidates	Edit ✖
Strategic Alpha ETF	Alpha and Diversification emphasis	ZROZ - PIMCO 25+ Year	James Damschroder	See Respective Candidates	Edit ✖
Aggressive Income		ACRE - Ares Commercial	JP Pedinielli	See Respective Candidates	Edit ✖

Candidates Set Name:
Aggressive Income

Note:
Stretch Income Opportunities

Enter your symbols separated by commas:
[Input Field]

Or find the asset by typing in below:
[Input Field]

Enter Symbol(s)
[Input Field]

Search Company or Fund Name
[Input Field]

#	Symbol	Company Name	
1	ACRE	Ares Commercial Real Estate Corporation	✖
2	AINV	Apollo Investment Corporation	✖
3	BXMT	Blackstone Mortgage Trust Inc.	✖
4	CIO	City Office REIT Inc.	✖

Manage the list of included investments here

Edits to the candidate set on an existing strategy will be utilized in the following Re-Optimization

Candidate sets are static lists available to all Re-Optimization events if the security had existed in the prior period

RESEARCH

All sets are available in the Research link, available to portfolio managers and admins.

Link to outside research

The screenshot shows the Gravity Investments Research interface. At the top left is the Gravity Investments logo with the tagline 'PORTFOLIO RE-OPTIMIZATION'. To the right, it says 'Powered by Gsphere' and 'Logged in as: James Damschroder' with a 'Logout' link. Below the header is a navigation bar with icons and labels for Investor, Portfolios, Modeling, Research, Compare, Settings, and Help. The 'Research' section is active, showing a 'Candidates' tab and a 'Candidate Sets' sub-tab. A table lists various investment funds with columns for Ticker, Name, Candidate Sets, See on Yahoo, and See on FinViz. Callouts are present: one points to the 'Research' link in the navigation bar, another points to the 'Research' section header, and a third points to the 'Candidate Sets' dropdown menu in the table.

Ticker	Name	Candidate Sets	See on Yahoo	See on FinViz
IVE	iShares S&P 500 Value Index Fund	ETF.com A Grade Ishare		FINVIZ.com Edit
IVV	iShares S&P 500 Index Fund	ETF.com A Grade Ishare		FINVIZ.com Edit
IVW	iShares S&P 500 Growth Index Fund	ETF.com A Grade Ishare		FINVIZ.com Edit
IJK	iShares S&P MidCap 400 Growth Index Fund	Gravity Dynamic Curati		FINVIZ.com Edit
IJH	iShares S&P MidCap 400 Index Fund	ETF.com A Grade Ishare		FINVIZ.com Edit
IJR	iShares S&P SmallCap 600 Index Fund	ETF.com A Grade Ishare		FINVIZ.com Edit
IJJ	iShares S&P MidCap 400 Value Index Fund	Equity Styles --- No act		FINVIZ.com Edit

Document whose ideas they are and why they are good investments

REPORT CONFIG

Select the report format: detailed report or factsheet. A comparison report is also offered from the comparison page and generally follows the format of the detailed report

Select the individual elements desired to include in the report. If benchmarks are set on your portfolio view page they will be included in the report.

All reports formats feature interactive 3D content inside the pdf (must be opened by Adobe Acrobat)

The screenshot shows the 'Report Config' interface with a dark theme. At the top is a navigation bar with icons and labels: Investor, Portfolios, Modeling, Research, Compare, Settings, and Help. Below this is a section for report format selection with three radio buttons: 'Back', 'Detailed Report' (selected), and 'Fact Sheet Report'. The main area is divided into several sections: 'Items in the Report' with a list of checkboxes for various report elements; 'Narrative' with a text input field; 'Disclosure Statements' with a list of disclosure items and a text editor; and a 'Generate Report' button. Callout lines with blue circles point to the format selection, the 'Items in the Report' section, the 'Narrative' section, the 'Disclosure Statements' section, and the 'Generate Report' button.

Investor Portfolios Modeling Research Compare Settings Help

Back Detailed Report Fact Sheet Report

Items in the Report

Please select the desired report elements:

- ☒ Portfolio Visualization
- ☒ Diversification Dashboard
- ☒ Profit and Loss chart
- ☒ Risk and Return Chart
- ☒ Allocation Chart
- ☒ Diversification Sources
- ☒ Position Performance
- ☒ Positions
- ☒ Return Report
- ☒ Risk Measures

Narrative

Please enter any text you want to appear on the first page of the report:

This portfolio is...

☐ Save Portfolio Descriptions ☐ Default Disclosure

Generate Report

Disclosure Statements

Please drag and drop statements to the editor field.

- Risk disclosure
- Past Performance
- Portfolio data
- Data used to build model
- Solely for informational purposes
- GI shall not be responsible
- Supplemental sales literature
- The fund is not FDIC-insured
- Asset performance statistics
- This portfolio is hypothetical
- Results not guaranteed

Format (inherited font) (inherited size)

This portfolio is hypothetical. Past performance is not indicative of future returns. The suitability of this portfolio recommendation must come from a Registered Investment Advisor. Investing involves risk; including loss of principal and failure to attain expected results.

Checking these boxes will save the reports elements to the report in the future

Select standard disclosure items or create your own

Include a narrative or for the factsheets, include a strategy description and objective and a firm profile and manager profile.

SETTINGS

Admin control user access conditions

Admins and Brand managers configure brand options

Create benchmarks including custom blended benchmarks

GRAVITY INVESTMENTS
PORTFOLIO RE-OPTIMIZATION

Powered by Gsphere

Logged in as: **James Damschroder**
[Logout](#)

Investor Portfolios Modeling Research Compare Settings Help

Settings

Users Brands **Benchmarks** Sharing Referral Permissions Logs

Benchmarks

Benchmarks already in the database:

Utilities [Delete Selected Benchmark](#)

Selected Benchmark

Enter your symbols separated by commas: Enter Symbol(s) Or search by Company name: Benchmark Name: [Save Benchmark](#)

Symbol	Name	Allocation
\$CASH\$	Cash and Equivalents	<input type="text"/>

Share data features with your brand or other users

Set the permission links for guest user access to system features including free portfolio analysis and portfolio views

HELP

Contact information for direct support or support tickets

Look up worldwide exchange codes as ticker suffix for global exchange strategies

Glossary with definitions and formulas

The screenshot shows the GRAVITY INVESTMENTS PORTFOLIO REOPTIMIZER interface. At the top, the logo and navigation bar are visible. The main content area displays the 'G-Sphere Policy Guide' with sections for Constraints, Diversification Management, and Simulation. Callouts point to various features: 'Support' (bottom left), 'Exchange Code Page' (top left), 'Glossary' (top center), 'Policies Description' (top right), 'Gravity Walk Forward Guide' (bottom right), 'Investor' (bottom left), 'Portfolios' (bottom center), 'Modeling' (bottom right), 'Research' (bottom right), 'Compare' (bottom right), 'Settings' (bottom right), and 'Help' (bottom right).

GRAVITY INVESTMENTS

PORTFOLIO REOPTIMIZER

Logged in as: **James Damschroder** [Logout](#)

Support Exchange Code Page Glossary Policies Description Gravity Walk Forward Guide

G-Sphere Policy Guide

Constraints

Threshold Constraint The Threshold Policy is applied to both a portfolio and any recommendation report built including that portfolio. The purpose of the threshold is to remove very small allocation weights that are so small as to be a nuisance due to the transaction costs in weighing the portfolio benefit given the value of a portfolio. The value is expressed as a percentage and any allocation given to any assets less than the designated percentage will be reset to zero and the capital reallocated to the remaining assets.

Constraint Policy This policy when activated incorporates the global minimum and maximum constraints as part of the policy tree.

Diversification Management

Computation Dimension The Computational Dimension relates to the number of assets being optimized. Generally the more assets being optimized the higher the computational dimension. A rule of thumb is to set the Computational Dimension as the square root of the number of assets. Three is the minimum value, while there is no formal maximum, the computational demands grows exponentially with every added dimension so we generally cap the values at 10. The computational dimension is also used as a concentration control function, the smaller the computational dimension the more gsphere will "cherry pick" a smaller subset of the most efficient and optimal assets.

Simulation

Simulation The Simulation is used to generate a "Superposition" which represents the average allocation produced by each simulated iteration. The simulation works effectively as a blender and generally normalizes the allocations in the direction of equal-weighting, while maintaining the principal tenants of Diversification Optimization. The simulation policy is preferred to using constraints to ensure a pragmatic, diversified portfolio that balances both systematic and non-systematic risks. The simulation is a Monte Carlo method which means simulated values are drawn from a probability distribution. This helps the simulation maintain a realistic posture.

Simulation Count The greater the simulation count, the greater the blending. Values should generally be set in the range 0-100. Simulations counts greater than 100 will have only a marginal effect and will take more time to compute.

Simulation ND ND simulations combine the Monte Carlo simulation method with Gsphere's own genetic algorithm. The resulting combination produces the same superposition allocation but one that is a little less randomly fluctuated and more in tune with the realistic, non-random structure of the optimization inputs. Generally speaking it is the preferred simulation option.

Allow existing assets to vary An existing position refers to an allocation, share of value that has been defined to the system. These positions will not vary in its portfolio weight unless checked.

Detailed descriptions of investment policies

Guide to walk forward out of sample multiperiod backtesting