

Portfolio Optimization: Your Allocation Edge

Successful businesses deliver what their customers want. When optimizing your alternative investment portfolio, we give you the ability to target the specific performance and risk metrics that you and your customers choose. This gives your allocation an edge over traditional approaches.

Take control of portfolio performance

The driver's seat

Industry standard approaches to portfolio allocation use pre-determined notions of risk and return, but you have unique performance and risk measures that work for you. Our approach puts those measures at the very center of the portfolio optimization process. You are no longer trapped inside someone else's risk-return framework: we put you firmly in the driver's seat.

Give investors what they want

Different investors want different things and their attitudes toward risk and return evolve. The optimization framework we use provides the flexibility to stay in tune with your investors' individual needs so you can deliver what they want now and in the future.

In our framework the optimal portfolio allocation depends on the objectives and constraints set by the allocator.

In the following 3-fund scenario, our objective is to maximize monthly cumulative growth subject to maximum drawdown and maximum allocation constraints. The optimal allocation varies depending on the constraints which are set by the allocator:

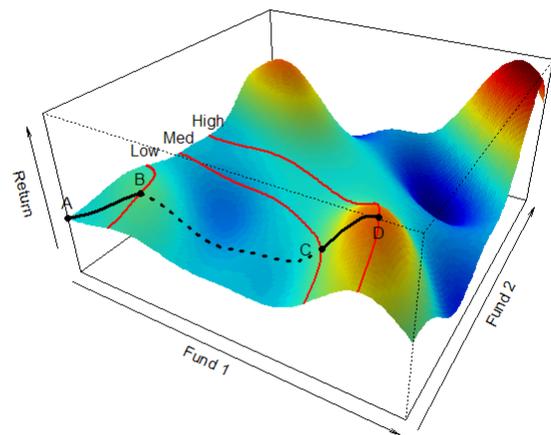
Optimal Allocation		Draw-Down Constraint	
		< 3%	< 10%
Maximum Allocation Constraint	Unlimited	49% FL1 * 85% FL2 * 3% FH *	96% FL1 171% FL2 7% FH
	33% Max	E(growth) = 1%	E(growth) = 2%
		33% FL1 33% FL2 9% FH	33% FL1 33% FL2 33% FH
		E(growth) = 0.6%	E(growth) = 0.8%

* FL1, a low volatility fund, has negligible correlation to the other 2 funds. FL2 and FH have +0.8 correlation. FH is a high-volatility, high-return fund.

risk measures resulting in a performance terrain that contains discontinuities (see below). Emphasizing two different constraints may lead to two quite different optimum portfolios (see table, left).

Traditional approaches sweep all these issues under the rug by adopting parametric probability distributions and simplifying the problem to the unconstrained optimization of a combined risk-return measure.

As risk constraints are relaxed to the red line marked "Low", the optimal portfolio moves from A to B with returns increasing in a non-linear manner. B remains the optimal portfolio even as constraints are relaxed as far as "Med".



As the constraints are relaxed beyond "Med", the optimal portfolio jumps from B to C; this is a discontinuity. As constraints are relaxed still further to "High", returns climb again as the optimal portfolio migrates from C to D.

Monte Carlo advantage

The parametric approach of classical statistics has two shortcomings: it glosses over valuable information in the data and infers information that is not actually there. Monte Carlo techniques make full use of the data without making assumptions. The Monte Carlo techniques we employ ensure we optimize a model that represents reality as close as is possible.

Big haystack, small needle

Even a simple portfolio represents a huge space in which to search for the optimum allocation. We make use of sophisticated and efficient genetic search algorithms to find this needle in a haystack. These techniques cope with noisy, discontinuous objective functions and they do not get hung up on local optima. They have the best chance of finding the global optimum and will look for it in places that MPT does not even consider.

The Analytical Engine

The Risk-Return Landscape

The challenge in constrained optimization of portfolio allocation is to navigate the complex contours of the risk-return landscape. Manager returns do not follow standard parametric distributions; they may have strong or weak relationships depending on market conditions. Constraints on the optimization involve path-dependent and non-linear

The Process

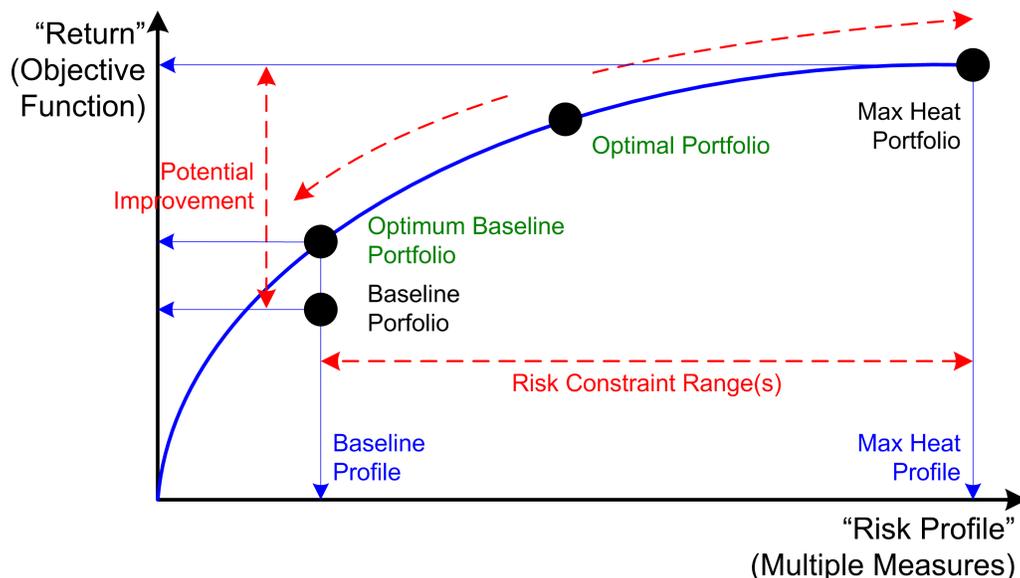
In keeping with our philosophy of tailoring everything we do to your unique requirements, the following outline is a conceptual plan only. Portfolio optimization is a complex undertaking but it can be split into two main tasks: benchmarking and optimization.

Benchmarking is the process of exploring the risk-return landscape so we can better understand the risk return trade-offs offered by a particular set of managers. Optimization is the process of setting performance objectives and risk constraints then searching for the optimal portfolio allocation.

Portfolio Benchmarking

- ◆ **Baseline Profile.** This step tells us where the Baseline Portfolio resides in the entire risk landscape: to reach our destination we need to know our starting point.
- ◆ **Maximum Heat Profile.** We maximize the potential return of the portfolio with a minimal set of constraints without regard to risk and profile the resulting Maximum Heat Portfolio.

These steps give us the range over which your risk measures are operative and the return potential of your managers. It shows the risk-return trade-offs of your portfolio. The diagram below indicates how each step of the process fills in more detail about the risk-return landscape, guiding us to our ultimate destination.



Portfolio Optimization

Based on the benchmarks developed in the previous steps, Rayner Gobran works with you to set values for the key constraints in the optimization process. The portfolio is then optimized in one of two modes:

- ◆ **Optimum Baseline Portfolio.** We optimize the Baseline Portfolio without increasing any measure of risk above the level found in the Baseline Portfolio. We are maximizing performance without increasing risk.
- ◆ **Optimal Portfolio.** We use the Baseline Profile and the Maximum Heat Profile to target acceptable levels of risk, then optimize within those constraints. This is an iterative process allowing you to fine-tune your requirements.

Whichever approach you choose, the final result is a portfolio positioned precisely in the sweet-spot of the risk-return landscape using the measures of performance and risk that are important to you.

Ian Rayner

I was Chief Operating Officer and Director of Research for The Bornhoft Group, an award-winning pioneer in multi-manager CTA funds. As COO I built institutional quality operations throughout our firm. As Director of Research I developed statistical tools for delving deep into manager performance, and building robust portfolios.

Our team placed hundreds of millions of dollars with quant managers. We allocated capital to the biggest names and to the smallest niche players. We screened 1,000's, analyzed 100's, and completed operational due diligence on the best to construct our portfolios. During my tenure, our flagship program returned over 40% per year.

I hold a Masters in Chemical Engineering from Queens' College, Cambridge University. I graduated one of only 10 Palmer Scholars in my class in the MBA program at The Wharton School, University of Pennsylvania.

Other Services

Manager Risk Profile: quantitative due diligence

- See the full risk picture for individual Managers and find subtle differences between them.
- Confidently allocate to higher return opportunities armed with clearer expectations.
- Monitor manager performance for style drift and loss of edge.
- Exploit available time-series relationships.

Portfolio Risk Profiles: make better allocation decisions

- Get all the benefits described above applied at the portfolio level.
- Exploit relationships amongst portfolio components and potential new allocations.
- Identify data outliers to improve analysis and to flag early warning signals.
- Test sensitivity of risk and performance metrics to portfolio changes.

Statistical Analysis and Testing

- We will tackle ad hoc analytical challenges. We can assist in improving or auditing your own back-testing, and data and system validation methodologies.
- Having designed and tested our own systematic trading strategies, we are uniquely positioned to participate in the due diligence process for systematic funds.

Call or email to discuss how we can maximize your alternative investment portfolio performance. Please visit us on LinkedIn (<https://www.linkedin.com/in/ianrayner/>) and feel free to connect! We also have a blog on our website (<https://www.raynergobran.com/technical-blog/>) where we discuss quantitative analysis for alternative investments.