R4A Investment Methodology

R4A leverages proprietary algorithms, unique architectural design, advanced optimization techniques, and multi-decade documented investment expertise to craft portfolios meticulously tailored to specific investment strategies, thus materially raising the probability of meeting the investment goal.

Lumen's investment approach is firmly grounded in two paramount principles:

1. The monetary value of all investments is equal to the sum of future cash flows discounted back to present value, i.e., the most basic (and powerful) principle of finance, Discounted Cash Flow (DCF). The discount rate used in the net present value calculation is equivalent to the expected percentage return of the investment. The rest is detail!

2. We do not rely on our capability to predict the future, very often a costly exercise in overconfidence. Instead, we dissect the present to extract and assess its embedded value information. I.e., the key to shaping investment returns lies in leveraging the opportunities embedded in the present.

In the end, the market is always right!

Armed with these two foundational principles and leveraging the transformational capabilities of Big Data bolstered by AI advancements, Lumen has developed a battle-tested proprietary algorithm, the Lumen Global Value Compass, that extracts the implied expected return directly from the market. In essence, **we place our trust in the predictive power of the most impartial, efficient, and close-to-infallible analyst available out there: the market itself**! This unbiased “equilibrium” metric is a perfect reference point to assess value and consistently rank investment alternatives to carry out optimal asset allocation.

Investing involves navigating uncertainties about the future, and one way to gauge these uncertainties is through probabilities. There's perhaps no better reference or starting point for assessing probability than the implicit or embedded probabilities within the market. The task of the investor then becomes assessing how reasonable the market is ... instead of outright “guesstimating” the probability.

By construction, markets incorporate and reflect all relevant and known (public) information; the rest is pure speculation. Nonetheless, note that we consider markets “close-to-infallible,” but far from foolproof. Indeed, investment is all about uncertainties measured by probability. While the market-implied is a good probability estimator, it is best “complemented” by engaging in the most effective risk management tool to offset (some) uncertainties: **extensive portfolio diversification and optimization – a.k.a., the only free lunch in finance**.

...more on the Lumen Compass, a detailed GPS of global value.

While there are other methods to extract market-implied expected returns, the metric derived by the Lumen Compass is unique in that it satisfies three crucial attributes for strategic asset allocation:

1. **It is universal**. One single value metric to rank and compare value across all investments (bonds, stocks, commodities), across factors (growth, dividends, etc.), ETFs, etc. on an “apple-to-apple” basis, i.e., comparing the present value of future cash flows.

2. **It is unbiased**. It is not derived and does not depend on subjective and speculative predictions for the future; it just reports what the market has "priced" objectively and impartially using the most powerful principle of finance listed above...the DCF!

3. **It is forward-looking**. The Lumen Compass methodology is powered by live forward-looking market data—it does not rely on history (the rearview mirror). For those quantitatively inclined, it is not subject to data mining, a unique and distinguishing feature of this proprietary tool.

Generating an extensive menu of investment ideas and opportunities...the crucial ingredient for asset allocation

This proprietary methodology generates a unique, comprehensive, internally consistent, granular **global ranking of investment opportunities** providing the most crucial ingredient for effective and customized asset selection. It enables the ranking of all markets (global, developed, emerging, frontier), all asset classes, individual countries, sectors, industries, securities, and investment factors (such as growth, value, quality, etc.). It encompasses every benchmark, ETFs, thematic areas such as ESG, and infrastructure, offering an infinite pool of investment combinations. Hence, **the key advantage of this extensive (open source) ranking is its ability to generate an unlimited array of investment combinations** and portfolios, each meticulously tailored to meet the most specific strategy and investment goal.

A proprietary Optimizer...without the use of deceptive and arbitrary constraints.

Once the investment universe—or the set of potential investment ideas—has been meticulously defined, we channel it through our proprietary optimizer. Central to our optimizer is the proprietary integration[1] of the Black-Litterman model—a Nobel Prize-studded framework portfolio construction model—allowing for the seamless incorporation of subjective views within this framework, thus marrying market-implied expectations with expert insights. We then further refine this harmonious integration through advanced statistical techniques, notably matrix shrinkage, **leading to portfolios that are both coherent—reflecting market-implied expected returns fine-tuned with subjective insights—and exceptionally well-diversified**.

Effective diversification means that for each level of risk undertaken, we maximize return by capitalizing on the risk/return trade-off across investments, calibrating the optimal allocation/weights, a crucial step very often left to approximation and haphazard out there. Significantly, **our approach achieves profound diversification without resorting to the arbitrary and disingenuous imposition of min/max position limits...a notable and distinguished feature of our platform.**

A proper assessment of risk...not volatility.

Note first that risk in finance refers to the probability of a permanent loss of capital, distinct from the volatility (whether up or down) of the price of securities, an often costly practice out there. Accordingly, the platform adopts a Value at Risk (VaR) methodology—including historical, parametric, and Monte Carlo methods—to assess downside risk. **This approach quantifies the probability (in %) of incurring a loss of**

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[1] Using the Compass generated implied return as the prior. See Nocera, Simon E., Portfolio Construction and Global Asset Allocation: A Practitioner Solution to a Black-Litterman Flaw (July 2016). Available at SSRN: https://ssrn.com/abstract=2864954 or http://dx.doi.org/10.2139/ssrn.2864954

amount X (in $) from an initial investment of Y (in $) over a specific period (usually months); e.g., a 5% probability of losing $ 50,000 on an initial investment of $1,000,000 in a specified period.

To complement this risk analysis, the platform employs stress testing through Monte Carlo simulations to predict the worst, average, and best outcomes at a given investment horizon. This methodology allows for a comprehensive examination of the portfolio's resilience under extreme market conditions. Finally, the same statistical tools are used to calculate the probability of meeting the target goals.

In Summary

R4A's proprietary algorithms and unique open architecture, combined with its advanced modules and optimization techniques, result in highly tailored investment solutions that are based on forward-looking coherent expectations, meticulously aligned with the investor's risk profile and goals, well-diversified to manage strategy and risk, ultimately materially raising the probability of successfully meeting the investment objective.