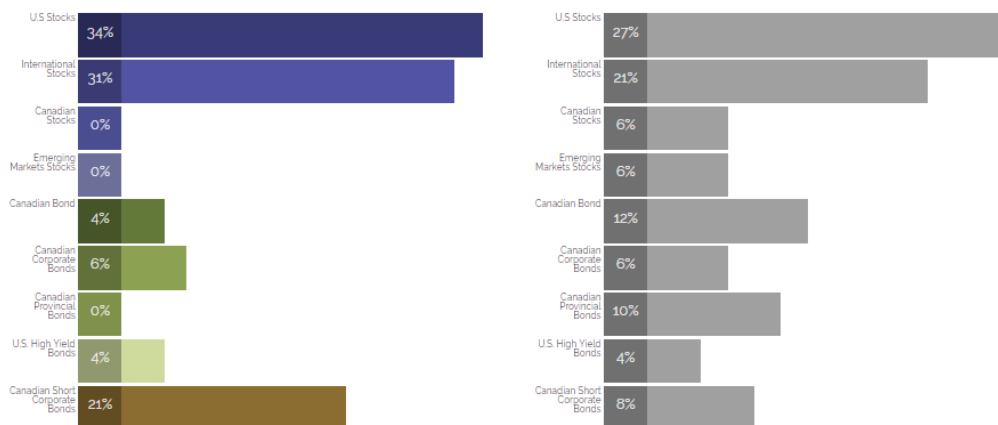# AI for Tactical Asset Allocation

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1 Background preparation

Data Science, Statistics, Statistical Modelling, some Finance.

2 Overview: Wealth Management for Individuals and Families

Can we use data to Responsively adjust asset weights to improve portfolio performance?

Responsive AI is a venture-backed startup in direct-to-client wealth management, hybrid wealth technology (B2B), and data-driven client intelligence research. This summer we are celebrating three years of operation and the close of our US $1.1mm seed financing round.

Responsive's asset management business is differentiated by streamlined user experience, industry-leading cost, and the implementation of data science research for optimized portfolio performance. Eschewing security selection as a source of value, Responsive clients own portfolios of Exchange Traded Funds (ETFs). Each ETF provides exposure to an asset class such as US stocks, foreign stocks, Government bonds, and High Yield Bonds. The Responsive investment process is to reconsider the weights monthly using signals from markets and the economy. Following Samuelson, "The market is micro efficient, but macro inefficient".

3 Problem Description

We will start with a collection of a few hundred time-series data series from the market and economy, coupled with returns in the major asset classes. Using a variety of transformations,

such as normalization or computing year-over-year rate of change, the data will be converted to 'factors'. For the asset classes, we are interested in relative returns for asset pairs, for example equity-versus-cash, and within equity, say Canada-versus-US. We will build an infrastructure to test, select, and combine the most reasonable, profitable, consistent, and additive factors. Turnover and portfolio risk are important constraints.

Market factors tend to take the form of valuation, momentum, and mean reversion. Since recessions are such significant divers of relative returns, macroeconomic forecasting is valuable, particularly in combination with market factors. For example, is a given 10% equity market drawdown just a "healthy correction" or the start of true bear market? The answer may be in how real retail sales are holding up.

Markets are adaptive ecosystems of people (and now machines). The modelling challenge is therefore behavioural and biological because the allocation decisions of individuals and investment committees reflexively help determine subsequent returns. Everyone is looking at subsets of the same data, headlines, and prices.