



MACHINE LEARNING

Can Machines Build Better Stock Portfolios?

The Virtue of Complexity in the Cross-Section of Stocks

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In the second issue of our 2024 Alternative Thinking series, we showed that machine learning techniques can be used to help improve market timing strategies. We now extend these concepts to constructing stock selection strategies following a similar framework.

The relation between predictor variables (i.e., signals) and stock returns is a complicated, unknown, and complex function. Recovering it from simple linear approximations is likely to be very limited.

One way machine learning techniques can be used to help improve stock selection strategies is by picking up nonlinearities between the predictor variables and returns in the cross-section. Given the unknown nature of nonlinearities, more “complex” models—those with a large number of predictor variables, which may exceed the number of observations—have greater efficacy.

More complex models can better identify true nonlinear relationships and, thus, produce better stock selection strategy performance. This “virtue of complexity” result is validated in practical multi-factor stock selection applications in which long/short optimal portfolios are formed using three signal sets: value and momentum, Fama-French 5 factor model plus momentum, and a suite of defensive-oriented signals. Our results indicate performance improvements relative to a simple, linear approach in the range of 50-100%, suggesting that machine learning can help to build better stock selection portfolios.

About the Portfolio Solutions Group

The Portfolio Solutions Group (PSG) provides thought leadership to the broader investment community and custom analyses to help AQR clients achieve better portfolio outcomes.

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