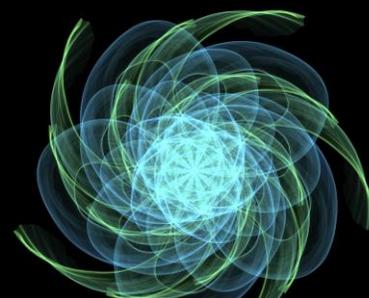


Enhancements in factor-based portfolio construction



Q&A with Evgenia and Nick

Russell Investments Research

Evgenia Gvozdeva, Ph.D., Senior Quantitative Research Analyst

Nick Zylkowski, CFA, Portfolio Manager

Q.

There has been a significantly growing emphasis on factor exposure management (smart beta) in recent years. You've been exploring ways to enhance the construction of factor portfolios. How have you gone about doing this?

Our latest work has been focused on using thoughtful portfolio optimization techniques to support dynamic factor allocations, and on constructing more concentrated factor portfolios without materially increasing idiosyncratic risk and active drawdowns. Reasonable portfolio concentration is important as it allows more flexible and efficient factor allocations, and ultimately allows for better management of transaction costs.

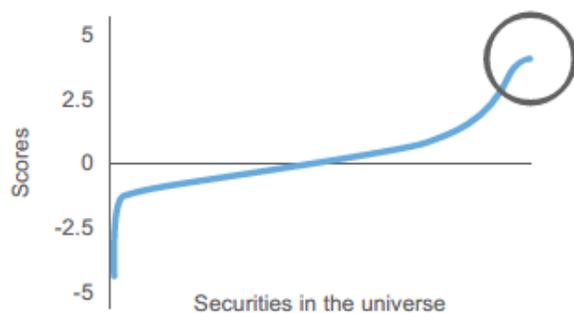
However, it can lead to unrewarded stock-specific risks, among other things. So we've been looking for ways to increase the concentration of factor exposures without introducing unwanted baggage, and portfolio optimization techniques are an effective way to address reasonable concentration for multi-factor portfolios.

To support robust portfolio optimization, one area we have looked at closely is the distribution of factor exposures. Most industry standard models are based on a distribution of factor scores that roughly follows a normal distribution. This leads to a majority of the universe having scores close to the mean, with fewer securities in the tails. In addition, the tails of these factor distributions are long with larger score magnitudes for the highest and lowest ranked securities. While this distribution may be fine for estimating total risk, it is problematic for constructing portfolios.

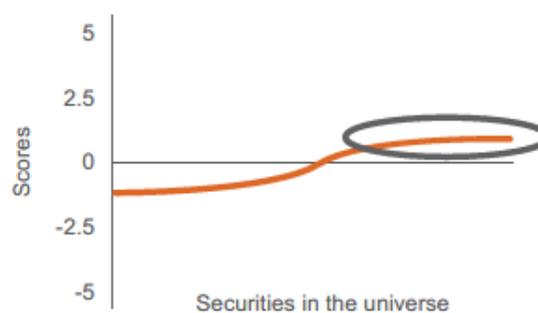
For the purposes of factor portfolio construction, a security having high or low exposure to a factor is a meaningful signal. However, distinguishing between the highest of the high and the lowest of the low is less important.¹ In other words, the

Exhibit 1: Value factor scores for Global Large Cap universe

Normal distribution



Bi-model



Data as of December 2016

weight of the first percentile stock in a factor portfolio should not have to be significantly greater than that of the tenth percentile stock.

We address this by using non-linear probability (NLP) transformation to push the normally-distributed factor exposure distribution into a more bi-modal type of distribution.

Exhibit 1 shows an example of the Value factor distribution under the normal and bi-modal models.

Q.

What is the impact of modeling the factor distributions this way?

By moderating how much active weight stocks receive at the tails of the factor distribution, portfolios are able to trade off idiosyncratic risk for higher factor exposure. Portfolios see an increased overall position in the factor exposure itself by owning a broad set of high value (for example) securities rather than over-concentrating in the highest of high value stocks (i.e., deep value). Since there are more similar (high) exposure securities in the bi-modal distribution than in the normal distribution, these portfolios are expected to achieve the desired factor exposure in a diversified way.

Q.

Has this been borne out by the historical results?²

Yes. Consider, for example, a three factor allocation to Value, Momentum and Quality. We compared portfolios based on the Russell Global Large Capitalization universe with different concentration levels (from 200 to 2000 securities) using a portfolio optimization approach, and compared them to a portfolio constructed by our standard rules-based approach with 2400 securities. We found that in concentrated optimized portfolios (down to around a third of the holdings of the rules-based approach), returns were preserved and active drawdowns were consistent. Concentrating beyond these levels would have had detrimental impacts to performance and risk due to higher levels of unrewarded stock-specific risk.

The interaction between the number of securities and the choice of factor score distribution is worth noting. Using a normal distribution, achieving higher exposures generally requires more concentration in terms of the number of stocks chosen along with higher levels of stock-specific risk. This, however, is not the case when we use factor scores from a bi-modal distribution. We see in portfolios constructed with increasing number of securities, 200 to 2000, average factor exposure for portfolios would remain consistent while returns

¹ See Maslov and Rytchkov (2013) and Bennett et al. (2014)

would increase, stock-specific risk decreases and active drawdowns decrease quite significantly as more securities are added. Because of Russell Investments' bi-modal distribution, we can build portfolios with higher levels of factor capture and lower levels of stock-specific risk.



Because of Russell Investments' bi-modal distribution, we can build portfolios with higher levels of factor capture and lower levels of stock-specific risk.

Another outcome of using factor distributions and a custom risk model built for these purposes, is our estimates of risk on an ex-ante basis are vastly improved. When using a bi-modal factor distribution, and building factor portfolios in the way we've described focusing on broad factor capture, the estimates of overall risk are generally quite close to ex-post realized risk. When constructing portfolios using 'standard' factor models with skewed distributions, we see much higher estimation errors for pure factor portfolios – the difference between estimated risk and realized risk. This leads us to believe that the idiosyncratic risk that comes with skewed distributions is not being appropriately accounted for.

Q.

What other areas have you been looking at?

We have also been looking closely at how we will translate these findings into our Dynamic Multi-Factor and Active Positioning Strategies (APS). These portfolios require dynamic adjustments to factor, industry and country signals, and relies on optimization methods to construct a final portfolio. APS portfolios are customized exposures directly managed by Russell Investments, they're intended for use within the total portfolio are complementary exposures to third party active managers. The portfolio optimization approaches we've developed will be critical for translating dynamic insights into invested portfolios. It's a more precise way of using active positioning, and the historical results are encouraging.

² Historical data is not indicative of future results.

About Russell Investments

Russell Investments is a global asset manager with a unique set of capabilities that we believe is essential to managing your total portfolio and to meeting your desired outcome. At Russell Investments, we stand with you, whether you're an institutional investor, a financial adviser, or an individual guided by an advisor's personalized advice. We believe the best way to reach your desired outcomes is with a multi-asset approach that combines: asset allocation, capital markets insights, factor exposures, manager research and portfolio implementation.

For more information

Call Russell Investments at [800-426-8506](tel:800-426-8506) or visit russellinvestments.com

Important information

Nothing contained in this material is intended to constitute legal, tax, securities, or investment advice, nor an opinion regarding the appropriateness of any investment, nor a solicitation of any type. The general information contained in this publication should not be acted upon without obtaining specific legal, tax, and investment advice from a licensed professional.

Please remember that all investments carry some level of risk, including the potential loss of principal invested. Although steps can be taken to help reduce risk, it cannot be completely removed. Investments typically do not grow at an even rate of return and may experience negative growth. As with any type of portfolio structuring, attempting to reduce risk and increase return could, at certain times, unintentionally reduce returns.

These views are subject to change at any time based upon market or other conditions and are current as of the date at the beginning of the document.

Diversification does not assure a profit and does not protect against loss in declining markets.

Russell Investments' ownership is composed of a majority stake held by funds managed by TA Associates with minority stakes held by funds managed by Reverence Capital Partners and Russell Investments' management.

Frank Russell Company is the owner of the Russell trademarks contained in this material and all trademark rights related to the Russell trademarks, which the members of the Russell Investments group of companies are permitted to use under license from Frank Russell Company. The members of the Russell Investments group of companies are not affiliated in any manner with Frank Russell Company or any entity operating under the "FTSE RUSSELL" brand.

Copyright © 2018. Russell Investments Group, LLC. All rights reserved. This material is proprietary and may not be reproduced, transferred, or distributed in any form without prior written permission from Russell Investments. It is delivered on an "as is" basis without warranty.

First used: February 2018

AI-26170-01-21