

Measuring Portfolio Diversification

Based on Optimized Uncorrelated Factors

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Abstract

In recent years the practitioners and academic financial community has witnessed a surge in interest in the concept of risk parity, as well as the broader concept of diversification management, see [Roncalli, 2013] for a review and references. In traditional risk parity, diversification is measured in terms of marginal risk contributions from each individual risk factor. Such contributions are spurious, because in reality they contain effects from all the factors at once. Furthermore, there exist no clear metric to quantify the diversification represented by the marginal risk contributions.

We propose an alternative approach to risk parity based on the Effective Number of Bets in [Meucci, 2009]: instead of the marginal contributions from correlated factors, we measure the true contributions from uncorrelated bets. In the original paper [Meucci, 2009], the uncorrelated bets are the market's principal components. The Principal Components Bets have spurred interest and called for extensive empirical analysis, see [Deguest et al., 2013]. However, the principal components are suboptimal, because they are purely statistical entities, not related to the investment process.

We introduce a natural set of uncorrelated bets to manage diversification, the Minimum-Torsion Bets, which are the optimized uncorrelated factors closest to the factors used by the portfolio manager.

Keywords: Risk Management, Diversification, Marginal Risk Contributions, Procrustes Problem

References

- [Deguest et al., 2013] Deguest, R., Martellini, L., and Meucci, A. (2013). Risk parity and beyond - from asset allocation to risk allocation decisions. <http://ssrn.com/abstract=2355778>. EDHEC-Risk Working Paper.
- [Meucci, 2009] Meucci, A. (2009). Managing diversification. <http://symmys.com/node/199>. Risk, 74-79.
- [Roncalli, 2013] Roncalli, T. (2013). *Introduction to Risk Parity and Budgeting*. Chapman and Hall.