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Newsletter

Edition: July 2014, *Quantsulting GmbH - Your partner for quantitative-related issues*

In this Edition

Content

Quantsulting

1.1 Company

After months of hard work, Quantsulting finally started its activity in June. Quantsulting provides, in collaboration with the University of Applied Sciences, consulting, advisory services as well as Research Development projects in quantitative finance.

We rely on cutting-edge research and advanced engineering methods to meet the real-world challenges faced by our clients. Our core expertise lies in portfolio and risk management, trading, optimization and financial modeling.

We combine an in-depth knowledge in quantitative-related areas, such as financial mathematics, statistics and financial engineering, with an extensive practical experience. Our clients benefit from high-quality services at reasonable costs.

1.2 Services

For every quantitative issue faced by your company, Quantsulting will help you to find a solution. You can access the online profile of the colleagues and students from the School of Engineering involved in our projects and get thus in touch to the right people in order to solve your problem.

Some quantitative questions or analyses can simply be tackled within a bachelor thesis, thus providing customized solutions to our clients at competitive costs. Our students obtain by this means a chance to acquire a first professional experience and to network with market professionals in their field.

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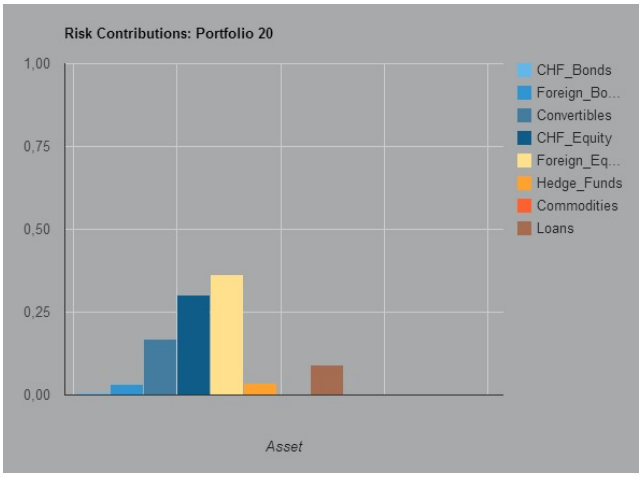
Quantsulting

1.3 Tools

The tools developed by Quantsulting, covering standard data analysis, financial modeling, portfolio and risk management can be accessed online on our website by suscribing to a flexible license plan, according to your needs.

The tool **finDiv** is already available online and provide you with an overview of the true diversification of your portfolio and a way to improve it. You can upload your own portfolio data and get within a few mouse clicks an analysis and a graphical representation of the diversification level of your portfolio !



Risk contribution of each asset within the portfolio

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Maximum Diversification

2.1 Methodology

In recent years practitioners and academic community have witnessed a surge in interest in the concept of risk parity based strategies, as well as the broader concept of diversification management.
In the traditional approach, 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 apply here the alternative approach proposed by Meucci (2013) to risk parity based on the Effective Number of Bets: " instead of the marginal contributions from correlated factors, we measure the true contributions from uncorrelated bets. These bets quantify the diversification level, summarizing in one number the fine structure of diversification contained in the set of uncorrelated bets in a portfolio.

We use a natural set of uncorrelated bets to manage diversification called the Minimum-Torsion Bets, which are the uncorrelated factors closest to the factors used by the portfolio manager. The contributions to risk from this approach constitutes a generalization of the marginal contributions to risk used in traditional risk parity. " [1]
Based on this approach, a mean-diversification efficient frontier was computed and an optimal portfolio was constructed.

2.2 Data

The dataset consists of closing prices of eleven asset classes covering equities, fixed-income, commodties, real estate and hedge funds. Dating from February 28th, 2006 to December 31st, 2013 the data spans a period of about 8 years containing 2046 observations.

[1] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2276632

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Maximum Diversification

2.3 Performance

The performance over time of our minimum-torsion portfolio has been compared with several traditional portfolio construction techniques such as the minimum variance portfolio, the traditional risk parity approach, the equally-weighted portfolio and the mean-variance efficient portfolio with the same variance as our minimum-torsion optimal portfolio.

	EWP	MTP	MVP	MTPaE	mRPP
Rendite	0.02	0.03	0.01	0.02	0.02
Volatilität	0.10	0.04	0.02	0.06	0.03
Sharpe-Ratio	0.20	0.78	0.39	0.40	0.69
Sterling-Ratio	0.28	1.05	0.45	0.82	0.78
Expected shortfall	1.19	0.48	0.23	0.76	0.39
Value at Risk	0.63	0.25	0.12	0.42	0.19

Key Performance Figures

Over the whole investment horizon, spanning the period 2007-2013, the minimum-torsion portfolio displays, even after taking transaction costs into account, the best performance (+24.6%) followed by the risk parity portfolio (+17.3%), the equally-weighted portfolio (+15.4%) and the mean-variance efficient portfolio (+14.4%). The minimum variance portfolio showed the weakest performance with a return of only 5.1% over the period.

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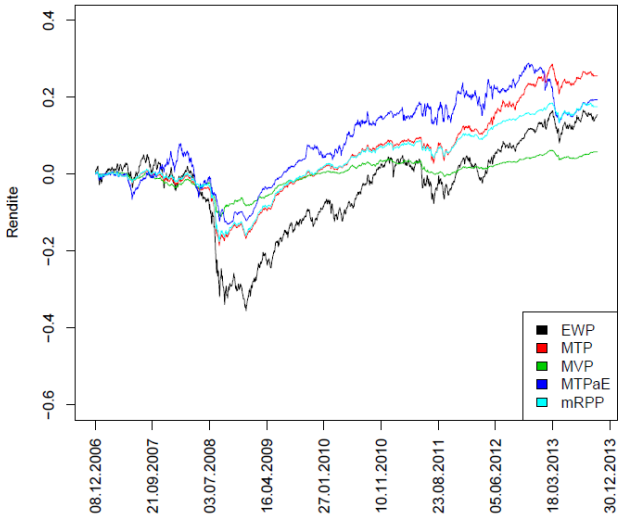
Maximum Diversification

This thesis brought a new framework for risk parity-based approaches and shed light on interesting results. Due to investment restrictions faced by most of institutional investors, such portfolios are obviously not implementable. We could in a next study try to slightly adapt this approach in order to take these restrictions into account and to apply instead a risk budgeting concept for asset allocation purposes.



Performance Comparison (after costs)

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Dynamic Portfolio Strategies

3.1 Approach

This approach has been developed within a bachelor thesis of two students of the Zurich University of Applied Sciences. A momentum-based strategy has been applied to twenty-one asset classes and each year the five best performing assets have been retained in order to build two portfolios:

- A first portfolio relies on the maximum sharpe ratio and is generally concentrated in a subset of asset classes.
- A second portfolio is built along the risk parity approach, where each asset contributes equally to the portfolio's overall risk.

The dynamic strategy relies on the evolution of the VIX index, also know as "fear" index, and mixes the two portfolios depending on the market's risk aversion.

A statistical approach has been applied to the VIX index in order to convert it to a weighting scheme for the two sub portfolios. Over the period considered, covering 2007-2013, the dynamic strategy displays nice stability properties and delivers the best performance in 2007 and 2013, as measured by the sharpe ratio. This dynamic allocation is relevant for every investor who's looking for stability and does not focus only on return.

Dynamic Portfolio Strategies

3.2 Data

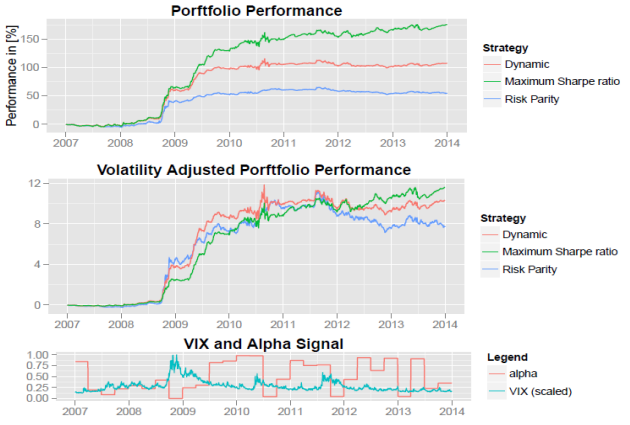
The first dataset consists of closing prices of 9 equity, 6 fixed-income, 4 commodity, 1 hedge fund and 1 real estate indices covering the period from February 28th 2006 to December 31st 2013.

3.3 Results

The performance over the whole period, on a volatility-adjusted basis, shows that all strategies were very close together up to 3rd Quarter of 2008. The following sub-period ranging from the 4th of 2008 until the end of the 2nd Quarter of 2009 displays a discrepancy, with the risk parity strategy performing best. From Mid 2009 up to the end of 2011, the dynamic portfolio strategy delivers the best volatility-adjusted performance. Finally in 2012-2013, the maximum Sharpe ratio approach took the lead.

3.4 Outlook

This bachelor thesis considered fixed rebalancing periods for the dynamic portfolio (e.g. quarterly rebalancing). The results achieved are encouraging and we could take a next step in the study and dynamically determine the rebalancing periods depending on the current VIX signal. This should lead to faster responses to turning points in the market's expected risk aversion and probably result in a better performance of the dynamic approach.



Portfolio Strategies Performance: Jan. 2007 - Dec. 2013

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Rmetrics Conference

4.1 Content

This year, the R/Rmetrics Workshop and Summer School moved to the Latin Quarter of Paris, after seven successful years in Meielisalp.

The conference consisted of lectures by invited speakers and contributed talks. Time was also provided for user/developer meetings. The conference focused on:

- New developments in statistics, related to quantitative finance and high-frequency trading,
- Financial engineering, and in particular new developments in portfolio construction and optimization,
- Risk measurement, specifically related to the regulatory requirements (Basel II and Solvency II).

This topics were discussed within the context of using R as a primary tool for financial risk management, portfolio construction, and trading. The conference took place in the historic College des Bernardins, in the heart of the Latin Quarter in Paris.

Rmetrics Conference

4.2 Shiny Contest

The Rmetrics Open Source Association and RStudio organized the first **Shiny App Contest for web applications in Finance and Insurance**.

Shiny makes it very simple for R users to turn analyses into interactive web applications that anyone can use. **Quantsulting** took the opportunity to present its new tool for portfolio diversification measurement, relying on the minimum-torsion approach presented under Maximum Diversification above, that is available online under http://www.quantsulting.ch.
We were also positively surprized by the encouraging feedbacks and outcome of this contest, as we won the 1st prize of this contest's first edition.

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