Project title: Mutual Fund Performance Evaluation and Equity Index Basis Forecasting

Abstract:

This capstone project contains two topics, fund selection based on mutual fund evaluation and rating system, and equity index basis forecasting. There are three sub-groups working on the fund selection topic, each focusing on one fund type, stock fund, bond fund and enhanced index fund ("EIF"), and one sub-group working on the basis forecasting topic.

The first three sub-groups analyzed the mutual fund historical data to predict their future performance including excess return, excess return volatility and maximum drawdown. We selected the well-performed funds as the top choices of FoF portfolios. These funds should have higher excess returns and lower risks than the market average, so that investors with different risk preferences could have a clear idea on the fund reallocation operation and frequency. The same goes with poorly-performed funds. Investors should avoid investing in them, or short them accordingly if they have already possessed them.

For evaluating fund performance, we calculated the weighted average of the factors influencing the fund profitability as the fund score and ranked them. We then developed the rolling-window backtesting system to observe the long-term performance of factor combination and weight calculation mechanism. As a result, the best model of the three sub-groups generated satisfying results. The well-performed fund portfolios have higher excess return than average in 85% of the backtesting periods, with incremental returns of higher than 2%, and the risks are also steadily lower than average. Finalizing the parameters of evaluation and rating system, we utilized it into fund selection and provided investors with the recommended funds per their unique request.

The basis forecasting sub-group focused on the prediction of change in CSI 500 index futures basis. Specifically, we aimed at the change in dominant contract basis five trading days away. The forecasting process takes a series of steps from defining dominant contracts, calculating basis and change in basis, collecting and consolidating potential factors, modeling, evaluating the models, and rolling-window backtesting. The multiple regression model taking factors "previous settle" and "hold" as independent variables is concluded to be our final model, with a high prediction accuracy of 1.17 and stable performance over the years. By utilizing the model, the company can sufficiently reduce the cost of hedging.

Team composition:

There are four sub-groups in our project, 3 under the mutual fund performance evaluation group, which we call the fund selection group, and 1 under the basis forecasting group.

Fund Selection:

    Stock Fund: Chai Yu, Yu Ange

    Bond Fund: Shao Yiting, Xu Li

    Enhanced Index Fund: Hu Zimeng, Liu Zhuoyu

    Basis Forecasting: Qiu Shihan, Tang Chenglin

Corporate Partner Introduction:

Corporate Basic Information

Beijing Prism Private Fund Management Co., Ltd. (hereinafter referred to as "the company" or "the client") was established in July 2021 and completed the registration of securities private fund manager in September of the same year (Code NO.P1072534). The team is formed by professional and experienced members and focuses on FoF

investment by quantitative methodologies. The team integrates the capabilities of outstanding managers in all fields of the market, and provides customers with one-stop allocation solutions.

Corporate Investment Process

The company adheres to the top-down investment philosophy. The first step is asset allocation. The allocation process focuses more on risk rather than return. In the first step, assets are allocated into several general asset classes like stock, bond, and commodity, and some strategy classes like CTA, arbitrage, etc. The general allocation is dynamically adjusted all the time while the fund managers will consider several main indicators like the basis of the stock index futures. The allocation process can also be viewed as a combination of strategic allocation (reflecting investors' needs) and tactic allocation(like time selection).

The second step is fund selection. In the second step, the company designed a comprehensive fund evaluation and rating system based on the characteristics of different strategy classes. The system helps us select the best from hundreds of funds in the same category, by considering various dimensions of these funds, such as management team performance, strategy effectiveness, product design, etc.

項目名稱：

公募基金業績評價與股指基差預測

摘要：

本項目包含兩個課題，公募基金業績評價與股指基差預測。四個小組中，前三組負責公募基金業績評價課題，每個小組專攻一種基金類型，包括主動型股票

基金、純債債券型基金和指數增強型基金；第四組負責股指基差預測課題。

前三組通過分析各類公募基金的歷史數據，預測每支基金的未來表現指標，包括基金超額收益率，基金超額收益波動率和基金超額最大回撤率等，並基於此選出能穩定提供較高超額收益的優質基金，作為構建 FoF 投資組合的備選基金，從而為不同風險偏好的投資者提供基金調倉操作和頻率的建議。同樣地，此評價系統也能有效篩選出風險較高、收益較差的劣質基金，使投資者可以避免將其選入投資組合，或相應地進行減倉操作。

為進行基金業績評價，我們首先選取了衡量基金歷史表現的評價指標，將其加權求和，得出每隻基金的表現分數，並根據分數對基金進行排序。接著，我們使用歷史數據的多期滑動窗口回測模型的綜合結果來判斷所選取的評價指標和權重計算方式是否長期穩定有效。三個選基小組最終選取的基金業績評價模型中，遴選出的最佳基金組合（稱為"五星基金組合"）多期滑動窗口回測的勝率可以達到 85% 以上，即五星基金組合的超額收益率長期高於同類全量平均基金水平，高出的超額收益率達到了 2% 以上，且超額收益波動率與最大回測率衡量的風險水平的表現也穩定好於平均水平。最終，此評價系統被應用至基金選擇（選基）過程中，並根據投資者不同的需求為其推薦合適的公募基金。

基差組重點研究對中證 500 股指期貨基差變化的預測，具體聚焦在 T+5 日主力合約基差的變動。預測過程包括：定義主力合約、計算基差和基差變動、收集並整合可能導致變動的因子、建立模型、評估模型、並進行滾動窗口回測。研究發現，以因子"期貨合約前結算價"和"期貨合約持倉量"作為自變量的多元回歸模型表現最佳，擁有高達 1.17 的預測準確率與高穩定性，並能有效降低公司套期保值的成本。

團隊成員：

本項目中成員分為四組，其中三組負責研究公募基金業績評價（也稱"選基組"），一組負責研究股指基差預測（也稱"基差組"）。

選基組：

主動型股票基金：柴渝，俞安格

純債債券型基金：邵逸婷，許立

指數增強型基金：胡梓萌，劉卓瑜

基差組：邱詩函，唐城霖

合作公司簡介：

公司介紹

北京棱鏡私募基金管理有限公司成立於 2021 年 7 月，同年 9 月份公司完成證券類私募基金管理人的登記（P1072534）。公司創始團隊均畢業於清華大學、中科院等一流高校和研究機構，具備多年國內外一線金融機構和科技公司從業經驗。棱鏡私募以量化、科技為抓手，致力於整合全市場各領域優秀基金管理人的能力，為委託人提供一站式二級市場配置的解決方案。

公司投資邏輯

該公司堅持自上而下的投資理念，遵循先資產配置、後基金選擇的步驟。資產配置相對更注重風險控制，通過投資多元化降低單一資產的非系統性風險。這一過程中，資產主要被分配到以下幾個資產類別——股票、債券和大宗商品等，並由基金經理根據股指期貨的基差等重要指標持續對配置進行動態調整。配置過程包含戰略配置（反映投資者的需求）與戰術配置（如時間選擇等）。第二步則是基金選擇，公司根據不同資產類別的特點設計一套全面的基金評估體系，通過考慮這些基金的多個維度，如管理團隊的表現、策略的有效性、產品設計等，從數百隻同類型基金中挑選出最適合投資者的基金或基金組合。