Hull TACTICAL

# Daily Report
## Executive Summary

## Today's Target Position: 101%  2017-12-28

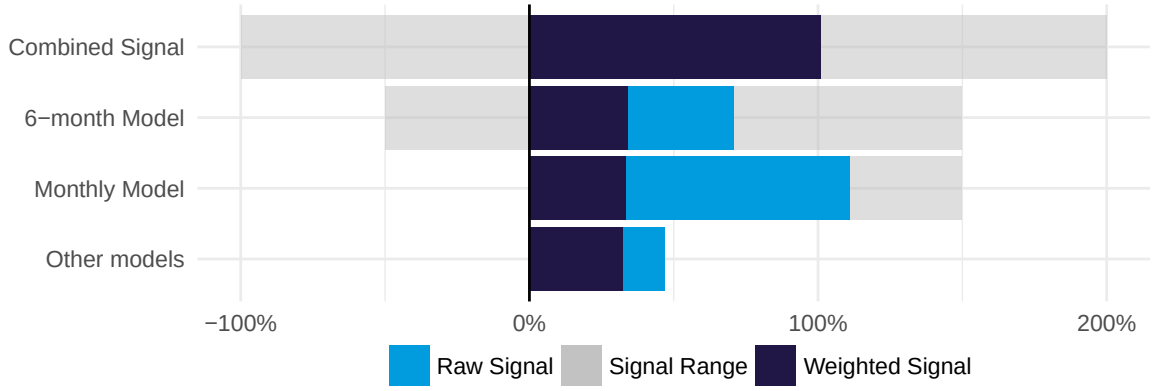
### Strategy Summary

The strategy is an ensemble of quantitative models with forecasting horizons between one day and six months. The strategy forecasts the excess returns of the S&P 500 index by utilizing a wide variety of proprietary analytical techniques. The Fund's investment approach is rooted in identifying and combining an array of signals spanning statistical, behavioral/sentiment, technical, fundamental, event based and economic data sources. Through the use of statistical techniques ranging from OLS, and kNN all the way to sophisticated machine learning methods, the portfolio managers continually investigate and evaluate the evolving complex relationships between these factors and the market.

When the strategy was launched in June 2015, stock market exposure was determined based on the output of a single six-month equity risk premium (ERP) model described in our paper "A Practitioner's Defense of Return Predictability"(2015). Since November 2015 we have introduced seven shorter term models. The monthly model, described in our paper "Return Predictability and Market-Timing: A One-Month Model"(2017) was added in July 2016. The other short term models have forecasting horizons of less than one month. We will expand this report to include more information on these other short term models as we publish more of our research.

Strategy exposure to the U.S. stock market can range from short 100% to long 200%. Volatility scaling was introduced in June 2017 to target 80% of the long-term volatility of S&P500.

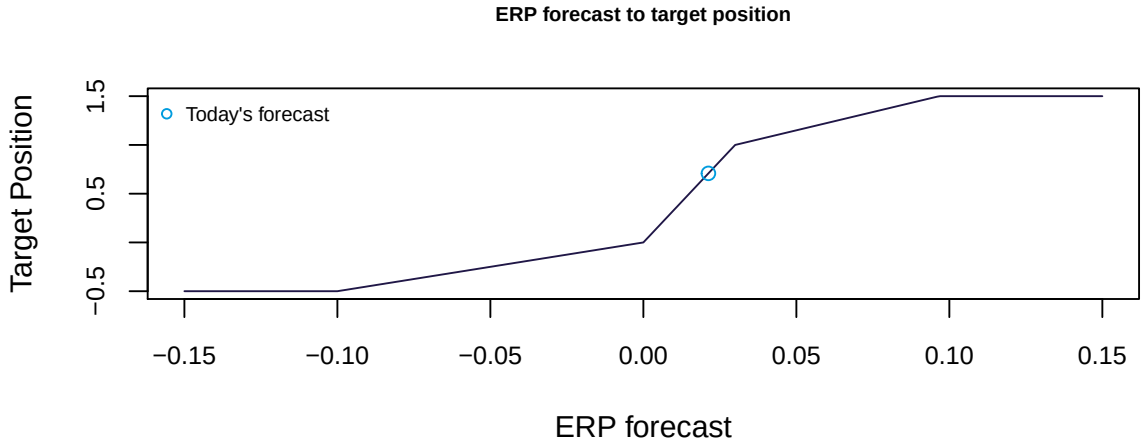
### Signal Decomposition




| | Raw Signal | Weight | Weighted Signal |
|---|---|---|---|
| 6-month Model | 71% | 48% | 34% |
| Monthly Model | 111% | 30% | 33% |
| Other models | 47% | 69% | 32% |
| Combined Signal | | | 101% |

## Model Description

The 6-month model employs OLS with correlation screening to find the most significant predictors from a group of 10 macroecomic and fundamental variables. The current estimate uses 5 of the 10 variables. The regression finds the historical sensitivity (the regression coefficient) of the next six months' excess return on the stock market to each variable. Each variable's forecast contribution is the product of its coefficient and value. Forecast contributions are capped, so no extreme value in a single variable can dominate all other variables. The forecast is the sum of the capped forecast contributions. The 6-month model uses a piecewise linear function to translate the ERP forecast into the target position in the S&P 500. The piecewise linear function targets a position of 100% if the ERP forecast equals the historical ERP. ERP forecasts above (below) the historical mean translate to target positions greater (less) than 100%. Target positions are constrained to lie between -50% and 150%. The piecewise linear function is shown below.




## 6-month Model Indicators

| | |
|---|---|
| Next Refit in | 14 days |
| Last Refit Date | 2017-12-19 |

| | Coefficient | Value | ERP forecast contribution |
|---|---|---|---|
| Intercept | 4.48 | 1.00 | 4.48% |
| Baltic Dry Index | 1.02 | -0.53 | -0.54% |
| LOAN | -6.41 | -0.49 | 3.17% |
| NOS | -3.95 | -0.16 | 0.62% |
| PCA Price | -5.01 | 1.60 | -5.00% |
| Variance Risk Premium | 0.79 | -0.77 | -0.61% |
| **ERP forecast** | | | **2.13%** |
| **Allocation** | | | **71%** |

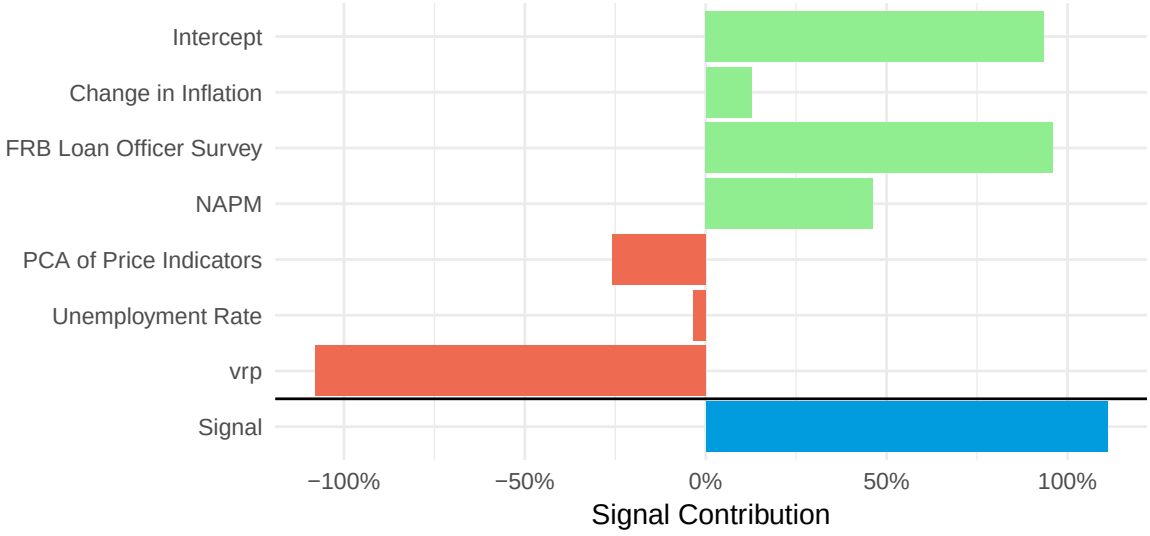
**6-month Model Conclusions**

Our unconditional forecast of the 6-month ERP is 4.48% (8.96% annualized). Variance Risk Premium has a positive coefficient and is below its average. Therefore it contributes negatively to our ERP prediction and target position. PCA Price has a negative coefficient and is above its average. Therefore it contributes negatively to our ERP prediction and target position. NOS has a negative coefficient and is below its average. Therefore it contributes positively to our ERP prediction and target position. LOAN has a negative coefficient and is below its average. Therefore it contributes positively to our ERP prediction and target position. Baltic Dry Index has a positive coefficient and is below its average. Therefore it contributes negatively to our ERP prediction and target position. Given this, our monthly ERP forecast is 2.13% (4.25% annualized) and we target a postion of 71% in the S&P 500.

## Model Description

The monthly model employs stepwise weighted least squares to find the most significant predictors from a group of 16 diverse variables. The current estimate uses 6 of the 15 variables. The regression finds the historical sensitivity (the regression coefficient) of the next month's excess return on the stock market to each variable. Each variable's forecast contribution is the product of its coefficient and value. The forecast is the sum of the forecast contributions. The forecast is adjusted by dividing by the root mean squared error of the regression (RMSE). A larger RMSE is accompanied by a smaller bet size, as a result. The RMSE adjusted forecast is multiplied by five to scale the bets to a range between 0% and 150%. If a scaled bet falls below 0%, the actual bet is set to 0%. Likewise, if a scaled bet exceeds 150%, the actual bet is set to 150%.

## Monthly Model Indicators




| | Coefficient | Value | ERP forecast contribution | Signal contribution |
|---|---|---|---|---|
| Intercept | 0.72 | 1.00 | 0.72% | 93.45% |
| Change in Inflation | 0.50 | 0.20 | 0.10% | 12.69% |
| FRB Loan Officer Survey | -0.49 | -1.51 | 0.74% | 96.01% |
| NAPM | 0.43 | 0.84 | 0.36% | 46.32% |
| PCA of Price Indicators | -0.61 | 0.33 | -0.20% | -25.93% |
| Unemployment Rate | -0.60 | 0.04 | -0.03% | -3.46% |
| vrp | 1.14 | -0.73 | -0.83% | -108.05% |
| **Signal** | | | **0.86%** | **111.03%** |

**Monthly Model Conclusions**

Our unconditional forecast of the monthly ERP is 0.72% (8.66% annualized). Change in Inflation has a positive coefficient and is above its average. Therefore it contributes positively to our ERP prediction and target position. FRB Loan Officer Survey has a negative coefficient and is below its average. Therefore it contributes positively to our ERP prediction and target position. NAPM has a positive coefficient and is above its average. Therefore it contributes positively to our ERP prediction and target position. PCA of Price Indicators has a negative coefficient and is above its average. Therefore it contributes negatively to our ERP prediction and target position. Unemployment Rate has a negative coefficient and is above its average. Therefore it contributes negatively to our ERP prediction and target position. vrp has a positive coefficient and is below its average. Therefore it contributes negatively to our ERP prediction and target position. Given this, our monthly ERP forecast is 0.86% (10.29% annualized) and we therefore target a postion of 111% in the S&P 500.

## GLOSSARY

- **Baltic Dry Index (BDI)** – An assessment of the price of moving raw materials by sea, published daily in London by the Baltic Exchange.
- **Change in Unemployemnt Rate (UR)** – Monthly change in the unemployment rate.
- **Commodity Price (CP)** – The monthly change in the S&P GSCI index intended to track the movements in oil price. Fluctuations in the GSCI are predominantly driven by oil price changes.
- **Consumption versus Wealth and Income (CAY)** – Deviations from the equilibrium relationship among these three variables can predict future stock returns, according to a 2001 paper by Lettau and Ludvigson.
- **Credit Risk Premium (CRP)** – The difference between the BAA and AAA corporate bond yields, also known as the default spread.
- **Default Spread** – The difference between the low quality and high quality corporate bond yields, also known as the credit risk premium.
- **Delinquencies (DL)** – Annual change in loan delinquencies. Similar to FRB Loan Officer Survey, this is another variable that we use to capture the macroeconomic conditions of banks, and complements the information contained in FRB Loan Officer Survey.
- **Equity Risk Premium (ERP)** – The excess return that investing in the stock market provides over the return on a riskfree asset like U.S. Treasury bills. To report an annual forecast of the ERP, the 6 month forecast is taken and the historical mean ERP is added for the remaining 6 months.
- **Exchange Rate (EVUSD)** – Monthly change in the U.S. Dollar Index (DXY).
- **FRB Loan Officer Survey (LOAN)** – The Federal Reserve Bank Senior Loan Officer Opinion Survey on Bank Lending Practices is published quarterly. The survey reflects FRB correspondence with up to eighty large domestic banks and 24 U.S. branches and agencies of foreign banks. The survey provides information about bank credit standards (i.e., whether bankers are tightening or loosening lending standards).
- **Housing Starts (HS)** – Monthly difference in the housing starts index.
- **Implied Correlation** – Average pairwise correlation inferred from the relationship between the implied volatility of an index of stocks and the individual implied volatilities of the stocks that make up the index.
- **Implied Volatility** – An estimate of the future volatility of a stock based on prices of options on the stock.
- **Industrial Production (IP)** – Monthly percent change in the industrial production index.
- **Intercept** - Intercept term from the regression model.
- **k-nearest Neighbors Algorithm (kNN)** - Regression and classification technique based on finding the closest observations as defined by the chosen distance metric to make predictions.
- **National Association of Purchasing Managers (NAPM)** – The difference between the manufacturing survey new orders and the prices paid indices.

- **New Orders / Shipments(NOS)** – New orders for and shipments of manufactured durable goods, as published by the U.S. Department of Commerce.
- **Ordinary Least Squares (OLS)** - Method for estimating the unknown parameters in a linear regression model.
- **PCA** – Abbreviation for Principal Components Analysis. A statistical process that takes a large number of variables and produces a smaller number of variables that contain much or most of the information in the original large set of variables.
- **PCA of Price Indicators (PCA Price)** - The first principal component of the cyclically adjusted price-to-earnings ratio (CAPE), cyclically adjusted total yield (dividends plus buybacks), and the price-to-book ratio.
- **Refit** – The process of estimating the relationship between model indicators and future stock returns with the benefit of new data.
- **RMSE** - The root-mean-square error. It is a common measure of the differences observed values and values predicted by a model. High values of RMSE indicate that we are less confident about our model.
- **Short Interest** – A measure of aggregate stock market short interest based on a weighted sum of short interest of individual stocks. A market participant sells a stock short by borrowing it from a broker and selling it, hoping to buy it back at a lower price.
- **Slope of the Interest Rate Term Structure (STS)** – The difference between the 10-year Treasury note and the three-month Treasury bill yields from Bloomberg. This quantity is sometimes called the term spread.
- **Variance Risk Premium** – The difference between volatility estimates observed in markets and recent realized volatility.

This report is provided by HTAA, LLC (Hull Tactical), a registered investment adviser. The material included herein is based on the views of Hull Tactical. Statements that are not factual in nature, including opinions, projections and estimates, assume certain economic conditions and industry developments and constitute only current opinions that are subject to change without notice. Nothing herein is intended to be a forecast of future events, or a guarantee of future results. This report should not be relied upon by the reader as research or investment advice (unless Hull Tactical has otherwise separately entered into a written agreement for the provision of investment advice).

There are risks involved with investing including loss of principal. There is no assurance that the objectives of any strategy will be achieved or will be successful. No investment strategy, including diversification, can protect against market risk or loss. Current and future strategy holdings are subject to risk. Past performance does not guarantee future results.

Certain economic and market information contained herein has been obtained from published sources prepared by other parties, which in certain cases have not been updated through the date hereof. While such sources are believed to be reliable, neither Hull Tactical nor its affiliates assumes any responsibility for the accuracy or completeness of such information and such information has not been independently verified by Hull Tactical. Index returns are for illustrative purposes only and do not represent actual strategy performance. Index performance returns do not reflect any management fees, transaction costs, or expenses, which would reduce returns. Indexes are unmanaged and one cannot invest directly in an index.