**Alpha Generation using Ichimoku, CCI, TP, TS and SSB**

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Alpha Generation using Ichimoku, CCI, TP, TS and SSB @Haotong

The theme we have chosen is alpha generation, which means generating excess returns, and our goal is to build a strategy where stocks generate returns above our benchmark, which is the CAPM model. Our modeling is based on momentum and mean-reversion strategies.

## Motivation

(briefly explain why technical indicators are chosen)

## Summary of the report

Methodology @Haotong & Cai Yihan

Sample text

## Theory Driven approach

(used to be voodoo science, now replicable with computer and became relevant blahblah)

### Momentum Strategy

The core of the momentum strategy is based on historical data analysis, and we believe that stocks that have performed well in the past will continue to move upward in the future, while those that have performed mediocrely in the past are unlikely to do so in the future.

CCI The selected momentum strategy indicators are CCI and Ichimoku (SSA and SSB). CCI is used to measure the deviation of the price from its statistical mean and is usually considered as an overbought or oversold condition when the CCI value is above +100 or below -100. This can be used as a trading signal in a momentum trading strategy. When the CCI is above +100, it may suggest that prices are overbought and selling may be considered. When the CCI is below -100, it may suggest that prices are oversold and one may consider buying.

Ichimoku SSA and SSB The Ichimoku Cloud consists of several components such as the Cloud (Kumo), the Conversion Line (Tenkan Sen), and the Baseline (Kijun Sen). These components can be used to confirm the direction of a price trend. The color and position of the cloud relative to the price chart provides information on the direction of the trend.

### Mean Reversion Strategy

The mean reversion strategy takes a completely different stance than the momentum strategy, in that the mean reversion strategy believes that the price of a stock should always fluctuate around the mean, so if a stock has performed well in the past and is trending upwards, we mark it short because we believe that the price of their stock will go down in the future, when the price of the stock is at a low point, we should go long because we are convinced that it will rise to the neighborhood of the mean.

For the selection of indicators, the important thing to mention is the selection of indicators for the mean reversion strategy, we firstly selected several typical mean reversion indicators, (TP, SMA\_TP, MD, CCI, TS, KS, SSA, SSB, LS, intercept) are our representative indicators. We selected TP,TS,SSB as our model indicators by performing OLS regression on these indicators, where TP (Typical Price - Typical Price): usually the average of the high, low and closing prices.

TP In a mean reversion strategy, TP is often used to represent the "typical" price of an asset.

TS. TS (Time Series Analysis): Time Series Analysis is a methodology used to analyze time series data and can be used to examine historical trends and patterns in prices to determine if prices are deviating from their mean values.SSB (Singular Spectrum Analysis Back Projection): This is a methodology used to analyze time series data to determine if prices are deviating from their mean values.

SSB. Spectrum Analysis Back Projection): SSB may be used to reduce the major cyclical components of time series data, thus helping to identify cyclical price movements. The main reason for choosing these three indicators is that they have the highest contribution to the final closing price (CLOSE) through statistical tests, and therefore were chosen.

## e.g. Market Selection

## e.g. Decomposition of Indicators

## e.g. Model selection and application

Below is a demonstration of our model. We focus on three stock markets, China, the U.S., and Singapore, and the main indicator we analyze is whether or not dividends are paid. We also analyze the suitability of our model for different companies in different stock markets by examining the relationship between strategy returns and market returns.

## e.g. Python Code Extracts

Sample text

Results @Cai Yihan

Sample text, diagrams, tables

## Hypothesis testing

1. Refine on the valuations
2. Analyze on price action between prediction and actual opening price in near future

## e.g. Diagrams

## e.g. Tables

## e.g. Back testing

Analyze on price action between prediction and actual opening price

1. Choose confidence level
2. trade signal: If opening price lower than prediction(or continuous for 5 days?)
3. keep: If closing price lower than prediction
4. out: if day range covers fair value

Discussion @Xia Tian

## e.g. Assumptions & Limitations

1. cost on false trading strategy (false negative on H0)
2. cost on rejected good trading strategy (false positive of H0)
3. Assumption / limitation:
   1. Price taker
   2. Long only
   3. Little spread between close and adjusted close
   4. No liquidity issue
   5. No outliner data to bias training data (black swan)
4. Extension:
   1. Short position
   2. Forex
   3. Leveraging
   4. Stock dividend
   5. Other marking
5. Money management
   1. Risk / reward ratio
   2. Win / loss ratio
   3. 2% risk of portfolio value per trade
   4. 10% risk of portfolio value per long period, before reviewing on model
6. API trading
   1. IBker: Interactive Brokers for US stocks
   2. MT4: Forex / Indices / Commodities
   3. TraderWagon (Binance): Cryptos

References & Annex