

Quantitative Trading Strategy in King Keltner

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Abstract

At present, with the strengthening of China's opening up to the outside world and the gradual relaxation of regulatory policies, there are many trading markets in China where trading options are increasing. While the restrictions on trading are also being gradually relaxed, the active degree of our country's trading market is promoted. Also it causes the volatility of investment income to strengthen step by step. In this context, compared with the traditional manual trading, the advantages of high-frequency quantitative trading based on learning and strategy are gradually emerging. This article will begin with a brief overview of the concept of quantitative trading. Secondly, it explains the King Keltner strategy. The strategy is then simulated as a procedural transaction and reported on its performance. Finally, optimize and summarize that strategy.

Keywords

Quantitative trading, King Keltner, optimization.

1. Introduction

Quantitative trading, use advanced mathematical models instead of artificial subjective judgments, makes use of computer technology from the huge historical data to make irrational investment decisions, which can bring excessive income from the selection of a variety of "probability" events to and greatly reduces the impact of volatility of investor sentiment for avoiding the market in the case of extreme enthusiasm or pessimism. With the increasing scale of assets under management, more and more asset management institutions rely on computer technology to make investment decisions. Additionally the scale of funds managed by quantitative and procedural exchanges is expanding.

2. Quantitative Trading Strategy

Quantitative trading strategy is divided into Alpha strategy, CTA strategy, high-frequency trading strategy and so on.

2.1. Alpha Strategy

There are different types of Alpha strategies: Fundamental Alpha (or Financial Alpha) and volume and price Alpha, depending on what is being studied. The industry generally does not separate the two types of Alpha completely. But different teams are biased in terms of what they can do, what they're good at, and what they believe in. Some teams like to use data mining to do pricing factors, while others like to base financial logic from the point of view, fine-grained screening of financial factors.

There are two types of hedging. Full hedging is called an Alpha strategy, and non-hedging is often referred to in the market as an exponential enhancement strategy. The two models are the same, but the latter lacks the hedging of futures. The downside of the lack of hedging is the downside, which is that the yield curve of the strategy is subject to a large pullback. But on the

plus side, this strategy works especially well in boom years; in the long run, the company earns Beta dividends and attracts index-friendly customers. In contrast, the hedging Alpha strategy generally outperforms the index in big bull markets; moreover, the advantage of not hedging is that the hedge Alpha strategy puts at least 20 to 30 percent of its money at the futures end as margin.

2.2. CTA Strategy

CTAs are Commodity Trading Advisors, also known as managed futures. It refers to a kind of fund organization in which Professional Fund Managers invest the funds entrusted by clients in futures market and option market, and charge the corresponding management fee. As a strategic method of investment, CTA is a collection of rules, which is very regular and includes many investment categories. It is an important way to realize the diversification of investment in asset allocation, at present, it is gradually becoming one of the basic asset allocation of mature investment institutions. It is characterized by the risk of return relative to Alpha will be more volatile, in the early benefits may be high. The core of CTA is diversification. Specifically, there are three dimensions: Multiple Varieties, multiple strategies, and multiple cycles.

2.3. High Frequency Trading Strategy

The main applications of high-frequency trading in China are as follows: Futures Trend, futures arbitrage, futures market-making, T+0 and full market-making. High-frequency trading applications are mainly private equity, basically will not go public or very little go public has the advantage of high-return small, but do high-frequency hardware and software investment is also expensive.

This paper mainly introduces the trading strategy of Keltner in CTA trading strategy.

3. Strategy Development and Testing

3.1. System Introduction

The Keltner channel is a trading system invented by Chester W. Keltner in the 1960s. The central idea is the moving average. And at that time the system in a very long period of time, has made remarkable achievements. Although the original Keltner channel system was not as effective as it was when it first appeared, its core ideas have had a profound impact on the trading world to this day. Later, the Keltner channel was improved by Linda Raschke. Linda Raschke is a well-known U.S. commodity futures trader and President of LBR asset management. The original Keltner midtrack was an average, changed to an exponential average. In addition, the calculation method of fluctuation amplitude is changed to mean real fluctuation amplitude (ATR). The calculation formula is:

Base price : (highest price + lowest price + closing price) / 3

Middle rail: N period exponential moving average of base price

Range of fluctuations: average true range of fluctuations (ATR)

Upper rail: middle rail + fluctuation range

Lower orbit: middle orbit - fluctuation amplitude

3.2. System Element

(1) Based on the highest price, the lowest price, the closing price of the three average calculated from the three-price moving average;

(2) The upper and lower rails of the channel are calculated based on the true amplitude of the trivalent moving average

3.3. System Element

We know that prices do not always move in a trend or shock fashion, but rather in an imperfect random alternation of trend and shock. Then King Keltner to channel the way as the dividing line, the trend market and the shock market separated. When the price moves between the upper and lower tracks, we can think of it as a choppy market. When prices break through the orbit, indicating that more powerful buying pressure has occurred, the future price pit you will rise further. When prices break the lower track, indicating that there has been a stronger sell-off pressure, the future price may fall further.

Admission Conditions

- (1)The three-price moving average upward, and the price on the broken Channel Rail, open a single;
- (2)The three-price moving average down, and the price under the broken channel under the rail, open empty single.

Entry Condition

- (1)When holding more than a single, the price below the three-price moving average, flat more single;
- (2)Holding empty single, the price of break three-price moving average, flat-empty single.

3.4. Test Result

Period: daily sample size: 500 maximum position: 1000

Margin rate: 10% sliding point: 5 Yuan per hand

Table 1: Test Result

	<i>Net profit</i>	<i>Profitability ratios</i>	<i>Total profit/total loss</i>	<i>Maximum asset retracement</i>	<i>Retracement value/previous high</i>
<i>Sample-more</i>	10100.00	25%	3.98	7535.00	0.08%
<i>Sample-empty</i>	1775.00	20%	0.58	5835.00	0.06%

3.5. Parameter Optimization

Table 2: Parameter optimization

The trivalent mean parameter		Real amplitude parameter		Net profit		Profitability ratios		Retracement value/previous high	
Before optimization	The optimized	Before optimization	The optimized	Before optimization	The optimized	Before optimization	The optimized	Before optimization	The optimized
40	26	40	42	10100	10885	0.25	0.4615	0.0008	0.0007
40	26	40	26	-1775	4080	0.2	0.4167	0.0006	0.0003

4. Strategy Optimization

4.1. Analysis of Strengths and Weaknesses

Advantage: The KENTNER system is based on a moving average of the highest, lowest, and closing averages, creating a channel of highest and lowest moving average cues at any given moment. Break the upper track to do long; under the lower track to short.

Deficiency and improvement: King Keltner strategy relies too much on the establishment of the upper and lower track, and the establishment of the good or bad directly determines the strategy's merits and demerits, so from this aspect, the accuracy of the establishment of the upper and lower track is further strengthened.

4.2. Code Optimization

Add a third parameter, a multiple of three-moving-average upper and lower channel ATR, that will adjust itself.

The new code:

Params

```
Numeric avgLength (40);           // average of three valences
Numeric atrLength (40);           // real amplitude parameter
Numeric Lots (0);                 // number of trading hands
Numeric N (2);                    // add a multiple of ATR
```

Vars

```
NumericSeries movAvgVal (0);      // average of three valences
NumericSeries dnBand (0);         // channel under rail
NumericSeries liquidPoint (0);    // entry conditions
```

The Begin

```
// collection bidding and section break filtering
If (!CallAuctionFilter Return ());
// average of three prices
MovAvgVal = Average((High + Low + Close)/3,avgLength);
// channel under rail
DnBand = movAvgVal - N*AvgTrueRange(atrLength);
// entry conditions
LiquidPoint = movAvgVal;
Draw a line / /
PlotNumeric (" movAvgVal movAvgVal);
PlotNumeric (" dnBand dnBand);
// the average of three prices down, and the price under the broken channel under the
rail, open single
```

```
If (MarketPosition! = -1 And movAvgVal[1] < movAvgVal[2] And Low [= dnBand[1]])
```

```
SellShort(Lots,Min(Open,dnBand[1]));
```

```
// when holding an empty list, the price on the break of the average line, flat list
```

```
If(MarketPosition == -1 And BarsSinceEntry >= 1 And High >= liquidPoint[1])
```

```
BuyToCover(0,Max(Open, liquidPoint[1]));
```

The End

4.3. Test Results

Table 3:Strategy optimization

NET PROFIT	PROFITABILITY RATIOS	TOTAL PROFIT/TOTAL LOSS	MAXIMUM ASSET RETRACEMENT	RETRACEMENT VALUE/PREVIOUS HIGH
2480.00	33.33%	1.09	16930.00	0.17%
3090.00	66.67%	1.24	13010.00	0.13%

5. Conclusion

Although King Keltner is an ancient trading method, there are still things we can learn from code that we can restore and improve upon. After the strategy is constructed and coded, the quantitative trader also has the opportunity to update the strategy code or adjust the parameters at a later stage due to the different market conditions that apply to any strategy. And the later revision of quantitative traders' strategies is constantly based on the analysis of the current fundamentals, and generally predicts the general situation of the market in the coming period, and based on this choice of the best arbitrage strategy or adjust the parameters to the optimal level. Only by making clear the trading principle, trading characteristic, trading method and using cycle of each trading technology, can it be applied freely in trading, seize good operation opportunity and reduce unnecessary loss.

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