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Analysis of the Wheat Futures Spread Trading

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Abstract: The future trading represents interesting possibility how to trade commodities. Each commodity and related futures contract has its own characters which can be advantages or disadvantages for successful trading. The spread trading can be used as appropriate tool for traders with budget constraint how to avoid the volatility. The study is focused on spread trading which are compound from two consecutive contract months of futures for wheat. The aim of this study is to analyze the spread consisting of May and March contract and suggest a strategy focused on small conservative trader and also offer some insight to spread trading and introduce it as the way of trading which can be useful for smaller traders with low budgets. For this purpose, there were analyzed all possible spreads for the stated commodity traded at Chicago Board of Trade (CBOT). The developed strategy is based on the contango phenomenon and uses tools of technical analysis moving averages to determine when to open the position. Positions are finish near to first notice day (at CBOT) for contract which expire sooner or with using stop-loss. The suggested strategy brought positive results. There are only two losses during the observed period.

Key words: Volatility, small investors, commodity, spread, exchange, contract month, volume, bid, ask, futures, margin, contango, stop-loss

INTRODUCTION

Commodity markets represent suitable markets for small investors (investors with limited budget in ten thousand of USD) because they offer lower margin and Tic units and minimum move are lower in comparison with other commodities which are traded on commodity exchanges, especially on Chicago Board of Trade (CBOT). Periods of higher volatility on the markets emphasis these characteristics for traders with limited budget.

Stakeholders with limited budget have to use Stop-Loss (S-L) to be able control their position and to avoid of uncontrolled loss (Osler, 2003). Their stop-loss should be appropriate to their budget and time frame. But on the other hand, it is the stop-loss what finish the position in the market premature and brings loss to the trader. There were developed some strategies which don't use the S-L but they are too risky. Although, some researchers state that S-L can bring higher volatility and can lead the crash of the market (De Long *et al*., 1990; Frankel and Froot, 1990; Gennotte and Leland, 1990).

We can find futures spread trading as another tool how to decrease the impact of volatility and reduce risk in comparison with normal futures trading. (Working, 1949; Graham and Dodd, 1976; Batten *et al*., 2013; Dunis *et al*., 2010; Daigler, 2007). Of course spread trading offers lower profits. Spread trading represents the alternative for the common futures trading at commodity exchange. But there are some differences between the classic futures and spread trading. These differences are connected with character of spread trading.

The spread trading helps reduce volatility at commodity markets for traders (Cuny, 2006). With lower volatility is connected lower risk and that's why there is usual that commodity exchanges and brokers require lower margins for spread trading. But the disadvantages are that with the lower risk provides lower profit and for the creating of spread it is necessary open two positions at the market which means that the commissions for the broker will be (2 times) higher. Because the considered type of trader is trader with lower budget the attention is focused on the reduction of risk simultaneously with keep the space for the profit. The chosen strategy was built so that there are not many situations when the market generates the signals to open the position and if the position is opened they are usually held for many months often about 1 year. Increasing volatility can negatively affect the traders with limited budget they have to leave the position. It caused that some ex-changes are not suitable with these small stakeholders, who can be also the producers for those this fact means next added problems (Sulaiman *et al*., 2014).

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For the creating spreads there was taken into account the fact that for the futures trading is possible quite often find the situation when the contracts which are closer to the expiration are cheaper than the contracts of the same commodity which expire later. It is because that with the physical holding of the underlying assets are related cost and most of the traders do not want to physically own the underlying asset (Daigler and Wiley, 1999). This phenomenon is called contango. That's why the analyzed spreads are often created that from the later expire contract is subtracted the sooner expire one. The expected effect of the contango is that with the impending expiration of the sooner expire contract the value of the spread should increase. Contango and its opposite backwardation were frequently discussed in literature and many studies from different points of view (Kocagil and Topyan, 1997; Cornell, 1981; Martell and Wolf, 1987; Ribeiro and Hodges, 2005). But it will be show that for analyzed spread, it works very well.

The aim of this study is to analyze contracts for Wheat and suggest the strategy which could be successfully adopted by small investor using the daily/weekly time frame.

MATERIALS AND METHODS

The objective of this study is to model the strategy for wheat spread on CBOT which could be successfully adopted by trader with limited budget. The budget constraint is set up at 10,000 USD for daily spread trading.

There were used the daily closing prices at CBOT (combined electronic and open outcry). These data were obtained and processed in SW Gecko T'nT, MS Excel with XL Analyzer.

According to Hull (2009), the futures price should thus be equal to the spot price plus interest and storage cost the so-called cost of carry. It is expressed as:

$$F_0 = S_0 + I + W \quad (1)$$

Where:

F_0 = Futures price at t = 0
S_0 = Spot price at t = 0
I = Interest
W = Storage cost

If the futures price exceeds the sum of the spot price and the cost of carry, there is an incentive to buy the commodity in the spot market and take a short position (i.e., an obligation to sell the asset) in a futures contract. This will drive up the spot price and lower the futures price. As arbitrageurs will be able to make a risk-free profit as long as:

$$F_0 > S_0 + I + W \quad (2)$$

the commodity is bought in the spot market and sell a futures contract, engaging in this kind of operation until prices have adjusted and the futures price is equal to the spot price plus the cost of carry (United Nations, 2011).

Contango is also obvious from Table 1 for wheat futures traded at CBOT where the spot price (cash) is the lowest one and contracts closer are getting cheaper closer to their expiration.

As it is mentioned above this analysis if focused on spreads which are compound from two consecutive contract months for the futures of one stated commodity. Then the spread is formed as the difference between these two futures. It is possible to make a spread as the contract which expires later minus the contract with sooner expiration. In this case, the speculation is that the sooner expire contract will be more expensive (stronger) then the contract which expires later. Of course, there is possible inverse situation when the assumption is that the contract expires later will be stronger then there will be made the difference between later and (minus) sooner expired contracts. The value of this spread will be exactly the opposite of the first case. This situation is illustrated by Table 2.

Table 1: Prices for wheat futures traded at CBOT

Contracts	Last	Change	Open	High	Low	Previous	Volume
ZWHY00 (cash)	580-0s	-8	0-0	586-0	586-0	594-0	0
ZWH15 (Mar. 15)	581-2s	-12	589-6	591-0	574-6	589-6	38.688
ZWK15 (May.15)	586-6s	-13	594-4	595-0	580-0	594-4	5.964
ZWN15 (Jul. 15)	589-0s	-12	598-0	598-2	582-0	597-4	5.648
ZWU15 (Sep. 15)	596-2s	-12	601-0	602-6	589-6	604-6	413
ZWZ15 (Dec. 15)	606-6s	-8	611-6	613-2	600-0	614-6	1.397
ZWKH16 (Mar. 16)	610-6s	-10	616-0	616-0	604-6	619-0	66
ZWK16 (May. 16)	606-0s	-7	0-0	606-0	606-0	613-0	2
ZWN16 (Jul. 16)	596-6s	-2	588-2	596-6	588-2	597-0	3
ZWU16 (Sep. 16)	600-0s	Unch	0-0	600-0	600-0	600-0	0
ZWZ16 (Dec. 16)	611-0s	-4	0-0	611-0	611-0	611-4	0
ZWH17 (Mar. 17)	613-6s	-4	0-0	613-6	613-6	614-2	0
ZWK17 (May. 17)	612-2s	-4	0-0	612-2	612-2	612-6	0
ZWK17 (Jul. 17)	591-2s	-4	0-0	591-2	591-6	591-6	0

Barchart.com, 2015

Table 2: Spread scheme

Expiration months	Position	Opening the position	Closing the position
May	Long	1	-1
March	Short	-1	1

Researchers, 2014

Because for the purpose of this analysis are considered spreads which are compound from two consecutive contract months of futures of one commodity the expected differences their fluctuation should be lower than the fluctuation of prices of the underlying assets. The spread trading helps reduce volatility at commodity markets for traders. According to Dunis *et al.* (2010), the spread returns can be calculated as:

$$R_s = \left[\frac{(Leg_{1,t} - Leg_{1,t-1})}{Leg_{1,t-1}}\right] - \left[\frac{(Leg_{2,t} - Leg_{2,t-1})}{Leg_{2,t-1}}\right] \quad (3)$$

Where:

$Leg_{1,t}$ = Price of Leg_1 at time t (March contract)
$Leg_{1,t-1}$ = Price of Leg_1 at time t-1 (March contract)
$Leg_{2,t}$ = Price of Leg_2 at time t (May contract)
$Leg_{2,t-1}$ = Price of Leg_2 at time t-1 (May contract)

This study is focused on spread of wheat traded on CBOT compounded from counteracts for months May and March (WK-WH). This spread is one of the analyzed in previous study published in 2012.

There were analyzed all possible spreads for the futures for wheat, soybeans and corn traded at CBOT with the keep the requirement that the underlying contracts have to be consecutive and for the one mentioned commodity. It is 17 spreads and their 10 years (2001-2011) history with daily dates which were analyzed to get know if the assumption that the spread trading can offer some possibilities for the smaller traders is right. For the spreads which seemed to be suitable for the considered budget (10,000 USD) were created trading strategy to find optimal time when the spread getting the highest and lowest values.

There were chosen 7 spreads as suitable for creating strategy. This study is focused on WK-WH spread because previous analysis showed consistent trend which was obvious in 8 of 10 observed cases for this spread.

The spreads are created as the difference between the later (May) and sooner (March) expire contract due to contango. This phenomenon is getting significant with coming expiration of the contract.

The created spreads were evaluated by charts analysis by technical analysis methods. There was placed emphasis on acceptable risk (volatility) and profit according to considered budget.

There are also taken into account years 2012, 2013 and 2014 to evaluate if the strategy which was created on historical data (2001-2011), really works.

To find some instrument which would help to determine when the market reach its minimum was in the most cases, used Moving Averages (MA). But there was a problem how to set their period. Unfortunately, there is not any rule how to calculate the optimal period and that's why this period was set by testing different periods for MA on historical data.

Moving Average (MA) shows average value data in the spread of its time frame. With connection of points of MA we get the line for moving average with given period (Mittelhammer, 2013):

$$\text{Simple MA} = \frac{P_1 + P_2 + ... + P_n}{n}, \frac{P_2 + P_3 + ... + P_{n+1}}{n} \quad (4)$$

Where:

P = Price used for average calculation
N = Represents the period (in days), used for MA calculation

There is an issue how to set up the period for MA. This period can be derived from the periods of change but it is a problem for spreads. In this case, the period has been obtained from visual analysis of charts and testing different periods to get the one which provides the best information.

Moving average is one of the most often used tools by investors. Cootner (1962) demonstrated that a moving average could generate profit.

The instruments based on graphical analysis (support, resistance, formations) and also some advanced indicators of technical analysis do not seem to by useful for the analysis of the spreads, if it is been taken into account that the chart of the spread do not provide any information about the prices of its underlying asset. On the other hand, the moving average provides easy but quite reliable tool how to identify the trend or its change (Anderson and Li, 2007).

Because the strategy is based on expected contango we can assume that the values of the spread will reach positive values before its expiration. This situation is showed by Fig. 1 for years 2002-2011 which were used for developing the strategy.

Figure 1 is obvious that with getting closer to their expiration the spreads became reach positive values. This fact which is linked to conatngo explained above was used as a fundament for suggested strategy together with moving averages.

Strategy rules: There were set up these rules to open the position:

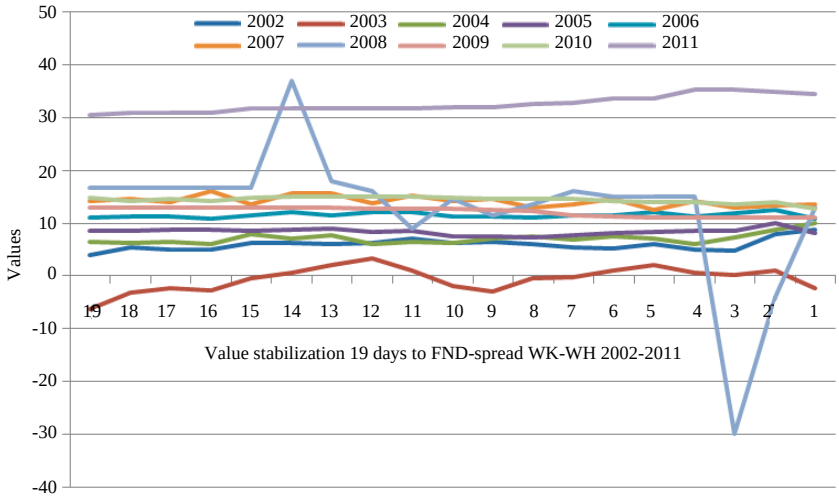

Fig. 1: Spread value stabilization before First Notice Day; Researchers, 2012

Table 3: Basic characteristics WK-WH spread during observed years

Tests	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SD	2.71	9.59	6.70	9.18	4.64	8.39	26.94	20.86	5.63	8.19	9.13	10.15	6.66
Average	4.45	-9.37	-3.52	-2.60	3.27	3.64	-12.44	-0.94	7.16	10.29	3.85	-3.35	1.48
Mean	5.00	-7.00	-3.00	0.00	3.00	7.00	-5.50	5.00	9.00	9.00	7.00	0.00	2.00

Researchers, 2014

- Current value of the spread has to be lower than -5 points
- Position is open when (next day) MA 10 overcome MA25

The position is closed when:

- Is used stop-loss -10 points added to the opening value
- 14 days before the First Notice Day (FND)

It is obvious that the maximum loss should not exceed 10 points which is equal to 500 USD for one spread containing two contracts.

RESULTS AND DISCUSSION

The data in Table 3 describes the basic attributes of data set. For years 2008 and 2009, we can observe the high values for standard deviation. This fact is caused by high volatility on the wheat market. During the year 2008 the wheat prices (and some other commodities) reached its historical maximum values. But during both mentioned years the positions were open and brought profit.

There is not such a big variance for mean values, this fact corresponds with assumption that spreads will converge to positive values before the expiration of underlying futures contracts. Here plays significant role contango.

Table 4: Results of chosen strategy

	Position open		Position close		Profit/Loss	
Years	Date	Values	Date	Values	Points	USD
2002	x	x	x	x	x	x
2003	9.10.2002	-15.5	24.10.2002	-28.75	-13.25	-662.5
2004	12.9.2003	-10.25	9.2.2004	7	17.25	862.5
2005	8.4.2004	-10	8.2.2005	8.75	18.75	937.5
2006	x	x	x	x	x	x
2007	9.11.2006	-7	8.2.2007	15.5	22.5	1125
2008	5.10.2007	-69.5	11.2.2008	37	106.5	5325
2009	26.3.2008	-8	9.2.2009	13	21	1050
2010	x	x	x	x	x	x
2011	x	x	x	x	x	x
2012	3.9.2010	-10	9.2.2012	10	20	1000
2013	18.11.2010	-15	21.1.2011	-25	-10	-500
2014	7.11.2012	-14	7.2.2014	1.75	15.75	787.5
SUM					198.5	9925

Researchers, 2014, data processed in Gecko T'nT and MS Excell

According to the results in Table 4, the position was not open for spreads expiring in years 2002, 2006, 2010, 2011. During this year was not generated a signal to open the position based on the given strategy.

In years 2003 and 2013, the position had to be terminated by using stop-loss. In spite of in both cases the spread would provide profit without implicated S-L is better to use it and have control about loss. In 2003, the loss was 13.25 points (662,5 USD) and in 2013 10 points (500 USD). The rest of observed years generated profit total amount 221.75 points which is equal to 11087.5 USD. Net profit in this case would be 198.5 points (9925 USD).

Based on Table 4 can be stated that strategy can generate the profit but not each observed year. One of the objectives was to set up the strategy for conservative trader which doesn't generate too many signals for opening of positions. And also in both cases when the S-L was used there was a room to make profit.

The lack of signals for opening positions can be pros for less experienced or more impulsive traders but on the other hand, it is obvious that this strategy don't offer opening position every year. Next issue is also the long period for which the position is open.

CONCLUSION

The aim of this study was to suggest the strategy for conservative investors with budget constraint about 10,000 USD which would be based on contango phenomenon. For this purpose was used spread consisting of two futures contract for wheat traded on Chicago Board of Trade. There were simultaneously open two positions long for May contract and short for March one. This spread was chosen on the basis of previous analysis focused on spreads of corn, soybeans and wheat traded on CBOT, published in 2012.

As tools for given strategy were used moving averages, stated value 5 points as boarder for potential profit and also observed day before FND using contango phenomenon. The strategy was built up in 2012 and used the data for years 2002-2011 and after that was tested on historical data (back test).

It is obvious that the modeled strategy keep working in next year. In 2012 brought profit 20, in 2013 loss 10 and in 2014 profit 15.75 points, resp. 1000, -500, 787.5 USD.

The positions were closed by using stop-loss in two cases for observed period. In both cases the values return to their "normals" and reached positive value before the contract expiration. But the rules of money management are necessary to avoid the bankrupt of investor.

The next important factor which is not included in this strategy is volume of underlying contracts. This factor is crucial for safe open a close position. The volume analysis and its implementation to the strategy using contango will follow in next study. This study shows that contango as a phenomenon exists and it is possible to use it as fundament for successful strategy.

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