

Trading Derivatives with Money Flow Index: Case study SET50 Index Futures S50Z17

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Abstract

The main objective of this research is to find the optimum parameters of Money Flow Index for trading derivatives, using s50z17 as a case study. The research use daily Opening, High, Low, Closing prices and volume of S50z17 from December 29, 2016 to November 30, 2017, constitute the database of 227 observations to study. These data computed Money Flow Index (MFI) to measures the momentum in the market. The MFI must configure 3 parameters together. The first parameter is a number of days which vary from 2 to 50. The second parameter is the oversold zone which varies from 1 to 49. The last is the overbought zone which varies from 51 to 99. All parameters will adjust in order to find the entry point that makes the best opportunity or the maximum profit. This research will initiate a new buy position when the MFI indicator drops to an oversold zone or lower, and then holds the derivative until the MFI indicator reach an overbought zone or over.

The result shows that MFI is a good indicator for any investor who wants to trade in derivatives because it makes sharper entry and exit points. There are two groups of parameters to maximize net profit. The first is the number of days which equal 3, oversold zone about 24-28 and overbought zone about 63-67. It will get a chance of winning about 80.00%-85.71% at net profit about 156.80-172.20 points. The second is the number of days about 20-21, oversold zone about 28-35 and overbought zone about 81-82. It will get a chance of winning about 100% at net profit about 125.90-126.50 points. The other fact from this result is that derivatives are a way of investment that "High Risk & High Returns". But we can reduce the risk in derivatives by the knowledge of Mathematics and Statistics, like MFI indicators.

Keywords: derivatives, money flow index, S50Z17

1. Introduction

Thailand Futures Exchange-TFEX is a subsidiary of the Stock Exchange of Thailand (SET) and was established on May 17, 2004 as a derivatives exchange (At a Glance, 2005). TFEX uses the same price/time priority rules as the equity market for order matching which refers to how orders are prioritized for execution. Orders are first ranked according to their price; orders of the same price are then ranked depending on when they were entered. TFEX is allowed to trade Futures, Options and Options on Futures where the permitted underlying assets are equities (i.e., index and stocks), debt (i.e., bonds mortgages and interest rate), commodities (i.e., gold, silver and crude oil) and others (i.e., exchange rate and other as may be announce by the SEC).

In finance, a derivative is a financial instrument. Futures contracts, forward contracts, options, swaps, and warrants are common derivatives. A futures contract is a derivative because its value is affected by the performance of the underlying contract. A stock option is a derivative because its value is derived from that of the underlying stock. While a derivative's value is based on an asset, ownership of a derivative doesn't mean ownership of the asset. Derivative can be used for a number of purposes, including insuring against price movements (hedging), increasing exposure to price movements for speculation, etc.

Derivatives allow investors to earn large returns from small movements in the underlying asset's price. Investors could lose large amounts if the price of the underlying moves against them significantly, because of the use of leverage, or borrowing. This is similar to a margin account when trading stocks. An initial margin will need to be deposited before each trade. Futures price will generally change daily, the difference in the prior agreed-upon price and the daily futures price is settled daily. The exchange will draw money out of one party's margin account and put it into the others so that each party has the appropriate daily loss or profit. If the margin account goes below a maintenance margin level, then a margin call is made and the account owner must replenish the margin account. In the stock market, if you trade stocks on

leverage (borrowed money) you could face a margin call which can vary by stock price though, and by broker.

Derivatives are required to use the trading name to facilitate trading and adhere to universal principles. The name of the product will contain initials, month and year of maturity. For example, s50z17, the first two alphabets "S50" mean a SET50 Index Futures product that traded on TFEX. SET50 Index was launched in 1995 and it is the first large-cap index of Thailand to provide a benchmark of investment in the Stock Exchange of Thailand. It is calculated from the stock prices of the top 50 listed companies on SET in terms of large market capitalization, high liquidity which listed SET50 Index was changed every 6 months. The last three alphabets "z17" are month and year of maturity which code "z" use for December (i.e., h for March, m for June and u for September) and "17" denoted year 2017.

A wise focus of any investor of technical analysis is to study indicators that make sharper entry and exit points in his or her trading. An interesting view was expressed that "The Relative Strength Index (RSI) by J. Welles Wilder Jr. is one of the most popular technical indicators. RSI is included in most of the technical analysis software available today. Anyone conversant with the algorithm used to calculate RSI knows that only the closing price is used. We believe RSI can be improved by using volume to weight the index. Classic market tops are characterized by an increase in volume. Technical indicators which rely only on price changes do not reflect the whole picture. Volume can vary by an order of magnitude in selloffs. The researchers believe that RSI's failure to account for volume is a serious deficiency because volume can vary widely in market tops and bottoms. In an effort to improve the RSI the researchers have devised a unique short-term technical indicator called Money Flow Index (MFI). This indicator attempts to measure the strength of money entering and leaving the market." (Quong & Soudack, 1989)

MFI is also known as volume-weighted RSI that starts with the typical price for each period that uses both price and volume to measure buying and selling pressure. MFI is positive when the typical price rises (buying pressure) and negative when the typical price declines (selling pressure). MFI is used to determine the conviction in a current trend by analyzing the price and volume of a given security which is similar to the RSI. The main difference between MFI and RSI is that MFI also accounts for volume, whereas the RSI do not accounts for volume. Many traders watch for opportunities that arise when the MFI moves in the opposite direction as the price. This divergence can often be a leading indicator of a change in the current trend. MFI is one of the more reliable indicators of overbought and oversold conditions, because it uses the higher readings of 80 and 20 as compared to the RSI's overbought/oversold readings of 70 and 30 (Investopedia, n.d.). Many traders commonly seek to buy and sell a stock in accordance with the movement of this indicator.

2. Objectives

The main objective of this research is to find the optimum parameters (number of days, oversold and overbought zone) of MFI for trading derivatives, using SET50 Index Futures s50z17 as a case study.

3. Materials and methods

The daily Opening, High, Low, Closing prices and volume of S50z17 from December 29, 2016 to November 30, 2017, constitute the database of 227 observations to study. These data computed Money Flow Index (MFI) to measure the momentum in the market by determining how much money is going into and out of the market. The value of the MFI is always between 0 and 100, and calculating it requires several steps. Step one is to calculate the typical price. Second, the raw money flow is calculated. The next step is to calculate the money flow ratio using the positive and negative money flows for the last n days. Finally, using the money flow ratio, the MFI is calculated (Gene Quong and Avrum Soudack, 1989; Buff Dormeier, 2011; Money Flow Index – MFI, n.d.). Formulas for each of these items are as follows:

1. Compute the Typical Price equal to:

$$\text{Typical Price} = (\text{High} + \text{Low} + \text{Close}) / 3$$
2. Compute Raw Money Flow equal to:

$$\text{Raw Money Flow} = \text{Typical Price} * \text{daily volume}$$

3. Calculate the Positive Money Flow and Negative Money Flow over the past n days by:
Positive money flow is calculated by summing up all of the money flow on the last n days where the typical price is higher than the previous period typical price. This same logic applies for the negative money flow.
4. Compute the Money Flow Ratio over a specified time period (n days) equal to:
Money Flow Ratio = (Positive Money Flow) / (Negative Money Flow)
5. Calculate the Money Flow Index as follows:
Money Flow Index = $100 - (100 / (1 + \text{Money Flow Ratio}))$

The aim of this research is to find the optimum parameters of MFI for trading derivatives, using s50z17 as a case study. The MFI must configure 3 parameters together. The first parameter is a number of days vary from 2 to 50. The second parameter is the oversold zone which varies from 1 to 49. The last is the overbought zone which varies from 51 to 99. All parameters will adjust in order to find the entry point that makes the best opportunity or the maximum profit. This research will initiate a new buy position when the MFI indicator drops to the oversold zone or lower, and then holds the derivative until the MFI indicator reaches the overbought zone or over.

There are 2 limitations in this research. The first one, in real life when we trade derivatives, we can trade both ways. This means we can buy at a low price and then sell at a high price later like trading in stocks. The other thing that we can't do in stocks is sell at a high price first and then follow buy at a low price. This research study was done only in the first way. The second limitation is the commission fee. Each time trading derivatives investors must pay the commission fee. This research doesn't include the net profits.

4. Results and Discussion

Considering the back test of whole s50z17 data, all possible results that generate form adjust 3 parameters were calculated and found that:

- Number of times to trade by MFI was between 0-32 times and the average was about 2 times.
- The opportunity to win was between 50-100% which an average was 94.05%.
- The opportunity to lose was less than or equal 50% which an average was 5.47%.
- The average profit and loss per trade was 30.62 and 0.70 points respectively.
- The maximum profit and loss per trade, was 172.0 and 40.4 points respectively.
- The average duration from buy to sell was 57.69 days.

The descriptive statistics of all case are shown as Table 1.

Table 1 The descriptive statistics of all possible results that generate form adjust 3 parameters

	Unit	Mean	SD	Skewness	Kurtosis	Minimum	Maximum
Trade	(times)	2.05	4.33	3.30	12.11	0.00	32.00
Win	(times)	1.75	3.43	2.91	9.05	0.00	22.00
	(%)	94.05	10.65	-1.63	1.77	50.00	100.00
Loss	(times)	0.26	0.91	4.74	27.51	0.00	9.00
	(%)	5.47	9.88	1.64	1.74	0.00	50.00
Draw	(times)	0.03	0.20	7.16	55.72	0.00	2.00
	(%)	0.48	2.36	6.88	55.82	0.00	25.00
Profit	(points)	30.62	40.57	0.93	-0.46	0.00	172.20
Loss	(points)	-0.70	2.97	-6.23	47.20	-40.40	0.00
Net Profit	(points)	29.92	39.39	0.88	-0.65	-4.30	170.70
	(%)	3.02	3.96	0.86	-0.74	-0.45	16.61
Max Profit	(points)	18.78	27.91	1.56	1.81	0.00	123.00
	(%)	1.91	2.86	1.61	2.01	0.00	12.82
Max Drawdown	(points)	10.69	25.84	2.57	5.86	-13.10	123.00
	(%)	1.10	2.66	2.59	6.00	-1.34	12.82
Total Duration	(days)	57.69	99.37	1.44	0.66	0.00	310.00
Max Duration	(days)	25.00	44.28	1.63	1.49	0.00	168.00

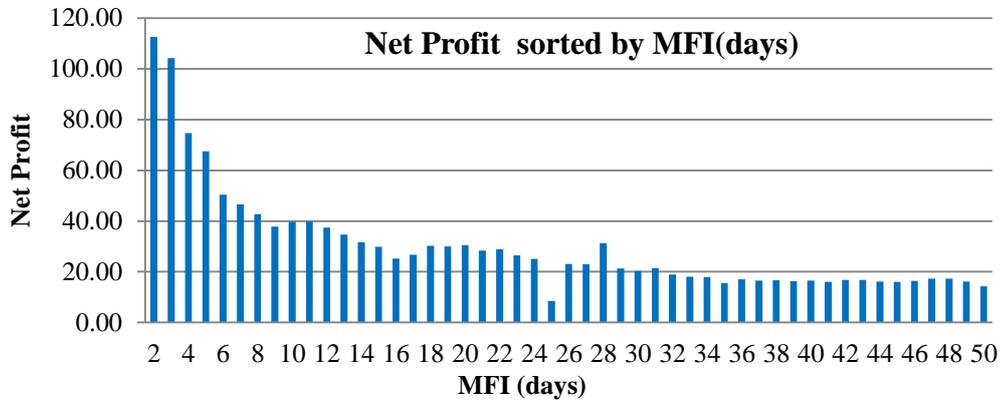


Figure 1 Distribution of net profit sorted by MFI (days)

Figure 1 shows the relationship between MFI (days) and Net Profit, when considered overall found that the less number of days of MFI make more net profit and more number of days of MFI makes less net profit. The maximum profit occurred at number of days equal 2.

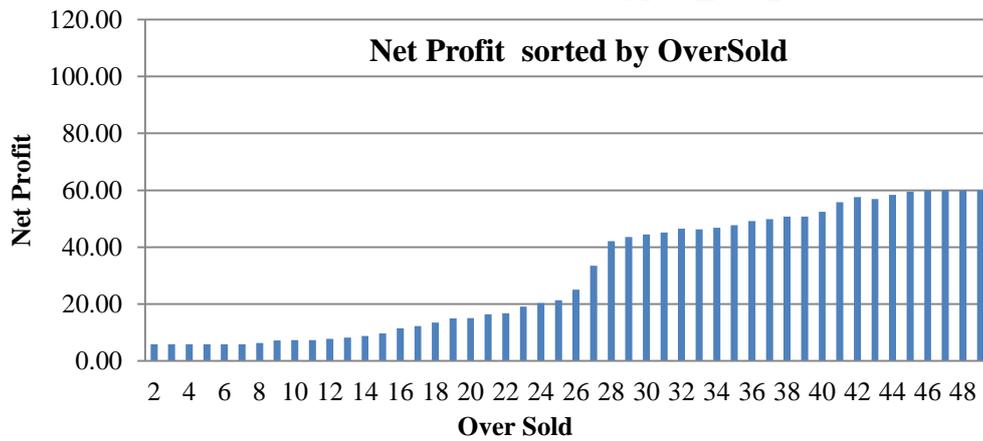


Figure 2 Distribution of net profit sorted by oversold

Figure 2 shows the relationship between the oversold zone and Net Profit, when considered overall found that more numbers of the oversold zone of MFI make more net profit. The maximum profit occurred at the oversold zone about 46-49.

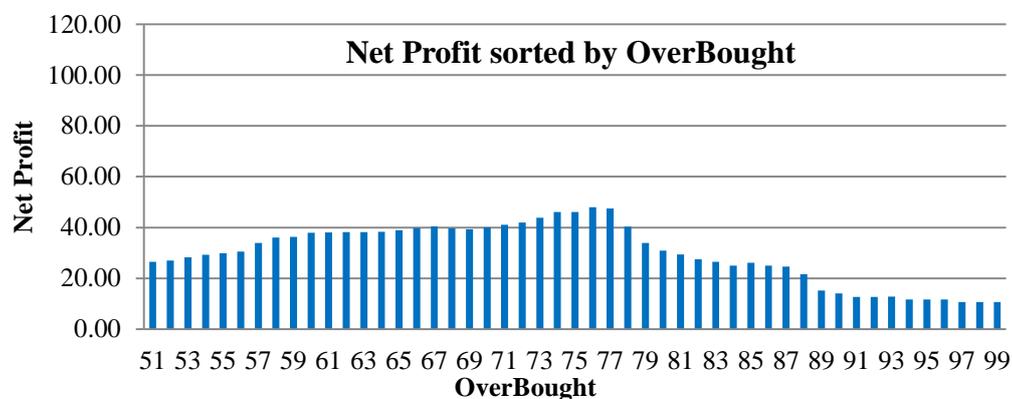


Figure 3 Distribution of net profit sorted by overbought

Figure 3 shows the relationship between the overbought zone and Net Profit, when considered overall, it was found that the overbought zone between 51-76 makes increased net profit and the overbought zone between 77-99 makes decreased net profit. The maximum profit occurred in the overbought zone equal 76.

Table 2 Top 10 maximum net profit ranking by MFI (days), oversold and overbought

Rank	1	2	3	4	5	6	7	8	9	10
MFI (days)	3	3	3	3	3	3	3	3	3	5
Over sold (Buy)	27	27	27	27	27	26	24	25	28	41
Over Bought (Sell)	67	66	63	64	65	67	67	67	67	64
Trade (times)	20	21	21	21	21	19	18	18	20	14
Win (times)	17	18	18	18	18	16	15	15	16	12
Loss (times)	3	3	3	3	3	3	3	3	4	2
Draw (times)	0	0	0	0	0	0	0	0	0	0
% Win	85.00	85.71	85.71	85.71	85.71	84.21	83.33	83.33	80.00	85.71
% Loss	15.00	14.29	14.29	14.29	14.29	15.79	16.67	16.67	20.00	14.29
% Draw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Profit (points)	172.2	164.2	162.6	162.2	162.2	159.5	159.2	159.2	164.7	159.1
Loss (points)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-7.8	-2.3
Net Profit (points)	170.7	162.7	161.1	160.7	160.7	158.0	157.7	157.7	156.9	156.8
Max Profit (points)	25.0	21.8	21.8	21.8	21.8	25.0	25.0	25.0	25.0	30.9
Max Drawdown (points)	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-5.5	-2.0
% Net Profit	16.61	15.89	15.73	15.69	15.69	15.39	15.31	15.31	15.20	15.26
% Max Profit	2.34	2.03	2.03	2.03	2.03	2.34	2.34	2.34	2.34	2.89
% Max Drawdown	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.56	-0.20
Total Duration (days)	309	309	309	309	309	309	309	309	309	299
Max Duration (days)	43	43	43	43	43	43	43	43	43	47

Table 2 shows the top 10 maximum Net Profit ranking by MFI (days), Oversold and Overbought. If we considered only maximum net profit, it was found that the back test result gets the maximum net profit between 156.80-172.20 points, which is percentage of winning between 80.00-85.71, a number of days equal 3, the oversold zone about 24-28 and the overbought zone about 63-67.

Table 3 Top 10 maximum percentage of winning ranking by MFI(days), oversold and overbought

Rank	1	2	3	4	5	6	7	8	9	10
MFI (days)	20	20	20	21	21	21	21	21	21	21
Over sold (Buy)	28	29	30	32	32	33	33	34	34	35
Over Bought (Sell)	82	82	82	81	82	81	82	81	82	81
Trade (times)	2	2	2	2	2	2	2	2	2	2
Win (times)	2	2	2	2	2	2	2	2	2	2
Loss (times)	0	0	0	0	0	0	0	0	0	0
Draw (times)	0	0	0	0	0	0	0	0	0	0
% Win	100	100	100	100	100	100	100	100	100	100
% Loss	0	0	0	0	0	0	0	0	0	0
% Draw	0	0	0	0	0	0	0	0	0	0
Profit (points)	126.5	126.5	126.5	125.9	125.9	125.9	125.9	125.9	125.9	125.9
Loss (points)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Profit (points)	126.5	126.5	126.5	125.9	125.9	125.9	125.9	125.9	125.9	125.9
Max Profit (points)	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5
Max Drawdown (points)	32.0	32.0	32.0	31.4	31.4	31.4	31.4	31.4	31.4	31.4
% Net Profit	13.04	13.04	13.04	12.96	12.96	12.96	12.96	12.96	12.96	12.96
% Max Profit	9.70	9.70	9.70	9.70	9.70	9.70	9.70	9.70	9.70	9.70
% Max Drawdown	3.33	3.33	3.33	3.26	3.26	3.26	3.26	3.26	3.26	3.26
Total Duration (days)	156	156	156	156	155	155	155	155	155	155
Max Duration (days)	156	156	156	156	155	155	155	155	155	155

Table 4 Top 3 maximum net profit and percentage of winning ranking by MFI(days), oversold and overbought compared with Relative Strength Index

Rank	Max. Net Profit by MFI			Max. % win by MFI			Relative Strength Index		
	1	2	3	1	2	3			
MFI (days)	3	3	3	20	20	20	14	14	14
Over sold (Buy)	27	27	27	28	29	30	30	25	20
Over Bought (Sell)	67	66	63	82	82	82	70	75	80
Trade (times)	20	21	21	2	2	2	7	3	1
Win (times)	17	18	18	2	2	2	7	3	1
Loss (times)	3	3	3	0	0	0	0	0	0
Draw (times)	0	0	0	0	0	0	0	0	0
% Win	85.00	85.71	85.71	100	100	100	100	100	100
% Loss	15.00	14.29	14.29	0	0	0	0	0	0
% Draw	0.00	0.00	0.00	0	0	0	0	0	0
Profit (points)	172.2	164.2	162.6	126.5	126.5	126.5	62.5	19.9	14.4
Loss (points)	-1.5	-1.5	-1.5	0.0	0.0	0.0	0	0	0
Net Profit (points)	170.7	162.7	161.1	126.5	126.5	126.5	62.5	19.9	14.4
Max Profit (points)	25.0	21.8	21.8	94.5	94.5	94.5	21.0	10.1	14.4
Max Drawdown (points)	-0.7	-0.7	-0.7	32.0	32.0	32.0	1.8	3	14.4
% Net Profit	16.61	15.89	15.73	13.04	13.04	13.04	6.23	2.04	1.47
% Max Profit	2.34	2.03	2.03	9.70	9.70	9.70	1.99	1.05	1.47
% Max Drawdown	-0.07	-0.07	-0.07	3.33	3.33	3.33	0.18	0.30	1.47
Total Duration (days)	309	309	309	156	156	156	302	162	0
Max Duration (days)	43	43	43	156	156	156	90	92	0

Table 3 shows the top 10 maximum percentage of winning ranking by MFI (days), Oversold and Overbought. If we considered only maximum percentage of winning, the researchers found that the back test result got the maximum net profit between 125.90-126.50 points which percentage of winning is 100, number of days between 20-21, the oversold zone about 28-35 and the overbought zone about 81-82.

Table 4 shows if we compared the top three maximum net profit, the top three maximum percentage of winning which ranking by MFI with the results from Relative Strength Index (RSI), one of the most popular indicators, which common parameters are the number of days equals 14, the overbought equal 70, 75, 80 and oversold equal 30, 25, 20. The RSI conditions in this research will initiates a new buy position when the RSI drops to the oversold zone or lower, and then holds until the RSI reaches the overbought zone or over. The comparison results clearly show that times of trade and net profit are different obviously. Although the RSI's results get 100% of winning equivalent to the top three maximum percentage of winning which is ranked by MFI, but the net profit of MFI is greater than about 1-8 times. When compared with the top three maximum net profit by MFI, although the percentage winning of MFI is about 85% that is less than RSI, the net profit of MFI is greater than RSI about 1.5-11 times. These results confirm that MFI make net profits more than RSI.

5. Discussion

The objective of this research is to find the optimum parameters of Money Flow Index for trading derivatives (s50z17). We already know that MFI is an oscillator that uses both price and volume to measure buying and selling pressure and from the back test result shows that:

When we consider overall about MFI, there are 3 parameters to optimize in this research. The first is MFI (days), less number of days of MFI make more net profit and the maximum profit occurred at number of days equal 2. The second is the oversold zone, more numbers of the oversold zone of MFI makes more net profit. And the last is the overbought zone, which is between 51-76 making the increased net profit between 77-99. The result makes a decreased net profit.

If investors want only high net profit and don't care about the percentage of winning, the best parameters is number of days equal 3, oversold zone about 24-28 and overbought zone about 63-67. In this case investors will get a chance of winning about 80.00%-85.71% at a net profit of about 156.80-172.20 points.

If investors want only a high percentage of winning and can accept less net profit, the best parameter is number of days between 20-21, an oversold zone about 28-35 and an overbought zone of about 81-82. In this case, investors will get a chance of winning about 100% at a net profit of about 125.90-126.50 points.

6. Conclusion

MFI is an indicator that makes sharper entry and exit points in this back test. It is similar to RSI but give a chance of winning to 100%. This result is a good indicator for any investor who wants to trade in derivatives. From this back test, there are two ways to winning in this game.

The first way to maximize profits with the best parameters is number of days equal 3, an oversold zone of about 24-28 and an overbought zone of about 63-67. One would get a chance of winning about 80.00%-85.71% at a net profit about 156.80-172.20 points.

The second way to maximize the percentage of winning with the best parameter is number of days between 20-21, an oversold zone of about 28-35 and an overbought zone of about 81-82. You will get a chance of winning about 100% at net profit about 125.90-126.50 points.

The fact that you get from this result is derivatives is a way of investment that "High Risk & High Returns". But you can reduce the risk in investment by the knowledge of mathematics and statistics, like MFI indicators.

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