

# Systematic vs. Discretionary Trading with the Triangle Pattern



The symmetric triangle is one of the most profitable patterns for short term-trading. This article shows how to exploit it as a discretionary and systematic trader.

Much was written about the differences between systematic and discretionary trading. While the discretionary trader is watching the markets very closely and takes his decisions based on his experience, the systematic trader evaluates the price data on pure statistics and later just applies the calculations of his computer. From the psychological point of view, the two approaches are different, but both

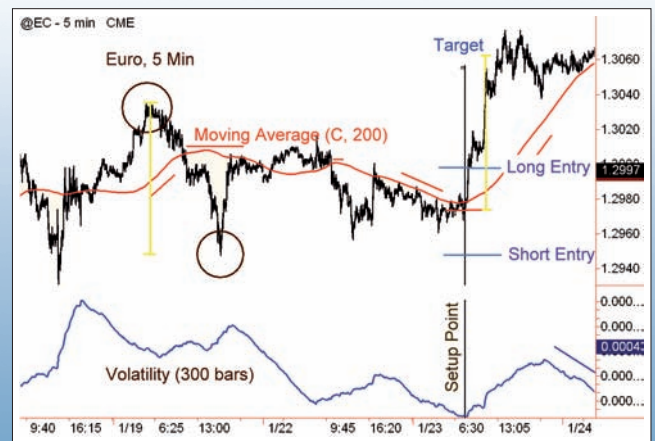
are difficult. The discretionary trader has to be mentally fit and concentrated each day to earn his money. He can be compared with a top athlete who goes for his best performance every day. In contrast, the systematic trader just has to switch on his PC after he has thoroughly done his statistical work. But he must have the discipline to let his computer run the signals, even if they are contrary to his

## F1) Principle of the Symmetrical Triangle Pattern



Euro, Globex, 5-Min, 21-24 January 2007. A natural profit target can be derived from the width of the triangle. False breakouts usually occur which make triangles difficult to programme for systematic trading. The final breakout takes place with a volume increase and leads the price into the target region.

## F2) Principle of a Programmed Triangle System



At the point before the breakout occurs (setup point) the volatility is extremely low and the moving average trends sideways. If these two conditions are true, a long stop and a short stop entry order is placed. These entry levels also work as natural initial stop and reverse points. A profit target is derived from recent highs and lows (yellow lines).

current market expectation and his personal feelings. This is just the psychological aspect. From the technical aspect there are more differences. Many profitable patterns can be seen by discretionary traders and they can make money with the necessary discipline. The human brain is clever enough to identify special figures which look different from the normal background noise that is always present. However, even simple patterns are often too complex to be evaluated with computers because within each price figure small details can occur that lead to miscalculations and misinterpretations. In this article we want to discuss these aspects on one of the most profitable patterns, the symmetric triangle (Figure 1). This figure shows a chart of a continuous, back-adjusted Euro/Dollar futures contract (Globex) at the end of January 7. You see that within three days a very nice, symmetric triangle developed. The triangle pattern is a very strong, profitable pattern since the logic behind it is sound. First, a phase of uncertainty leads to a compression in the market. The volatility



decreases while the triangle pattern gets increasingly narrow. This phase of decreasing interest of the market participants forms the base of the succeeding movement. The longer the indecisive phase is the stronger is the subsequent breakout. At a certain point, when the consolidation has continued for a longer time while many market participants are unsure about the further development, any distortion, e.g. a news event, can create a strong breakout. Many traders who had been standing on the sidelines before are now in a hurry to jump on the driving train. They amplify the emerging trend. This is underlined by the increasing volume when the breakout happens.

But, as you might have recognised, before that final breakout took place, smaller movements out of the boundaries of the triangular figure had occurred. While a good discretionary trader might ignore the false breakouts, such "spikes" are difficult to programme on a computer. First of all, it is difficult to identify such a triangular pattern. Then, if your algorithm has found it, to draw the legs of the triangle

### T1) Portfolio Figures, Jan 2002 - Jan 2007

Portfolio Analysis 1/21/2002-1/19/2007			Time Analysis (Days)						
Total Net Profit		\$58,254	Trading Period						
Gross Profit		\$160,808	Years	0.52					
Gross Loss		-\$102,554	Months	6.20					
Net Profit of Long Trades		\$34,629	Weeks	26.85					
Net Profit of Short Trades		\$23,625	Days	188.47					
Total Commissions and Slippage		\$18,750	Time in the Market	201.67					
Comm. & Slipp. Per Roundturn		\$30	Percent in the Market	10.33%					
Profit Factor		1,57	Longest Flat Period	28.90					
<b>Total Trade Analysis</b>			Avg. Time in Trades	0,32					
Number of Total Trades		625	Avg. Time Between Trades	2.47					
Number of Long Trades		322	Avg. Time in Winning Trades	0.42					
Number of Short Trades		303	Avg. Time Between Winning Trades	4.88					
Average Trade		\$93	Avg. Time in Losing Trades	0.22					
Percent Profitable Trades		53%	Avg. Time Between Losing Trades	5.63					
Ratio Avg. Win/Avg. Loss		1,40							
<b>Drawdown</b>									
Maximum Drawdown		-\$3,275							
Max. Drawdown Date		02.14.03							
<b>Outlier Trades</b>									
	Total Trades	Profit/Loss							
Positive Outliers	9	\$17,986							
Negative Outliers	0	\$0							
Total Outliers	9	\$17,986							
<b>Portfolio Components</b>									
Market	Tradestation	Net Profit	Max. Equity Drawdown	Net Profit Long	Net Profit Short	Number of Trades	Average Trade	Profit Factor	Percent Profitable
1. Euro/Dollar Future	@EC	\$15,915	-\$4,575	\$8,693	\$7,222	197	\$81	1.40	49%
2. S&P 400 MidCap Future	@EMD.D	\$11,280	-\$2,440	\$6,810	\$4,470	149	\$76	1.70	54%
3. US-Treasury Bond Future	@US.P	\$12,019	-\$4,590	\$9,556	\$2,463	140	\$86	1.66	57%
4. Light Crude Oil Future	@CL.C	\$19,040	-\$3,050	\$9,570	\$9,470	139	\$137	1.68	53%
<b>Linear Correlation Coefficients based on Daily Equity</b>									
	@EMD.D	@EC	@CL.C	@US.P	Profit Factor = Gross Profit/Gross Loss				
@EMD.D		0.0189	0.0197	(0.0016)					
@EC	0.0189		(0.0015)	0.0235					
@CL.C	0.0197	(0.0015)		0.0057					
@US.P	(0.0016)	0.0235	0.0057						

Portfolio figures of the Triangle System applied to the following markets: Euro/Dollar Future, S&P400 MidCap Future, US-T-Bond-Future and Light Crude Oil Future. Same system parameters for all markets, \$30 S&C per RT, calculated on a day-to-day basis.



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you must tell the PC where the triangle starts and which points define the legs. Do you ignore the spikes in your calculations or do you include them? This will be different for each situation. Furthermore, when will the triangle end and how will you calculate the profit target from the triangular shape? For the discretionary trader these points are very easy to see, but on a PC it is a long list of programming tasks.

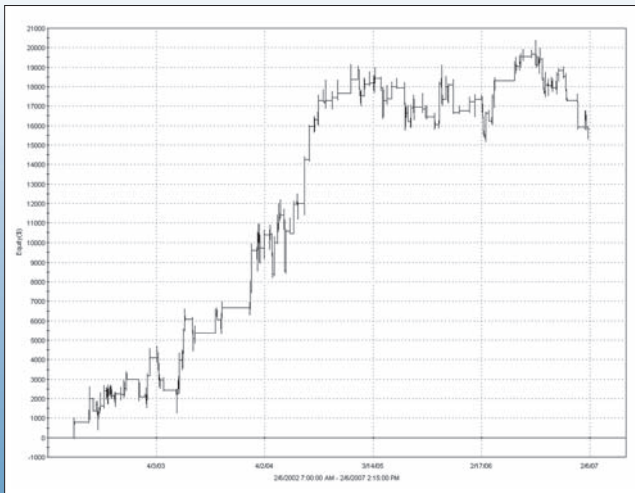
To overcome these issues we took a different, more abstract approach. We added a simple moving average of the last 200 closing prices and a volatility indicator of the last 300 bars to the same Euro, 5-minute, chart (Figure 2). On this example, you can see how the symmetric triangle can be programmed. The figure shows that shortly before the breakout occurred, at the position of the black vertical line (called “setup point”), two conditions were true at the same time:

- 1) The volatility indicator of the last 300 bars has dropped to its lowest point
- 2) The moving average of the last 200 closing prices is moving nearly horizontal.

With these two clear, simple conditions we can programme the setup of the triangle pattern, or better to call it the “low-volatility/flat moving average”-pattern because we do not programme a pattern recognition logic that is identifying symmetrical triangles. Instead, we are only looking for low volatility phases and for phases in which the market trends sideways at the same time, described by the horizontal movement of the moving average. This is a much weaker condition than the exact pattern recognition, but helps us to simplify our programmed trading system logic to put it into reality. Our two setup conditions could well occur in other patterns, e.g. if the market consolidated within a rectangular small trading range.

Now, the entry logic can be completed as follows: If our setup with the two conditions is true, we place a long entry stop order a fixed amount above the current market price, and symmetrically a short entry stop order the same amount below the current market price. The long and short entry levels act as a natural stop-loss and reversal point of our initiated positions. So if we have entered the market long, and after the market shortly proves us wrong and changes to the down side, we exit

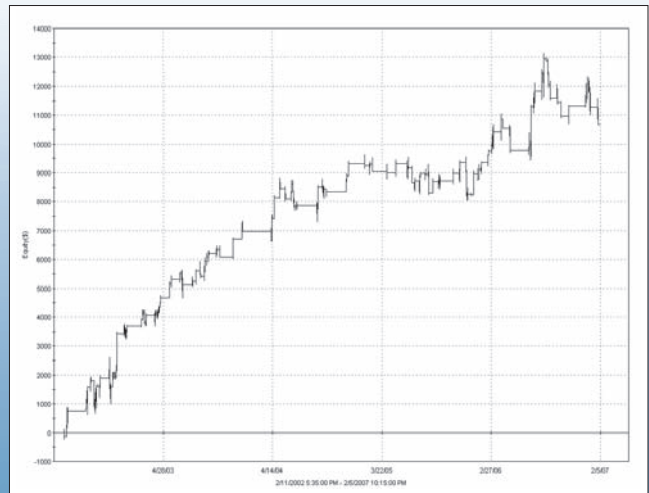
### F3a) Equity Curve – Euro/Dollar Future



Result of Triangle System on 4 different markets: Feb/06/2002- Feb/06/2007, \$30 S&C per RT, on a day-to-day basis.

3a: Euro/Dollar Future (Tradestation symbol @EC)

### F3b) Equity Curve – S&P400 MidCap Future



Result of Triangle System on 4 different markets: Feb/06/2002- Feb/06/2007, \$30 S&C per RT, on a day-to-day basis.

3b: S&P400 MidCap Future (Tradestation symbol @EMD.D)

our long position and enter the market in the opposite direction short. Thus, our logic lets the market decide about its breakout direction and just follows it. We exit the position at a profit target which we determine from the difference of the high and the low within the last 300 bars (see yellow vertical lines in Figure 2). If the profit target is not reached shortly after the breakout we exit the position with a trailing stop instead.

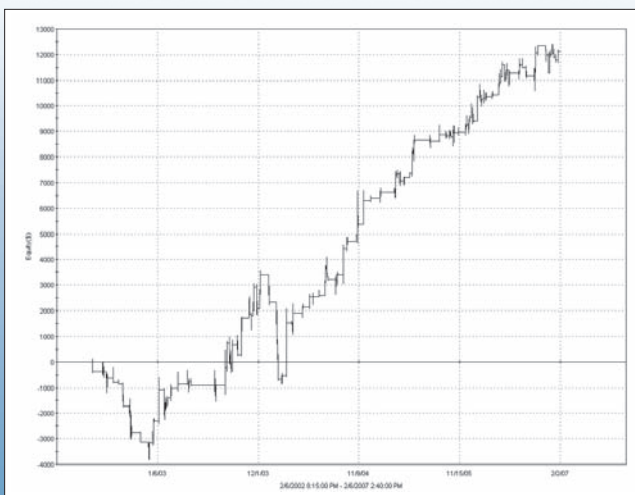
### Application to Different Liquid Futures Markets

We apply our gained system code to 5-minute data of four different markets from different liquid futures markets groups: The Euro/Dollar futures as a currency market, the S&P400 MidCap futures as a stock

index, the US-T-Bond-Future as a bond market and Light Crude Oil as a liquid commodity future. We tested our system within the period of the last 5 years on backadjusted futures data from Jan 2002 - Jan 2007 on all 4 markets with the same system parameters. Our computer simulation is calculated with \$30 slippage and commissions per roundturn (\$30 S&C per RT).

The equity curves all grow very steadily with only minor drawdowns (Figure 3a - 3d). The best equity line seems to be Light Crude Oil. Also, very steady over the tested 5 years were S&P400 MidCap and US-T-Bond-Future. On the other hand, the Euro Future had a sideways phase for the last two years with its biggest drawdown happening just recently, in January 2007 (-\$4,575). Overall, the equity

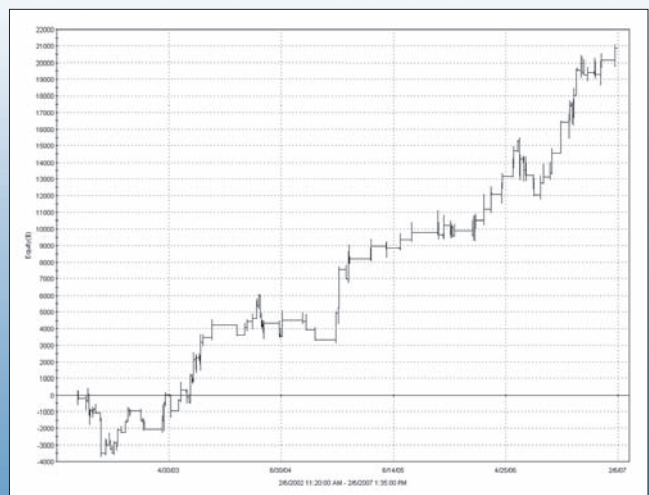
### F3c) Equity Curve – US-T-Bond-Future



Result of Triangle System on 4 different markets: Feb/06/2002- Feb/06/2007, \$30 S&C per RT, on a day-to-day basis.

3c: US-T-Bond-Future (Tradestation symbol @US.P)

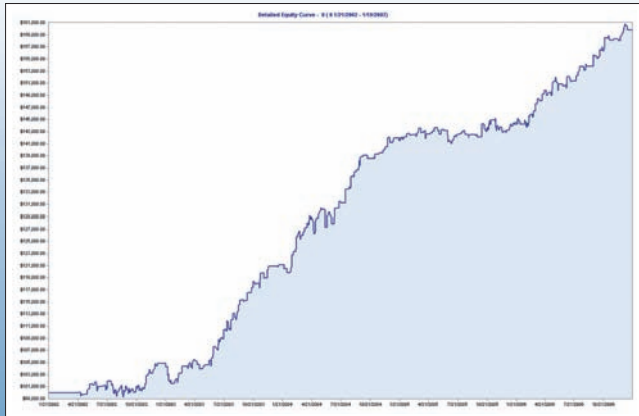
### F3d) Equity Curve – Light Crude Oil Future



Result of Triangle System on 4 different markets: Feb/06/2002- Feb/06/2007, \$30 S&C per RT, on a day-to-day basis.

3d: Light Crude Oil Future (Tradestation symbol @CLC)

## F4) Equity Curve of 4-Market Portfolio



Triangle System applied with same system parameters to the following markets: Euro/Dollar Future, S&P400 MidCap Future, US-T-Bond-Future and Light Crude Oil Future. Equally weighted on a one-contract basis, incl. \$30 S&C per RT, Jan 2002-Jan 2007, calculated on a day-to-day basis.

line, which you get by adding all trades, is still clearly positive. If you watch the equity curves of the single markets more closely you can see that they look a bit like stairs. The reason for this behaviour is long lasting, flat periods between the signals. The system is only about 1-2% of the total time in the market, the rest of the time it is flat. It is an important characteristic of our system that signals occur very seldom, but when trades are taken they tend to result in big profits.

A very positive side effect of the system's low market exposure is a very low correlation of the system's results when applied to the four different markets simultaneously (Table 1). You can see that the correlations of all 4 systems' results are nearly 0. They vary between -0.0016 (which is a very small negative correlation) and 0.0235. This practically uncorrelated behaviour of the four markets helps to build a high return/low risk portfolio when combining them. You can see that while the Maximum Equity Drawdowns of the four single markets vary between -\$2,440 (S&P400 MidCap) and -\$4,590 (US-Treasury Bond Future) the Maximum Equity Drawdown of the 4-Market Portfolio is with -\$3,275 in the same area. So while the profit of the portfolio grows linear with the added markets to over \$58,000 the Maximum Drawdown is kept in the area of one single market! This results in a very steady portfolio equity curve (Figure 4). It is worth mentioning that even within the 4-Market Portfolio, the system is only in the market 10% of the total time. So the market exposure is very low which would allow to add further systems or markets to the portfolio.

You see in the trade statistics that the gains of the system do not result from a high winning percentage (53%), but from the fact that the average winning trade is a large amount greater (factor of 1.4) than the average losing trade. Furthermore, you see that the average time in trades is very small at 0.3 days. This shows that the system captures mainly dynamic breakouts which happen very fast and only last for a short time.

If you have a closer look at the system figures, you can see one more important quality of our developed trading system: The equal weight between long and short trades. From the 625 trades, longs and shorts nearly have the same number (322 vs. 303) and the profits

are nearly divided equally between the long and short side. This applies for the single markets as well as for the combined portfolio. This feature is the result of the construction of the trading logic, which lets the market itself decide in which direction it goes and just follows it, with same probability in the long and in the short direction.

### Conclusion

The example of the triangular pattern shows the different tasks of discretionary and systematic traders very well. While discretionary traders can rely on their experiences and their ability to estimate the market correctly, systematic traders need to act in a different way. Since many patterns that are easily visible with the human eye cannot be programmed directly, we took a different approach and simulated the pattern with common indicators: A moving average, the volatility and the prices themselves. With this approach we could not exactly simulate the triangular pattern, but we created a trading system which comes close to the conditions which are true within such a triangle pattern: decreasing volatility and sideways market direction. In this way, our trading logic was gained by pure market observation and not by optimisation or curve fitting. We are rewarded with a very robust system that stays profitable over different markets with the same input parameters. At first glance, it seems to be a disadvantage that signals occur very rarely and that the time in the market is very low. But it is this fact which makes different markets completely uncorrelated for our trading logic and allows us to build a profitable low risk portfolio.

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