Determine The Beginning And The End

Trend Alert! With The CCI

The trend is your friend — or is it?

How do you know when a trend has turned against you? There are only so many indicators that can alert you. Among them, one of the most helpful is the commodity channel index (CCI). Introduced by Donald Lambert in 1980, the CCI is a price momentum indicator that measures a security price's variance from its statistical mean. It is commonly considered useful in determining the beginning and end of a trend.

It does so effectively, but it can also be used in another way. When I was engaged in a major research project involving statistical analysis of more than 8,000 NYSE/Nasdaq stocks over a five-year period, I tested well-known technical indicators as well as technical patterns. The results were intriguing.

TRADITIONAL METHOD

The literature on the CCI contains a fairly consistent recipe for using this indicator. For example, Amy Wu stated in a STOCKS & COMMODITIES article that the CCI falls within the +/-100 range. When the index moves beyond this range, it suggests that the movements are no longer random, which creates trading opportunities. Hence, if the CCI rises above +100, it means that you should consider going long, and

RESULTS OF GOING LONG WHEN CCI CROSSES ABOVE +100

Total number of stocks: 8,589
Period tested: July 1, 1997, to October 25, 2002

Positive results after 5 days (3,459) = 40.27%	Avg. result = 1.63%
Positive results after 20 days (3,131) = 36.45%	Avg. result = 3.46%
Negative results after 5 days (5,130) = 59.73%	Avg. result = -1.73%
Negative results after 20 days (5,458) = 63.55%	Avg. result = -3.63%
Negative results after 60 days (5,293) = 61.63%	Avg. result = -7.46%

FIGURE 1: USING THE TRADITIONAL METHOD. These results show that if you apply the traditional method found in most literature you will end up losing capital in the long run.

when it falls below +100, you should exit your position.

If the CCI crosses +100, tradition recommends that you enter a long position. However, many traders use this indicator in a different way: when the CCI crosses above +100, it indicates overbought conditions, meaning you should go short. A downward crossing of -100 suggests you go long. This provides an interesting point for statistical analysis. The results of going long when the CCI crosses above +100 are displayed in Figure 1.

Using the CCI to go long when it crosses above +100 has a chance of being correct 50% of the time. That means all results below 50% are to be considered failures. None of the chosen time intervals yielded results over 41%. In other words, using the CCI to go long, as in the traditional method, will result in lost capital in the long run.

Going short, on the other hand, yields positive results in all time intervals. This means that if you want to use the CCI for making money with these parameter readings, you had better go short when the CCI crosses above +100.

by Martin Boot

PATRICK FITZGERALD

OVERALL PERFORMANCE SUMMARY

Total net profit:	310,991.62	Total commissions paid:	0.00
Return on account:	34.94 %	Open position gain/loss	27,074.57
Buy & hold profit:	222,658.28	Bars (avg days) in test:	124,387 (2,026)
Buy & hold % return:	25.02%	System to buy & hold index:	39.67%
Annual system % return:	5.55%	Annual buy & hold % return:	4.10%
System drawdown:	-9,849.21	Buy & hold drawdown:	-9,935.80
Max system drawdown:	-30,612.09	Buy & hold max drawdown:	-635,156.07
Max system % drawdown:	-98.62%	Buy & hold max % drawdown:	-99.77%
Max trade drawdown:	-26,244.74		
Max trade % drawdown:	-71.62%		
Trade drawdown:	-12,572.71		
Total number of trades:	7,218	Percent profitable:	36.5%
Number winning trades:	2,637	Number losing trades:	4,581
Profit of winners:	2,050,433.56	Loss of losers:	-1,968,007.79
Total # of bars in winners:	17,410	Total # of bars in losers:	14,668
Commissions paid in winners:	0.00	Commissions paid in losers:	0.00
Largest winning trade:	15,052.13	Largest losing trade:	-8,046.13
# of bars in largest winner:	7	# bars in largest loser:	2
Commission paid in largest winner:	0.00	Commission paid in largest loser:	0.00
Average winning trade:	777.56	Average losing trade:	-429.60
Avg # of bars in winners:	6.6	Avg # bars in losers:	3.2
Avg commission paid in winner:	0.00	Avg commission paid in loser:	0.00
Max consecutive winners:	7	Max consecutive losers:	16
Bars out of the market:	92,218	Interest earned:	201,491.28
Exposure:	25.9%	Risk adjusted annual return:	8.17%
Ratio avg win/avg loss:	1.81	Avg trade (win & loss):	11.42
Profit factor:	1.04		

FIGURE 2: AMIBROKER RESULTS. Applying this system to the Amibroker program, I ended up with this performance summary.

> **In addition to identifying trend changes, the CCI indicates tops and bottoms in a fairly consistent way.**

SELECTION PROCESS AND OPTIMIZATION

Let's see how the CCI performs when it is applied to a random sample of stocks and indexes. When I applied the crossover trading system on Amibroker 4.2, opening long positions when the CCI crosses above +100, I ended up with the results displayed in Figure 2.

Instead of using +100 and -100 crossover, suppose you use the CCI like a typical oscillator by going long when it crosses above 30 and short when it crosses below 70. Does this improve the results? When optimized for the long side (when CCI crosses above 40) and applied as a trading system, the random sample I selected yielded the results in Figure 3. This method almost doubles the profitability, but even from this point of view, I think a different approach is worth looking into.

CCI AND CYCLES

In addition to identifying trend changes, the CCI indicates tops and bottoms in a fairly consistent way. That is why I consider it to be such a valuable tool for daily trading. A trader who is knowledgeable about cycles will be able to trade tops and bottoms. In the 1980s, it was Walter Bressert who discovered all major cycles in financial instruments. One of these is the primary cycle of SPX and DJIA, the major indexes.

OVERALL PERFORMANCE SUMMARY

Total net profit:	594,861.73	Total commissions paid:	0.00
Return on account:	66.84 %	Open position gain/loss	144,024.23
Buy & hold profit:	226,158.23	Bars (avg days) in test:	124,309 (2,025)
Buy & hold % return:	25.41%	System to buy & hold index:	163.03%
Annual system % return:	9.67%	Annual B&H % return:	4.17%
System drawdown:	-9,999.44	B&H drawdown:	-9,935.80
Max system drawdown:	-98,924.86	B&H max drawdown:	-566,066.67
Max system % drawdown:	-99.99%	B&H max % drawdown:	-99.77%
Max trade drawdown:	-45,265.90		
Max trade % drawdown:	-81.08%		
Trade drawdown:	-19,340.81		
Total number of trades:	7,574	Percent profitable:	30.4%
Number winning trades:	2,304	Number losing trades:	5,270
Profit of winners:	3,852,065.59	Loss of losers:	-3,578,464.42
Total # of bars in winners:	34,791	Total # of bars in losers:	23,582
Commissions paid in winners:	0.00	Commissions paid in losers:	0.00
Largest winning trade:	65,608.29	Largest losing trade:	-15,228.13
# of bars in largest winner:	33	# bars in largest loser:	4
Commission paid in largest winner:	0.00	Commission paid in largest loser:	0.00
Average winning trade:	1,671.90	Average losing trade:	-679.03
Avg # of bars in winners:	15.1	Avg # bars in losers:	4.5
Avg commission paid in winner:	0.00	Avg commission paid in loser:	0.00
Max consecutive winners:	9	Max consecutive losers:	21
Bars out of the market:	65,373	Interest earned:	177,236.33
Exposure:	47.4%	Risk adjusted annual return:	15.15%
Ratio avg win/avg loss:	2.46	Avg trade (win & loss):	36.12
Profit factor:	1.08		

PERFORMANCE FOR !COMP

Total net profit:	12,895.38	Total commissions paid:	0.00
Return on account:	128.95 %	Open position gain/loss	2,075.35
Buy & hold profit:	37.17	Bars (days) in test:	1,459 (2,116)
Buy & hold % return:	0.37%	System to buy & hold index:	34588.99%
Annual system % return:	15.36%	Annual B&H % return:	0.06%
System drawdown:	-742.37	B&H drawdown:	-1,641.61
Max system drawdown:	-10,241.05	B&H max drawdown:	-30,342.56
Max system % drawdown:	-35.10%	B&H max % drawdown:	-78.40%
Max trade drawdown:	-2,653.27		
Max trade % drawdown:	-9.95%		
Trade drawdown:	-2,030.01		
Total number of trades:	77	Percent profitable:	36.4%
Number winning trades:	28	Number losing trades:	49
Profit of winners:	32,114.27	Loss of losers:	-23,635.76
Total # of bars in winners:	533	Total # of bars in losers:	216
Commissions paid in winners:	0.00	Commissions paid in losers:	0.00
Largest winning trade:	3,254.67	Largest losing trade:	-1,889.69
# of bars in largest winner:	24	# bars in largest loser:	4
Commission paid in largest winner:	0.00	Commission paid in largest loser:	0.00
Average winning trade:	1,146.94	Average losing trade:	-482.36
Avg # of bars in winners:	19.0	Avg # bars in losers:	4.4
Avg commission paid in winner:	0.00	Avg commission paid in loser:	0.00
Max consecutive winners:	4	Max consecutive losers:	9
Bars out of the market:	699	Interest earned:	2,341.53
Exposure:	52.1%	Risk adjusted annual return:	25.40%
Ratio avg win/avg loss:	2.38	Avg trade (win & loss):	110.11
Profit factor:	1.36		

FIGURE 3: AMIBROKER RESULTS. When I applied the 30-point crossover system to the Amibroker program, the performance statistics showed an almost doubling of my net profits.

CALCULATING AN 11-PERIOD CCI

The commodity channel index (CCI) can be calculated using any lookback period chosen by the trader. The Excel spreadsheet shown here is an 11-period CCI for the Dow Jones Industrial Average. The first step is to calculate the daily typical price. This is the high, low and close added together and divided by three. This step is performed in column E. The formula for cell E2 is:

$$=(B2+C2+D2)/3$$

The second step is to calculate an 11-day simple moving average of the typical price. This is done in column F. The formula for cell F12 is:

$$=AVERAGE(E2:E12)$$

The next step is to determine the 11-day mean deviation. Take the absolute value of the difference between today's moving average and each of the last 11 days' typical prices. These values are the deviations. Sum these values and divide by 11. This calculated in column G. The formula for cell G12 is:

$$=(ABS(E12-F12)+ABS(E11-F12)+ABS(E10-F12)+ABS(E9-F12)+ABS(E8-F12)+ABS(E7-F12)+ABS(E6-F12)+ABS(E5-F12)+ABS(E4-F12)+ABS(E3-F12)+ABS(E2-F12))/11$$

The CCI, a ratio, is calculated in column H. The numerator is the difference between today's typical price and today's moving average. The denominator is today's mean deviation multiplied by the constant 0.015. The formula for cell H12 is:

$$=(E12-F12)/(0.015*G12)$$

—Thom Hartle

	A	B	C	D	E	F	G	H
1	Date	High	Low	Close	Typical Price	11 period	11 period	CCI
2	930104	3319.21	3298.68	3309.22	3309.04	Moving	Mean	
3	930105	3338.12	3279.23	3307.87	3308.41	Average	Deviation	
4	930106	3330.29	3276.53	3305.16	3303.99			
5	930107	3313.26	3260.85	3268.96	3281.02			
6	930108	3280.31	3221.68	3251.67	3251.22			
7	930111	3262.75	3250.05	3262.75	3258.52			
8	930112	3268.15	3239.51	3264.64	3257.43			
9	930113	3269.50	3243.83	3263.56	3258.96			
10	930114	3279.22	3251.13	3267.88	3266.08			
11	930115	3285.17	3258.15	3271.12	3271.48			
12	930118	3296.52	3244.65	3274.91	3272.03	3276.20	17.76	-15.66
13	930119	3283.28	3254.37	3255.99	3264.55	3272.15	13.99	-36.24
14	930120	3278.96	3231.41	3241.95	3250.77	3266.91	11.07	-97.23
15	930121	3269.77	3219.25	3253.02	3247.35	3261.76	8.42	-114.10
16	930122	3292.74	3225.74	3256.81	3258.43	3259.71	6.42	-13.30
17	930125	3324.89	3243.84	3292.20	3286.98	3262.96	8.42	190.18
18	930126	3331.91	3272.47	3298.95	3301.11	3266.83	11.68	195.58
19	930127	3318.67	3260.05	3291.39	3290.04	3269.80	13.21	102.16
20	930128	3327.86	3270.58	3306.25	3301.56	3273.67	15.46	120.31
21	930129	3331.10	3287.06	3310.03	3309.40	3277.61	18.37	115.35
22	930201	3332.45	3308.40	3332.18	3324.34	3282.41	21.63	129.26
23	930202	3355.68	3300.30	3328.67	3328.22	3287.52	23.55	115.19
24	930203	3397.83	3322.73	3373.79	3364.78	3296.63	27.20	167.02
25	930304	3441.33	3367.03	3416.74	3408.37	3310.96	33.07	196.38
26	930205	3443.21	3410.79	3442.14	3432.05	3327.75	40.44	171.94
27	930208	3472.94	3408.91	3437.54	3439.80	3344.24	48.73	130.72
28	930209	3436.46	3407.82	3414.58	3419.62	3356.30	51.48	82.01
29	930210	3423.76	3406.47	3406.47	3412.23	3366.40	50.92	60.01

SIDEBAR FIGURE 1: EXCEL AND THE CCI. This Excel spreadsheet calculates an 11-period CCI for the Dow Jones Industrial Average.

FIGURE 4: CCI AND CYCLES. Note how the low and high of the CCI coincide with the bottom and top of the respective cycles.

FIGURE 5: APPLYING IT ON THE DOW JONES INDUSTRIAL AVERAGE. Here also you see the coincidence between the CCI and cyclical price movements.

Take a look at Figure 4. The parameters for CCI are 24, and on the graph the values -100, zero, and +100 are significant. This figure gives a picture of the first SPX primary cycle of 2002. In this figure the value zero is the turning point, not 100 or -100. You can clearly see that the beginning of the primary cycle is equal to the bottom of the former one. They both coincide with a bottom in CCI — that is, a value below 200; the top coincides with a top in CCI, or a value above 150. It is clear from this picture why +100 is *not* the value for going long: +100 is equivalent to the midrun or even end-phase of the runup in the primary cycle.

The values between +100 and -100 do not coincide with trend changes. But with the normal subdivisions in the primary cycle, the hesitation at the zero line coincides with subcycles of the primary cycle, as can be concluded from this picture.

PRIMARY CYCLE SUBDIVISION
Take a look at Figure 5. It is clear that CCI depicts the subdivision of the primary cycle in three subcycles: even the normal phenomenon of divergence appears on the first subcycle. In my daily trading practice, CCI has been functioning this way for more than five years now. It correctly points to the primary cycle and its subcycles in the financial instruments I study and trade.

Note that the same primary cycle of 2002 can be seen on the Amsterdam Exchange Index (AEX) displayed in Figure 6.

CONCLUSION

My research points to the following conclusions:

1 The parameters normally found in the literature are incorrect.

2 The CCI can be optimized into a profitable trading system that forces the trader to take many positions over the years.

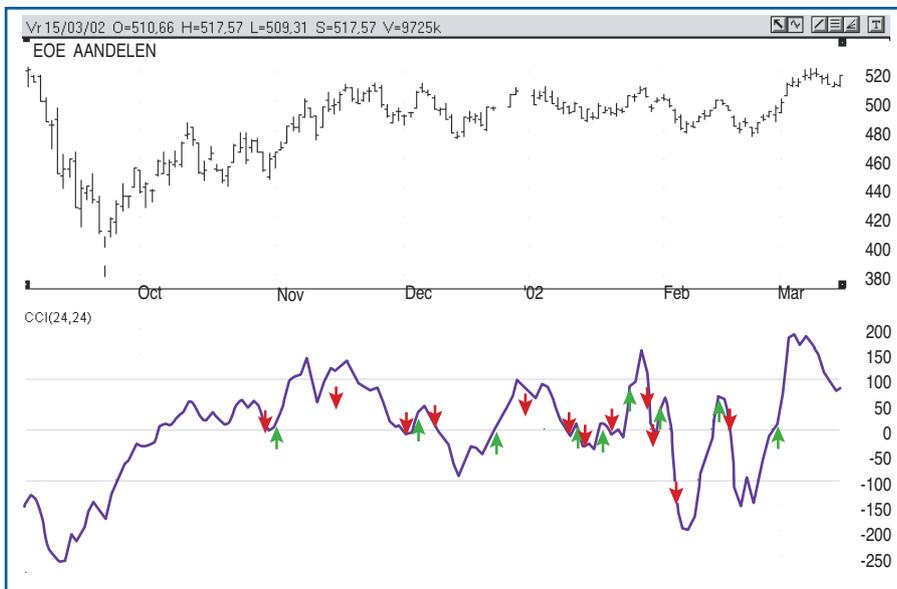3 The CCI is a strong instrument for visually analyzing the really profitable cycles in financial instruments.

FIGURE 6: SIMILAR RESULTS ON THE AMSTERDAM EXCHANGE INDEX. Note the similarities when applied to different financial instruments.

4 The CCI clearly makes a distinction between the primary cycle and its subcycles. It gives a picture of the total body of the cycle. This turns it into a highly profitable tool for the knowledgeable trader.

Martin Boot is a computational linguist, psychotherapist, writer, and trader. He may be reached at his website at www.mboot.com and via e-mail at info@mboot.com.

SUGGESTED READING

Boot, Martin [2002]. "Does The Head & Shoulders Formation Work?" *Technical Analysis of* STOCKS & COMMODITIES, Volume 20: April.

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Wu, Amy [2002]. "Commodity Channel Index," *Technical Analysis of* STOCKS & COMMODITIES, Volume 20: April.

‡Amibroker ‡TradeStation

†See Traders' Glossary for definition
‡See Editorial Resource Index

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