



Tackling trending and ranging markets with CMI

A two-part system uses a simple indicator to trigger both trend and countertrend trades

BY DANIEL FERNANDEZ

Because trading systems are designed to take advantage of specific aspects of market behavior, they are typically very well adjusted to certain conditions and vulnerable to others. For example, classic trend-following strategies work very well when the market has a high degree of directionality but they fail — often for extended periods — when the market trades more randomly.

The ideal solution to this problem would be a system that can benefit from both trending and ranging market conditions to generate a smoother equity curve with much shorter drawdowns and higher profit levels. The realities of trading, however, make this ideal an elusive goal.

Let's see how a system that uses the Choppy Market Index (CMI) to trade both ranging and trending markets performs in terms of achieving this goal.

The Choppy Market Index

The CMI is a simple indicator that gauges whether the market has behaved in a choppy (non-directional) manner or a trending (directional) manner. The indicator calculates the difference between the most recent bar's close and the close n bars ago and then divides this value by the difference between the highest high and lowest low over these n bars. This value is then multiplied by 100 to give us a nor-

malized value between zero and 100:

$$\text{CMI} = ((\text{ABS}(C[0]-C[n]))/(\text{H}[n]-\text{L}[n]))*100$$

Where

ABS = absolute value

C[0] = most recent close

C[n] = close n bars ago

H[n] = highest high of past n bars

L[n] = lowest low of past n bars

When the CMI is high (near 100) it means the difference between the most recent close and the close n bars ago is nearly as large as the high-low difference during that period (i.e., trading has been directional), while a low CMI value implies the market has moved in one direction and then reversed (perhaps more than once) — that is, it has been in a choppy, trading-range environment. Notice the CMI gives no information about whether the market has been moving up or down overall; it simply measures the market's degree of choppiness, regardless of direction.

Because the raw CMI tends to fluctuate wildly, it is often smoothed with a moving average. The following system

uses a 60-period CMI smoothed with a 10-period simple moving average (SMA).

A CMI system

The easiest way to build a daily strategy that can profit from both ranging and trending conditions using the CMI is to design two sets of entry and exit rules that tackle these problems separately.

The first entry rule will tackle the range problem, while the second one will tackle the trending problem. The range part of the strategy assumes drops in the CMI (reflecting a choppier environment) imply a completion of the current range (a move in the opposite direction of the most recent 20-bar close-to-close move), while the trending strategy assumes a higher CMI (reflecting a trendier environment) implies a continuation of the most recent 20-bar close-to-close move. Both strategies will exit positions when the CMI crosses the median line of 50, which suggests uncertainty about whether the market is ranging or trending.

Range strategy rules:

1. Enter a long when the 10-bar SMA of the 60-bar CMI is below 40 and the difference between the current bar's close and the close 20 bars ago is negative.
2. Enter a short when the 10-bar SMA of the 60-bar CMI is below 40 and the difference between the current bar's close and the close 20 bars ago is positive.
3. Exit trades when the CMI moves above 50.

Trend strategy rules

1. Enter a long when the 10-bar SMA of the 60-bar CMI is above 60 and the difference between the current bar's close and the close 20 bars ago is positive.
2. Enter a short when the 10-bar SMA of the 60-bar CMI is above 60 and the difference between the current bar's close and the close 20 bars ago is negative.
3. Exit trades when the CMI moves below 50.

Trade size is adjusted according to market volatility using the 14-day aver-

age **true range** (ATR):

$$\text{Lot Size} = 0.01 * (\text{account balance}) / (\text{contract size} * 14\text{-day ATR})$$

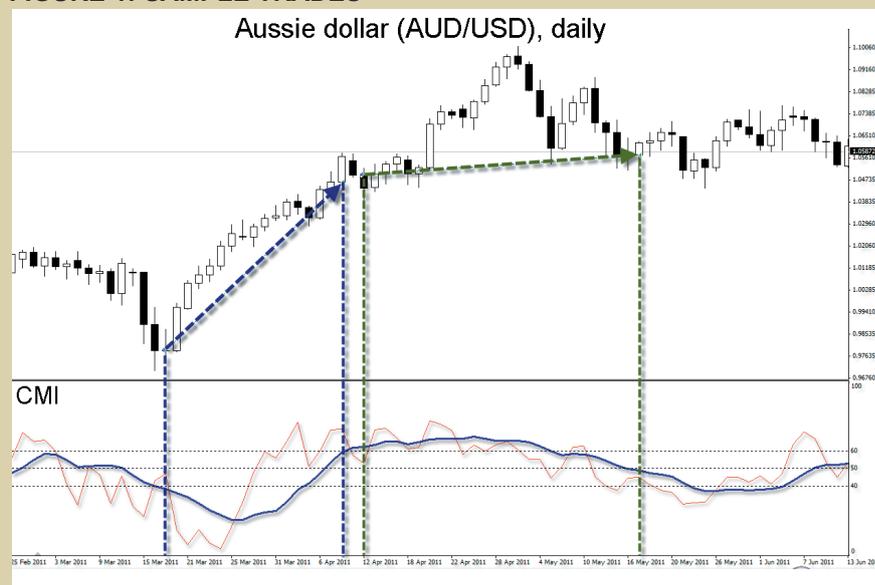
For example, assuming a \$100,000 account balance, \$100,000 contract size, and a 14-day ATR of 0.0123, the trade size would be:

$$(0.01 * 100,000) / (100,000 * 0.0123) = 0.81, \text{ or } \$81,000.$$

Although the strategy does not use a hard stop-loss, the exit rules adequately limit risk since moderate changes on the daily chart will cause the CMI to rise or fall significantly, causing trades to be closed (if the change was unfavorable) or remain open (if the change leads to further profits).

Figure 1 shows two sample trades from March 2011 (range trade shown in blue; trend trade shown in green). The range-strategy trade was triggered after a decline in the Australian dollar/U.S. dollar pair (AUD/USD) caused the CMI to drop below 40 (signaling range conditions) and exited when the CMI detected the beginning of trending conditions. Soon after, the trending component triggered,

FIGURE 1: SAMPLE TRADES



The range component signaled a trade when the CMI was dropping, while the subsequent trend trade signaled when the CMI was rising.



TABLE 1: SYSTEM PERFORMANCE SUMMARY

	AUD/USD	NZD/USD	Portfolio
Avg. annual profit	6.75%	9.56%	15.21%
Max. drawdown	21.59%	21.72%	30.43%
Reward/risk ratio	1.61	1.8	1.7
Win %	53%	58%	55%
Profit factor	1.81	2.45	2.11
No. of trades	66	66	132
Ulcer Index	8.21	7.33	7.86
Avg. risk per trade	2.80%	2.47%	2.63%
Trade costs (pips)	3.5	8	-

System results were comparable for the two currency pairs, with a slight edge going to NZD/USD.

and the trade was subsequently exited when the CMI indicated an emerging range environment.

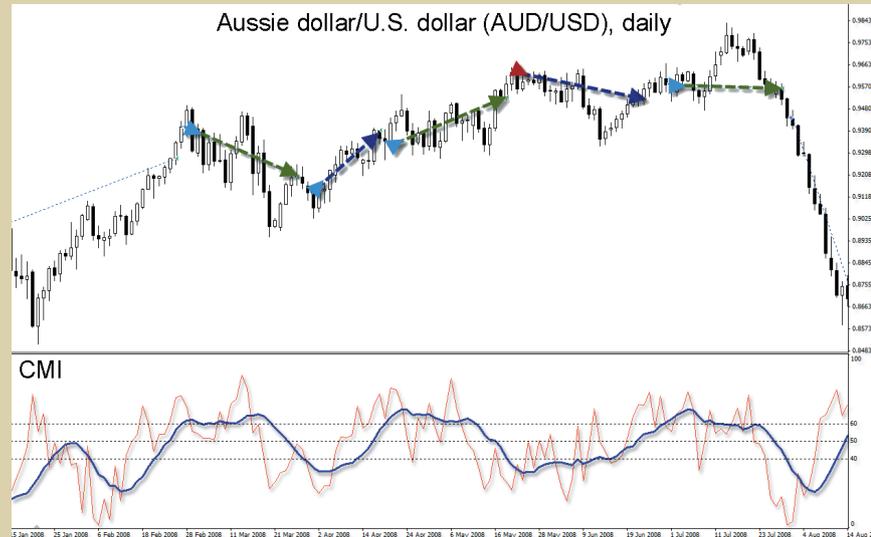
Testing the system

The strategy was tested on daily data in the AUD/USD pair and the New Zealand dollar/U.S. dollar (NZD/USD) from Jan. 1, 2000 to June 1, 2011 (11.5 years), using trading costs of 3.5 and 8 pips, respectively. Table 1 summarizes the system’s performance.

The most interesting aspect of the tests results was arguably the system’s ability to smooth returns by reducing losses when strong ranging periods developed in both currency pairs. The low Ulcer Index (7.86) for the portfolio suggests the strategy would be psychologically easier to trade than many other trend-following systems, which generally have Ulcer Index values above 9. Although the longest drawdown was quite prolonged (1,024 days for the portfolio), it was not particularly deep, and the other drawdowns not particularly frequent.

Another interest characteristic was both strategies’ performance during choppy range periods. Figure 2 shows both strategies worked together in ranging conditions, with the range-trading strategy effectively profiting from the sideways movements while the trending strategy repeatedly attempted to profit from any small breakouts or extensions of the range. Although the strategy failed to achieve large profits within rang-

FIGURE 2: COMPONENTS WORKING TOGETHER



The range-trading and trend-trading components worked together, limiting drawdowns despite generating relatively small profits during the range periods.

ing periods — primarily because of losses triggered on breakouts that were quickly reversed — drawdowns were sharply reduced.

Figure 3 shows the equity curves for the individual currency pairs as well as the portfolio, highlighting the solid overall returns (especially for the portfolio). The two pairs' results are fairly similar, although the NZD/USD had slightly better statistics, including higher profits and a lower Ulcer Index (refer to Table 1). Also, their drawdowns generally occurred at different times. The portfolio profit factor was notably high, underscoring the high reward the strategy generated in the long term.

The system's annual returns were quite favorable (Figure 4). Notice that although there were three losing years, two of them were very small (less than 1 percent) and the third was immediately followed by an equally profitable year. Also, although classic trend-following systems almost always generate high profits on rapidly developing, highly directional markets (such as in 2008), this strategy posted its best performance under less-volatile conditions (such as 2007) when retracements that led to short-term ranges ensured the best odds of capturing profits from both sides of the system. Finally, these results were achieved without any optimization.

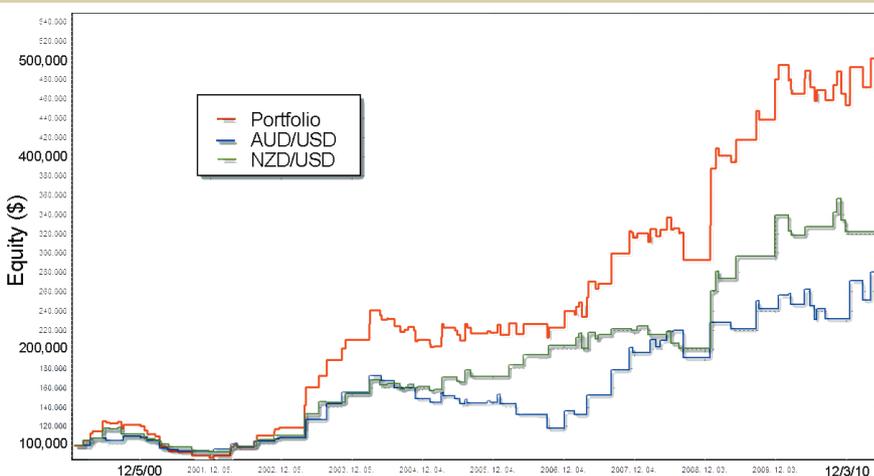
Additional suggestions

The system suggests it's possible — given realistic expectations — to create strategies using a core concept that can tackle both trending and ranging conditions. Although the results shown here were limited to two currency pairs that initially indicated a favorable combination of trending and ranging conditions in which to test the system, it has potential to be applied to

a wider portfolio of currencies. Robust optimization might also lead to more favorable results, both on these pairs and others. ☒

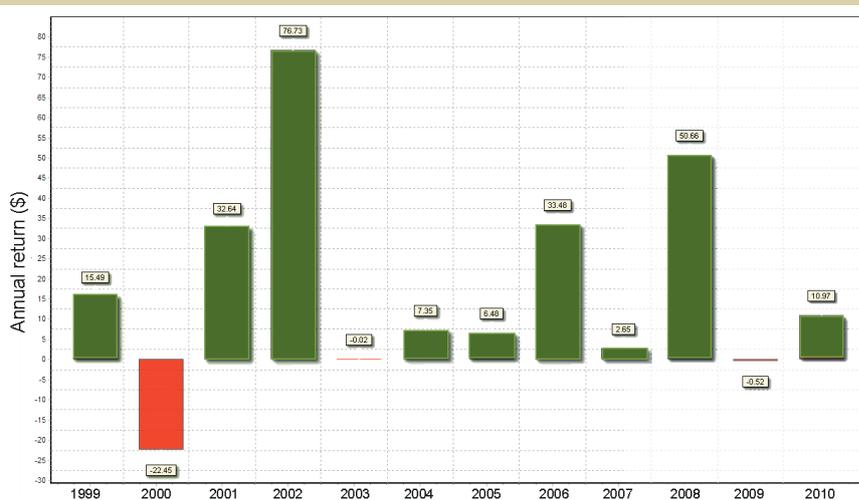
For information on the author, see p. 4.

FIGURE 3: EQUITY CURVES



Among the system's favorable characteristics is the fact that the drawdowns for the individual currencies were generally not concurrent.

FIGURE 4: ANNUAL RETURNS



There were three losing years in the test period, but two of them were smaller than -1 percent.



Hong Kong dollar still made in Japan

The legacy of Japan's glory days and the exceptional case of the Hong Kong dollar

BY HOWARD L. SIMONS

One of the reasons we should run the numbers on each and every currency we find is data analysis is the best — indeed, the only — way of correcting all of those suppositions and misconceptions we have otherwise. Moreover, the very act of running the numbers and getting your hands dirty with the data (inasmuch as anything digital can get your hands dirty) occasionally reveals one of those little gems that make an economist's life worth living.

Let's take the Hong Kong dollar (HKD). This is a currency that should have disappeared after the British returned the former crown colony to China in 1997, but for some

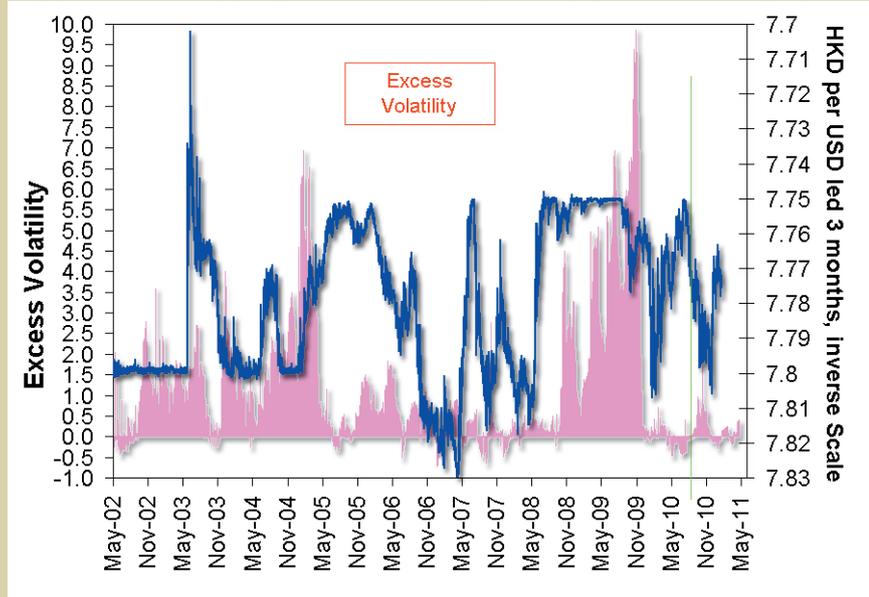
obvious political reasons did not. The mainland was smart enough to, bluntly, know when to keep its mitts off, as the booming city-state provided real value in terms of commercial contacts, financial expertise, and a guide for how to manage a boisterous free-market economy in a very crowded place. China's financial center has been shifting slowly and surely to Shanghai, but Hong Kong still plays a role. Ironically, the biggest threat to Hong Kong comes not from any political repression or an economic squeeze, but rather from clouds of pollution streaming southward from Guangzhou's industries. It is just a tough place for people who like to breathe.

The HKD has been managed within a very tight band against the U.S. dollar. As the Chinese yuan has been either pegged or managed against the USD since the 1997 return of the Crown Colony to China, the cross rate between the CNY and HKD is of little interest. However, as we shall see, the long-term banking relationships between Hong Kong and Japan, some of which are a remnant of Japan's glory days, make the HKD/JPY cross-rate far more critical than commonly recognized.

Volatility

As a simple truism, a country can fix its exchange rate or it can fix its short-term interest rates, but it cannot fix both simultaneously. Hong Kong can choose to fix its exchange rate, which means it either has to let its short-term interest rates swing about or it has to

FIGURE 1: EXCESS VOLATILITY LEADS HKD'S SMALL CHANGES



The excess volatility readings, which are occasionally quite high, lead (by three months on average) the very small moves allowed in the exchange rate and spike whenever speculation about a CNY revaluation increases.