

You don't need to be a rocket scientist to catch the trend, but you do need to know which tools work best. Here's one simple approach.

## Simple system, big profits

BY LESLIE K. MCNEW

**T**hat the trend is your friend is the first rule of trading. One of the easiest and most visual methods of trend following is to locate the moving average of the price data and trade with it. Experts have declared that trend trading is dead, or at least seriously injured, but one real-world experiment shows that with the right filters trading the trend as described by a set of moving averages is still profitable.

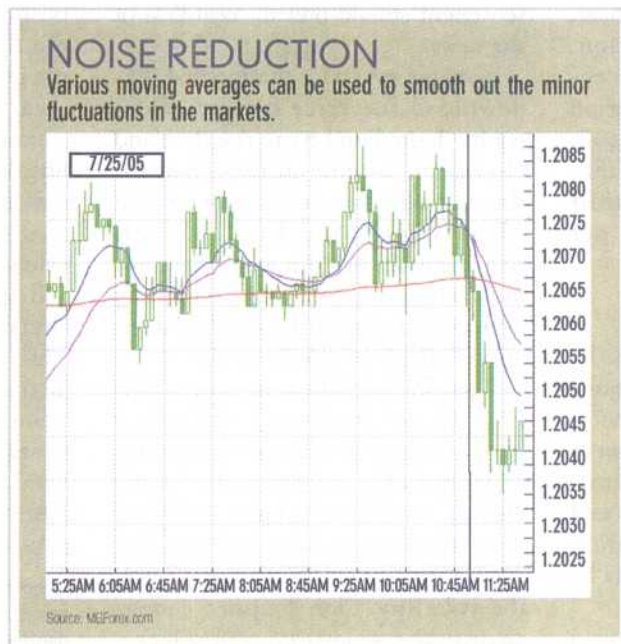
Consider the five-minute candlestick chart of the EUR/USD in "Noise reduction" (right). The blue line is the 10-period exponential moving average, the purple line is the 20-period exponential moving average and the red line is the 200-period exponential moving average.

Moving averages ultimately are useful because they are easy to follow: They smooth price action through a period, thus cutting out the

price "noise." Price noise is a term for excessive price volatility that may disguise a price trend.

The use of moving averages by traders is not new and many traders rely on moving averages as part of their trading tool kit. This article will

define a simple trading plan, using the five-minute EUR/USD candlestick chart and the previously mentioned moving averages. In the style of "keep it simple, stupid," we will demonstrate that this basic trading plan, if followed, will make money through time. The concept of the moving average in trading is not dead.



### WHAT ARE MOVING AVERAGES?

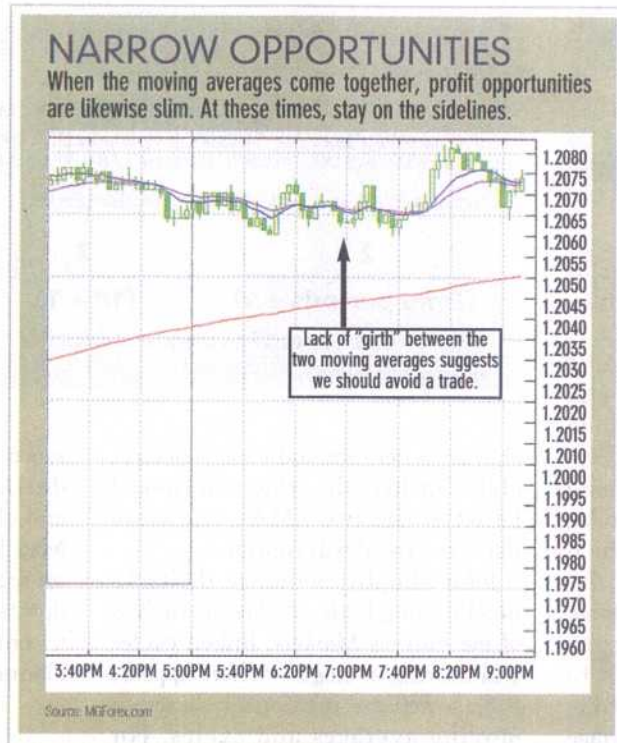
A moving average is an indicator that will calculate the average price of a commodity (in this case, the EUR/USD) throughout a period of time. To illustrate, because we are using the five-minute candlestick chart, the moving average is an equal weight of the past 10 periods of candlesticks, or the past 50 minutes. With each new candlestick, the oldest data point is dropped and the newest candlestick of data is added. Thus, a moving average is not

tell us during what time period to trade while following the trend.

**TIME IS ON OUR SIDE**

Certain time periods of the day are not well suited for trend-trading signals (see "Narrow opportunities," right). From our research, we have found that trend trading normally in the late afternoon through mid-evening does not produce enough girth between the moving averages needed to obtain the space for a profitable trade.

The best trend trading times for the EUR/USD seem to be in the London market, usually around 2:30 a.m. EST time until 6 a.m., and then when the New



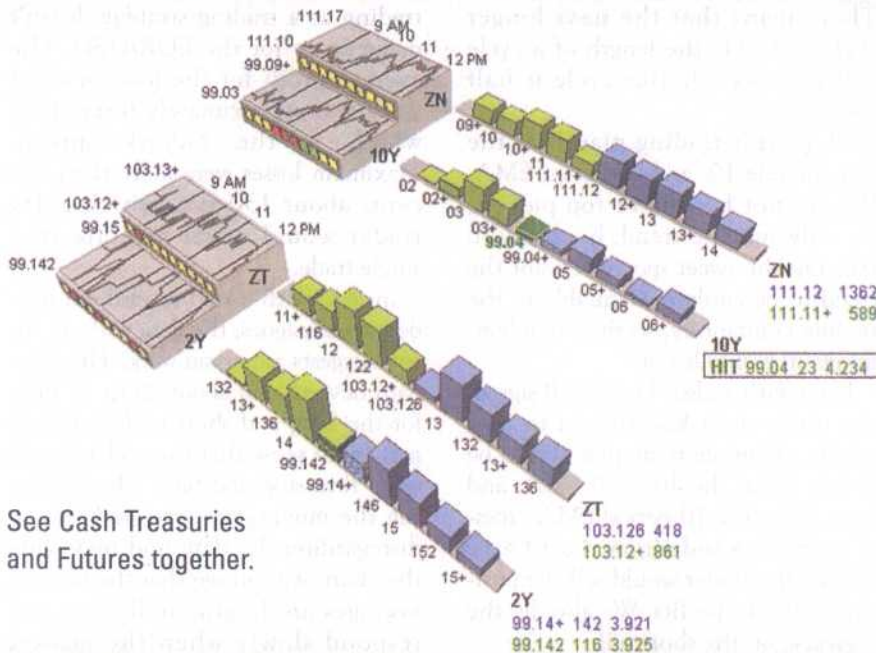
York desks come in around 7 a.m. through about noon. Research suggests the two EMAs in question must have an approximate six-tick girth for the trade to be profitable. If visually the two EMAs are what might be casually described as "right on top of each other," then there is no trade.

The raw research presented earlier in this article does not filter for the girth of the moving averages and does not filter for time.

"Time-based trades" (right) shows our trend trades just in the 8 a.m. to noon period.

Two other filters should also be considered: limits and stops. Assume the trader shorted the EUR/USD on

# We're working with that part of the



# Green

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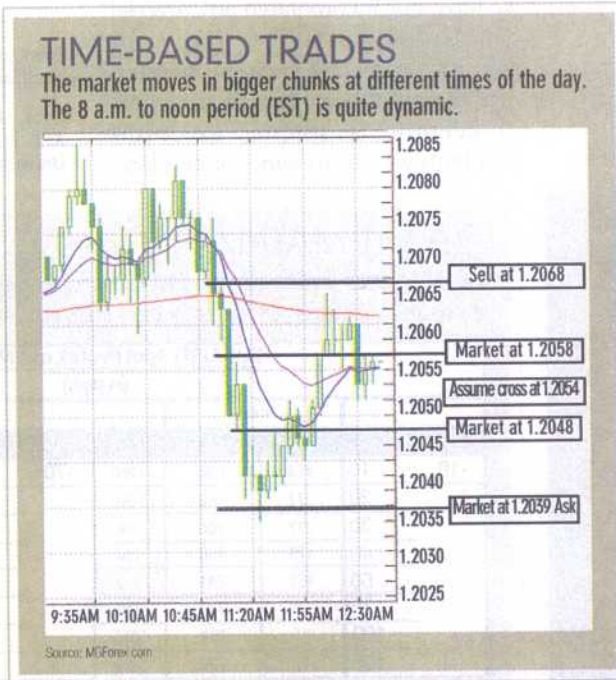
the crossover signal and got the price of 1.2068. The trick then is to know when to get out of the trades and take profits. Following the above trade suggested on the 20 > 10 EMA cross, the trader would then sell the EUR/USD. If the trader sold on the 20 > 10 EMA cross and bought back when the 10 > 20 cross, he would have made about 14 ticks. However, he could have made more than 20 ticks if he allowed the trade to run a little longer. We know that visually, the wider the girth of the moving average — the spread between the 20 EMA and the 10 EMA — the more likely the trade will be profitable.

We were able to test what

the stops and limits should be using a five-minute double crossover method

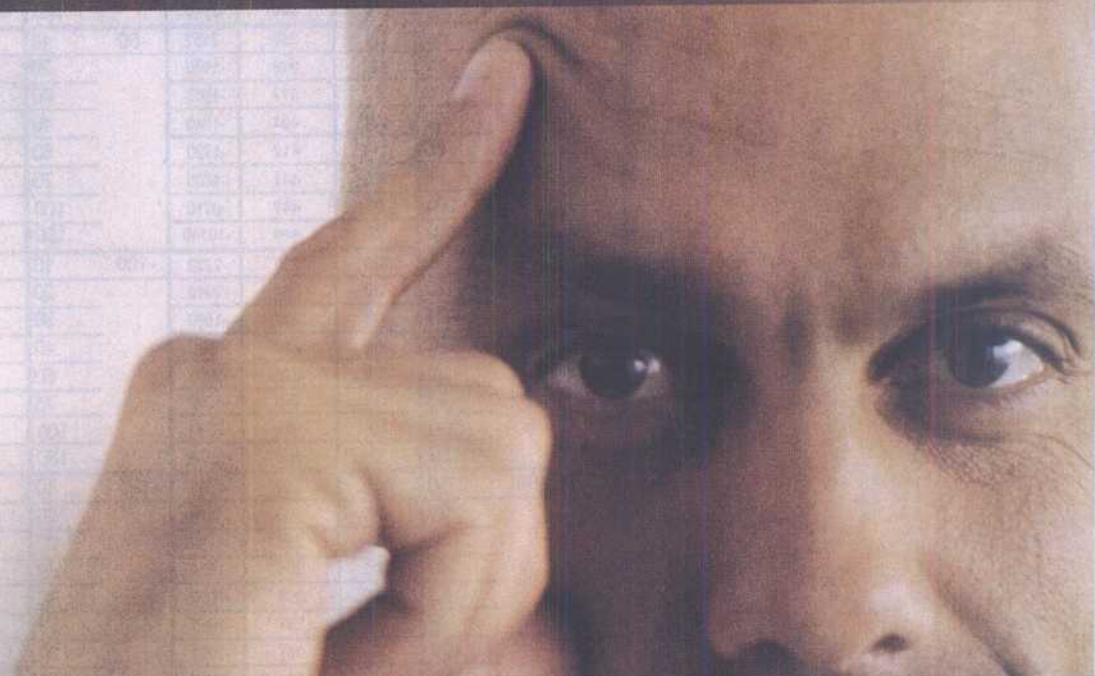
of moving average trading during our selected New York morning time frame. The summary of our results for buys only is located in "Profit matrix" (page 52). A buy signal is located when the 10 > 20 EMA.

For day traders, the most profitable performance came from a stop of 10 ticks and a limit of 50 ticks. However, swing trading proved the best use of the double crossover EMA: Stops of one cent or a cent-and-a-half and limits up to 100 ticks. We found this research to be confirmed on the one-hour chart. It should be noted, confirming common wisdom, that a deeper pocket when trading works better. Holding a trade with a wide stop loss takes deep pockets indeed. Research also



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## SIMPLE MA

$$A_d = \frac{\sum_{i=1}^n M_{(d-i)+1}}{n} \quad n \leq d$$

Source: [http://www.bournibub.ch/fackdel/www/subsection1\\_4\\_1\\_0\\_8.html](http://www.bournibub.ch/fackdel/www/subsection1_4_1_0_8.html)

static; it is rolling.

A simple moving average for M candlesticks of data shows the closing price of each candlestick (M1, M2, ..., MD) is M, and where D is the total number of measurements made and MD is the most recently made measurement (see "Simple MA," right).

For our discussion, we are using exponential moving averages (EMA), the 10- and 20-period EMA, which are calculated similar to the simple moving average but give more weight to the more recent price action. The EMA is an attempt to reduce the lag of the simple moving averages: to make the moving average trendline respond more quickly to changing price action (see "Exponential moving average," right).

## THE DOUBLECROSS

It's helpful to transact with two moving averages, one of a shorter length than the other, to generate trading signals. This method should work well with trending commodities, and the EUR/USD and the other five major currencies are trending markets.

Our rules are simple: when the shorter of the two moving averages crosses over the longer of the two moving averages, a buy signal is generated. In the converse, a sell signal is generated. Because we are day trading the EUR/USD, we use an even shorter EMA against a short EMA: the 10-period against the 20-period EMA. The length of the moving average chosen should fit the time cycle traded.

When the 10-period EMA is above the 20-period EMA, we buy the EUR/USD (10 > 20 EMA). When the 20-period EMA is above the 10-period EMA, we sell the EUR/USD (20 > 10 EMA). Notice in "Noise reduction" how the signal of the trend

## EXPONENTIAL MOVING AVERAGE

The formula for an exponential moving average is:

$$\text{EMA (current)} = ((\text{Price (current)} - \text{EMA (prev)}) \times \text{Multiplier}) + \text{EMA (prev)}$$

For a percentage-based EMA, "Multiplier" is equal to the EMA's specified percentage.

For a period-based EMA, "Multiplier" is equal to  $2 / (1 + N)$  where N is specified number of periods.

For example, a 10-period EMA's Multiplier is calculated like this:

$$\frac{2}{(\text{Time periods} + 1)} = \frac{2}{(10 + 1)} = 0.1818 \quad (18.18\%)$$

This means that a 10-period EMA is equivalent to an 18.18% EMA.

Source: [www.stockcharts.com](http://www.stockcharts.com)

change is definite and clearly observable. Further, the wider the spread between the two EMAs, the more likely the trend will continue.

John Murphy, author of the technical trading bible, *Technical Analysis of the Futures Markets*, linked cycles and moving averages: "There appears to be a definite relationship between moving averages and cycles. For example, the monthly cycle is one of the best known cycles operating throughout the commodity markets. A month has 20 to 21 trading days. Cycles tend to be related to their next longer or shorter cycles harmonically, or by a factor of two. That means that the next longer cycle is double the length of a cycle and the next shorter cycle is half its length."

Thus, this trading plan uses the recognizable 10- and 20-period EMA. We are not bottom or top pickers; we only surf the trend, hopefully to take out the sweet spot. We want the trend to be easily recognizable to the trading community, so that, like lemmings all will follow it.

Even with a clear buy or sell signal, the trader must know when to take profits. A simple trade plan would be to buy when the 10 > 20 EMA, and then when the 10-period EMA crosses to the downside (now the 20 > 10 EMA), the trader would sell the position and take profits. We also did the converse on the short sell.

We decided to backtest this strategy, because a simple eye-ball of the chart looked like it didn't make

sense. Viewing all five-minute candlestick chart data (high, low, open and close) from Nov. 28, 2001, until May 31, 2005, we found 5,736 trades on the upside and 5,735 trades on the downside. We paid the bid/ask spread to enter the trade. The returns are alarming:

	Long: 10>20	Short: 20>10
Number of Trades	5,736	5,735
Min P/L	(133) tics	(127) tics
Average P/L	(3.06) tics	(3.67) tics
Max P/L	213 tics	178 tics
STD P/L	19.84 tics	18.45 tics

The above data suggests that trend trading as a trading strategy doesn't make sense for the EUR/USD. The average profit for the long or short trade was approximately three ticks, which is the bid/ask spread. Maximum losses were more than one cent, about 130 tics, which a day trader would never tolerate in a single trade.

In fact, with a nod toward our academic colleagues, the data without filters suggests a random walk. The standard deviation is about 20 to 19 ticks for the long and short trades; thus, it may make sense that the trader should use a firm stop and limit when entering the moving average trade. Even disregarding the data and reviewing the chart, we can see that the moving averages are lagging indicators and respond slowly when the market reverses. We need a filter for the simple trading plan that would allow us to protect profits and limit losses, and



suggests there is lots of noise within the trend; a stop of 20 ticks is not wide enough to plow through the noise to make the profit.

Trend trading is a lagging indicator method. Candlesticks denote entry and exit signals and should be used in conjunction with the above

methodology and to compensate for the lag. It should be noted that we have not incorporated any reversal candlestick patterns into our analysis. In practice, we do incorporate these patterns. But in the effort of keeping it simple, we know that bulls win, bears win, but pigs lose.

Every trader should locate the trend and grind out a result. **FM**

Juan Londono, Parag Patel and Justin Tannen contributed to this article.

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## Final trading rules

Here are the rules we followed to generate our ultimate trading results.

- All data is from EUR/USD, five-minute chart, Nov. 28, 2001 to May 31, 2005, for the daily time period 8 a.m. to 12 p.m. (EST).

- Buy signal occurs when 10-period EMA crosses over 20-period EMA on five-minute period chart. Buy the next candlestick.

- Moving averages are calculated using typical price for each five-minute period. Typical Price =  $(1/3) * (\text{Close}) * (\text{High}) * (\text{Low})$

- Close signal occurs when user-define limit or stop-order hits:

### Notes:

A three-tick spread is included in calculations. For example, if you buy at 1.2010 with a stop loss of five ticks, your trade will hit stop and close at 1.2005. Therefore, the user-defined stop must be less than three ticks.

Open trades that are not closed by 12 p.m. (EST), are assumed to be "frozen" until 8 a.m. on the next trading day. If by 8 a.m. the market price exceeds the user-defined stop or limit, the trade will be closed immediately. If, during the frozen period, the market price exceeds the stop or limit and retraces back within the trade's trading range (not violating stop and limit) by 8 a.m., the trade will remain open.

There is no consideration given to interest expenses that occur when trades are held overnight.

## PROFIT MATRIX

This table shows us how different limit values worked with various stop levels. For example, a stop loss of 100 pips allowed for far more profit potential for limit values under 50 pips.

EUR/USD Spot Profit/Loss Matrix (in pips)										
		Trades					Trades			
Stops	Limits	Positive	Negative	P/L	Stops	Limits	Positive	Negative	P/L	
-10	10	413	539	-1260	-70	10	599	107	-1500	
	20	277	660	-1060		20	441	138	-840	
	30	227	700	-190		30	361	160	-370	
	40	179	730	-140		40	282	174	-900	
	50	153	741	240		50	240	182	-740	
	75	87	762	-1095		75	141	193	-2935	
-20	100	44	787	-3270	100	78	195	-5950		
	150	12	787	-5970	150	25	197	-10040		
	-30	10	527	371	-2150	-75	10	600	99	-1425
		20	373	473	-2000		20	442	130	-910
		30	299	522	-1470		30	363	149	-285
		40	232	556	-1940		40	284	162	-780
50		200	567	-1340	50		242	169	-575	
75		113	581	-3345	75		142	178	-2700	
-40	100	60	597	-5940	100	79	180	-5600		
	150	19	598	-9110	150	25	182	-9900		
	-50	10	581	259	-2160	-80	10	604	91	-1240
		20	408	338	-1880		20	446	117	-440
		30	327	377	-1500		30	367	133	370
		40	257	404	-1940		40	288	145	-80
50		217	419	-1720	50		245	152	90	
75		123	441	-4005	75		145	161	-2005	
-60	100	67	447	-6710	100	82	163	-4640		
	150	22	448	-10140	150	26	165	-9300		
	-70	10	578	200	-2220	-100	10	605	59	150
		20	420	261	-2040		20	447	78	1140
		30	338	293	-1580		30	368	90	2040
		40	264	314	-2000		40	289	97	1860
50		224	330	-2000	50		246	103	2000	
75		130	350	-4250	75		146	110	-50	
-80	100	69	357	-7360	100	82	111	-2600		
	150	23	358	-10870	150	26	111	-7200		
	-90	10	587	155	-1980	-150	10	607	23	2620
		20	428	206	-1740		20	450	27	4850
		30	349	232	-1130		30	372	32	6360
		40	272	251	-1870		40	294	33	8810
50		231	264	-1850	50		248	35	7150	
75		136	281	-3850	75		148	38	5400	
-100	100	75	287	-8850	100	83	39	2450		
	150	24	288	-10800	150	26	39	-1950		

Source: Backtestly 9000, McNew 2005