



Edge-ratio strategy design

Adding unoptimized exit and risk-control rules to an entry signal with favorable odds increases the likelihood of creating a robust trading system. This MACD-based system illustrates the approach.

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Analysis often suggests seemingly worthwhile trading ideas, but without the ability to turn those ideas into tradable realities, the best-looking setup has no practical value.

“Edge-ratio analysis of ‘classic’ indicator entry rules” (*Currency Trader*, January 2011) detailed a specific edge ratio analysis of different traditional indicator signals on four major forex currency pairs. The analysis uncovered several exploitable entry signals with the potential to provide the basis of successful trading strategies.

However, the article did not discuss how to actually create a system in practice out of this information. Here, we’ll

use some of this information to create a [moving-average convergence-divergence \(MACD\)](#)-based strategy for the Euro/U.S. dollar pair (EUR/USD) that we will test over a 10.5-year period. We will walk through the process of analyzing what *could* be created, how to determine appropriate exit rules, and how to avoid pitfalls such as curve-fitting in the design process.

Using edge-ratio tables

Edge-ratio analysis compares how the ratio of favorable price movement to unfavorable price movement following a particular trade signal. (The basic approach is outlined in “The edge-ratio technique” on the next page.) Table 1 is an example of edge-ratio table; it highlights entries that yielded an edge ratio above 1.00.

When attempting to create a system from an edge-ratio table, you should always take into account the type of system you want to create. For example, if you want to create a trend-following system that enters trades after momentum established itself, you should first find an entry signal that triggers after specific behavior in favor of the trend has happened—for example, a resistance or support breakout, or an inverted oscillator signal).

Then look for a currency pair with an edge-ratio table showing several consecutive rows with values above 1.00. Suppose we want to create a strategy

TABLE 1: MACD ZERO LINE HISTOGRAM CROSS

	GBP/USD		USD/JPY		USD/CHF		EUR/USD	
Period	Long	Short	Long	Short	Long	Short	Long	Short
1	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
2	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
5	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
10	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
20	Brown	Brown	Blue	Green	Blue	Blue	Green	Blue
30	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
40	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
50	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
60	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
70	Brown	Brown	Brown	Green	Blue	Blue	Green	Blue
80	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
90	Green	Blue	Blue	Green	Blue	Blue	Green	Blue
100	Green	Blue	Blue	Green	Blue	Blue	Green	Blue

Legend: Above 1 edge ratio for both long and short. Below 1 edge ratio for both long and short (above 1 for the opposite rule). Below 1 edge ratio. Above 1 edge ratio.

The edge-ratio technique

Edge-ratio analysis is a way to evaluate the potential of a given entry signal in the absence of a full trading strategy (i.e., without position sizing or exits). It measures the amount the market moves for or against the position as a percentage of a volatility adjusted benchmark over a certain holding period after trade entry.

The first step in the process is to choose a volatility benchmark (e.g., the 14-day average true range, ATR) and a fixed holding period (e.g., 20 days). Then, for each entry signal we calculate the maximum move in favor of the trade (the maximum favorable excursion, MFE) and the maximum move against it (the maximum adverse excursion, MAE) as a percentage of the 14-day ATR. A signal's edge ratio is simply the ratio of the MFE to the MAE.

For example, suppose a long entry occurs in the EUR/USD pair at 1.3560 and we want to analyze its performance in the first 20 days after the signal. If the highest high after entry was 1.3580, the lowest low after entry was 1.3520, and the 14-day ATR was 0.0080, the MFE is:

$$(1.3580 - 1.3560) / 0.0080 = .25, \text{ or } 25 \text{ percent of the ATR.}$$

The MAE is:

$$(1.3560 - 1.3520) / 0.0080 = .50, \text{ or } 50 \text{ percent of the ATR.}$$

The edge ratio in this case is $.25 / .50 = 0.50$. A "good" entry — that is, one followed by more favorable price action than adverse price action — will have an edge ratio greater than 1.00.

This type of analysis is very similar to the benchmark analysis shown in many *Currency Trader* and *Active Trader* magazine articles, in which post-signal price performance is compared to overall market performance various ways using the largest up move (LUM) and largest down move (LDM) calculations.

Trade size

There are many ways to determine an appropriate position size, but using a volatility adjusted criteria usually gives the best results. The formula used uses 1 percent of account equity, as adjusted by the 14-day ATR:

$$\text{Trade size} = 0.01 * \text{Account Balance} / (\text{Contract Size} * 14\text{-day ATR})$$

Figure 1 shows a sample trade from 2010 that profited from a long-term downtrend in the EUR/USD pair. A short trade triggered at 1.4739 when the 14-day ATR was 0.0142, and a stop-loss was entered at 1.5023 ($1.4739 + (2 * 0.0142)$). Assuming an account balance of \$100,000 and the contract size (standard forex trading lot) of 100,000, the position size was:

$$0.01 * 100,000 / (100,000 * 0.0142) = 0.7, \text{ or } \$70,000$$

that enters trends in the direction of increasing momentum. The MACD signal described in the January article is an example of this idea:

- Go long when the 12-26-9 MACD histogram crosses above zero; go short when the MACD histogram crosses below zero.

Table 1 shows the edge-ratio analysis for this signal. The performance in the EUR/USD has a clear edge in several consecutive short-term periods (as well as the longest periods), which suggests the MACD signal is a good choice for creating a trend-following system on the daily time frame for this pair.

After deciding upon the pair and entry you want to work with, you can move on to the key considerations of trade size and exit criteria that will ultimately determine whether or not the system is successful.

Adding exit rules

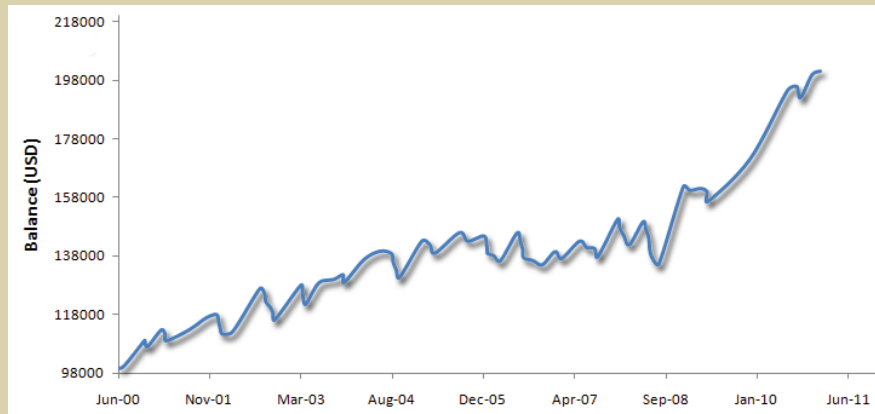
Great care is needed here to avoid over-optimization, or "curve fitting" (cherry picking the most profitable system parameters from a historical test) that would harm the strategy's real-time performance. To sidestep this problem, exits should be created without any optimization. This will result in a more robust trading system.

There are two easy ways to create an exit mechanism for a strategy like this. The first is an inverse-entry criteria, which means the system would exit a trade whenever a signal opposite to entry signal occurs. The second is to create stop-loss and profit-taking criteria, which presents the challenge assigning their values without succumbing to curve fitting. Here, we'll use the inverse-entry approach because of its greater simplicity, but add the following unoptimized stop-loss rule to ensure a fixed risk per trade: All trades will be closed when price moves against the position by two times the 14-day **average true range (ATR)** from the entry price. For example, if the EUR/USD pair's 14-day ATR is 150 pips (0.0150) and a short trade is triggered at 1.5050, a stop-loss order would be placed at 1.5350 ($1.5050 + (0.0150 * 2)$).

The system is stop-and-reverse: It covers shorts and goes long whenever the 12-26-9 MACD histogram crosses above the zero line, and exits longs and goes short when the MACD histogram crosses below the zero line.



FIGURE 2: EQUITY CURVE



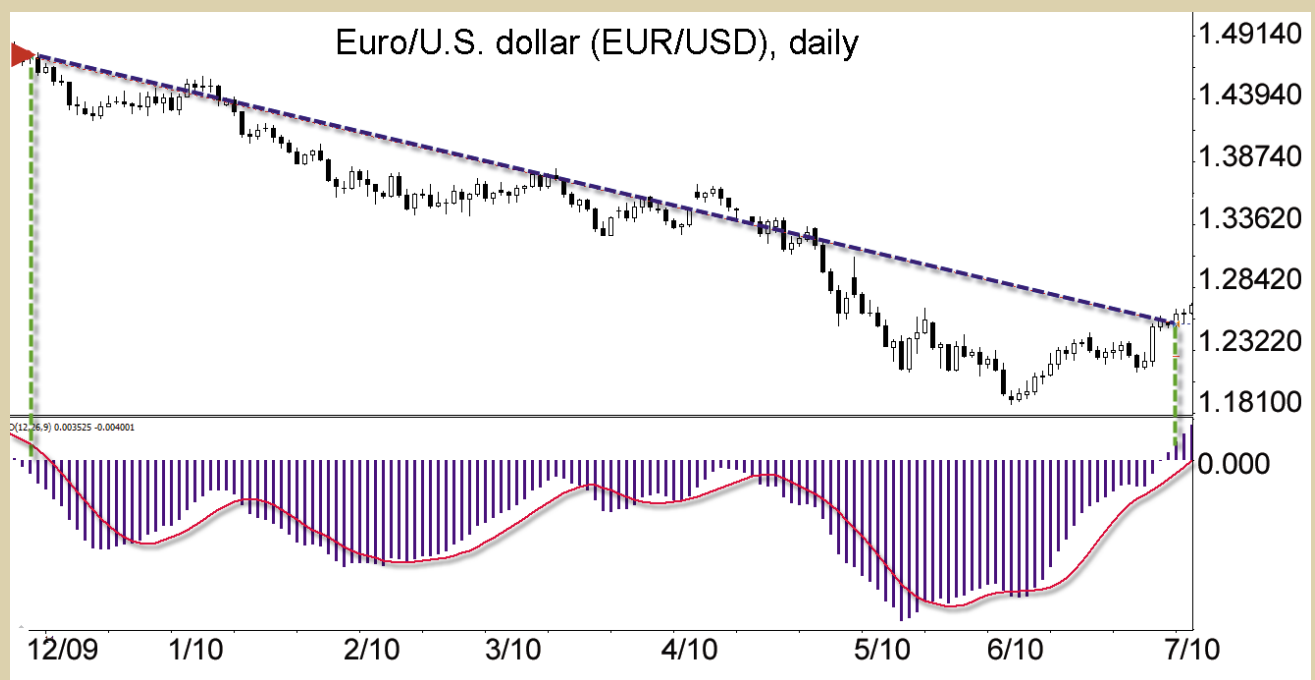
The system upward progress was modest but upward until a sharp surge in 2008.

Testing the system

The strategy was test on EUR/USD daily data from June 1, 2000 to Jan. 1, 2011, deducting trading costs of 2 pips per trade.

The test results indicate the initial edge-ratio analysis correctly identified an approach that was able to adequately predict medium-term trends in the EUR/USD beyond random chance. Figures 2 shows and Figures 3 show that, despite the its simplicity, the strategy produced positive returns in all years except 2006, which posted a 5-percent loss. The net profit over the test period was 101 percent, or 6.72 percent annually. The maxi-

FIGURE 1: SAMPLE TRADE



The system captured an extended downtrend in 2010 by entering short when the MACD histogram dropped below its zero line.

mum drawdown was very modest at 10.14 percent. The other performance statistics in Table 2 reflect what we would expect from an intermediate- to longer-trend-following strategy: a low winning percentage (35 percent) compensated by a very high reward-to-risk ratio, and a low number of trades.

Edge ratio analysis and simplicity

An important factor to consider is the system development process and a strategy's end characteristics. The fact that this strategy's parameters are unoptimized and no profit-taking rule is used — which “let profits run” — increases the odds it is robust, even though it has been applied to only the currency pair for which the Edge-ratio analysis showed the best potential.

Keeping things simple, avoiding curve-fitting, and properly interpreting edge-ratio analysis will allow you to design systems with the potential to be successful over time, and on a portfolio basis. ☒

For information on the author, see p. 4.

TABLE 2: PERFORMANCE STATISTICS

Avg. compound annual profit	6.72%
Net profit	101%
Maximum drawdown	10.14%
No. trades	79
Winning percentage	35%
Reward:risk ratio	3.53
Ulcer Index	4.39

The system posted solid trend-following results using simple, unoptimized rules.

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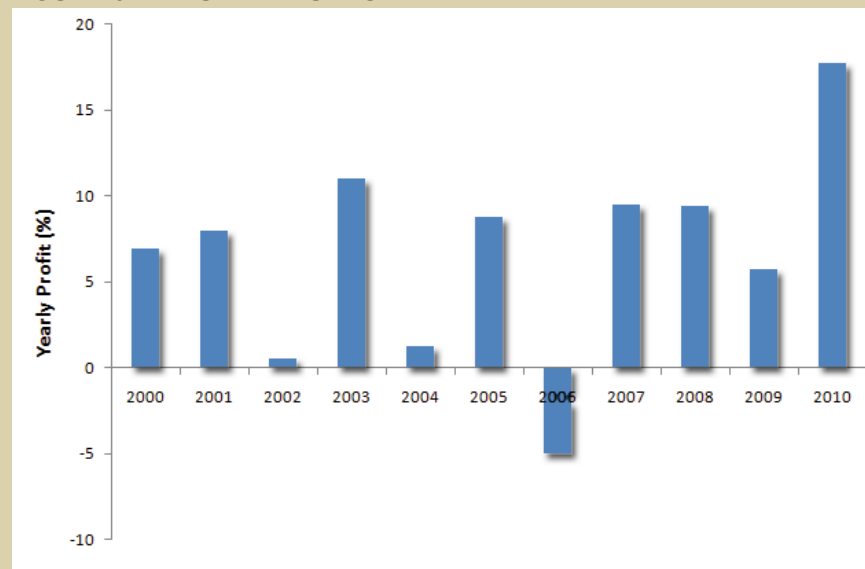
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FIGURE 3: ANNUAL RETURNS



The system was profitable in all years but one.