How to Beat FOREX Brokers and Earn Money?

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What is FOREX?

FOREX stands for Foreign Exchange Market, the global market where currencies are bought and sold. Ordinary people like us can make trades through accounts on FOREX brokers. Everytime you buy a currency, your broker sells you the currency, and when you sell, your broker buys. Thus, you don't have to worry about if you can find someone to sell your currency like living a jungle (transaction time is almost zero, thanks to the 21st century). In other words, when you lose money, your broker earns, and when you earn, your broker loses. To earn money, you have to buy a currency when it is cheap and sell it when it is expensive. Since most of traders don't have technical skills and make decisions based on their emotion, they lose money, which contributes to the survival of many FOREX brokers.

How to Beat Brokers?

If you don't have a good trading system or don't know the logic of using trading systems, trading on FOREX is the same as going to a CASINO to earn cash. You may earn some cash by luck, but eventually you will lose because the odds of casino games are against you. However, if you have valid trading systems, you can be a **CASINO** and can make your broker play your game. You may lose some money, but you will eventually earn because your trading system makes the odds of trading in favor of you. With a trading system, you don't have to predict future price, which is what amatuers try to do and fail.

Therefore, the goal of this research is to show:

- How to construct a valid trading system
- How to trade with a valid trading system

Data

I have the time series data of daily EURUSD prices (open, high, low, close). I am going to split the data into the training data and the test data set with the 70:30 ratio. The whole range of data is from 1989-06-22 to 2016-01-15, and test data starts on 2008-08-19 (5173 and 2218 observations for the training and the test data sets, respectively).

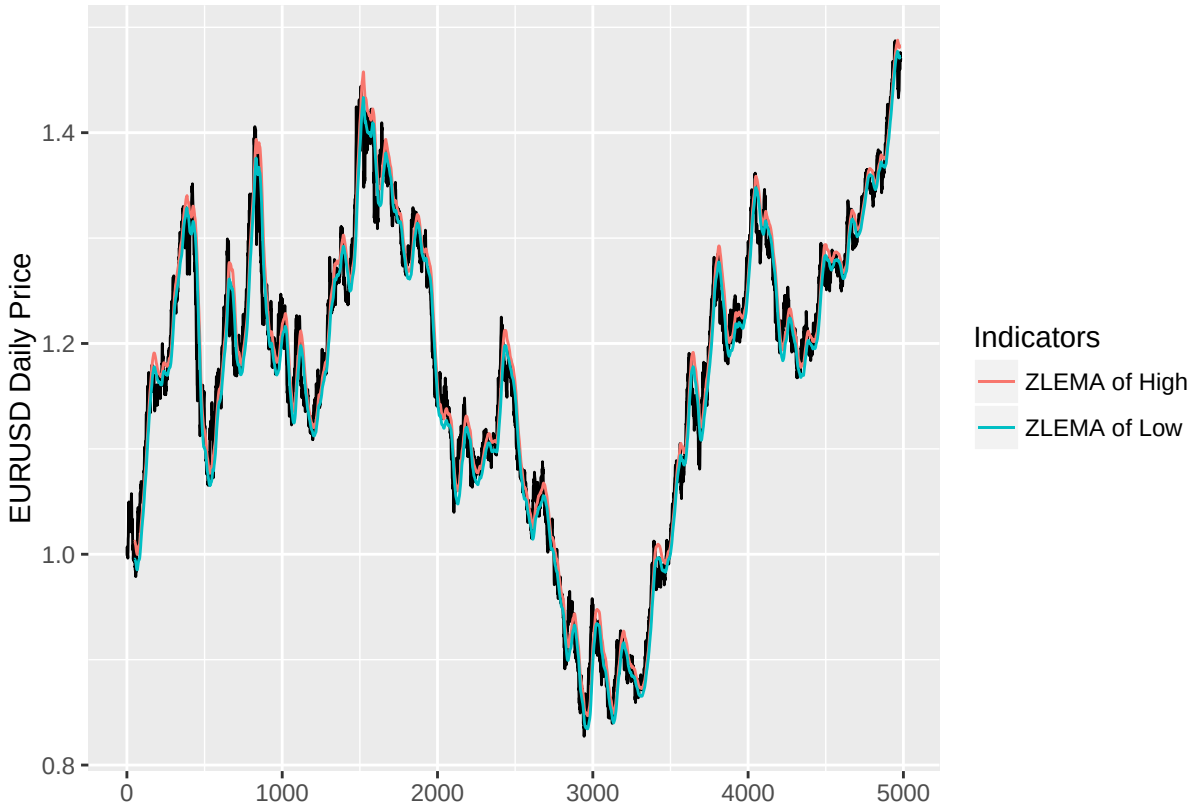
How to Construct a Trading System?

A trading system is a set of rules that indicates when to buy or sell a currency and when to close your transactions. Trading systems usually involve financial indicators because of its convenience to construct from time series data. In this research, I will use only one indicator called **"Zero Lag Exponential Moving Average"**, which has one parameter **Period**. The following is the code for ZLEMA in R :

```
zlema <- function(x, period) {
  k <- 2 / (period + 1)
  n <- length(x)
  y <- floor((period - 1) / 2)
```

```
  urdun = 0
  urdun[ y ] <- x[ y ]
  for (i in (y + 1):n) {
  urdun[i] <- k * (2 * x[i] - x[i - y]) + (1 - k) * urdun[i - 1]
  }
  urdun[1:y-1] <- NA
  return(urdun)
}
```

For example, zlema for high and low prices with the period 100 looks like this:



The name of the trading system is "**High Low ZLEMA**." Its rules are:

- Buy if price is closed "above" the zlema of the price "High" and close the transaction when the price is closed "below" the zlema of the price "Low."
- Sell if price is closed "below" the zlema of the price "Low" and close the transaction when the price is closed "above" the zlema of the price "High."

The following is the code for High.Low.ZLEMA ("period" is a parameter a user has to supply) in R:

```
system_zlema <- function(period, test_high, test_low, test_closed) {

    mah <- zlema(test_high, period)
    mal <- zlema(test_low, period)
    n <- length(test_closed)
    k <- 0
    closed_profit <- rep(0, n)

    for (i in period:n - 1) {
        if (i >= k & test_closed[i] > mah[i]) {
```

```
            k <- i
            while (test_closed[k] > mal[k]) {
                if (k == n) {
                  break
                }
                k <- k + 1
            }
            closed_profit[i] <- test_closed[k] - test_closed[i]
        } else if (i >= k & test_closed[i] < mal[i]) {
            k <- i
            while (test_closed[k] < mah[k]) {
                if (k == n) {
                  break
                }
                k <- k + 1
            }
            closed_profit[i] <- test_closed[i] - test_closed[k]
        }
    }
    closed_profit <- closed_profit[which(closed_profit != 0)]
    number_of_trade <- length(closed_profit)
    system_profit <- sum(closed_profit)
    ave_profit_per_trade <- system_profit/number_of_trade

    result <- list(closed_profit, number_of_trade, system_profit, ave_profit_per_trade)
    names(result) <- c("closed_profit", "number_of_trade", "system_profit",
        "ave_profit_per_trade")
    return(result)
}
```

The output of the function above contains total profit of the system, total trade numbers, and average profit per trade for the user supplied parameter "period."

Optimizing a Trading System

For my High.Low.ZLEMA trading system, I will earn different profits for different values for the parameter "period." So, the big question is which "value for the parameter" is most profitable for my trading system. Answer is simple; plug all the possible values in "period," and keep track of the resulting system profits to find the best.

In terms of coding in R, it will add one extra loop to the code of High.Low.ZLEMA. Since the code is trivial, I will not include. For the period 1 to 400 (400 is enough):

```
qplot(x = 1:400, y = training_result$total_system_profit, geom = "area", fill = "Training Data") +
    xlab("Parameter Period 1 to 400") + scale_fill_discrete(name = "System Profit") +
    ylab("Pips")
```

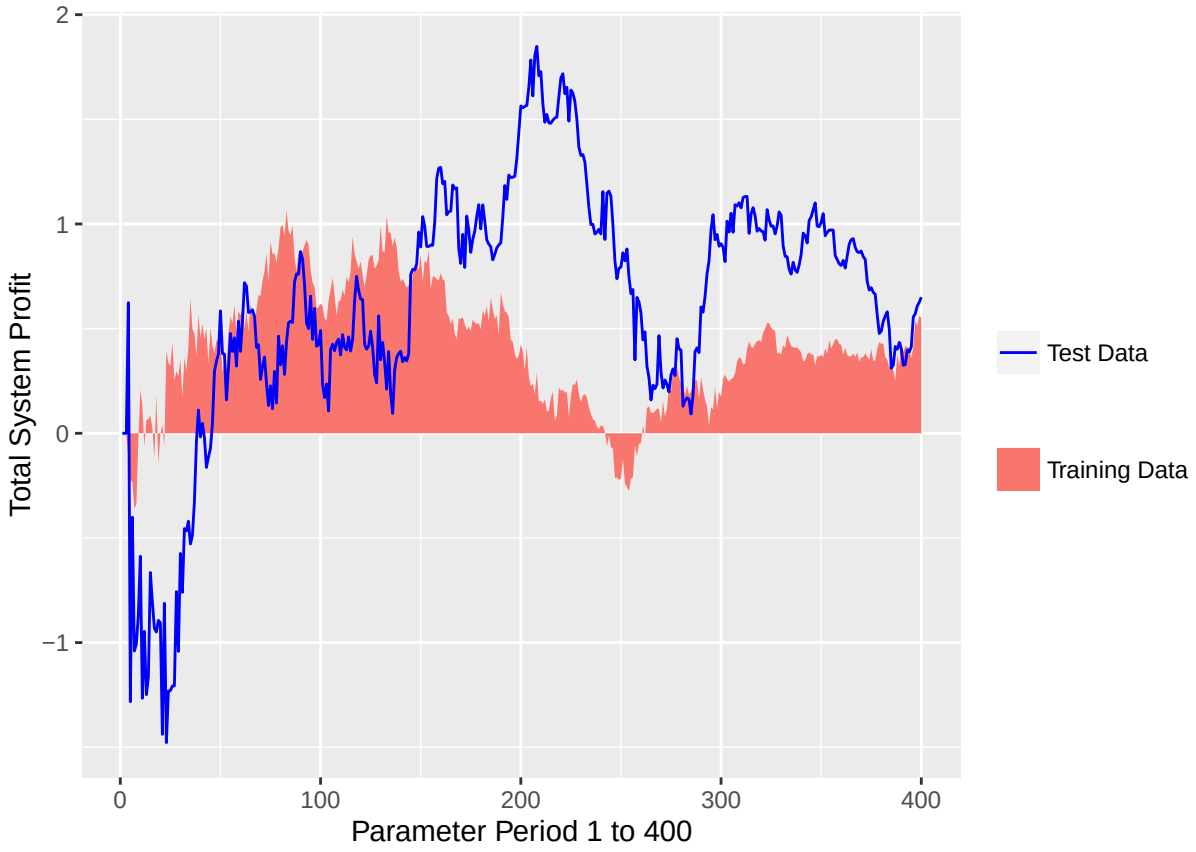
It shows that High.Low.ZLEMA(period = 83) is most profitable on the training, giving 1.0655 = 10655 pips (I will explain pips later). Am I ready to trade since I have the most profitable trading system? Not yet, I have to be sure that my trading system has the prediction power. Let's run the system for the test data.

```
test_result_83 <- system_zlema(period = 83, test_high = test_eurusd$high, test_low = test_eurusd$low,
    test_closed = test_eurusd$closed)
test_result_83$system_profit * 4983/2136
```

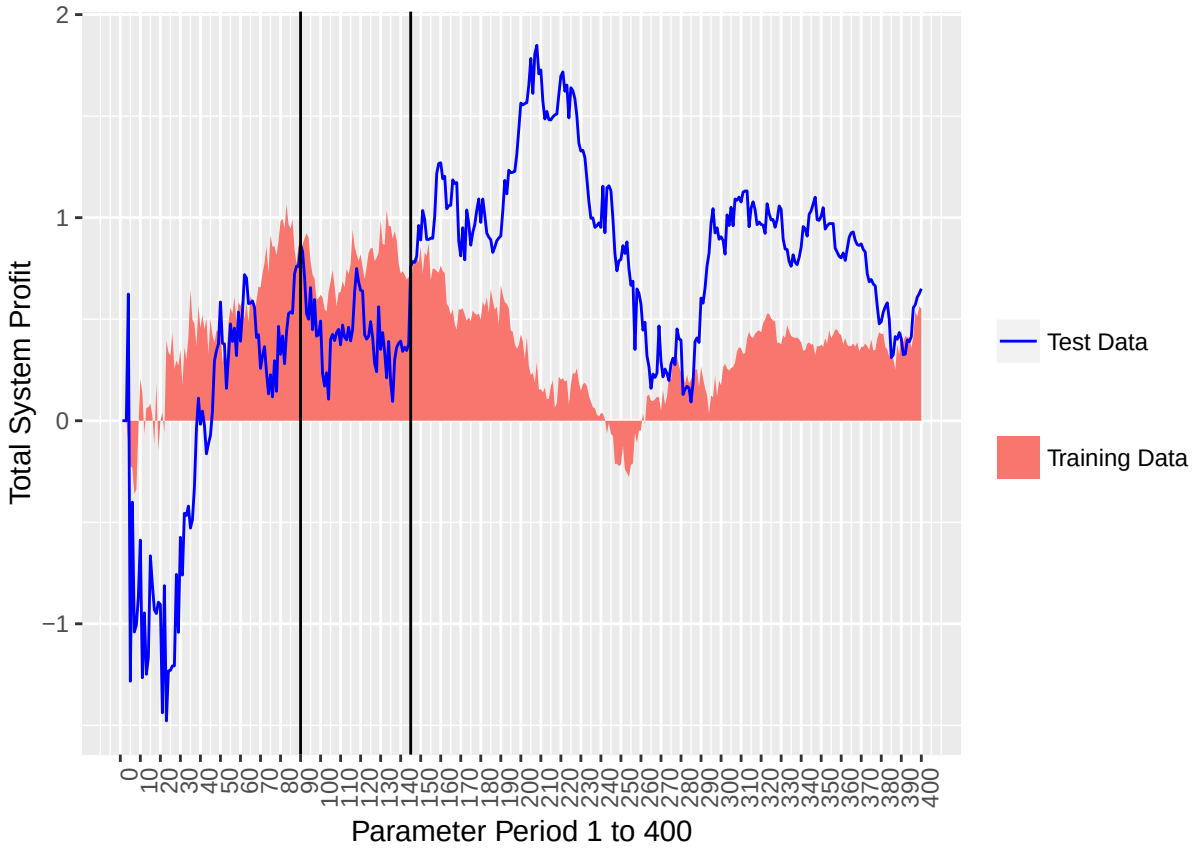
```
## [1] 0.4362924
```

Surprise, High.Low.ZLEMA(period = 83) results in 4363 pips (not that high) on the test data. Unfortunately, our best system doesn't have prediction power. So, we have to check the next best systems. Notice how I multipled the system profit on the test data by (4983 / 2136). Because the training and test data have different sizes, I have to adjust sample profits to compare expected profits on the same time span.

```
qplot(x = 1:400, y = training_result$total_system_profit, geom = "area", fill = "Training Data",
    ylab = "Total System Profit") + geom_line(aes(x = 1:400, y = 4983/2136 *
    test_result$total_system_profit, color = "Test Data")) + scale_color_manual(name = "",
    values = "blue") + xlab("Parameter Period 1 to 400") + scale_fill_discrete(name = "")
```



I have to look for period values that will give the same system profits for both the training data and test data. That will imply that infact our system works and gives us the consistent profit over time. The periods where the system profit on training data can be slightly above the system profit on test data; the difference might be due to a chance or a small test data size (in comparision to training data).



Thus, candidate values for the optimal parameter of the best system are "90", and "145."

```
## [1] 0.7882 0.6653
```

If the profit of the system on test data is greater than the profit on training data, it is suspicious because it might be due to just a chance. Over time, the profit might converge to the profit on the training data by decreasing. That is why I wrote profits of systems on training data can be a little bit above profits on test data.

So, I conclude that the optimal trading system is High.Low.ZLEMA with period `90`. Now, I am ready to trade.

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
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```

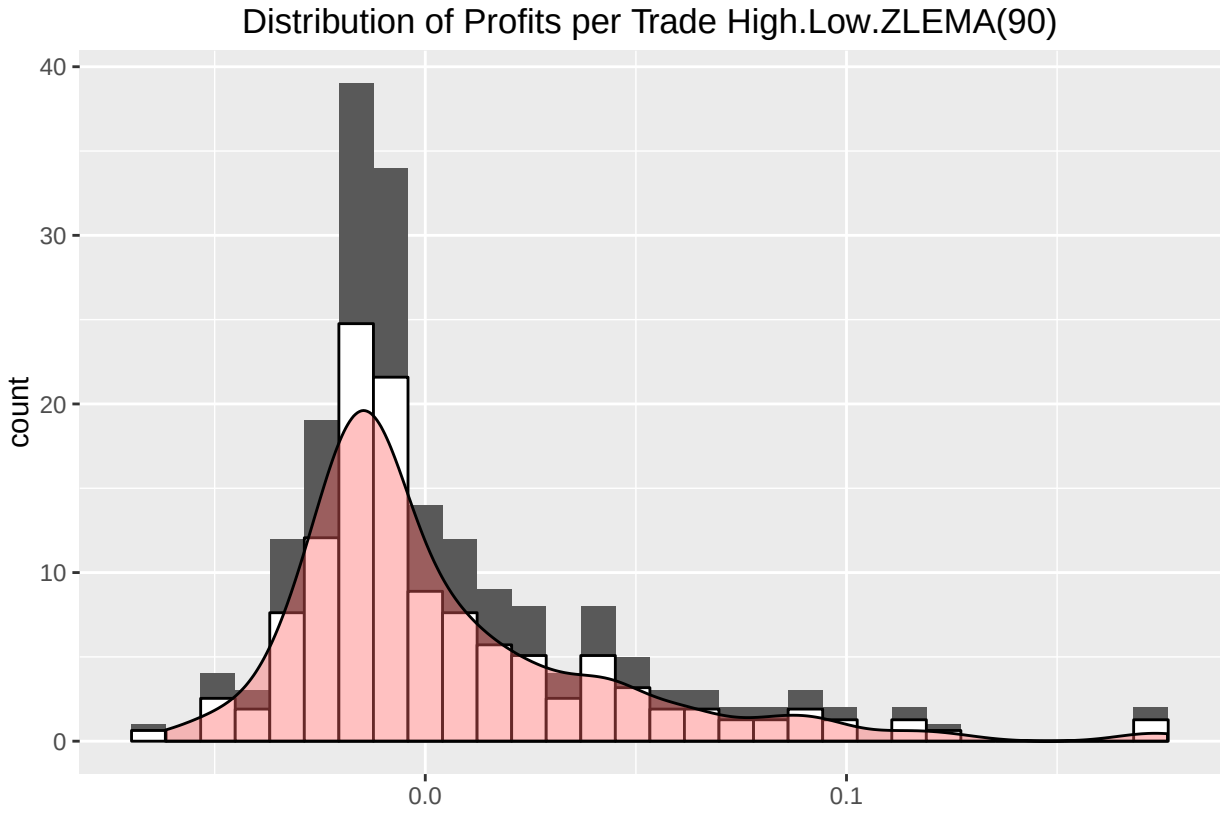


```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## -0.061700 -0.018200 -0.009200  0.004105  0.017430  0.176200
```

For each trade, the expected profit is 0.0041 * 10000 = 41 pips, and the standard deviation is 383.6251407 pips. Pips basically means that you will earn 1 dollar for each pips if you have an account with 1:50 leverage. With High.Low.ZLEMA(90), we could have earned 3721.2 dollars if we started investing on 2008-08-19 (Test Data Started There).

How to Trade?

One sentence. Stick to the rules and be consistent. Have you ever seen CASINO dealers at the table breaking their job rules?

How to Earn More Money?

You have endless opportunities; add more indicators to improve trading systems, include crossing of indicators, divise your own unique indicators that no one uses, tweak the rules, and test it. However, the practice of traders has already proved has the complexity of a trading system doesn't have positive relation with profit. Instead, try to find effective indicators.

Also, note that EURUSD is a very risky pair (price fluctation is high, and stantard deviation was 446 pips in our system). If you are risk-unfovourite, consider other stable pairs. One famous pawn shop owner said, "Close the deal to earn." This word is statistically meaningful. For example, in our case, what if the price never closes below or above the moving average? (We will never make a trade, no earning, no losing). For that reason, shorter time frames like 1 Hour or 30 min are useful for trading systems based on statistical analysis (remember the Law of Large Numbers).

My other fovorite indicators are “Tilson Moving Average,” “Jurik Moving Average,” and “Linear Weighted Moving Average.”

I have been trading on FOREX (foreign exchange market) independently for 4 years and would like to share my experience. Believe me, the first year was excruciating (no discipline, no patience, no consistency, yes emotion, yes anger, yes fighting against market…). However, I learned from my mistakes, learned to be consistent, and witnessed how Law of Large Numbers took effect when making decisions consistently (Thank God, I study Statistics).