

I. INTRODUCTION AND LITERATURE REVIEW

Trading rules based on technical analysis is well-known among investors. This method is originated from Dow Theory by Charles Dow, an American journalist and founder of The Wall Street Journal. It is claimed the ability to forecast the future securities price movement by examining past price and volume. It can also indicate market condition such as uptrend, downtrend, and sideways. Easy to understand is one of its advantages compared to fundamental analysis which requires several fields such as economics, and accounting. Moreover, it can apply with different kinds of product such as stock, foreign exchange, commodity and futures. Various researches study the beneficial of technical analysis. Brock, Lakonishok, and LeBaron, (1992) test two simple trading rules, moving average and trading range break, with Dow Jones Industrial Average Index from 1897 to 1986. The result suggests that the rules can produce positive excess returns over 4 strategies, random walk, AR(1), GARCH-M and Exponential GARCH without transaction cost. Although, ex post selection problem can happen from such researches. Because of their methodology, they may select the appropriate trading rules after they have seen the historical securities price and yield biased positive excess returns. This problem called data snooping problem (Allen, and Karjalainen, 1999). Moreover, the rules broadly used by technical trader are considered to be one type of data snooping problem as well. They are broadly used since they can make profits with the previous data (Ready, 1998).

Genetic programming (GP), created by John Koza, is recently introduced as a new method to optimize trading rules and mitigate data snooping problem. This method can avoid data snooping problem because the rules are chosen by genetic programming before testing periods. GP is evolutionary algorithm motivated by biological evolution. The sample techniques are crossover, mutation, reproduction, and selection. There are many researches studying trading rules with GP in the last decade. One of famous research papers studies S&P500 index from 1928 to 1995 using daily price data (Allen and Karjalainen, 1999). They investigate whether technical trading rules from genetic programming can make consistent