Chapter 1

Introduction

1.1 Rationale

Regime switching of a stock price is a sharp increase of the price from a lower price to a higher price. It can be on the opposite side which is a change form a higher price to a lower price. It indicates time periods that an investor should and should not buy stocks. At the lower regime, stock prices are still low. They move quite constantly. They are unattractive to investors although they are potential for making profit. An investor should buy the stock at this lower regime when they are sure that the stock price will increase. At the higher regime, the prices are more expensive. It may be too late to buy the stocks at this higher regime.

It is possible that regime switching may occur in stock prices. Sudtasan and Suriya (2012) found the regime switching before the year end. The reason of the rise is the so called "window dressing" which is a strategy of mutual funds to manipulate stock prices to make up their asset values.

This study will investigate the regime switching before the XD dates. The author believes that regime switching may occur at other time periods in a year apart of just before the year end. It may happen before some important days, festivals and some long weekends.

XD is an abbreviation of Excluding Dividend. A listed company in Stock Exchange of Thailand announces an XD dates to notify investors that they will not receive dividend when they purchase the securities of the company on those days. An investor who would like to receive dividend must purchase the securities before the first day of XD dates. XD dates may last for a week or more.

On the first day of XD dates, the stock price will be recalculated to adjust the dividend into its price. The new price equals to the closing price of the previous day minus dividend per share. This is to make it fair to investors who receive the dividend such that they cannot sell the securities on XD dates to make profit from the price gap. For example, if an investor buys a security before XD dates at 100 Baht with the

dividend of 10 Baht per share and if the stock price is not recalculated, then the investor would make profit of 10 Baht immediately on the first day of XD dates. With the recalculation, the stock price will decrease to 100 Baht minus 10 Baht which equals to 90 Baht. When the investor sells the securities on XD dates, he will make no profit because he will get only 90 Baht from the market plus 10 Baht from the dividend.

Before XD dates, it is possible that a stock price will increase especially the stock which pays a good dividend rate. This is because the time to receive the dividend becomes shorter and shorter for everyday before XD dates. An investor will receive the higher and higher yield if the stock price stays at the same level. For example, if a company announces to pay the dividend of 10 Baht per share and its stock price is 100 Baht on 10 days before XD dates, then an investor who buys this stock will get 10 Baht or 10 percent of the profit in 10 days. If the price is still 100 Baht on the last day before XD dates, then an investor who purchases this stock will get 10 Baht in 1 day. The yield is 10 times higher than another investor who purchased the stock 10 days ago. To avoid this problem, the dividend rate will remain at 1 percent per 1 day which leads to the stock price of 1,000 Baht. This example may be extreme but it shows how the price can increase sharply before the XD dates.

Actually, a stock price does not increase tremendously right before the XD dates. It gradually increases through the year when the expected rate of return from the dividend is higher than the rate of last year. Then the price on 10 days and 1 day before XD dates will not be so much different theoretically.

However, if some companies announce unexpected dividend rates, especially the higher rates than the expected ones, then their stock prices will shoot sharply before the XD dates. Therefore, investors who collect the stocks before the rise of their prices will make substantial profit. From observations of many stocks, this phenomenon is possible to happen. If an investor knows how many days before XD dates are on the lower regime, then he will make good profit in the speculation of the stock price by purchasing the securities on those days.

Genetic algorithm (GA) is a quantitative method to detect lower and higher regimes. It is a mathematical model that optimizes an objective function, e.g. a profit function. It indicates which day is on the lower regime by showing a signal, e.g.

number 1, and the day on the higher regime by another different signal, e.g. number 0. An investor will read the signals and buy the securities at the time indicated by number 1.

There are several reasons why this study chooses genetic algorithm over other econometric models. First, GA is a model-free method. It does not rely on the type of data distribution and the stationary of the data. Therefore, it is flexible to use for all time series. Second, GA ensures profit maximization. It is a tool for optimization. It finds a solution that maximizes the objective function. It can ensure that the regime switching is from a lower to higher regime. It avoids the solution which indicates the switching from higher to lower regime. Third, GA is good to apply to a specific part of time series. It does not need a long time series data: 30 – 50 observations are enough. Last, GA does not aim at forecasting. Rather, it emphasizes on what should be done during the whole process to ensure the highest performance or output. Therefore, it is good for indicating when the appropriate time periods to buy the stock are. The detail of the mechanism of genetic algorithm will be described in chapter 3.

This study will use genetic algorithm to detect the regime switching and identify the lower and higher regimes of 8 stock prices before XD dates in the Stock Exchange of Thailand. It will suggest buying strategies for those stocks. It will also evaluate the performance of the suggested buying strategies. The research results will empower investors to buy stocks at the right time and make them successful in speculation in the stock market.

1.2 Objectives

1.2.1 To detect whether the regime switching of stock prices before XD dates does exist.

1.2.2 To investigate when the buying time periods before XD dates that maximize profit in stock investment are.

1.2.3 To evaluate the performance of strategies suggested by genetic algorithm to buy stocks before XD dates.

1.3 Scope of the study

1.3.1 The study limits to the detection of regime switching just before XD dates.

1.3.2 By the calculation capacity of the super computer at the Center for Quantitative Analysis, Faculty of Economics, Chiang Mai University, it can extend the evaluated time period before XD dates from 30 days (Sudtasan and Suriya, 2011) to 50 days.

1.3.3 The study includes only 8 stocks. The first seven stocks are the blue chip stocks. The last stock is the rising stars in the Stock Exchange of Thailand by their business growth. The stocks are as follows:

- PTT Public Co., Ltd. (PTT)
- Advanced Info Service Public Co., Ltd. (ADVANC)
- The Siam Cement Public Co., Ltd. (SCC)
- Kasikornbank Public Co., Ltd. (KBANK)
- Charoen Pokphand Foods Public Co., Ltd. (CPF)
- CP All Public Co., Ltd. (CPALL)
- Indorama Ventures Public Co., Ltd. (IVL)
- Tanachart Capital Public Co., Ltd. (TCAP).

1.4 Definitions

Regime is a level of price. The price remains constant or changes not so much around this level.

Lower regime is a level of a stock price which lies lower than other levels. In another word, it is a level of cheaper prices.

Higher regime is a level of a stock price which lies higher than other levels. In another word, it is a level of more expensive prices.

Regime switching is the sharp change from the lower regime, i.e. lower price to the higher regime, i.e. higher price. It can be on the opposite side which is the change from the higher regime to lower regime. However, this study emphasizes on only the change from the lower to higher regime. The detection of regime switching

means the searching for the time that the sharp change takes place. Regime switching can be more than one place for a series of data.

XD dates are days on a period that investors who buy the securities will not get the dividend from the company.

Buying signal is a signal that guides investors to buy the stock. In this study, the buying signal is given by number 1. It also indicates the lower regime of the stock price.

Selling signal is a signal that guides investors not to buy the stock. In this study, the buying signal is given by number 0. It also indicates the higher regime of the stock price.

Parents are two initial sets of number used in genetic algorithm. Information from parents will create new sets of number which are called children. The amount of the informational transfer from parents to children is governed by the cross over and mutation process.

Father is a parent who contains a set of information.

Mother is also a parent who contains another set of information which is normally different from those of father.

Children are new sets of number generated by the informational transfer from parents through the cross over and mutation process.

Families are groups of parents. Parents from a family differ from those from another family by their initial pieces of information. For example, a father from family A may contain number 1 in all of its information while a father from family B may contain randomized numbers.

Cross over is a process of transferring information from initial sets of data which are called parents to create new sets of data which are called children. The probability of a child to be different from parents depends on the cross over ratio. Zero cross over means that the child will be perfectly the same as one of the parents. By 100 percent of the cross over, it means that the child will absolutely different from parents.

Mutation is a process that changes some information of the children. For example, it changes number from 1 to 0 or from 0 to 1. The amount of mutated information depends on the mutation rate.

Soft computing is a group of mathematical methods that are not limited to assumptions of data. Most of the methods imitate biological process, e.g. natural learning of human being or rule of natural selection. Some methods can learn from its environment and adjust itself to the environment which is called self-supervised.

1.5 Benefits of the study

1.5.1 Practically, the research results will propose investors in the Stock Exchange of Thailand to buy some certain stocks at their lower regimes before XD dates in order to make good profit for the investment.

1.5.2 Academically, the study will encourage further studies on regime switching of stock prices or other time series at other points in a year, e.g. festivals and long weekends.