

The impact of price level on CPALL common stock price.



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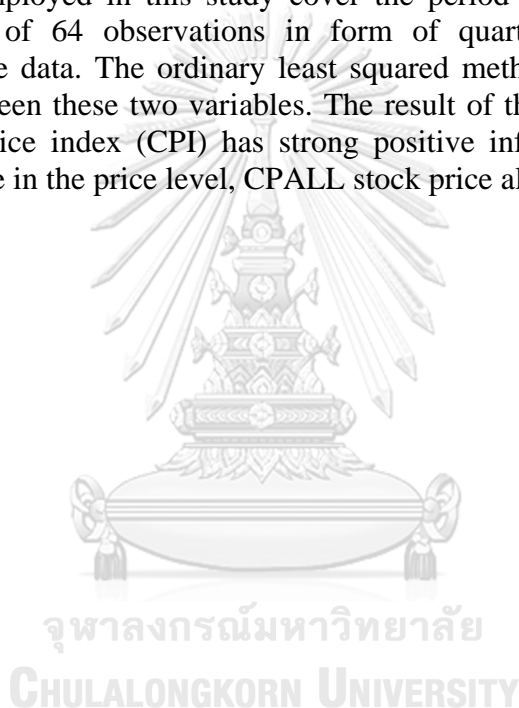
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Stock market is an essential sector of the economy of any country. It performs as a leading indicator that represents the whole economic movement. It is also served as the indicator of financial performance of company. The stock price of CPALL is one of commerce stock that investor very interested in, with high growth potential and continuous profit growth. This research represented an explores the importance of Consumer price index (CPI) that influence the CPALL stock price. The data that employed in this study cover the period from 2004 to 2019. The sample consists of 64 observations in form of quarterly data based on the availability of the data. The ordinary least squared method is adopted to test the relationship between these two variables. The result of this research indicates that the Consumer price index (CPI) has strong positive influence on CPALL stock price. An increase in the price level, CPALL stock price also go up.



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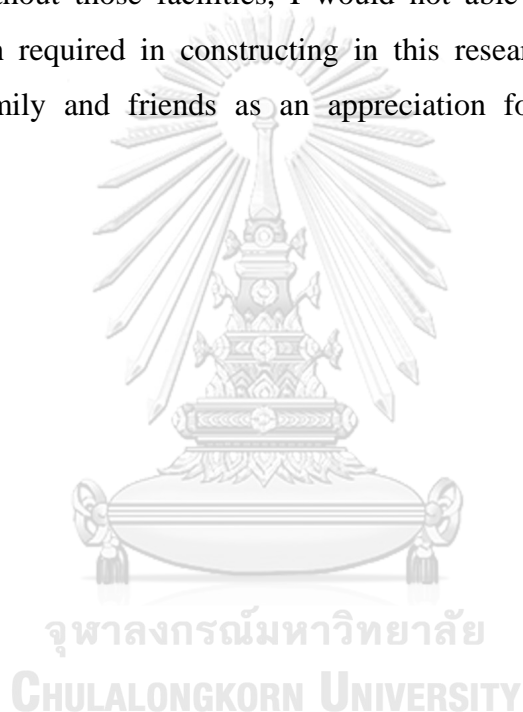


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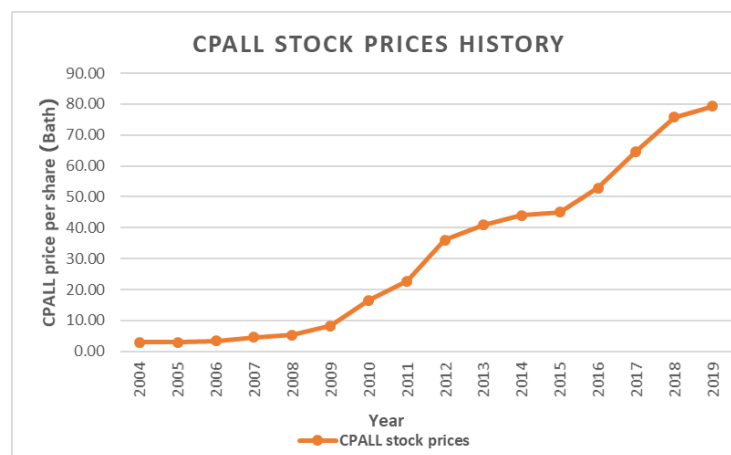


Chapter 1

Introduction

Stock market is an essential sector of the economy of any country. It performs as a leading indicator that represents the whole economic movement. It is also important for a company. A company stock price involves investor recognition of its capability to earn and grow profits in the future because their wealth is directly dependent on the worth of the stock prices. Hence, the stock price is generally served as a signal of the financial health of a company (Enow & Brijlal, 2016) High stock value is a good indicator that the company is doing well which is to encourage investors to buy shares in the company because investors feel more confident about the company's future.

CP ALL Public Company Limited operates the convenience store business with the most market shares in the retail business of convenience stores in Thailand. The company listed in The Stock Exchange of Thailand (SET) in the commerce sector and symbol of the company's stock trading is "CPALL". The company has various characteristics in which investors are interested. It has a strong point from over 10,000 branches of 7-eleven as of 2019 with high growth revenue. The company's stock can be a profitable investment option, resulting in a continuing increase in the stock price of the company. As shown in figure 1, CPALL stock price history has increased steadily from 2004 to 2019. It has shown an ability for sustained growth of company.



Source: CPALL stock price data collected from Yahoo finance
Figure 1: CPALL stock price history from 2004 to 2019

Aside from the company's stock price, CPALL market capitalization is ranked number one in the commerce sector and seems to be steadily increasing that indicates the size and high value of the company. Consequently, CPALL is the most popular stock that investors are very interested in, with high growth potential and continuous profit growth.

However, there might be some factors that may cause fluctuation in company stock prices. It can happen by factors causing an up or down in the demand and supply of company stock prices that affect its performance (Arshad et al., 2015). Price level might be a crucial impact on the movement of CPALL stock. When the price level of goods and services changes, people will adjust their spending which affects the sales of the company. Thus, it will be affected to company profitability because the majority of the CPALL's revenue is derived from convenience stores (7-Eleven) that distribution of daily-life consumer products which are based on the market price. The most commonly used to measure a change in price level is Consumer price index or CPI, as a proxy for the rate of inflation. It is one of the crucial factors to criticize the company stock price and the main concern for investors. Still, the correlation of Consumer price index (CPI) and stock prices is presented in several pieces of research. No agreement on the influence of the Consumer price index (CPI) on stock return has been made to be positive or negative.

The objective of this research is to explore the consequence of the Consumer price index (CPI) that influences stock prices of CPALL. According to theory and the previous empirical, the hypothesis of this research is to see a significant relationship between CPALL stock price and Consumer price index (CPI) is negative. To test hypotheses, this research uses CPALL's trading price in The Stock Exchange of Thailand (SET) and Consumer price index (CPI) in Thailand from 2004 to 2019 on a quarterly basis. Other variables namely Gross domestic product (GDP), Interest rate, SET50 index, Exchange rate, and Dividend within the same period are also be considered. The ordinary least square estimation (OLS) model is performed to analyze hypotheses.

The result from this research is an alternative to investors from the economic situation that has fluctuations in stock prices and to enable investors to make informed about important factors and this will give them the advantage to make investment decisions.

This research is constructed as follows. Literature reviews in the next chapter. Chapter 3 introduces the theoretical model. Data and research methodology used for this research are present in chapter 4. Empirical results are present in Chapter 5 and Chapter 6 provides conclusions and implications.



Chapter 2

Literature reviews

This chapter contributes a presenting of literatures relating to the relationship between stock price and Consumer price index (CPI) which divided into 2 parts. The first part is to review empirical evidence. The second part is introduced a theoretical framework about theories and concepts that are relevant to the research problem in the next chapter.

From several previous studies on the connection between the CPI with stock price, there is a produce difference conclusion. Some studies provide evidence that the association between these two factors is positive.

Rjoub et al., (2009), examine the connection between stock returns in Turkey stock market covers the period 2001 to 2005. The companies listed in stock market were grouped into 13 portfolios rather than a single stock. Six macroeconomic variables are selected under APT model namely term structure interest rate, unanticipated inflation, risk premium, money supply and exchange rate. The ordinary least square estimation (OLS) model is performed to test the effect of those variables on the stock return and the result has shown that unanticipated inflation has the same direction with stock market return in various portfolios.

A similar study had been done by Owusu-Nantwi and Kuwornu (2011) also applied the APT model to find the impact of macroeconomic terms on stock market return in Ghana stock exchange (GSE) for the period 1992 to 2008. Those variables adopted to test in this paper are CPI, exchange rate, oil price and treasury bill rate which represent to interest rate. To test the hypotheses that the connection of those variables is negative, the ordinary least square estimation (OLS) was employed. However, the finding from this study was unexpected, it shown that the stock return goes in the same direction with the inflation rate.

This present study on CPALL stock price also adopted the idea of APT model in which the earning of an asset can be predicted by multi-macroeconomic variables using the OLS method same as the study from Rjoub et al., (2009) and Owusu-Nantwi

and Kuwornu (2011). The asset of pricing theory also provides in this study similar to their paper.

Hasan (2008) evaluates the performance of the hypothesis by Fisher that stock return should be move with inflation. This paper explores the related of inflation and movement of stock return in the United Kingdom from 1968 to 2003. The linear regression was adopted to test the direction of these two factors and the cointegration test also applied to test long-term relation. The conclusion of this study confirmed the fisher hypothesis that inflation has strongly positive on stock return in the long run relationship. However, this study on CPALL stock prices is hypothesis follow the proxy hypothesis that state the relationship of two variables is inversely by using the ordinary least square estimation (OLS) model instead of the Cointegration test.

Eita (2012) investigates the connection between stock returns and inflation in the Johannesburg Stock Exchange (JSE) for the period of 1980 to 2008. Total market index and gold index are adopted to represent the stock market returns. The result from the ordinary least square estimation (OLS) points out the positive relationship between these two variables. The causality is also tested by the Granger causality method. This study hypothesized that the two variables did not cause each other. The result reveals the gold index and inflation go in one direction while the total share index and inflation are caused by each other. However, this study on CPALL stock prices did not use the other index to represent the movement of CPALL stock price and the causality on two variables did not test.

On the contrary, some studies provide the opposite conclusion that the correlation between these two variables is negative.

The study from Singh et al., (2011) attempts to investigate the relationship between Taiwan 50 Index and inflation from the year 2003 to 2008. Other variables including employment rate, exchange rate, GDP and money supply are also examined. The 50 listed companies were grouped into stock portfolios by market capitalization rather than single stocks and the result from linear regression show an adverse connection between inflation and stock return for big and medium companies while small companies exist the positive relation. However, this present research on CPALL

stock price also focuses on SET50 index but it considered as an independent variable instead dependent variable like this paper and criticize based on the single stock rather than the stock portfolio.

According to Al-Tamimi et al., (2011), this paper employed both fundamental factors and macroeconomic factors to examine the main factors that influence the 17 companies stock prices of both banks and non-banks in the United Arab Emirates (UAE) for the period from 1990 to 2005. The factors including CPI, GDP, money supply, interest rate and earnings per share. The ordinary least square estimation (OLS) is conducted to test the states of the hypothesis that there exists an adverse relation between CPI and stock returns. The finding is proved the hypothesis that the correlation between these two variables is negative.

A similar research paper was also conducted by Al-Shubiri (2010) also adopted both internal and external factors to find the effect of those variables on stock return in the banking sector but in a different market. This paper focuses on 14 companies listed banking sector in Amman stock exchange (ASE) that were tested from 2005 to 2008. The variables used are inflation rate, lending interest rate, GDP, net asset value per share, dividend and earnings per share. The hypothesis states that there is a significant association between stock return and inflation and the outcome from ordinary least squares (OLS) was as expected that inflation has an opposite effect on Jordanian banks.

However, the study form Al-Tamimi et al., (2011) and Al-Shubiri (2010) tend to focus on the banking sector. In contrast, CPALL is listed in the commerce sector. Thus, the impact of CPI on stock in different sectors may be different. Moreover, both internal and external factors are used to analyze in their papers but in the present study only focusing on the external factor that determined CPALL stock price.

Quayes and Jamal (2008) applied the demand and supply model for equity assets to consider the effect of inflation on stock return in the United States for the period from 1950 to 2000. Also, the Feldstein model was employed to represent the after-tax real return. From the demand theory, this paper expected to see the negative relationship between two variables. The result from Two-stage-least-squares was as

expected that inflation will reduce the demand for stocks. However, an examination on CPALL stock prices did not consider the demand and supply fundamental and using the ordinary least square estimation (OLS) approach instead of Two-stage-least-squares.

Subhani et al., (2010) attempt to find the response of trading volume as the result of the level of a Consumer price index (CPI) in Pakistan stock exchange for the period from 2004 to 2009. Simple linear regression is performed to test the hypothesis that change in CPI has an impact on stock trading volume. The result of this paper supported the hypothesis that CPI has influenced the stock trading volume in the opposite direction. However, their study conducted the simple linear regression model using only one independent variable which is CPI but this study on CPALL stock prices, the other variables are also considered by using the multiple regression to find the result.

The study from Saleem et al., (2013) also explores the relationship between these two variables in the same market for the period from 1996 to 2011. However, this paper using the Cointegration test instead. Granger causality also adopted to test the causal of these two variables. The result suggests the adverse relation and there is no causal between two variables which means two variables not cause each other. However, to find the effect of CPI on CPALL stock price did not employ the cointegration test and the causality between two variables did not test in this research.

Geetha et al., (2011) investigate the significant relationship in short-run and long term between expected and unexpected inflation with return of stock in Malaysia, China and the United States for the period from 2000 to 2009. The cointegration result shown a negative long-run relationship on stock return of three countries while short run relation exists for China. However, this study did not divide the inflation in to expected and unexpected inflation.

In the case of stock market in Thailand, the study from Forson and Janrattanagul (2014) aims to analyzes the movement of a SET index as a result of macroeconomic variable for the period from 1990 to 2010. The variable includes CPI, money supply, interest rate and the industrial production index are determined the

relationship with SET index by Cointegration approach. The result of the paper has supported the hypothesis that CPI has a negative impact on stock return as expected. However, this research use SET50 index as independent variable to see whether CPALL stock price go in the same way with the whole stock market or not and use the OLS model instead of Cointegration test in order to find the outcome.

Another study by Zhang (2013) suggests different rate of inflation affects stock returns in different directions. This paper aims to test the hypothesis that CPI has an inverse effect on the stock return in United States market for a time period 1871 to 2012. S&P index in percentage change is applied as dependent variable and categorized range of inflation into deflation, moderate inflation and hyperinflation. The result from the ordinary least square estimation (OLS) model indicates the rate of inflation and low and moderate have an adverse impact on stock performance while during the hyperinflation period, stock return also increases. However, this researcher separates the effect of inflation on stock return on a different level but in this paper on CPALL stock did not divide the level of inflation and use the data of company stock index in quarter instead percentage change.

The connection between CPI and stock returns has been studied broadly in different points of view. However, no consensus is gained on the question of whether the relationship from the impact of CPI on stock prices is positive or negative in former empirical evidences.

Chapter 3

Theoretical model

This section offers the relevant theories that describe the connection between stock market returns and the price level and asset pricing theory. The theories reviewed are Consumer price index (CPI), Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT) and Discounted cash flow model (DCF).

Consumer price index (CPI)

CPI generally serves as the average price of consumption of goods or products. It is a principle to determine the change in the level price of the consumption basket of goods over a defined period. As noted by Wynne & Sigalla (1994), CPI is extensively practical to evaluate the rate of inflation by Economists and Policymakers. It can be calculated by:

$$\text{Inflation rate} = \frac{(\text{CPI}_{t+1} - \text{CPI}_t)}{\text{CPI}_t} \times 100$$

Inflation means an ongoing rise in the price level that causes a loss in purchasing power of consumers. The main causes of inflation are either demand - pull due to higher demand for goods and services or cost – push due to an increase in cost to produce goods and services. During the period of inflation, Inflation could reduce a firm real - after-tax profitability (Defina, 1991). When inflation rises, the cost of company also rises while revenue remains the same. Once investors expect the firm will be less profit in the real term than they did before, they might be reducing the volume to hold this stock. Thus, the stock price will also drop.

Moreover, if an expected investment is risky, investors asked for a higher expected return to convince them to seize the extra risk, which impulses the cost of money. Thus, the more security's risk, its lower the price and drives up the required return. Inflation surges a cost of money. For instance, an investment in one year, investor can be earned 10 percent, but inflation induces the prices to boost up by 20 percent. This means the worth of return at the end of the year less than the original

one that you invested. Certainly, if inflation is expected at 20 percent, it should have required a higher rate of return of more than 10 percent. (Brigham, Ehrhardt, Koh & Keng, 2014, p.82).

Besides, inflation is controlled by Central Bank using interest rate policy as an instrument through monetary policy. If inflation becomes too high the economy can suffer also in the financial market. As noted by Grande, Locarno & Massa (1998), a high inflation rate can affect the central bank's decision to implement high-interest rate policy. Therefore, investors seem to more deposit their savings in banks or invest in alternative assets and contractions in the quantity of investments in stock traded. Consequently, stock prices drop, it results in inflation has an inverse impact on stock return.

Moreover, there are two aspects of theories that explain how the inflation rate affect stock market returns on whether the relationship between stock market returns and inflation is positive or negative. Fisher effect by Fisher (1930) states that there is positive connection between inflation and value of stocks. Moreover, Inflation is a major concern to investors. When the inflation rate increase, investors might ask for the more required rate of return because they think the higher return to be recompensed to maintain their real returns. (Geetha et al.,2011)

Fisher hypothesized that expected rate of return of stock market reflected by nominal interest rate which comprises of two components, real interest rate and an expected inflation rate. According to this theory, the expected inflation rate is irrelevant to real interest rate. It characterized by the other variables in an economy. Therefore, this theory indicates the stock returns should move positively with expected inflation by one-to-one. Hence, the stock return can hedge against the inflation rate. However, empirical studies have often concluded that the Fisher hypothesis is not well supported by the data.

Conversely, the proxy hypothesis introduced by Fama (1981). This theory argued that stock returns are inverse correlation with inflation. The theory hypotheses state as follows: First, real economic activity and inflation have a reverse correlation which explain by money demand function. Higher growth rate of real economic

activity is correlated with lower rate of inflation. Second, the real return of stock and real economic activity is moving together. Therefore, the negative correlation between stock market returns and inflation are driven by the reverse relation between real economic activity and inflation. Proxy hypothesis has been tested in many empirical studies and mostly uses this theory to support the finding of study. According to this theory, an acceleration of the inflation rate might disturb the economic activity which affected company earnings that will cause the price of stocks to decrease.

Capital Asset Pricing Model (CAPM)

Capital Asset Pricing Model (CAPM) is a fundamental method that most widely used to forecast the return of an investment in an asset. It developed by Sharpe in 1964 and Lintner in 1965. This model applied to consider the relationship between risk and rate of return and about how to assess the risk of an instrument in the portfolio.

The relationship between risk and required rate of returns can be found as specified in the Security market line (SML) formula:

$$r_i = r_{RF} + (r_m - r_{RF})\beta_i$$

Where:

r_i	=	Required rate of return on stock i
r_{RF}	=	Risk free rate
r_m	=	Market portfolio
$r_m - r_{RF}$	=	Market risk premium
β_i	=	Beta coefficient of stock i .

According to the Security market line (SML), the coefficient of beta is amount of risk that the stock distributes to a portfolio. If beta greater than one suggests stock seems to move in the same direction as the market but it riskier than the market. It also means higher stock beta, required rate of return also higher. If a stock has a beta

equal to one, stock tends to move as market and it will be risky as market (Brigham, Ehrhardt, Koh & Keng, 2014, p.242).

Besides, this model given the risk-free rate (r_{RF}) as a measured by government is called nominal return and it consists of real risk-free rate (r^*) which is short term treasury bond and inflation premium (IP) which is expected inflation in next year. The formula can be written as:

$$r_{RF} = r^* + IP$$

The fact that risk-free rate that is based on the inflation rate is the rate that is anticipated in the future, not the rate that is in the past. Although an annual inflation rate is reported, it comes from the data in the past, it is not anticipated for the future. Therefore, the current risk-free rate would be shaped by the expected inflation rate in the future.

The nominal risk-free rate could change as a result of the change in inflation or interest rate change of government bonds. This means the risk free rate is already cover the expected inflation. Thus, as risk-free rate changes, high-risk free rate as a result of the high rate of inflation. Therefore, the required return of stock also high.

Arbitrage Pricing Theory (APT)

A possible choice to the CAPM model presented by APT model. Unlike CAPM, that explains changes of return of one stock could be described by beta only. APT model allows more than one factors to describe the link between risk and expected return by multiple factors instead of the individual market index. As noted by Kisman and Restiyanita (2015), the major implication of the theory is the expected return could be predicted by using a linear function of diverse macroeconomic factors that affect the expected return of asset.

The Formula for the APT model can be written as:

$$E(r_i) = r_f + \beta_{i1}RP_1 + \beta_{i2}RP_2 \dots \dots + \beta_{in}RP_n$$

Where:

$E(r_i)$	=	Asset expected return
r_f	=	Risk-free rate
β_{in}	=	Sensitivity of the asset to factor
RP_n	=	Risk premium.

The factors in APT can be adapted to changes that influence stock price because every stock can have specific effects that affect the return rate, where the coefficient of beta indicates the responsiveness to change in each factor. APT assumptions do not specific factor to be included in model. However, the study from Chen et al., (1986) suggest the necessary factor that needs to be considered should have effect on real value of cash flow and discount rate. According to their study, four factors that effected the future cash flow include unanticipated inflation, risk premiums, term structure of interest rates and industrial growth production. The suggest of this paper shown the positive sign of risk premium and industrial growth production while term structure of interest rates and change in inflation is inversely related to asset return.

Discounted cash flow model (DCF)

DCF model is most commonly used to evaluate the value of common stocks. The analysis of this model uses future expected free cash flow (FCF) to predict the value of stock. FCF is the cash flow accessible for delivery to investors. Therefore, the company's value to its investors depends on its expected future FCF which discounted to the present value. (Brigham, Ehrhardt, Koh & Keng, 2014, p.68). Weighted average cost of capital (WACC) it usually uses as the discount rate when evaluating the company's value at the present value.

Below is the equation for the DCF model:

$$DCF = \frac{FCF_1}{1+r} + \frac{FCF_2}{(1+r)^2} + \dots + \frac{FCF_n}{(1+r)^n} + \frac{FCF_\infty}{(1+r)^\infty}$$

Where:

DCF	=	Sum of all future discounted cash flows
FCF_n	=	Total cash flow for given n period
r	=	Discount rate (WACC)

FCF is different between net operation profit after taxes and operating capital investment. WACC is average rate of return required by investors by weighted average of the cost of equity and the cost of debt. Moreover, the expected cash flow it provides to its stockholders can be based on expected future dividend. In many cases, investors expect dividends to grow at constant rate. (Brigham, Ehrhardt, Koh & Keng, 2014, p.264). It can be written as follows:

$$\begin{aligned}\widehat{P}_0 &= \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \dots + \frac{D_0(1+g)^\infty}{(1+r_s)^\infty} \\ &= \frac{D_1}{r_s - g}\end{aligned}$$

Where:

\widehat{P}_0	=	Price of stock
D_1	=	Dividend paid at the end of the year 1
g	=	Expected growth rate in dividend
r_s	=	Required rate of return

The factors are required for the DCF analysis including stock price, dividend, and dividend growth rate. The expected growth can be obtained from various types of growth rate but the most common used one is GDP. If investors expect the growth of company to continue, they might be performed as an evaluate of expected future growth rate. (Brigham, Ehrhardt, Koh & Keng, 2014, p.338)

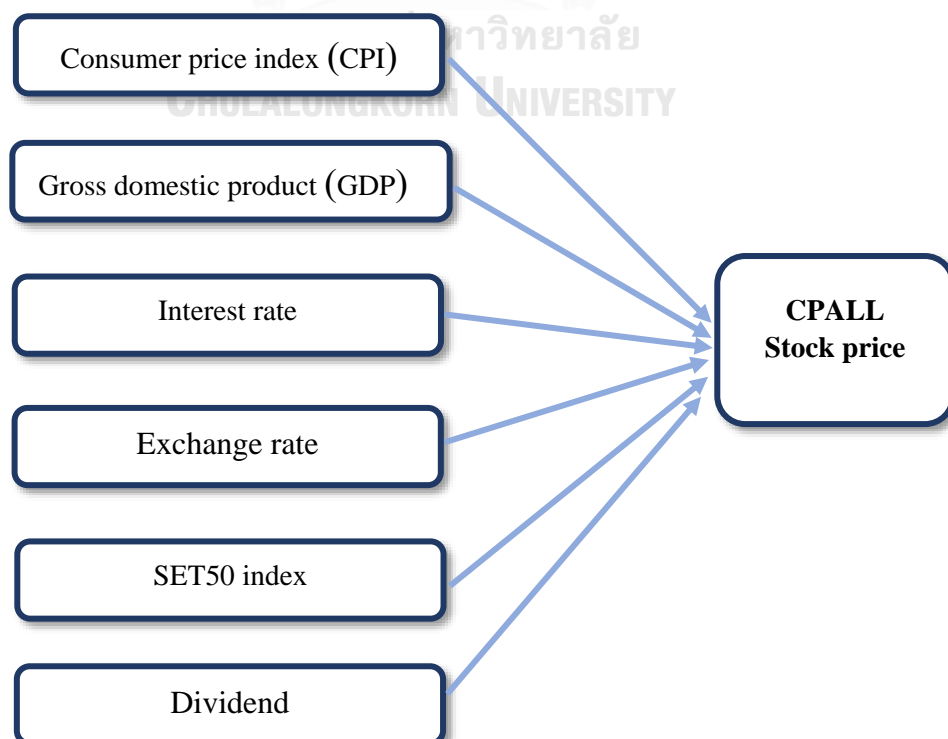
Chapter 4

Empirical model

According to theory, it suggests the relevant variables that affect on the return of stock. Hence, some variables from theory will be applied in this research which are Consumer price index (CPI) as a proxy for inflation, Gross domestic product (GDP), three-months treasury bill is considered as the interest rate and net profit which considered as Dividend. However, there are some factor that not employed in this research which are industry production growth because of the limitation in available data. Risk premium is additional that investors require for taking risk, it depends on the degree of risk aversion of investor and can be considered in different point of views. Hence, this variable is not adopted to tested.

Besides, Exchange rate and SET50 index are also considered in this research. Since CPALL has foreign exchange risk from a business operation which is purchase and sale of goods in foreign currencies and its shares have long been popular among both local and foreign investors. Hence, it considered as risk factor to investors. SET50 index refers to the benchmark of stock performance. Thus, it used to see whether the volatility of CPALL stock follows the market direction or not.

Conceptual framework



The conceptual framework above is constructed to understand the impact of CPI, it considered as inflation on CPALL stock price. In economic theory, the relationship between the inflation rate and the value of stock exists. Stock price has tended to fall when the level of inflation has increased, and vice versa (Defina,1991). However, other factors may influence stock prices including, GDP, Interest rate, Exchange rate, SET50 index and Dividend.

Data descriptive

The following is an explanation of the variables used to analyze this research. CPI is usually used to assess the variation in the price level of the weighted average prices of the consumption basket of goods and services. This index can be calculated by the aggregate price change of each piece in the basket of goods and average them. Also, it is considered an indicator of inflation and one of the most important economic indicators. (Shapiro and Wilcox, 1996). Consequently, the CPI affects stock market trading. If the consumer cuts down their spending due to high basic expenses, the earnings for the company might be lower which also means lower prices for their stocks.

GDP is an assessment of aggregate output by domestically located factors of production during a given period, regardless of nationality. GDP is a primary indicator of an economy's overall health. As noted by Barra (2010), investor's expectation of growth or decline in economic could affect the movement of the stock return. If the economy doing well, the stock performance will reflect a positive movement in the GDP. It's also good for the company because investors gain confidence in companies. Thus, they put more on their investing.

In financial markets, investors would consider how to allocate their money in various investment options. It may be thought of as the interest rate on short-term government securities which considered as risk-free instrument. Thus, the three-month treasury bill is adopted as a measure for interest rate. If interest rate increase, an investor will shift their money into government securities to get a higher return. In effect, a decrease in demand for trade volume in the stock market results in a decrease in the stock price of company.

Exchange rate is one important factor that investors should consider before investing in stocks. As noted by Tsai (2012), if the country's currency depreciated or appreciate, the investment strategy is different. If the country's currency depreciated, foreign investors outflows from the stock market. As a result, the price of stock tends to fall. Conversely, if the currency strengthens, foreign investors will flow into stock market to invest because they will gain profit from the country's currency appreciate causing the price of stock will rise. Hence, a rise in exchange rate means the value of this currency depreciates causing the stock price will fall. Therefore, stock prices and exchange rates should be adverse correlated.

SET50 Index is stock index that tracks the stocks of 50 large market capitalization companies on SET. In an investor's aspect, it has always been ambitious to forecast the exact daily stock price of company. SET50 is the benchmark of measurement of stock market performance and always being served as the indicator of the economy performance. Its performance can influence an investor's decision to buy or sell securities. If the overview of the SET50 index movement goes up and investors are confident in investing choices, it may contribute to a surge in stock price of company.

The company's stock is determined by a discount of expected return. These returns could be considered in the form of earnings or dividends of company (Friend and Puckett, 1964). A dividend is a distribution of profits after-tax by a company to its shareholders. Thus, the movement of stock has corresponded to a change in earnings or dividend. Generally, dividend forces the share price in a positive direction. When the net profit of company increase, investors might expect a high ability to pay dividend of company causing the higher value of stock prices.

Empirical approach

The ordinary least square estimation (OLS) model is performed to investigate the influence of factors on CPALL stock price. In order to test hypotheses, a multiple regression model is specified as:

$$Price_{cpall} = \beta_0 + \beta_1 CPI + \beta_2 GDP + \beta_3 IR + \beta_4 EXR + \beta_5 SET + \beta_6 DIV + \varepsilon$$

Where:

$Price_{cpall}$	=	Stock price of CPALL
β_0	=	Constant
$\beta_{0,1,2,\dots,5}$	=	Coefficients of predictors
CPI	=	Consumer price index (CPI)
GDP	=	Gross Domestic Product (GDP)
IR	=	Interest rate
EXR	=	Exchange rate
SET	=	SET50 index
DIV	=	Dividend

As mentioned in previous section, for brief summary, CPI represents change in price level. When the price level for goods and services keeps increasing, this situation usually defined as inflation that means the loss of purchasing power and also the drop-in value of money. Previous empirical studies and the theory suggest a negative effect of CPI on stock prices. Accordingly, it expected that arises in the price level will negatively impact on stock performances. When the level of GDP is rising and expect high growth. It demonstrates that the great performance of the whole economy. Accordingly, the higher the growth rate of GDP, the better for stocks price of the company. If the interest rate of safe securities arises, investors might shift their money to invest it and contraction to trade in stock market which riskier.

Accordingly, it anticipated that a higher interest rate will drop the value of share price. Exchange rate is the meaningful factor of the foreign investor. The investment arrangement depends on what happens to exchange rate. A rise in the value of exchange rate, in turn, the fall in stock investment. Accordingly, it expected to see a diverse direction of these two. SET50 index performance is considered to be the best representation of the overall market. So, investors use the SET50 index as benchmarks to gauge the movement and performance of the market. Accordingly, it expected to see the direction of share price move with the whole market. The company's profitability is represented by net profit to the aspect of investors. The higher dividend indicates the internal strength of company. It means the capability of a company to generate a profit resulting in a higher rate of dividend. Accordingly, it expected to see dividend impact share price in a positive way.

In short, CPI, Interest rate and Exchange rate are expected to have an inverse association with CPALL stock price. A rise in these variables is likely to lead to a fall in CPALL stock price. Conversely, GDP, SET50 index and Dividend are anticipated to have a positive association with CPALL share price. Thus, an increase of these variables, CPALL stock price also rises.

Chapter 5

Data analysis

The secondary data is used to analyze this research and gathered from different sources. All the data and variables are in the form of quarterly data that cover the period starting from January 2004 to December 2019. The closing price of CPALL stock price historical data is obtained from the Yahoo Finance page in form of daily price, and then average the closing price into the quarterly respectively.

CPI data is gathered from Bureau of Trade and Economic Indices, Ministry of Commerce. This study uses the core consumer price index that excludes fresh food and energy prices with the base year 2015. GDP is gathered from the Office of The National Economic and Social Development Board. This study uses the level of GDP in chain volume measures with the year 2002 as the reference year. Interest rate data is provided from The Thai Bond Market Association (ThaiBMA). In this study, interest rate is presented by short-term government securities which are 3-months treasury bill. The data is adopted in form of daily quotation, and then average the yield into the quarterly respectively. Exchange rate is collected from the Bank of Thailand. The reference exchange rate of Thailand against U.S. Dollar is used in this study. SET50 index data is provided by The Stock Exchange of Thailand. Dividend is collected from financial statement of company. However, dividend is usually announced on yearly basis. Hence, this study used net profit is considered as dividend.

Descriptive statistics of variables

Table 1: Data Summary Statistics

	Minimum	Maximum	Mean	Standard deviation
CPALL	0.163	81.021	27.964	25.732
CPI	84.600	102.770	94.825	5.771
GDP	1.683	4.338	2.955	0.764
IR	1.045	4.934	2.237	1.034
EXR	29.804	41.335	34.006	3.161
SET	295.013	1,187.840	758.694	257.472
DIV	72.990	6,299.110	2,413.642	1,837.738

Table 1 summarize the descriptive statistic of all variables, there are 64 observations for each variable. The result shown that average of CPALL stock price is 27.96 bath with a standard deviation of 25.73 bath and has a range from 0.10 to 81.02 bath. CPI has a mean of 94.82 index and a standard deviation of 5.77 index. The value of minimum and maximum of 84.60 and 102.77 index, respectively.

Empirical results

According to the ordinary least squares estimations of the first model, the multiple regression of CPALL stock price and each of the dependent variables namely CPI, GDP, IR, EXR, SET and DIV. Table 2 presented the outcome of analysis indicate that GDP, EXR, SET and DIV are positive and significant at 1 percent significance level and 5 percent in case of GDP, but statistically insignificant in the event of CPI and IR. The percentage of the coefficient of determination (adjusted R-squared) is 97.

In the estimation in model 2, in order to assess the predictive ability of variables on CPALL stock price, the following instrument were performed. Firstly, the correlation matrix was utilized to observe multicollinearity. The results show the correlation between GDP and DIV is quite high which is greater than 0.88. It indicates these two variables are highly correlated. To evade the multicollinearity problem, these two variables were excluded from the regression model. Therefore, four variables which are CPI, IR, EXR and SET remained for examination in model 2. The result from model 2 indicates that CPI, EXR and SET are all significant at 1 percent significance level to explain the CPALL stock price. All of them have a positive relationship with CPALL stock price, while IR is negative and significant at 5 percent significance level. The percentage of the coefficient of determination (adjusted R-squared) has decreased from 97 to 93.

Secondly, the White test and Breusch-Godfrey LM test were implemented to check autocorrelation and heteroskedasticity problems in result of model 2. The result shows that both serial correlation and heteroskedasticity problems existed. The persistence of these problems might lead to the inefficiency of the estimator. Therefore, in model 3, to correct the problem, all variables are converted into a

natural logarithm form. After all variables were transformed, the heteroskedasticity problem can be mitigated. However, the autocorrelation problem still exists. Hence, the Cochrane–Orcutt is applied to solve the autocorrelation problem. The result presented in model 3 included the AR (1) term to remove the autocorrelation. In this model, the value of Durbin Watson is higher than the critical range indicate that there is no autocorrelation problem.

Table 2: Result from ordinary least square estimation (OLS) model

Variables	Model		
	OLS I	OLS II	OLS III
CPI	-0.621 (- 1.115)	2.325*** (5.432)	13.549*** (3.838)
GDP	15.753** (2.425)		
IR	-0.086 (- 0.118)	-2.270** (-2.377)	-0.2128 (-1.441)
EXR	0.742*** (2.723)	1.127*** (3.085)	0.941 (0.355)
SET	0.032*** (5.073)	0.050*** (5.772)	0.657** (2.370)
DIV	0.006*** (3.421)		
Observation	64	64	63
Adjusted R-squared	0.967	0.928	0.989

* indicates significant at 10%

** indicates significant at 5%

*** indicates significant at 1%

In test result of model 3 shown that only CPI and SET are positive significant at 1 percent and 5 percent significance level respectively. The coefficient of CPI is 13.549, which mean that for each additional 1 percent of CPI, the value of CPALL stock price increase by an average of 13.549 percent while all other independent variables are held constant. Also, the coefficient of SET is 0.657, which means that for each additional 1 percent of SET, the value of CPALL share price increase by 0.657 percent when the other variables are constant. It suggests that the movement of CPALL stock price is following the whole stock market. In contrast, the remain variables including IR and EXR are all statistically insignificant, this means those variables do not influence CPALL stock price.

Moreover, the percentage of the coefficient of determination (adjusted R-squared) in this model 3 has the highest value at 98, which is higher than the other regressions model. This suggests that the model fits the data quite well. This is mean that 98 percent of the CPALL stock price is described by the variation in four independent variables, whereas 2 percent remain unexplained. Also, the p-value is approximately 0. This confirms that the model is valid.

According to the hypotheses of this research, CPI and CPALL stock price is expected to have an inverse relationship. However, as the result of the analysis is not expected, it indicates that these two variables go in the same direction. It can be explained by the following reason. The outcome of this research illustrates that the high selling prices in fact distributed to higher profitability in companies instead of lowering the earning in the case of CPALL. However, during the high level of price, it might be some issue about the cost of production, but the company can sell the product at a high price while the cost remaining the same because the price of material can be purchased during the low- price period. Therefore, when the level of price of goods increases more than the cost, the earning of the company also increases. When investors select the company's stock to invest, they will consider on current and future profit of the company. As a consequence, investors are motivated to invest in companies with good financial performance. This will influence the increase in the value of the stock price.

Chapter 6

Conclusion and policy implication

Stock market is a prominent indicator that represented the whole economy movement. It also important for the company as well. The share price of the company is performed as the signal of financial health of company that involves investor perception. CPALL is one of the most popular commerce stocks listed in The Stock Exchange of Thailand (SET) with the high growth potential of profit. As a result, CPALL has delivered a higher return over time.

However, there might be some factor causing an up or down in CPALL stock price. The level of the price which measures by the Consumer price index (CPI) seems to be the main factor because most company's revenue received from a convenience store. Several previous empirical and theory indicated that the relationship between CPI and share price exists with many reasons as clarified in the previous chapter.

This research is carried out to study whether the CPI has an inverse effect on the value of CPALL stock price or not. Other variables are also considered. The asset pricing theory was implemented to suggest the relevant variables and predict the direction. This research using the secondary data and obtained in the form of quarterly data that cover the period starting from January 2004 to December 2019. It results in total of 64 observations.

The statistical procedures were performed to analyzed, including basic statistic and the ordinary least square (OLS). Both were implemented to determine the connection between those variables. Besides, to satisfy the required conditions of regression analysis, other techniques also employed to detect the problem including multicollinearity, heteroskedasticity and autocorrelation. The empirical findings suggest that CPI has a positive effect on the value of CPALL stock price. This means that an increase in CPI, the value of CPALL stock price also rises.

Finally, the finding in this research will give them the advantage for both company and investors in their strategy. The result suggested the importance of the CPI to determine the CPALL stock price. Therefore, an investor who is interested in stock price of CPALL can be considered this factor when making an investment decision. Also, the CPALL company should give more attention to this factor when analyzing their strategy according to the change in this factor. That is, a higher expected return of CPALL stock price is required for the higher level of CPI. It can be implied that once the company has a higher profit, it signals to investors to invest. Consequently, the values of their stock price also higher.

Lastly, recommendations for further studies are as follows, Firstly, an increase in the number of observations as much as possible will provide a clearer picture of results. Secondly, further research can be considered more on the internal factor as are believed to affect on CPALL stock price. Thirdly, the relationship between these two variables can be determined in the long-run relationship by using an alternative methodology. Fourthly, the investor's perception might be essential information. Further study might be including the response from an investor to their portfolios.

Appendix

Appendix 1: Correlation matrix

Dependent variables	Correlation coefficient					
	CPI	GDP	IR	EXR	SET	DIV
CPI	1.000	0.980	-0.425	-0.635	0.921	0.932
GDP	0.980	1.000	-0.451	-0.615	0.927	0.967
IR	-0.425	-0.451	1.000	0.110	-0.366	-0.540
EXR	-0.635	-0.615	0.110	1.000	-0.579	-0.494
SET	0.921	0.927	-0.366	-0.579	1.000	0.894
DIV	0.932	0.967	-0.540	-0.494	0.894	1.000

Appendix 2: Result from ordinary least square estimation (OLS) model 1

Model 1: OLS, using observations 2004:1-2019:4 (T = 64)

Dependent variable: CPALL

	coefficient	std. error	t-ratio	p-value
const	-22.615	42.501	-0.532	0.597
CPI	-0.621	0.556	-1.115	0.269
GDP	15.753	6.496	2.425	0.018
IR	-0.086	0.727	-0.118	0.907
EXR	0.742	0.272	2.723	0.009
SET	0.032	0.006	5.073	0.000
DIV	0.006	0.002	3.421	0.001
Mean dependent var	27.964	S.D. dependent var	25.732	
Sum squared resid	1232.916	S.E. of regression	4.651	
R-squared	0.970	Adjusted R-squared	0.967	
F(6, 57)	311.920	P-value(F)	0.000	
Log-likelihood	-185.476	Akaike criterion	384.952	
Schwarz criterion	400.065	Hannan-Quinn	390.906	
rho	0.337	Durbin-Watson	1.321	

Appendix 3: Result from ordinary least square estimation (OLS) model 2

Model 2: OLS, using observations 2004:1-2019:4 (T = 64)

Dependent variable: CPALL

	coefficient	std. error	t-ratio	p-value
const	-263.840	42.633	-6.189	0.000
CPI	2.325	0.428	5.432	0.000
IR	-2.270	0.955	-2.377	0.021
EXR	1.127	0.365	3.085	0.003
SET	0.050	0.009	5.772	0.000
Mean dependent var	27.964	S.D. dependent var	25.732	
Sum squared resid	2799.853	S.E. of regression	6.889	
R-squared	0.933	Adjusted R-squared	0.928	
F(4, 59)	205.006	P-value(F)	0.000	
Log-likelihood	-211.722	Akaike criterion	433.444	
Schwarz criterion	444.239	Hannan-Quinn	437.697	
rho	0.871	Durbin-Watson	0.299	

Appendix 4: Result from ordinary least square estimation (OLS) model 3

Model 3: Cochrane-Orcutt, using observations 2004:2-2019:4 (T = 63)

Dependent variable: l_CPALL

rho = 0.885

	coefficient	std. error	t-ratio	p-value
const	-66.243	16.051	-4.127	0.000
l_CPI	13.549	3.531	3.838	0.000
l_IR	-0.213	0.148	-1.441	0.155
l_EXR	0.941	1.010	0.932	0.355
l_SET	0.657	0.277	2.370	0.021
Statistics based on the rho-differenced data				
Sum squared resid	1.764	S.E. of regression	0.174	
R-squared	0.990	Adjusted R-squared	0.989	
F(4, 58)	9.458	P-value(F)	0.000	
rho	0.003	Durbin-Watson	1.984	
Statistics based on the original data				
Mean dependent var	2.520	S.D. dependent var	1.651	

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