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總體經濟變數對市場指數之影響－以美國、日本及中國市場為例

HOW DO MACROECONOMIC VARIABLES IMPACT ON MARKET INDEX PRICE – EVIDENCE ON USA, JAPAN AND CHINA

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How do macroeconomic variables impact on market index price - Evidence on USA, Japan and China

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準碩士推薦函

本校企業管理學系管理科學碩士班研究生 古妍娜 君在本系修業 2.5 年，已經完成本系碩士班規定之修業課程及論文研究之訓練。

1、在修業課程方面：古妍娜 君已修滿 41 學分，其中必修科目：經營專題 、管理科學 、研究方法 、決策專題 等科目，成績及格(請查閱碩士班歷年成績)。

2、在論文研究方面：古妍娜 君在學期間已完成下列論文：

(1)碩士論文：How do macroeconomic variables impact on market index price – Evidence on USA, Japan and China

(2)學術期刊：How do macroeconomic variables impact on market index price – Evidence on USA, Japan and China

本人認為 古妍娜 君已完成南華大學企業管理學系管理科學碩士班之碩士養成教育，符合訓練水準，並具備本校碩士學位考試之申請資格，特向碩士資格審查小組推薦其初稿，名稱：How do macroeconomic variables impact on market index price – Evidence on USA, Japan and China ，以參加碩士論文口試。

指導教授：[signature] 簽章

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ABSTRACT

The movements of macroeconomic variables are highly sensitive to the changes on a stock price return and to the changes in expectations about future anticipations. Accordingly, this study aims to demonstrate how some major macroeconomic variables which are viewed as the indicator can best explain the movement of stock price for stock investing profit impact on the market price return of the USA, Japan and China. The monthly data have been used for the empirical result during the period of 2005-2015. Also, their impact of the selected macroeconomic variables on the market price index that says CPI, GDP, PMI, money supply and the unemployment rate are examined by the single and multiple regression analysis in this study. We found GDP will significantly positively impact on the stock price of all sample markets. Secondly, the market price of China, that says is Shanghai stock market, is positively affected by all the selected five macroeconomic variables. Furthermore, it found that the explanatory ability of multiple regressions model is significantly better than single regression.

Keywords: Market Price Index, Macroeconomic Variables, Multiple Regressions

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CHAPTER ONE
INTRODUCTION

1.1 Background

Numerous studies have supported that the stock price is strongly impacted by economy movements. Thus, the rational investors make their investing decision in accordance with the macroeconomics variables. And, the economy movements are motivated by a lot of macroeconomic variables. Among them, several major macroeconomic variables have strongly effect on an economy movements and a stock price. In particular, the expansion and descension of the gross domestic product (GDP), purchasing manager index (PMI), consumer purchasing index (CPI), unemployment rate (U^R) and money supply (M^S) are strongly effective on the stock price were observed by numerous analyzers. For example, Tobin (1969), Modigliani (1971), Cochrane (1994), Humpe and Macmillan (2005), Duca (2007), Pagano and Pica (2010) and Abdel-Aziz (2013) all unanimously established that the GDP has strongly significant on the stock price. But Stock and Watson (2001), Liang-ping (2005), Zamil and Areiqat (2011), Usman and Alfa (2013) did not agree the results of them and they implied that the GDP is insignificant on the stock price. Our study result contradicted them and we argued that GDP is most efficient macroeconomic variable on the stock market.

Another important macroeconomic variable is PMI. It has been shown to be a leading indicator for the stock markets (Niemira and Zukowski, 1998). Based on its significance, Niemira and Zukowski rank the PMI in the second best group of economic indicators along with the CPI, the producer price index, and retail sales. The PMI also has been used to be an explaining variable for forecasting models.

Incorporating the PMI into economic models adds significantly to their explanatory power (Harris, 1991). Expect the summaries of Collins (2001) and Nitish (2014) that there are negative effect between PMI and stock price, Harris (1991), Rossiter (2010), Johnson and Watson (2011) and Wang (2012) proposed that PMI is positively correlated with the stock price.

Smirlock (1986), Schwert (1989), Boskin *et al.* (1998) and Reinsdorf and Triplett (2004) concluded that the stock price is strongly impacted by the CPI. Also, Fama and Schwert (1977), Jain (1988) and George Filis (2009) reported that there is a negative effect between the CPI and the stock price. The another conclusions which the unemployment rate is positive correlated with the stock returns were made by Blanchard (1981), Krueger (1996), Jian Hu *et al.* (2002), Taamouti and Gonzalo (2014). Jagannathan and Wang (1993), Farsio and Fazel (2013) investigated the unemployment rate has not strongly effect on the stock prices and their relationship is insignificant. Therefore, the money supply is an efficient indicator of economic activity. The money supply is widely used by economists, forecasters, and professional traders as an early indicator of cyclical change and direction for the stock market. So, Cooper (1974), Auerbach (1976), Fama (1981), Mukherjee and Naka (1995), Brahmasrene and Jiranyakul (2007) investigated that the money supply is highly correlated with the stock price. But, recording to the conclusions of Osamwonyi (2003), Rogalski and Vinso (1977), the money supply has negative impact on the stock price. We can see which indicator is most efficient on the stock price and how difference between our outputs and these previous academic papers from the empirical result and conclusion in this study.

New York S&P 500 Stock Market, Tokyo Stock Exchange (TOPIX) and B shares of Shanghai index on Shanghai Exchange which are three of the top 10 biggest stock markets of the world have been chosen as the dependent variables in

this study. We will evidence how effective our selected macroeconomic variables on the stock price of these three stock markets. This rank is calculated by multiplying the share price by the number of outstanding shares. At the end of May 2013, the NYSE Euro-next USA ranked as the largest by market capitalization with a value of tradable shares amounting to 15.8 trillion U.S. dollars. The figure 1 shows the largest stock markets in the world by market capitalization of listed companies as of May 2013 (in billion U.S. dollars).[1]

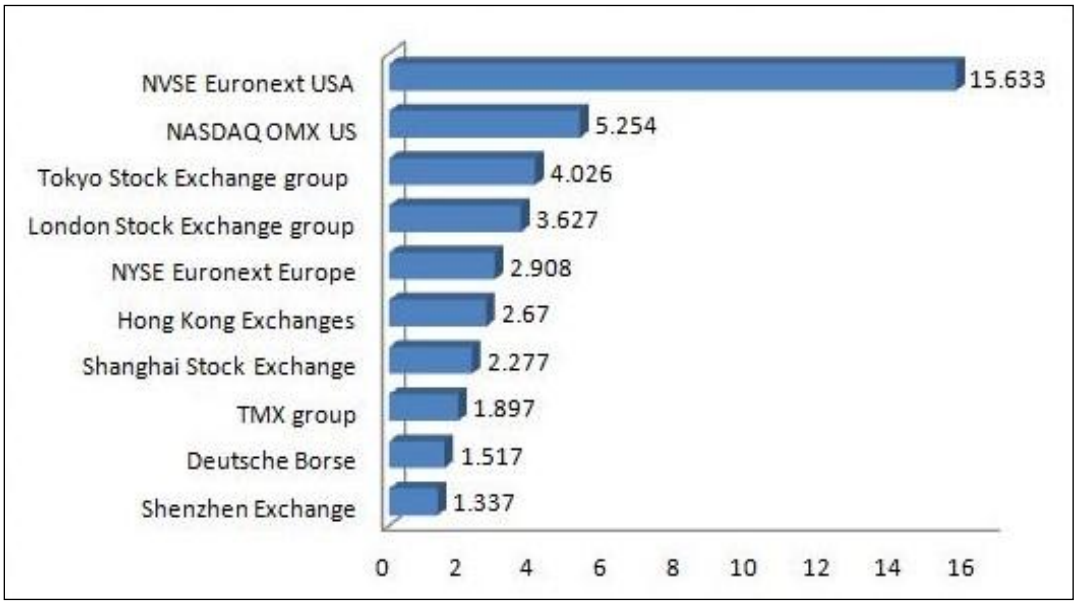

Figure 1.1 The Largest Stock Markets in the World

Data source: www.statista.com

S&P 500 Stock Index

The first big stock market which we selected is S&P 500 stock market. At the beginning, Standard and Poor introduced in 1923, and since March 1957, the S&P expanded by current 500 indexes. On the other hand, it is based on the market

[1] http://www.statista.com/

capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ in the USA. The S&P 500 index is widely used as a measure of the general level of stock prices, as it includes both growth stocks and value stocks. It components and their weightings are determined by S&P Dow Jones Indices[2]. Moreover, the S&P 500 is widely regarded as the best single gauge of large-cap USA equities. There is over USD 7.8 trillion benchmarked to the index, with index assets comprising approximately USD 2.2 trillion of this totals. The index includes 500 leading companies and captures approximately 80% coverage of available market capitalization.

TOPIX Index

The second stock market by selected us is TOPIX of Tokyo stock exchange (TSE). The Tokyo stock price index is commonly known as TOPIX, along with the Nikkei 225, is an important stock market index for the TSE in Japan, tracking all domestic companies of the exchange's First Section. As of 1 February 2011, there are 1,669 companies listed on the First Section of the TSE, and the market value of the index was ¥197.4 trillion.[3] The index transitioned from a system where a company's weighting is based on the total number of shares outstanding to a weighting based on the number of shares available for trading as calls the free float. This transition took place in three phases started in October 2005 and was completed in June 2006. Although the change is a technicality, it had a significant effect on the weighting of many companies in the index, because many companies in Japan have significant holdings of shares of their business partners as a part of intricate business alliances, and such shares are no longer included in calculating the weight of companies in the index. TSE currently calculates and distributes

[2] http://www.wikipedia.com/
[3] http://signalsdirectory.com/

TOPIX every second and further plans to launch a new High-Speed Index dissemination service provided at the millisecond level from February 28, 2011.

The Chinese Stock Market and the Feature of the Financial System in China

We selected third stock market is Shanghai Stock Market. The Chinese stock market consists of two exchanges, the Shanghai Securities Exchange (SHSE) and the Shenzhen Securities Exchange (SZSE). The SHSE was opened in December 1990 and the SZSE in February 1991. Since 1998, the market has been supervised by the Chinese Securities Supervision Commission, before which it was regulated by a State Council committee. While it has been subject to many complicated regulations, including price limits from time to time, the trend is towards cautious deregulation. An interesting feature of the market for the first two decades of its existence is various types of shares. The two main types are A and B shares[4]. The shares are denominated in the local currency (Renminbi or RMB) and are traded by domestic residents and institutions - foreign individuals and institutions are not permitted to buy and sell the A shares. B shares are denominated in US dollars on the Shanghai Exchange and Hong Kong dollars on the Shenzhen Exchange. They were originally intended for trading by foreign investors but the restriction that only offshore individuals and institutions are permitted to trade in B shares was lifted in 2001, permitting domestic residents to trade in them but only in foreign currency. In addition to A and B shares, some Chinese companies have shares listed on foreign stocks exchanges such as H shares listed on the Hong Kong stock exchange.

[4] Qi, Wu and Zhang (2000) distinguish 5 types of shares by further subdividing the A and B share according to ownership restrictions.

1.2 The Study Intends at the Following Objectives:

1. To research the main macroeconomic variables which we selected the GDP, CPI, PMI, unemployment rate and money supply
2. To inspect the effect these macroeconomic variables on the stock price
3. To analyze the differences between the stock markets of the USA, Japan, and China. Also, to compare how difference the stock price movements of these three countries based on selected macroeconomic variables
4. To analyze the relationship between the stock price and the macroeconomic variables in the regression model

1.3 Motivation

Motivation of our study is before many researchers have been extensively established how the PMI impacts on the other macroeconomic indicators as especially the GDP, money supply, industrial production (IP) and economic activities are impacted by the PMI strongly. But, not many previous studies have been examined the relationship between PMI and stock market returns. Our study aims to provide more information to the academic literature by investigating the impact of the PMI on the stock prices in the USA, Japan, and China.

1.4 Research Questions of the Study:

1. What is a movement of stock prices of the Shanghai Stock Market /B/, Tokyo Stock Exchange (TOPIX) and New York S&P 500 Stock Market when some major macroeconomic variables grow and fall?
2. What is a reason of increase and decrease of the stock price?
3. Why the macroeconomic variables always change in an economic market? What are determinants of that change?

4. How do investors to know some basic macroeconomic variables that they should focus on while investing in stock market and will have the advantage to make their own good investment decisions?

1.5 Main Methodology of the Study for the Data Analysis:

1. All investors and traders use the two main tools that the fundamental and technical analyzes to invest in stock market. In this study, we have used the fundamental analyze. The fundamental analysis beliefs that stock prices are influenced by changes in money supply, gross domestic product, interest rates and other macroeconomic indicators. The fundamental analysis can help the human mind discern and find highly profitable investments with great accuracy far enough in advances to plan for that investment. According to the benefits of technical analysis previously discussed supposedly, all fundamental factors affecting a stock's value are already figured into the charts so an investor can quickly discern trading trends without having to research all types of fundamental data affecting that stock.
2. The main method of this study is multiple regression analysis. The multiple regressions are regression with two or more independent variables on the right-hand side of the equation[5]. On the other word, it is a statistical process for estimating the relationships among variables. Multiple regressions help to use more than one factor to make a prediction. Simple regression only allows one causal factor. Also, the multiple regressions help to separate causal factors, analyzing each one's influence on a dependent variable.

[5] Samuel L. Baker, "Multiple Regression Theory", 2006

1.6 Social Contribution of the Study:

According to the empirical result of this study, the market price is affected by the GDP is most valuable and strongly than other macroeconomic indicators. Secondly, we could establish that the stock market of China is the most efficient market and the market price return in Shanghai stock market is affected by most important macroeconomic variables so strongly and entire positive, however, the stock market of the USA and Japan are the largest stock market than China.

One feature of our study is our empirical result is confirmed by the evidence of the largest stock markets in the world as the USA, Japan, and China. However, there are a lot of academic papers selected these stock markets as their evidence, but they chose to analyze one or two of them, not all these three market.

Finally, due to our empirical result, we could investigate that our selected five macroeconomic variables are so efficient and significant on the stock price. Because not only the GDP has the positive impact on all markets' price return, but also other four macroeconomic variables are significant correlations with the markets' price returns cause of each these predictors have the positive impact on the stock price of two countries at least in the result. Briefly speaking, the contribution of this study can be concluded as the following:

1. The empirical results of this study may help both academics and practitioners comprehend the relationship between the major macroeconomic variables and the stock prices in the USA, Japan and China.
2. Also, the results of this study may help investors to select their investment sector and may inform about the relationship between the macroeconomic variables and the stock price to stockholders.

3. The content of this study may give more understanding to people who interest about stock market of the USA, Japan and China and who intend to invest in these stock markets.

1.7 Outline of the Study is Organized as Follows:

1. The second section refers the literature review which connects the relationship between some major macroeconomic variables and the stock markets.
2. The third section presents the data and methodology. This section includes the description of variables, the data collections and the methodology used in the research.
3. The fourth section reports the empirical results of regression analysis and discussions of descriptive statistics.
4. The fifth section establishes the entire conclusion. Also, there are the recommendations as well as suggestions for further research and concludes this research in this section.

CHAPTER TWO
LITERATURE REVIEW

So many economists and market traders use a lot of economic reports and indicators which put out by government agencies, non-profit organizations and even private companies. Although all the indicators of macroeconomic data are usually employed to be the explained variable for stock price, but some of them are more valuable and useful for market return than others. That's why I chose those five indicators which most important and could influence to stock price stronger than others. While I was researching a literature review what related to an economic market and stock price, I have considered separately and classified each indicator of the macroeconomic how to influence the for market price according to the time period.

2.1 Gross Domestic Product (GDP) and Stock Price

A many papers which related to economics literature have documented a positive relationship between GDP growth rate and stock market development. The first link was suggested by Tobin (1969). It focuses on the impact that share prices between the cost of capital, and is captured by a coefficient known as Tobin's Q, which is the ratio of the market value of current capital to the cost of replacement capital. When share prices are high, the value of the firm relative to the replacement cost of its stock of capital is also high. Consequently, this leads to increased investment expenditure and thus to higher aggregate economic output as firms find it easier to finance investment expenditures. This occurs because investment would be easy as it would require a lower share offering in a situation of a high share price. The second channel was GDP may influence stock market

performance was suggested by Modigliani (1971). His proposition operates through the impact that the wealth variable has on consumption. A permanent increase in security prices results in an increase in the individual's wealth holdings, and therefore in higher permanent income. Through the permanent income hypothesis, Modigliani postulated that inter temporally, consumers smoothen consumption in order to maximize their utility. An increase in permanent income will therefore enable consumers to re-adjust upwards their consumption levels in each period.

Cochrane (1994) found strong evidence that substantial amount of variation in GDP growth and stock returns are attributed to transitory shocks. He defined the transitory shock to the consumption-GDP system as a shock to GDP holding consumption constant so that the shock does not affect consumption contemporaneously. The facts that the consumption/GDP ratio does not forecast consumption growth and that consumption is nearly a random walk drive this definition. Levine and Zervos (1998) argued that an economic growth can predict future stock market movements and productivity and that stock market liquidity is another determinant of GDP growth. Bennett, Estrin, Maw and Urga (2003) study revealed that there is a significant relationship that GDP growth and economic growth impact on a development of the stock market. Liang-ping, Si-Feng and Chuan-min (2005) concluded that compared with the stock market of USA, the stock market of China is still not the perfect relationship, because the degree of incidence between the stock market index and GDP of China is lower than that of the USA. Humpe and Macmillan (2005) analyzed the extent to which macroeconomic variables explained stock market movements in the USA and Japan. Using a log-linear model, they found that a 1 % increase in industrial production triggered a 1.09 % increase in USA stock prices whilst a 1 % increase

in Japanese industrial production triggered a 0.4 % increase in Japanese stock prices. Both parameters were highly statistically significant.

NZu's (2006) empirical results suggested that there is a long-run relationship between GDP growth and stock market price. Moreover, there is a unidirectional causality running from the economic growth to the stock market development. Nishat and Mustafa (2007) tried to produce empirical evidence between the stock market and real economy of Pakistan through a research study. The model used for this study was based on the variables such as GDP, production growth to represents the liquidity of the stock market, real economy, and the size of the stock market represent the stock prices. Two test error correction model and co-integration were applied to examine the relationship, between the stock prices and GDP the data used from the time period 1980-2004.The findings revealed that in the short run, the GDP and the output growth in Pakistan explain the stock market movement. The economic variables in Pakistan both in short, run as well as in long run explain that the growth of the stock market variables depends on the overall growth of the economy. The empirical evidence emerged from their study revealed that there is a need to develop the stock market in Pakistan further to play its vital role in the economy parallel to other financial institutions.

Duca (2007), the result of bi-variate test in the case of the USA suggests that there is not any causality from GDP to the stock price of USA. A similar tendency emerged for the UK where the leading stock index, namely the FTSE 100 Granger causes GDP. Like USA the reverse causality namely from GDP to stock prices does not appear to be present. The analysis for Japan points to the same conclusion derived in the UK and the USA, a unidirectional relationship similar to that in the previous two countries were established, whereby the causality runs from GDP to stock prices. Also, in the case of France, the picture that emerges is similar to that

prevailing in Japan, the UK, and the USA. A unilateral causality is found to exist from GDP to the stock price. On the other hand, no reverse linkage is found from GDP to the stock market. But in the case of Germany, movements in stock prices and GDP are found to be independent of one another. Nurudeen's (2009)'s study covered the period 1981-2007 of Nigerian stock market. It was shown that stock market development (market capitalization) contributes positively to economic growth. Then economic growth impact to stock price strongly. Andrianaivo and Yartey (2009) studied the stock market development was measured by market capitalization as a percentage of GDP. They found that bank credit; stock market liquidity, gross domestic savings, and GDP per capita are significant and have positive effects on stock market development. Income level was an important determinant of stock market development.

Ake and Ognaligui (2010) tried to find the relation between the Doula Stock exchange's Market Capitalization and Cameroonian economic growth by GDP evaluation with the utilization of quarterly time series data from 2006 to 2010. The study applied Granger's causality and the test applied variance decomposition by Cholesky, the study revealed that there was evidence that Cameroonian economic growth and GDP have positive impact on the Doula Stock exchange's market capitalization. Al-Qudah (2011), the regression results of his study showed that the coefficient of real GDP growth is positive and highly significant with stock markets. Obiyo and Torbira (2011), their paper attempted to empirically examine the impact of stock market capitalization, the value of listed securities and all share index on GDP of the Nigeria economy over twenty-eight years period. The unit root test and co-integration test were carried out. The result revealed a positive relationship between the stock market capitalization and the output level of GDP. The result also showed that the value of listed securities had a positive and

significant relationship with the output level of GDP while the all share index has a negative and a significant relationship with the output level of GDP.

Zamil and Areiqat (2011) study used Amman Stock Exchange data 2001-2008 to investigate the relationship between the real estate market and Amman Stock Exchange, through the impact of three macroeconomic factors (GDP, inflation rate, and the population growth rate) and another three factors from the microeconomic indicators (interest rate, remittances of Jordanian expatriates, and the loans provided by the Jordanian banks). The results showed that the microeconomic indicators are more influenced by the stock market than the real estate market and responds more rapidly than the real estate market for the changes in the microeconomic indicators. There is a weak relationship between changes in GDP and changes in the weighted prices index of ASE, and the prices of construction companies' stocks, which means that the changes in GDP do not respond strongly to the prices in the two markets.

Usman and Alfa (2013) investigated empirically the impact of stock exchange market on economic growth in Nigeria applying time series data spanning 1981 to 2010. The result indicated a positive relationship between controlled variables of the stock exchange market and economic growth in Nigeria. The granger causality test indicates a bi-directional relationship between Market Capitalization and Value Traded in the stock market. There is also a unidirectional relation between market capitalization and Real GDP with causality running from Real GDP to Market Capitalization. According to Sharabati (2013), Pearson correlation results showed that the four sectors of Amman Stock Exchange (ASE) market are strongly related to each other and are strongly related to ASE general indicator. Among the four ASE sector only Industrial sector showed a strong relationship with GDP while others did not show a significant relationship with

GDP including ASE general indicator. Simple regression test showed that there is no effect of ASE general indicator on GDP. While multiple regressions showed that there is a strong effect of the ASE sectors together on GDP, but results did not show any significant effect of each sector when considering the four sectors together on GDP. First step wise regressions model showed that there is a strong positive significant effect of industries sector on GDP while second model showed that there is a negative significant effect of insurances sector on GDP. Finally, simple regression showed that when each ASE sector regressed separately against GDP, only industry sector showed a high a significant effect on GDP.

2.2 Purchasing Managers Index (PMI) and Stock Price

Many researchers have been extensively established the influence of PMI on the other macroeconomic variables as the relationship between PMI and GDP, money supply, industrial production (IP) and economic activities etc…For example:

Harris (1991) and Rogers (1992) determined how well the PMI forecasts the IP and establish the fact that the PMI successfully predicts the IP. Also, some research proposed that the PMI is a good indicator of the entire USA economy, as well as the index of industrial production (IP). Dasgupta and Lahiri (1992, 1993) concluded that the PMI can be used to forecast the GDP and business cycles. Kauffman (1999) shown that the PMI has many desirable indicator qualities of business and economic activity. Koenig (2002) suggested whether the PMI forecasts the IP and GDP, and discovered a strong relationship between the PMI and the federal funds rate, which is an instrument of monetary policy determined by the Federal Reserve's Federal Open Market Committee. Also, he researched that the PMI is a valuable tool for tracking the health of the economy's manufacturing sector. Smirnov (2010) who is the researcher of Russia suggested

that the PMI indicated signs of an approaching crisis. In recent research using the standard Granger causality test, evidence gave in support of the PMI as a predictor of GDP and was quantitatively more important than the Consumer Confidence Index (Afshar *et al.*, 2011). After that, as shown by Schröder and Hüfner (2002), Matthew, Raymond and Sarte (2004); Tsuchiya (2011), Vermeulen (2012), Giesen and Lindner (2013), the PMI to be a predictor of the direction of change in the industrial production and GDP. They both agreed with this decision consentaneous etc...

But, so few researchers have been examined the relationship between PMI and stock market returns. Our study may contribute to the academic literature by investigating the impact of the PMI on the stock prices in the USA, Japan and China.

Due to Granger causality tests, Collins (2001) implied that the PMI is not a predictor of stock market performance, based on USA data. In case of James Rossiter (2010) in Canada, his comparative result of random-walk and autoregressive model was that PMI is useful for forecasting developments in the global economy. As the forecasts are updated throughout the quarter with the monthly release of the PMI data, forecasting performance generally improves. Johnson and Watson (2011) explored the changes in the PMI have predictive power for future stock returns in the USA, using time-series regression analysis. They inspected whether the changes in PMI have predictive power for future stock returns. When the monthly data of PMI in the USA from January 1973 to December 2009 was analyzed by them, the output was the positive, statistically significant relationship between changes in PMI and stock returns, even after controlling for size and industry differences, as well as other macroeconomic factors. They utilized the univariate analysis of the relationship between monthly

stock returns and changes in PMI, lagged by a month. Three measures of stock returns are used in the analysis: the S&P 500 Indexes, the CRSP Equal-Weighted Index, and the CRSP Value-Weighted Index. Results revealed a positive, statistically significant relationship between lagged changes in PMI and stock returns for all three indices. In further analysis, the researchers also checked the linkage between lagged PMI and stock returns for size-sorted portfolios, as measured by market capitalization. Using annually rebalanced size-deciles portfolios from CRSP and controlling for the three macroeconomic factors and result was the statistically significant positive relationship between lagged changes in PMI and stock returns for all deciles. Finally, all of the results justified that lagged changes in PMI have a stronger impact on the future returns of small stocks compared with large stocks. There are the limited researchers agreed the PMI is a predictor of share prices.

One of them was Wang (2012). His study analyzed the relationship between the Shanghai composite index and the PMI resulted in evidence of a long- term and co-integrated relationship and he concluded that the PMI can be applied to analyze and predict the trend of the stock market. The study of Nitish (2014) was used to run the ADF and Granger causality test and data was the monthly period for the South African PMI and index prices in the manufacturing industry from August in 2000 up to August in 2013. After the analysis, he concluded that the PMI does not have the ability to forecast future trends in the manufacturing sector or in any of the sub-sectors. The PMI also had no predictive effect in the top twenty-five industrial companies. Besides, the results indicated a causal relationship where the manufacturing sector prices aided in predicting future PMI figures. Sub-sectors such as transportation and engineering discovered the same output. The outputs of

the metals and mining sector and the top twenty-five industrial companies indicated no causal relationship between stock prices and PMI.

2.3 Consumer Price Index (CPI) and Stock Price

Jaffe and Mandelker (1976), Fama and Schwert (1977) all have discussed present evidence that both the expected and unexpected components of the consumer price index from 1953 to 1981 are negatively related to monthly returns to a broad group of New York Stock Exchange common stocks The one research of Schwert assessed the new information concerning inflation to the reaction of equity prices based on his study of 1981 year on returns to the Standard and Poor's composite portfolio from 1953 to 1978. It indicated that the announcement of unexpected inflation and CPI reacts negatively to the stock market although the magnitude of the reaction is small. The stock market seems to provide at the time of the CPI announcement approximately one month after the price data are collected by the Bureau of Labor Statistics. When the CPI is sampled (several weeks before the announcement date), the stock market does not appear to react to unexpected inflation during the time and when the CPI is announced, the stock market tends to react to unexpected inflation around the time. However, the reaction of aggregate stock returns to unexpected inflation is not strong. Coefficients of unexpected inflation are small and negative for the 15 trading days around the announcement date. Leakage of information does occur which foreshadows the subsequent announcement. Fama answered why the unexpected inflation to the stock market reaction is so weak. He explained that unexpected inflation is contemporaneously correlated with unexpected movements in important "real" variables like capital expenditures and real GNP. The correlation between stock returns and unexpected inflation is spurious.

Using daily data Pearce and Roley (1985) did not catch sight of an association between surprises in consumer price index (CPI) announcements and stock market reaction. Jain (1988) used hourly data, then reviewed that CPI announcement surprises have strong negative effects on stock prices and trading volume was not united with surprises in the CPI announcements and the results were consistent with the hypothesis that market participants interpret the surprises in announcements in a hasty manner and do not engage in additional trading. In the study of Nasseh and Strauss (2000), CPI is used as representative for discount rate because stock prices are always listed at nominal prices. Their result proposed that CPI is priced neutrality or its explanation as the one percentage for each percentile change in CPI will react to the stock price. Bilson *et al.* (2001) argued how some macroeconomic variables impact on the stock market performance in emerging stock markets. Based on their result, CPI and money supply appeared to have explanatory power over stock market returns.

Wongbangpo and Sharma (2002) researched the relationship between the goods market and the stock markets in five Asian countries, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand. During to check the effect of the goods market, they used GDP and CPI. There is the negative effect has been found between CPI and stock prices in their case. This can be explained as the results of the higher risk of future profitability. The reason to increase the cost of production is the increase in prices level which in turn would reduce future profitability. But some results in this study indicates that higher prices level can also have a positive effect on stock prices due to the use of equities itself as equipment for hedging inflation. Another conclusion was made by Gunasekarage *et al.* (2004) and they discussed that CPI as the proxy for

inflation has the significant influence on Sri Lanka's Stock Market. Also, he mentioned that CPI is such a specific factor representing some macroeconomic variables such as the discount rate, inflation, and the industrial production.

George (2009) using a VAR he found that the Greek CPI exercises a significant negative influence on the Greek stock market. Further, oil prices are negatively influencing the Greek CPI and stock market, at a significant level. It is worth noting that on average, shocks from CPI require about 3 years to be orbed by the each of the other variables, shocks from the stock market and oil need about 2-3 years, whereas shocks from industrial production will be absorbed within a period of 1-2 years from each of the other variables. To discover any effect of CPI and inflation on the stock return is the mean purpose of Essays (2013). The linear regression model was used in this paper for two variables CPI and stock returns and covered from July 2001 to March 2011. They concluded some key findings which the R2 obtained from the stock returns are not at all impacted by the inflation. Also, the result assumed that there is no effect of CPI on the stock returns. They mentioned that the data is insignificant and the variables have an insignificant no effect on the stock returns. Zhongqiang (2014) applied the paper which related to the stock market in China. The result of this paper was tested by the regression analysis and the result revealed that if CPI increased by 1%, the Shanghai Composite Index fell 5%. That is why the effect of CPI on the stock market is negative, the long-term effects are less than the short-term. Otherwise, the CPI has a negative effect on the Shanghai Composite Index and the long-term effects are weaker. The effect of CPI on The Shanghai Composite Index is not strong.

2.4 Unemployment Rate and Stock Price

There are the several studies are related to the relationship between the stock price and unemployment rate which are based on the regression analysis. Blanchard (1981) indicated that in equilibrium, the same news about unemployment can sometimes be good and sometimes bad for financial return, depending on the state of the economy. In 1969, with low unemployment factories running near full capacity, a surprise in industrial production may result in fears of an overheating economy, inflation, and possible efforts by policymakers to raise the real interest rate. Such an announcement could then be ‘’bad news’’ for the stock market. Cutler, Poterba and Summers (1989) implicitly implied that a positive surprise in industrial production at the end of the Great Depression invokes the same response as a surprise in industrial production during the depression, a time of record unemployment and excess industrial capacity, could show both the end of the depression and higher forecasts of firm cash flow. Such an announcement would likely be “good news” for the stock market.

Orphanides (1992) proved empirical suggestion by showing that the macroeconomic news to stock price response may depend on the state of the economy. In particular he concluded that the unemployment news to stock price response depends on the average unemployment rate during the previous year. Jagannathan and Wang (1993) investigated that the per capital labor income growth rate are negatively correlated with monthly stock returns. Krueger (1996) researched the labor market news to the market rationality of bond price responses. He inspected the market reaction to the availability of more reliable information, as the unemployment data were revised. Finally, he could argue that market prices were strongly affected by the unemployment announcements. Similar conclusions were made by Jagannathan, Kubota and Takehara (1998) using Japanese data was

it since most of the variation in per capita labor income arises from variation in hours worked and not the wage rate, these findings are consistent with the positive correlation between the growth rate of the unemployment and stock returns.

Using daily data for January 1997 to June 2002 period, Norbert and Akimi (2002) studied the linkage between the macroeconomic news and the stock price reaction in USA and Germany. They have been used five hypotheses and find that news on real economic activity has a significant impact on stock prices. The effects are changed by different types of stocks and depend on the state of the economy. For example, the stock market implication of news is state-dependent. For the USA, their evidence was for asymmetric effects of news related to unemployment, GDP growth, and the federal funds target rate. Bad economic news, such as an unexpected increase in unemployment, may be good news for stock prices during a good condition of the economic but when a bad condition of the economic, an unexpected increase in unemployment is bad news for the stock price.

John, Jian and Jagannathan (2002) they tried to answer “Why Bad News Is Usually Good for Stocks”. Their response was that the impact of the unemployment news is asymmetric. During the reductions of the unemployment rate, the news of rising unemployment has the negative effect on the stock price. During the increases of the unemployment rate, the increase in the unemployment has positive effect on the stock price. Farsio and Fazel (2013) investigated the relationship between unemployment rate and stock prices in USA, China and Japan; the top three world economies. The objective of the study was to investigate the assertion by some financial analysts that a negative casual relation exists from the unemployment to stock prices, and that unemployment rate can be used to predict future stock prices. They analyzed factor determinants of unemployment rate and stock prices and hypothesized that there would be no stable long-term causal

relationship from unemployment rate to stock prices. Furthermore, using quarterly data covering the 1970-2011 periods, they provided empirical support for their hypothesis in the three largest world economies. The empirical analysis of that paper was based on co integration and Granger Causality tests. Their findings have one important implication for investors: it would be a mistake to rely on data for unemployment rate forecasts and trends to make investment decisions in the stock market. In most recently studies of Taamouti and Gonzalo (2014) empirically investigated the short-run impact of anticipated and unanticipated unemployment rates on stock prices. They particularly determined the unemployment rate to the nonlinearity in stock market's reaction and calculated the effect at each individual point (quantile) of the stock return distribution. They discovered that only anticipated unemployment rate has a strong impact on stock prices. Quantile regression analysis indicates that the causal effects of anticipated unemployment rate on stock return are usually heterogeneous across quantizes. For the quantile range (0:35; 0:80), a raise in the anticipated unemployment rate leads to an increase in the stock market price. Thus, a raise in the anticipated unemployment rate is in general good news for stock prices. Also, one finding of them was a reasonable explanation of why unemployment rate should affect stock prices and how it affects them. Using Fisher and Phillips curve equations, they found that high unemployment rate is followed by monetary policy action of Federal Reserve (Fed). When the unemployment rate increases, the Fed decreases the interest rate, which in turn increases the stock market prices.

2.5 Money Supply and Stock Price

The study researched by Lorie and Hamilton (1973), there have been only three sharp market declines which were not preceded by a period of money contraction. It is 1939-1940, 1962 and 1966 and the lag time for bull markets are

typically shorter and averaged two to three months. In recent times, there is mounting evidence that changes in the rate of growth in the money supply lead to changes in stock prices by a shorter period or are simply coincidental. As shown by Cooper (1974) money supply lags the S&P 500 Indexes over the period 1947-1970 by approximately one to three months. Cooper's analysis was significant correlations between money supply and stock price only at future lags of two and three months and past eight months. Rozeff (1974) examined between the money supply and Fisher's index from 1947-1972 and discovered that significant future lags one, two and four months and significant past lags at zero eight and twelve months. He investigated that money supply changes are important, and it is so significant to the stock prices.

Between 1963-1974 years, Rogalski and Vinso were proposed that information concerning the actual rate of growth of the money supply is incorporated into equity returns as espoused to by various monetary portfolio theorists. Causality does not go from money supply to stock prices but rather it grew from stock prices to money supply and conceivably back again. Auerbach (1976) protested the trend and cyclical components of money and assumed a weak relationship between stock returns and changes in the M1 money supply series. These results are consistent with the EMH. Rogalski and Vinso (1977) mentioned there is a consensus in finance that an unexpected raising or reducing the growth rate of money results in a change in the equilibrium position of money in relation to other assets in the portfolio of investors. Because of this belief, investors try to adjust the proportion of their asset portfolios signified by money balances. It has been hypothesized that changes in the nation's money supply will cause variations in stock prices. On the other word, the changes in stock prices will respond to monetary disturbances with a lag (assuming the hypothesis is valid).

In 1981, Fama argued that an increase in the money supply would lead to inflation, and may enhance the discount rate and decrease stock prices. The negative effects might be countered by the economic stimulus provided by money growth, also known as the corporate earnings effect, which may enhance future cash flows and stock prices. In the study of Hafer (1986) there is weekly money supply data to test both anticipated and unanticipated money growth. Hafer mentioned that anticipated monetary changes had no effect on stock prices, while positive unanticipated changes had a significant effect. His study gave the supports to EMH. Similar conclusions were made by Davidcon and Froyen (1982) and Rozeff (1994), they came up with the interesting conclusion that money growth affects stock prices adversely. Also, another many studies using data from developed countries like that. As the hypothesis of Mukherjee and Naka (1995), the relation between the TSE and the exchange rate is positive and it is Brown and Otsuki (1990) report the same relation. The link between the TSE and inflation (CPI) is negative. A similar relation is discovered in the United States by Fama and Schwert (1977), Chen, Roll and Ross (1986), Geske and Roll (1983). Equation result also indicated that the equilibrium relation between the TSE and money supply is positive. This result may assume that in Japan the money supply's positive effect on stock prices via augmented corporate earnings overpowers its negative effect resulting from enhanced inflation.

Maysami and Koh (2000) reported a positive relationship between money supply changes and stock returns in Singapore, further support this hypothesis. Also in this year, Kevin surveyed the supply of money as a leading indicator. While M2 is M1 plus near monies, M1 mentions to currency in circulation plus claim deposits like a time deposit. The investors will adjust M2 for that study. Supply of money affects economic activities and that is why its control has been

the chief function of the central monetary authority of any given economy. The researcher Osamwonyi in 2003 year investigated that Money supply (M2) has a negative relationship with the stock market index in the short run. It is in the short run but not in the long run. The reason for its negative sign is the fiscal indiscipline of financing money supply growth by ways and means, the focus on trade instead of manufacturing, import fueled consumption and poor capacity utilization in the real sector. According to Rogalski and Vinso (1977), Urich and Wachtel (1981), Chaudhuri and Smiles (2004) the money supply, for example, M1 is also likely to influence share prices through at least three mechanisms. They agreed that those three mechanisms are first, changes in the money supply may be related to unanticipated increases in inflation and future inflation uncertainty and hence negatively related to the share price, Second, changes in the money supply may positively influence the share price through its impact on economic activity, finally, portfolio theory is maybe a positive relationship, since it relates an increase in the money supply to a portfolio shift from non-interest bearing money to financial assets including equities.

As shown by Chena *et al.* (2005) the money supply and unemployment rate can significantly explain stock price returns. Especially, the money supply and stock returns are positively related, whereas unemployment rate has a negative impact on stock returns. Chakravarty (2006) analyzed the relationship between stock price and the main macroeconomic variables in India for the period 1991-2005 using monthly time series data. The Granger non causality test procedure developed by Toda and Yamamoto (1995) was used in this paper. The empirical result of the paper assessed that the stock price of India does not cause from IP (industrial production) and IR (inflation) and the relation between stock price and money supply is unidirectional. More recent in 2007, Brahmasrene and Jiranyakul

determined the relationship of the stock market index and selected macroeconomic variables during the post-financial liberalization (pre-financial crisis) and the post-financial crisis in Thailand. In the empirical summary, they showed unit root, co-integration and Granger causality tests. In their finding, the money supply has a positive effect on the stock market index while the industrial production index, the exchange rate and oil prices have a negative effect in the post-financial liberalization period. With respect to the post-financial crisis, money supply is documented to be the only variable positively impacting the stock market.

2.6 Summary of the Literature Review

In the table 2.1, except the results of Liang-Ping *et al.* (2005), Zamil and Areiqat (2011), Usman and Alfa (2013), the other researchers all concluded that the GDP has positively and significantly impact on the stock price return.

Table 2.1 Gross Domestic Product and Stock Price

			Empirical findings		
Author	**Year**	**Scope of the study**	**Positive**	**Negative**	**Insignificant**
Tobin	1969	USA	+		
Modigliani	1971	USA, Boston	+		
Cochrane	1994	USA, Philadelphia	+		
Levine & Zervos	1998	USA (1976-1993)	+		
Bennett *et al.*	2003	USA & UK	+		
Liang-Ping *et al.*	2005	China & USA		+	

Humpe & Macmillan	2005	USA & Japan	+		
NZu	2006		+		
Nishat & Mustafa	2007	Pakistan (1980-2004)	+		
Duca	2007	USA, UK and Japan	+		+ (Germany)
Nurudeen	2009	Nigeria (1981-2007)	+		
Andrianaivo & Yartey	2009	Africa (1990-2006)	+		
Ake & Ognaligui	2010	Doula Stock exchange's Market Capitalization and Cameroon (2006-2010)	+		
Al-Qudah	2011	Jordanian privatized firms (1992-2005)	+		
Obiyo & Torbira	2011	Nigeria (28 years period)	+		
Zamil & Areiqat	2011	Amman Stock Exchange (2001-2008)			+
Usman & Alfa	2013	Nigeria (1981-2010)			+

Data source: This Research Summarized

In the table 2.2, Colins (2001) implied that the PMI has insignificantly impact on the stock price and Nitish (2014) demonstrated that the PMI has

negative effect on the stock price. But most of the researchers agreed with the PMI has positively impact on the stock price return.

Table 2.2 Purchasing Managers Index and Stock Price

			Empirical findings		
Author	**Year**	**Scope of the study**	**Positive**	**Negative**	**Insignificant**
Harris	1991	USA	+		
Dasgupta & Lahiri	1992	USA	+		
Kauffman	1999	NAPM report on business	+		
Collins	2001	USA			+
Koenig	2002	Federal Reserve Bank of Dallas	+		
Hüfner & Schröder	2002	Germany	+		
Matthew, Raymond & Sarte	2004	Prior to the Richmond Survey, information on Fifth District manufacturing activity in the USA	+		
Smirnov	2010	Russia	+		
James Rossiter	2010	International Economic Analysis Department Bank of Canada	+		

Tsuchiya		USA	+		
Johnson and Watson	2011	The S&P 500 Index, the CRSP Equal-Weighted Index, and the CRSP Value-Weighted Index in USA	+		
Wang	2012	Shanghai in China	+		
Nitish	2014	South Africa (2000-2013)		+	

Data source: This Research Summarized

In the table 2.3, most of the researchers concluded that the CPI has negative impact on the stock price return. But another three researchers did not agree with it and they found that the CPI has positive impact on the stock price.

Table 2.3 Consumer Price Index and Stock Price

			Empirical findings		
Author	**Year**	**Scope of the study**	**Positive**	**Negative**	**Insignificant**
Jaffe & Mandelker	1976	New York Stock		+	
Fama & Schwert	1977	Exchange		+	
Pearce & Roley	1985	USA		+	
Jain	1988	USA, Philadelphia		+	

Nasseh & Strauss	2000	France, Italy, Swiss, Germany, Netherlands and UK	+		
Bilson *et al.*	2001	USA	+		
Wongbangpo & Sharma	2002	Indonesia, Malaysia, Philippines, Singapore and Thailand		+	
Gunasekarage *et al.*	2004	Sri Lanka's Stock Market	+		
George Filis	2009	Stock Market in Greece (1996-2008)		+	
Essays	2013	USA (2001-2011)			+
Zhongqiang	2014	Shanghai in China		+	

Data source: This Research Summarized

In the table 2.4, the some researchers examined that an effect of the unemployment rate is different in each country. It is maybe depends on a state of economic situation. Also, most of the researchers surveyed that the unemployment rate has positively impact on the stock price return.

Table 2.4 Unemployment Rate and Stock Price

			Empirical findings		
Author	**Year**	**Scope of the study**	**Positive**	**Negative**	**Insignificant**
Blanchard	1981	USA	+	+ (depends on the state of the economy)	
Cutler, Poterba & Summers	1989	S&P 500 index (1946-1987)	+		
Orphanides	1992	USA (1980-1992)	+		
Jagannathan & Wang	1993	The United States, Canada, and East Asia		+	
Krueger	1996	the Bureau of Labor Statistics (BLS) in the USA	+		
Kubota & Takehara	1998	Japan (1981-1993)	+		
Norbert & Akimi	2002	USA & Germany		+	
John, Jian & Jagannathan	2002	The Bureau of Labor Statistic (BLS)'s monthly announcement in the USA (1948-2000)	+		

Farsio & Fazel	2013	USA, China and Japan (1970-2011)		+	
Taamouti & Gonzalo	2014	BLS of the USA	+		

Data source: This Research Summarized

In the table 2.5, most of the researchers analyzed that the stock price influenced by the money supply positively and significantly. The few researchers found that the money supply has negative impact on the stock price return.

Table 2.5 Money Supply and Stock Price

			Empirical findings		
Author	**Year**	**Scope of the study**	**Positive**	**Negative**	**Insignificant**
Lorie & Hamilton	1973	1939-1940, 1962 and 1966	+		
Cooper	1974	S&P 500 Index (1947-1970)	+		
Rozeff	1974	USA (1947-1972)	+		
Auerbach	1976	1960-1970	+		
Rogalski & Vinso	1977	1963-1974		+	
Fama	1981	USA	+		
Davidson & Froyen	1982	New York Stock Exchange	+		

Hafer	1986	USA	+ (unanticipated monetary)	+ (anticipated monetary)
Rozeff	1994	European countries	+	
Mukherjee & Naka	1995	Japan	+	
Maysami & Koh	2000	Singapore	+	
Osamwonyi	2003	Nigerian capital market (1975-2005)		+
Rogalski & Vinso	1977	The economic market of the USA	+ (economic activity and money supply)	+ (inflation)
Urich & Wachtel	1981			
Chaudhuri & Smiles	2004			
Chena *et al.*	2005	East Asian countries		
Chakravarty	2006	India (1991-2005)		
Brahmasrene & Jiranyakul	2007	Post-financial crisis in Thailand	+	

Data source: This Research Summarized

CHAPTER THREE
DATA AND METHODOLOGY

3.1 Variables Description

3.1.1 Gross Domestic Product (GDP)

This is one of the methods of measuring the size of its economy. The GDP of a country is defined as the total market value of all final goods and services produced within a country in a given period of time (usually a calendar year). It is also considered the sum of value added at every stage of production (the intermediate stages) of all final goods and services produced within a country in a given period of time. The most common approach to measuring and understanding GDP is the expenditure method:

GDP = consumption + investment + (government spending) + (exports − imports) or GDP = C + I + G + (X-M)

"Gross" means depreciation of capital stock is not included. With depreciation, with net investment instead of gross investment, it is the net domestic product. The measure of aggregate output in the national income accounts is Gross Domestic Product according to Blanchard (1997). He stated that there are three ways of thinking about an economy's GDP. These are:

1. GDP is the value of the final goods and services produced in the economy during a given period
2. GDP is the sum of value added in the economy during a given period ,
3. GDP is the sum of incomes in the economy during a given period.

Nominal GDP is simply the sum of the quantities of final goods produced times their current price. Economists use nominal for variables expressed in units of the currency of the relevant country. Nominal GDP increases over time for two reasons. The first is that the production of most goods increases over time. The second is that the price of most goods increases over time.

3.1.2 Purchasing Managers Index (PMI)

The National Association of Purchasing Managers (NAPM) in the U.S in co-operation with the U.S Department of Commerce launched the purchasing managers' business research in manufacturing since the 1930's. The main goal of the research was to get better business information around the manufacturing activity in the economy. In 1982, today's principle of PMI was formally established by Theodore Torda and the PMI was published under the name NAPM index. The PMI was based on a research of 400 ISM members from the manufacturing industry of the U.S for over 70 years (Smit and Pellissier, 2002). The PMI follows the characteristics of business tendency researches which use opinion research techniques to determine the factors which determine their business conditions. The PMI is then calculated as a weighted average of five of the individual index. The choice of index included and the weightings used for the SA PMI are identical to that of the ISM in the U.S (Smit and Pellissier, 2002). The SA PMI currently uses the following indexes and weightings:

- Business activities - 0.25
- New sales orders - 0.30
- Employments - 0.20
- Supplier deliveries - 0.15
- Inventories - 0.10

$PMI_t = 0.3(NOI_t) + 0.25(PI_t) + 0.2(EMI_t) + 0.15(SD_t) + 0.1(INV_t)$[6]

The PMI deserves the attention it receives in the financial and business press as an indicator of changes in real economic activity. If the index is showed in isolation, its level is what matters. In last some years, PMI readings above 47 have signaled an expanding manufacturing sector (with each point above 47 translating into about 0.6 percentage points of factory output growth), and PMI readings above 40 have signaled an expanding economy overall (with each point above 40 translating into about 0.25 percentage points of GDP growth). If the index is showed in conjunction with recent jobs, sales, and factory output data, its change completely useful information. A rising PMI signals that GDP growth is likely stronger than early estimates of these other indicators would suggest.

3.1.3 Consumer Price Index (CPI)

The CPI estimates the measurement of changes in the prices paid for goods and services by urban consumers for the specified month. The CPI is essentially a measure of individuals' cost of living changes and provides an indication of the inflation rate related to purchasing those goods and services. The CPI does not include every item an individual may buy, but instead takes a sampling of several hundred goods and services across 200 item categories. Data is collected through phone calls and personal visits in 87 urban areas across the country. The CPI does not include income, Social Security taxes, or investments in stocks, bonds or life insurance. But it does include all sales taxes united with the purchases of those goods and services. This index is the important indicator of inflation that we have to believe. It is especially closely investigated by financial economists now since it shows inflation to be at a 16-year low. Changes in inflation can spur the Fed to take action to change its

[6] Rolando F. Peláez, A Reassessment of the Purchasing Managers' Index, Oct – 2003, University of Houston

monetary policy. While it is often referred to as a "cost-of-living index" (CLI), and indeed was so titled until 1945, the CPI is not in popular a CLI. A CLI is determined as the ratio of the minimum expenditure required to obtain a particular level of satisfaction in two price situations; a comparison period and the base period. The CPI, a changed Laspeyres index, holds the standard of living constant (in the span between major revisions) by keeping quantities fixed, but allows prices to vary.

3.1.4 Unemployment Rate

Unemployment is the state in which a person is without work, available to work, and is currently seeking work. There are a variety of different types of unemployment, depending on the cause, and disagreement on which is most sever. Different economic theories suggest different measures to limit it and on its importance, the monetarism, for example, thinks that controlling inflation to facilitate growth and investment is more important, and will lead to increase employment. A common typology of unemployment is the following:

Though many people care about the number of unemployed, economists typically focus on the unemployment rate. This corrects for the normal increase in the number of people employed due to increases in population and increases in the labor force relative to the population. The unemployment rate is expressed as a percentage, and is calculated as follows:

Unemployment Rate = (Unemployed Workers/Total Labor Force)*100%[7]

The unemployment rate information along with wage earnings, weekly hours and employment is the first indicator of economic trends announced in each

[7] http://en.wikipedia.org/wiki/Unemployment

month. Investors often used to produce other macroeconomic variables such as personal income, industrial production and productivity, which are announced late in the month. Unemployment is considered a lagging economic indicator and as such, will give investors no insight into future stock prices. Unemployment information will be run just to show past results which were statistically consistent. Also unemployment news bundles three types of primitive information relevant for valuing stocks: information about future interest rates, equity risk premium, and corporate earnings and dividends. According to economist Edmond Malinvaud, the type of unemployment that occurs depends on the situation at the goods market, rather than that they belong to opposing the economic theories. If the market for goods is a buyers' market, Keynesian unemployment may ensue while a limiting production capacity is more consistent with classical unemployment.

3.1.5 Money Supply

Money supply (M0, M1 and M2) indicates the aggregate total of all money a country has in circulation. It takes into account all physical currency such as bills and coins, demand deposit savings and checking accounts, traveler's checks, assets in retail money market accounts and small money market mutual funds, (i.e., less than $100,000), individual time deposits and savings deposits, certificates of deposits etc.., also include some repurchase agreements and Eurodollar holdings. It does not include institutional money fund assets, large denominated (more than $100,000) time deposits, or any special reserves banks are required to support. The Federal Reserve uses this data to evaluate current economic and financial conditions, and to help modify its monetary policy, which includes increasing and decreasing interest rates. The Fed's actions are tended at helping or decreasing the money supply. Economists and investors also use M2 data to predict cyclical economic recessions and recoveries and expected changes in stock prices not to

refer expected changes in the Fed's monetary policy. The opinions of some economists, M2's relevancy has waned over the past 20 years. For many years this monetary calculation had closely paralleled the growth or contraction of the U.S. economy and overall changes in prices. But over the past two decades, a bevy of changes such as the data of new depository products, the movement of consumer funds from bank deposits to supply accounts and the internationalization of the economy, because the money supply data to fall out of sync with other economic indicators.

3.2 Data

The objective of this paper is to empirically examine the impacts of some macroeconomic factors on the stock market returns of the USA, Japan and China. In this study, stock price index of the USA, Japan and China are considered as the dependent variables. On the other hand, based on previous studies, five macroeconomic variables namely gross domestic production growth rate, consumer price index, purchasing managers' index, unemployment rate and money supply are used as independent variables.

The study has been examined by the monthly and quarterly data for all the macroeconomic variables under covering the period of time from January 2005 to December 2015 (240 monthly observations) which are collected from the Taiwan Economic Journal.

But the table 4.1, 4.2 and 4.3 are covered the period of time from 2000 to 2013 and the figure 4.1, 4.2 and 4.3 are covered from 2005 to 2014, the figure 4.4 is covered from 2004 to 2015 and the figure 4.5 is covered the period of time from 2000 to 2011 which are collected from the official economic website.

Table 3.1 Regression Variables

Variable	Concept	Units	Time period	Data source
		Independent variables		
GDP	Gross domestic production	Percentage	2005.01.01 – 2015.12.31, quarterly	Taiwan Economic Journal
CPI	Consumer price index	Percentage	2005.01.01 – 2015.12.31, monthly	
PMI	Purchasing managers' index	Percentage	2005.01.01 – 2015.12.31, monthly	
UR	Unemployment Rate	Percentage	2005.01.01 – 2015.12.31, monthly	
MS	Money Supply	Billions USD (Billions CNY and Billions JPY)	2005.01.01 – 2015.12.31, monthly	
		Dependent variables		
SP of China (SHBSHR)	Shanghai B Stock Index	Share price	2005.01.01 – 2015.12.31, monthly	Taiwan Economic Journal
SP of Japan (TOPIX)	Tokyo Stock Index (TOPIX)	Share price	2005.01.01 – 2015.12.31, monthly	
SP of USA (S&P 500)	S&P 500 Stock Index NY	Share price	2005.01.01 – 2015.12.31, monthly	

3.3 Methodology

The main econometric model is conducted in this study: Multivariable regression is used to test the relationship between the macroeconomic variables and the stock price index of USA, Japan and China. Francis Galton first observed the phenomenon in the context of simple linear regression of data points[8]. The regression analysis is an inferential statistical technique that is used to learn more about the relationship between a independent variable (referred to as X) and dependent variable (referred to as Y). When there is only one independent variable, the prediction method is called simple regression. So, the regression equation $Yi = \beta 0 + \beta 1\ Xi + ui$ where Yi is the dependent variable, Xi is the independent variable, $\beta 0$ is the constant (or intercept), $\beta 1$ is the slope of the regression line which represent the strength and direction of the relationship between the independent and dependent variables and ui is random error term. Purposes of the multiple regression models are:

1. Incorporating more than one independent variable into the explanation of a dependent variable
2. Measuring the cumulative impact of independent variables on a dependent variable
3. Determining the relative importance of independent variables

Here, in this study we carried out the multiple regression models to see that the impact of macroeconomic variables is analyzed on the share prices. The following Model was used:

[8] Galton, F (1889), *Natural Inheritance*, London, Macmillan

1. $Y_1 = \alpha + \beta_1 X_1 + \eta$

   $Y_1 = \alpha + \beta_2 X_2 + \eta$

   $Y_1 = \alpha + \beta_3 X_3 + \eta$

   $Y_{1\,=} \alpha + \beta_4 X_4 + \eta$

   $Y_{1\,=} \alpha + \beta_5 X_5 + \eta$

   Y_1 (SHBSHR) $= \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \eta$

2. $Y_2 = \alpha' + \beta'_1 X'_1 + \eta'$

   $Y_2 = \alpha' + \beta'_2 X'_2 + \eta'$

   $Y_2 = \alpha' + \beta'_3 X'_3 + \eta'$

   $Y_{2\,=} \alpha' + \beta'_4 X'_4 + \eta'$

   $Y_{2\,=} \alpha' + \beta'_5 X'_5 + \eta'$

   Y_2 (TOPIX) $= \alpha' + \beta'_1 X_1 + \beta'_2 X_2 + \beta'_3 X_3 + \beta'_4 X_4 + \beta'_5 X_5 + \eta'$

3. $Y_3 = \alpha'' + \beta''_1 X''_1 + \eta''$

   $Y_3 = \alpha'' + \beta''_2 X''_2 + \eta''$

   $Y_3 = \alpha'' + \beta''_3 X''_3 + \eta''$

   $Y_{3\,=} \alpha'' + \beta''_4 X''_4 + \eta''$

   $Y_{3\,=} \alpha'' + \beta''_5 X''_5 + \eta''$

   Y_3(S&P 500) $= \alpha'' + \beta''_1 X''_1 + \beta''_2 X''_2 + \beta''_3 X''_3 + \beta''_4 X''_4 + \beta''_5 X''_5 + \eta''$

Where: (Independent variables)

X_1 (X'_1 or X''_2) – GDP for China (Japan or USA)

X_2 (X'_2 or X''_2) – CPI for China (Japan or USA)

X_3 (X'_3 or – X''_3) – PMI for China (Japan or USA)

X_4 (X'_4 or X''_4) – M^s for China (Japan or USA)

X_5 (X'_5 or X''_5) – U^r for China (Japan or USA)

(Dependent variables)

Y_1 - Shanghai B Stock Index (SHBSHR)

Y_2 - Tokyo Stock Index (TOPIX)

Y_3 - S&P 500 Stock index NY (S&P 500)

At first, we aimed to determine how the each independent variable impact on the three dependent variables. Then, we intended to carry out how the both five independent variables impact on each dependent variable. Ultimately, we focused which predictors influence on the market price more sensible. If the result of the regression parameter would be significant, it means that predictor will impact on a stock price positively. In this case, a stock price will follow to ups and downs of that predictor. Contrary to it, if the result of the regression parameter would be not significant, it means that predictor will impact on a stock price negatively. In this case, if that predictor would increase, a stock price will decrease and if that predictor would decrease, a stock price will increase.

CHAPTER FOUR
EMPIRICAL RESULT

Multiple regression analysis was used to investigate the relationship between dependent variable and independent variables. The multiple regression results are employed to investigate how the major five macroeconomic variables impact on the market index price of the three countries the USA, Japan and China which are the three biggest stock markets in the world.

4.1 The Macroeconomic Performance of the Sample Markets

At the analysis of the relation between the macroeconomic variables and stock market index, it is necessary to demonstrate the macroeconomic performance of the sample markets. It summaries the comparative statistics for the macroeconomic variables of the USA, Japan and China in last 9-13 years are shown in figure 4.1-4.5 and table 4.1-4.3.

Table 4.1 The Interactive Summary Statistics of the Gross Domestic Products in the USA, Japan and China (2000-2013)

	USA	China	Japan	All selected countries
Average	6.48	4.31	4.59	5.13
Standard deviation	1.83	0.21	0.47	1.46
Min value	4.1 (2000)	3.8 (2007)	3.9 (2007)	3.8 (2007)
Max value	9.7 (2010)	4.6 (2013)	5.4 (2002)	9.7 (2010)
Coverage	2000-2013	2000-2013	2000-2013	2000-2013

Data source: www.theglobaleconomy.com, World Bank

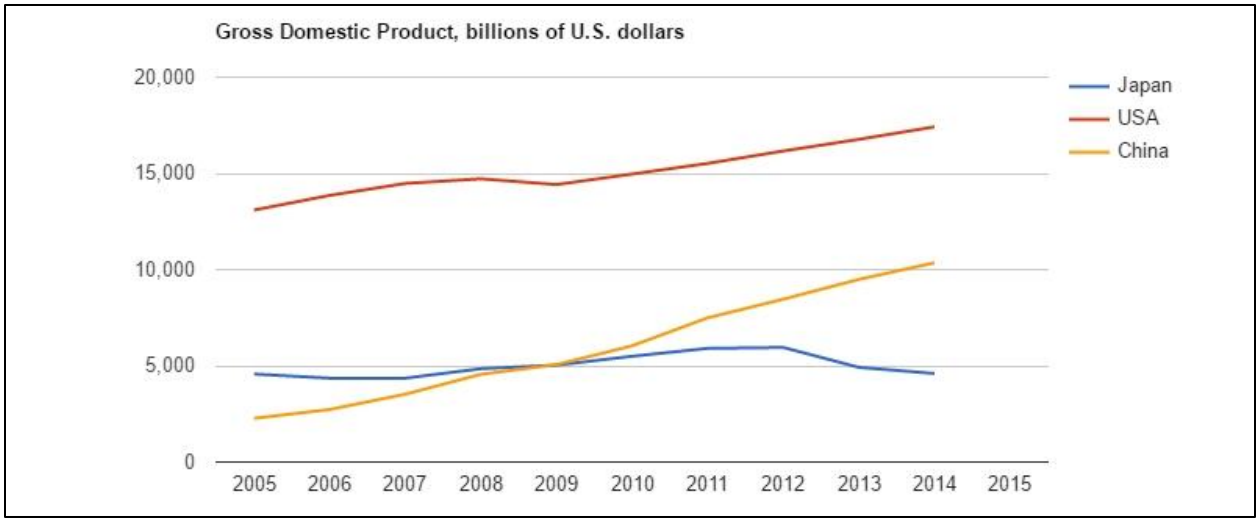

Figure 4.1 The Growth of The Gross Domestic Products
in The USA, Japan and China (2005-2014)

Data source: www.theglobaleconomy.com, World Bank

From table 4.1 and figure 4.1, we can see the growth rate and decline in the gross domestic products of the USA, Japan and China during the last 9-13 years. The GDP of USA increased to 17419 (2014) billion of U.S dollars is most high expansion and the GDP of Japan was 4601 (2014) billion of U.S dollars is most low index. Also, the GDP of China was 1205.26 billion of U.S dollars in 2000 year, but in 2014, this index reached to 10354.83 billion of U.S dollars.

Table 4.2 The Interactive Summary Statistics of the Money Supply in the USA, Japan and China (2000-2013)

	USA	China	Japan	All selected countries
Average	6.12	17.19	0.01	7.77
Standard deviation	3.21	4.05	4.91	8.22
Min value	-2.74 (2010)	12.32 (2000)	-17.24 (2001)	-17.24 (2001)
Max value	11.74 (2007)	28.42 (2009)	3.79 (2013)	28.42 (2009)
Coverage	2000-2013	2000-2013	2000-2013	2000-2013

Data source: www.theglobaleconomy.com, World Bank

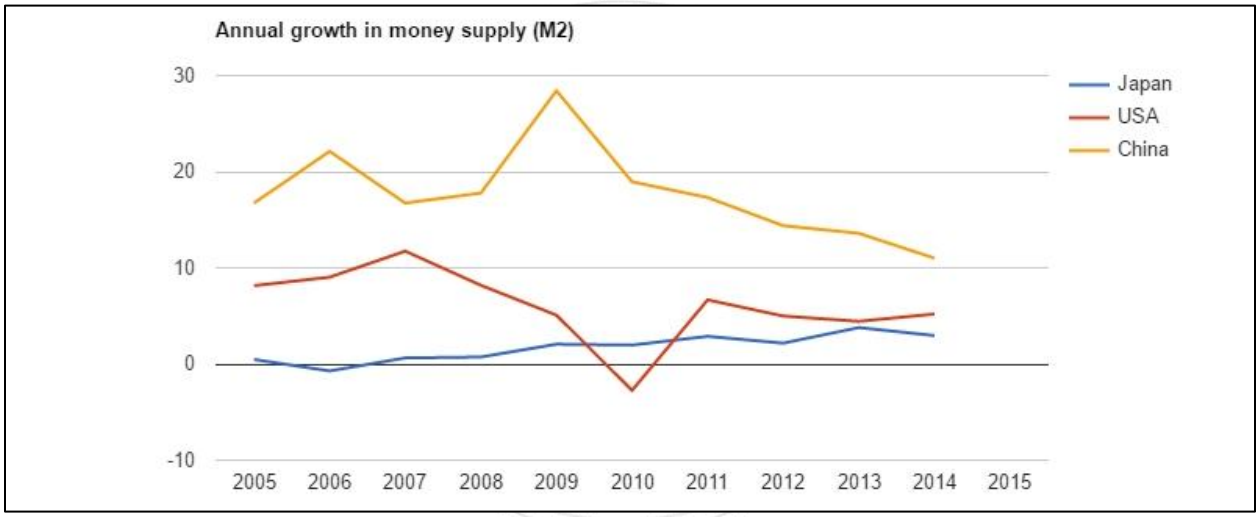

Figure 4.2 The Growth of The Money Supply in The USA, Japan and China (2005-2014)

The table 4.2 and figure 4.2 clearly show that the growth rate and decline in the money supply of the USA, Japan and China during the last 9-13 years. In 2009 year, the money supply of China increased to 28.42 billion of U.S dollars is most high expansion and in 2001 year, the money supply of Japan decreased to -17.24 billion of U.S dollars are most low index. Moreover, the money supply of the USA decreased to -2.74 billion of U.S dollars in 2010. After 2009 year, the money

supply of China has been decreasing to 11.01 billion of U.S dollars (2014), but this index is higher than Japan and China.

Table 4.3 The Interactive Summary Statistics of the Unemployment Rate in the USA, Japan and China (2000-2013)

	USA	China	Japan	All selected countries
Average	6.48	4.31	4.59	5.13
Standard deviation	1.83	0.21	0.47	1.46
Min value	4.1 (2000)	3.8 (2007)	3.9 (2007)	3.8 (2007)
Max value	9.7 (2010)	4.6 (2013)	5.4 (2002)	9.7 (2010)
Coverage	2000-2013	2000-2013	2000-2013	2000-2013

Data source: www.theglobaleconomy.com, World Bank

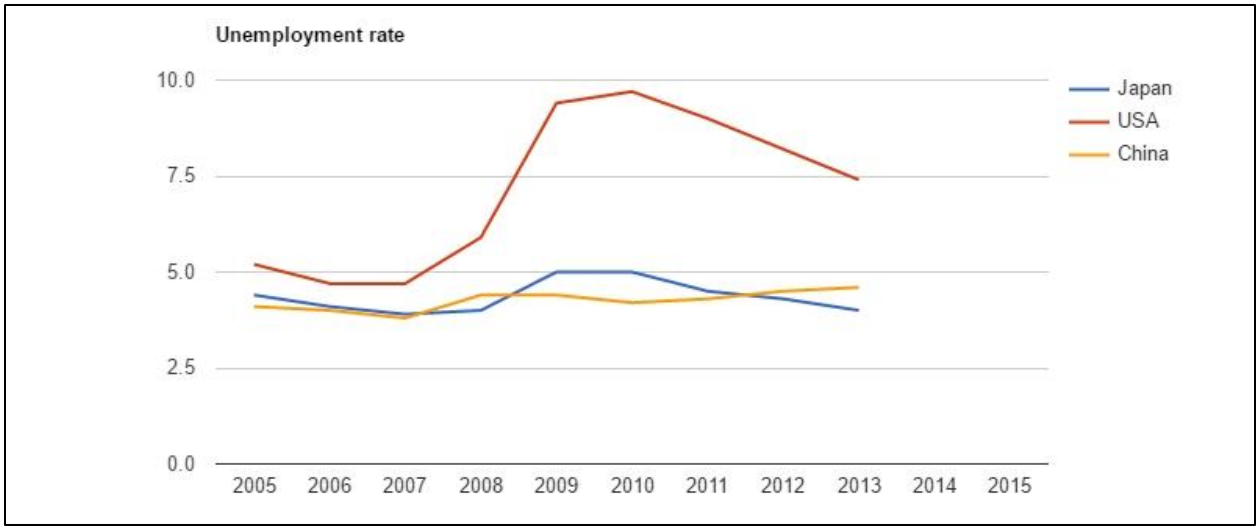

Figure 4.3 The Growth of The Unemployment Rate
in The USA, Japan and China (2005-2014)

Data source: www.theglobaleconomy.com, World Bank

The table 4.3 and figure 4.3 indicate that the growth in the unemployment rate of the USA, Japan and China during the last 9-13 years. After the world economic crises, in 2009-2010 years the unemployment rate of the USA increased sharply to 9.4-9.7% is most high than other two countries. In 2007, the unemployment rates of China and Japan was 3.8% and 3.9% are most low indexes. In most recent year (2013), the unemployment rate of Japan is 4 %, but this amount is almost twice (7.4%) as high as in the USA.

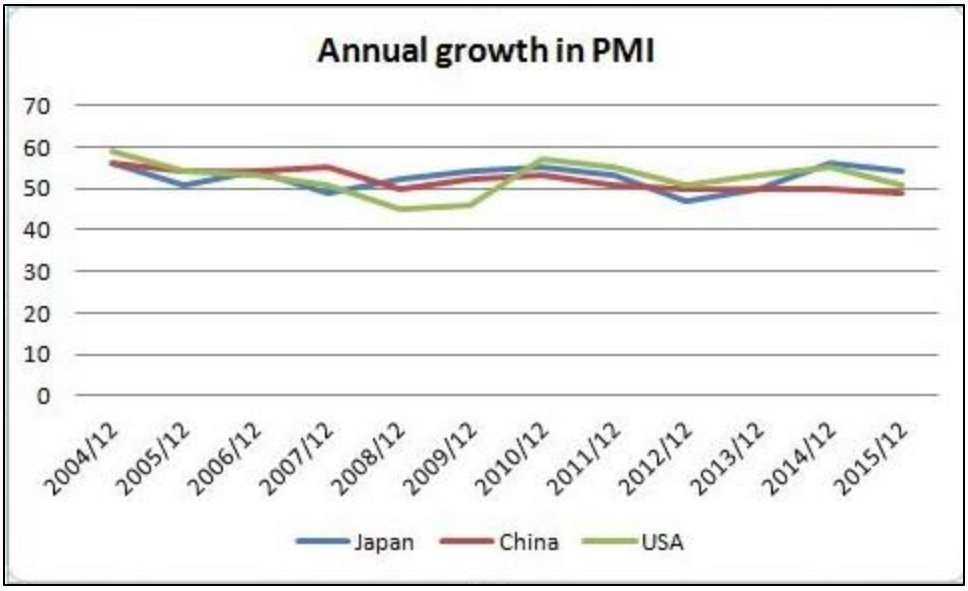

Figure 4.4 The Growth of the Purchasing Manager Index in the USA, Japan and China (2004-2015)

Data source: Taiwan Economic Journal (TEJ)

In the figure 4.4, the manufacturing PMI in the USA fell to 45-46% in December of 2008-2009 from 51% in 2007 and below market expectations. But in 2010, raised up to 57 and it is 2% lower than the index in 2004 year (59%). In December of 2015, the PMI of Japan is 54%, China is 49% and the PMI reached to 51% in the USA.

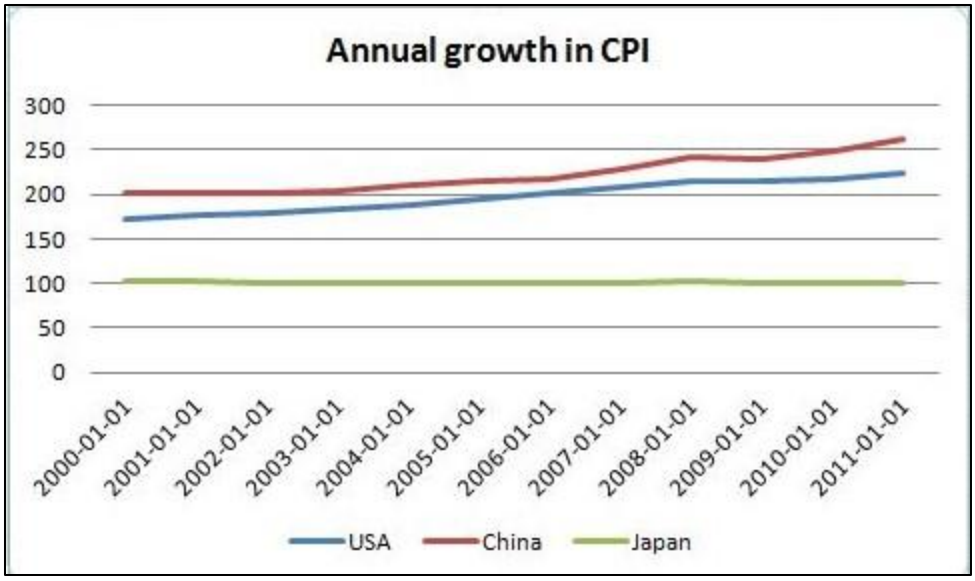

Figure 4.5 The Growth of the Consumer Price Index
in the USA, Japan and China (2000-2011)

Data source: www.quandl.com

From the figure 4.5 we can see the manufacturing annual growth indexes in CPI of the USA, Japan and China. The highest index is the CPI growth in China and it was 200.5 in 2000, and during last 11 years, the CPI in China has been increasing to 261.4. After that, the CPI in the USA from 172.2 in 2000 year reached to 224.94 in December of 2011. For Japan, the growth of PMI is so sustainable and it was 102.7 in 2000. But in 2011, that index fell to 99.6.

4.2 Single Regression Analysis

Before the multiple regression analysis, single variable regression model is employed to investigate the relationship between each major macroeconomic variable and the market index price. The purpose of single regression model is to explore the explained ability for each macroeconomics variable on market index price. The empirical results of single regression analysis of the macroeconomic variables on market stock price are shown in Table 4.4-4.6 for USA, Japan and China are selectively.

4.2.1 USA Market

Table 4.4 Results of the Single Regression Analysis of Model 1-5

Independent Variables	**Dependent Variable "NY S&P 500 Stock index"**				
	Model 1 **Beta (β)**	**Model 2** **Beta (β)**	**Model 3** **Beta (β)**	**Model 4** **Beta (β)**	**Model 5** **Beta (β)**
CPI	-0.093				
GDP		0.195**			
M^s			-0.130		
PMI				0.305**	
U^r					-0.185
R	0.093	0.195	0.130	0.305	0.185
R^2	0.009	0.038	0.017	0.093	0.034
Adj-R^2	0.001	0.031	0.009	0.086	0.027
***F*-value**	1.141	5.136	2.246	13.354	4.625
***T*-value**	-1.068	2.266	-1.499	3.654	-2.151
D-W	1.678	1.735	1.749	2.036	1.824

Data source: This Research Summarized

Table 4.4 shows that result of the influence of the five macroeconomic variables on the stock price of S&P 500 stock market in the USA.

Model-1: The effect of the Consumer Price Index (CPI) on the stock price of the S&P 500 stock market

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.093, R^2 is 0.009 and the adjusted R^2 is 0.001 (Adj- $R^2 < 0.5$), it meaning that only 0.9% of the variance on the stock price of the S&P 500 stock market can be explained from the Consumer Price Index. The F value is 1.141 ($F \geq 4$) and it mean is insignificant. This indicates that when CPI is entered by itself, it is the insignificant predictor of the stock price in the S&P 500 stock market. The next important part of the output to check is T value. In this case, T value equal to -1.068 ($T > 1.96$) and it mean is the CPI has negative impact on the stock price of S&P 500 stock market. D-W is 1.678 (DW: 1.5-2.5) and it mean there is normal correlation between CPI and the stock price of the S&P 500 stock market. At last, the beta value is -0.093 ($\beta \neq 0$) and it mean is the influence of the CPI is negative to the stock price of the USA.

In sum, the explain ability to market index is quite low and insignificant. The Result maybe can be explain by the market index is a leading indicator, but the CPI is the lagging indicator, this study infer that the explain ability might be improved if the CPI can be replaced by the predicting variable of price index.

Model-2: The effect of the Gross Domestic Product (GDP) on the stock price of the S&P 500 stock market

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.195, R^2 is 0.038 and the adjusted R^2 is 0.031 (Adj- $R^2 < 0.5$), it

meaning that 3.8% of the variance on the stock price of the S&P 500 stock market can be predicted from the Gross Domestic Product. The F value is 5.136 ($F \geq 4$) and it mean is significant. This indicates that when GDP is entered by itself, it is the significant predictor of the stock price in the S&P 500 stock market. The next important part of the output to check is T value. In this case, T value equal to 2.266 ($T > 1.96$) and it mean is the GDP has positive impact on the stock price of S&P 500 stock market. D-W is 1.735 (DW: 1.5-2.5) and it mean there is normal correlation between CPI and the stock price of the S&P 500 stock market. At last, the beta value is 0.195** ($\beta \neq 0$ and P value<0.05 or <0.001 or <0.10) and it mean is the influence of the GDP is positive to the stock price of the USA.

Model-3: The effect of the Money Supply (M^S) on the stock price of the S&P 500 stock market

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.13, R^2 is 0.017 and the adjusted R^2 is 0.009 (Adj- $R^2 < 0.5$), it meaning that 1,7% of the variance on the stock price of the S&P 500 stock market can be predicted from the Money Supply. The F value is 2.246 ($F \geq 4$) and it mean is insignificant. This indicates that when M^S is entered by itself, it is the insignificant predictor of the stock price in the S&P 500 stock market. The next important part of the output to check is T value. In this case, T value equal to -1.499 ($T > 1.96$) and it mean is the M^S is negative on the stock price of S&P 500 stock market. D-W is 1.749 (DW: 1.5-2.5) and it mean there is normal correlation between CPI and the stock price of the S&P 500 stock market. At last, the beta value is -0.13 ($\beta \neq 0$) and it mean is the influence of the M^S is negative to the stock price of the USA.

Model-4: The effect of the Purchasing Manager Index (PMI) on the stock price of the S&P 500 stock market

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.305, R^2 is 0.093 and the adjusted R^2 is 0.086 (Adj- $R^2 < 0.5$), it meaning that 9.3% of the variance on the stock price of the S&P 500 stock market can be predicted from the Purchasing Manager Index. The F value is 13.354 ($F \geq 4$) and it mean is significant. This indicates that when PMI is entered by itself, it is the significant predictor of the stock price in the S&P 500 stock market. The next important part of the output to check is T value. In this case, T value equal to 3.654 ($T > 1.96$) and it mean is the PMI has positive impact on the stock price of S&P 500 stock market. D-W is 2.036 (DW: 1.5-2.5) and it mean there is good correlation between PMI and the stock price of the S&P 500 stock market. At last, the beta value is 0.305** ($\beta \neq 0$ and P value<0.05 or <0.001 or <0.10) and it mean is the influence of the PMI is positive to the stock price of the USA.

Model-5: The effect of the Unemployment Rate (U^R) on the stock price of the S&P 500 stock market

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.185, R^2 is 0.034 and the adjusted R^2 is 0.027 (Adj- $R^2 < 0.5$), it meaning that 3.4% of the variance on the stock price of the S&P 500 stock market can be predicted from the Unemployment Rate. The F value is 4.625 ($F \geq 4$) and it mean is significant. This indicates that when the unemployment rate is entered by itself, it is the significant predictor of the stock price in the S&P 500 stock market. The next important part of the output to check is T value. In this case, T value equal to -2.151 ($T > 1.96$) and it mean is the unemployment rate has negative impact on the stock price of S&P 500 stock market. D-W is 1.824 (DW: 1.5-2.5)

and it mean there is normal correlation between the unemployment rate and the stock price of the S&P 500 stock market. At last, the beta value is -0.185 ($\beta \neq 0$) and it mean is the effect of the unemployment rate is negative to the stock price of the USA.

4.2.2 Japan Market

Table 4.5 Results of the Single Regression Analysis of Model 6-10

Independent Variables	**Dependent Variable "Tokyo stock index TOPIX"**				
	Model 6	**Model 7**	**Model 8**	**Model 9**	**Model 10**
	Beta (β)	**Beta (β)**	**Beta (β)**	**Beta (β)**	**Beta (β)**
CPI	0.13^{+}				
GDP		0.141**			
M^s			0.181**		
PMI				-0.106	
U^r					0.144**
R	0.130	0.141	0.181	0.106	0.144
R^2	0.017	0.020	0.033	0.011	0.021
Adj-R^2	0.009	0.012	0.025	0.004	0.013
***F*-value**	2.252	2.619	4.419	1.476	2.755
***T*-value**	1.501	1.618	2.102	-1.215	1.660
D-W	1.559	1.543	1.475	1.514	1.534

Note: *** p < 0.001, ** p<0.01, * p< 0.05, $^{+}$p<0.1

Data source: This Research Summarized

Table 4.5 shows that result of the influence of the five macroeconomic variables on the stock price of the Tokyo stock exchange (TOPIX) in Japan.

Model-6: The effect of the Consumer Price Index on the stock price of the Tokyo stock exchange (TOPIX)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.13, R^2 is 0.017 and the adjusted R^2 is 0.009 (Adj- $R^2 < 0.5$), it meaning that 1.7% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the Consumer Price Index. The F value is 2.242 ($F \geq 4$) and it mean is insignificant. This indicates that when CPI is entered by itself, it is the insignificant predictor of the stock price in the Tokyo stock exchange (TOPIX). The next important part of the output to check is T value. In this case, T value equal to 1.501 ($T > 1.96$) and it mean is the CPI has insignificant impact on the stock price of the Tokyo stock exchange (TOPIX). D-W is 1.559 (DW: 1.5-2.5) and it mean there is normal correlation between CPI and the stock price of the Tokyo stock exchange (TOPIX). At last, the beta value is 0.13^{+} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the CPI is positive to the stock price of the Japan.

Model-7: The effect of the Gross Domestic Product on the stock price of the Tokyo stock exchange (TOPIX)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.141, R^2 is 0.02 and the adjusted R^2 is 0.012 (Adj- $R^2 < 0.5$), it meaning that 2% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the Gross Domestic Product. The F value is 2.619 ($F \geq 4$) and it mean is insignificant. This indicates that when GDP is entered by itself, it is the insignificant predictor of the stock price in the Tokyo stock

exchange (TOPIX). The next important part of the output to check is T value. In this case, T value equal to 1.618 (T > 1.96) and it mean is the GDP has insignificant impact on the stock price of the Tokyo stock exchange (TOPIX). D-W is 1.543 (DW: 1.5-2.5) and it mean there is normal correlation between GDP and the stock price of the Tokyo stock exchange (TOPIX). At last, the beta value is 0.141^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the GDP is positive to the stock price of the Japan.

Model-8: The effect of the Money Supply on the stock price of the Tokyo stock exchange (TOPIX)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.181, R^2 is 0.033 and the adjusted R^2 is 0.025 (Adj- $R^2 < 0.5$), it meaning that 3.3% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the Money Supply. The F value is 4.419 ($F \geq 4$) and it mean is significant. This indicates that when the M^S is entered by itself, it is the significant predictor of the stock price in the Tokyo stock exchange (TOPIX). The next important part of the output to check is T value. In this case, T value equal to 2.102 (T > 1.96) and it mean is the M^S has positive impact on the stock price of the Tokyo stock exchange (TOPIX). D-W is 1.475 (DW: 1.5-2.5) and it mean the correlation between M^S and the stock price of the Tokyo stock exchange (TOPIX) is not strongly. At last, the beta value is 0.181^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the GDP is positive to the stock price of the Japan.

Model-9: The effect of the Purchasing Manager Index on the stock price of the Tokyo stock exchange (TOPIX)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.106, R^2 is 0.011 and the adjusted R^2 is 0.004 (Adj- $R^2 < 0.5$), it meaning that 1.1% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the Purchasing Manager Index. The F value is 1.476 ($F \geq 4$) and it mean is insignificant. This indicates that when PMI is entered by itself, it is the insignificant predictor of the stock price in the Tokyo stock exchange (TOPIX). The next important part of the output to check is T value. In this case, T value equal to -1.215 ($T > 1.96$) and it mean is the PMI has negative impact on the stock price of the Tokyo stock exchange (TOPIX). D-W is 1.514 (DW: 1.5-2.5) and it mean there is normal correlation between PMI and the stock price of the Tokyo stock exchange (TOPIX). At last, the beta value is -0.106 ($\beta \neq 0$) and it mean is the influences of the PMI is negative to the stock price of the Japan.

Model-10: The effect of the Unemployment Rate on the stock price of the Tokyo stock exchange (TOPIX)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.144, R^2 is 0.021 and the adjusted R^2 is 0.013 (Adj- $R^2 < 0.5$), it meaning that 2,1% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the Unemployment Rate. The F value is 2.755 ($F \geq 4$) and it mean is insignificant. This indicates that when U^R is entered by itself, it is the insignificant predictor of the stock price in the Tokyo stock exchange (TOPIX). The next important part of the output to check is T value. In this case, T value equal to 1.660 ($T > 1.96$) and it mean is the U^R has insignificant impact on the stock price of the Tokyo stock exchange (TOPIX). D-W is 1.534 (DW: 1.5-2.5) and it mean there is normal correlation between U^R and the stock price of the Tokyo stock exchange (TOPIX). At last, the beta value is 0.144^{**} (P value<0.05 or

<0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the U^R is positive to the stock price of the Japan.

4.2.3 China Market

Table 4.6 Results of the Single Regression Analysis of Model 11-15

Independent Variables	**Dependent Variable "Shanghai B Stock Index"**				
	Model 11	**Model 12**	**Model 13**	**Model 14**	**Model 15**
	Beta (β)	**Beta (β)**	**Beta (β)**	**Beta (β)**	**Beta (β)**
CPI	0.103**				
GDP		0.177**			
M^s			0.094**		
PMI				0.114**	
U^r					0.239**
R	0.103	0.177	0.094	0.114	0.239
R^2	0.011	0.031	0.009	0.013	0.057
Adj-R^2	0.003	0.024	0.001	0.005	0.050
***F*-value**	1.395	4.184	1.150	1.724	7.876
***T*-value**	1.181	2.046	1.072	1.313	2.806
D-W	1.783	1.844	1.791	1.822	1.773

Note: *** p < 0.001, ** p<0.01, * p< 0.05, $^{+}$p<0.1

Data source: This Research Summarized

Table 4.6 shows that result of the influence of the five macroeconomic variables on the stock price of the Shanghai Stock market (B) in China.

Model-11: The effect of the Consumer Price Index on the stock price of the Shanghai Stock market (B)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.103, R^2 is 0.011 and the adjusted R^2 is 0.003 (Adj- $R^2 < 0.5$), it meaning that 1.1% of the variance on the stock price of the Shanghai Stock market (B) can be predicted from the Consumer Price Index. The F value is 1.395 ($F \geq 4$) and it mean is insignificant. This indicates that when CPI is entered by itself, it is the insignificant predictor of the stock price in the Shanghai Stock market (B). The next important part of the output to check is T value. In this case, T value equal to 1.181 ($T > 1.96$) and it mean is the CPI has insignificant impact on the stock price of the Shanghai Stock market (B). D-W is 1.783 (DW: 1.5-2.5) and it mean there is normal correlation between CPI and the stock price of the Shanghai Stock market (B). At last, the beta value is 0.103^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the CPI is positive to the stock price of the China.

Model-12: The effect of the Gross Domestic Product on the stock price of the Shanghai Stock market (B)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.177, R^2 is 0.031 and the adjusted R^2 is 0.024 (Adj- $R^2 < 0.5$), it meaning that 3.1% of the variance on the stock price of the Shanghai Stock market (B) can be predicted from the Gross Domestic Product. The F value is 4.184 ($F \geq 4$) and it mean is significant. This indicates that when GDP is entered by itself, it is the significant predictor of the stock price in the Shanghai Stock market (B). The next important part of the output to check is T value. In this case, T value equal to 2.046 ($T > 1.96$) and it mean is the GDP has positive impact in the stock price of the Shanghai Stock market (B). D-W is 1.844 (DW: 1.5-2.5) and it mean there is

normal correlation between GDP and the stock price of the Shanghai Stock market (B). At last, the beta value is 0.177^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the GDP is positive to the stock price of the China.

Model-13: The effect of the Money Supply on the stock price of the Shanghai Stock market (B)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.094, R^2 is 0.009 and the adjusted R^2 is 0.001 (Adj- $R^2 < 0.5$), it meaning that 0.9% of the variance on the stock price of the Shanghai Stock market (B) can be predicted from the Money Supply. The F value is 1.15 ($F \geq 4$) and it mean is insignificant. This indicates that when M^S is entered by itself, it is the insignificant predictor of the stock price in the Shanghai Stock market (B). The next important part of the output to check is T value. In this case, T value equal to 1.072 ($T > 1.96$) and it mean is the M^S has insignificant impact on the stock price of the Shanghai Stock market (B). D-W is 1.791 (DW: 1.5-2.5) and it mean there is normal correlation between M^S and the stock price of the Shanghai Stock market (B). At last, the beta value is 0.094^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the M^S is positive to the stock price of the China.

Model-14: The effect of the Purchasing Manager Index on the stock price of the Shanghai Stock market (B)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.114, R^2 is 0.013 and the adjusted R^2 is 0.005 (Adj- $R^2 < 0.5$), it meaning that 1.3% of the variance on the stock price of the Shanghai Stock market (B) can be predicted from the Purchasing Manager Index. The F value is 1.724 ($F \geq 4$) and it mean is insignificant. This indicates that when PMI is entered by itself, it is the insignificant predictor of the stock price in the Shanghai Stock market (B).

The next important part of the output to check is T value. In this case, T value equal to 1.313 (T > 1.96) and it mean is the PMI has insignificant impact on the stock price of the Shanghai Stock market (B). D-W is 1.822 (DW: 1.5-2.5) and it mean there is normal correlation between PMI and the stock price of the Shanghai Stock market (B). At last, the beta value is 0.114^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the PMI is positive to the stock price of the China.

Model-15: The effect of the Unemployment Rate on the stock price of the Shanghai Stock market (B)

In this result, the multiple correlation coefficient (R), using all the predictors simultaneously, is 0.239, R^2 is 0.057 and the adjusted R^2 is 0.05 (Adj- $R^2 < 0.5$), it meaning that 5.7% of the variance on the stock price of the Shanghai Stock market (B) can be predicted from the Unemployment Rate. The F value is 7.876 ($F \geq 4$) and it mean is strongly significant. This indicates that when U^R is entered by itself, it is the significant predictor of the stock price in the Shanghai Stock market (B). The next important part of the output to check is T value. In this case, T value equal to 2.806 (T > 1.96) and it mean is the U^R has significant impact on the stock price of the Shanghai Stock market (B). D-W is 1.773 (DW: 1.5-2.5) and it mean there is normal correlation between U^R and the stock price of the Shanghai Stock market (B). At last, the beta value is 0.239^{**} (P value<0.05 or <0.001 or <0.10 and $\beta \neq 0$) and it mean is the influences of the U^R is positive to the stock price of the China. Furthermore, the beta is measured in units of standard deviation. According to a large value indicates that a unit change in this predictor variable has a large effect on the criterion variable, the beta value (0.239^{**}) has strong effect on the stock price of the Shanghai Stock market (B).

4.3 Multiple Regression Analysis

The multiple regressions model is helped to explore more about the relationship between all the independent variables and a dependent variable. On the other word, the purpose of multiple regression model is to investigate the explained ability for all the macroeconomics variables on market index price. The empirical results of multiple regression analysis of the macroeconomic variables on market stock price are shown in Table 4.7-4.9 for USA, Japan and China.

Table 4.7 The Effect of All 5 Macroeconomic Variables on the Stock Price of the S&P 500 Stock Market in The USA

Independent Variables	**Dependent Variable "NY S&P 500 Stock index"**					
	Beta (β)	*T*-value	R Square	Adjusted R Square	F Value	Durbin Watson
CPI	-0.142	-1.781				
GDP	0.257**	3.112				
M^s	-0.099	-1.195				
PMI	0.35^+	4.224	0.212	0.181	6.791	2.238
U^r	-0.158	-1.973				

Note: *** $p < 0.001$, ** $p<0.01$, * $p< 0.05$, $^+p<0.1$

Data source: This Research Summarized

Table 4.7 reveals that which variable from CPI, GDP, M^S, PMI and U^R has so strongly effect and most inefficient effect on the stock price of the USA. By the output, GDP (0.257**) has most significant effect on the stock price of the USA, after that, PMI (0.35^+) has positive effect on the stock price of the USA, but the CPI (-0.142), money supply (-0.099) and unemployment rate (-0.158) have

negative effect on the stock price of the USA. The next important predictor is T value. In this case, only T values of PMI (4.224) and GDP (3.112) have strongly positive effect on the stock price of the NY S&P 500 stock market in the USA. But, another three predictors – CPI (-1.781), M^S (-1.195) and U^R (-1.973) have negative effect on the stock price of the USA. In this result, using all the predictors simultaneously, R^2 is 0.212 and the adjusted R^2 is 0.181 (Adj- $R^2 < 0.5$), it meaning that 2.12% of the variance on the stock price of the NY S&P 500 stock market can be predicted from the these 5 variables. The F value is 6.791 ($F \geq 4$) and it mean is significant. This represents the overall significance of our model. Also, D-W is 2.238 (DW: 1.5-2.5) and it mean there is good correlation between these 5 macroeconomic variables and the stock price of the S&P 500 stock market in the USA.

Table 4.8 indicates that which variable from CPI, GDP, M^S, PMI and U^R has so strongly effect and most inefficient effect on the stock price of Japan. By the output, M^S (0.181**) has most significant effect on the stock price of the Japan, after that, CPI (0.148**), GDP (0.103**) and U^R (0.061**) have positive effect on the stock price of Japan, but only PMI (-0.086) has negative effect on the stock price of Japan. The next important predictor is T value. In this case, also T value of M^S (2.109) has strongly positive effect on the stock price of the Tokyo stock exchange in Japan. But CPI (1.727), GDP (1.057) and U^R (0.569) have insignificant impacts on the stock price of Japan. Only PMI (-1.881) has negative effect on the stock price of Japan. In this result, using all the predictors simultaneously, R^2 is 0.084 and the adjusted R^2 is 0.048 (Adj- $R^2 < 0.5$), it meaning that 8.4% of the variance on the stock price of the Tokyo stock exchange (TOPIX) can be predicted from the these 5 variables. The F value is 2.325 ($F \geq 4$) and it mean that variable is insignificant on the stock price of Japan. Also, D-W is 1.556

(DW: 1.5-2.5) and it mean there is normal correlation between these 5 macroeconomic variables and the stock price of the Tokyo stock exchange (TOPIX) in Japan.

Table 4.8 The Effect of the All 5 Macroeconomic Variables on the Stock Price of the Tokyo Stock Exchange (TOPIX) in Japan

Independent Variables	**Dependent Variable "Tokyo TOPIX stock index"**					
	Beta (β)	*T*-value	R Square	Adjusted R Square	F Value	Durbin Watson
CPI	0.148**	1.727				
GDP	0.103**	1.057				
M^s	0.181**	2.109				
PMI	-0.086	-0.881	0.084	0.048	2.325	1.556
U^r	0.061**	0.569				

Note: *** p < 0.001, ** p<0.01, * p< 0.05, $^{+}$p<0.1

Data source: This Research Summarized

Table 4.9 signifies that which variable from CPI, GDP, M^S, PMI and U^R has so strongly effect and most inefficient effect on the stock price of the China. By the output, U^R (0.225**) has most strong effect on the stock price of China, after that, PMI (0.099**), GDP (0.084**) and M^S (0.068**) have positive effect on the stock price of China, and only CPI (0.13^{+}) has insignificant effect on the stock price of China. The next important predictor is T value. In this case, also T value of U^R (2.457) has strongly positive effect on the stock price of the Shanghai stock market in China. But for others, CPI (1.536), (1.096), PMI (1.096), GDP (0.901) and M^S (0.779) have insignificant impact on the stock price of Japan. In this result, using

all the predictors simultaneously, R^2 is 0.1 and the adjusted R^2 is 0.064 (Adj- R^2 < 0.5), it meaning that 10% of the variance on the stock price of the Shanghai stock market can be predicted from the these 5 variables. The F value is 2.799 ($F \geq 4$) and it mean that variable is insignificant on the stock price of China. Also, D-W is 1.908 (DW: 1.5-2.5) and it mean there is good correlation between these 5 macroeconomic variables and the stock price of the Shanghai stock market in China.

Table 4.9 The Effect of the All 5 Macroeconomic Variables on the Stock Price of the Shanghai Stock Market (B) in China

Independent Variables	**Dependent Variable "Shanghai B Stock Index"**					
	Beta (β)	*T*-value	R Square	Adjusted R Square	F Value	Durbin Watson
CPI	0.13^{+}	1.536				
GDP	0.084**	0.901				
M^s	0.068**	0.779				
PMI	0.099**	1.096	0.100	0.064	2.799	1.908
U^r	0.225**	2.457				

Note: *** p < 0.001, ** p<0.01, * p< 0.05, $^{+}$p<0.1

Data source: This Research Summarized

4.4 The Summary of Empirical Result

Table 4.10 shows the all empirical results in the single regression analysis and table 4.11 shows the all empirical results in the multiple regression analysis.

Table 4.10 The Summary of the Single Regressions' Result

Independent Variables	Dependent Variables														
	"NY S&P 500 Stock index"					"Tokyo stock index TOPIX"					"Shanghai B Stock Index"				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta
CPI	-0.093					0.13^{+}					0.103**				
GDP		0.195**					0.141**					0.177**			
M^s			-0.130					0.181**					0.094**		
PMI				0.305**					-0.106					0.114**	
U^r					-0.185					0.144**					0.239**
R	0.093	0.195	0.130	0.305	0.185	0.130	0.141	0.181	0.106	0.144	0.103	0.177	0.094	0.114	0.239
R^2	0.009	0.038	0.017	0.093	0.034	0.017	0.020	0.033	0.011	0.021	0.011	0.031	0.009	0.013	0.057
Adj-R^2	0.001	0.031	0.009	0.086	0.027	0.009	0.012	0.025	0.004	0.013	0.003	0.024	0.001	0.005	0.050
***F*-value**	1.141	5.136	2.246	13.354	4.625	2.252	2.619	4.419	1.476	2.755	1.395	4.184	1.150	1.724	7.876
***T*-value**	-1.068	2.266	-1.499	3.654	-2.151	1.501	1.618	2.102	-1.215	1.660	1.181	2.046	1.072	1.313	2.806

Data source: This Research Summarized

Table 4.11 The Summary of the Multiple Regressions' Result

Independent Variables	Dependent Variables					
	"NY S&P 500 Stock index"		**"Tokyo stock index TOPIX"**		**"Shanghai B Stock Index"**	
	Model 4		**Model 5**		**Model 6**	
	Beta (β)	T-value	Beta (β)	T-value	Beta (β)	T-value
CPI	-0.142	-1.781	0.148**	1.727	0.13^{+}	1.536
GDP	0.257**	3.112	0.103**	1.057	0.084**	0.901
M^s	-0.099	-1.195	0.181**	2.109	0.068**	0.779
PMI	0.35^{+}	4.224	-0.086	-0.881	0.099**	1.096
U^r	-0.158	-1.973	0.061**	0.569	0.225**	2.457
R^2	0.212		0.084		0.100	
Adj-R^2	0.181		0.048		0.064	
***F*-value**	6.791		2.325		2.799	
***T*-value**	2.238		1.556		1.908	

Data source: This Research Summarized

In sum, it found that the explain ability of multiple regression model is significantly better than single regression model. And some variables' explain abilities are insignificant in single variable models but significant in multiple regression models. It implies that the macroeconomic variables have combined effect on the stock market index. From the empirical results and the models' analysis, we can draw the following 6 conclusions:

Firstly, the impacts of the CPI, money supply and unemployment rate are limited on the stock price. Especially, these three macroeconomic variables have the strongly negative effect on the stock price of the USA stock market. But in the evidence of Japan and China, the CPI, money supply and unemployment rate have the positive impact on the stock price.

Secondly, the PMI has the positive impact on the stock price because in the cases of the USA and China, it implied that if the PMI increase the stock price will be simulated. However, in the case of Japan, its stock price is affected by the PMI negatively.

Thirdly, the empirical results reveal that the GDP has the empire positive impact on the stock price to all sample markets in this study.

Fourthly, on the other hand, excepting the negative effect of PMI, the correlations of the CPI, GDP, unemployment rate and money supply and the stock price are very efficient and positive for the Tokyo stock exchange. The money supply has the strong effect on the stock price than others in Japan.

Fifthly, in based on the USA stock index, the GDP and PMI have the positive impact on the stock price, but the CPI, money supply and unemployment

rate have the negative impact on the stock price. The relationship between the PMI and stock price is so efficient than others in the USA.

Sixth, we have found that all the macroeconomic variables in our study positively effected on the stock price of China. Among them, the unemployment rate is most significant on the stock price than others in case of China.

CHAPTER FIVE

5.1 Overall Conclusions

Our empirical study aims to demonstrate which main macroeconomic variable can explain the stock price well and what the relationship is between the macroeconomic variables and the market index price. This study demonstrate the empirical work evidence on the USA, Japan and China which are the biggest markets in the world. We have employed both the single variable regression and multiple regression analysis to implement the empirical work. The empirical data covers the monthly data during the period of January 2005 to December 2015 (240 monthly observations in total). The macroeconomic variables used to explain the market price index by this study are the GDP, PMI, CPI, money supply and unemployment rate which are usually recognized as the key factor impact on the performance of market price index. As the result, the stock prices are used as dependent variables, while the macroeconomic variables are used as independent variables in the regression analysis.

The results of single regression analysis are different to the multiple regression models. According to our empirical result, the explanatory ability of unit macroeconomic variable is usually insignificant, however, if the other variable are incorporated into the regression model, the model explanatory ability increase sharply. The possible reason might be these macroeconomic variables impact jointly on the market price index. Besides that, their explanatory powers on sample markets are different. It might be related to an economic situation of every country. For example, during the time period of 2005-2015 the economic situation of the USA was not good related to the economic crisis of 2008. But the effect of this economic crisis was good to the economy of China. That is why, these three stock

markets influenced by the selected 5 macroeconomic variables are different and also the effects in the stock price returns of these three countries are different.

The result shown that the stock price of the USA was influenced by the CPI, money supply and the unemployment rate negatively and it means if these three indicators would fall down (rise up), a stock price might replace it; however the PMI and GDP have positively effect on the stock price in the USA. In sum, the stock price of the USA is affected by our selected macroeconomic variables most weak and limited than other two countries.

One of the important findings has been found in the case of China. This result revealed that these five macroeconomic variables all have significantly and positively impact on the stock price of China. It means the expansion or reduction of these selected macroeconomic variables is plays in important part in determining the stock price of China. At last, the stock price of China is affected by all selected macroeconomic variables most significantly positive than other two countries.

In the case of Japan, the PMI has negative effect on the stock price and it means when PMI increases, the stock price of Japan will decrease, however it influenced by the another four macroeconomic variables positively. So, future investors who want to invest Tokyo stock exchange should beware of the inverse of PMI.

Finally, in the based on the theoretical results, we have concluded that the GDP has most significantly positive impact on the stock price; it implies the GDP is as a key macroeconomic variable which can best explain the market price index. It means if a GDP in a country increases, then a stock price of that county would increase too. If a GDP decreases, also a stock price would decrease. Also, another

four macroeconomic variables can explain the market price index significant and we are suggesting that these five macroeconomic variables all can explain the market price index significantly. Except the GDP, however other four macroeconomic variables have different effects on the stock price of each country, but it is possible to make a profit by the negative effect of these indicators to investors. For it, future investors need to give attention more to a movement and change in economic situation of each country which is caused by these 5 macroeconomic variables. Our result is agree with the previous studies and demonstrated that these five macroeconomic variables are most efficiently predictors on the stock prices of the countries which are the USA, Japan and China.

5.2 Limitation and Recommendation for Further Research

5.2.1 Limitations

Although our study has achieved the aims, there are some avoidable limitations in the study and we should concentrate on solving these limitations:

1. In this study, we collect the data from Taiwan economic journal and the economic formal website. While the sources of these data are of high quality; there are other factors that must be imputed while completing this research. The reason being the limitation of quality, measure and access.
2. All the collected data are not same time period. Although the outputs in this study are analyzed in accordance with the rule, some collected data are monthly data, but some of them yearly and quarterly data. The limit of date period accuracy might affect the outputs.
3. Also, we selected the data covered in the years of 2005-2015. According to the impact of the global economic crisis (2008), the whole world economic situation was changing drastically within a 10 year period. This

economic change affected the stock market of each country in the world (whether it is positive or negative). That is why the selected time period in this study might have been influenced; resulting in differences in the empirical result compared to another time period.

4. The findings of the study were limited to three countries. Including the five macroeconomic variables for avoiding the reciprocal effects between markets and explained variables (which might report the empirical result of most stock markets and macroeconomics variables).
5. This study was analyzed by both the single regression and multiple regressions (which are not just one way to reach the aims for all academic papers alike). Future researchers need to consider that there are diversified methods to formulate data.

5.2.2 Recommendations

In order to achieve a deeper understanding of the stock price movement, future researchers and investors need to focus on these recommendations:

1. We suggest that any researcher deciding to investigate a topic similar to this study is welcome to. Reason being, the scope of this study is available to be extended and reviewed in regards to the long term relationship between macroeconomic variables and stock price return.
2. Impacts of macroeconomic variables on a stock price are so diversified in every country; due to the economic situations, developments and characteristics in any given region. So, future researchers need to involve more countries and stock markets. Involving over diverse macroeconomic variables is needed for a good analysis; because, the stock prices of every country can be impacted by different macroeconomic variable.

3. We can recommend that besides the regression analysis, future researchers need to utilize a more precise methodology to demonstrate a significant output. There are a lot of method and tools to examine selected data.
4. For investors who want to invest the stock market of our selected countries, need to focus on all relevant sources of any information when making an investment decision. Furthermore, they need to anticipate the role of macroeconomic variables on the stock price of every country. While focusing on how an investor can reduce investment risk by undertaking a strong portfolio diversification strategy.

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