EXPLORATORY FACTOR ANALYSIS ON HONG KONG EQUITY MARKET

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given on the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutions of learning.

(3) Equal contribution has been made by each group member in completing the research project.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AMS	Automatic Order Matching and Execution System
APT	Arbitrage Pricing Theory
CAPM	Capital Pricing Model
CF	Cash Flow
CRSP	Centre for Research in Security Pricing
DIV	Dividend Yield
EFA	Exploratory Factor Analysis
EMH	Efficient Market Hypothesis
ETF	Exchange Traded Fund
FZ	Firm Size
GLS	Generalized Least Square
HKSE	Hong Kong Stock Exchange
HKEX	Hong Kong Exchange and Currency
HKD	Hong Kong Dollar
IPO	Initial Public Offering
LEV	Leverage
MBV	Market-to-Book Value
NYSE	New York Stock Exchange
OLS	Ordinary Least Square
P/E	P/E Ratio
ROI	Return on Investment

PREFACE

This research is a study on the determination of the Stock Return in Hong Kong Stock Market with the use of the method of Exploratory Factor Analysis. The study conducted is based on the data obtained upon from year 2000 until 2010 from the 45 listed companies. In here, a special thanks to our supervisor, Mr. Lim Tze Jian. Without his encouragement and guidance this project would not be materialized. Further we would like to thank our second examiner, Mr. Keh who pointed out on our work development so that we are able to fix it constructively. Also, Miss Lim, the coordinator for the briefing and guidance all along the period of the final year project.

ABSTRACT

This research adopt an alternative way to determine the stock returns in 45 selected companies which are listed in Hong Kong Stock Exchange (HKSE) from year 2000 to 2010. Additionally, exploratory factor analysis is undertaken in order to obtain a superior result as it allows discovering the hidden factors in a set of variables which explain stock return. Besides, we employ the Ordinary Linear Square (OLS) method to examine the relationship between the stock returns and factor variables through dimension reduction technique. In our study, we found that in year 2001, there are six factors, which are cash flow, leverage, firm size, dividend, market-to-book value and P/E ratio will affects stock returns in HKSE. Meanwhile, in year 2008, there are only four factors which are similar to year 2001 excluding market-to-book value and P/E ratio. Besides, there are five factors for year 2000 and the remaining years. Those factors are same as year 2001, excluding P/E ratio. On the other hand, we found that the model we employed in year 2000 is significant to explain the stock returns, whereas others are not.

Keywords: Cash Flow (CF), Leverage (LEV), Firm Size (FZ), Dividend (DIV), Market- to- book Value (MBV), Hong Kong Stock Exchange (HKSE), Hang Seng Index (HSI).

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

Several variables which are significant to stock returns can be determined from the economy and financial perspectives. Meanwhile, the purpose of this research project is to investigate the hidden factors in a set of variables which will generally affect the stock returns in Hong Kong Stock Exchange (HKSE) by adopting exploratory factor analysis. The major objective of this chapter is to enable the readers to develop a better understanding about the topic layout which are concerned in this study. Alternatively, description about the background of HKSE, significant events, problem statement, research objectives, research questions, hypotheses and significant of the study as well as chapter layout will be included in this chapter. Lastly, the structure of this study from chapter 2 until chapter 5 will be more detailed in further chapters.

1.1 Background of Hong Kong Stock Exchange (HKSE)

Hong Kong is one of the world's leading international financial centers. It is a major capitalist service economy characterized by low taxation and free trade. Besides, the currency of Hong Kong, Hong Kong dollar (HKD), is the ninth most traded currency in the world. Hong Kong has remained as the world's free economy, according to the Index of Economic Freedom since the inception of the index in year 1995.

The Index measures restrictions on business, trade, investment, finance, property rights and labour associated with consideration of the impact of corruption, government size and monetary controls in 183 economies.

Hong Kong is also the only country to have ever scored 90 points or above on the 100 points scale. Furthermore, Hong Kong Stock Exchange (HKSE) is the sixth largest in the world, with a market capitalization of about US$2.97 trillion. In year 2006, Hong Kong Exchanges and Clearing (HKEX) have an average daily turnover of 33.4 billion, which is 12 times compared to Shanghai. In year 2009, Hong Kong has become the largest center of initial public offerings (IPO) capital in the world.

Hong Kong Stock Exchange (HKSE) is located in Victoria, Hong Kong. It is the third largest stock exchange market in Asia in terms of market capitalization, after Tokyo Stock Exchange and Shanghai Stock Exchange. It is also the sixth largest stock exchange market in the world. HKSE is the holding company of The Stock Exchange of Hong Kong Limited, Hong Kong Futures Exchange Limited and Hong Kong Securities Clearing Company Limited. Moreover, HKSE has successfully transformed Hong Kong's financial services industry from a domestically focused market to become a central market place in Asia by attracting investment funds and converging the market organization from all over the world.

Apart from this, HKSE was formed in year 1947. It merged by the first formal securities market, the Association of Stockbrokers in Hong Kong (1891) and the second exchange, the Hong Kong Stockbrokers' Association which established in year 1921. After Second World War, HKSE was re-established and merged with other four notional exchanges in the end of 20^{th} century.

HKSE also used electronic trading as their trading system by first introduced a computer-assisted trading system on 2 April 1986. In year 1993, HKSE launched the "Automatic Order Matching and Execution system" (AMS), which was replaced by the third generation system (AMS/3) in October 2000.

Meanwhile, the operations of HKSE are organized into focused units which directly supervised and controlled by management and the board of directors. HKSE acts as the operator and frontline regulator of the central securities and derivatives marketplace in Hong Kong. It provides services such as comprise trading, clearing and settlement, depository and nominee service, and information services.

The vision of HKSE is to become the commercial entity with public duties and responsible for the operation of the central marketplace. In addition, its initiatives reinforce Hong Kong's standing as an international financial centre and support the country's further development. The mission statement of HKSE for year 2020 is to create and operate international public financial markets actively in Hong Kong.

Until the end of April 2012, there were 1,516 companies listed under HKSE with the market capitalization of $20,231 billion Hong Kong dollar. The trading securities in HKSE include equities, derivative warrants, Exchange-Traded Fund (ETF), bonds, stock and index options, and futures. Apart from securities products, HKSE also provides derivatives products, clearing services, data products, issuer services and hosting services.

1.2 Significant Events

Hang Seng Index (HSI) is a market capitalization-weighted stock market index in Hong Kong. It is the most widely quoted barometer for the Hong Kong economy which used to record and monitor daily changes of the largest companies in the Hong Kong Stock Market.

In 2000 and 2002 respectively, the Mini-HIS futures and options contracts were launched to serve the trading and hedging needs of retail investors. This enables investors to manage the investment risk which eventually affect the stock market more effectively.

On 15 September 2008, Lehman Brothers Holdings Incorporate filed for Chapter 11 bankruptcy protection in New York and triggered the bankruptcy of the Lehman Brothers group of companies. The collapse of Lehman Brothers has sparked many major regulatory developments in Asia, including Hong Kong.

Hong Kong was significantly affected by the bankruptcy of the Lehman Brothers.

The domestic stock market of Hong Kong fell abruptly. Hang Seng Index broke below 16,500 and interbank liquidity was also tightened. There was rumors sparked run on Bank of East Asia, reflecting some panic response by investors and financial institutions. The exports of Hong Kong also affected amid the Lehman incident.

Besides, a global financial crisis in 2008 has caused stagnation in development of Hong Kong. According to Zhang Yang (2009), Hong Kong's economic growth was moderated significantly from 6.4% in 2007 to 2.5% in 2008 during the financial crisis.

Investors lost confidence towards Hong Kong stock market lead to the sunk of Hong Kong's capital market. Infrastructure development in the region was suspended caused the unemployment rate of Hong Kong increases.

Famous for its high efficiency and transparency, Hong Kong Government launched a series of economy-boosting infrastructure investment to ease the financial panic. The Ten Major Infrastructure Projects and a large number of small and medium local projects were initiated by Hong Kong Government to boost the economy.

As the results, the strong government support and proper stimulus plans have brought up the economy of Hong Kong, this country started to show real growth in year 2010 after a year of stagnation. Hong Kong's economy is expected to remain competitive in the coming decade.

1.3 Problem Statement

There are numerous studies have been done by researchers such as Akdeniz et al. (2000), Banz (1981), Lakonishok et al. (1994), Wong, K, and Lye, M. (1990) and others to determine the fundamental factors which will affect the stock returns in stock market.

Meanwhile, several of independent variables especially cash flow, firm size, leverage, dividend, market-to-book value and PE ratios have been studied extensively by the experts across the world.

In finance, return on investment (ROI) is the ratio of money lost or earned relative to the amount of money used on an investment. Stock returns are the returns that an investor receives in stock market. It may be in the form of dividends which rewarding shareholders by the companies from time to time or as capital gain through trading in secondary market. Investors able to receive favourable stock return if they purchase stocks at lower price and sell at a higher price in the secondary market. Nonetheless, instead of using Capital Asset Pricing Model (CAPM), there are still many alternative ways have been developed to measure the stock returns.

1.4 Research Objectives

In this research, we use exploratory factor analysis to examine the variables that affect stock market returns. We intend to find the hidden factors that are measured by observed variables, and use these hidden factors (factor scores) to regress on our dependent variable (stock returns). Consequently, this should enable us to obtain a superior result compared to merely regressing the observed variables on the dependent variable (stock returns).

1.5 Research Questions

Estimation of stock returns is crucial for investors, researchers, stock brokers and other interest groups. The quality of stock market analysis and the amount of risk each individual is willing to take help to determine the stock market returns that an investor could earn. Dissimilar to bond market returns, stock returns are capricious in nature.

Hence, it is essential for the investors to speculate on the technical analysis, fundamental basis and know the variables which may influence them. This inspires our interest to do further in depth study as well as figure out the relationship between our dependent and independent variables.

The research questions of our study are whether the accounting information is important to explain the movement of stock market and what are the variables which will affect the stock market returns.

1.6 Hypotheses of the Study

A main testable hypothesis has been developed to guide the direction of our study.

H0**:** The factor variables of Cash Flow (CF), Leverage (LV), Firm Size (FZ), Dividend (DIV), Market-to-Book Value (MBV) and P/E Ratio (P/E) have insignificant effect on price of component stocks in Hong Kong Stock Exchange (HKSE).

H1**:** The factor variables of Cash Flow (CF), Leverage (LV), Firm Size (FZ), Dividend (DIV), Market-to-Book Value (MBV) and P/E Ratio (P/E) have significant effect on price of component stocks in HKSE.

1.7 Significant of the Study

One of the contributions of this study is to reveal a better way which provides more precise estimation of stock returns for investors, researchers, stock brokers and other interest group. For example, CAPM has poor empirical record and this is invalid the use in applications.

Besides, exploratory factor analysis is functional and simplest models in finance. Thenceforth, it analyses the appropriate and relevant factors and able to determine the hidden factors in a set of variables to explain stock returns.

In this study, we include the data of 10 years to determine Hong Kong stock returns, which is longitude study. This is beneficial as it enable us to track changes over the years to figure out the impact of significant events such as U.S crisis and 2007 subprime crisis as well as the stability of the coefficients before and after these events.

1.8 Chapter Layout

For this study, we include the background of Hong Kong Stock Exchange (HKSE), problem statement, research objective, research question, hypothesis and significance of study in our chapter 1.

Chapter 2 - Literature reviews in some relevant journal articles which are related to our study, including the introduction, literature reviews and hypothesis development.

Chapter 3 - Methodologies consisting data sources, research techniques, definition of factor analysis, advantages of the factor analysis, definition of ordinary least square (OLS), data analysis and the coefficient of multiple determinations.

Chapter 4 - Data analysis which discussing how to determine factor rotation and naming the variables. Besides, test of significant by using OLS method will also be discussed in this chapter.

Finally, Chapter 5 reveals the conclusion that can be drawn from this study. Apart from this, other sections such as major finding, implication, limitation and recommendation of the study will also be included in this chapter.

1.9 Conclusion

This present study is focused on examining an alternative way to explain stock returns. Thus, this study attempts to determine factors which have a significant explanatory power to influence stock returns among 45 companies in Hong Kong Stock Exchange (HKSE) for the period 2000 to 2010 by using the exploratory factor analysis. Nevertheless, some limitations of the CAPM have been found when compared to the actual returns and challenges the assumption of a single risk factor that has been made previously. Thus, exploratory factor analysis is adopted in order to explore the hidden elements and provide more precise estimation of stock return for investors, researchers, stock brokers to predict future expected return. A review of the relevant literature is present in chapter 2 to indicate that stock returns is determined by multiple factor such as cash flow, firm size, and market- to- book value, dividend, P/E ratio and leverage.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In the previous chapter, we have discussed about the general background of Hong Kong stock market and significant events of financial market that happened in Hong Kong between years 2000 to 2010. Besides, we also discussed about the problem statement, general and specific objectives, and research question of our study. Moreover, testable hypothesis, significance and chapter layout of our study are also been discussed. Thenceforth, we will discuss about the results of similar studies which have been done by previous researchers in this newly chapter.

There are several ways or types of methodologies to determine the factors which might affect the stock returns. Hence, it is crucial to refer for different journals which have been conducted by previous researchers in order to gain a wider range of perspective and outcomes. Forte and shortcoming such as limitations of previous researches can be taken into consideration to improve this study.

Recently, there are various types of theories and methods that have been proposed to examine those variables which will affect the stock market returns. Although previous literature covered a wide variety of theories and methodologies, our reviews will only focus on four major themes that emerge repeatedly throughout the literature reviewed.

One of the major themes is the variables that can affect the stock market returns, which including cash flow, market-to-book value, dividend yield, leverage, market risk measured by beta, P/E ratio and firm size. Then, follow with the explanation of CAPM, efficient market hypothesis (EMH) and the arbitrage pricing theory (APT).

2.1 Factors That Affected Stock Market Returns in Past Literature

2.1.1 Cash Flow

Daniat and Suhairi (2006) claim that some significant information such as investing activities and gross profit has an impact on expected return of shares in Arab from year 2000 to 2009 by using Ordinary Least Square (OLS) method. However, Meythi (2006) strongly disagree that cash flow from operating activities is insignificant to the expected return in Indonesia. The research is based on 100 manufacturing firms in Bursa Efek Indonesia (BEJ) during year 1992 to 2002 by adopting OLS method. It shows that profits persistence as intervening variables, cash flow from operating activities does not affect stock price.

The cash flow of an asset has two important characteristics, which are degree of its movement with consumption (covariance) and cash flow duration. Based on the consumption-based models of Abel (1999) and Bansal and Yaron (2004), they state that covariance determines stocks exposure to systematic risk.

On the other hand, Lettau and Wathter (2005) claim that there is a negative relation between cash flow duration and stock price from monthly data year 1952 to 2002 by using risk-based model. This is because they strongly believe that high cash flow duration will lead to a lower expected return. Besides, Ang et al. (2006) claim that there is a negative relationship between the cash flow volatility and stock returns in New York from year 1963 to 2010 due to systematic risk and special volatilities.

According to Bansal, Dittmar, and Lundblad (2005) argued that in Sydney from year 1964 to 2002 shown that cross-sectional variation of risk premium can affect by cash flow covariance (Cov), which is using OLS regressions. Higher cash flow covariance will lead to a higher risk premium, beta and consequently a higher return in CAPM.

For instance, an asset with positive (negative) Cov, its cash flow commoves more (less) with aggregate consumption than aggregate consumption. Lettau and Wachter (2007) agree with risk premium affect by cash flow duration from 1952 to 2002 in by using OLS method in United States of America. Meanwhile, large variation in cash flow in cross-sectional cause cash flow duration provides additional explanatory power through a second-order interaction term with cash flow covariance. Therefore, it can explain by two asset have difference return with different cash flow durations such as growth stock portfolios, thus it is necessary to account for cash flow duration.

2.1.2 Market –to–Book

The literatures of the relationship between cross sectional factors and stock returns in Hong Kong. Chan, Hamao, & Lakonishok (1991) argue that there is significant relation between market to book and returns in Japanese stock by using OLS method. A poor prospects' firm has been signaled by low ratio of market-to-book equity and low stock price tends to have greater expected stock returns than strong prospects' firm.

Meanwhile, some researchers claim that there is a positive relationship between market-to-book equity and stock returns in U.S. stock market from year 1979 to 2000 by using OLS method. When book-to-market equity increases, stock returns increase with the successful of detecting the market inefficiency by diverse instrumental variables, which can detects the larger potential profits. Moreover, some researchers claim that positive relationship between market-to-book and stock returns because most of the investors merely have a preference for investing in ‘superior firm’ with high market-to-book and growth. Thenceforth, the firm’s stock price and stock returns will continue to grow (Stattman, 1980; Rosenberg, Reid, & Lanstein, 1985).

2.1.3 Dividend Yield

Hess (1981) makes use of the data from January 1926 until December 1978 from the Centre for Research in Security Prices (CRSP) by OLS method. This researcher discovers a different view on the relationship between stock return and dividend yield, which they are not constant across securities.

According to Blume (1980) that using the data from year 1936 to 1976, he claims that there is a positive relationship between the stock returns and dividend yield by using OLS method. In this research, the risk-adjusted returns on dividend-paying stocks increased monotonically with the anticipated dividend yield throughout the 41 years ending in 1976.

This means that higher dividend yield will leads to greater stock returns as it indicates good cash flow, profitability and company is generally in excellent performance. Besides, this evidence is consistent to Lemmon and Thanh (2008), which employing the data from January of 1973 until December of 2005 in the Hong Kong stock market as neither dividend income nor capital gains is taxed. The result of Lemmon and Thanh (2008) is generally robust for different period of time, different sub-samples and different method for risk adjustment. This is also supported by the researches that have been done previously by Keim (1985) that uses the data from January of 1931 until December of 1978 in the New York Stock Exchange (NYSE), and Litzenberger and Ramaswamy (1982) that utilizes the data from year 1940 until 1980 from the New York Stock Exchange (NYSE).

2.1.4 Leverage

Poutiainen and Zytomierski (2010) uses OLS method and the data from year 1990 to 2009 in Swedish found that there is no evidence that leverage as a stock characteristic can explain returns in cross-sectional regression. Thus, they find no relationship between stock returns and leverage.

On the other hand, Johnson et al. (2010) that adopt the OLS method and the data from year 1965 to 2003 in US find that there is a negative relationship between the leverage or default risk and expected stock returns. In their research, they concur that the endogenous leverage choice and rational pricing may imply a negative and significant relation between debts and expected stock returns. Meanwhile, Muradoglu and Sivaprasad (2008) that utilize the data from year 1980 to 2004 that listed in the London Stock Exchange also discover that leverage has a negative relation with stock returns in the overall samples.

On the contrary, Ozdagli (2010) uses data from year 1962 to 2008 in U.S and obtains different result from his research. In his research, he analyzes the effects of financial leverage on investment and explained the positive relationship between book-to-market values and stock returns by using the firm with limited capital irreversibility and risk-free debt contracts. A firm with high book-to-market ratio will tends to have a higher leverage, consequently higher stock returns.

2.1.5 Market Risk Measured by Beta

Referring to Lakonishok and Shapiro (1984,1986) , they observe the returns of the stocks which are traded on NYSE (New York Stock Exchange) within the periods of year 1962 to 1980 by using OLS method and they notice that the market beta is particularly insignificant or inconsistent to the cross-sectional variation in stock returns. In respect to our resulting evidence, this empirical result is also supported by the researches that have be done in Finland and Sweden (Ostermark, 1991), Canada (Calvet and Lefoll, 1989), United Kingdom (Chan and Chui, 1996), Hong Kong (Cheung and Wong, 1992) and others.

Some papers proved that beta and stock returns are significant positively related when market excess returns are positive and vice versa. This can be explained by low market risk stock is less sensitive to the positive risk premium. Therefore, it will have a higher return than high market risk stocks

A positive risk–return relationship is also discovered by Isakov (1999) in Swiss stock for the period’s year 1973 to 1991 as they follow the methodology of Pettengill, Sundaram and Mathur (1995), which is OLS method. Furthermore, those empirical findings are also consistent with papers done by researchers in other countries, such as UK, Germany and Taiwan (Jagannathan and Wang, 1996; Fletcher, 1997; Elsas, El-Shaer and Theissen, 2003).

According to a number of researchers, value strategies inspire much of dynamic management in U.S. It takes advantage by purchasing assets whose are relatively riskier and prices are low comparative to fundamental value and selling those assets once their prices are high and gain lucrative stock returns.

For example, investor finances in value stocks such as low P/E ratio or high book-to-market’s stocks are likely to put up with higher fundamental risk.

Thus, these investors tend to be compensated by a higher stock returns and be evidence for a positive relationship between market beta and stock returns. (Lakonishok, Shleifer, & Vishny, 1994)

2.1.6 P/E Ratio

Although several papers discover that P/E ratio has no explanatory power to stock returns, such as study carry out by Akdeniz (2000) in Turkey by using OLS method within the periods of year 1992 to 1998. However, some researchers discover a different result by employing the same method in U.S. and Japan. They strongly disagree and argue that stock with high earnings/price ratios (P/E ratio) is able to earn a higher return. They have a positive relationship (Basu, 1977; Chan, Hamao, & Lakonishok, 1991; Fama and French, 1992). This is also supported by Wong and Lye who select year 1975 to 1985 data from Singapore Stock exchange to analyze their relationship by using CAPM (Wong and Lye, 1990).

Meanwhile, the concept of ‘value strategies’ is consistent with the results, where one who invest on low P/E ratio’s stock can get higher stock return. Furthermore, inconsistent of price per earning is sometimes vindicated by some of behavioral and physiological theories. Most of the investors will react excessively to firm news.

When there is news for decreased earnings in the market, the firm’s stock price will be driven down due to overreact by the investors. Corrective effect can only be done in the next few years. Therefore, P/E ratio will be at low levels in the initial year then gradually rises until years where the adjustment takes place. Simultaneously, positive returns are generated due to increase in price. Consequently, low initial levels of P/E ratio are linked with high stock returns and vice versa are discovered in U.S. for the periods of year 1926 to 1982, by using OLS (De Bondt and Thaler 1985, 1987).

2.1.7 Firm Size

In year 1986, Shapiro and Lakonishok (1986) update their investigation by adding in the size of the firm in U.S by using OLS method, within the period of year 1962 to 1981. After the research conducted, they proved neither cross-sectional variation in returns can be explained by the traditional measure of risk (beta) nor the alternative risk measures (variance or residual standard deviation). On the contrary, firm size is the only factor which can explain average stock returns.

Meanwhile, Banz (1981) obtain a negative relationship between the firm size and the stock return in U.S by using Generalized Least Square (GLS) method for the periods year 1926 to 1975. Large firms usually have a lower average stock return than any known CAPM predicts. On the other hand, some significant information such as transaction costs, which are related to the 'size effect' are taken into considerations by the researchers.

Large firms' stocks are relatively liquid and lesser transaction costs incur while trading the stocks. Besides, information of the large firm is easier available, hence the large firm's monitoring cost will be lesser if compared to small firm. However, Schultz and Schwert finds no evidence to conclude that this information can explain low average stock return to large firm's stock in U.S. by using OLS method (Schultz , 1983; Schwert, 1983).

2.2 Stock Pricing Model and Theory

2.2.1 Capital Asset Pricing Model (CAPM) Model

Capital Asset Pricing Model (CAPM) is a model that has been adopted to depict the relationship between the expected return and risk of an investment which is used to obtain an investment's fitting price. It is extended from Harry Markowitz’s modern portfolio theory (MPT), which is also known as portfolio management theory or portfolio theory. MPT is a theory which defines how risk-averse investors can create portfolios to maximize or optimize the expected return if given a certain amount of market risk.

Initially, CAPM is used as a "single factor" way to explain portfolio returns. Some researchers claimed that (a) Expected return of stock is determined by the risk premium and risk free asset. There is a linear relationship between expected return on risky asset and its beta (slope in the regression of a security’s return on the market’s return) and (b) cross section of expected returns are sufficiently described by the market beta in the regression (Lintner, 1965). This model explains that beta is the only determinant that will affect the pricing of risky assets. Other statistic risks measures, for examples, kurtosis, skewness, total risks and other will not affect the risk-return relationship.

However, some limitations of the CAPM have been found when compared to the actual returns and challenges the assumption of a single risk factor that has been made previously. Remarkably, size of firm (Banz, 1981; Akdeniz, Altay, Salih, & Aydogan, 2000), earnings per price ratio (Basu, 1983), past sales growth (Lakonishok, Schleifer, &Vishny,1994), cash flow per price (Rosenberg, Reid, & Lastein,1985), book-to-market equity ratio (Fama and French, 1992, 1996a,1996b; , Altay - Salih, & Aydogan, 2000), leverage

(Bhandari, 1988) have been found could affect average stock return more significantly as compared to the beta. Hence, beta is not the only determinant that affects average stock return.

After the seminal work on U.S. market, Fama and French (1992) found that on average, 70% of realized returns can only be explained by the portfolio's beta. For instance, if a portfolio was increases 10%, about 70% of the return can be explicated by the advance of all stocks. However, the other 30% is affected by other determinates which are not related to beta. Furthermore, they successfully reported that the book-to-market equity is a significant factor which determines stock returns. Meanwhile, beta is only an explanatory variable which do not hold strong explanatory power. This is supported by same results which had been found by previous researchers in Japanese stock market (Chan, Hamao, & Lakonishok, 1991).

Besides CAPM model, alternative ways such as three-factor model have been developed to determine the stock return. Three-factor model was discovered by Fama and French in year 1992. This model was developed by modifying the CAPM equation. Two extra risks factors, which are value risk and size risk, were added into the model.

The original CAPM equation:

$$E(rA) = r(f) + \beta A(E(rm) - rf)$$

where,
r(f) is the risk-free rate and
E(rm) is the equity risk premium.

The Fama and French equation:

$$E(rA) = r(f) + \beta A(E(rm) - rf) + sASMB + hAHML$$

where,

SMB is the "Small Minus Big" market capitalization risk factor and

HML is the "High Minus Low" value premium risk factor.

However, some researchers criticized this three-factor model is not priced after observing at the covariance structure of returns and certain firm characteristics. Thus, it cannot be considered as a risk factor (Daniel and Titman, 1997).

A commonly held view of emerging stock markets is that they are characterized by high return and high volatility. The proportion of variance attributable to world factors has only little influence on the volatility for emerging market (Bekaert and Harvey, 1997). This result is same as other global event, such as Gulf War had little impact (Aggarwal et al., 2009). Thus, there is much more natures of stock returns to be discovered and understand at the individual stock level in these markets.

2.2.2 Efficient Market Hypothesis

As stated in an investment theory, it is impossible for market participants to receive supernormal profit or capital gains from the basis of market info. This is because if market is efficient, the current stock prices completely reflect all available info and each investor is privy to the similar information. According to efficient market hypothesis (EMH), individual or firms can only buy or get rid of stock at its fair value. There is not a single one of them stands a chance to procure stocks below fair value or get rid of the overvalued stocks. Thence, procuring high risk stocks is the only way for the market participants to earn lucrative returns and profits. (Aga and Kocaman, 2008)

Apart from this, the EMH assumes that stock markets are efficient. Nevertheless, strong form efficiency, semi-strong form efficiency and weak form efficiency are the three common classifications of EMH. Each of these three basis forms has dissimilar implications for how the stock markets work. Some researches strongly suggested HKSE is following a random walk model and therefore the index is weak form efficient. Meanwhile, this result has been conflicting and confirmatory supported by the evidence conducted in previous researches (Cheung and Coutts, 2001).

In weak form efficiency, the price of stocks reflects all available trading history and past price of the stocks. The technical analysis cannot be used to recognize stocks which are below or above the fair value as the stock prices are on a random walk. On the contrary, fundamental analysis is effective. Investors may stand a chance to receive supernormal profit or capital gains by fine grinding on the financial statements.

2.2.3 The Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory (APT) was developed by Stephen Ross in year 1976. It was an alternative way to the capital asset pricing model (CAPM). According to Copeland and Fred Weston (1983), the CAPM was predicts that security rates of return will be linearity related to single common factor, the rate of return on the market portfolio.

On the other hand, the APT is based on the same situation, but is much more general. The APT was an asset pricing model that based on the idea that an asset’s returns can be predicted using the relationship between the same asset and many common risk factors. The APT was a single period model in which an investor believes that the stochastic properties of returns of capital assets were consistent with a factor structure (Huberman & Wang, 2005).

According to Copeland and Fred Weston (1983), the formula of Arbitrage Pricing Theory (APT) is assumes the rate of return on any security is a linear function of *k* factors as shown below:

$$\tilde{R}_i = E(\tilde{R}_i) + b_{i1}\tilde{F}_1 + \ldots + b_{ik}\tilde{F}_k + \tilde{e}_i ,$$

Where

$\tilde{R}_i$ = the random rate of return on *i* th asset,

$E(\tilde{R}_i)$ = the expected rate of return on *i* th asset,

b_{ik} = the sensitivity of the *i* th asset's returns to the *k* th factors,

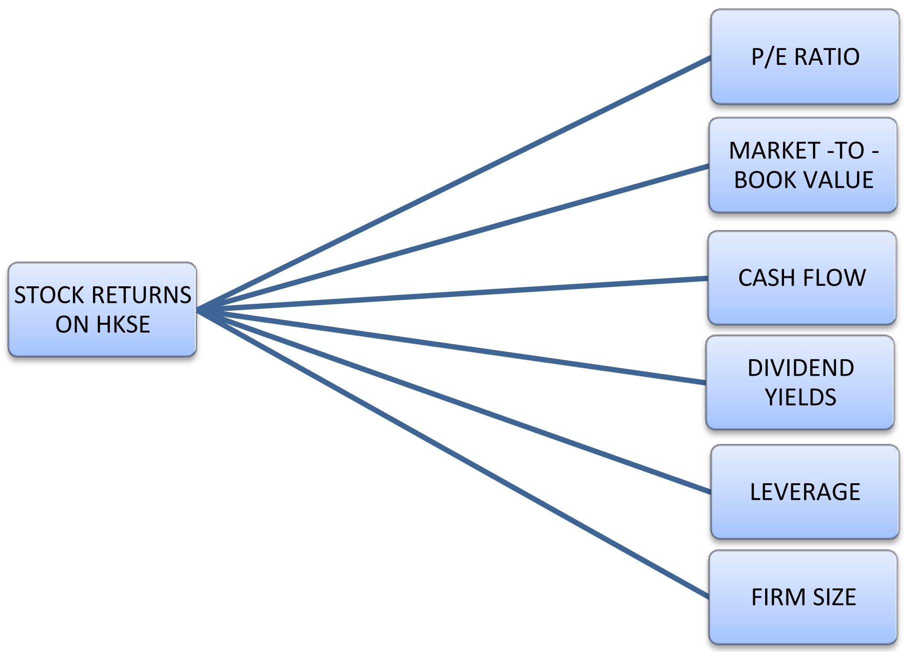
$\tilde{F}_k$ = the mean zero *k* th factor common to the returns of all assets under consideration,

$\tilde{e}_i$ = a random zero mean noise term for the *i* th asset.

In conclusion, the Arbitrage Pricing Theory (APT) can be applied to cost of capital and capital budgeting problems in a multi period framework. Besides, based on the previous empirical test of the APT have shown that the asset returns can be explained by three or four factors. It also ruled out the variance of an asset's own returns as one of the factors.

2.3 Conceptual Framework

DEPENDENT VARIABLE INDEPENDENT VARIABLES



2.4 Hypothesis Development

H0: The independent variables of Cash Flow, Leverage, Firm Size, Dividend, Market-to-Book Value and P/E Ratio are insignificant effect on HKSE

H1: Not all slope coefficients are simultaneously zero.

2.5 Conclusion

In this chapter, several journals which are related to our study have been reviewed in order to get an in-depth knowledge or idea. Furthermore, we also found the relationship between stock returns and variables such as cash flow, book-to-market, dividend yield, leverage, market beta, PE ratio and firm size. This allows us to build out our hypothesis assumptions according to those expected sign.

Before suggesting for an alternative way to determine the variables which can be affect the stock returns, we have briefly looked into the CAPM and theory of EMH, which is related and commonly been use by most of the previous researchers. However, we strongly believe that factor analysis is a better way as it allows us to discover hidden factors which may have an imperceptible effect on stock returns.

In addition, this chapter allows us to obtain a better understanding and concepts in order for us to process to next chapter. In Chapter 3, we will discuss more about the method that we have employed in this study.

CHAPTER 3: DATA AND METHODOLOGY

3.0 Introduction

This chapter describes the research methods used to determine the stock returns. Methodology is a set of methods or procedures used to conduct research. There are two types of methodologies which include qualitative and quantitative methodology that can be used to conduct research. In this study, quantitative methodology had been used for the determining the stock returns. Besides, secondary data collection method had been used in order to investigate the hypotheses and research questions. Secondary data is the data that has been collected and is readily. In fact, there are various methods in collecting information or more precisely data gathering. The research method used for this dissertation purpose is the review of literature from previous studies and collection of data from DataStream. Thus, the purpose of this study is to examine the cross-sectional relationship between the variables and stock returns.

3.1 Data sources

The data of this study covers the period from years 2000 to 2010, which incorporates 45 listed companies in Hong Kong Stock Exchange (HKSE) and Hang Seng Index. The yearly stock price data and company financial statement information was obtained from the DataStream in the library of University Tunku Abdul Rahman. DataStream is the world's largest and most respected historical financial numerical database provided by Thomson Reuters Corporation. From DataStream, company account data which consists of financial performance and account data were obtained and collected to examine the relationship between factors which can affect stock returns.

3.2 Research techniques used: Factor Analysis and Ordinary Least Square (OLS)

Research techniques refer to the instruments and behavior that used in conducting research operations. The instruments and behavior include making observations, recording data and techniques of processing data. In this study, there are two techniques that used to conduct research which include Factor analysis and Ordinary Least Square (OLS) model.

3.2.1 Factor Analysis

Factor analysis is a method used for investigate whether a number of variables of interest are linearly related to a smaller number of unobservable factors by seeking underlying unobservable variable that are reflected in the observed variable. It is a method of data reduction which helps to select small group of representative variables from larger set and reduce the many variables to a more manageable number of variables. Many variables can be explained using factor analysis as the variables are put into categories according to their factor scores and hypotheses can be confirmed.

Furthermore, factor analysis is a technique that is based on the correlation matrix of the variable involved, and correlations usually need large sample size before they stabilize. Hence, it is crucial for researchers to use large sample size to conduct a research. According to Comrey and Lee (1992) and Tabachnick and Fidell (2001), in choosing the sample size, 50 variables are very poor, 100 are poor, 200 are fair, 300 are good and 1000 variables are most excellent. As a rule of thumb, many researchers conclude that a bare minimum of 10 observations per variables is needed in order to avoid the computational difficulties. In this study, there still left 39 variables for the computational after a dimension reduction toward the company data.

Therefore, the sample size used can be considered as an optimized sample size for determine the results of observation.

According to Vierra, R.K and Carlson, D.L (1981), they stated that factor analysis is used to search for patterning the research data. The pattern result suggests the presence of underlying dimension which are hidden in the original data set and only can be measured indirectly. Pattern result indicates a certain degree of structure in the data. This is considered meaningful, particularly when a reasonable amount of the total variation has been accounted for.

There are various methods which can be used to conduct the factor analysis, such as principal component analysis, maximum likelihood, generalized least squares and unweighted least squared. According to Nie et al. (1975), the principal axis factor was conducted using SPSS statistical package in order to perform patterning.

In this study, principal component analysis in a data matrix consisting of 45 companies that listed in the HKSE and 39 variables were performed. There are many options available to perform the analysis for factors which consist of eigenvalues greater than 1.0, such as the original and reproduced correlation matrixes, the scree plot and the plot of rotated factor. However, varimax orthogonal rotation was found as the most common and suitable option to perform the analysis.

3.2.2 Advantages of the Factor Analysis

Factor analysis is useful when researches intend to condense and simplify multivariate data. It can reduce and combine a number of variables into a single factor and identify the relationship of the inter-related variables.

Furthermore, underlying factors that are not directly observed, which known as latent factors can be revealed by using factor analysis. Latent factors are used to determine the relationship among several variables in a research study. Identification of the relationship of latent factors can be easily done by using the technique of factor analysis.

Factor analysis also useful when deal with the curse of dimensionality. The curse of dimensionality refers to the arisen of phenomena in the analysis and organization of high-dimensional spaces of data that do not occur in low-dimensional settings. The volume of the data spaces increases very fast when the dimensionality space of data increases. This cause the available data become sparse and lead to the problem of statistical insignificance. However, factor analysis able to solve the curse of dimensionality by organizing and searching data and grouping objects with similar properties.

According to Tessler and Altinoglu (2004), factor analysis helps to clarify the conceptual locus of various normative orientations and identifies empirically the distinct clusters of items. It will determine the indicators of a single conceptual dimension through the demonstration of the items pertaining to democracy. Factor analysis will shed light on the character of each distinct dimension if the items pertaining to democracy are not the indicators of a single conceptual dimension.

Lastly, high loadings of a common factor by using the scaling technique of factor analysis provide evidence of reproductively and unidimensionality of the factor. This can enhance the reliability and validity of the research study.

3.2.3 Ordinary Least Square (OLS)

OLS, one of the most powerful and popular methods of regression analysis was attributed by Carl Friedrich Gauss. OLS is a method used to estimate the unknown parameters in a linear regression model. The OLS model has several fundamental assumptions which form the foundation for all regression analysis.

The assumptions are:

Assumption 1: Linear Regression Model

Assumption 2: The number of observation must be greater than the number of parameters to be estimated

Assumption 3: Fixed independent variable

Assumption 4: Zero mean value of disturbance

Assumption 5: Homoscedasticity or constant variance of error term

Assumption 6: No autocorrelation between the disturbances

Assumption 7: The nature of independent variable

- Independent variable in a given sample must not be the same.
- Variance of independent variable must be a positive number and is independent from each other
- No outliers in the values of independent variable to avoid the regression results being dominated by such outliers

3.3 Application of Factor Analysis and OLS to our Data Set

3.3.1 Exploratory Factor Analysis

Recently, many studies are featured that “object are characterized by using some of the variables” (Rietveld & Van Hout 1993). For that reason, most of the studies become so complicated.

Furthermore, it may cause the same fundamental variable measured with dissimilar characteristic. Therefore, exploratory factor analysis (EFA) has been invented.

With the use of EFA, it allows most of the inter-correlated hidden variables to be carried out. Specifically, according to Rietveld and Van Hout (1993), the main purpose of the EFA is to construct a new dimensionality by using the dimension reduction technique and give an interpretation to the new data. It is spanned by a reduced number of new dimensions which are supposed to lie behind the previous data. Besides that, EFA also attempts to discover the variances in the unobserved variable and a measure of the factors structure, as well as the internal reliability examination. In brief, EFA offers not only the possibility of gaining a clear view of the data, but also the possibility of using the output in subsequent analyses (Field 2000).

The new dimension of the factors can be pictured as categorization axes by the side of which measurement variables to be plotted (Field 2000). Thus, factor loading and factor score will be carried out due to the projection of the factors. The factor score usually work well in a multiple regression analysis with the creation of new scores. For factor loading, it helps to determine the substantive significant of particular variable in order to characterize them.

Hence, it becomes easier to name the factor as well as interpretation by squaring the factor loading under varimax rotation.

In this study, several steps in the factor analysis which include the factor extraction, factor rotations, as well as interpretation of the results will be presented. However, we do not include the explanation of matrix correlations as factor scores can be served as a solution for multicollinearity problems.

3.3.2 Factor Extraction

According to Field (2003), the options of factor analysis depend on the quantity of the variables as well as the degree of factors loading. Thus, question arises for this case, how many factors should we retain? Basically, the amount of factors to be retained should parallel to the number of positive eigenvalues of the correlation matrix. However, these statements are not so reliable since some of the researchers showed that it is possible to obtain the positive eigenvalues while close to zero. Therefore, according to Field (2000) and Rietveld & Van Hout (1993), some assumptions have been recommended for establishing the number of factors should be retained.

First, under the Guttman-Kaiser rule, researchers should retain only those factors with an eigenvalues larger than 1. Second, at least 70 until 80 percent of total variances should be accounted to retain the factors. Third, researchers need to make a scree plot in order to retain all factors before the breaking point.

3.3.3 Factor Rotation

After factor extraction, difficulty may arise for the interpretation and naming the factors on the basis of factor loadings. However, factor rotation can be used as a solution for this difficulty by altering the pattern of the factor loadings and improve the interpretation. Before factor rotation is conducted, method of rotation should be selected between orthogonal and oblique rotation. In orthogonal rotation, there is no correlation between the extracted factors while in oblique rotation, there is correlation between the extracted factors. Nevertheless, the choice for the rotation is not easy. According to Field (2000), the best choice of the rotation to be considered depends on the cluster of variable around the factor for ease of explanation. Besides that, it also depends on whether rotation method provides a good theoretical reason to support and whether the factors should be correlated according to theory. Hence, one of the ways to decide which rotation to be used is to conduct analysis with the five rotations which include orthogonal (quartimax, equamax, varimax) and oblique (direct oblimin, promax).

Once the oblique rotation shows an unimportant correlation from the extracted factors, the orthogonally rotation as a solution is rational (Field, 2000). In most of the cases, varimax is used in orthogonal rotation while direct oblimin used in oblique rotation. After that, factor loadings will be conducted to see the degree of loading within the variable. Variables which have a high loading represent significant factor while small loading indicates less significant one.

3.3.4 Interpretation: Factor Loading and Factor Scores

According to Field (2000), the rotated component matrix will illustrate the factor loading and the factors that consist of high loading are important for the result interpretation. The Guttman-Kaiser rule states that it is impossible to account 100 percent for the total variances. More to the point, sample size also taken an important role to determine the result interpretations. According to Field (2000), the small loading of the factor variable is due to the bigger sample size of the research.

For factor scores, it is useful and can be treated as the second result in factor analysis. According to Field (2000) and Rietveld & Van Hout (1993), multicollinearity problem can be remedied by factors scores in the multiple regression analysis. A case in point, in the orthogonal rotation, factor variables among the 39 variables is not correlated while factor scores ensure that there is no multicollinearity problem among the 5 variables. Thus, factors scores may be helpful in some of the studies that involve big events and numerous measurements done on the same subjects.

3.3.5 OLS Regression

Generally, OLS regression is used to determine the relationship between dependent variable and independent variables. The regression model can be written in the population as

$$Y_i = \beta o + \beta_1 F1 + \beta_2 F2 + \beta_3 F3 + \beta_4 F4 + \beta_5 F5 + u$$

Where β_0 is the intercept, β_1 is the slope coefficient associates with F1; β2 is the slope coefficient associates with F2 and so on. Since there are *k* independent variables and an intercept, the equation contains *k+1* population parameter. Also, since this is a multiple linear regression, neither β_1 nor β_2 is itself a slope, but together the independent variables determine the slope of the relationship between stock return and the factors variables.

The terminology for multiple regressions is similar to the simple regression. Just as in simple regression, the variable *u* is the error term or disturbance. It contains factors other than the independent variable which affect dependent variable. In short, the error term consists of omitted factors, or possible measurement error in the measurement of dependent variable.

There are two types of regression model which are simple regression model and multiple regressions model. Simple regression model occurs when there is only one independent variable that affects the dependant variable. It is also known as two-variable linear regression model or bivariate linear regression model as it relates two variables which are independent variable and dependent variable. In this study, there is more than one independent variable included in the model. Thus, it is known as multiple linear regressions model.

In a linear regression model, the sample chosen depends on a number of factors such as the desired power, alpha level, number of predictor and expected sizes. As a rule of thumb, the larger the sample size, the more accurate the model will be if the processing time is ignored. Thus, the multiple regression analysis finds the coefficient for each independent variable, so that taken together they make the line with the lowest sum of squared errors. The slope coefficient shows how much an increase of one its value will change the dependant variable, holding others independent variables constant

In a cross sectional data regression model, all the errors are assumed to be independent. Unlike the regression which is performed in times series data, the errors are autocorrelated. Therefore, a seemingly low R^2 value does not necessarily mean that an OLS regression equation is useless. It is still possible that the equation is good to estimate the ceteris paribus relationship between the independent variable and dependant variable.

Proposition 1: ***p-value of OLS Regression***

Ho: The model is insignificant.

H_1: The model is significant.

Reject Ho if p-value is less than significant level of 0.01, 0.05, and 0.10. Otherwise, do not reject Ho.

3.3.6 The Coefficient of Multiple Determinations (R squared)

Whenever we use a regression equation, we should indicate how well the equation fits the data. It is often useful to compute a number that summarize how well the OLS regression line fits the data. One way to assess the fitness is to check the coefficient of determination, which can compute from the following formula.

$$\mathbf{R^2} = \frac{\boldsymbol{TSS - SSE}}{\boldsymbol{TSS}}$$

$$= \frac{\sum(y-\bar{y})\,\mathbf{2} - \sum(y-\hat{y})\,\mathbf{2}}{\sum(y-\bar{y})\,\mathbf{2}}$$

Where,

TSS = Total sum of square

SSE =Sum of square error

The proportional of the total variation in independent variable that is explained by the predictive power of the entire dependent variable is measured by the R^2, through the multiple regression models. Basically, the value of R^2 is always fall between zero and one as TSS is greater compared to SSE. It is necessary to multiply the R^2 with 100 percent when interpreting R^2.

When there is zero residual in the equation, R^2 equal to 1. In this case, the prediction equation passed through all the data points and show that the OLS provides a perfect fit to the data. In contrast, a value of R^2 that is nearly equal to zero indicates a poor fit of the OLS line. It means that a very little of the variation in dependent variable is captured by the variation in the estimated dependent variable.

An important fact about R^2 is that it invariably increases and never decreases when the number of independent variables increases. This is due to the sum of squared error will decrease when additional independent variable are added into the model. Nevertheless, this fact makes R^2 become a poor tool for determine how many variables should be added to a model. Thus, if there are many independent variables in the model, then the adjusted R^2 should be looked at.

Generally, a low R^2 indicates that it is difficult to predict individual outcome on dependent variable accurately. However, according to the source web learning (2012), there is frequent cases when for low R2 in the regression, especially for cross-sectional analysis, the low R2 still consider a useful tool for model explanation. Thus, a seemingly low R^2 does not necessarily mean that an OLS regression equation is useless. The accuracy of the equation does not solely due to the measurement of R^2. Sometimes, it could be due to an extensive part of the sample in the dependant variable explained by the independent variable.

3.3.7 Multicollinearity

Multicollinearity occurs when a regression model involve more than two independent variables that are superfluous and generate the same information.

The linear dependencies among the independent variable can affect the model ability to estimate regression coefficient (Adnan, 2006).

$$\boldsymbol{Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + e_i}$$

Y_i = dependant variable
x_1 and x_2 = independent variable which exhibit correlation
β_0, β_1, and β_2 = regression coefficient.
e_i = Vector of error matrix term.

According to Alabi, Ayinde and Olatayo (2008), under the assumption of classical linear regression model, independent variables are assumed to be independent. When this assumption fails, the problem of multicollinearity arises. However, OLS will still be unbiased and blue even though there is an extreme multicollinearity problem. Apart from that, multicollinearity problem is not so important when the model is used for prediction or forecasting. The null hypothesis will be rejected when the t-statistic test of each coefficient are high, while the standard error are low (Alabi, Ayinde & Olatayo, 2008).

Variances Inflation Factors (VIF) is the measure of the speed in which variance and covariance increases. It is the most commonly used method for detecting multicollinearity problems.

$$\text{VIF} = \frac{1}{(1-R^2)}$$

In order to interpret the VIF, it is a measure of how much the variances of the estimated regression coefficient is inflated by the existence of correlation among the predictor variable in the model. A VIF of 1 represent that there is no correlation among the independent variables. Thus, the variance of coefficient is not inflated at all. The general rule of thumb is that VIFs exceeding 5 require further investigation, while VIFs exceeding 10 indicate sign of serious multicollinearity problem.

3.3.8 Normality Test

In order to calculate the test statistic for the OLS Regression, we have assumed that the residuals are normally distributed. Therefore, a useful test for normality is the Jarque-Bera test, which examines the skewness and kurtosis of the residuals. According to the Agostino (1990), test of normality are statics inference procedure design to test the underlying distribution of a random variable is normally distributed.

The Jarque-Bera test computes the skewness and kurtosis measures of the OLS residuals and then uses the following test statistic,

$$JB = n\left[\frac{S}{6} + \frac{(K-3)}{24}\right]$$

Under the null hypothesis of normality, the JB statistic is asymptotically distributed as a chi-squared distribution with 3 degrees of freedom. So the decision making will be if the *p-value* of the computed chi-squared statistic is sufficient low, then reject the normality.

Proposition 3: Normality Test

Ho: The error term is normally distributed.

H_1: The error term that is not normally distributed.

Reject Ho if P-value for JB-stats is < 0.01, otherwise, do not reject Ho

3.4 Multiple Linear Regression Analysis

In this research, the functions in year 2000 until 2010 (except year 2001 and year 2008) are written as:

Y = f (Cash Flow)

Y = f (Leverage)

Y= f (firm size)

Y= f (Dividend)

Y= f (Market-to-Book Value)

While the functions for year 2001are written as:

Y = f (Cash Flow)

Y = f (Leverage)

Y= f (firm size)

Y= f (Dividend)

Y= f (Market-to-Book Value)

Y= f (Price Earnings Ratio)

The functions for year 2008 are written as;

Y = f (Cash Flow)

Y = f (Leverage)

Y= f (firm size)

Y= f (Dividend)

3.4.1 Empirical model

The empirical model for year 2000 to year 2010 (except for the year 2001 and year 2008) is written as:

$$Y_{ij} = \beta o + \beta_1 F1_{ij} + \beta_2 F2_{ij} + \beta_3 F3_{ij} + \beta_4 F4_{ij} + \beta_5 F5_{ij} + \varepsilon_{ij}$$

While the empirical model for the year 2001 is written as:

$$Y_{ij} = \beta o + \beta_1 F1_{ij} + \beta_2 F2_{ij} + \beta_3 F3_{ij} + \beta_4 F4_{ij} + \beta_5 F5_{ij} ++ \beta_6 F6_{ij} + \varepsilon_{ij}$$

The empirical model for year 2008 is written as:

$$Y_{ij} = \beta o + \beta_1 F1_{ij} + \beta_2 F2_{ij} + \beta_3 F3_{ij} + \beta_4 F4_{ij} + \varepsilon_{ij}$$

Y_{ij} = Stock Return

βo = Intercept

F1 = Factor Variable 1

F2 = Factor Variable 2

F3 = Factor Variable 3

F4 = Factor Variable 4

F5 = Factor Variable 5

F6 = Factor Variable 6

ε_{ij} = Error Term

The dependant variable in this study which is denoted as the Y_{ij} represent the stock returns calculated from the monthly stock price of companies listed in HKSE. The interception point between independent and dependant variables is referred to the β_0. In the model, the independent variables are being denoted, while all the β is the estimation of the regression between the stock returns and the independent variables (factor variables). Lastly, the error term ε_{ij}, is defined as consists of omitted variable, or possible measurement error in the measurement of stock returns.

3.5 Conclusion

In this chapter, we have explained the methodologies that will be used in this study in details. Factor analysis and OLS had been used as research techniques to conduct research. In the next chapter, standard statistical programmes such as SPSS and E-view are used to conduct this study. Both of this computer programme are the most widely used programmes for statistical analysis and assist to run different method in order to generate a report based data collected. For instances, SPSS allows researchers to investigate whether a number of interest are linearly related to unobserved variables which involve the method of data reduction. Data analyst required to retain the original data records for the purpose of making analysis test. We will show some results regarding the process of choosing of rotation method and carry out the data analysis which include the simple data entry and method encompassing the analysis of coefficient of determination.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

The research methodology that we adopted has been mentioned in the previous chapter. In this chapter, we will show the data and several tests that processed by the SPSS and E-Views. Furthermore, the output of Exploratory Factors Analysis (EFA) and Ordinary Least Square (OLS) of the estimated model will be presented.

EFA output will be presented in order to identify the number of factors that can explain most of the variance underlying factors that are not directly observed. Factor analysis also has been employed as a solution for the multicollinearity problems. Moreover, a further elaboration of OLS regression will be presented in order to estimate the significant level and relationship between the independents and dependant variables. For that reason, a testing hypothesis about an individual partial regression coefficient will be presented in this chapter. The assumptions of OLS regression are Best, Linear, Unbiased and Estimator (BLUE). In this study, we will adopt cross sectional data to conduct our research. Thus, the model is free from heteroscesdacity and autocorrelation problems. At the same time, we will employ Variance Inflation Factors (VIF) to detect the multicollinearity problems. Last but not least, we also refer previous studies to ensure the consistency and significance of our results in this chapter.

4.1 Exploratory Factor Analysis

4.1.1 Factor Extraction

Table 4.1: Output of Exploratory Factor Analysis in year 2000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	20.944	53.703	53.703	20.944	53.703	53.703	18.864	48.368	48.368
2	8.336	21.375	75.078	8.336	21.375	75.078	9.677	24.813	73.181
3	3.658	9.379	84.457	3.658	9.379	84.457	3.083	7.905	81.085
4	1.756	4.503	88.960	1.756	4.503	88.960	2.652	6.800	87.886
5	1.058	2.712	91.672	1.058	2.712	91.672	1.477	3.787	91.672
6	.966	2.476	94.148						
7	.650	1.666	95.814						
8	.566	1.450	97.265						
9	.385	.988	98.253						
10	.193	.494	98.746						
11	.145	.372	99.118						
12	.118	.303	99.422						
13	.076	.194	99.616						
14	.054	.138	99.754						
15	.036	.093	99.847						
16	.028	.071	99.917						
17	.014	.035	99.952						
18	.007	.019	99.971						
19	.005	.012	99.983						
20	.004	.009	99.992						
21	.001	.003	99.995						
22	.001	.002	99.998						
23	.001	.001	99.999						
24	.000	.000	99.999						
25	9.453E-005	.000	100.000						
26	6.154E-005	.000	100.000						
27	3.204E-005	8.216E-005	100.000						
28	2.177E-005	5.582E-005	100.000						
29	8.417E-006	2.158E-005	100.000						
30	4.898E-006	1.256E-005	100.000						
31	3.177E-006	8.146E-006	100.000						
32	8.334E-007	2.137E-006	100.000						
33	4.798E-007	1.230E-006	100.000						
34	1.594E-008	4.088E-008	100.000						
35	5.781E-009	1.482E-008	100.000						
36	6.863E-016	1.760E-015	100.000						
37	2.956E-017	7.580E-017	100.000						
38	-2.287E-016	-5.865E-016	100.000						
39	-7.753E-016	-1.988E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for Research

Table 4.1.1: Output of EFA in year 2001

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	23.892	61.262	61.262	23.892	61.262	61.262	21.951	56.284	56.284
2	4.307	11.045	72.307	4.307	11.045	72.307	4.870	12.487	68.771
3	3.569	9.150	81.457	3.569	9.150	81.457	3.487	8.941	77.712
4	2.251	5.771	87.228	2.251	5.771	87.228	2.452	6.287	83.999
5	1.313	3.366	90.594	1.313	3.366	90.594	1.844	4.727	88.726
6	1.018	2.610	93.204	1.018	2.610	93.204	1.747	4.478	93.204
7	.779	1.998	95.203						
8	.709	1.817	97.019						
9	.390	1.000	98.019						
10	.255	.653	98.672						
11	.144	.368	99.040						
12	.139	.357	99.397						
13	.063	.162	99.559						
14	.059	.151	99.710						
15	.052	.133	99.842						
16	.038	.096	99.939						
17	.009	.023	99.962						
18	.007	.018	99.979						
19	.004	.010	99.989						
20	.002	.005	99.994						
21	.001	.003	99.996						
22	.001	.002	99.998						
23	.000	.001	99.999						
24	.000	.000	99.999						
25	.000	.000	100.000						
26	6.926E-005	.000	100.000						
27	5.503E-005	.000	100.000						
28	1.579E-005	4.048E-005	100.000						
29	8.193E-006	2.101E-005	100.000						
30	4.575E-006	1.173E-005	100.000						
31	1.865E-006	4.783E-006	100.000						
32	3.183E-007	8.162E-007	100.000						
33	1.078E-007	2.764E-007	100.000						
34	2.941E-008	7.542E-008	100.000						
35	8.235E-009	2.112E-008	100.000						
36	1.661E-015	4.259E-015	100.000						
37	1.059E-015	2.714E-015	100.000						
38	3.818E-016	9.789E-016	100.000						
39	-9.787E-016	-2.510E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for Research

Table 4.1.2: Output of EFA in year 2008

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	27.146	69.605	69.605	27.146	69.605	69.605	25.093	64.342	64.342
2	4.818	12.353	81.959	4.818	12.353	81.959	5.054	12.960	77.302
3	2.761	7.078	89.037	2.761	7.078	89.037	4.358	11.175	88.477
4	1.530	3.923	92.960	1.530	3.923	92.960	1.749	4.484	92.960
5	.793	2.032	94.993						
6	.676	1.733	96.726						
7	.496	1.271	97.997						
8	.322	.825	98.822						
9	.187	.480	99.302						
10	.117	.299	99.601						
11	.053	.137	99.738						
12	.043	.110	99.848						
13	.021	.053	99.901						
14	.016	.042	99.943						
15	.010	.024	99.967						
16	.004	.011	99.978						
17	.004	.010	99.988						
18	.002	.006	99.994						
19	.001	.003	99.998						
20	.001	.001	99.999						
21	.000	.000	99.999						
22	.000	.000	100.000						
23	4.479E-005	.000	100.000						
24	3.862E-005	9.902E-005	100.000						
25	2.696E-005	6.913E-005	100.000						
26	1.700E-005	4.359E-005	100.000						
27	7.077E-006	1.815E-005	100.000						
28	2.967E-006	7.607E-006	100.000						
29	1.767E-006	4.530E-006	100.000						
30	4.419E-007	1.133E-006	100.000						
31	5.768E-008	1.479E-007	100.000						
32	5.010E-008	1.285E-007	100.000						
33	2.816E-008	7.221E-008	100.000						
34	1.604E-008	4.114E-008	100.000						
35	1.409E-015	3.614E-015	100.000						
36	7.017E-016	1.799E-015	100.000						
37	3.132E-016	8.031E-016	100.000						
38	-2.971E-017	-7.618E-017	100.000						
39	-6.472E-016	-1.659E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Extraction of the number of factors to be retained is probably the most important decision to make in factor analysis as this will governs the resultant structure and the relationship between variables and factors. Generally, the number of factors to be retained is based on some criteria. One of the most common rules in performing the Principle Component extraction is the Kaiser's criterion. Based on the Kaiser's, in extracting Principal Component from a correlation matrix, each variable contributes a variance of 1. A factor should be retained if it possesses more variance than a single variable. Thus, factors are retained when the Eigenvalue is more than or equal to 1.

From Table 4.1, the number of rows in Extraction Sums of Squared Loading is corresponding to the number of factor to be retained. The table shows that each variable consists of 39 factors in year 2000. However, only the first five factors are being extracted for analyzing as the Eigenvalues for five of them are larger than 1.

According to Table 4.1.1, it shows that there is six factors to be retained in year 2001, while the number of factors to be retained decrease to four factors in year 2008, as shown in Table 4.1.2. For the remaining years, the number of factor to be retained for analysis consists of five factors. Refer to list of Appendices A.

Therefore, this study will consists of three empirical models used to explain the stock returns since there are three different numbers of factors to be retained in the studied year.

4.1.2 Total Variances Explanations

Table 4.2: Amount of Total Variances to be Explained

Year	Numbers of factors to Extract	Cumulative Rotation Sum of Squared Loadings (in %)
2000	5	91.072
2001	6	93.204
2002	5	90.672
2003	5	93.676
2004	5	94.190
2005	5	93.209
2006	5	94.620
2007	5	95.658
2008	4	92.960
2009	5	94.255
2010	5	96.794

Source: Developed for Research

As a rule of thumb, the number of factors to be retained has loading value more than threshold level of |0.30| indicates the solution have simple structures. For instances, according to Table 4.2, in the year 2000, the result for the factor analysis is a rotated component analysis consists of five factors that accounted for 91.072% of total variances. For year 2001, the analysis yields a six factors solution which accounted for 93.204% of total variances while there are four factors accounted for 92.960% of total variances in year 2008. For the remaining years, which are year 2002 to 2007, 2009 and 2010, there are five factors that accounted for approximately 95% of total variances in each year. The number of factors to be retained has loading value more than threshold level of |0.30|. This indicates that our factor variables have simple structures.

4.1.3 Choosing a Factor Rotation Method

Table 4.3: Correlation Matrix with Direct Oblimin Method.

Component	1	2	3	4	5
1	1.000	.164	.001	.092	.312
2	.164	1.000	-.089	.096	-.056
3	.001	-.089	1.000	.190	.168
4	.092	.096	.190	1.000	.151
5	.312	-.056	.168	.151	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Source: Developed for Research.

Tabachnick and Fiddell (2007) states that perhaps the best way to decide the orthogonal or oblique rotation is referred to the requirement of the oblique rotation with the desired numbers of factors as well as the correlation among factor. However, if there have correlations in the data, the factor rotation will be more suitable for oblique rotation. Based on Tabachnick and Fiddell (2007), the threshold of the correlation matrix is 0.32 and above. If the correlation exceeds 0.32, then there is overlap in the variances among the factor. This indicated that the rotation with extracted factor gives the best possibilities to interpret the factors.

Based on the result shown in table 4.3, the highest correlation is 0.312. Subsequently, none of the correlation goes beyond the threshold of 0.32. It shows that the rotation method remains nearly as orthogonal. Therefore, we could just run the orthogonal and compare the result with the oblique.

Table 4.4: Output of Varimax Rotation Method

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EBITDA	.989				
EBIT	.987				
OPERATING PROFIT	.980				
PRE-TAX PROFIT	.976				
DEPRECIATION	.960				
PAYMENTS: FIXED ASSETS	.956				
MV	.953				
TRADE CREDITORS	.948				
EARNED FOR ORDINARY	.945				
PUBLISHED AFTER TAX PROFIT	.941				
ENTERPRISE VALUE (EV)	.938				
EQUITY CAP. AND RESERVES	.912				
TOT. SHARE CAPITAL & RESERVES	.912				
TOTAL CAPITAL EMPLOYED	.899				
TOT FIXED ASSETS-NET	.896				
CASH IN -OPERATING ACTIVITIES	.881				
TOTAL SALES	.874				
TRADE DEBTORS	.837				
ASSETS (TOTAL)	.820	.481			
TOTAL CURRENT ASSETS	.735	.623			
TOTAL CASH & EQUIVALENT	.707	.660			
MARKET TO BOOK VALUE EX. INTAN	.466				
BORROWINGS REPAYABLE < 1 YEAR		.993			
TOTAL DEBT		.940			
TOTAL CURRENT LIABLITIES		.924			
NET CURRENT ASSETS		-.922			
NET DEBT		.920			
NET INTEREST CHARGES		.916			
CASH INFLOW FROM FINANCING		.879			
NET CASH FLOW		.801			
CASH OUT-INVESTING ACTIVITIES	.574	.800			
DIVIDENDS PER SHARE			.877		
NET EPS			.756		
PUBLISHED CASH EPS		.555	.735		
SALES PER SHARE			.628		
TOTAL STOCK AND W.I.P.				.814	
MINORITY INTERESTS				.780	
MINORITY INTERESTS				.731	.494
BOOK VALUE PER SHARE			.541		.626

Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Source: Developed for Research

Table 4.5: Output of Quartimax Rotation Method

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EBITDA	.991				
OPERATING PROFIT	.987				
EBIT	.985				
DEPRECIATION	.971				
PAYMENTS: FIXED ASSETS	.971				
PRE-TAX PROFIT	.960				
TRADE CREDITORS	.960				
MV	.953				
ENTERPRISE VALUE (EV)	.947				
EARNED FOR ORDINARY	.928				
CASH IN -OPERATING ACTIVITIES	.924				
TOT FIXED ASSETS-NET	.922				
PUBLISHED AFTER TAX PROFIT	.921				
EQUITY CAP. AND RESERVES	.918				
TOT. SHARE CAPITAL & RESERVES	.918				
TOTAL CAPITAL EMPLOYED	.913				
TOTAL SALES	.901				
ASSETS (TOTAL)	.877				
TRADE DEBTORS	.872				
TOTAL CURRENT ASSETS	.807	.530			
TOTAL CASH & EQUIVALENT	.778	.573			
BORROWINGS REPAYABLE < 1 YEAR		.985			
NET CURRENT ASSETS		-.941			
NET INTEREST CHARGES		.931			
NET DEBT		.927			
TOTAL DEBT		.891			
TOTAL CURRENT LIABLITIES	.467	.877			
CASH INFLOW FROM FINANCING	.468	.826			
NET CASH FLOW	.479	.743			
CASH OUT-INVESTING ACTIVITIES	.627	.735			
MARKET TO BOOK VALUE EX. INTAN					
DIVIDENDS PER SHARE			.875		
NET EPS			.720		
PUBLISHED CASH EPS		.500	.701		
SALES PER SHARE			.600		
TOTAL STOCK AND W.I.P.				.799	
MINORITY INTERESTS				.756	
MINORITY INTERESTS				.729	.461
BOOK VALUE PER SHARE			.544		.567

Rotation Method: Quartimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for Research

Table 4.6 : Output of Equamax Rotation Method

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EQUITY CAP. AND RESERVES	.762				
TOT. SHARE CAPITAL & RESERVES	.762				
TOTAL CAPITAL EMPLOYED	.747				
EARNED FOR ORDINARY	.744		.468		
EBIT	.737		.561		
PRE-TAX PROFIT	.731		.579		
EBITDA	.724		.584		
OPERATING PROFIT	.721		.596		
PUBLISHED AFTER TAX PROFIT	.719		.517		
TOT FIXED ASSETS-NET	.686				
PAYMENTS: FIXED ASSETS	.682		.635		
MV	.671		.666		
ENTERPRISE VALUE (EV)	.664		.646		
DEPRECIATION	.661		.629		
ASSETS (TOTAL)	.632	.475			
CASH IN -OPERATING ACTIVITIES	.603		.591		
BORROWINGS REPAYABLE < 1 YEAR		.987			
TOTAL DEBT		.926			
NET DEBT		.922			
NET CURRENT ASSETS		-.919			
TOTAL CURRENT LIABLITIES		.917			
NET INTEREST CHARGES		.914			
CASH INFLOW FROM FINANCING		.870			
CASH OUT-INVESTING ACTIVITIES		.799	.465		
NET CASH FLOW		.786	.499		
TOTAL CASH & EQUIVALENT		.644	.547		
TOTAL CURRENT ASSETS		.601	.556		
TRADE CREDITORS	.626		.674		
	.473		.630		
TOTAL SALES					
MARKET TO BOOK VALUE EX. INTAN			.592		
TRADE DEBTORS	.502		.561		
DIVIDENDS PER SHARE				.904	
NET EPS				.808	
PUBLISHED CASH EPS		.538		.775	
SALES PER SHARE				.596	
BOOK VALUE PER SHARE				.574	.500
TOTAL STOCK AND W.I.P					.833
MINORITY INTERESTS					.769
MINORITY INTERESTS					.744

Rotation Method: Equamax with Kaiser Normalization.
a. Rotation converged in 10 iterations.

Source: Developed for Research

Table 4.7: Output of Direct Oblimin Rotation Method

Pattern Matrix[a]

	Component				
	1	2	3	4	5
EBIT	.995				
PRE-TAX PROFIT	.994				
EBITDA	.988				
OPERATING PROFIT	.984				
EARNED FOR ORDINARY	.975				
PUBLISHED AFTER TAX PROFIT	.965				
PAYMENTS: FIXED ASSETS	.949				
EQUITY CAP AND RESERVES	.944				
TOT. SHARE CAPITAL & RESERVES	.944				
MV	.941				
DEPRECIATION	.932				
ENTERPRISE VALUE (EV)	.926				
TOTAL CAPITAL EMPLOYED	.917				
TRADE CREDITORS	.915				
TOT FIXED ASSETS-NET	.886				
CASH IN -OPERATING ACTIVITIES	.852				
ASSETS (TOTAL)	.806				
TOTAL SALES	.765				
TRADE DEBTORS	.759				
TOTAL CURRENT ASSETS	.673	.507			
TOTAL CASH & EQUIVALENT	.657	.549			
BORROWINGS REPAYABLE < 1 YEAR		.990			
NET CURRENT ASSETS		-.976			
NET DEBT		.958			
NET INTEREST CHARGES		.941			
TOTAL DEBT		.897			
TOTAL CURRENT LIABLITIES		.878			
CASH INFLOW FROM FINANCING		.813			
NET CASH FLOW		.739			
CASH OUT-INVESTING ACTIVITIES	.521	.726			
DIVIDENDS PER SHARE			.858		
NET EPS			.750		
PUBLISHED CASH EPS		.598	.738		
SALES PER SHARE			.619		
TOTAL STOCK AND W.I.P				.821	
MINORITY INTERESTS				.786	
MINORITY INTERESTS				.717	-.461
BOOK VALUE PER SHARE					-.595
MARKET TO BOOK VALUE EX. INTAN					

Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 17 iterations.

Source: Developed for Research

Table 4.8: Output of Promax Rotation Method

Pattern Matrix[a]

	Component				
	1	2	3	4	5
PRE-TAX PROFIT	1.048				
EBIT	1.033				
EARNED FOR ORDINARY	1.032				
PUBLISHED AFTER TAX PROFIT	1.025				
EBITDA	1.019				
OPERATING PROFIT	1.012				
EQUITY CAP. AND RESERVES	.977				
TOT. SHARE CAPITAL & RESERVES	.977				
PAYMENTS: FIXED ASSETS	.966				
MV	.965				
DEPRECIATION	.943				
ENTERPRISE VALUE (EV)	.942				
TOTAL CAPITAL EMPLOYED	.934				
TRADE CREDITORS	.929				
TOT FIXED ASSETS-NET	.882				
CASH IN -OPERATING ACTIVITIES	.838				
ASSETS (TOTAL)	.778				
TOTAL SALES	.736				
TRADE DEBTORS	.733				
TOTAL CURRENT ASSETS	.622	.498			
TOTAL CASH & EQUIVALENT	.609	.545			
NET CURRENT ASSETS		-1.036			
BORROWINGS REPAYABLE < 1 YEAR		1.030			
NET DEBT		1.015			
NET INTEREST CHARGES		.988			
TOTAL DEBT		.930			
TOTAL CURRENT LIABLITIES		.904			
CASH INFLOW FROM FINANCING		.833			
NET CASH FLOW		.752			
CASH OUT-INVESTING ACTIVITIES	.470	.742			
MARKET TO BOOK VALUE EX. INTAN		-.484			-.480
DIVIDENDS PER SHARE			.882		
PUBLISHED CASH EPS		.632	.805		
NET EPS			.768		
SALES PER SHARE			.670		
TOTAL STOCK AND W.I.P				.825	
MINORITY INTERESTS				.817	
MINORITY INTERESTS				.664	.677
BOOK VALUE PER SHARE					.647

Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Source: Developed for Research

According to Field (2000), the choice of rotation depends on whether there is a good theoretical reason to determine the factor should be related or independent. However, Kim and Mueller (1978) argue that it may not make much more difference in EFA for the issue of factors whether they are correlated or not. They also strongly claim that employing a method of orthogonal may be more favorable over oblique rotation, when there is no other reason that the former is much simpler to understand and interpret. Furthermore, according to Gorsuch (1983), he discloses that if the simple structure is clear, or any of the rotation leads to the same interpretation, the rotation chosen will be the varimax, which is under the orthogonal.

Compared the result in Table 4.4 to 4.8, the result performed by the five rotation methods which include varimax, quartimax, equamax, direct oblimin, and promax, they are lead to the same interpretations and there are not much different between the five rotation methods. The correlation by using the oblique method does not exceed the minimum threshold value of 0.32. Hence, it is recommended to use the varimax rotation in the rotation menu. Due to this reason, we choose to display the factor score coefficient matrix in the score menu and opted for listwise exclusion, sorting by size and suppressions of absolute less than 0.45 in the option menu. A value of 0.45 was chosen as the sample size is not big for each year.

4.1.4 Naming of the Factor Variables

Table 4.9: Varimax Rotation Loading in year 2000.

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EBITDA	.985				
EBIT	.983				
OPERATING PROFIT	.980				
PRE-TAX PROFIT	.975				
PAYMENTS: FIXED ASSETS	.958				
DEPRECIATION	.954				
TRADE CREDITORS	.952				
MV	.948				
PUBLISHED AFTER TAX PROFIT	.939				
EARNED FOR ORDINARY	.939				
ENTERPRISE VALUE (EV)	.934				
EQUITY CAP. AND RESERVES	.898				
TOT. SHARE CAPITAL & RESERVES	.898				
CASH IN -OPERATING ACTIVITIES	.886				
TOTAL CAPITAL EMPLOYED	.878				
TOT FIXED ASSETS -NET	.878				
TOTAL SALES	.865				
TRADE DEBTORS	.834				
ASSETS (TOTAL)	.812	.465			
TOTAL CURRENT ASSETS	.750	.603			
TOTAL CASH & EQUIVALENT	.724	.643			
MARKET TO BOOK VALUE EX. INTAN	.465				
BORROWINGS REPAYABLE < 1 YEAR		.991			
TOTAL DEBT		.925			
NET DEBT		.921			
NET CURRENT ASSETS		-.919			
TOTAL CURRENT LIABILITIES		.918			
NET INTEREST CHARGES		.915			
CASH INFLOW FROM FINANCING		.868			
CASH OUT-INVESTING ACTIVITIES	.569	.793			
NET CASH FLOW		.789			
PUBLISHED CASH EPS		.582	.526		.466
DIVIDENDS PER SHARE			.925		
BOOK VALUE PER SHARE			.713	.518	
NET EPS			.587		.503
MINORITY INTERESTS				.832	
TOTAL STOCK AND W.I.P.				.781	
MINORITY INTERESTS				.685	
SALES PER SHARE					.628

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Developed for Research

Table 4.10: Varimax Rotation Loading in year 2001

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
MV	.991					
CASH IN -OPERATING ACTIVITIES	.990					
PAYMENTS: FIXED ASSETS	.988					
EBITDA	.984					
PRE-TAX PROFIT	.981					
ENTERPRISE VALUE (EV)	.981					
EBIT	.979					
OPERATING PROFIT	.978					
DEPRECIATION	.977					
PUBLISHED AFTER TAX PROFIT	.968					
TRADE CREDITORS	.962					
EARNED FOR ORDINARY	.961					
TOTAL CASH & EQUIVALENT	.932					
TOTAL CURRENT LIABLITIES	.925					
TOTAL SALES	.905					
TOTAL CURRENT ASSETS	.900					
TOT FIXED ASSETS-NET	.900					
CASH OUT-INVESTING ACTIVITIES	.899					
EQUITY CAP. AND RESERVES	.882					
TOT. SHARE CAPITAL & RESERVES	.882					
ASSETS (TOTAL)	.856					
TOTAL CAPITAL EMPLOYED	.836					
TRADE DEBTORS	.765					
NET INTEREST CHARGES		.942				
NET DEBT		.931				
CASH INFLOW FROM FINANCING		-.897				
TOTAL DEBT		.833				
NET CASH FLOW	-.605	-.637				
MARKET TO BOOK VALUE EX. INTAN		-.522				
DIVIDENDS PER SHARE			.947			
NET EPS			.836			
PUBLISHED CASH EPS			.813			
BOOK VALUE PER SHARE			.639		.510	.468
MINORITY INTERESTS				.790		
TOTAL STOCK AND W.I.P.				.764		
NET CURRENT ASSETS	.611			.680		
MINORITY INTERESTS					.774	
BORROWINGS REPAYABLE < 1 YEAR	.626				.663	
SALES PER SHARE						.797

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Source: Developed for research

Table 4.11 Varimax Rotation Loading in year 2008

	Component			
	1	2	3	4
EBITDA	.985			
CASH IN -OPERATING ACTIVITIES	.984			
PRE-TAX PROFIT	.983			
EBIT	.983			
DEPRECIATION	.982			
PUBLISHED AFTER TAX PROFIT	.981			
OPERATING PROFIT	.980			
MV	.977			
EARNED FOR ORDINARY	.976			
TRADE CREDITORS	.974			
CASH OUT-INVESTING ACTIVITIES	.973			
TOTAL CASH & EQUIVALENT	.973			
PAYMENTS: FIXED ASSETS	.973			
ENTERPRISE VALUE (EV)	.966			
NET DEBT	-.963			
EQUITY CAP. AND RESERVES	.953			
TOT. SHARE CAPITAL & RESERVES	.953			
TOTAL CURRENT ASSETS	.952			
TOTAL CURRENT LIABLITIES	.949			
NET INTEREST CHARGES	-.941			
TOT FIXED ASSETS-NET	.931			
ASSETS (TOTAL)	.921			
TOTAL SALES	.914			
TOTAL CAPITAL EMPLOYED	.914			
NET CURRENT ASSETS	.892			
CASH INFLOW FROM FINANCING	-.857			
MINORITY INTERESTS		.955		
BORROWINGS REPAYABLE < 1 YEAR		.873		
MINORITY INTERESTS		.833		
TOTAL DEBT		.759		
TOTAL STOCK AND W.I.P.		.698		
NET CASH FLOW	.559	.615		
BOOK VALUE PER SHARE			.876	
SALES PER SHARE			.794	
PUBLISHED CASH EPS	.584		.779	
DIVIDENDS PER SHARE			.770	
NET EPS			.737	
MARKET TO BOOK VALUE EX. INTAN				-.940
TRADE DEBTORS		.473		.722

Source: Developed for Research

In orthogonal rotation, interpretations or naming of the factors mostly take place by examining the varimax component matrix. Based on the Table 4.9, the first component has high loading from six cash flow variables, such as EBITA, EBIT, Operating Profit, Pre-tax Profit, Trade Creditor and has moderate loading in cash operating. Due to these six cash item sort in the same factor, there is a justification for combining these items in scale and named it as “cash flow.”

Second, Total debt, Total Current Liability, Net Debt and Net Interest Charge are associated strongly with the second component. We combined these observed variables and named them as “Leverage” since that four items sort on the same factor,

The third factor loads into items relating to the “Firm Size” such as Publish cash EPS, Dividend per Share and Net Earnings per Share.

Next, the items which load into the fourth factor include Minority Interest Rate, Total Stock and W.I.P in statistic which labeled as “Dividend”.

Lastly, the fifth factor constitutes of three high variables which are Sales per Share, Minority Interest TS and Publish Cash EPS and labeled as “Market-to-Book Value”.

The following are names of the factors:

1. Cash Flow
2. Leverage
3. Firm Size
4. Dividend
5. Market-to- Book Value.

The same factor names will be used for year 2002, 2003, 2004, 2005, 2006, 2007, 2009 and 2010 as the number of factors to be retained which is five factors are same as year 2000. This shows that the item component which yield the high loading have not much difference for the year as well.

However, there are two special cases for the year 2001 and 2008 as the number of factors to be retained is consists of six and four factors respectively.

Therefore, based on Table 4.10, the names of the factors in year 2001 are:

1. Cash Flow
2. Leverage
3. Firm Size
4. Dividend
5. Market-to- Book Value
6. P/E Ratio, since the high loading item consists of the Sales per Share and Book value per share

For Table 4.11, the four retained factor variables are named as:

1. Cash Flow
2. Leverage
3. Firm Size
4. Dividend

4.1.5 Factors Score Loading

Table 4.12 Component Score Covariance Matrix

Component	1	2	3	4	5
1	1.000	.000	.000	.000	.000
2	.000	1.000	.000	.000	.000
3	.000	.000	1.000	.000	.000
4	.000	.000	.000	1.000	.000
5	.000	.000	.000	.000	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Sources: Developed for Research

As mentioned in Chapter 3, the factor score can be served as a solution for multicollinearity problem in a multiple regressions model. In Table 4.12, the factor score covariance matrix is presented with its diagonal element as the variances of the factors score in the sample. The result demonstrates that the five factors are orthogonal. That is, the factor scores for the five factors do not correlate with each other. Hence, the model which we regressed based on the factors score is free from multicollinearity problem.

4.2 Multiple Linear Regresion Model

4.2.1 Coefficient of Determination (R squared)

Table 4.13: Summary of R^2 Result from year 2000 to 2010

Year	Coefficient of Determination (R^2)
2000	0.416058
2001	0.121609
2002	0.107279
2003	0.163215
2004	0.026047
2005	0.078008
2006	0.038797
2007	0.045543
2008	0.070292
2009	0.024716
2010	0.112948

Source: Developed for Research

The main purpose of R^2 which are used in the context of statistical models is to predict the future outcomes on the basis of other related information. It provides a measure of how well the future outcomes can be predicted by the model.

From the Table 4.13, the R^2 of the regression model in year 2000 is the highest among the ten years in our sample size, which is 0.416058. This means that 41.6% of the total variation in stock returns can be explained by the total variation in factor variables. As a rule of thumb, R^2 which is more than 20-30 percents means that the total variation in the dependent variables significantly explains by independent variable. The 41.6% of R^2 in year 2000 is consider insignificant, the R^2 of remaining years are even lower. In year 2001, the R^2 of the regression model is 0.121609. It indicates 12.16% of the total variation in stock returns can be explained by the total variation in factor variables.

Meanwhile, the R^2 of the regression model in year 2002 and 2003 are 0.107279 and 0.163215 respectively. These explain that 10.73% and 16.32% of the total variation in rate of return can be explained by the total variation in factor variables. Next, the R^2 of the regression model in year 2004 is the lowest among the ten years, which only carries 0.026047. This shows that only 2.6% of the total variation in rate of return can be predicted from the total variation in factor variables in year 2004.

On the other hand, the R^2 of the regression model is 0.078008 and 0.038797 in year 2005 and 2006 respectively. These signify that 7.8% and 3.88% of the total variation in rate of return can be explained by the total variation in factor variables. In year 2007, the R^2 of the regression model is 0.045543 which means that 4.55% of the total variation in rate of return can be annotated by the total variation in factor variables. Nevertheless, the R^2 in year 2008 is 0.070292, which is greater than previous year. It implies that 7.03% of the total variation in rate of return can be construed by the total variation in factor variables. Last but not least, the R^2 of regression model in last two years in our sample size is 0.024716 and 0.112948 respectively. These signify that 2.47% and 11.29% of the total variation in rate of return can be explained by the total variation in factor variables.

Based on the result, we can conclude that the R^2 of the 10 years are low and the total variation in factor variables do not carry a high percentage to annotate the total variation in the rate of return. However, this is a common case in cross-sectional data. According to Ferson, Sarkissian, and Simin (2003), a R^2 of 10% or even small as 5% is statistically significant in some application. One of the best examples is in predicting the stock returns.

4.2.2 Multicollinearity

Table 4.14: VIF for year 2000 to 2010

Year	R-square	Variances Inflation Factor (VIF)
2000	0.416058	1.7125
2001	0.121609	1.1385
2002	0.107279	1.1202
2003	0.163215	1.1950
2004	0.026047	1.0267
2005	0.078008	1.0846
2006	0.038797	1.0404
2007	0.045543	1.0477
2008	0.070292	1.07561
2009	0.024716	1.0253
2010	0.112948	1.1273

Source: Developed for Research

In a linear regression model which consists of more than two variables, multicollinearity problem between variables may be existed. A multicollinearity test is therefore needed for all the independent variable in each year. We use Variances Inflation Factors (VIF) to detect whether there is any correlation between the independent variables. A rule of thumb of VIF > 10 indicates that there is a serious problem in the multicollinearity. Besides that, 1<VIF < 5 indicating there is multicollinearity problem but not serious while VIF=1 show that there is no multicollinearity problem in the model. Based on the result from table 4.14, the VIF for the ten year is almost approximately equal to one. Therefore, we may conclude that the entire model for each year does not consist of multicollinearity problems.

4.2.3 Test of Significance

Table 4.15: Probabilities for Each Coefficient for year 2000 to 2010

IV.	Prob.										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CF	0.0346	0.5062	0.4101	0.4116	0.6766	0.8672	0.3642	0.7979	0.2960	0.6951	0.4339
LEV	0.0029	0.1092	0.849	0.1006	0.9259	0.2977	0.9859	0.4791	0.5962	0.8158	0.346
FZ	0.0263	0.188	0.1055	0.3376	0.5073	0.3853	0.768	0.8224	0.2108	0.4874	0.3146
DIV	0.2069	0.6865	0.5905	0.3976	0.698	0.5968	0.9266	0.2753	0.9965	0.6964	0.2905
MBV	0.02	0.942	0.344	0.1284	0.6151	0.3199	0.4306	0.9281		0.719	0.2714
P/E		0.6984									

Source: Developed for Research

According to Winters (2006), a low p-value (probability) e.g. 5% shows that the observations are outside the normal 95% region. Therefore, this variable is significantly different from our null hypothesis, i.e. we reject the H_0. If investigators include p-value in their reports, it enables them to convince their readers and enhances their credibility. If the p-value is less than α= 0.05, there is sufficient evidence to prove that the relative variable is significant at 0.05 significant level.

From the results in Table 4.15, it shows that in year 2000, there is an adequate evidence to conclude that cash flow, leverage, firm size and market-to-book value are significant to stock returns at α= 0.05. This is due to the probabilities of cash flow (0.0336), leverage (0.0029), firm size (0.0263) and market-to-book value (0.02) are less than α= 0.05.

However, dividend is the variable which is insignificant to stock returns at α= 0.05 in year 2000. This is due to the probability of dividend (0.2069) is more than α= 0.05. Hence, there is insufficient evidence to conclude that the dividend is significant to explain the stock returns.

Besides that, from the results in Table 4.15, it indicates that cash flow, leverage, firm size, dividend, market-to-book value and P/E ratio are insignificant to stock returns in year 2001. This is due to the probabilities of cash flow (0.5062), leverage (0.1092), firm size (0.188), dividend (0.6865), market-to-book value (0.942) and P/E ratio (0.6984) are more than α= 0.05. Hence, there is insufficient evidence to conclude that all the factors mentioned are significant to explain the market stock returns.

The result also point out that cash flow, leverage, firm size and dividend are reasonably insignificant in year 2008. This is due to the probabilities of cash flow (0.296), leverage (0.5962), firm size (0.2108), and dividend (0.9965) are more than α= 0.05. Hence, there is insufficient evidence to conclude that all the factors mentioned are significant to explain the stock returns.

4.2.4 Discussion on Test of Significance

From our result, we found that there is sufficient evidence to prove that Cash Flow (CF), Firm Size (FZ), Leverage (LEV), and Market-to-Book Value (MBV) is statistically significant at significance level of 0.05. Furthermore, this result is identical with several previous researchers which prove that they have significant effect to the stock returns. Dwi Maltani, Malone, and Rahfiani Khairurizka (2009) study the effect of financial ratio, firm size, cash flow operating in the interim report to the stock returns and shows that cash flow, firm size, and market-to-book value have significant impact on the stock return.

A previous study also shows that leverage has significant effect on the stock returns. According to Kennedy (2003), the debt-to-equity ratio which is categorized under the leverage has significant effect to the stock return. In addition, Ozdagli (2009) also indicated that leverage is the main source of value premium that significantly affect stock return.

From the result, it is evident that the cash flow is significant to stock returns in year 2000. However, it is insignificant to stock returns in the remaining nine years. Previous researchers, Daniat and Suhairi (2006) claim that the cash flow from investing activities and gross profit are significantly affect the expected return on shares. However, Meythi (2006) argues that cash flow from operating activities is insignificant to the expected return based on the result of 100 manufacturing firms in BEJ during year 1992-2002. He also shows that cash flow from operating activities does not affect stock price with profit persistence as intervening variables.

Besides, the result evidenced that leverage is significant in the year 2000 but insignificant in the remaining nine years. The insignificant effect of leverage to stock returns is consistent with the finding of Poutiainen and Zytomierski

(2010). They state that there was no evidence to prove that leverage as a stock characteristic able to explain stocks returns in cross-sectional regression.

According to Taani, K. and Banykhaled, M (2011), the firm size has insignificant effect on the stock returns. This is consistent with our result presented in the year 2002 to 2010. The researchers claim that the insignificant of the firm size is due to the involvement of market-to-book effect.

For dividend, the results show that dividend have an insignificant effect on stock returns for the years 2000 to 2010. This is consistent with the research studies of Allen and Rachim (1996), Rashid and Rahman (2009). According to Miller and Modigliani (1961), they show that dividends have no overall effect on the stock returns due to the appreciation of the price which has a compensatory effect on the dividend distribution.

Our results also found that the book-to-market value is significant to stock returns in year 2000, which is consistent with previous studies. However, book-to-market value has insignificant effect to stock returns in the remaining nine years. According to Matteev (2004), he argues that book-to-market equity plays no role in annotating the cross-sectional stock returns. His results are in contrast with the evidence from other markets.

Lastly, the P/E ratio has insignificant effect to stock return in the year 2001. This is consistent with the finding of Sparta and February (2005). They studied the effect of Return on Equity (ROE), Earning Per Share (EPS), and Cash Flow Operating (CFO) on stock returns in manufacturing industry. The result showed that ROE are significantly influences the stock returns but EPS and CFO have insignificant effect on the stock returns.

4.2.5 Multiple Linear Regressions Coefficients

Table 4.16 Summary of Coefficients for Each Year

YEAR			COEF.				
IV.	C	CF	LEV	FZ	DIV	MBV	P/E
2000	0.263345	0.142705	0.205684	-0.149621	0.083174	0.15723	
2001	-0.110361	-0.044789	-0.109457	0.089455	0.027137	-0.004885	-0.00261
2002	0.042706	-0.053470	0.012306	-0.106415	0.034841	-0.061468	
2003	0.244916	-0.078785	0.159661	-0.09216	-0.081358	0.0147458	
2004	0.568056	-0.073272	0.016324	-0.1167	-0.068163	-0.088394	
2005	0.143797	0.009793	0.061405	-0.05108	0.031024	0.058606	
2006	0.119979	0.073983	-0.001438	-0.023941	0.007474	0.064177	
2007	0.585867	0.032609	0.090383	0.028586	-0.139960	0.011487	
2008	-0.247363	0.037149	0.018741	0.044619	0.000154		
2009	-0.061825	-0.025731	-0.015284	-0.045682	-0.025616	-0.023613	
2010	0.463399	-0.061108	0.073726	-0.078741	-0.082819	0.086228	

Source: Developed for Research

Based on Table 4.15, there is an ambiguous relationship among the independent variables. According to the result, it shows that cash flow (CF) has a positive coefficient in year 2000, 2005, 2006, 2007, and 2008, and a negative coefficient for the remaining six years.

For leverage (LEV), there is negative relationship between the leverage and stock returns in year 2001, 2006 and 2009. On the contrary, there is positive relationship between the leverage and stock returns for the remaining years.

In contrast, there is a positive relationship between the firm size (FZ) and stock returns in year 2001, 2007 and 2008, whereas for the remaining years, there is a negative relationship between the leverage and stock returns. Next, the results indicate that the dividend (DIV) has negative coefficient in year 2003, 2004, 2007, 2009 and 2010. In contrast, there is a positive relationship between dividend and stock returns in the remaining six years.

For the market-to-book value (MBV), there is a negative relationship between the market-to-book value and stock returns in year 2001, 2002, 2004, and 2009, whereas for the remaining years, there are a positive relationship between the market-to-book value and stock returns.

Lastly, there is extra one variable, which is P/E ratio in the year 2001. From the result presented, there is a negative relationship between P/E ratio and stock returns in year 2001.

Next, we will interpret the multi-linear regression within the ten years. We have selected three years, which is year 2000, 2001 and 2008 for interpretations since there are three different numbers of independent variables in the three respective years.

Table 4.17: Summary of Regression Analysis in year 2000

Variables	Coefficient	Standard Error	T-statistic	Probability
Constant (C)	0.263345	0.064082	4.109490	0.0002
CF	0.142705	0.064806	2.202018	0.0336
LEV	0.205684	0.064806	3.173819	0.0029
FZ	-0.149621	0.064806	-2.308744	0.0263
DIV	-0.083174	0.064806	-1.283426	0.2069
MBV	0.157253	0.064806	2.426505	0.0200

R-square	0.416058
Adjusted R-Square	0.341193
S.E. Regression	0.429877
Sum Square residual	7.206970
Log likelihood	-22.64092
F-statistic	5.557486
Prob.(F-Statistic)	0.000587
Durbin-Watson stat	2.093426

Source: Developed for Research

Ŷ = 0.263345 + 0.142705 Cash Flow + 0.205684 Leverage – 0.149621 Firm Size – 0.083174 Dividend + 0.15723Market to Book Value

Based on the result, the variability that is measured by the coefficient of variation (β) of all independent variable is positive except firm size and dividend.

In general, the coefficients of the slope indicate the level of explained variability in the model.

The interpretation of the estimated model in year 2000 is as follow:

- The estimation of β_0 which is the interception of the line is 0.263345. This indicates the average level of annual stock returns when the level of factor variable is zero, holding other variables remain constant.

- The estimation of cash flow is 0.142705. If the cash flow increase by one year, the mean annual rate of stock returns will increase by 0.142705, holding other variables remain constant.

- The estimation of leverage is 0.205684. If the leverage increase by one year, the mean annual rate of stock returns will increase by 0.205684, holding other variables remain constant.

- The estimation of firm size is –0.149621. If the firm size increases by one year, the mean annual rate of stock returns will decrease by 0.149621, holding other variables remain constant.

- The estimation of dividend is – 0.083174. If the dividend increases by one year, the mean annual rate of stock returns will decrease by 0.083174, holding other variables remain constant.

- The estimation of market-to-book value is 0.15723. If the market-to-book value increases by one year, the mean annual rate of stock returns will increase by 0.15723, holding other variables remain constant.

Table 4.18: Summary of Regression Analysis in year 2001

Variables	Coefficient	Standard Error	T-statistic	Probability
Constant (C)	-0.110361	0.065987	-1.672466	0.1026
CF	-0.044789	0.066733	-0.671166	0.5062
LEV	-0.109457	0.066733	-1.640231	0.1092
FZ	0.089455	0.066733	1.340502	0.1880
DIV	0.027137	0.066733	0.406651	0.6865
MBV	-0.004885	0.066733	-0.073199	0.9420
P/E	-0.026055	0.066733	-0.390434	0.6984

R-square	0.121609
Adjusted R-Square	-0.017084
S.E. Regression	0.442655
Sum Square residual	7.445863
Log likelihood	-23.37465
F-statistic	0.876821
Prob.(F-Statistic)	0.521016
Durbin-Watson stat	2.027242

Source: Developed to the research

Ŷ= -0.110361- 0.044789 Cash Flow – 0.109457 Leverage +0.089455 Firm Size +0.027137 Dividend - 0.004885 Market to Book Value – 0.026055P/E Ratio

Based on the result, the variability that is measured by the coefficient of variation (β) of all independent variable is negative except firm size and dividend. In general, the coefficients of the slope indicate the level of explained variability in the model.

The interpretation of the estimated model in year 2001 is as follow:

- The estimation of β_0 which is the interception of the line is -0.110361. This indicates the average level of annual stock returns when the level of factor variable is zero, holding other variables remain constant.

- The estimation of cash flow is - 0.044789. If the cash flow increase by one year, the mean annual rate of stock returns will decrease by 0.044789, holding other variables remain constant.

- The estimation of leverage is – 0.109457. If the leverage increase by one year, the mean annual rate of stock returns will decrease by 0.109457, holding other variables remain constant.

- The estimation of firm size is 0.089455. If the firm size increases by one year, the mean annual rate of stock returns will increase by 0.089455, holding other variables remain constant.

- The estimation of dividend is 0.027137. If the dividend increases by one year, the mean annual rate of stock returns will increase by 0.027137, holding other variables remain constant.

- The estimation of market-to-book value is - 0.004885. If the market-to-book value increases by one year, the mean annual rate of stocks return will decrease by 0.004885, holding other variables remain constant.

- The estimation of P/E Ratio is – 0.026055. If the P/E Ratio increase by one year, the mean annual rate of stock returns will decrease by 0.026055, holding other variables remain constant.

Table 4.19: Summary of Regression Analysis in year 2008

Variables	Coefficient	Standard Error	T-statistic	Probability
Constant (C)	-0.247363	0.034690	-7.130664	0.0000
CF	0.037149	0.035082	1.058918	0.2960
LEV	0.018741	0.035082	0.534205	0.5962
FZ	0.044619	0.035082	1.271836	0.2108
DIV	0.000154	0.035082	0.004378	0.9965

R-squared	0.070292
Adjusted R-Squared	-0.022679
S.E. Regression	0.232707
Sum Squared residual	2.166109
Log likelihood	4.406694
F-statistic	0.756067
Prob.(F-Statistic)	0.560012
Durbin-Watson stat	1.667813

Source: Developed to the research

$\hat{Y}$ = -0.247363+ 0.037149 Cash Flow + 0.018741 Leverage + 0.044619 Firm Size + 0.000154 Dividend

Based on the result, the variability that measure by the coefficient of variation (β) of all independent variable is positive. In general, the coefficients of the slope indicate the level of explained variability in the model.

The interpretation of the estimated model in year 2008 is as follow:

- The estimation of β_0 which is the interception of the line is -0.247363. This indicates the average level of annual stock returns when the level of factor variable is zero, holding other variables remain constant.

- The estimation of cash flow is 0.037149. If the cash flow increase by one year, the mean annual rate of stock returns will increase by 0.037149, holding other variables remain constant.

- The estimation of leverage is 0.018741. If the leverage increase by one year, the mean annual rate of stock returns will increase by 0.018741, holding other variables remain constant.

- The estimation of firm size is 0.044619. If the firm size increases by one year, the mean annual rate of stock returns will increase by 0.044619, holding other variables remain constant.

- The estimation of dividend is 0.000154. If the dividend increases by one year, the mean annual rateod stock returns will increase by 0.000154, holding other variables remain constant.

4.2.6 Discussion on the Slope Coefficient

With the intention to examine the consistency of the coefficients in the models, previous studies have been deliberate.

In manufacturing industry, the relationship between cash flow and stock returns are ambiguous. Based on the result, there is positive relationship between cash flow and stock returns in year 2000, 2005, 2006, 2007, 2008 and 2010. The relationship between cash flow and stock returns is largely depends on the industries. Bansal, Dittmar, and Lundblad (2005) shows that the positive relationship between the cash flow and stock return. In contrast, there is negative relationship between cash flow and stock returns in year 2002, 2003, 2004, 2009 and 2010. Ang et al. (2006) argues that the negative relationship between the cash flow and stock returns is due to the systematic and special volatilities occurred in the stock price.

In general, there is positive relationship between leverage and stock returns. The higher the leverage, the higher the stock returns. The right use of leverage will generate the returns effectively. According to the result obtained, the positive coefficient of leverage in the year 2000, 2002, 2003, 2004, 2005, 2007, 2008, and 2009 is consistent with the findings of Bhandari (1998) and Ozdagli (2010) based on the theory of Miller and Modigliani proposition II. However, different industries have contradicted result with our study in the year 2001, 2006 and 2009. According to Schwartz (1959) and Korteweg (2004), there is negative relationship between leverage and stock returns. They found that the use of leverage is not good for generating stock returns. We may conclude that the contradicting empirical results are mainly due to the restrictions in the sample used. The positive relationship between leverage and stock returns is unique to risk class which is highly regulated and has concentration of leverage ratio, for instance, utilities sector, while the negative relationship has little effect on the pure capital structure changes, which the sample chosen is consists of low risk class.

For firm size, there is negative coefficient in year 2000, 2002 to year 2006, as well as 2009 and 2010. This is consistent with the result of previous studies. According to Shapiro and Lakoniskshok (1986), the firm size is the only factor which explains the average stock return and resulted in a negative relationship with stock returns after adding the factor of firm size into their investigation. Meanwhile, Banz (1981) also discover a negative relationship between the firm size and the stock returns. Besides that, Senthilkumar, G (2009) shows a negative and insignificant relationship between the firm size and stock returns. They claim that it is the market-book-equity that affected the firm size. The smaller firm will generate a higher stock returns due to the small firm normally have smaller market-to-book ratio. Therefore, there is no room for the stock price to increase. Conversely, the positive relationship between the firm size and stock returns are consistent with previous studies. Berk (1995b) states that stock returns may arise with the monitoring of the market value of equity or using the non-market measure for the firm size. This is due to larger firm normally has higher market-to-book ratio. Thus, there are more chances for the stock price to increase further.

Under the dividend signaling theory, it states that changes in dividend policy convey information about changes in future cash flows. Based on the results, there is a positive relationship of dividend yield and stock returns in year 2001, 2002, 2005, 2006, and 2008. This is consistent with the result of previous researchers such as Blume (1980), Lemmon and Thanh (2008), Keim (1985), and Litzenberger and Ramaswamy (1982). The researchers found that the positive coefficient is due to the risk adjusted returns on dividend-paying stocks increased monotonically with the anticipated dividend yield. This reason is matches with the dividend signaling theory. A high dividend show there is a good cash flow, profitability, and generally, good performance of the company to explain the stock returns. It is also means that when stock price increase, it will lead to an increase in dividend yield. On the other hand, there was a negative relationship between dividend yield and stock returns in year 2000, 2003, 2004, 2007, 2009 and 2010. This is consistent with the result of past researcher such as Hess (1981). He states that stock return and dividend yield is not constant across the securities. The payment of the dividend does not enough to retain the company return due to economic and financial crisis that indirectly affects the dividend yield of the shareholders.

Meanwhile, the results of the regressions are in line with previous studies such as Stattman (1980), Rosenber, Reid, and Lanstein (1985) which point out a positive relationship between the market-to-book equity and stock returns in year 2000, 2003, 2005, 2006, 2007 and 2010. Most of the investors merely have a preference for investing in ‘superior firm’ with high market-to-book and growth. Thenceforth, the firm’s stock price and stock returns will continue to grow. On the contrary, our results indicate a negative relationship in year 2001, 2002, 2004 and 2009. This can be explained by (Penman et al (2005) which discover a strong evidence to prove that market-to-book equity and stock returns will be negatively correlated. Firm with small market-to-book equity tends to have higher returns. This is due to the stock prices are unrealized and it may potentially increased in the future. Meanwhile, Fama and French (1995) and Chen and Zhang (1998) develop a consistent view of company with high book-to-market equity has persistently low stock returns in U.S stocks using OLS method. Its earning will be more precarious, higher financial leverage and may reduce or cut dividend compared to the firm with low book-to-market equity.

Lastly, the negative coefficient of P/E ratio is inconsistent with some previous studies. Sparta and Fabruwaty (2005) studied the effect of return on equity, P/E ratio, and cash flow from operation to the stock return during 1999 to 2002. The result indicated that only return on equity significantly influences stock return at 5 % significant level, while the P/E ratio and cash flow from operation have insignificant effect to the stock return. Utama and Santaso (1998) prove that P/E ratio has negative effect on stock return. This negative correlation can be rationalized by the value of the price itself. A very high price-to-book value can cause overvalue on stock returns as the high price will tend to decrease to reach its intrinsic value. As a result, this will reduce the stock returns. Accordingly, the low P/E ratio will increase the stock returns due to the low stock price.

4.3 Diagnostic Checking

4.3.1 Heteroscedasticity Test

Ho: There is no Heteroscedasticity problem in the model.

H_1: There is Heteroscedasticity problem in the model.

Table 4.20: Summary of Heteroscedasticity Result for Year 2000 to 2010

Year	Prob. F (1,38)
2000	0.3723
2001	0.9097
2002	0.5360
2003	0.3613
2004	1.000
2005	1.000
2006	0.0789
2007	0.1676
2008	0.0945
2009	0.7246
2010	0.9999

Source: Developed for Research

Based on the Heteroscedasticity White Test, we can reject H_0 if the p-value is less than significant level of 0.05 (α=0.05). Otherwise, we do not reject H_0. According the table above, p-value from the table above from year 2000 to 2010 is greater than the significant level of 0.05. Therefore, we do not reject H_0. As a result, there is not enough evidence that there is no heteroscedasticity problem in the model for the year 2000 to 2010.

4.3.2 Ramsey RESET Test

H_0: The model is correctly specified.

H_1: The model is not correctly specified.

Table 4.21: Summary of Ramsey RESET Test for year 2000 to 2010

Year	Prob. F (1,38)
2000	0.0458
2001	0.9081
2002	0.2109
2003	0.2365
2004	0.5602
2005	0.9504
2006	0.8244
2007	0.9084
2008	0.01
2009	0.3142
2010	0.5109

Source: Developed for Research

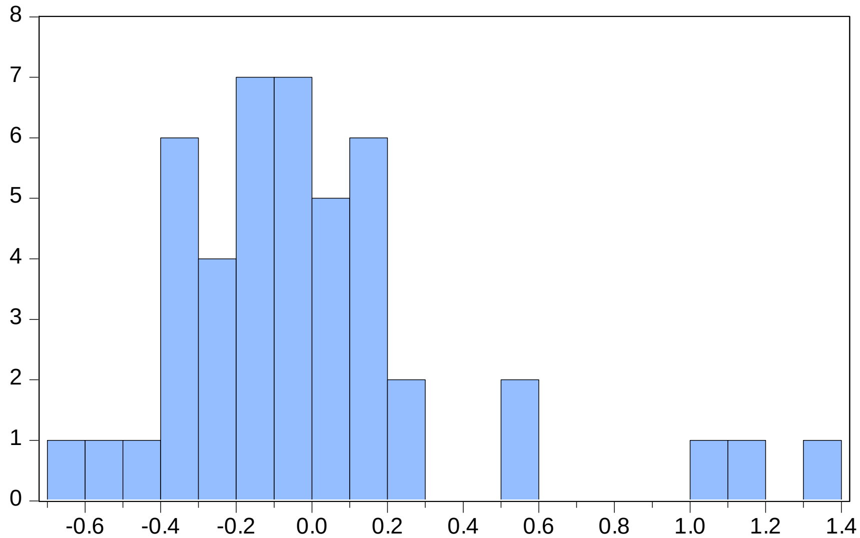
The Ramsey Regression Equation Specification Error Test (RESET) is a specification test which test for the linear regression model. Based on the result obtained from the Table 4.20, it shows that there is a linear regression model for year 2000 to 2010, except for the year 2000 and 2008. The result indicated there is a linear regression model due to the p-value for the ten years, except year 2000 and 2008 are greater than the significant level (α=0.05). This implied that the null hypothesis cannot be rejected and the model is correctly specified. However, the model is non linear in year 2000 and 2008 since the p-value is less than 0.05. This shows that the null hypothesis should be rejected and the model is not correctly specified.

4.3.3 Normality Distribution

H_0: The error term is normally distributed.

H_1: The error term is not normally distributed.

Table 4.21 Result of Jarque-Bera Test in year 2000

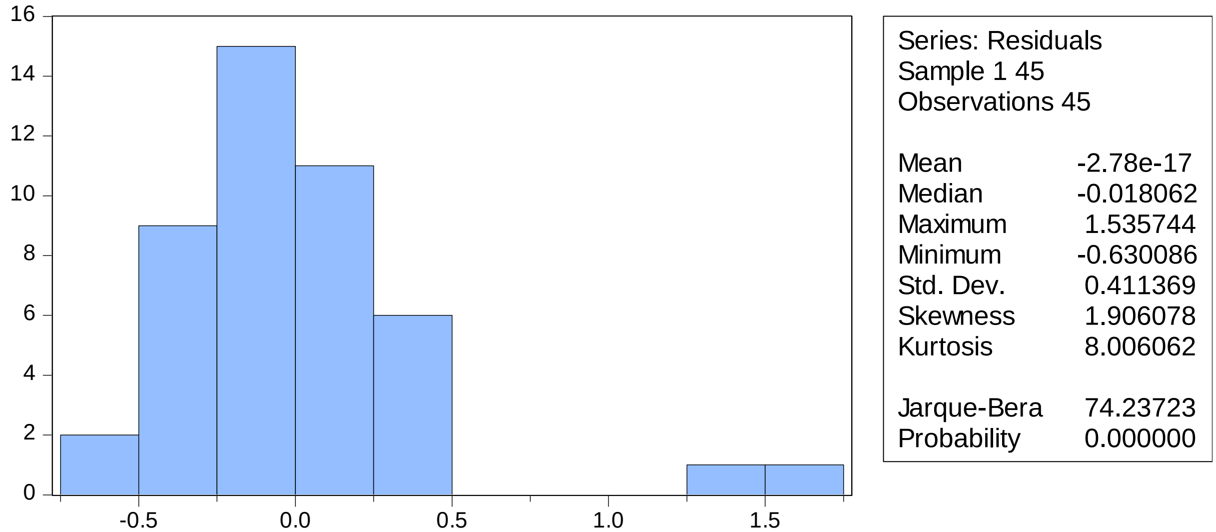


Series: Residuals	
Sample 1 45	
Observations 45	
Mean	-4.44e-17
Median	-0.088271
Maximum	1.370319
Minimum	-0.694466
Std. Dev.	0.404716
Skewness	1.597041
Kurtosis	6.059001
Jarque-Bera	36.67434
Probability	0.000000

Source: Developed for Research

Based on the Jarque-Bera test in Table 4.21, the Jarque-Bera statistic is around 36.67434, and the probability for the result is 0.000. Hence, we can conclude that the error term is not normally distributed at the significant level of 0.05 (α=0.05) since its p-value (0.000) is less than 0.05. Therefore, the error term of estimated model is not normally distributed.

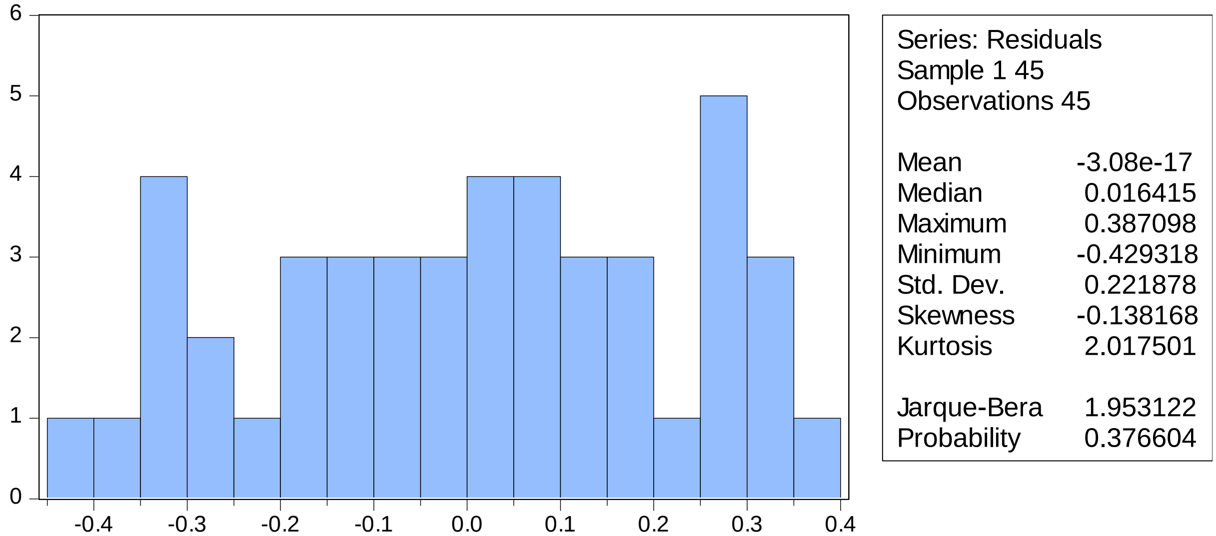
Table 4.22 Result in Jarque-Bera Test in year 2001



Source: Developed for Research

Based on the Jarque-Bera test in Table 4.22, the Jarque-Bera statistic is 74.23723, and the probability for the result is 0.000. Hence, we can conclude that the error term is not normally distributed at the significant level of 0.05 (α=0.05) since its p-value (0.000) is less than 0.05. Therefore, the error term of estimated model is not normally distributed.

Table 4.23 Result of Jarque-Bera Test in year 2008



Source: Developed for Research

Based on the decision rule, reject the null hypothesis if the probability more than the significant level of 0.05 (α=0.05), otherwise do not reject the null hypothesis. Hence, we do not reject the null hypothesis since the p-value (0.376604) is higher than 0.05 at significant level of 0.05. Therefore, we may conclude that the error term follow normal distribution at 5% significant level.

4.4 Conclusion

In this chapter, we have presented the results that processed by the SPSS and E-Views. Output of Exploratory Factors Analysis (EFA), Ordinary Least Square (OLS) of the estimated model as well as the interpretation had been carried out. We have showed the way in choosing the factor variation method and the rotation chosen is varimax. Then, we named the factor variables based on the high loadings value under the varimax rotation method.

Next, we have regressed the regression model using factor scores and used Variances Inflation Factor (VIF) to detect the multicollinearity problem between the independent variables. Based on the result, we can conclude that the model is free from multicollinearity problem.

Apart from that, we used the OLS method to estimate the significant level and relationship between the independents and dependant variables. According to the result, there is only one year which is year 2000 have significant effect to explain the stock returns. Furthermore, after conduct the normality test, figure out that our dataset has suffers from the non-normal distribution. However, solving this problem is beyond the scope of our research.

Last but not least, summarizing of statistical analysis, implications, limitations of this study, as well as recommendations will be presented in the next chapter.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATION

5.0 Introduction

In previous chapter, we have gone through a few of the discussion. In Chapter 1, we have discussed about the main purpose, background as well as the problem statement in our research. In Chapter 2, we have summarized all the past researchers studies. In chapter 3, we have mentioned the method that we employed for regressing our data as well as interpretation of our results in Chapter 4.

Subsequently, we will discuss about the summary of data analysis, major findings, multiple linear regression, implications, limitations, and also recommendations of our study in this chapter. Furthermore, we will also summarize our entire descriptive and inferential analyses. The major objective in this chapter is to point out the limitations in our research as well as provide recommendations for future researchers.

5.1 Summary of Statistical Analysis

A summary for description of the entire descriptive and inferential analysis as well as discussion of the previous chapters are provided as follow.

5.1.1 Summary of the Descriptive Analyses

We had adopted stock returns from the company that established in Hong Kong as our dependant variable. From our Exploratory Factor Analysis, we have found some factor variables which may explain the stock returns from the year 2000 to 2010. These independent variables are Cash Flow, Leverage, Firm Size, Dividend, Market-to-Book Value, and P/E ratio. Besides, highly correlated between the independent variables has been solved due to the factor scoring. Variance Inflation Factor (VIF) method has also been used for the detecting of multicollinearity problem in the OLS regressions.

5.1.2 Factor Rotation

In order to ensure the outcome of the model is simple structure and easy for interpretation, methods of factor rotation such as, varimax, quartimax, equamax, direct oblimin, and promax have been compared with each other. Based on the outcome in chapter 4, varimax rotation had been selected for the model interpretations. This is because some previous studies have justified that when the simple structure is clear, all the rotation methods would provide the same results. Therefore, we decided to employ the varimax rotation for our results interpretations and it allowed us to name the factors variables which consist of high factors loading more than 0.30.

5.1.3 Factor Extraction

Basically, the number of factors to extract is important for the decision in the factors analyze, especially for structuring the model to explain our research.

In order to establish the number of factors, some criteria have been recommended by the past researchers. According to the Guttman- Kaiser rule, researchers should retain those factors with Eigenvalues more than 1. Besides, the total variances should account at least 70 to 80 percent for explanations. Based on the result we have conducted in previous chapter, there are at least five factors will be retained for the years 2000 to 2010, excluding year 2001 and 2008. Thence, most of the factors have account approximately 90 percent of the total variances. In contrast, the numbers of factor extracted are four factors and six factors for the year 2001 and 2008. Thus, the total variances for these two years also account for more than 70 percents.

5.1.4 Significant P-Value

The significant level of α for a given hypothesis test is a value which a P-value less than or equal to the (α) is considered statistically significant. Refer back to our result shown in chapter 4, most of the p-value for each of the independent variables are greater than the significant level at $\alpha = 0.05$. This indicates our results obtain an insignificant level between the stock returns and the factor variables for the explanation. However, there is only one year which shown a significant effect between the independent variables and stock returns. For example, cash flow, firm size, leverages and market-to-book ratio show a significant effect to the stock returns in year 2000, whereas insignificant effect in the remaining years.

5.1.5 Factor Score Loading and Variances Inflation Factor (VIF)

In order to solve the multicollinearity problem, the factor score covariances matrix is adopted. From the result, the factor score covariances reveal the five factors variables are orthogonal. This means the factor scores for the five factors do not covary with each other. Consequently, the model do not consist any multicollinearity problem.

Moreover, a further detection has been carried out in order to prove the result shown by the factor score. Based on the VIF result from the chapter 4, most of the VIF approximately near to 1 indicate that there is no multicollinearity problem in the model from year 2000 to 2010.

5.1.6 Multiple Linear Regressions

Multiple Linear regressions (MLR) are a statistical technique that uses several explanatory variables to predict the outcome of a response variable. The objective of MLR is to model the relationship between the explanatory and response variables.

From the summarized results of the regression analysis in previous chapter, the stock returns of HKSE are moderately sensitive to variation with the R^2 value of 0.416058 or 41.6% in year 2000. This means that there are 41.6% in the stock variation affected by the five independent variables which are cash flow, leverage, firm size, dividend, and also market-to-book value. In other words, 59.4% of stock returns are affected by other factors. Furthermore, the coefficients of variables (β) of all independents are expected to be positive excluding the firm size and dividend. The following years of

2002, 2003, 2004, 2005, 2006, 2007, 2009, and 2010 are found to have the same independents variable with year 2000.

In year 2001, the dependents variable are found to be affected by six independent variables, which are cash flow, leverage, firm size, dividend, market-to-book value and P/E ratio. In the same year, the stock returns of HKSE are less sensitive to variation with the R^2 value of 0.121609 or 12.16%. This means that there are 12.16% in the stock variation affected by the six independent variables. In other words, 87.84% of stock returns are affected by other factors. Apart from firm size and dividend, the coefficients of variables (β) of all independents are expected to be negative.

On the other hand, four independent variables including cash flow, leverage, firm size, and dividend are found to bring some effects to stock returns in year 2008. The stock return of HKSE was less sensitive to variation with the R^2 value of 0.070292 or 7.03%. This means that there are 7.03% in the stock variation affected by the 4 independent variables. In other words, it also means that 92.97% of stock returns are affected by other factors. In this year, all of the coefficients of variables (β) of all independents are expected to be positive.

5.2 Discussion of Major Findings

Based on the OLS result presented, it showed that there were ambiguous relationships between independent variables and dependent variable.

In manufacturing industry, the relationship between cash flow and stock returns are ambiguous. The positive correlations of cash flow towards stock returns are due to the cash flow covariance while the negative relationship is due to the systematic and special volatilities occurred in the stock price. For leverage, the contradicting empirical results are mainly due to the restrictions in the sample used. The positive relationship between leverage and stock returns is unique to risk class while the negative relationship is based on the pure capital structure changes.

Next, firm size is the only factor which explains the average stock return and resulted in a negative relationship with stock returns after adding the factor of firm size into their investigation. The stock returns may arise with the monitoring of the market value of equity or using the non-market measure for the firm size and resulted in a negative relationship.

Meanwhile, the positive relationship between dividend yield and stock returns are due to the risk adjusted returns on dividend-paying stocks increased monotonically with the anticipated dividend yield while the negative relationship is caused by the financial crisis. For book-to-market value, the positive relationship is due to most of the investors preferred to invest 'superior firm' with high market-to book and growth, therefore, it increases the stock price and stock returns. In contrary, negative relationship because some believe the firms with low market-to book value, their stock prices are unrealized and have potential to increase in future, therefore rise in stock price and returns.

Lastly, the negative correlation of P/E ratio towards stock returns can be rationalized by the value of the price value itself. A very high price book value can cause overvalue on stocks and thus price will tend to decrease to reach the intrinsic value. As a result, the stock returns are low.

On the other hand, our result reveals that the model we employed in our study is only significant in year 2000, whereas the remaining years are insignificant.

5.3 Implication of Study

Stock returns are vital part of dynamics of financial activity as it indicates a country's financial strength and development. It is important for a country to make decision about the implementation of monetary or fiscal policy in order to control well the country economic and finance. Furthermore, stock returns indicate the growth of the industry and commerce. Therefore, factors which will affect stock returns are necessary to be determined if a country wishes to boost its economy.

5.3.1 Investor's perspectives

Factor analysis is superior way for investors to explore the determinants which will affect stock returns. As for the investor's perspectives, this study enables investors who are interested to invest in HKSE to determine how each of the variables can affect the stock prices. Besides, it also allows the investors to build a better model toward the HKSE and evaluate potential returns or dividends which will be rewarded by the companies.

Moreover, certain groups of investors do not have too much excessive gain to other investors will destabilize the Hong Kong stock market. Thus, different researches of stock return aid to develop a better understanding of stock market pricing.

5.3.2 Market's perspectives

From market point of view, our study may contributed significantly to the market regulators as they get a more in depth knowledge about the factors which affect stock pricing for analysing future regulations in stock market. Furthermore, this study is also beneficial for international financial market. It urges more investors to invest in Hong Kong as it allows the investors to reduce uncertainties and create more awareness of understanding about HKSE. Moreover, it aids policy maker to absorb more financial activities from China due to the Hong Kong act as an intermediary of China.

5.4 Limitations of Study

Theoretically, one of the ways to get robust results is to adopt a large sample size. According to Rhiel and Chaffin (1996), they strongly believe that the larger the sample size, the greater the possibility to find statistical significance, and minimize the errors term. Consequently, the results will be more accurate and robust.

However, we only used 45 companies as our sample size to conduct this research. At first we found around 200 companies in HKSE as our samples size. Nevertheless some of the companies' data consist of missing value or carry no meaning. At last, we weeded out the unnecessary data until 45 companies.

On the other hand, the most crucial decision making in factor analysis is to retain the number of factors during extraction. This is because this rules the relationship between factors and variables as well as resultant structure. Meanwhile, we have adopted K1 rule in this study, it is the most default and general principle in most statistical packages performing principle component extraction. Variance associated with the factor (Eigenvalues), is less or equal to one and factors are retained.

This is based on a contention in removing principle components from a correlation matrix and every variable will contribute a variance of one. Therefore, Principle Component (a factor) must be retained if it has more variance than a single variable. However, some criticize that the K1 rule is likely to overestimate the variance in the factor. Besides, there are usually several factors with Eigen value fluctuating around one. Thus, the outcome of adopting K1 rule is consequently a tendency to keep hold of more factors than is apposite.

Another limitation is lack of journals which used the same method (factor analysis) as we carry out our research is available. Last but not least, we used data from years 2000 to 2010 in our sample size. However, the frequencies of the data we used are too low. High-frequency data are observations on financial variables recorded quarterly, monthly, weekly, daily data or at a finer time scale. It possesses extraordinary features if compared to data measured at low frequency. Besides, analyzing high frequency data poses exclusive and fascinating challenges to statistical analysis. Thenceforth, high frequency data are always vital for carrying out a research in order to get robust results (Goodhart and O'Hara, 1997; Andersen, 2000; Ghysels, 2000).

5.5 Recommendations

The evidence presented at Chapter 4 suggests several directions of future research for the determinations of stock return. First, for the aspect of sample size, it is strongly believe that the sample size should be increased to obtain accurate and robust result.

However, according to Field (2005), the sample size necessary for factor analysis depends on many things. There is no estimation for sample size for factor analysis based on any statistical theory. Thus, future researchers are recommended to choose and determine the sample size appropriately in order to obtain robust result.

Second direction is concern with the result that had obtained in our study. According to the result, there is only one year which is year 2000 significant to explain the stock returns. Future researchers are recommended to conduct more tests in order to obtain more significance results. Besides that, future researchers also recommended to conduct other least square methods and different tests for the nine remaining insignificant years.

Besides that, high frequency data is recommended to be used in future research. Monthly data as well as daily data might be more useful for studying the statistical properties, particularly the volatility of stock returns as high frequency data possess unique features absent in data measured at lower frequencies. Other types of data, like time series data and panel data also recommended to be used in the future research.

Next direction is related with the county that being selected to conduct research. Future researchers are recommended to conduct research in countries such as United States, which is the world's largest trading. This is due to the high rates of economic growth in developed country tends to provide great absolute investment opportunities in the financial market. This may provide different inferences in terms of stock returns compared to the research conduct in Hong Kong.

Lastly, it is related to the extent of the research circumstance whereby future researches are recommended to conduct research during the period of economic booming as well as financial crisis. The magnitude impact of economic booming and financial crisis on stock return might be significantly severe. They may bring abnormal or unexpected stock returns to the stock market.

5.6 Conclusion

In a nutshell, this study bring to light for an alternative way to demonstrate the hidden factor in a set of variables which have significant explanatory power to influence stock returns in Hong Kong. This study is beneficial as it allows developing a better understanding towards evaluation of stock prices and perhaps prediction of stock returns in the financial market. Thence, this may be essential especially for investors, as they can earn lucrative capital gain and dividend. Last but not least, this study is also crucial for government, analysts and researches for further research.

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APPENDICES A: Factor Extraction and Total Variances Explanation For year 2000 until 2010

Table 4.1: Result for Total Variances Explanation in Year 2000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	20.944	53.703	53.703	20.944	53.703	53.703	18.864	48.368	48.368
2	8.336	21.375	75.078	8.336	21.375	75.078	9.677	24.813	73.181
3	3.658	9.379	84.457	3.658	9.379	84.457	3.083	7.905	81.085
4	1.756	4.503	88.960	1.756	4.503	88.960	2.652	6.800	87.886
5	1.058	2.712	91.672	1.058	2.712	91.672	1.477	3.787	91.672
6	.966	2.476	94.148						
7	.650	1.666	95.814						
8	.566	1.450	97.265						
9	.385	.988	98.253						
10	.193	.494	98.746						
11	.145	.372	99.118						
12	.118	.303	99.422						
13	.076	.194	99.616						
14	.054	.138	99.754						
15	.036	.093	99.847						
16	.028	.071	99.917						
17	.014	.035	99.952						
18	.007	.019	99.971						
19	.005	.012	99.983						
20	.004	.009	99.992						
21	.001	.003	99.995						
22	.001	.002	99.998						
23	.001	.001	99.999						
24	.000	.000	99.999						
25	9.453E-005	.000	100.000						
26	6.154E-005	.000	100.000						
27	3.204E-005	8.216E-005	100.000						
28	2.177E-005	5.582E-005	100.000						
29	8.417E-006	2.158E-005	100.000						
30	4.898E-006	1.256E-005	100.000						
31	3.177E-006	8.146E-006	100.000						
32	8.334E-007	2.137E-006	100.000						
33	4.798E-007	1.230E-006	100.000						
34	1.594E-008	4.088E-008	100.000						
35	5.781E-009	1.482E-008	100.000						
36	6.863E-016	1.760E-015	100.000						
37	2.956E-017	7.580E-017	100.000						
38	-2.287E-016	-5.865E-016	100.000						
39	-7.753E-016	-1.988E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.1: Result for the Total Variances Explanation in Year 2001

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	23.892	61.262	61.262	23.892	61.262	61.262	21.951	56.284	56.284
2	4.307	11.045	72.307	4.307	11.045	72.307	4.870	12.487	68.771
3	3.569	9.150	81.457	3.569	9.150	81.457	3.487	8.941	77.712
4	2.251	5.771	87.228	2.251	5.771	87.228	2.452	6.287	83.999
5	1.313	3.366	90.594	1.313	3.366	90.594	1.844	4.727	88.726
6	1.018	2.610	93.204	1.018	2.610	93.204	1.747	4.478	93.204
7	.779	1.998	95.203						
8	.709	1.817	97.019						
9	.390	1.000	98.019						
10	.255	.653	98.672						
11	.144	.368	99.040						
12	.139	.357	99.397						
13	.063	.162	99.559						
14	.059	.151	99.710						
15	.052	.133	99.842						
16	.038	.096	99.939						
17	.009	.023	99.962						
18	.007	.018	99.979						
19	.004	.010	99.989						
20	.002	.005	99.994						
21	.001	.003	99.996						
22	.001	.002	99.998						
23	.000	.001	99.999						
24	.000	.000	99.999						
25	.000	.000	100.000						
26	6.926E-005	.000	100.000						
27	5.503E-005	.000	100.000						
28	1.579E-005	4.048E-005	100.000						
29	8.193E-006	2.101E-005	100.000						
30	4.575E-006	1.173E-005	100.000						
31	1.865E-006	4.783E-006	100.000						
32	3.183E-007	8.162E-007	100.000						
33	1.078E-007	2.764E-007	100.000						
34	2.941E-008	7.542E-008	100.000						
35	8.235E-009	2.112E-008	100.000						
36	1.737E-015	4.455E-015	100.000						
37	6.911E-016	1.772E-015	100.000						
38	3.202E-016	8.210E-016	100.000						
39	-2.249E-015	-5.767E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.2: Result for the Total Variances Explanation in Year 2002

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	25.078	64.302	64.302	25.078	64.302	64.302	24.058	61.688	61.688
2	4.154	10.652	74.954	4.154	10.652	74.954	4.187	10.736	72.424
3	2.689	6.896	81.849	2.689	6.896	81.849	3.065	7.859	80.283
4	2.110	5.410	87.259	2.110	5.410	87.259	2.210	5.666	85.948
5	1.331	3.412	90.672	1.331	3.412	90.672	1.842	4.723	90.672
6	.914	2.343	93.014						
7	.812	2.082	95.096						
8	.661	1.694	96.790						
9	.500	1.282	98.073						
10	.299	.767	98.840						
11	.148	.379	99.219						
12	.108	.277	99.496						
13	.086	.221	99.717						
14	.046	.118	99.836						
15	.026	.067	99.902						
16	.015	.039	99.942						
17	.009	.023	99.965						
18	.006	.015	99.980						
19	.004	.009	99.989						
20	.002	.006	99.995						
21	.001	.002	99.997						
22	.000	.001	99.998						
23	.000	.001	99.999						
24	.000	.000	100.000						
25	7.003E-005	.000	100.000						
26	3.351E-005	8.593E-005	100.000						
27	2.596E-005	6.657E-005	100.000						
28	1.709E-005	4.381E-005	100.000						
29	3.378E-006	8.662E-006	100.000						
30	2.081E-006	5.337E-006	100.000						
31	9.597E-007	2.461E-006	100.000						
32	3.479E-007	8.920E-007	100.000						
33	2.740E-007	7.026E-007	100.000						
34	9.342E-008	2.395E-007	100.000						
35	5.021E-009	1.287E-008	100.000						
36	1.161E-015	2.976E-015	100.000						
37	4.402E-016	1.129E-015	100.000						
38	-1.308E-016	-3.355E-016	100.000						
39	-4.240E-016	-1.087E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.3: Result for the Total Variances Explanation in Year 2003

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.554	68.086	68.086	26.554	68.086	68.086	25.325	64.936	64.936
2	4.350	11.155	79.241	4.350	11.155	79.241	4.856	12.450	77.387
3	2.514	6.447	85.688	2.514	6.447	85.688	2.728	6.994	84.380
4	1.907	4.891	90.579	1.907	4.891	90.579	2.238	5.739	90.119
5	1.208	3.098	93.676	1.208	3.098	93.676	1.387	3.557	93.676
6	.880	2.256	95.932						
7	.555	1.424	97.356						
8	.392	1.004	98.360						
9	.237	.608	98.968						
10	.133	.340	99.309						
11	.101	.260	99.568						
12	.050	.128	99.697						
13	.040	.103	99.800						
14	.026	.067	99.867						
15	.017	.042	99.910						
16	.011	.028	99.938						
17	.008	.022	99.960						
18	.006	.016	99.976						
19	.005	.012	99.988						
20	.002	.005	99.993						
21	.001	.003	99.997						
22	.001	.002	99.999						
23	.000	.001	99.999						
24	.000	.000	100.000						
25	8.405E-005	.000	100.000						
26	4.302E-005	.000	100.000						
27	3.328E-005	8.534E-005	100.000						
28	1.207E-005	3.096E-005	100.000						
29	5.051E-006	1.295E-005	100.000						
30	1.813E-006	4.648E-006	100.000						
31	6.131E-007	1.572E-006	100.000						
32	2.267E-007	5.813E-007	100.000						
33	1.223E-007	3.135E-007	100.000						
34	6.033E-008	1.547E-007	100.000						
35	5.704E-009	1.463E-008	100.000						
36	4.142E-016	1.062E-015	100.000						
37	-6.445E-017	-1.653E-016	100.000						
38	-6.845E-016	-1.755E-015	100.000						
39	-9.587E-016	-2.458E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.4: Result for the Total Variances Explanation in Year 2004

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.256	67.323	67.323	26.256	67.323	67.323	24.960	64.000	64.000
2	4.584	11.754	79.078	4.584	11.754	79.078	5.201	13.336	77.336
3	3.023	7.751	86.829	3.023	7.751	86.829	2.876	7.376	84.711
4	1.773	4.546	91.375	1.773	4.546	91.375	2.379	6.099	90.810
5	1.098	2.815	94.190	1.098	2.815	94.190	1.318	3.380	94.190
6	.747	1.915	96.106						
7	.468	1.200	97.305						
8	.320	.820	98.126						
9	.256	.658	98.783						
10	.186	.478	99.262						
11	.128	.328	99.590						
12	.064	.164	99.754						
13	.033	.085	99.838						
14	.018	.047	99.885						
15	.017	.043	99.929						
16	.012	.031	99.960						
17	.008	.020	99.979						
18	.005	.012	99.991						
19	.002	.004	99.996						
20	.001	.002	99.997						
21	.001	.001	99.999						
22	.000	.001	99.999						
23	.000	.000	100.000						
24	7.850E-005	.000	100.000						
25	3.692E-005	9.466E-005	100.000						
26	2.510E-005	6.436E-005	100.000						
27	1.737E-005	4.454E-005	100.000						
28	8.766E-006	2.248E-005	100.000						
29	2.233E-006	5.725E-006	100.000						
30	1.121E-006	2.875E-006	100.000						
31	1.061E-006	2.721E-006	100.000						
32	6.537E-008	1.676E-007	100.000						
33	3.075E-008	7.884E-008	100.000						
34	5.359E-009	1.374E-008	100.000						
35	1.596E-009	4.093E-009	100.000						
36	9.223E-016	2.365E-015	100.000						
37	7.003E-016	1.796E-015	100.000						
38	-1.008E-016	-2.586E-016	100.000						
39	-5.383E-016	-1.380E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.5: Result for the Total Variances Explanation in Year 2005

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	25.957	66.557	66.557	25.957	66.557	66.557	24.366	62.478	62.478
2	4.705	12.065	78.622	4.705	12.065	78.622	5.247	13.455	75.932
3	2.923	7.495	86.117	2.923	7.495	86.117	3.030	7.770	83.702
4	1.427	3.658	89.775	1.427	3.658	89.775	2.084	5.344	89.046
5	1.339	3.434	93.209	1.339	3.434	93.209	1.624	4.163	93.209
6	.620	1.590	94.800						
7	.592	1.517	96.317						
8	.481	1.232	97.549						
9	.285	.730	98.279						
10	.243	.624	98.902						
11	.223	.571	99.473						
12	.098	.251	99.725						
13	.041	.104	99.829						
14	.024	.061	99.889						
15	.016	.040	99.929						
16	.010	.025	99.954						
17	.007	.017	99.972						
18	.005	.014	99.985						
19	.003	.008	99.993						
20	.001	.003	99.996						
21	.001	.002	99.999						
22	.000	.000	99.999						
23	.000	.000	100.000						
24	9.940E-005	.000	100.000						
25	3.996E-005	.000	100.000						
26	2.829E-005	7.254E-005	100.000						
27	1.430E-005	3.666E-005	100.000						
28	8.037E-006	2.061E-005	100.000						
29	1.724E-006	4.419E-006	100.000						
30	8.108E-007	2.079E-006	100.000						
31	5.381E-007	1.380E-006	100.000						
32	7.693E-008	1.972E-007	100.000						
33	2.450E-008	6.281E-008	100.000						
34	5.925E-009	1.519E-008	100.000						
35	1.367E-010	3.505E-010	100.000						
36	1.070E-015	2.743E-015	100.000						
37	4.082E-016	1.047E-015	100.000						
38	2.352E-016	6.030E-016	100.000						
39	-9.157E-016	-2.348E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.6: Result for the Total Variances Explanation in Year 2006

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.157	67.070	67.070	26.157	67.070	67.070	24.374	62.497	62.497
2	4.953	12.701	79.771	4.953	12.701	79.771	5.314	13.625	76.122
3	2.864	7.344	87.115	2.864	7.344	87.115	2.982	7.647	83.768
4	1.511	3.875	90.991	1.511	3.875	90.991	2.405	6.167	89.935
5	1.415	3.629	94.620	1.415	3.629	94.620	1.827	4.684	94.620
6	.616	1.579	96.199						
7	.456	1.170	97.369						
8	.414	1.061	98.430						
9	.199	.510	98.940						
10	.150	.384	99.323						
11	.106	.271	99.595						
12	.076	.195	99.789						
13	.030	.076	99.865						
14	.024	.062	99.927						
15	.014	.035	99.962						
16	.007	.017	99.979						
17	.003	.007	99.986						
18	.002	.005	99.991						
19	.002	.004	99.995						
20	.001	.002	99.997						
21	.001	.002	99.999						
22	.000	.001	100.000						
23	7.936E-005	.000	100.000						
24	4.445E-005	.000	100.000						
25	2.638E-005	6.764E-005	100.000						
26	1.210E-005	3.103E-005	100.000						
27	3.560E-006	9.127E-006	100.000						
28	2.555E-006	6.551E-006	100.000						
29	1.451E-006	3.722E-006	100.000						
30	3.188E-007	8.175E-007	100.000						
31	1.527E-007	3.916E-007	100.000						
32	6.609E-008	1.695E-007	100.000						
33	1.815E-008	4.653E-008	100.000						
34	1.898E-009	4.866E-009	100.000						
35	1.591E-015	4.080E-015	100.000						
36	3.194E-016	8.190E-016	100.000						
37	-5.185E-017	-1.330E-016	100.000						
38	-1.233E-015	-3.160E-015	100.000						
39	-1.433E-015	-3.674E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

<u>Table 4.1.7: Result for the Total Variances Explanation in Year 2007</u>

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.468	67.866	67.866	26.468	67.866	67.866	24.509	62.843	62.843
2	5.109	13.099	80.966	5.109	13.099	80.966	5.886	15.093	77.936
3	2.553	6.546	87.512	2.553	6.546	87.512	2.900	7.437	85.373
4	1.841	4.721	92.234	1.841	4.721	92.234	2.354	6.037	91.409
5	1.335	3.424	95.658	1.335	3.424	95.658	1.657	4.248	95.658
6	.465	1.192	96.850						
7	.355	.910	97.760						
8	.272	.698	98.458						
9	.194	.497	98.955						
10	.157	.403	99.358						
11	.098	.252	99.611						
12	.068	.175	99.786						
13	.034	.087	99.872						
14	.022	.057	99.929						
15	.012	.030	99.959						
16	.009	.022	99.982						
17	.003	.007	99.988						
18	.002	.006	99.994						
19	.001	.002	99.997						
20	.000	.001	99.998						
21	.000	.001	99.999						
22	.000	.000	99.999						
23	.000	.000	100.000						
24	.000	.000	100.000						
25	2.720E-005	6.975E-005	100.000						
26	2.111E-005	5.413E-005	100.000						
27	1.155E-005	2.962E-005	100.000						
28	9.415E-006	2.414E-005	100.000						
29	1.872E-006	4.800E-006	100.000						
30	2.370E-007	6.078E-007	100.000						
31	1.969E-007	5.047E-007	100.000						
32	7.865E-008	2.017E-007	100.000						
33	3.286E-008	8.425E-008	100.000						
34	2.825E-009	7.243E-009	100.000						
35	8.068E-016	2.069E-015	100.000						
36	4.775E-016	1.224E-015	100.000						
37	4.267E-018	1.094E-017	100.000						
38	-3.360E-016	-8.615E-016	100.000						
39	-8.365E-016	-2.145E-015	100.000						

Extraction Method: Principal Component Analysis.

<u>Source:</u> Developed for research

Table 4.1.8: Result for the Total Variances Explanation in Year 2008

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	27.146	69.605	69.605	27.146	69.605	69.605	25.093	64.342	64.342
2	4.818	12.353	81.959	4.818	12.353	81.959	5.054	12.960	77.302
3	2.761	7.078	89.037	2.761	7.078	89.037	4.358	11.175	88.477
4	1.530	3.923	92.960	1.530	3.923	92.960	1.749	4.484	92.960
5	.793	2.032	94.993						
6	.676	1.733	96.726						
7	.496	1.271	97.997						
8	.322	.825	98.822						
9	.187	.480	99.302						
10	.117	.299	99.601						
11	.053	.137	99.738						
12	.043	.110	99.848						
13	.021	.053	99.901						
14	.016	.042	99.943						
15	.010	.024	99.967						
16	.004	.011	99.978						
17	.004	.010	99.988						
18	.002	.006	99.994						
19	.001	.003	99.998						
20	.001	.001	99.999						
21	.000	.000	99.999						
22	.000	.000	100.000						
23	4.479E-005	.000	100.000						
24	3.862E-005	9.902E-005	100.000						
25	2.696E-005	6.913E-005	100.000						
26	1.700E-005	4.359E-005	100.000						
27	7.077E-006	1.815E-005	100.000						
28	2.967E-006	7.607E-006	100.000						
29	1.767E-006	4.530E-006	100.000						
30	4.419E-007	1.133E-006	100.000						
31	5.768E-008	1.479E-007	100.000						
32	5.010E-008	1.285E-007	100.000						
33	2.816E-008	7.221E-008	100.000						
34	1.604E-008	4.114E-008	100.000						
35	1.555E-015	3.988E-015	100.000						
36	1.043E-015	2.673E-015	100.000						
37	4.543E-016	1.165E-015	100.000						
38	8.601E-017	2.205E-016	100.000						
39	-6.927E-016	-1.776E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.9: Result for the Total Variances Explanation in Year 2009

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	27.806	71.296	71.296	27.805	71.296	71.296	25.766	66.066	66.066
2	4.358	11.175	82.471	4.358	11.175	82.471	3.350	8.589	74.655
3	1.696	4.349	86.819	1.696	4.349	86.819	3.234	8.292	82.947
4	1.507	3.863	90.682	1.507	3.863	90.682	2.715	6.961	89.909
5	1.394	3.573	94.255	1.394	3.573	94.255	1.695	4.346	94.255
6	.913	2.341	96.597						
7	.448	1.148	97.745						
8	.255	.653	98.397						
9	.245	.629	99.026						
10	.148	.380	99.406						
11	.111	.286	99.692						
12	.043	.109	99.801						
13	.037	.095	99.896						
14	.020	.050	99.946						
15	.009	.022	99.968						
16	.005	.014	99.982						
17	.003	.008	99.989						
18	.002	.005	99.994						
19	.002	.004	99.998						
20	.000	.001	99.999						
21	.000	.001	99.999						
22	.000	.000	100.000						
23	6.040E-005	.000	100.000						
24	4.095E-005	.000	100.000						
25	2.144E-005	5.497E-005	100.000						
26	7.837E-006	2.009E-005	100.000						
27	6.153E-006	1.578E-005	100.000						
28	2.514E-006	6.446E-006	100.000						
29	9.428E-007	2.417E-006	100.000						
30	3.576E-007	9.168E-007	100.000						
31	5.176E-008	1.327E-007	100.000						
32	3.673E-008	9.417E-008	100.000						
33	1.439E-008	3.689E-008	100.000						
34	1.731E-010	4.440E-010	100.000						
35	1.091E-015	2.797E-015	100.000						
36	5.210E-016	1.336E-015	100.000						
37	-1.855E-016	-4.757E-016	100.000						
38	-5.439E-016	-1.395E-015	100.000						
39	-1.147E-015	-2.941E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

Table 4.1.10: Result for the Total Variances Explanation in Year 2010

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.263	67.340	67.340	26.263	67.340	67.340	25.457	65.274	65.274
2	5.073	13.009	80.349	5.073	13.009	80.349	5.005	12.834	78.108
3	3.864	9.906	90.255	3.864	9.906	90.255	3.816	9.785	87.892
4	1.298	3.328	93.583	1.298	3.328	93.583	2.039	5.229	93.121
5	1.252	3.211	96.794	1.252	3.211	96.794	1.432	3.673	96.794
6	.433	1.111	97.906						
7	.257	.659	98.565						
8	.151	.386	98.951						
9	.125	.320	99.271						
10	.121	.309	99.581						
11	.081	.207	99.788						
12	.053	.136	99.923						
13	.014	.037	99.960						
14	.006	.015	99.975						
15	.004	.010	99.986						
16	.003	.008	99.993						
17	.001	.003	99.996						
18	.001	.002	99.998						
19	.000	.001	99.999						
20	.000	.001	99.999						
21	7.339E-005	.000	100.000						
22	6.417E-005	.000	100.000						
23	3.177E-005	8.145E-005	100.000						
24	1.934E-005	4.960E-005	100.000						
25	6.812E-006	1.747E-005	100.000						
26	5.114E-006	1.311E-005	100.000						
27	3.142E-006	8.057E-006	100.000						
28	2.493E-006	6.391E-006	100.000						
29	1.287E-006	3.301E-006	100.000						
30	4.970E-007	1.274E-006	100.000						
31	2.016E-007	5.170E-007	100.000						
32	1.421E-007	3.643E-007	100.000						
33	5.270E-008	1.351E-007	100.000						
34	3.787E-009	9.710E-009	100.000						
35	1.152E-011	2.953E-011	100.000						
36	8.487E-016	2.176E-015	100.000						
37	1.095E-016	2.808E-016	100.000						
38	-2.226E-016	-5.708E-016	100.000						
39	-1.177E-015	-3.017E-015	100.000						

Extraction Method: Principal Component Analysis.

Source: Developed for research

APPENDICES B: Factor Rotation and Factor Loading

Table 4.2: Result for Factor Loading in Year 2000

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EBITDA	.989				
EBIT	.987				
OPERATING PROFIT	.980				
PRE-TAX PROFIT	.976				
DEPRECIATION	.960				
PAYMENTS: FIXED ASSETS	.956				
MV	.953				
TRADE CREDITORS	.948				
EARNED FOR ORDINARY	.945				
PUBLISHED AFTER TAX PROFIT	.941				
ENTERPRISE VALUE (EV)	.938				
EQUITY CAP AND RESERVES	.912				
TOT. SHARE CAPITAL & RESERVES	.912				
TOTAL CAPITAL EMPLOYED	.899				
TOT FIXED ASSETS-NET	.896				
CASH IN OPERATING ACTIVITIES	.881				
TOTAL SALES	.874				
TRADE DEBTORS	.837				
ASSETS (TOTAL)	.820	.481			
TOTAL CURRENT ASSETS	.735	.623			
TOTAL CASH & EQUIVALENT	.707	.660			
MARKET TO BOOK VALUE EX. INTAN	.466				
BORROWINGS REPAYABLE < 1 YEAR		.993			
TOTAL DEBT		.940			
TOTAL CURRENT LIABLITIES		.924			
NET CURRENT ASSETS		-.922			
NET DEBT		.920			
NET INTEREST CHARGES		.916			
CASH INFLOW FROM FINANCING		.879			
NET CASH FLOW		.801			
CASH OUT-INVESTING ACTIVITIES	.574	.800			
DIVIDENDS PER SHARE			.877		
NET EPS			.756		
PUBLISHED CASH EPS		.555	.735		
SALES PER SHARE			.628		
TOTAL STOCK AND W.I.P				.814	
MINORITY INTERESTS				.780	
MINORITY INTERESTS				.731	.494
BOOK VALUE PER SHARE			.541		.626

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 5 iterations.

Source: developed for research

Table 4.2.1: Result for Factor Loading in Year 2001

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
MV	.991					
CASH IN -OPERATING ACTIVITIES	.990					
PAYMENTS: FIXED ASSETS	.988					
EBITDA	.984					
PRE-TAX PROFIT	.981					
ENTERPRISE VALUE (EV)	.981					
EBIT	.979					
OPERATING PROFIT	.978					
DEPRECIATION	.977					
PUBLISHED AFTER TAX PROFIT	.968					
TRADE CREDITORS	.962					
EARNED FOR ORDINARY	.961					
TOTAL CASH & EQUIVALENT	.932					
TOTAL CURRENT LIABLITIES	.925					
TOTAL SALES	.905					
TOTAL CURRENT ASSETS	.900					
TOT FIXED ASSETS-NET	.900					
CASH OUT-INVESTING ACTIVITIES	.899					
EQUITY CAP. AND RESERVES	.882					
TOT. SHARE CAPITAL & RESERVES	.882					
ASSETS (TOTAL)	.856					
TOTAL CAPITAL EMPLOYED	.836					
TRADE DEBTORS	.765					
NET INTEREST CHARGES		.942				
NET DEBT		.931				
CASH INFLOW FROM FINANCING		-.897				
TOTAL DEBT		.833				
NET CASH FLOW	-.606	-.637				
MARKET TO BOOK VALUE EX. INTAN		-.522				
DIVIDENDS PER SHARE			.947			
NET EPS			.836			
PUBLISHED CASH EPS			.813			
BOOK VALUE PER SHARE			.639		.510	.468
MINORITY INTERESTS				.790		
TOTAL STOCK AND W.I.P				.764		
NET CURRENT ASSETS	.611			.680		
MINORITY INTERESTS					.774	
BORROWINGS REPAYABLE < 1 YEAR	.626				.663	
SALES PER SHARE						.797

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Source: developed for research

Table 4.2.2: Result for Factor Loading in Year 2002

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
CASH OUT-INVESTING ACTIVITIES	.994				
CASH IN -OPERATING ACTIVITIES	.994				
EBITDA	.993				
DEPRECIATION	.988				
PAYMENTS: FIXED ASSETS	.985				
EBIT	.982				
OPERATING PROFIT	.982				
TRADE CREDITORS	.980				
MV	.976				
PRE-TAX PROFIT	.976				
TOTAL CURRENT LIABLITIES	.975				
ENTERPRISE VALUE (EV)	.960				
TOTAL CASH & EQUIVALENT	.952				
TOT FIXED ASSETS-NET	.950				
TOTAL CURRENT ASSETS	.947				
PUBLISHED AFTER TAX PROFIT	.943				
TOT. SHARE CAPITAL & RESERVES	.943				
EQUITY CAP. AND RESERVES	.943				
EARNED FOR ORDINARY	.941				
ASSETS (TOTAL)	.940				
TOTAL SALES	.928				
TOTAL CAPITAL EMPLOYED	.921				
NET CASH FLOW	.884				
BORROWINGS REPAYABLE < 1 YEAR	.838				
TRADE DEBTORS	.821				
CASH INFLOW FROM FINANCING	.572	-.511			
DIVIDENDS PER SHARE		.950			
BOOK VALUE PER SHARE		.840			
PUBLISHED CASH EPS	.450	.800			
SALES PER SHARE		.508			
NET DEBT			.889		
NET INTEREST CHARGES			.851		
TOTAL DEBT	.673		.681		
MARKET TO BOOK VALUE EX. INTAN			-.542		
NET CURRENT ASSETS				.775	
MINORITY INTERESTS				.760	
NET EPS		.505		-.615	.499
TOTAL STOCK AND W.I.P				.507	.463
MINORITY INTERESTS					.847

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Source: Developed for research

Table 4.2.3: Result for Factor Loading in Year 2003

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
DEPRECIATION	.995				
EBITDA	.994				
PAYMENTS: FIXED ASSETS	.994				
CASH IN -OPERATING ACTIVITIES	.993				
OPERATING PROFIT	.987				
TRADE CREDITORS	.987				
CASH OUT-INVESTING ACTIVITIES	.987				
EBIT	.986				
TOTAL CURRENT LIABLITIES	.982				
PRE-TAX PROFIT	.981				
MV	.981				
ENTERPRISE VALUE (EV)	.968				
PUBLISHED AFTER TAX PROFIT	.964				
TOT. SHARE CAPITAL & RESERVES	.958				
EQUITY CAP AND RESERVES	.957				
TOTAL CASH & EQUIVALENT	.955				
EARNED FOR ORDINARY	.949				
TOT FIXED ASSETS-NET	.948				
ASSETS (TOTAL)	.944				
TOTAL CURRENT ASSETS	.940				
TOTAL SALES	.934				
TOTAL CAPITAL EMPLOYED	.929				
BORROWINGS REPAYABLE < 1 YEAR	.924				
CASH INFLOW FROM FINANCING	-.913				
NET CASH FLOW	.827				
TRADE DEBTORS	.770				
TOTAL STOCK AND W.I.P	.561				
NET EPS		.938			
DIVIDENDS PER SHARE		.936			
PUBLISHED CASH EPS		.871			
BOOK VALUE PER SHARE		.846			
SALES PER SHARE		.718			
NET INTEREST CHARGES	.487		.775		
TOTAL DEBT	.573		.714		
NET DEBT	-.478		.657		
NET CURRENT ASSETS	-.564		.565		
MINORITY INTERESTS				.910	
MINORITY INTERESTS				.862	
MARKET TO BOOK VALUE EX. INTAN					.820

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Source: Developed for research

Table 4.2.4: Result for the Factor Loading in Year 2004

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
DEPRECIATION	.996				
PAYMENTS: FIXED ASSETS	.994				
EBITDA	.994				
CASH IN -OPERATING ACTIVITIES	.993	.110			
CASH OUT-INVESTING ACTIVITIES	.991				
TRADE CREDITORS	.990				
PRE-TAX PROFIT	.988	.137			
EBIT	.987	.143			
OPERATING PROFIT	.987	.146			
PUBLISHED AFTER TAX PROFIT	.981	.182			
TOTAL CURRENT LIABLITIES	.975		.175		
MV	.973	.139			.101
TOTAL CASH & EQUIVALENT	.973	.129			
EARNED FOR ORDINARY	.970	.224			
TOT FIXED ASSETS-NET	.963	.178	.144		
ENTERPRISE VALUE (EV)	.962	.164	.106		
EQUITY CAP AND RESERVES	.961	.194			
TOT. SHARE CAPITAL & RESERVES	.961	.194			
TOTAL CURRENT ASSETS	.956	.158	.130	.126	
ASSETS (TOTAL)	.954	.204	.153	.107	
TOTAL CAPITAL EMPLOYED	.944	.234		.123	
TOTAL SALES	.943	.190	.106		.157
CASH INFLOW FROM FINANCING	-.935	-.115	-.269		
NET CURRENT ASSETS	-.789	.281	-.287	.170	.148
TOTAL DEBT	.720	.314	.578	.163	
TRADE DEBTORS	.719	.267	.246	.252	.384
NET CASH FLOW	.633	.339	-.410	-.370	-.228
NET EPS	.153	.970			
PUBLISHED CASH EPS	.322	.923			
DIVIDENDS PER SHARE	.141	.902	.175		.207
BOOK VALUE PER SHARE	.218	.877		.300	
SALES PER SHARE		.872			
NET INTEREST CHARGES	.300		.870		-.166
NET DEBT	-.431	.263	.804	.155	
BORROWINGS REPAYABLE < 1 YEAR	.626		.684	.160	
MINORITY INTERESTS				.924	
MINORITY INTERESTS			.242	.787	-.218
TOTAL STOCK AND W.I.P	.515	.279		.624	.294
MARKET TO BOOK VALUE EX. INTAN			-.226	-.105	.905

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for research

Table 4.2.5: Result for the Factor Loading in Year 2005

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
DEPRECIATION	.994				
PAYMENTS: FIXED ASSETS	.991				
CASH IN -OPERATING ACTIVITIES	.990				
EBITDA	.989				
OPERATING PROFIT	.984				
PRE-TAX PROFIT	.982				
EBIT	.981				
TOTAL CASH & EQUIVALENT	.981				
MV	.977				
TRADE CREDITORS	.976				
CASH OUT-INVESTING ACTIVITIES	.974				
TOTAL CURRENT LIABLITIES	.969				
PUBLISHED AFTER TAX PROFIT	.967				
ENTERPRISE VALUE (EV)	.966				
EQUITY CAP. AND RESERVES	.962				
TOT. SHARE CAPITAL & RESERVES	.962				
TOTAL CURRENT ASSETS	.961				
EARNED FOR ORDINARY	.960				
TOT FIXED ASSETS-NET	.957				
ASSETS (TOTAL)	.949				
NET CASH FLOW	.941				
TOTAL CAPITAL EMPLOYED	.941				
TOTAL SALES	.935				
CASH INFLOW FROM FINANCING	-.873				
NET DEBT	-.821		.525		
NET CURRENT ASSETS	.556	.504			
NET EPS		.956			
BOOK VALUE PER SHARE		.908			
PUBLISHED CASH EPS		.891			
DIVIDENDS PER SHARE		.860			
SALES PER SHARE		.842			
NET INTEREST CHARGES			.882		
BORROWINGS REPAYABLE < 1 YEAR			.863		
TOTAL DEBT	.595		.677		
MINORITY INTERESTS				.898	
MINORITY INTERESTS				.851	
MARKET TO BOOK VALUE EX. INTAN					.901
TRADE DEBTORS	.510		.472		.590
TOTAL STOCK AND W.I.P.					

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for research

Table 4.2.6: Result for the Factor Loading in Year 2006

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
DEPRECIATION	.993				
CASH IN -OPERATING ACTIVITIES	.992				
CASH OUT-INVESTING ACTIVITIES	.992				
PAYMENTS: FIXED ASSETS	.990				
EBITDA	.989				
TOTAL CASH & EQUIVALENT	.987				
OPERATING PROFIT	.986				
MV	.986				
PRE-TAX PROFIT	.986				
EBIT	.984				
TRADE CREDITORS	.980				
ENTERPRISE VALUE (EV)	.980				
PUBLISHED AFTER TAX PROFIT	.980				
EARNED FOR ORDINARY	.972				
TOTAL CURRENT ASSETS	.969				
TOTAL CURRENT LIABLITIES	.966				
EQUITY CAP. AND RESERVES	.964				
TOT. SHARE CAPITAL & RESERVES	.963				
TOT FIXED ASSETS-NET	.945				
ASSETS (TOTAL)	.943				
TOTAL CAPITAL EMPLOYED	.933				
TOTAL SALES	.925				
CASH INFLOW FROM FINANCING	-.866				
NET DEBT	-.863		.470		
NET CURRENT ASSETS	.818				
NET CASH FLOW	.596				
DIVIDENDS PER SHARE		.964			
NET EPS		.943			
BOOK VALUE PER SHARE		.908			
SALES PER SHARE		.906			
PUBLISHED CASH EPS		.846			
NET INTEREST CHARGES			.891		
BORROWINGS REPAYABLE < 1 YEAR			.757		
TOTAL DEBT	.475		.747		
MINORITY INTERESTS				.886	
MINORITY INTERESTS				.876	
TOTAL STOCK AND W.I.P				.555	.460
MARKET TO BOOK VALUE EX. INTAN					.919
TRADE DEBTORS	.472		.518		.573

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for research

Table 4.2.7: Result for the Factor Loading in Year 2007

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
CASH OUT-INVESTING ACTIVITIES	.991				
DEPRECIATION	.991				
CASH IN -OPERATING ACTIVITIES	.990				
ENTERPRISE VALUE (EV)	.988				
MV	.988				
EBITDA	.988				
OPERATING PROFIT	.988				
PAYMENTS: FIXED ASSETS	.987				
PRE-TAX PROFIT	.985				
EBIT	.985				
PUBLISHED AFTER TAX PROFIT	.981				
TRADE CREDITORS	.978				
TOTAL CASH & EQUIVALENT	.978				
EARNED FOR ORDINARY	.976				
TOTAL CURRENT LIABLITIES	.969				
TOTAL CURRENT ASSETS	.963				
EQUITY CAP. AND RESERVES	.961				
TOT. SHARE CAPITAL & RESERVES	.961				
TOT FIXED ASSETS-NET	.957				
ASSETS (TOTAL)	.947				
TOTAL SALES	.937				
TOTAL CAPITAL EMPLOYED	.935				
NET DEBT	-.909				
CASH INFLOW FROM FINANCING	-.883				
NET CURRENT ASSETS	.874				
DIVIDENDS PER SHARE		.970			
SALES PER SHARE		.941			
BOOK VALUE PER SHARE		.909			
NET EPS		.886			
PUBLISHED CASH EPS	.490	.836			
NET CASH FLOW	.494	.649			
MINORITY INTERESTS			.960		
MINORITY INTERESTS			.915		
TOTAL STOCK AND W.I.P			.662		
NET INTEREST CHARGES				.850	
TOTAL DEBT	.461			.731	
BORROWINGS REPAYABLE < 1 YEAR				.723	
MARKET TO BOOK VALUE EX. INTAN					-.952
TRADE DEBTORS					.694

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for research

Table 4.2.8: Result for the Factor Loading in Year 2008

Rotated Component Matrix[a]

	Component			
	1	2	3	4
EBITDA	.985			
CASH IN -OPERATING ACTIVITIES	.984			
PRE-TAX PROFIT	.983			
EBIT	.983			
DEPRECIATION	.982			
PUBLISHED AFTER TAX PROFIT	.981			
OPERATING PROFIT	.980			
MV	.977			
EARNED FOR ORDINARY	.976			
TRADE CREDITORS	.974			
CASH OUT-INVESTING ACTIVITIES	.973			
TOTAL CASH & EQUIVALENT	.973			
PAYMENTS: FIXED ASSETS	.973			
ENTERPRISE VALUE (EV)	.966			
NET DEBT	-.963			
EQUITY CAP. AND RESERVES	.953			
TOT. SHARE CAPITAL & RESERVES	.953			
TOTAL CURRENT ASSETS	.952			
TOTAL CURRENT LIABLITIES	.949			
NET INTEREST CHARGES	-.941			
TOT FIXED ASSETS-NET	.931			
ASSETS (TOTAL)	.921			
TOTAL SALES	.914			
TOTAL CAPITAL EMPLOYED	.914			
NET CURRENT ASSETS	.892			
CASH INFLOW FROM FINANCING	-.857			
MINORITY INTERESTS		.955		
BORROWINGS REPAYABLE < 1 YEAR		.873		
MINORITY INTERESTS		.833		
TOTAL DEBT		.759		
TOTAL STOCK AND W.I.P.		.698		
NET CASH FLOW	.559	.615		
BOOK VALUE PER SHARE			.876	
SALES PER SHARE			.794	
PUBLISHED CASH EPS	.584		.779	
DIVIDENDS PER SHARE			.770	
NET EPS			.737	
MARKET TO BOOK VALUE EX. INTAN				-.940
TRADE DEBTORS		.473		.722

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Source: Developed for research

Table 4.2.9: Result for the Factor Loading in Year 2009

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
CASH OUT-INVESTING ACTIVITIES	.981				
PRE-TAX PROFIT	.981				
PUBLISHED AFTER TAX PROFIT	.980				
CASH IN -OPERATING ACTIVITIES	.980				
OPERATING PROFIT	.979				
NET DEBT	-.979				
DEPRECIATION	.978				
EBITDA	.978				
CASH INFLOW FROM FINANCING	-.977				
EBIT	.977				
TRADE CREDITORS	.975				
EARNED FOR ORDINARY	.974				
TOTAL CASH & EQUIVALENT	.974				
PAYMENTS FIXED ASSETS	.971				
MV	.964				
TOTAL CURRENT ASSETS	.956				
TOTAL CURRENT LIABLITIES	.950				
TOT. SHARE CAPITAL & RESERVES	.949				
EQUITY CAP. AND RESERVES	.949				
NET CURRENT ASSETS	.939				
ENTERPRISE VALUE (EV)	.938				
TOTAL SALES	.937				
TOT FIXED ASSETS-NET	.919				
ASSETS (TOTAL)	.914				
TOTAL CAPITAL EMPLOYED	.904				
NET INTEREST CHARGES	-.887				
NET CASH FLOW	-.697				
PUBLISHED CASH EPS	.687			.609	
MINORITY INTERESTS		.953			
MINORITY INTERESTS		.910			
TOTAL STOCK AND W.I.P.		.638			
TOTAL DEBT		.557	.549		
SALES PER SHARE			.838		
BOOK VALUE PER SHARE			.859		
BORROWINGS REPAYABLE < 1 YEAR			.649		
NET EPS	.523			.752	
DIVIDENDS PER SHARE	.481			.689	
MARKET TO BOOK VALUE EX. INTAN					-.969
TRADE DEBTORS					.707

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Source: Developed for research

Table 4.2.10: Result for the Factor Loading in Year 2010

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
CASH IN -OPERATING ACTIVITIES	.997				
OPERATING PROFIT	.996				
DEPRECIATION	.996				
EBITDA	.995				
PRE-TAX PROFIT	.995				
PUBLISHED AFTER TAX PROFIT	.995				
EBIT	.994				
EARNED FOR ORDINARY	.993				
TOTAL CASH & EQUIVALENT	.989				
CASH OUT-INVESTING ACTIVITIES	.988				
MV	.986				
EQUITY CAP. AND RESERVES	.985				
TOT. SHARE CAPITAL & RESERVES	.984				
TRADE CREDITORS	.984				
PAYMENTS: FIXED ASSETS	.978				
TOTAL CURRENT ASSETS	.977				
TOTAL CURRENT LIABLITIES	.976				
ENTERPRISE VALUE (EV)	.966				
TOT FIXED ASSETS-NET	.964				
TOTAL SALES	.962				
ASSETS (TOTAL)	.961				
TOTAL CAPITAL EMPLOYED	.957				
NET DEBT	-.945				
CASH INFLOW FROM FINANCING	-.944				
NET CURRENT ASSETS	.922				
NET INTEREST CHARGES	-.766			.532	
NET CASH FLOW	.689				
TRADE DEBTORS	.539				.524
NET EPS		1.000			
BOOK VALUE PER SHARE		1.000			
SALES PER SHARE		.999			
DIVIDENDS PER SHARE		.999			
PUBLISHED CASH EPS		.999			
MINORITY INTERESTS			.929		
MINORITY INTERESTS			.911		
TOTAL STOCK AND W.I.P			.791		
TOTAL DEBT			.546	.760	
BORROWINGS REPAYABLE < 1 YEAR			.593	.729	
MARKET TO BOOK VALUE EX. INTAN					-.937

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Source: Developed for research

Appendices C: Multiple Linear Regressions for the year 2000 -2010

Table 4.3: Result for the OLS in Year 2000

Dependent Variable: Y

Method: Least Squares

Date: 06/16/12 Time: 14:35

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.263345	0.064082	4.109490	0.0002
F1	0.142705	0.064806	2.202018	0.0336
F2	0.205684	0.064806	3.173819	0.0029
F3	-0.149621	0.064806	-2.308744	0.0263
F4	-0.083174	0.064806	-1.283426	0.2069
F5	0.157253	0.064806	2.426505	0.0200

R-squared	0.416058	Mean dependent var	0.263345
Adjusted R-squared	0.341193	S.D. dependent var	0.529621
S.E. of regression	0.429877	Akaike info criterion	1.272930
Sum squared resid	7.206970	Schwarz criterion	1.513818
Log likelihood	-22.64092	Hannan-Quinn criter.	1.362731
F-statistic	5.557486	Durbin-Watson stat	2.093426
Prob(F-statistic)	0.000587		

Source: Developed for the research

Table 4.3.1: Result of OLS in Year 2001

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:18

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.110361	0.065987	-1.672466	0.1026
F1	-0.044789	0.066733	-0.671166	0.5062
F2	-0.109457	0.066733	-1.640231	0.1092
F3	0.089455	0.066733	1.340502	0.1880
F4	0.027137	0.066733	0.406651	0.6865
F5	-0.004885	0.066733	-0.073199	0.9420
F6	-0.026055	0.066733	-0.390434	0.6984

R-squared	0.121609	Mean dependent var	-0.110361
Adjusted R-squared	-0.017084	S.D. dependent var	0.438922
S.E. of regression	0.442655	Akaike info criterion	1.349984
Sum squared resid	7.445863	Schwarz criterion	1.631021
Log likelihood	-23.37465	Hannan-Quinn criter.	1.454752
F-statistic	0.876821	Durbin-Watson stat	2.027242
Prob(F-statistic)	0.521016		

Source: Developed for the research

Table 4.3.2: Result of OLS in Year 2002

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:05

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.042706	0.063499	0.672536	0.5052
F1	-0.053470	0.064217	-0.832655	0.4101
F2	0.012306	0.064217	0.191629	0.8490
F3	-0.106415	0.064217	-1.657120	0.1055
F4	0.034841	0.064217	0.542546	0.5905
F5	-0.061468	0.064217	-0.957190	0.3444

R-squared	0.107279	Mean dependent var	0.042705
Adjusted R-squared	-0.007173	S.D. dependent var	0.424447
S.E. of regression	0.425966	Akaike info criterion	1.254652
Sum squared resid	7.076439	Schwarz criterion	1.495540
Log likelihood	-22.22967	Hannan-Quinn criter.	1.344453
F-statistic	0.937330	Durbin-Watson stat	1.996789
Prob(F-statistic)	0.467681		

Source: Developed for the research

Table 4.3.3: Result of OLS in Year 2003

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:08

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.244916	0.093872	2.609046	0.0128
F1	-0.078785	0.094933	-0.829903	0.4116
F2	0.159661	0.094933	1.681839	0.1006
F3	-0.092160	0.094933	-0.970796	0.3376
F4	-0.081358	0.094933	-0.857005	0.3967
F5	0.147458	0.094933	1.553292	0.1284

R-squared	0.163215	Mean dependent var	0.244916
Adjusted R-squared	0.055935	S.D. dependent var	0.648098
S.E. of regression	0.629712	kaike info criterion	2.036457
Sum squared resid	15.46494	Schwarz criterion	2.277345
Log likelihood	-39.82028	Hannan-Quinn criter.	2.126258
F-statistic	1.521388	Durbin-Watson stat	2.207754
Prob(F-statistic)	0.205570		

Source: Developed for the research

<u>Table 4.3.4: Result of OLS in Year 2004</u>

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:12

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.568056	0.172424	3.294529	0.0021
F1	-0.073272	0.174372	-0.420205	0.6766
F2	0.016324	0.174372	0.093618	0.9259
F3	-0.116700	0.174372	-0.669255	0.5073
F4	-0.068163	0.174372	-0.390905	0.6980
F5	-0.088394	0.174373	-0.506924	0.6151

R-squared	0.026047	Mean dependent var	0.568056
Adjusted R-squared	-0.098818	S.D. dependent var	1.103421
S.E. of regression	1.156656	Akaike info criterion	3.252509
Sum squared resid	52.17626	Schwarz criterion	3.493397
Log likelihood	-67.18145	Hannan-Quinn criter.	3.342310
F-statistic	0.208603	Durbin-Watson stat	2.050476
Prob(F-statistic)	0.956876		

<u>Source:</u> Developed for the research

Table 4.3.5: Result for OLS in Year 2005

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:19

Sample (adjusted): 1 44

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.143797	0.057489	2.501288	0.0168
F1	0.009793	0.058154	0.168401	0.8672
F2	0.061405	0.058154	1.055907	0.2977
F3	-0.051080	0.058154	-0.878363	0.3853
F4	0.031027	0.058154	0.533537	0.5968
F5	0.058606	0.058154	1.007771	0.3199

R-squared	0.078008	Mean dependent var	0.143797
Adjusted R-squared	-0.043307	S.D. dependent var	0.373341
S.E. of regression	0.381339	Akaike info criterion	1.035869
Sum squared resid	5.525946	Schwarz criterion	1.279168
Log likelihood	-16.78912	Hannan-Quinn criter.	1.126096
F-statistic	0.643018	Durbin-Watson stat	2.071452
Prob(F-statistic)	0.668338		

Source: Developed for the research

Table 4.3.6: Result for the OLS in Year 2006

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:21

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.119979	0.079687	1.505627	0.1402
F1	0.073983	0.080588	0.918040	0.3642
F2	-0.001438	0.080588	-0.017849	0.9859
F3	-0.023941	0.080588	-0.297080	0.7680
F4	0.007474	0.080588	0.092744	0.9266
F5	0.064177	0.080588	0.796363	0.4306

R-squared	0.038797	Mean dependent var	0.119979
Adjusted R-squared	-0.084434	S.D. dependent var	0.513327
S.E. of regression	0.534559	Akaike info criterion	1.708817
Sum squared resid	11.14439	Schwarz criterion	1.949706
Log likelihood	-32.44839	Hannan-Quinn criter.	1.798618
F-statistic	0.314834	Durbin-Watson stat	2.111840
Prob(F-statistic)	0.901064		

Source: Developed for the research

Table 4.3.7: Result of OLS in Year 2007

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:23

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.585867	0.125069	4.684357	0.0000
F1	0.032609	0.126482	0.257814	0.7979
F2	0.090383	0.126482	0.714594	0.4791
F3	0.028586	0.126482	0.226007	0.8224
F4	-0.139960	0.126482	-1.106562	0.2753
F5	0.011487	0.126482	0.090818	0.9281

R-squared	0.045543	Mean dependent var	0.585867
Adjusted R-squared	-0.076824	S.D. dependent var	0.808506
S.E. of regression	0.838987	Akaike info criterion	2.610323
Sum squared resid	27.45209	Schwarz criterion	2.851212
Log likelihood	-52.73228	Hannan-Quinn criter.	2.700124
F-statistic	0.372184	Durbin-Watson stat	2.041165
Prob(F-statistic)	0.864613		

Source: Developed for research

Table 4.3.8: Result of OLS in Year 2008

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:24

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.247363	0.034690	-7.130664	0.0000
F1	0.037149	0.035082	1.058918	0.2960
F2	0.018741	0.035082	0.534205	0.5962
F3	0.044619	0.035082	1.271836	0.2108
F4	0.000154	0.035082	0.004378	0.9965

R-squared	0.070292	Mean dependent var	-0.247363
Adjusted R-squared	-0.022679	S.D. dependent var	0.230113
S.E. of regression	0.232707	Akaike info criterion	0.026369
Sum squared resid	2.166109	Schwarz criterion	0.227109
Log likelihood	4.406694	Hannan-Quinn criter.	0.101203
F-statistic	0.756067	Durbin-Watson stat	1.667813
Prob(F-statistic)	0.560012		

Source: Developed for research

Table 4.3.9: Result of OLS in Year 2009

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:26

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.061825	0.064431	-0.959559	0.3432
F1	-0.025731	0.065159	-0.394904	0.6951
F2	-0.015284	0.065159	-0.234564	0.8158
F3	-0.045682	0.065159	-0.701084	0.4874
F4	-0.025616	0.065159	-0.393131	0.6964
F5	-0.023613	0.065159	-0.362389	0.7190

R-squared	0.024716	Mean dependent var	-0.061825
Adjusted R-squared	-0.100320	S.D. dependent var	0.412039
S.E. of regression	0.432213	Akaike info criterion	1.283770
Sum squared resid	7.285518	Schwarz criterion	1.524658
Log likelihood	-22.88482	Hannan-Quinn criter.	1.373570
F-statistic	0.197673	Durbin-Watson stat	1.949513
Prob(F-statistic)	0.961513		

Source: Developed for research

Table 4.3.10: Result of OLS for Year 2010

Dependent Variable: Y

Method: Least Squares

Date: 06/17/12 Time: 01:27

Sample: 1 45

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.463399	0.076426	6.063386	0.0000
F1	-0.061108	0.077289	-0.790645	0.4339
F2	0.073726	0.077289	0.953900	0.3460
F3	-0.078741	0.077289	-1.018788	0.3146
F4	-0.082819	0.077289	-1.071543	0.2905
F5	0.086228	0.077289	1.115648	0.2714

R-squared	0.112948	Mean dependent var	0.463399
Adjusted R-squared	-0.000777	S.D. dependent var	0.512480
S.E. of regression	0.512679	Akaike info criterion	1.625234
Sum squared resid	10.25077	Schwarz criterion	1.866122
Log likelihood	-30.56777	Hannan-Quinn criter.	1.715035
F-statistic	0.993169	Durbin-Watson stat	2.013644
Prob(F-statistic)	0.434510		

Source: Developed for research.

Appendices D: Diagnostic Checking –Heteroscedasticity Test from year 2000 until 2010

Table 4.4: Result from the White Test for the Year 2000

Heteroskedasticity Test: White

F-statistic	1.144741	Prob. F(20,24)	0.3723
Obs*R-squared	21.96974	Prob. Chi-Square(20)	0.3422
Scaled explained SS	41.74110	Prob. Chi-Square(20)	0.0030

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:21
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.109462	0.850136	-0.128758	0.8986
F1	0.083982	1.767197	0.047523	0.9625
F1^2	-0.300710	0.564750	-0.532466	0.5993
F1*F2	0.559645	2.150276	0.260267	0.7969
F1*F3	-0.456035	0.890089	-0.512348	0.6131
F1*F4	0.283290	1.034894	0.273738	0.7866
F1*F5	-0.528982	0.781078	-0.677246	0.5047
F2	-0.147245	2.156302	-0.068286	0.9461
F2^2	0.065261	0.421734	0.154744	0.8783
F2*F3	-1.206151	0.970132	-1.243286	0.2258
F2*F4	2.384529	2.375099	1.003970	0.3254
F2*F5	0.218631	0.838942	0.260603	0.7966
F3	-0.667498	0.413318	-1.614974	0.1194
F3^2	0.606640	0.564361	1.074914	0.2931
F3*F4	0.270814	0.261569	1.035345	0.3108
F3*F5	0.023336	0.291382	0.080088	0.9368
F4	0.388954	0.850568	0.457287	0.6516
F4^2	-0.092973	0.195173	-0.476364	0.6381
F4*F5	0.060515	0.211407	0.286249	0.7771
F5	-0.038034	0.177146	-0.214704	0.8318
F5^2	-0.002471	0.082074	-0.030103	0.9762

R-squared	0.488216	Mean dependent var	0.160155
Adjusted R-squared	0.061730	S.D. dependent var	0.364294
S.E. of regression	0.352871	Akaike info criterion	1.059298
Sum squared resid	2.988436	Schwarz criterion	1.902407
Log likelihood	-2.834209	Hannan-Quinn criter.	1.373601
F-statistic	1.144741	Durbin-Watson stat	2.164465
Prob(F-statistic)	0.372322		

Source: Developed for research.

Table 4.4.1: Result from the White Test for the year 2001

Heteroskedasticity Test: White

F-statistic	0.565747	Prob. F(27,17)	0.9097
Obs*R-squared	21.29756	Prob. Chi-Square(27)	0.7722
Scaled explained SS	53.20053	Prob. Chi-Square(27)	0.0019

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:33
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.939832	3.252636	1.518716	0.1472
F1	20.03292	12.30264	1.628344	0.1218
F1^2	-0.639761	1.450621	-0.441025	0.6648
F1*F2	-18.32480	57.83724	-0.316834	0.7552
F1*F3	13.59136	13.98570	0.971805	0.3448
F1*F4	-16.54630	21.46199	-0.770959	0.4513
F1*F5	19.31142	22.55820	0.856071	0.4039
F1*F6	16.68122	10.54514	1.581888	0.1321
F2	-12.18988	19.98073	-0.610082	0.5499
F2^2	-0.118270	0.903293	-0.130932	0.8974
F2*F3	2.296392	9.034879	0.254170	0.8024
F2*F4	-3.048392	7.362041	-0.414069	0.6840
F2*F5	-8.066111	11.76967	-0.685330	0.5024
F2*F6	-10.17859	11.87230	-0.857339	0.4032
F3	3.509573	2.051569	1.710677	0.1053
F3^2	-2.221127	2.902763	-0.765177	0.4547
F3*F4	4.277973	3.625712	1.179899	0.2543
F3*F5	-4.224415	6.099125	-0.692626	0.4979
F3*F6	-0.192473	2.618416	-0.073508	0.9423
F4	-0.644448	4.290559	-0.150201	0.8824
F4^2	-0.416964	1.030805	-0.404503	0.6909
F4*F5	2.646081	2.748190	0.962845	0.3491
F4*F6	-0.369619	2.230001	-0.165748	0.8703
F5	4.135055	3.571815	1.157690	0.2630
F5^2	-2.279837	1.782958	-1.278683	0.2182
F5*F6	0.816163	2.983784	0.273533	0.7877
F6	3.354924	1.749606	1.917531	0.0721
F6^2	0.793089	1.269357	0.624796	0.5404

R-squared	0.473279	Mean dependent var	0.165464
Adjusted R-squared	-0.363278	S.D. dependent var	0.442914
S.E. of regression	0.517144	Akaike info criterion	1.790005
Sum squared resid	4.546447	Schwarz criterion	2.914151
Log likelihood	-12.27511	Hannan-Quinn criter.	2.209075
F-statistic	0.565747	Durbin-Watson stat	2.305338
Prob(F-statistic)	0.909678		

Source: Developed for research.

Table 4.4.2: Result from the White Test for the year 2002

Heteroskedasticity Test: White

F-statistic	0.956150	Prob. F(20,24)	0.5360
Obs*R-squared	19.95536	Prob. Chi-Square(20)	0.4607
Scaled explained SS	37.69840	Prob. Chi-Square(20)	0.0096

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:39
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.195019	0.292839	0.665960	0.5118
F1	0.401264	1.388799	0.288928	0.7751
F1^2	-0.533622	0.415570	-1.284073	0.2114
F1*F2	-3.867936	3.804525	-1.016667	0.3195
F1*F3	3.502795	4.178976	0.838195	0.4102
F1*F4	-2.955041	2.017768	-1.464510	0.1560
F1*F5	4.301738	5.296917	0.812121	0.4247
F2	-0.637211	0.826653	-0.770832	0.4483
F2^2	-0.497819	0.433895	-1.147327	0.2626
F2*F3	0.592990	1.320827	0.448953	0.6575
F2*F4	-1.622203	2.070567	-0.783458	0.4410
F2*F5	0.703749	1.454930	0.483700	0.6330
F3	0.173026	1.745053	0.099152	0.9218
F3^2	0.800705	0.605955	1.321393	0.1988
F3*F4	-0.850455	2.006574	-0.423834	0.6755
F3*F5	2.000717	2.251298	0.888695	0.3830
F4	-1.618380	0.981531	-1.648832	0.1122
F4^2	0.643346	0.502467	1.280376	0.2126
F4*F5	1.092099	1.113066	0.981163	0.3363
F5	1.240120	1.511726	0.820334	0.4201
F5^2	-0.451235	0.488409	-0.923889	0.3647

R-squared	0.443453	Mean dependent var	0.157254
Adjusted R-squared	-0.020337	S.D. dependent var	0.356678
S.E. of regression	0.360287	Akaike info criterion	1.100893
Sum squared resid	3.115361	Schwarz criterion	1.944002
Log likelihood	-3.770091	Hannan-Quinn criter.	1.415196
F-statistic	0.956150	Durbin-Watson stat	1.906643
Prob(F-statistic)	0.536017		

Source: Developed for research.

Table 4.4.3: Result from the White Test for the year 2003

Heteroskedasticity Test: White

F-statistic	1.159287	Prob. F(20,24)	0.3613
Obs*R-squared	22.11172	Prob. Chi-Square(20)	0.3345
Scaled explained SS	36.40696	Prob. Chi-Square(20)	0.0138

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:46
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.339773	0.806247	0.421425	0.6772
F1	-0.676758	3.503985	-0.193139	0.8485
F1^2	-0.336737	1.316820	-0.255720	0.8003
F1*F2	-1.742756	8.330571	-0.209200	0.8361
F1*F3	-5.712567	7.845360	-0.728146	0.4736
F1*F4	4.268963	13.61295	0.313596	0.7565
F1*F5	0.815300	4.264887	0.191166	0.8500
F2	-0.527025	1.592695	-0.330902	0.7436
F2^2	-0.547275	0.815547	-0.671053	0.5086
F2*F3	0.507635	1.499853	0.338457	0.7380
F2*F4	-3.140708	2.809525	-1.117879	0.2747
F2*F5	-0.262234	0.843619	-0.310843	0.7586
F3	0.244030	1.311439	0.186078	0.8539
F3^2	0.640841	1.325837	0.483348	0.6332
F3*F4	1.874924	3.159169	0.593486	0.5584
F3*F5	-0.593613	2.074664	-0.286125	0.7772
F4	-1.604452	2.946340	-0.544557	0.5911
F4^2	0.607941	0.623585	0.974912	0.3393
F4*F5	-1.435040	0.940406	-1.525979	0.1401
F5	0.092392	1.228856	0.075186	0.9407
F5^2	-0.360782	0.475058	-0.759447	0.4550

R-squared	0.491372	Mean dependent var	0.343665
Adjusted R-squared	0.067515	S.D. dependent var	0.727712
S.E. of regression	0.702717	Akaike info criterion	2.437000
Sum squared resid	11.85147	Schwarz criterion	3.280109
Log likelihood	-33.83249	Hannan-Quinn criter.	2.751302
F-statistic	1.159287	Durbin-Watson stat	1.949277
Prob(F-statistic)	0.361313		

Source: Developed for research.

Table 4.4.4: Result from the White Test for the year 2004

Heteroskedasticity Test: White

F-statistic	0.077248	Prob. F(20,24)	1.0000
Obs*R-squared	2.721587	Prob. Chi-Square(20)	1.0000
Scaled explained SS	34.80893	Prob. Chi-Square(20)	0.0211

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:48
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.173998	17.58943	-0.237302	0.8144
F1	-42.33710	111.0363	-0.381291	0.7063
F1^2	14.58818	23.29145	0.626332	0.5370
F1*F2	37.27040	64.22129	0.580343	0.5671
F1*F3	57.10338	262.0899	0.217877	0.8294
F1*F4	57.37094	164.9104	0.347892	0.7310
F1*F5	35.44382	86.11886	0.411569	0.6843
F2	2.450667	14.02870	0.174690	0.8628
F2^2	-1.190991	8.896675	-0.133869	0.8946
F2*F3	-14.98347	38.15275	-0.392723	0.6980
F2*F4	-6.893563	26.70556	-0.258132	0.7985
F2*F5	1.290497	11.09959	0.116265	0.9084
F3	22.42588	34.88781	0.642800	0.5264
F3^2	-9.637042	25.54967	-0.377189	0.7093
F3*F4	-11.53316	39.34823	-0.293105	0.7720
F3*F5	-13.52958	54.09067	-0.250128	0.8046
F4	10.11593	34.36129	0.294399	0.7710
F4^2	1.257926	7.329510	0.171625	0.8652
F4*F5	3.050876	15.38421	0.198312	0.8445
F5	2.033887	20.85457	0.097527	0.9231
F5^2	0.436667	3.451461	0.126517	0.9004

R-squared	0.060480	Mean dependent var	1.159472
Adjusted R-squared	-0.722454	S.D. dependent var	6.842857
S.E. of regression	8.980722	Akaike info criterion	7.532762
Sum squared resid	1935.681	Schwarz criterion	8.375872
Log likelihood	-148.4872	Hannan-Quinn criter.	7.847065
F-statistic	0.077248	Durbin-Watson stat	1.986301
Prob(F-statistic)	1.000000		

Source: Developed for research.

Table 4.4.5: Result from the White Test for the year 2005

Heteroskedasticity Test: White

F-statistic	0.122211	Prob. F(20,23)	1.0000
Obs*R-squared	4.226723	Prob. Chi-Square(20)	0.9999
Scaled explained SS	12.58685	Prob. Chi-Square(20)	0.8944

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:50
Sample: 1 44
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.487233	0.835119	0.583430	0.5653
F1	1.551436	3.502736	0.442921	0.6620
F1^2	-0.071300	1.066945	-0.066826	0.9473
F1*F2	-1.413047	2.323943	-0.608039	0.5491
F1*F3	0.473625	4.535172	0.104434	0.9177
F1*F4	-2.943659	3.518863	-0.836537	0.4115
F1*F5	-3.588388	12.60529	-0.284673	0.7784
F2	-0.153250	0.506138	-0.302782	0.7648
F2^2	0.005984	0.281716	0.021242	0.9832
F2*F3	0.580090	0.604331	0.959888	0.3471
F2*F4	0.052411	1.574294	0.033292	0.9737
F2*F5	0.006395	0.694828	0.009204	0.9927
F3	0.004507	1.150330	0.003918	0.9969
F3^2	-0.240164	0.642193	-0.373975	0.7118
F3*F4	0.711758	1.088750	0.653738	0.5198
F3*F5	0.634930	1.553505	0.408708	0.6865
F4	-0.434799	0.750980	-0.578976	0.5682
F4^2	0.004367	0.389370	0.011217	0.9911
F4*F5	-1.336947	1.700963	-0.785994	0.4399
F5	-0.546384	2.293217	-0.238261	0.8138
F5^2	-0.068936	0.110933	-0.621422	0.5404

R-squared	0.096062	Mean dependent var	0.125590
Adjusted R-squared	-0.689971	S.D. dependent var	0.358994
S.E. of regression	0.466688	Akaike info criterion	1.619537
Sum squared resid	5.009342	Schwarz criterion	2.471082
Log likelihood	-14.62982	Hannan-Quinn criter.	1.935331
F-statistic	0.122211	Durbin-Watson stat	2.266511
Prob(F-statistic)	0.999993		

Source: Developed for research.

Table 4.4.6: Result from the White Test for the year 2006

Heteroskedasticity Test: White

F-statistic	2.276995	Prob. F(20,24)	0.0789
Obs*R-squared	29.46935	Prob. Chi-Square(20)	0.0280
Scaled explained SS	202.9615	Prob. Chi-Square(20)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 01:54
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.741495	1.340763	2.790571	0.0101
F1	20.14075	7.056524	2.854204	0.0088
F1^2	-2.026128	1.352508	-1.498052	0.1472
F1*F2	-30.43302	8.436225	-3.607421	0.0014
F1*F3	-6.892932	10.55960	-0.652764	0.5201
F1*F4	-31.46366	11.18738	-2.812425	0.0096
F1*F5	4.074665	10.74540	0.379201	0.7079
F2	0.127353	1.229915	0.103546	0.9184
F2^2	-0.239370	0.607056	-0.394314	0.6968
F2*F3	14.06113	5.089109	2.762984	0.0108
F2*F4	1.761911	2.884992	0.610716	0.5471
F2*F5	0.782615	1.482394	0.527940	0.6024
F3	-5.034763	1.713411	-2.938445	0.0072
F3^2	-1.448978	1.925242	-0.752621	0.4590
F3*F4	6.909920	2.023174	3.415386	0.0023
F3*F5	1.449357	2.020707	0.717253	0.4801
F4	-5.012068	1.486473	-3.371785	0.0025
F4^2	-0.023000	0.852399	-0.026982	0.9787
F4*F5	-5.645659	1.596895	-3.535399	0.0017
F5	3.325626	1.460867	2.276475	0.0320
F5^2	0.164274	0.828716	0.198228	0.8445

R-squared	0.654874	Mean dependent var	0.247653
Adjusted R-squared	0.367270	S.D. dependent var	1.072527
S.E. of regression	0.853134	Akaike info criterion	2.824925
Sum squared resid	17.46811	Schwarz criterion	3.668034
Log likelihood	-42.56082	Hannan-Quinn criter.	3.139228
F-statistic	2.276995	Durbin-Watson stat	1.969219
Prob(F-statistic)	0.028041		

Source: Developed for research.

Table 4.4.7: Result from the White Test for the year 2007

Heteroskedasticity Test: White

F-statistic	1.507588	Prob. F(20,24)	0.1676
Obs*R-squared	25.05605	Prob. Chi-Square(20)	0.1993
Scaled explained SS	152.1645	Prob. Chi-Square(20)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 02:11
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27.74928	7.722567	3.593271	0.0015
F1	99.66481	40.29905	2.473130	0.0209
F1^2	-28.70558	6.863759	-4.182195	0.0003
F1*F2	-4.572871	31.69422	-0.144281	0.8865
F1*F3	-61.12460	29.48205	-2.073282	0.0490
F1*F4	-209.6085	45.15785	-4.641686	0.0001
F1*F5	624.6405	233.7730	2.671996	0.0133
F2	31.84492	8.413948	3.784778	0.0009
F2^2	-0.986849	3.866139	-0.255254	0.8007
F2*F3	-14.14645	10.89630	-1.298280	0.2065
F2*F4	10.49191	9.242602	1.135169	0.2675
F2*F5	102.2488	40.00827	2.555692	0.0174
F3	-6.405072	10.66698	-0.600458	0.5538
F3^2	-0.221968	3.585708	-0.061903	0.9512
F3*F4	31.11682	11.80350	2.636236	0.0145
F3*F5	-13.58778	7.642654	-1.777888	0.0881
F4	-33.71517	9.505321	-3.546978	0.0016
F4^2	15.77009	3.663517	4.304632	0.0002
F4*F5	-124.1032	60.41087	-2.054320	0.0510
F5	96.49512	35.81469	2.694288	0.0127
F5^2	-13.61185	5.705699	-2.385659	0.0253

R-squared	0.556801	Mean dependent var	0.610046
Adjusted R-squared	0.187469	S.D. dependent var	2.480882
S.E. of regression	2.236279	Akaike info criterion	4.752229
Sum squared resid	120.0227	Schwarz criterion	5.595338
Log likelihood	-85.92515	Hannan-Quinn criter.	5.066531
F-statistic	1.507588	Durbin-Watson stat	1.948589
Prob(F-statistic)	0.167640		

Source: Developed for research.

Table 4.4.8: Result from the White Test for the year 2008

Heteroskedasticity Test: White

F-statistic	1.761665	Prob. F(14,30)	0.0945
Obs*R-squared	20.30336	Prob. Chi-Square(14)	0.1209
Scaled explained SS	8.161460	Prob. Chi-Square(14)	0.8807

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 02:14
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.235867	0.066847	3.528488	0.0014
F1	1.023225	0.325079	3.147622	0.0037
F1^2	-0.068092	0.026641	-2.555928	0.0159
F1*F2	-1.045447	0.496427	-2.105944	0.0437
F1*F3	-0.405037	0.134670	-3.007621	0.0053
F1*F4	0.236861	0.396257	0.597744	0.5545
F2	-0.128248	0.047619	-2.693238	0.0115
F2^2	-0.060245	0.038310	-1.572539	0.1263
F2*F3	-0.140236	0.084310	-1.663352	0.1067
F2*F4	-0.034530	0.038812	-0.889680	0.3807
F3	0.065634	0.035191	1.865083	0.0720
F3^2	-0.049558	0.021402	-2.315548	0.0276
F3*F4	0.075876	0.080042	0.947947	0.3507
F4	0.105118	0.059569	1.764631	0.0878
F4^2	-0.014103	0.010057	-1.402289	0.1711

R-squared	0.451186	Mean dependent var	0.048136
Adjusted R-squared	0.195073	S.D. dependent var	0.049104
S.E. of regression	0.044055	Akaike info criterion	-3.145562
Sum squared resid	0.058225	Schwarz criterion	-2.543341
Log likelihood	85.77514	Hannan-Quinn criter.	-2.921060
F-statistic	1.761665	Durbin-Watson stat	2.251535
Prob(F-statistic)	0.094520		

Source: Developed for research.

Table 4.4.9: Result from the White Test for the year 2009

Heteroskedasticity Test: White

F-statistic	0.766851	Prob. F(20,24)	0.7246
Obs*R-squared	17.54494	Prob. Chi-Square(20)	0.6174
Scaled explained SS	117.7099	Prob. Chi-Square(20)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 02:15
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.841810	1.602005	-0.525473	0.6041
F1	-3.073710	9.527799	-0.322604	0.7498
F1^2	-0.585983	1.499681	-0.390739	0.6994
F1*F2	3.716687	18.91000	0.196546	0.8458
F1*F3	9.512246	35.39735	0.268728	0.7904
F1*F4	1.402043	18.18299	0.077107	0.9392
F1*F5	9.452464	47.73815	0.198006	0.8447
F2	1.137576	1.984012	0.573371	0.5717
F2^2	-0.210064	1.218767	-0.172358	0.8646
F2*F3	0.940131	2.747525	0.342174	0.7352
F2*F4	-0.473294	1.906157	-0.248298	0.8060
F2*F5	1.436011	4.529298	0.317049	0.7539
F3	2.488420	5.963484	0.417276	0.6802
F3^2	0.535635	2.547483	0.210260	0.8352
F3*F4	1.203943	2.260169	0.532679	0.5992
F3*F5	3.032193	4.201519	0.721690	0.4775
F4	-1.207892	3.867945	-0.312283	0.7575
F4^2	0.306693	1.768562	0.173414	0.8638
F4*F5	1.373954	5.646751	0.243318	0.8098
F5	-2.923071	5.431477	-0.538172	0.5954
F5^2	0.980248	0.707800	1.384922	0.1788

R-squared	0.389888	Mean dependent var	0.161900
Adjusted R-squared	-0.118539	S.D. dependent var	0.692024
S.E. of regression	0.731892	Akaike info criterion	2.518356
Sum squared resid	12.85597	Schwarz criterion	3.361465
Log likelihood	-35.66302	Hannan-Quinn criter.	2.832659
F-statistic	0.766851	Durbin-Watson stat	1.961280
Prob(F-statistic)	0.724610		

Source: Developed for research.

Table 4.4.10: Result from the White Test for the year 2010

Heteroskedasticity Test: White

F-statistic	0.170184	Prob. F(20,24)	0.9999
Obs*R-squared	5.589244	Prob. Chi-Square(20)	0.9993
Scaled explained SS	25.73389	Prob. Chi-Square(20)	0.1748

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/17/12 Time: 02:17
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.766451	1.729985	1.021079	0.3174
F1	-9.428065	14.34813	-0.657093	0.5174
F1^2	1.336963	2.708241	0.493665	0.6260
F1*F2	13.25640	118.2988	0.112059	0.9117
F1*F3	8.922746	32.71499	0.272742	0.7874
F1*F4	5.835427	6.957792	0.838689	0.4099
F1*F5	4.067802	13.73797	0.296099	0.7697
F2	21.97858	21.36359	1.028787	0.3138
F2^2	-3.414949	2.930947	-1.165135	0.2554
F2*F3	-2.418059	35.43793	-0.068234	0.9462
F2*F4	-7.386317	33.62428	-0.219672	0.8280
F2*F5	-30.37431	66.88638	-0.454118	0.6538
F3	0.562861	5.039658	0.111686	0.9120
F3^2	0.227007	2.370391	0.095768	0.9245
F3*F4	0.756971	1.220824	0.620049	0.5411
F3*F5	2.389550	2.967358	0.805279	0.4286
F4	-0.771997	4.232755	-0.182386	0.8568
F4^2	0.185155	0.650754	0.284524	0.7784
F4*F5	0.435884	1.393175	0.312871	0.7571
F5	-5.549690	12.77785	-0.434321	0.6679
F5^2	0.092219	0.285189	0.323363	0.7492

R-squared	0.124205	Mean dependent var	0.227795
Adjusted R-squared	-0.605623	S.D. dependent var	0.806609
S.E. of regression	1.022080	Akaike info criterion	3.186281
Sum squared resid	25.07153	Schwarz criterion	4.029390
Log likelihood	-50.69132	Hannan-Quinn criter.	3.500583
F-statistic	0.170184	Durbin-Watson stat	1.894591
Prob(F-statistic)	0.999917		

Source: Developed for research.

Appendices E: Diagnostic Checking –Model Specification Error Test from year 2000 until 2010

Table 4.5: Result from the Ramsey Test for the year 2000

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	2.064740	38	0.0458
F-statistic	4.263153	(1, 38)	0.0458
Likelihood ratio	4.784825	1	0.0287

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.726979	1	0.726979
Restricted SSR	7.206970	39	0.184794
Unrestricted SSR	6.479991	38	0.170526
Unrestricted SSR	6.479991	38	0.170526

LR test summary:

	Value	df
Restricted LogL	-22.64092	39
Unrestricted LogL	-20.24851	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:34
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.036155	0.157576	-0.229442	0.8198
F1	-0.278260	0.213176	-1.305310	0.1996
F2	-0.426018	0.312217	-1.364494	0.1804
F3	0.074509	0.125136	0.595426	0.5551
F4	-0.052025	0.064056	-0.812176	0.4217
F5	0.075888	0.073678	1.029993	0.3095
FITTED^2	1.632502	0.790657	2.064740	0.0458

R-squared	0.474961	Mean dependent var	0.263345
Adjusted R-squared	0.392060	S.D. dependent var	0.529621
S.E. of regression	0.412948	Akaike info criterion	1.211045
Sum squared resid	6.479991	Schwarz criterion	1.492081
Log likelihood	-20.24851	Hannan-Quinn criter.	1.315812
F-statistic	5.729262	Durbin-Watson stat	2.099774
Prob(F-statistic)	0.000255		

Source: Developed for research.

Table 4.5.1: Result from the Ramsey Test for the year 2001

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5 F6
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.116202	37	0.9081
F-statistic	0.013503	(1, 37)	0.9081
Likelihood ratio	0.016419	1	0.8980

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.002716	1	0.002716
Restricted SSR	7.445863	38	0.195944
Unrestricted SSR	7.443147	37	0.201166
Unrestricted SSR	7.443147	37	0.201166

LR test summary:

	Value	df
Restricted LogL	-23.37465	38
Unrestricted LogL	-23.36644	37

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:39
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.095110	0.147300	-0.645687	0.5225
F1	-0.034513	0.111322	-0.310023	0.7583
F2	-0.066147	0.378801	-0.174621	0.8623
F3	0.081490	0.096283	0.846363	0.4028
F4	0.019051	0.097023	0.196360	0.8454
F5	-0.003403	0.068808	-0.049454	0.9608
F6	-0.022338	0.074800	-0.298632	0.7669
FITTED^2	-0.434677	3.740710	-0.116202	0.9081

R-squared	0.121930	Mean dependent var	-0.110361
Adjusted R-squared	-0.044192	S.D. dependent var	0.438922
S.E. of regression	0.448515	Akaike info criterion	1.394064
Sum squared resid	7.443147	Schwarz criterion	1.715248
Log likelihood	-23.36644	Hannan-Quinn criter.	1.513798
F-statistic	0.733979	Durbin-Watson stat	2.031523
Prob(F-statistic)	0.644538		

Source: Developed for research.

Table 4.5.2: Result from the Ramsey Test for the year 2002

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.272573	38	0.2109
F-statistic	1.619443	(1, 38)	0.2109
Likelihood ratio	1.878022	1	0.1706

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.289249	1	0.289249
Restricted SSR	7.076439	39	0.181447
Unrestricted SSR	6.787190	38	0.178610
Unrestricted SSR	6.787190	38	0.178610

LR test summary:

	Value	df
Restricted LogL	-22.22967	39
Unrestricted LogL	-21.29066	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:45
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.019435	0.079709	-0.243827	0.8087
F1	-0.086093	0.068676	-1.253595	0.2176
F2	0.027170	0.064775	0.419447	0.6773
F3	-0.196386	0.095172	-2.063473	0.0459
F4	0.085818	0.075260	1.140295	0.2613
F5	-0.100751	0.070797	-1.423097	0.1629
FITTED^2	2.998929	2.356586	1.272573	0.2109

R-squared	0.143769	Mean dependent var	0.042705
Adjusted R-squared	0.008574	S.D. dependent var	0.424447
S.E. of regression	0.422623	Akaike info criterion	1.257363
Sum squared resid	6.787190	Schwarz criterion	1.538399
Log likelihood	-21.29066	Hannan-Quinn criter.	1.362130
F-statistic	1.063422	Durbin-Watson stat	1.988667
Prob(F-statistic)	0.401228		

Source: Developed for research.

Table 4.5.3: Result from the Ramsey Test for the year 2003

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.202809	38	0.2365
F-statistic	1.446749	(1, 38)	0.2365
Likelihood ratio	1.681446	1	0.1947

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.567192	1	0.567192
Restricted SSR	15.46494	39	0.396537
Unrestricted SSR	14.89775	38	0.392046
Unrestricted SSR	14.89775	38	0.392046

LR test summary:

	Value	df
Restricted LogL	-39.82028	39
Unrestricted LogL	-38.97955	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:51
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.082046	0.164462	0.498874	0.6207
F1	-0.062096	0.095408	-0.650850	0.5191
F2	-0.024161	0.179629	-0.134508	0.8937
F3	-0.109651	0.095507	-1.148089	0.2581
F4	-0.001415	0.115445	-0.012253	0.9903
F5	0.017265	0.143618	0.120218	0.9049
FITTED^2	1.282287	1.066077	1.202809	0.2365

R-squared	0.193905	Mean dependent var	0.244916
Adjusted R-squared	0.066626	S.D. dependent var	0.648098
S.E. of regression	0.626136	Akaike info criterion	2.043536
Sum squared resid	14.89775	Schwarz criterion	2.324572
Log likelihood	-38.97955	Hannan-Quinn criter.	2.148303
F-statistic	1.523471	Durbin-Watson stat	2.281132
Prob(F-statistic)	0.196903		

Source: Developed for research.

Table 4.5.4: Result from the Ramsey Test for the year 2004

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.574178	38	0.5692
F-statistic	0.329680	(1, 38)	0.5692
Likelihood ratio	0.388727	1	0.5330

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.448777	1	0.448777
Restricted SSR	52.17626	39	1.337853
Unrestricted SSR	51.72748	38	1.361249
Unrestricted SSR	51.72748	38	1.361249

LR test summary:

	Value	df
Restricted LogL	-67.18145	39
Unrestricted LogL	-66.98708	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:53
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.615932	2.069380	-0.297641	0.7676
F1	0.134555	0.402430	0.334357	0.7399
F2	-0.085674	0.249989	-0.342712	0.7337
F3	0.164954	0.521116	0.316541	0.7533
F4	0.122557	0.375858	0.326074	0.7462
F5	0.213486	0.554402	0.385075	0.7023
FITTED^2	3.347467	5.830018	0.574178	0.5692

R-squared	0.034425	Mean dependent var	0.568056
Adjusted R-squared	-0.118035	S.D. dependent var	1.103421
S.E. of regression	1.166726	Akaike info criterion	3.288315
Sum squared resid	51.72748	Schwarz criterion	3.569351
Log likelihood	-66.98708	Hannan-Quinn criter.	3.393082
F-statistic	0.225795	Durbin-Watson stat	2.069258
Prob(F-statistic)	0.965867		

Source: Developed for research.

Table 4.5.5: Result from the Ramsey Test for the year 2005

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.062678	37	0.9504
F-statistic	0.003929	(1, 37)	0.9504
Likelihood ratio	0.004672	1	0.9455

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000587	1	0.000587
Restricted SSR	5.525946	38	0.145420
Unrestricted SSR	5.525360	37	0.149334
Unrestricted SSR	5.525360	37	0.149334

LR test summary:

	Value	df
Restricted LogL	-16.78912	38
Unrestricted LogL	-16.78679	37

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:55
Sample: 1 44
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.150597	0.123150	1.222876	0.2291
F1	0.010555	0.060173	0.175417	0.8617
F2	0.066957	0.106388	0.629365	0.5330
F3	-0.052462	0.062920	-0.833790	0.4098
F4	0.034504	0.080927	0.426352	0.6723
F5	0.062767	0.088771	0.707065	0.4840
FITTED^2	-0.217246	3.466044	-0.062678	0.9504

R-squared	0.078105	Mean dependent var	0.143797
Adjusted R-squared	-0.071391	S.D. dependent var	0.373341
S.E. of regression	0.386438	Akaike info criterion	1.081218
Sum squared resid	5.525360	Schwarz criterion	1.365066
Log likelihood	-16.78679	Hannan-Quinn criter.	1.186482
F-statistic	0.522457	Durbin-Watson stat	2.069138
Prob(F-statistic)	0.787515		

Source: Developed for research.

Table 4.5.6: Result from the Ramsey Test for the year 2006

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.223407	38	0.8244
F-statistic	0.049911	(1, 38)	0.8244
Likelihood ratio	0.059066	1	0.8080

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.014618	1	0.014618
Restricted SSR	11.14439	39	0.285754
Unrestricted SSR	11.12977	38	0.292889
Unrestricted SSR	11.12977	38	0.292889

LR test summary:

	Value	df
Restricted LogL	-32.44839	39
Unrestricted LogL	-32.41886	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:56
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.161160	0.201212	0.800947	0.4281
F1	0.165869	0.419309	0.395577	0.6946
F2	0.001006	0.082318	0.012217	0.9903
F3	-0.031595	0.088489	-0.357051	0.7230
F4	0.015120	0.088475	0.170896	0.8652
F5	0.106569	0.206550	0.515949	0.6089
FITTED^2	-1.688346	7.557257	-0.223407	0.8244

R-squared	0.040058	Mean dependent var	0.119979
Adjusted R-squared	-0.111512	S.D. dependent var	0.513327
S.E. of regression	0.541192	Akaike info criterion	1.751949
Sum squared resid	11.12977	Schwarz criterion	2.032986
Log likelihood	-32.41886	Hannan-Quinn criter.	1.856717
F-statistic	0.264288	Durbin-Watson stat	2.094492
Prob(F-statistic)	0.950127		

Source: Developed for research.

Table 4.5.7: Result from the Ramsey Test for the year 2007

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.115802	38	0.9084
F-statistic	0.013410	(1, 38)	0.9084
Likelihood ratio	0.015878	1	0.8997

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.009684	1	0.009684
Restricted SSR	27.45209	39	0.703900
Unrestricted SSR	27.44240	38	0.722168
Unrestricted SSR	27.44240	38	0.722168

LR test summary:

	Value	df
Restricted LogL	-52.73228	39
Unrestricted LogL	-52.72434	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 02:58
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.414794	1.482712	0.279754	0.7812
F1	0.007828	0.249412	0.031386	0.9751
F2	0.018974	0.629816	0.030127	0.9761
F3	0.014151	0.178749	0.079165	0.9373
F4	-0.088214	0.464851	-0.189769	0.8505
F5	0.005198	0.139148	0.037355	0.9704
FITTED^2	0.459442	3.967486	0.115802	0.9084

R-squared	0.045879	Mean dependent var	0.585867
Adjusted R-squared	-0.104771	S.D. dependent var	0.808506
S.E. of regression	0.849805	Akaike info criterion	2.654415
Sum squared resid	27.44240	Schwarz criterion	2.935451
Log likelihood	-52.72434	Hannan-Quinn criter.	2.759183
F-statistic	0.304542	Durbin-Watson stat	2.049974
Prob(F-statistic)	0.930684		

Source: Developed for research.

Table 4.5.8: Result from the Ramsey Test for the year 2008

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	2.706198	39	0.0100
F-statistic	7.323508	(1, 39)	0.0100
Likelihood ratio	7.743957	1	0.0054

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.342451	1	0.342451
Restricted SSR	2.166109	40	0.054153
Unrestricted SSR	1.823658	39	0.046760
Unrestricted SSR	1.823658	39	0.046760

LR test summary:

	Value	df
Restricted LogL	4.406694	40
Unrestricted LogL	8.278672	39

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 03:01
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.392926	0.976177	2.451323	0.0188
F1	-0.273170	0.119214	-2.291434	0.0274
F2	-0.318758	0.128903	-2.472839	0.0179
F3	-0.673629	0.267403	-2.519153	0.0160
F4	0.001695	0.032605	0.051977	0.9588
FITTED^2	-40.72784	15.04984	-2.706198	0.0100

R-squared	0.217274	Mean dependent var	-0.247363
Adjusted R-squared	0.116925	S.D. dependent var	0.230113
S.E. of regression	0.216242	Akaike info criterion	-0.101274
Sum squared resid	1.823658	Schwarz criterion	0.139614
Log likelihood	8.278672	Hannan-Quinn criter.	-0.011474
F-statistic	2.165176	Durbin-Watson stat	1.956985
Prob(F-statistic)	0.077866		

Source: Developed for research.

Table 4.5.9: Result from the Ramsey Test for the year 2009

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.019970	38	0.3142
F-statistic	1.040338	(1, 38)	0.3142
Likelihood ratio	1.215417	1	0.2703

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.194143	1	0.194143
Restricted SSR	7.285518	39	0.186808
Unrestricted SSR	7.091375	38	0.186615
Unrestricted SSR	7.091375	38	0.186615

LR test summary:

	Value	df
Restricted LogL	-22.88482	39
Unrestricted LogL	-22.27711	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 03:04
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.194816	0.145423	-1.339650	0.1883
F1	-0.165109	0.151374	-1.090734	0.2823
F2	-0.057863	0.077356	-0.748013	0.4591
F3	-0.217918	0.180988	-1.204052	0.2360
F4	-0.147638	0.136211	-1.083895	0.2852
F5	-0.111426	0.107951	-1.032190	0.3085
FITTED^2	16.78059	16.45205	1.019970	0.3142

R-squared	0.050705	Mean dependent var	-0.061825
Adjusted R-squared	-0.099183	S.D. dependent var	0.412039
S.E. of regression	0.431990	Akaike info criterion	1.301205
Sum squared resid	7.091375	Schwarz criterion	1.582241
Log likelihood	-22.27711	Hannan-Quinn criter.	1.405972
F-statistic	0.338288	Durbin-Watson stat	1.922201
Prob(F-statistic)	0.912266		

Source: Developed for research.

Table 4.5.10: Result from the Ramsey Test for the year 2010

Ramsey RESET Test
Equation: UNTITLED
Specification: Y C F1 F2 F3 F4 F5
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.663714	38	0.5109
F-statistic	0.440516	(1, 38)	0.5109
Likelihood ratio	0.518663	1	0.4714

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.117471	1	0.117471
Restricted SSR	10.25077	39	0.262840
Unrestricted SSR	10.13330	38	0.266666
Unrestricted SSR	10.13330	38	0.266666

LR test summary:

	Value	df
Restricted LogL	-30.56777	39
Unrestricted LogL	-30.30843	38

Unrestricted Test Equation:
Dependent Variable: Y
Method: Least Squares
Date: 08/17/12 Time: 03:08
Sample: 1 45
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.885705	0.640917	1.381934	0.1751
F1	-0.126187	0.125199	-1.007891	0.3199
F2	0.258360	0.288871	0.894380	0.3767
F3	-0.159689	0.144690	-1.103664	0.2767
F4	-0.182631	0.169340	-1.078488	0.2876
F5	0.250003	0.258745	0.966214	0.3400
FITTED^2	-1.732585	2.610439	-0.663714	0.5109

R-squared	0.123113	Mean dependent var	0.463399
Adjusted R-squared	-0.015343	S.D. dependent var	0.512480
S.E. of regression	0.516397	Akaike info criterion	1.658153
Sum squared resid	10.13330	Schwarz criterion	1.939189
Log likelihood	-30.30843	Hannan-Quinn criter.	1.762920
F-statistic	0.889187	Durbin-Watson stat	1.961092
Prob(F-statistic)	0.512442		

Source: Developed for research.