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政治變動對蒙古股票市場報酬與波動性的影響

The impact of political changes on Mongolian stock market  
returns and volatilities



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## ABSTRACT

Mongolia is a developing country in North East Asia with quickly growing country of 2.9 million populations and USD 10.2 billion GDP in 2012. Mongolia peacefully transitioned into a democratic society in 1990 and transformed from central planning economy to a market-oriented economy.

In the last decades, Mongolia has attracted foreign investors by huge amount of natural resources. In 2012, mining industry of Mongolia produced 20 percent of the Gross Domestic Production and 89 percent of it is export. Furthermore, 33 percent of total foreign direct investments are invested in geology, mining and petroleum industries. Also, 97 percent of total market capitalization of MSE is belonged to the mining companies in June, 2012. However, Mongolia's political and investment environment doesn't have much experience to deal with foreign investors on big projects. Mongolian government still has argued with mining companies.

On the other hand, political changes create impacts on stock market and investors make their investment decision according to political changes. As the particular situation of Mongolian stock market, this paper proposed to present Mongolia's political impact on stock market returns and volatilities using daily MSE TOP20 index from February 9, 2001 to June 9, 2012. To examine stock returns and volatility, GARCH model by RATS programs is employed to investigate the results. We use congressional effect and a political change of Mongolia to examine political impact on

Mongolian stock market. Congressional effect is presented by Mongolian parliament session. In 2009, Transition of ruling party is used by political changes of Mongolia. The preliminary results show that politics have a significant impact on stock market volatilities. Furthermore, the results illustrate that politics have negatively association with volatility of stock market returns in case of Mongolia. The results may help the decision making of investors’.

**Keywords:** Mongolian Stock Exchange Market, Politics, Stock Return, Volatility, GARCH model



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## CONTENTS

ABSTRACT .....	iii
ACKNOWLEDGEMENT .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.1 Research background .....	1
1.1.1 An Overview of Mongolian Stock market .....	1
1.2 Research Motivation .....	5
1.3 Research Objectives and Scope .....	6
1.2 Research procedure and structure .....	6
CHAPTER TWO .....	8
LITERATURE REVIEW .....	8
2.1 Stock return volatility .....	8
2.2 Empirical impacts on Stock return volatility. ....	9
2.2.1 Presidential and parliament elections .....	10
2.2.2 Political news .....	11
2.2.3 Parliament sessions .....	11
CHAPTER THREE .....	13
DATA AND METHODOLOGY .....	13
3.1 Sample data .....	13
3.2 Event identification .....	14
3.3 Mongolian parliament and ruling parties .....	14
3.4 Modeling Time-varying Volatility .....	16

CHAPTER FOUR .....	18
DATA DESCRIPTION AND EMPIRICAL RESULTS.....	18
4.1 Data Description.....	18
4.2 Test of stationarity.....	20
4.3 Test of ARCH effect and Volatility asymmetry .....	23
4.4 Empirical Results .....	24
CHAPTER FIVE .....	28
CONCLUSTION .....	28
REFERENCES .....	29



## LIST OF TABLES

Table 1-1 Mongolian Stock Exchange's main indices.....	3
Table 3-1 Classification of event period .....	14
Table 4-1 Basic statistics for Mongolian stock market returns.....	20
Table 4-2 The AIC and SBC value of unit root test MSE return.....	22
Table 4-3 The ADF and P-P value of unit root test of MSE return.....	23
Table 4-4 The ARCH effect and volatility asymmetry test.....	24
Table 4-5 The Empirical Results of AR(2)-EGARCH Model.....	25
Table 4-6 The results of Mongolian presidential elections.....	26





## LIST OF FIGURES

Figure 1-1	Number of listed companies on Mongolian Stock Exchange.....	1
Figure 4-1	The trend of MSE index.....	18
Figure 4-2	The trend of MSE returns .....	19



# CHAPTER ONE

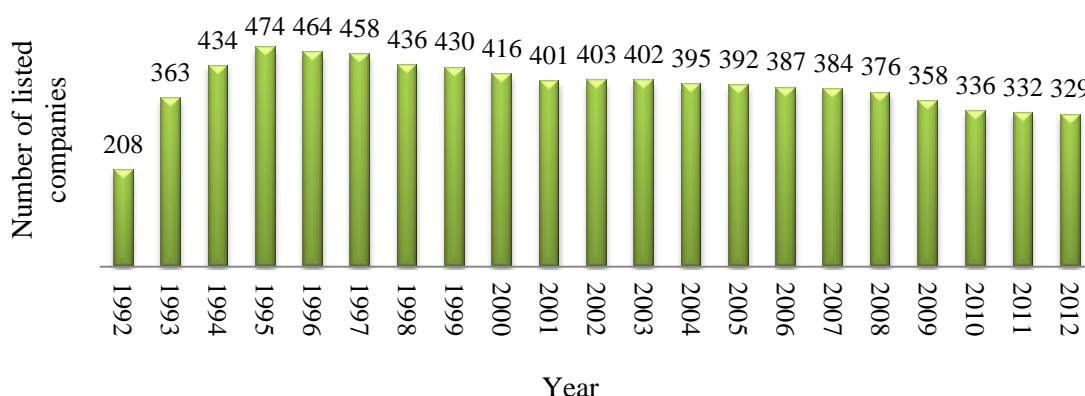
## INTRODUCTION

### 1.1 Research background

#### 1.1.1 An overview of Mongolian Stock Exchange (MSE)

Mongolia has made great reform in the 1990s. Mongolian political system has moved into democratic system as well as economy transitioned from central planning to a market oriented. During this transition period, the Mongolian government carried out such reform as price and trade liberalization, adoption of floating exchange rate, restructuring the banking sector, curtailing budget transfers and lending to state, and launching large-scale privatization of state-owned enterprises.

On 18<sup>th</sup> January 1991, Mongolian government established Mongolian Stock Exchange (MSE) for purpose of privatization of state-owned assets, developing investment and securities market. According to principles of transition to a market economy, the parliament decided to distribute privatization vouchers free of charge to each citizen born before 1 July, 1991 for the purchase of shares of enterprises, which is could be traded in secondary market. During 1992 to 1995, 474 state-owned entities were transformed into private companies through Mongolian Stock Exchange (fully or partly privatized). It valued 96.1 million shares worth 8.2 billion MNT<sup>1</sup> (7.0 million USD).



*Source:* Source of Mongolian Stock Exchange (2013), Number of listed companies on Mongolian Stock Exchange

*Figure 1-1* Number of listed companies on Mongolian Stock Exchange

<sup>1</sup> MNT - official currency of Mongolia

In 1994, the parliament approved the securities law and established the “Securities and Exchange Commission” to coordinating and monitoring the securities market. The Securities and Exchange Commission has carried out such activities as preparation and implementation of rules and regulations concerning the securities market, adoption of the secondary stock market, licensing and certifications of brokers.

The secondary market trade began on August 28, 1995 and it provided opportunity to citizens for trading their stocks bought by vouchers in primary market via brokers. First trade was auctioning 16000 shares of three companies that valued 15000 USD.

The newly established Mongolian stock market was young and small enough, didn't have much experience to operating the securities market. On the other hand, shareholders were not able to recognize their own shares and did not understand that the dividend is one of sources of fixed income for them, which seemed to lead many clients to much less confidence to the market. The secondary stock market quickly exposed the weakness of the newly privatized companies; share prices remained depressed throughout 1996 and many small shareholders sold their shares, allowing a few domestic and foreign investors to gain majority holdings in the remaining listed companies.

The Mongolian government changed policy of privatization method in 1996. The government has adopted the auction method of privatization and has continued the privatization process by selling down its stakes in partly privatized companies by auctions run by the State Property Committee. It reduced new issuance of shares by the government through the Mongolian Stock Exchange.

During 1997 – 2004, the State Property Committee traded 56.8 million state shares at the MSE. This caused serious fall of trading volume and value of shares in the MSE. Value of shares trading has been reduced from 14.9 million USD in 1997 to 0.539 million USD in 2004.

In 2006, a few companies issued new shares and stock trading increased and made up 69.9 per cent of total trade. For example: Zoos bank became the first bank listed in the MSE, it issued two million common shares with a face value of 1000 MNT, which is 15.8 per cent of total value of share trading. In the last 5 years, Mongolian stock

market has growing rapidly, that grew was presented by market capitalization to 419.7 million USD by 2008 and then trebly again to 1289.2 million USD 2012.

Since 2000, the Mongolian stock exchange has organized the government bond trading. In 2000 - 2012, Government bonds with total value of 344.7 million USD have been traded.

Moreover, the companies bond trading started in 2001. The performance of Mongolian Stock Exchange is shown in the Table 1-1 as below.

Table 1-1 Mongolian Stock Exchange's main indices by USD

Indices	Corporate bond trading value	Government bond trading value	Value of share trading	Market capitalization	Top-20 index
1995			1,713,930	24,508,713	87.35
1996		208,246	6,057,281	25,475,992	150.80
1997			14,983,291	54,208,429	360.08
1998			12,060,173	40,206,256	235.02
1999			3,058,908	32,163,946	255.72
2000		10,147,785	2,710,376	36,903,169	469.93
2001	1,093,563	27,921,999	1,564,757	37,486,355	814.02
2002	2,631,484	37,088,359	1,222,799	31,890,372	933.93
2003	2,553,482	18,561,505	765,489	42,308,319	895.90
2004	2,291,242	10,285,644	539,743	24,729,480	585.69
2005	2,171,451	5,517,121	2,076,566	45,407,890	1,019.20
2006	824,905	3,830,142	10,820,607	112,615,544	2,030.81
2007	726,966	33,839,231	53,089,876	613,184,657	10,256.13
2008	408,472	1,216,251	49,105,614	419,759,963	5,583.22
2009			16,066,562	430,197,192	6,189.91
2010	-	23,876,416	50,039,509	1,093,496,985	14,759.81
2011	3,197,890	172,267,938	79,399,482	1,578,059,951	21,687.57
2012	221,852	-	103,678,404	1,289,224,283	17,714.50

Source: Source of Mongolian Stock Exchange

Since Mongolian stock market established in 1991, twenty years had passed. However Mongolia is in the process of developing its capital market and the stock market is still very small and illiquid. Mongolian Stock Exchange could not be become the centre that supports enterprises in mobilizing long term and low cost financial resources, that provides protection of investors' interest and rights. Listed companies are still few in number (329 listed companies) and small in size, with most of larger ones focused on mining. The MSE Top 20 listed companies account for 86 percent of the current market capitalization. According to MSE estimates out of 100 top local

companies in Mongolia, only 13 are listed on MSE. There are at least 18 mining companies operating in Mongolia (estimated to be worth over 29 billion USD) producing 5 times the Mongolian GDP, which are listed abroad.

#### Regulatory framework

The existing Securities Market law enacted in 1994 (amended twice 2002 and 2005). It regulates the issuing, registering and trading of securities, transfer of share ownership rights, investor protection and supervision of brokers. The Securities and Exchange Commission was established for the purpose of coordinating and monitoring the securities market activities. In 2006, The Securities and Exchange Commission was restructured into the newly established Financial Regulatory Commission (FRC).

The law on the Financial Regulatory Commission regulates the establishment, organization and operations of the FRC and provides for the coordination and monitoring of financial services. It issued in December 2005 and amended in July 2006. The FRC's activity is directed at improving comprehensive rules on regulation and supervision of non-bank financial institutions and capital market; insuring sustainability of financial market; establishing and developing database and network system; enhancing accountability and transparency of non-bank financial institutions and capital market.

The FRC is playing a significant role in facilitating development of capital markets. FRC together with MSE have been very determined to weed out listed companies that have not complied with MSE rules. Out of 336 companies listed on the MSE (in 2010) 118 are suspended from trading, and it is expected that they will be delisted over time. These companies have not complied with the listing requirements on disclosures and financial reporting.

The Legislation on the capital market consists of the legal acts as follows:

1. Securities law, 2002
2. Foreign investment law, 1997
3. Bankruptcy law, 1997
4. Taxation law, 2006
5. Accounting law, 1993
6. Auditing law, 1997
7. Company law, 1999 and others

## Trading and technology

The MSE is open for trading everyday from 9:40am to 01:00pm, with the exception of holidays declared by Mongolian Government. MSE divided its listed companies into A and B board and classify companies in order to increase liquidity and quality of listings.

In April 2011, Strategic Partnership was agreed between MSE and London Stock Exchange for the purpose of transforming MSE to a world class exchange operator by bringing in international expertise and to develop Mongolian capital market as a whole. Under the framework of “Master Service Agreement”, MSE enabled to switch to T + 3 settlement system and to set up a new post trading environment.

The main indicator of Mongolian Stock Market (MSE TOP20 index) is calculated based on the market capitalization and average daily trading value of the top 20 securities listed on the Mongolian Stock Exchange.

## Capital Market Intermediaries

Mongolian capital market intermediaries are not well developed to effectively intermediate between savers and channel them towards investment in the capital market. As of January 2012, the number of broker dealer companies licensed by the FRC reached 88, out of which 22 acts as underwriters, 16 investment advisers, and 1 credit rating agency. Of the 88 broker dealers, one company carries out more than 50 per cent of total transaction volumes on MSE. Most brokers do not actively conduct brokerage business and have very small capital base. To date, there are no intermediaries for fund management, no mutual funds in the domestic market, and no derivatives market.

## 1.2 Research motivation

In the last decades, Mongolia has attracted foreign investors by huge amount of natural resources. In 2012, mining industry of Mongolia produced 20 percent of the Gross Domestic Production and 89 percent of it is export. Furthermore, 33 percent of total foreign direct investments are invested in geology, mining and petroleum industries. Also, 97 per cent of total market capitalization of MSE is belonged to the mining companies in June, 2012. However, Mongolia’s political and investment environment doesn’t have much experience to deal with foreign investors on big projects. Mongolian government still has argued with mining companies. On the other

hand, political changes create impacts on stock market and investors make their investment decision according to political changes.

As the particular situation of Mongolian stock market, this paper chooses to examine Mongolia's political impact on stock market returns and volatilities. The results may help the decision making of foreign and domestic investors'.

### **1.3 Research propose and objectives**

The purpose of this paper is to present Mongolia's political impact on stock market returns and volatilities using daily MSE TOP20 index from February 9, 2001 to June 9, 2012.

Due to research objective, this investigation is conducted to determine Mongolian stock market; political changes and issues affect significantly on stock return and volatility of Mongolian Stock Exchange during the sample period. And "How does Mongolian politics affect the Mongolian stock market?"

We use congressional effect (political issue) and a political change of Mongolia to examine political impact on Mongolian stock market. Congressional effect is presented by Mongolian parliament session. In 2009, Transition of ruling party is used by political changes of Mongolia. It will be described in Chapter three.

Fist, we aim to detect that how political changes and issues affect on stock market return. Second we examine also how these factors influence on volatility of stock return during the sample period.

### **1.4 Research procedure and structure**

In the first stage of investigation, the relevant previous studies will be reviewed, in order to deeply understanding this studies, impacts on the stock market and research methodology. After the identification of research objectives, empirical results will be presented by methodology which is defined in first the stage. Finally, the conclusion and suggestion will be reported based on the results of the study.

First chapter provide a brief introduction of Mongolian stock market, research motivation, objectives, procedure and structure of the dissertation. The second chapter will discuss selected relevant studies about political impacts on stock market returns and volatilities. The third chapter will discuss sample data and starting analysis to find

the volatility effects of political changes. Fourth chapter will cover empirical results and chapter five will contain conclusion.





## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Stock return and volatility

Stock return has been one of the most popular topics in research. Investors aim to earn more high return from their portfolio and they have experienced abnormal levels of investment performance volatility during various periods of time. Hence, Volatility of stock return is an important task in financial markets. Study on this subject has held the attention of academics and practitioners over the last three decades. Finance theory and empirical evidence shows that relation between stock return and its own variance.

Since, financial risk management has taken central role in finance; volatility forecasting became top issue of stock market. For this reason, policy makers often rely on market estimates of volatility as a barometer for the vulnerability of financial market.

In finance, volatility of stock return is a statistical measure of the dispersion of returns for a given security or market index.

Volatility is not the same as risk. When it is interpreted as uncertainty, it becomes a key input to many investment decisions and portfolio creations. Investors and portfolio managers have certain levels of risk which they can bear. A good forecast of the volatility of asset prices over the investment holding periods is good starting point for assessing investment risk.

Despite of being unobservable in the financial market, the volatility of a security's return can be assessed by many ways. In finance, one of the most common is variance which is measure of the squared deviation of a security's return from the expected return; the standard deviation is the square root of the variance.

Standard deviation is the typical statistic used to measure volatility. However, volatility and standard deviation are considerably different, which is necessary to point out. The standard deviation of a sample  $\hat{\sigma}$  is a distribution free parameter which presents the second moment characteristic of the sample. In fact, the standard deviation can be calculated from any irregular distribution. But the required probability density and cumulative probability density are only can be derived analytically when standard deviation is attached to a standard distribution, such as a normal or a t-distribution. So it

is just meaningful to use standard deviation as a measure of uncertainty when the distribution of return is normal (Poon & Granger, 2003).

Despite of being unobservable, volatility may be characterized into some special features including fat-tail distribution of risky asset returns, volatility clustering, asymmetry and mean reversion and co-movements of volatilities across assets and financial markets. For financial time series, the volatility has found to be more complicated. As noted by (Poon & Granger, 2003), the correlation among volatility is stronger than that among returns and both tend to increase during bear markets and financial crises, the volatility of time series appear to have a unit root.

The volatility clustering feature implies that asset returns are dependent during the time. As noted by (Mandelbrot, 1963), large return tends to be followed by large return. This indicated that future volatility can be predicted by past and current volatility. He also shows that the volatility changes over the time and with short lags, the time series of daily stock index returns present positive autocorrelation. Moreover, the daily stock index return tends to have larger kurtosis than if they were normally distributed.

Asymmetry is also commonly seen in volatility of financial time series. The distribution of variance and standard deviations are asymmetric and leptokurtic but logarithmic variances are distributed approximately normal (Ebens, 1999). In practice, the volatility seems to react asymmetrically to change of stock price which is so called leverage effect.

## **2.2 Empirical impacts on Stock return volatility**

Political factor has a significant influence on stock market returns and volatilities. Many previous studies have found that the numerous impact on stock market performance. Different political changes and political issues have different influence for the stock market volatilities and investors' behavior. According to a number of theoretical and empirical articles, significant political events are investigated. Such as

1. Presidential and parliament elections
2. Political news (bad and good)
3. Parliament session

Researchers used different ways to test political events, also used them to test against stock market volatilities.

In any case of country, politics and that country's economic are closely related on each other. Countries economics are managed by country's government, the different parties have different economic policies and agendas. It means politics factor significantly influences economy, furthermore it affects financial market. Especially, political uncertainty and instability make impact on investor's decision making.

### 2.2.1 Presidential and parliament elections

The study on the correlation between political events and stock market is tested mostly. The relevant studies focused on election and transition of ruling party and changes of president and prime minister are more common variable in this study. By using political events in many countries such as United States, France, United Kingdom, Canadian, Japan, Hong Kong etc examined effect of political changes in their stock markets. Moreover, researchers found some developed country's political change does not only have influence on their stock market, it also impacts others foreign stock markets. For example, Foerster (1994) found that the US presidential election cycle does not only have influence on the US stock market, also impacts the Canadian and other foreign markets.

In addition, Chuang and Wang (2009) utilized panel data to examine political change effects on American, Japanese, British and French stock markets from November, 1979 to January 2001. Stock returns were captured according to the Hausman test by the fixed-effect model to fit the stock market. Their analytical findings showed that political changes negatively relate to the American, Japanese, British and French stock return 5% significant level and the impact is dramatically stronger after the financial crisis, the 1987 crash.

Recently, Ukrainian and Pakistan stock market are tested by political impacts by Malyshko and Tykhomyrova (2011), Suleman (2012). Hung (2011) examined presidential election effect (short-term or long-term) on stock market (The case of Taiwan). But findings are shown no proof for a bull-run election and no evidence for the market's preference.

### 2.2.2 Political news

Stock markets generally respond to new information from government regarding to political decisions that may affect domestic and foreign policy. It is reason that investors keep a watch on the happenings of politics. Hence, political news and congressional effect are attracted by researchers.

Hong Kong stock market is most interesting field to examine political impacts on stock market volatilities. Hong Kong's political and economic status once it reverts back to Chinese rule by 1997 after 156 years of British rule. Chan and Wei (1996) investigated the impact of political news on the stock market volatility in Hong Kong. They used two indices: blue-chip shares are represented by the Hang Seng Index, and China-related stocks are represented by the Red Chip index. They found that political news increases the stock volatility of both blue-chip and red-chip shares.

### 2.2.3 Parliament sessions

Lin and Wang (2007) analyzed the behavior in stock market returns and volatilities during sessions of the Legislative Yuan using EGARCH model from January 1991 to May 2005. In mature democracies, legislative institutions are always important in curbing the powers of the president or premier and holding national stability. Most of the uncertainty regarding major bills, budgets and other important national affairs are determined through decisions by vote or political negotiations during congressional sessions. Taiwan congress is the top legislative institution and played an important role on the path to Taiwan's democratization. They found evidences that the congressional effect is negative effect on stock returns but volatilities are not significant.

Kim and Mei (2001) analyzed political risk on Hong Kong stock return. Their results show that political developments in Hong Kong have a significant impact on its market volatility and return.

Fong and Koh (2002) also used the data from Hong Kong stock market to investigate political risk has induced regime shifts in stock market volatility. The results illustrated a strong evidence of the regime shift in conditional volatility as well a significant volatility asymmetry in high volatility periods.

Regarding to literature review, most of previous studies found significant impact on stock market volatilities. Also, political changes and political issues are negatively related to stock market returns and volatilities in emerging market. Mongolian political system and economy have changed 20 years ago and Mongolian stock market is still being small and young. Thus, researches of political impact on stock market have not yet been done. According to relevant studies, we expect Mongolian politics negatively related to stock market return and volatility. Because Mongolia is in the process of developing its capital market and Mongolian political system is not developed yet, may we can say unstable.



## CHAPTER THREE

### DATA AND METHODOLOGY

#### 3.1 Sample data and data source

This investigation is going to use the daily closing MSE Top 20 index from February 9, 2001 to June 9, 2012. There are a total 2880 observations.

The main indicator of Mongolian Stock Market (MSE TOP20 index) is calculated based on the market capitalization and average daily trading value of the top 20 securities listed on the Mongolian Stock Exchange. It was initially comprised of 75 companies between from 1995 to 2003. Since 2003, a number of companies in the basket were reduced to 20 companies. In addition, the MSE Top20 listed companies account for 86 percent of the current market capitalization. The panel data obtained from MSE database.

The daily stock returns are calculated by following equation:

$$R_t = \frac{(P_t - P_{t-1}) + D_t}{P_{t-1}} \quad (1)$$

Of which,

$R_t$ : is stock return on the day t

$P_t$ : is the stock market index on the day t

$P_{t-1}$ : is the stock market index on the day t-1 (the day before t day)

$D_t$ : is the dividend on the day t

The daily dividends are not included in computation of this research, because daily dividends are very small, not to enough cause distortion.

During the sample period, Mongolian stock market shows more efficient performance in its history. Main indices have growing rapidly, such as MSE Top 20 index and market capitalization.

Also, Mongolian political environment has experienced by competition of political parties and issues of foreign direct investment on mining sector in this time period.

### 3.2 Event identification

Mongolian stock market has growing rapidly in the last decade. Furthermore, Mongolian government approved new securities law and restructured Financial Regulatory Commission to supporting stock market development.

The Financial Regulatory Commission's activity is directed at improving comprehensive rules on regulation and supervision of non-bank financial institutions and capital market; insuring sustainability of financial market; establishing and developing database and network system; enhancing accountability and transparency of non-bank financial institutions and capital market. Mongolian government has been approaching to develop Mongolian capital market, its regulatory framework.

For the purpose of this investigation, the MSE index is estimated with the following political factors by GJR-GARCH model.

First, we use parliament effect which describe how political issue impact on Mongolian stock market. Political issue is presented by Mongolian parliament session.

According to constitution, the Great State Khural (Mongolian parliament) shall hold two sessions each year. The first session shall run from 5, April to 1, July, and second sessions from 1, October to 10, February.

Second, we use a political change which is transition of ruling party by presidential election in 2009. Table 3-1 presents politic changes and political effects which are tested in our analysis.

Table 3-1 Classification of event period

Event Description	Period (dd/mm/yyyy)		Duration
Parliament effect	From	09/02/2001	2882 days
	To	09/06/2012	
Effect of political changes	From	18/06/2009	769 days
	To	09/06/2012	

### 3.3 Mongolian parliament and ruling parties

Socialist regime collapsed and Mongolia has moved into democratic system in the 1990s. Mongolian politics takes a place in a framework of a multi-party system.

The State Great Khural is supreme legislative body. Mongolian State Great Khural consists of a chairman of parliament, 2 vice chairman and 76 members. The

President, Staff Office of the President of Mongolia and Government are the executive organizations. Mongolia elects the president and parliament at the national level. Elections hold for a four-year term by the people. Mongolia's first multi-party election for a State Great Khural (parliament) was held in 1992.

Basically, Mongolia has 22 political parties. There have 2 main political parties such as Mongolian People's Revolutionary Party (MPRP) and Democratic Party.

In October 1992, the Mongolian Democratic Union became a political party along with a number of new parties that banded to support P. Ochirbat for president election. He won the presidential election in an overwhelming victory. The 1996 election represented an important change in Mongolia, as democratic forces attained government power for the first time.

In 1997, the presidential election took place, and MPRP member Bagabandi Natsag was elected as the President. Thus, the parliamentary majority was balanced by the President, nominated from the minority party. In July 2000, a national election brought the MPRP back into power when it gained 72 seats in Parliament and formed the Government (Prime Minister and Cabinet) without any opposition. Following the election, the opposition parties, which had divided into separate parties before the election, began taking steps to reunite into one large opposition party once again.

In May 2001, President Bagabandi Natsag was reelected, affirmed a government and presidency of MPRP members. In 2004 Mongolia had Parliamentary election and voted new Parliamentary members. In 2005 Nambariin Enkhbayar won the Presidential election. In 2008 parliament took place and result brought the public embroilment and violence finally MPRP and Democratic parties composed JOINT GOVERNMENT. Thanks to the joint government many big projects such as Oyu Toilgoi which the richest coppers mine were begun to operate without big opposition in parliament. Many small and new parties were accused of violence and protests and they decomposed and lost the political reputation.

Mr. Elbegdorj who is one of pioneers and leaders of democratic revolution in 1990 was elected as the President in June, 2009. It was the big changes in Mongolian politic after the long time ruling of MPRP. Mr. Elbegdorj's election campaign's poster was to make justice and eliminate the state staffs bribe. Then Former president Mr. Enkhbayar was accused of bribes and spent 2 years in prison he belongs to former



MPRP Powerful party MPRP decomposed to 2 parties Mongolian People's Party and MPRP. Due to this sensational occasion, Democratic Party took power in 2012 and organized government which called 'New Government for Changes' as well as Mr. Elbegdorj who belongs to Democratic Party was reelected in 2013.

### 3.4 Modeling time-varying volatility

The GARCH family models are well-known in modeling time-varying volatility. With contribution of many financial analysts during last two decades, this group of methodologies were developed from the method Autoregression Conditional Heteroscedasticity (ARCH) of Engle (1982) and General Autoregression Conditional Heteroscedasticity (GARCH) of Bollerslev (1986). Owing to the literature on t asymmetric volatility in the GARCH model, numerous studies have demonstrated that univariate models can capture the asymmetric volatility effect in the EGARCH or GJR–GARCH models (Friedmann and Sanddorf-Köhle 2002) and most of these models successfully out perform their symmetrical counterparts. This work employs the GJR–GARCH model (Glosten et al. 1993) to separate stock returns into expected returns and return shocks and determine which of the components of daily Mongolian stock returns play a predominant role in explaining stock returns.

Accordingly, the dummies are embedded in the GJR–GARCH (1, 1) to detect the impact political changes on stock returns, as follows:

$$R_t = a_0 + a_1D_1 + a_2D_2 + a_3D_3 + \sum_{i=1}^m b_iR_{t-i} + \varepsilon_t \quad (2)$$

of which:

$R_t$  stock return at t time

$R_{t-i}$ : stock return before t time i days

m: number of order autoregressive process

$D_1$  denotes the dummy of parliament sessions' effect, where  $D_1$  equals 1 during the parliament session period (the first session shall run from 5, April to 1, July, and second sessions from 1, October to 10, February in each year) and equals 0 otherwise.

$D_2$  denotes the dummy of political changes 2009. Therefore, the sample period is distinguished between pre-changes period ( $D_2$  equals 0) 9 February, 2001 – 17 June, 2009 and post-changes period, 18 June, 2009 - 9 June, 2012 ( $D_2$  equals 1).

$D_3$  denotes the dummy variables of interactive effects between parliament sessions ( $D_1$ ) and political changes ( $D_2$ ). It is computed by multiplying  $D_1$  by  $D_2$ .

Where error term  $\varepsilon_t$  is assumed to follow the non-central t distribution as equation (3) because central t-distribution allows stock returns have thicker tails, but is still symmetric (Wang & Lin, 2007) and (Harvily & Siddique, 2000).

$$\varepsilon_t | \Omega_{t-1} \sim \mathbf{T}(\mathbf{0}, h_t) \quad (3)$$

The volatility of the GJR-GARCH model measured by the conditional variance  $h_t$  as below equation (4):

$$\ln h_t = \tau_0 + \tau_1 D_{1t} + \tau_2 D_{2t} + \tau_3 D_{3t} + \alpha \varepsilon_{t-1}^2 + \theta S_{t-1}^- \varepsilon_{t-1}^2 + \beta h_{t-1} \quad (4)$$

The lag length of conditional mean returns of GARCH (1,1) model is chosen as two based on the minimum value of the Akaike information criterion (Akaike, 1973) and the Schwarz Bayesian Criterion (Schwarz, 1978). The maximum likelihood estimation method is used to determine the parameters of the mean and time-varying conditional variance-covariance are jointly determined. Because the log likelihood function of parameters is nonlinear, the algorithm proposed by (Berndt, Hall, E, & Hausman, 1974), is used to obtain the maximum likelihood estimates of the parameters.

In the dissertation, software Win RATS 6.0 and EVIEWS 7 are used to detect the sample data and generated results will be shown in next chapters.

## CHAPTER FOUR

### DATA DESCRIPTION AND EMPIRICAL RESULTS

#### 4.1 Data description

This section presents a preliminary analysis of the Mongolian stock market. The trend and return of MSE stock market are shown as Figures 4-1 and 4-2 respectively during the sample period.

Mongolian stock market is in the developing process. Visually, the MSE index was growing rapidly in the last part of figure 4-1. As being introduced in chapter one, the Mongolian Stock Exchange has growing in last 5 years. That grew was presented by market capitalization to 419.7 million USD by 2008 and then trebly again to 1289.2 million USD 2012. Moreover, this growth strongly related with increasing of share trading in Mongolian Stock Exchange.

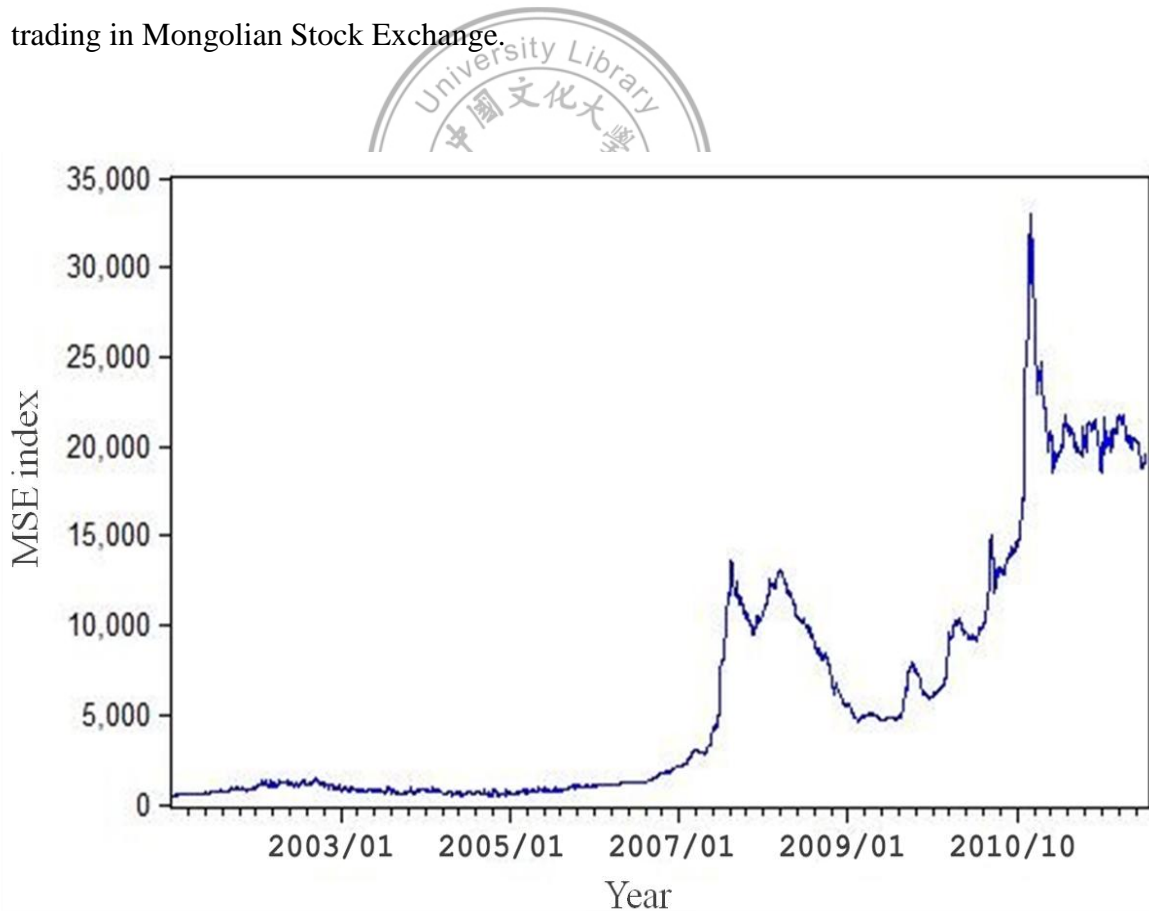


Figure 4-1 The trend of MSE index

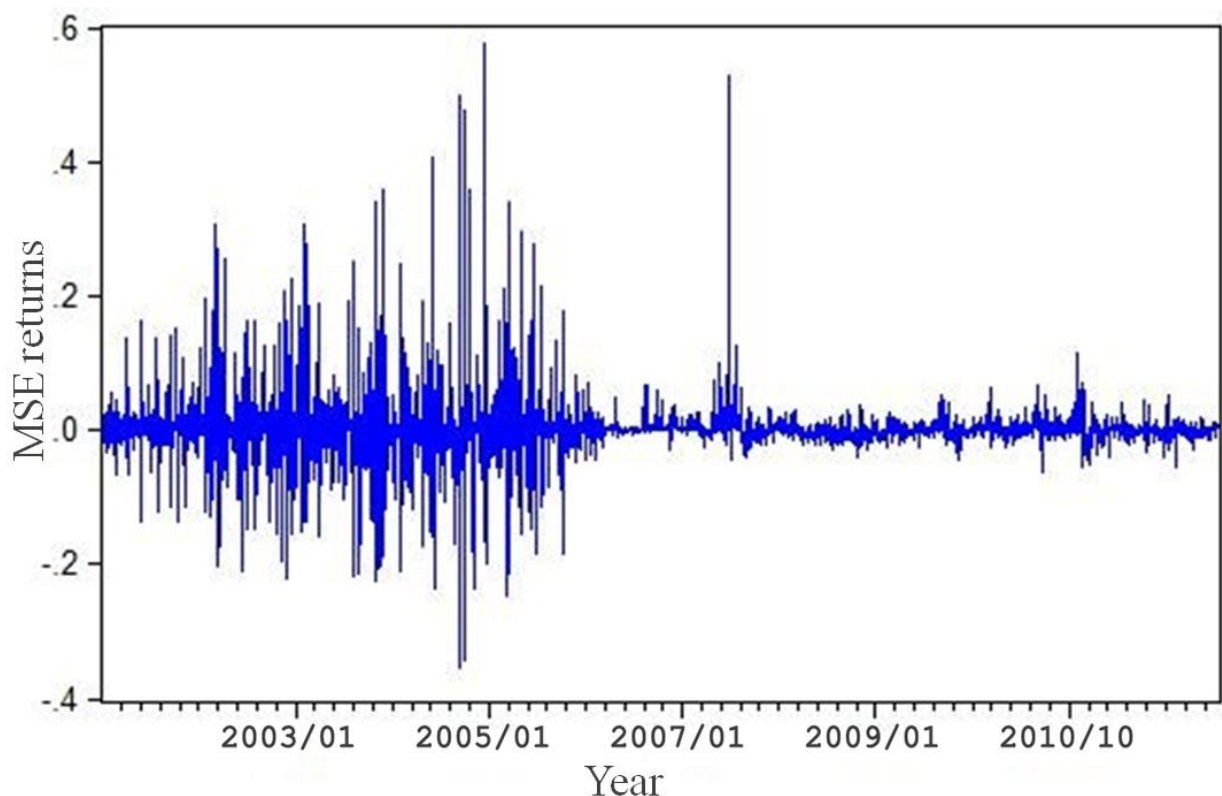


Figure 4-2 The trend of MSE returns

The MSE-index was base to compute the MSE-index return which is the research object of the dissertation. Table 4-1 shows the basic statistics of MSE returns during the sample period. The statistics includes sample size, mean return, standard deviation, Skewness, Kurtosis, the median, minimum, maximum returns, Jarque-Bera test statistic and Ljung-Box Q test statistic.

From the result shows, that the mean of MSE-index returns is significantly different from zero (0) at any statistical significance levels.

In any conventional statistic textbook, the calculation of significance (p-values) for hypothesis test typically is based on the assumption that the population distribution is normal. Thus, It is practical to test the normality of distribution. Among variety test of normality, Jarque-Bera test found by Jarque and Bera (1987) has now become a popular method. In a data set, The Jarque-Bera test statistic is computed based on the skewness and kurtosis.

The Skewness and Kurtosis parameters are the measurements of the asymmetry and thickness in the tails of probability density function. For normal distribution they

equal 0 and 3 respectively. According the Jarque and Bera test, the null hypothesis (Ho) is normal distribution against the alternative hypothesis (H1) non-normal distribution. The test can compared with chi-square ( $\chi^2$ ) distribution with 2 degree of freedom. The null hypothesis will be rejected if the calculated Jarque-Bera test exceeds the critical value from the chi-square distribution.

According to the results shown in the table 4-1, although the Skewness and Kurtosis statistics are different from the critical values and Kurtosis is significant at 1% significance level, the results from Jarque-Bera test is big enough to exceed the critical value from  $\chi^2$  distribution and also significant at 1% significance level. Thus, the null hypothesis of normality is confidentially rejected. In the other word, the distribution of MSE-index is concluded not to follow a normal distribution.

The Ljung-Box Q-statistics is for testing the joint significant autocorrelation within series. As shown in the table 1, Q(6), Q<sup>2</sup>(6), Q(12), Q<sup>2</sup>(12), denoting the Ljung-Box Q-statistics for return and square return at lags of 6 and 12 trading days, are statistically significant at the 1% significance level. It is supported that daily MSE-index returns have significant serial correlation.

Table 4-1 Basic statistics for Mongolian stock market returns

Mean	0.12741	Std. Dev.	4.77082
Maximum	45.49931	Minimum	-43.60337
Skewness	0.59201**	Kurtosis	23.08468**
Q(6)	123.8036**	Q(12)	137.9881**
Q <sup>2</sup> (6)	264.5036**	Q <sup>2</sup> (12)	349.4924**
Jarque-Bera	64116.51738**	Sample Size	2880

Notes: \*\* 1% significance level

\* 5% significance level

Q(k) ( Q<sup>2</sup>(k) ) is the Ljung-Box Q-statistic for the returns and squared returns lagged k trading days.

## 4.2 Test of Stationarity

In the literatures of time series analysis, the data have been approached as stationary series. According to the definition in book “Bussiness Forecasting with ForecastX<sup>TM</sup>”, 6<sup>th</sup> edtion (Wilson J. Holton, 2009), a stationary time series is one in which two consecutive values in the series depend on the time interval between them

and not on time itself. In the other words, the stationary time series is one whose statistical properties such as mean, variance, autocorrelation are all constant over time. Because of this characteristic, most of forecasting and modeling models are based on the assumption of stationarized time series.

The unit root test was used to detect the stationary of sample time series. There are some methods for unit root test and in this dissertation, the augmented Dickey-Augmented Dickey-Fuller (ADF) which is the extended Dickey-Fuller test for higher order and Phillips and Perron (P-P) tests were employed to indentify the unit root of stock index and return with the support of software Eview 7.

Under the unit root hypothesis of which the null Hypothesis is that the time series has unit root or non-stationary and the alternative hypothesis is that the time series doesn't have unit root or stationary.

he Null hypothesis should be rejected if the calculated statistic is smaller than the 5% level critical value following the critical value table of MacKinnon. Conventionally, the unit root tests utilized three main unit root hypothesis with time trend (Trend and Intercept), with constant term (Intercepts) and with neither constant term nor time trend (None).

The value of Akaike Information criterion (AIC) (Akaike, 1973) and Schwarz Bayesian Criterion (SBC) (Schwarz, 1978) are calculated as below functions:

$$AIC(k) = n \cdot \ln \sigma_t^2 + 2k \quad (5)$$

$$SBC(k) = n \cdot \ln \sigma_t^2 + k \cdot \ln T \quad (6)$$

Where, k denotes the lagged period, n denotes the number of sample, and  $\sigma_t^2$  denotes the lagged k periods.

Table 4-2 The AIC and SBC value of unit root test of MSE-index returns

Item	AIC	Order	SBC	Order
None	-3.216860**	1	<b>-3.212716**</b>	<b>1</b>
	-3.220707**	2	-3.214489**	2
	-3.226097**	3	-3.217804**	3
	-3.225167**	4	-3.214798**	4
Intercept	-3.220273**	1	<b>-3.214057**</b>	<b>1</b>
	-3.224772**	2	-3.216482**	2
	-3.231024**	3	-3.220658**	3
	-3.230028**	4	-3.217585**	4
Trend and Intercept	-3.219912**	1	<b>-3.211624**</b>	<b>1</b>
	-3.224476**	2	-3.214113**	2
	-3.230805**	3	-3.218366**	3
	-3.229799**	4	-3.215282**	4

Notes: \*\* 1% significance level.

AIC denotes value of Akaike Information Criterion (Akaike, 1973)

SBC denotes value of Schwarz Bayesian Criterion (Schwarz, 1978)

The optimal order or lag interval was determined based on minimum value of AIC and SBC. Among the value of AIC and SBC shown on the table 4-2, the order 1 correctively was eligible in favor of Schwarz Bayesian Criterion.

Table 4-3 reports the testing results for the Augmented Dickey-Fuller (ADF) and Phillips and Perron (P-P) tests under the unit root hypothesis (Null Hypothesis  $H_0$ ). The order or lag interval was determined based on minimum value of Akaike Information criterion (AIC) (Akaike, 1973) and Schwarz Bayesian Criterion (SBC) (Schwarz, 1978). The Null hypothesis should be rejected if the calculated statistic is smaller than the 5% level critical value following the critical value table of MacKinnon (1991). All values computed are MSE-index returns are stationary under the unit root test.

Table 4-3 The ADF and P-P value of unit root test of MSE-index returns

Item	ADF	Order	P-P	Order
None	-44.80553**	1	-63.96405**	1
Intercept	-45.02152**	1	-64.14719**	1
Trend and Intercept	-45.03188**	1	-64.15169**	1

Notes: \*\* 1% significance level.

Order is lag length was selected according to Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC)

### 4.3 Test of ARCH effect and Volatility asymmetry

Test of ARCH effect is to find out if there is any conditional heteroscedasticity (Engle, 1982) by conducting the squared residuals series. In the dissertation, the method to test ARCH effect is Lagrange Multiplier test of which procedure was suggested by Engle (1982). The null hypothesis is that coefficient values of q lags of squared residuals are not significantly different from zero. If the value of test statistic is greater than the critical value from the chi-square distribution with q degree of freedom, the null hypothesis can be rejected. That means the series has ARCH(q) effect. In the research, the ARCH test is conducted at 5 lags of squared residuals.

The diagnostic test including sign bias test (SBT), negative size bias test (NSBT), and positive size bias test (PSBT) is to find out if the conditional heteroskedasticity has any asymmetric effect (Engle and Ng, 1993). The three tests jointly run as Joint test (JT)  $TR^2$  for null hypothesis of no asymmetric effect. The null hypothesis can be rejected if the value of test statistic is greater than the critical value from the chi-square distribution with 3 degree of freedom.

Table 4-4 listed the result of ARCH test to find out if there is any heteroscedasticity (Engle, 1982) and diagnostic test to find out if the conditional heteroskedasticity has any asymmetric effect (Engle and Ng, 1993). It includes the result of ARCH test and diagnostic test (SBT, NSBT, PSBT, and JT). The value of ARCH (5) statistic test is much greater than its critical value of 7.82 at 5% significant level from chi-square distribution with 5 degree of freedom. Then the null hypothesis is confidently rejected. Although, the positive size bias test (PSBT) is less than its 5% level critical value but



the Joint test (JT) is much greater than its 5% critical value of 7.82 as chi-square distribution with 3 degree of freedom. Consequently, the null hypothesis is also justified to be rejected. Based on examination of ARCH test and asymmetric diagnostic test, the volatilities of MSE-index returns exhibit conditional heteroscedastical and asymmetry.

Table 4-4 The ARCH effect and volatility asymmetry test

Method	ARCH(5)	SBT	NSBT	PSBT	JT(3)
Value	307.7475**	-4.8086	-4.1626**	4.9246**	246.2635**
	(99.5344)	(3.8421)	(0.6422)	(0.5870)	(100.6215)

Notes: \*\* 1% significance level

\* 5% significance level

Numbers in parentheses are the standard errors of variables. ARCH denotes the Lagrange Multiplier test of Engle (1982), and the criterion is 7.82 at the 5% significant level. SBT, NSBT and PSBT denote the sign bias test, negative size bias test, and positive size bias test respectively, and the criterion is 2.353 at the 5% significant level. JT denotes the joint test, and the criterion is 7.82 at the 5% significant level.

#### 4.4 Empirical results

This section presents our empirical results. This investigation employed GJR-GARCH model to estimate the impact of political changes on stock market returns and volatilities during the sample period. The GJR-GARCH model to detect the impact political changes on stock returns, as follows:

$$R_t = a_0 + a_1D_1 + a_2D_2 + a_3D_3 + \sum_{i=1}^m b_iR_{t-i} + \varepsilon_t \quad (2)$$

of which:

$R_t$  stock return at t time

$R_{t-i}$ : stock return before t time i days

m: number of order autoregressive process

$D_1$  denotes the dummy of parliament sessions' effect, where  $D_1$  equals 1 during the parliament session period (the first session shall run from 5, April to 1, July, and second sessions from 1, October to 10, February in each year) and equals 0 otherwise.

$D_2$  denotes the dummy of political changes 2009. Therefore, the sample period is distinguished between pre-changes period ( $D_2$  equals 0) 9 February, 2001 – 17 June, 2009 and post-changes period, 18 June, 2009 - 9 June, 2012 ( $D_2$  equals 1).

$D_3$  denotes the dummy variables of interactive effects between parliament sessions ( $D_1$ ) and political changes ( $D_2$ ). It is computed by multiplying  $D_1$  by  $D_2$ .

The volatility of the GJR-GARCH model measured by the conditional variance  $h_t$  as below equation (4):

$$\ln h_t = \tau_0 + \tau_1 D_1 + \tau_2 D_2 + \tau_3 D_3 + \alpha \varepsilon_{t-1}^2 + \theta S_{t-1}^- \varepsilon_{t-1}^2 + \beta \ln h_{t-1} \quad (4)$$

Table 4-5 The Empirical Results of the GJR-GARCH Model

Variable		Return	Volatility
<i>Constant</i>		0.7602 (0.3946)	6.3584e-06** (2.9452e-07)
<i>The effect of parliament session 2001-2012 (D1)</i>		-0.5877 (0.1593)	-2.2914e-07** (1.3889e-07)
<i>The effect of political changes 2009 (D2)</i>		-0.0870 (1.0528)	-4.4999e-06** (3.6685e-07)
<i>Interactive effect (D3)</i>		-0.0747 (0.4763)	1.4753e-03** (1.0281e-07)
Coefficient	Estimation	Coefficient	Estimation
$\beta$	9.6525e-07** (6.1767e-07)	$\alpha$	2.7192e-05** (1.7553e-05)
$\theta$	3.6087e-05** (2.9310e-06)	$\nu D$	1.0592e+41** (5.4928e+46)
$b_1$	-0.2168** (5.9384e-03)	$b_2$	-0.0889** (6.0563e-03)
Model Diagnosis			
Q(6)	5.1553	Q(12)	18.2530
Q <sup>2</sup> (6)	5.1538	Q <sup>2</sup> (12)	18.2489

Notes: \*\* 1% significance level

\* 5% significance level

Numbers in parentheses are the standard errors of variables. Q(k) ( Q2(k)) is the Ljung-Box Q-statistic for the returns and squared returns lagged k trading days. Critical value at 5% significant level for k =6 is 0.5240, and for k=12 is 0.1082

The table 4-5 shows that coefficients of effects are negative and insignificant on MSE stock returns. However, the results show Mongolian politics have negative impact on Mongolian Stock Exchange.

During the sampling period, Mongolian political environment was seemed like very unstable. Two main political parties (Mongolian People's Party and Democratic Party) have very strong competition in parliament and president elections. Most powerful reason for that Democratic Party dominated from 2009 after long time ruling of MPRP (Mongolian People's Revolutionary Party). It leads to political instability. Table 4-6 reveals Mongolian political parties competition in presidential elections.

According to the constitution of Mongolia, the President shall be the head of State and embodiment of the unity of the Mongolian people. An indigenous citizen of Mongolia, who has attained the age of forty-five years and has permanently resided as a minimum for the last five years in Mongolia, shall be eligible for election to the post of president for a term of four years. Political parties which have obtained seats in the parliament shall nominate individually or collectively presidential candidates, one candidate per party or coalition of parties. The President can be re-elected only once.

Table 4-6 The results of Mongolian presidential elections

Year	Political party or coalition	Total votes received (by %)
1993	Coalition merged from MNDP and MSDP	57.7
	MPRP	38.7
1997	MPRP	60.8
	Coalition merged from MNDP and MSDP	29.8
	MTUP	6.6
2001	MPRP	58.1
	DP	36.5
	CWP	3.5
2005	MPRP	53
	DP	19.76
	RP	13.9
	MP	11.4
2009	DP	51.24
	MPRP	48,1
2013	DP	50.23
	MPP	41.97
	MPRP	6.5

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*Notes: MNDP and MSDP – Mongolian National Democratic Party and Mongolian Social Democratic party*

*MPRP – Mongolian People’s Revolutionary Party*

*MTUP – Mongolian Traditional United Party*

*DP – Democratic party*

*CWP – Civil Will Party*

*RP – Republican Party*

*MP – Motherland Party*

*MPP – Mongolian People’s Party*

Source: Info Mongolia (2013), Mongolian presidential elections, Retrieved from

<http://www.infomongolia.com/ct/ci/6100/138/The%20Presidents%20of%20Mongolia>

This particular situation may influence negatively on the correlation between stock market returns and politics.

Also, empirical findings show that coefficients of parliament session  $\tau_1$  (-2.2914e-07) and coefficient of political changes  $\tau_2$  (-4.4999e-06) are significantly negative at 1 % significant level on MSE stock volatility. And, coefficient of interactive effect  $\tau_3$  (1.4753e-03) is also significantly at 1 % significant level but it is illustrated positive impact on MSE stock volatility.

These results represent volatility of stock return on Mongolian stock market. During the sampling period, Mongolian parliament sessions has negatively associated with volatility of stock return before the political change in 2009. Since Democratic Party dominated, volatility of stock return has increasing in parliament sessions.

## CHAPTER FIVE

### CONCLUSION

This study examines the impact of politics on stock market returns and volatilities in case of Mongolia. Mongolian parliament sessions and political change (2009) were used to investigate the impacts on MSE stock returns and volatilities by employing the GJR-GARCH model from February 9, 2001 to June 9, 2012.

Politics is one of the important factors in business environment. Countries economics are managed by country's government, the different parties have different economic policies and agendas. From previous studies, the impact of negative political events and news are indeed more significant. It means politics factor significantly influences stock market. Especially, political uncertainty and instability make impact on investor's decision making.

Our investigation found that an evidence of Mongolian politics has impact on Mongolian stock market. Due to our objective, first we found MSE stock returns are insignificantly related to political change and parliament sessions. Also, MSE stock returns have insignificantly relation with interactive effects between parliament sessions and political change. Perhaps, the Mongolian Stock Exchange is inefficient with Mongolian politics. However, we found that existence of politics effect on MSE volatilities secondly. Mongolian parliament sessions and political change are negatively and significant correlated with daily stock volatility. Furthermore, interactive effect is significant correlated with MSE stock volatility. It presents that volatility of MSE stock return was more stable in the parliament sessions before political change in 2009. After transition of ruling party, volatility of MSE stock return decreased. But it increases in the parliament session. May, it relates with political instable environment.

The results of our investigations may help the decision making of investors' in Mongolian stock market. Also, our findings tend to support previous literatures about the relationship between the politics and stock market return volatility.

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