Erasmus University Rotterdam

Erasmus School of Economics

Bachelor Thesis Financial Economics

The relation between stock returns and default risk:

Examining in KOSPI market

Author: Seihee Kim, 482334

Thesis supervisor: Dr. Sebastian Pfeil

Second assessor: Dr. Ruben de Bliek

Date: 15.07.2019

Abstract

The general relation between the stock returns and its default risk is positive – people require higher returns to endure higher risk of default. However, Chava and Purnanandam (2010) show that there is an anomalous negative relation between stock returns and default risk in post-1980s in the US stock market. To extend the empirical research of Chava and Purnanandam's findings regarding the Asian stock market, the relation between stock returns and default risk in KOSPI market (Korea Composite Stock Price Index) has been analysed. The average KOSPI returns have a significant positive relation to default risk measured as South Korean 5 years sovereign credit default swap (CDS) spreads. Meanwhile, some assorted stocks returns which are exposed to North Korea is shown to have a negative relation to default risk, but the coefficient is insignificant to be accepted.

1. Introduction

Investigating the relation between stock returns and default risk has raised a considerable interest. Classical Asset Pricing Model (CAPM) assumes that investors should be compensated by high risk premium to bear risk of stocks if default risk is systematic (Sharpe, 1964). However, the findings of Chava and Purnanandam (2010) show there is a negative relation between US stock returns and its default risk in the decade of 1980s. Why does such results occur? Seemingly, this negative relation is caused by market inefficiency, but the reason that even some rational investors could not arbitrage in that period is still in doubt (Chava & Purnanandam, 2010). Therefore, intensive analysis is required to verify the actual relationship between stock returns and default risk since the gap between the theory and empirical findings occurs.

Meanwhile, most of major financial studies are conducted in US and European countries but not that much in Asian stock markets except some of big stock markets such as Nikkei from Japan, Shanghai Composite Index from China, and Hang Seng China Enterprises Index from Hong Kong. KOSPI, a South Korean stock index, is the 15th largest stock market in the world with respect to the aggregate market capitalization as of April, 2019, but a few academic researches to KOSPI market are recognized externally. It is important to observe the KOSPI market because it has a special kind of stocks – stocks with exposure to North Korea. As well known, South Korea and North Korea are in a state of truce, so the existence of this kind of stocks seems abnormal and interesting. It indicates some stocks issued by companies which are closely related to North Korea in producing and selling goods and services. For instance, South Korean government has supported North Korea with fertilizers as an aid project to encourage their agricultural industry. In this regard, several chemical fertilizer manufacturing companies are engaged and supported by government to produce goods for North Korean farmers. The other example is, some South Korean firms have their factories in certain North Korean region. Gaesong Industrial Complex, which was established in 2000 as a way to improve South and North Korean economic cooperation, is still one of the most representative symbols of active engagement of the inter-Korean collaboration. The companies relevant to these business are therefore highly sensitive to the international atmosphere related to North Korea. Some corporates would not be able to sell their products any more, and some other companies would not be able to produce their goods if South and North Korea stop to interact each other because of certain risky political issues. Indeed, these days, North Korea has threaten the neighbor countries by developing nuclear weapons, while strengthen their dictatorship through a hereditary succession of three generations. South Korea is the main opponent and at the same time the closest neighbor country to North Korea. In this regard, geopolitical tensions in the Korean Peninsula fluctuates largely even to the small action by North Korea. Therefore, the stocks issued by companies which are operating their own business towards North Korea

have high risk. In South Korea, investors who are risk loving prefer those stocks portfolios since they believe they will also have high returns, as indicated by CAPM. However, it seems that the theory is not applied well on those stocks. It is because the outcomes are frequent, that the stock returns with exposure to North Korea plunge when their default risks increase. These interesting features of stocks are not have been dealt with academic researches, so it is meaningful to observe it to extend what Chava and Purnanandam (2010) find. They infer the causes of the anomaly as poor credit rating as a negative information events (Avramov, Chordia, Jostova & Philipov, 2006; Elton, 1999), and the revision of bankruptcy law in 1970s and growth of institutional investors (Chava & Purnanandam, 2010). In light of the fact that South Korean stocks which are exposed to North Korea tend to be small-size and low graded in corporate credit ratings, it corresponds to the assumptions that the negative anomaly may exists.

In an attempt to figure out the relation between stock returns and default risk in KOSPI market, two separate hypotheses and two separate models for each hypothesis are constructed in this paper. The first hypothesis describes the relation between the general stock returns of KOSPI and its default risk as positive. In order to test the first hypothesis, 5 years sovereign bond credit default swap (CDS) spreads of South Korea is used as a proxy for KOSPI default risk. By running a regression model with the variable CDS premium of South Korea as an independent variable and the variable KOSPI stock returns as a dependent variable, a significant positive relation is observed. Meanwhile, some another strong relationships towards stock returns of KOSPI are found by control variables. Stock returns of US stocks has a strong positive relation to KOSPI stock returns, while book-to-market equity (BE/ME) is shown to have a significant negative relation to stock returns of KOSPI market. Finally, earnings to price ratio is positively related to stock returns of KOSPI.

The second hypothesis aims to find out whether the aforementioned anomaly exists in KOSPI market. South Korean stocks with Exposure to North Korea (SKENK) are selected to be analysed since they have a special characteristics. The second hypothesis is constructed to argue that there is a negative relation between stock returns of SKENK and its default risk. To examine it, risk events are deemed as proxy for default risk of stocks. Risk events are measured by accessing local South Korean political news articles which imply how risky SKENK is. The results of the regression model for the second hypothesis show that stock returns of SKENK and default risk are not significantly related.

The rest of the paper is organized as follows. Section 2 reviews relevant previous literatures and develops the main hypotheses for this research. Collected data and methodologies applied on the tests which aim to verify the validity of hypotheses will be described in section 3. Section 4 will provide and interpret the results from the regression models. In section 5, a brief summary of the findings in this paper will suggested as a conclusion. Moreover, implications and limitations of the paper will be discussed.

2. Theoretical background and Hypothesis development

2.1. Stock returns

As stock returns are one of the primary interest in stock investment, numerous studies have been conducted in order to figure out financial factors that related to stock returns. Sharpe (1964), Lintner (1965), and Black (1972) established the fundamental idea of the relation between average stock returns and risk factors through the Asset-Pricing model. Fama and French (1992) show the two variables, size of firms and book-to-market equity, are outstanding to capture the cross sectional average stock returns. Stocks which have high sensitivity to liquidity are likely to have higher returns than stocks with low sensitivity, whilst a liquidity risk factor is associated to a momentum strategy (Pastor & Stambaugh, 2003). Stock returns have shown various anomalies, and many scholars try to explain those anomalies. For instance, Fama (1981) explains the anomalous negative relation between US stock returns and inflation during the post-1953 period. Real stock returns have a positive relation to real activity, and real activity is negatively related to inflation. French (1980) finds out the Weekend effect, that the expected returns on Mondays are three times higher than the rest days of the week. Seasonal stock returns anomalies also exist, and they indicate that on January comparing to the remaining months, the daily abnormal return distribution shows large means. Along with the January effect, size anomalies are observed as there is a significant negative relation between abnormal returns and size of firms (Keim, 1983). However, still many correlated factors to stock returns remain undiscovered, it is hard to explain stock returns perfectly.

2.2. Default risk

Default occurs when a firm fails to meet interest bearing liabilities obligations (Vassalou & Xing, 2004). High default risk companies pay out their investors higher interest spreads because in the incident of default, debt holders are repaid first and equity holders last. So higher the default risk, the more equity holders will demand from the company. Firm distress risk factors such as firm size and book-to-market equity are significantly correlated to the stock returns (Fama & French, 1993). Vassalou and Xing (2004) also confirm that size and book-to-market characteristics are highly related to the default risk of firms. Smaller firms are likely to have much higher default risk than bigger firms, and value stocks which have high book-to-market equity have much higher default risk than growth stocks which have low book-to-market equity. However, the size effect and book-to-market effect only occur within the highest default risk quintiles (Vassalou & Xing, 2004). This implies that the level of default risk is important to determine the size of the effects. Meanwhile, return volatility has significant positive

effect to risk premium (Chava & Purnanandam, 2010).

Whether default risk is systematic has led to controversies. Denis and Denis (1995) argue that default risk is primarily related to macroeconomic factors and regulatory developments. Vassalou and Xing (2004) find out default risk varies with the business cycle. On the other hand, Opler and Titman (1994) insist that factor that drives financial distress is not clear, so it is idiosyncratic rather than systematic. Though it is helpful to value firm debt and derivative products when establishing and analysing default risk model. To measure default risk, Chava and Purnanandam (2010) use three methods – hazard rate model, option-pricing based model and leverage-sigma model. Hazard rate model uses historical default information and calculates a maximum likelihood estimate of default. Applying the option-pricing based model, which is in other words distance-to-default model, Expected Default Frequency is computed and to do this, the estimation of the market value of firms and assets volatility are required. As hazard rate model needs historical default data, the distance-to-default model is better to apply if it is hard to obtain relevant historical data. The last model is leverage-sigma model, which contains a simple sorting process. Based on information of leverage and equity return volatility of firms, the likelihood of default can be obtained.

Credit Default Swap (CDS) is one of the most representative measures to detect default risk. It indicates a financial swap agreement that the seller insures to compensate the buyer in the case of debt default. Most CDSs require premium payment to retain contract, so this premium can be a measure of the likelihood of default. For instance, if CDS premium decreases, it implies lower cost in issuing securities because of decreased default risk. Generally, the expected market risk premium is positively related to the forecastable volatility of stock returns (French, Schwert & Stambaugh, 1987). On the other hand, if unexpected change in the volatility of stock returns occurs, the stock returns are negatively affected by it. The purpose of CDS is that it allows the trading of default risk solely from sources of uncertainty (Ericsson, Jacobs & Oviedo, 2009). It is crucial to note that credit risk does not disappear entirely, but instead it is just transferred to the CDS seller. It implies that when the borrower of investment defaults, the CDS seller also defaults. Therefore this can cause credit crisis as 2008 financial crisis had shown: one of the CDS seller Lehman Brothers went bankrupted as their CDS obligations defaulted (Zingales, 2008). Meanwhile, CDS is the most common form of credit derivative which are highly determined by stock's volatility and leverage. Credit Default Swap Index (CDX), which is a financial instrument consists of credit derivatives, is examined every six months and replaced with new securities. Credit rating agencies (CRA) such as Moody's, Standard & Poor's, and Fitch rate the likelihood of default and creditworthiness of debt obligations of borrowers.

Taly (2015) discovered that there are significant return and volatility spillover effects between South Korean CDS market and the Korean stock market. It implies that sovereign CDS premium can be used to measure default risk of KOSPI stocks.

2.3. Anomalies in the relation between stock returns and default risk

It is widely accepted that higher-risk assets should be compensated with higher expected returns. In efficient markets, it should be held to maintain the investment decision and asset pricing framework (Avramov, Chordia, Jostova & Philipov, 2009). Surprisingly, this principal of risk-return tradeoff does not seem to be held in real market as several empirically studies show. Dichev (1998) shows that empirical findings since the post 1980 periods, firms with high bankruptcy risk earn lower returns than average. He concludes this phenomenon as an anomaly, and firm size and book-to-market equity, which are the main firm distress risk factors, are unlikely to be related to bankruptcy risk. Griffin and Lemmon (2002) concluded that firms with high distress risks reveal larger return reversals. These firms with high credit risk tend to have low book-to-market equitys and it may lead to mispricing. Avramov, Chordia, Jostova, and Philipov (2009) confirm that high credit risk stocks earn lower returns than low credit risk stocks on average. They analyse the causal effect of this phenomenon, which is about credit rating downgrades. If distress risk is idiosyncratic, then there should be no difference of stock returns between high and low credit risk stocks. However when around downgrades, stocks from poor rated corporates face to significant price decreases and deterioration of their assets. Therefore, it is more likely to default when the firms with high risk are downgraded comparing to the firms with low risk (Avramov, Chordia, Jostova & Philipov, 2009). Meanwhile, Vassalou and Xing (2004) find that firms with high default risk earn higher returns than firms with low default risk only to the extent when they are small and have high book-to-market equity.

2.4. Characteristics of the KOSPI market

KOSPI, an abbreviation of Korea Composite Stock Price Index, stands for a capitalization-weighted index of all common stock traded on the Korea Exchange market which is one of the representative stock market index in South Korea (Bloomberg, 2019). Total size of capitalization of KOSPI is about 1 trillion 236 billion US dollar (which is 1461 trillion Korean won). The largest corporates in KOSPI in terms of market capitalization are Samsung Electronics, SK Hynix, Hyundai Motor Company, preferred stock of Samsung Electronics, Celltrion, LG Chem Ltd., Shinhan Financial Group, POSCO, Hyundai Mobis, and LG Household & Health Care (Korea Futures Exchange, 2019). KOSPI was developed with a base value of 100 as of January 4th, 1980, so to obtain a right market capitalization of a current period, the formula below should be computed.

$$\text{KOSPI} = \frac{Current\ value\ of\ market\ capitalization}{Base\ point\ value\ of\ market\ capitalization} \times 100$$

The restriction of price range of the KOSPI market is 30% above and below. KOSPI has its futures market - KOSPI 200, which is one of the most actively traded index futures including major 200

corporates in KOSPI, to hold the representativeness of the market. Current KOSPI is a capitalization-weighted index designated in 1983. Before then, it was calculated by the method of Dow-style adjusted price-weighted average, but it faced some criticism that the method does not reflect stock prices of newly listed companies as the Korean economy had grown. The new index Korea composite index was launched in 1972 and had been used until early 1980s, but it also had been modified several times later. Therefore, it is hard to verify how the actual level of stock price was at that period.

Meanwhile, many Korean domestic reports were conducted to clarify which factors affect KOSPI change. According to Weekly KDB Report issued as of January 29th, 2018, it has been proved that the relation between Korean won appreciation and increase of liquidity has weakened since 2009, after global financial crisis. Theoretically, when KOSPI is in rising trend, both internal and external economies recover and business performance of domestic companies improves and these lead to appreciation of Korean won. If so, foreign investment increases because the investors are on the lookout to make foreign exchange profit and this increase implies liquidity growth in domestic stock market. What the report points out is that this causal effect has weakened, and also the sequent reversal phenomenon that Korean won appreciation may affect the export-oriented domestic company negatively should be taken into account. Deficit that the export-oriented company may suffer will lead to depreciation of KOSPI (KDB Bank, 2018).

Since KOSPI market is the representative and general stock market in South Korea, the general positive relation between stock returns and default risk may appear. Therefore, the first hypothesis is developed as follows:

Hypothesis 1: A positive relation between KOSPI stock returns and its default risk may exist.

2.5. Stock returns relations between KOSPI and US stock markets

US stock market is much larger than KOSPI market, and while US stock market is mature, KOSPI market is emerging. Therefore, two stock markets may well have quite different characteristics each other. The main distinction is the influence of top large companies in the stock index. Top 10 of KOSPI 200 firms were 49.13% while that of S&P 500 was 22.82% as of June 2004 (Jung, Chae, Yang & Moon, 2006). It implies that the stock returns of KOSPI 200 is more volatile to the impact of a few largest companies. On one hand, Jung, Chae, Yang and Moon (2006) also find out that KOSPI is highly correlated with the foreign stock markets especially US stock market. They draw this finding based on the fact that majority of KOSPI stocks of top companies are possessed and a huge part of market liquidity is supplied by foreign investors. Also, under globalization, a few financially developed

countries influence world stock markets to a great extent. In this regard, almost all of the stock markets in the world are synchronized towards US stock market (Jung, Chae, Yang & Moon, 2006). Kwon (2017) observed the strong correlation between two separate markets, KOSPI and NASDAQ, in practice. Taly (2015) describes the significant return spillover effects from US stock market to the KOSPI market. Therefore, it can be presupposed that KOSPI stock returns also have a positive relationship with the default risk as Chava and Purnanandam (2010) show with US stock market data.

2.6. South Korean stocks exposed to North Korea (Daebuk-ju)

Some South Korean stocks are exposed to North Korea mainly in construction, tourism, and economic cooperative industries between South and North Korea. These stocks are called 'Daebuk-ju' in Korean, but actually it is not an official term. From now on, in the remaining part, this paper will call it SKENK as an abbreviation. Some of these stocks are included in KOSPI, and the rest of them are belong to KOSDAQ (Korea Securities Dealers Automated Quotation) index. KOSDAQ is a capitalization-weighted stock index which benchmarked US NASDAQ. KOSDAQ is regarded as a second largest stock market in Korea, has high turnover ratio and it mainly consists of venture companies.

Representative SKENK is divided into several sectors: stocks related to Gaeseong Industrial Complex, stocks related to power transmission to North Korea, stocks related to fertilizer aid to North Korea, stocks related to tourism towards North Korea, stocks related to construction of Eurasia Railroad, stocks related to DMZ (Demilitarized Zone), stocks related to gas pipe towards North Korea and Russia, and stocks related to cement production and engineering construction.

2.7. Default risk of SKENK

These unique stocks are idiosyncratic when taking account of the default risk of normal KOSPI stocks. South Korean stocks which are with exposure to North Korea are indeed influenced a lot by the existing state of international affairs of North Korea. Stock prices of South Korean firms exposed to North Korea plunged when North Korea suspended nuclear talks with the US government in March, 2019 (Lee, 2019). Meanwhile, defense-related stocks in South Korean and Japan surged. On the other hand, shares of South Korean tourism and construction with exposure to North Korea jumped when South Korean President and US President were planning to have official talks (Park & Choi, 2019). Like this, these idiosyncratic stock returns are heavily fluctuated by the international situation, therefore high default risk follows.

A noteworthy feature of SKENK is that it is mainly invested to earn short-term arbitrage. Accordingly, the volatility of SKENK is high since investors buy it when they expect the stock returns to increase while sell it right away if they realize arbitrage profit. The volatility of SKENK depends on the news or announcements which are associated to North Korea largely.

2.8. High default risk of SKENK and its stock returns

The main finding that Chava and Purnanandam (2010) focus on the negative relation between the US stock returns and their default risk in 1980s. They assume that the reason for such unexpected anomaly attributes to the credit ratings of firms. In the post-1984 period, firms which got poor credit rating were related to anomalistic underperformance (Avramov, Chordia, Jostova & Philipov, 2006), and this can be interpreted as the perception that rating downgrades' connotation with negative information events (Elton, 1999). In addition, the revision of bankruptcy law in 1970s and growth of institutional investors who seek safer stocks is another possible reason caused the negative returns anomaly (Chava & Purnanandam, 2010). Unlike normal stocks, SKENK has high default risk which depends on international affairs heavily. Meanwhile, the companies related to SKENK tend to be small and with low credit ratings, because in practice many small and medium-sized enterprise are involved in South-North economic cooperation due to the merits of the South Korean subsidies. Therefore, the special characteristics of the companies related to SKENK can be affected by the aforementioned anomaly which indicates even though with high default risk, it cannot be compensated with high returns.

In this regard, the second hypothesis is developed as follows:

Hypothesis 2 : A negative relation between stock returns of South Korean stocks with exposure to North Korea and default risk may exist.

3. Data and Methodology

To examine the two hypotheses mentioned above, two separate models are built. The first model is to verify hypothesis 1, which is about the relation between KOSPI stock returns and its default risk. Hypothesis 1 is constructed based on the result of Chava and Purnanandam (2010) that normally the relation between the two variables is indeed positive as the theory proposes. On the other hand, the

second model is to test hypothesis 2, South Korean stocks which are exposed to North Korea have negative relation between their stock returns and default risks as long as they are highly related to non-financial factors. The two models require different statistical analyses, since the dependent variable of model 1 is an average stock returns of KOSPI, while five specific stock constituents of KOSPI and KOSDAQ composes the dependent variable of model 2. Therefore, OLS regression model with robustness analysis is applied on model 1 and Panel data analysis as well as OLS regression are used for model 2.

3.1. Models, data collection and sample – The first hypothesis

The first hypothesis concentrates on the relation between KOSPI stock returns and its default risk. To test the first hypothesis, robust regression model is conducted to the realized total stock returns as a dependent variable and sovereign CDS premiums as an independent variable accounting for other control variables. For the dependent variable, weekly data of average KOSPI stock return for recent 10 years from January 2009 to December 2018 are used and collected from Bloomberg database. The period has been set from 2009 to 2018 to exclude the effects of 2008 financial crisis in which period are correlated to another various financial factors. Expected anomalies of during the period of financial crisis are hard to interpret, so the periods after financial crisis are selected. To make a sample size large enough, a total of 522 observations data points are collected. The gained stock return data is in a percentage form, so the range of the value of the stock return is wide; ranging from less than -3 to more than 166.

As for the independent variable, South Korean 5 years sovereign CDS spreads are collected as a proxy for default risk of KOSPI for the corresponding period. Since KOSPI stock returns are the most representative Korean stock market index containing 783 securities as of June 2019, high correlation with the Korean sovereign bonds can be expected as previously performed studies reveal (Lenciauskaitė, 2012). To avoid omitted variable bias, control variables stock returns of US, book-to-market equity, and earnings to price ratio of the corresponding period are added.

As aforementioned in section 2.5., KOSPI stock returns are highly related to the US stock returns, so the weekly S&P 500 stock returns is included as an explanatory variable. The relevant data is collected in a percentage form from Bloomberg. Variable book-to-market equity (BE/ME) is introduced from the method of Three Factor Model by Fama and French (1992), and it is selected since it has been proved that it has a strong explanatory power with respect to average stock returns. Earnings to price ratio (E/P) is also added as a control variable to reduce omitted variable bias even though Fama and French (1992) confirm that the influence of E/P is likely to be absorbed by the combination of size and book-to-market equity factors. Weekly data of book-to-market equity of KOSPI and earnings to

price ratio are gathered through Datastream.

In this regard, the linear regression model 1 is formed as below:

$$Stock\ Returns\_KOSPI_t = \alpha + \beta_1 \times KOR5yrsCDS_t + \beta_2 \times Stock\ Returns\_S\&P500_t + \beta_3 \times BE/ME_t + \beta_4 \times E/P_t + \varepsilon_t$$

3.2. Models, data collection and sample – The second hypothesis

The second model aims to verify whether there is any significant relation between stock returns of SKENK (South Korean stock with Exposure to North Korea) and its default risks, based on the aforementioned second hypothesis which insists a negative relation might exist between two variables. To test the model, 30 specific company stocks constituents which correspond to SKENK are selected (Table 1, Appendix A). Among them, five companies are selected randomly as samples (Table 2, Appendix A). The reason why only five companies are selected among thirty companies is because the data set is too large to be analysed since the number of observation would be more than 15,660. As a dependent variable, each stock returns of SKENK are collected weekly for recent 3 years from January 2016 to December 2018. The total number of observation is 780. The relevant data are collected from Bloomberg.

To measure default risks of each stock, it is impossible to collect CDS premium of each selected company or credit ratings which could be direct proxies for default risk. It is because the chosen companies do not have any relevant information published since they are too small companies to retain regular credit rating inspection. Therefore, another method to measure default risk is devised. An peaceful relationship of North Korea towards neighbor countries, especially South Korea and US, affects stock risks of SKENK greatly. By accessing all of daily political and economic relevant local news articles in South Korea for the period from 2016 to 2018, a timeline is formed which indicates when the international political issues around North Korea occurred (Table 3, Appendix A). The news articles are collected through various South Korean major press companies. To evaluate how risky that SKENK may default, timeline analyses the major risky issues occurred between North Korea and South Korea. When the news articles which describe diplomatic and political tensions between North and South Korea, the period is regarded as risky to SKENK returns. On the other hand, if the news illustrate cooperation and reconciliation between the two Koreas, the period is considered to be a low-risk period, a peaceful moment to proceed a local business toward North Korea. Based on this timeline, a variable 'Risk Events' is organized as a dummy variable. If geopolitical risk is relatively low and cooperation between North Korea and South Korea is enhanced, the period is recorded as 'low', which implies the default risk is low. In contrast, if geopolitical risk in the Korean Peninsula is increasing because of

provocation of North Korea towards neighbor countries with regards to nuclear test and missile test, Risk Events gets value 'high' in that period. This data is presented as weekly data to be appropriately to compare with other variables, that represent and synthesize the propensity of geopolitical risk issue of the corresponding week. When running OLS regression for this model, 'low' is translated to 0, and 'high' is translated to 1. The interpretation of this variable focuses on the effect of high risk events occurrence to the stock returns of SKENK.

As control variables for model 2, book-to-market equity and volatility of each stock are added. Contrary to the first model, earnings to price ratio is excluded because the five sample companies do not offer official data of price to earnings ratio weekly in this period, so this will be a limitation of this model. Instead, a variable Volatility is included to help to explain stock returns. Lastly, stock returns of KOSPI is added to increase explanatory power of this model, since overall performances of KOSPI affects stock performances of SKENK a lot. All relevant data for the control variables are collected from Datastream, for the period from January 2016 to December 2018 also.

The regression model 2 is formulated as below:

$$Stock\ Returns_t\_SKENK = \alpha + \beta_1 \times Risk\ Events_t + \beta_2 \times Stock\ Returns\_KOSPI_t + \beta_3 \times BE/ME_t + \beta_4 \times Volatility_t + \varepsilon_t$$

4. Results and Interpretation

4.1. Descriptive results

To regress the formulated model properly, tests for heteroskedasticity and Variance Influence Factor (VIF) are conducted. According to the Breusch-Pagan test conducted on the regression model, strong heteroskedasticity is observed, so robust regression model is adopted. The observed variance influence factor of each independent variables are relatively moderate (Table 4, Appendix A).

Descriptive statistic results for model 1 are shown in table 1. It indicates that the average KOSPI stock return is 91.33%, which implies that normally the average KOSPI stocks have a good performance. Comparing to the average stock returns of S&P 500 index, the mean of stock returns of KOSPI is lower than the mean of S&P 500's. Even though KOSPI consists of more stocks than S&P 500, its standard deviation is smaller than S&P 500's. This may attribute to that the size of firms in KOSPI is smaller than the size of firms in S&P 500. Credit default swap spreads of South Korean

sovereign bond is 2.96% on average, with a minimum value of 1.24% to a maximum value of 4.97%. Current credit rating that South Korea got from Standard and Poor's on 2019 is AA, which implies South Korea has a stable financial status. The maximum value of 4.97% is recorded on October 2009, which period had affected from the global financial crisis 2008 greatly. The average book-to-market equity and earnings to price ratio of KOSPI are 0.79 and 0.036 each respectively in the aforementioned period. The information imply that KOSPI stocks are overvalued in average (0.79 < 1), while they are expected to have higher-than-average growth in earnings considering the low earnings to price ratio.

Table 1

Descriptive statistics of model 1.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Stock returns_KOSPI	522	91.33117	32.81322	-4.23	166.794
KOR 5yrs CDS spreads	522	2.956036	1.033403	1.235	4.973
Stock returns_S&P500	522	130.2411	86.7005	-21.182	312.815
BE/ME	522	0.7933123	.01169678	0.5636943	1.22142
E/P	522	0.0358997	0.0122021	0.0082322	0.0672277

In model 2, heteroskedasticity test is performed and the result indicates relatively strong heteroskedasticity exists. To rectify it, robust regression is conducted. According to the VIF test, there are weak influences among each explanatory variable (Table 5, Appendix A). Meanwhile, panel data analysis is introduced to verify whether the risk events affect stock returns of SKENK.

Table 2 shows descriptive statistics results of model 2. The average stock returns of five companies which are related to SKENK is much lower than the stock returns of KOSPI since the mean value is approximately 0.2%, while the mean of KOSPI returns is 91.33%. Such low average stock returns of SKENK attributes to the big gap between whole stock returns value, as the minimum value is -78.45%, while the maximum value is 117.95%. Comparing to the stock returns of KOSPI, the minimum value is 83.6%. This huge gap between stock returns of SKENK is assumed to originate from the high volatility of SKENK, because it is affected from investors' expectations and international political tensions heavily. The average book-to-market equity is 1.349 with the minimum value of 0.115 and the maximum value of 20. These results indicates that overall stocks are undervalued (1 < 1.349), but some stocks are highly overvalued (0.115 < 1), while others are largely undervalued (1 < 20). Stock price volatility of SKENK is 0.58 on average.

Table 2

Descriptive statistics of model 2.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Stock returns_SKENK	780	0.2024526	10.21682	-78.45304	117.9487
Risk Events	780	0.4807692	0.4999506	0	1
Stock returns_KOSPI	780	125.2263	23.24986	83.595	166.794
BE/ME	780	1.348219	2.030828	0.1142857	20
Volatility	780	0.5791332	0.256985	0.3178	1.1734

Panel data analysis shows the stock returns change across companies vary over time in relatively same directions (Graph 1, Appendix B). This proves that when risk events occur, they give significant effects to stock returns of SKENK.

4.2. Regression results

For model 1, four different sub-models were conducted in order to figure out whether any significant effects from adding control variables is observed. Table 3 provides the result. Model 1-a is a regression model which contains only the independent variable of interest to the dependent variable. In model 1-b, 1-c, and 1-d, additional control variables are included gradually to examine the robustness of the independent variable.

Table 3 indicates the results of the robust regression for model 1. In model 1-a, South Korean sovereign 5 years bond CDS premium as a proxy for default risk has a negative coefficient at a significance level of 1%. Even though the outcome is statistically significant, the explanatory power represented by the R^2 value is relatively lower than another models. Also, since the coefficient value of CDS premium changes a lot when the additional control variables are included, it can be presumed that there is a strong omitted variable bias in model 1-a. The highest value of R^2 is shown at model 1-d, which contains three control variables – stock returns of S&P 500, book-to-market equity, and earnings to price ratio. To look model 1-b over, the variable stock returns of S&P 500 is added, and it causes the coefficient change of CDS premium into positive. A positive coefficient of CDS spreads is worth notice since it is valid at significant level of 1% in all other models – model 1-b, 1-c and 1-d which have high R^2 level. It means that the coefficients of the explanatory variables are true with 95% confidence level. To interpret the model, if South Korean sovereign 5 years bond CDS spreads rises by 1%, then the stock returns of KOSPI increases by 5.55%. If the stock returns of S&P 500 increases by 1%, it causes stock returns of KOSPI increases by 0.39%. On the other hand, when book-to-market equity goes up by 1 %,

KOSPI stock returns decreases by 37.49%. Finally, an 1% increase of earnings to price ratio leads 231% increase of KOSPI stock returns. Indeed, this robust regression test shows that stock returns of KOSPI is positively related to default risks at a 1% significant level. Therefore, according to this result, the first hypothesis 'A positive relation between KOSPI stock returns and its default risk may exist' is accepted.

Table 3

Results of the Robust regression for model 1 with Stock Returns of KOSPI as dependent variable

Variable	Model 1-a	Model 1-b	Model 1-c	Model 1-d
KOR 5yrs CDS spreads	-21.97877***	4.00919***	5.193897***	5.55047***
	(0.000)	(0.000)	(0.000)	(0.000)
Stock returns_S&P500		0.3756626***	0.3587302***	0.3858437***
		(0.000)	(0.000)	(0.000)
BE/ME			-32.98656***	-37.49225***
			(0.000)	(0.000)
E/P				231.303**
				(0.026)
Constant	156.3012***	30.55314***	55.42505***	46.11043***
	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.4791	0.7945	0.8022	0.8041

**p < 0.05 significance levels based on two-tailed tests.

***p < 0.01 significance levels based on two-tailed tests.

Meanwhile, table 4 displays statistical results for model 2. This time again there are four sub-models conducted to verify whether the independent variable is robust or not. Model 2-a consists of the independent variable only. Variable Risk events as a proxy for default risk has a negative coefficient value which is significant at a 1% significance level. However, the outcome of R^2 is too low to accept this model. Model 2-b, 2-c and 2-d contain extra explanatory variables to improve R^2 and it indeed improves when more variables are added, however, still at a low level. The level of R^2 less than 0.02 indicates less than approximately 2% of observed variation can be explained by the model. Risk events has a negative coefficient for all models, but it is only significant at model 2-a. To interpret model 2-d which has the highest R^2 among the models, if risk events as a proxy for default risk occurs, stock returns of SKENK decreases 1.21%. However, it is insignificant at a 5% significance level. To interpret the relation between control variables and the dependent variable, when the stock returns of KOSPI increases by 1%, stock returns of SKENK increases by 0.02%, but this is also insignificant at a 5%

significance level. Book-to-market equity has a negative relation towards the stock returns of SKENK, that if BE/ME rises by 1%, the stock returns of SKENK decreases by 0.32% with a significance at a 10% level. If volatility of the stock price of SKENK increases by 1, then the stock returns of SKENK tends to decrease by 1.82%, but this coefficient is insignificant at a 5% significance level. Overall, the outcome of the regression for model 2 is invalid at 95% significance level, so it is hard to conclude that a negative relation between stock returns of SKENK and default risk may exist. Therefore, the second hypothesis is rejected.

Table 4

Results of the Robust regression for model 2 with Stock Returns of SKENK as dependent variable

Variable	Model 2-a	Model 2-b	Model 2-c	Model 2-d
Risk Events	-1.994045***	-1.235431	-1.160244	-1.213244
	(0.006)	(0.141)	(0.167)	(0.143)
Stock returns_KOSPI		0.0246232	0.0179182	0.0198431
		(0.205)	(0.350)	(0.324)
BE/ME			-0.4055468**	-0.3233407*
			(0.016)	(0.066)
Volatility				-1.822795
				(0.295)
Constant	1.161128	-2.287064	-0.9368046	-0.2075564
	(0.044)**	(0.398)	(0.727)	(0.932)
R^2	0.0095	0.0113	0.0175	0.0193

*p < 0.10 significance levels based on two-tailed tests.

**p < 0.05 significance levels based on two-tailed tests.

***p < 0.01 significance levels based on two-tailed tests.

5. Conclusion

The aim of this paper is to analyse the relationship between stock returns and default risk in KOSPI (Korea Composite Stock Price Index) market. Based on the findings of Chava and Purnanandam (2010), this paper aims to extend empirical evidences to verify the actual relationship between stock

returns and default risk to another global stock market. Chava and Purnanandam find a negative relation between the US stock returns and default risk for the specific period in the decade of 1980, while a positive relationship exists between the overall US stock returns for the period from 1950s to pre-1980s. To find out whether this anomaly of negative relation also exists in KOSPI market, two separate hypotheses and two separate models for each hypothesis are constructed. The first hypothesis which focuses on the relation between the general stock returns of KOSPI and its default risk assumes a positive relation. Model 1, which aims to verify the validity of hypothesis 1 confirms that there is a significant positive relation between the stock returns of KOSPI and its default risk. This reinforces what Chava and Purnanandam find in their previous work. In model 1, 5 years sovereign bond credit default swap spreads of South Korea is used as a proxy for KOSPI default risk. The proxy is drawn up based on the fact that KOSPI market is the most representative stock market in South Korea, and sovereign CDS premium is highly related to overall stock returns of the country's representative stock market. Some another strong relationships towards stock returns of KOSPI are found by control variables in model 1, too. Stock returns of US stock index, especially S&P 500, has a strong positive relation to KOSPI stock returns. On the other hand, book-to-market equity (BE/ME) is shown to have a significant negative relation to stock returns of KOSPI market. Finally, earnings to price ratio is positively related to stock returns of KOSPI.

The purpose of the second hypothesis is to find out whether the aforementioned anomaly exists in KOSPI market. This time, a specific kind of stocks, SKENK (South Korean stock with Exposure to North Korea) is subject to the analysis since it has special characteristics. SKENK is highly affected to issues related to international political situations towards to North Korea, and it highly fluctuates when exposed to changes in geopolitical risks in the Korean Peninsula. Meanwhile, the companies which issue SKENK are mostly small and medium-size firms which are likely to achieve low credit ratings. Indeed, samples of companies that are picked to create model 2 have low credit rates. Based on this, hypothesis 2 is constructed to argue that there would be a negative relation between stock returns of SKENK and its default risk. In model 2, risk events are counted as proxy for default risk of stocks. Risk events are measured by accessing local South Korean news articles for the period from January 2016 to December 2018, and especially political and economic news are analysed to examine how risky that SKNEK may default. Regarding to the risky news, default risk of SKENK is counted as 'high' when the geopolitical risks arise, while regarded as 'low' when the news articles describe cooperation and reconciliation between North and South Korea. Based on this timeline, high-risk periods are translated to 1 and low-risk periods are translated to 0 to form a dummy variable. The results of robust regression model for model 2 shows that there might be a negative relationship between stock returns of SKENK and default risk, but the coefficient is insignificant. In addition, average stock returns of KOSPI has a positive relation to SKENK returns, yet also insignificant. Book-to-market equity is negatively related

to SKENK returns, and it is significant at a 10% significance level. This negative relation between stock returns and BE/ME corresponds to the outcome in model 1. Volatility of SKENK is identified to be negatively related to SKENK returns, but this is insignificant, also. To sum it up, hypothesis 2 is rejected since stock returns of SKENK and risk events as a proxy for default risk do not have significant relation.

The implications of this paper are as follows: it tries to figure out the relationship between stock returns and default risk in South Korean stock market which is less well known. There are several studies dealing with default risk of stocks for US and European stock markets, but only a few previous studies for South Korean stock market exists. Therefore, this paper is meaningful since it extends the contemplation of the relation between stock returns and default risk to another side of global stock market – especially, to an Asian market which has been left behind of study. As Chava and Purnanandam (2010) show the positive relation between the two variables in pre-1980s of the US stocks, the paper reconfirms this general positive relation in South Korean stocks. Moreover, this paper deals with SKENK which has similar characteristics to the anomalous situation of the US stocks in 1980s. It is revealed that SKENK does not follow the general positive relation, and it is meaningful to provide evidence of anomaly on relationship between stock returns and default risk.

Still, there are some limitations on this paper. One shortcoming in model 1 is that it does not collect various explanatory variables which may harm explanatory power of the model itself. There may be omitted variable biases on the models. For example, Fama and French (1992) discover that the size of firm is highly correlated to stock returns. It is desirable to include size effect as an explanatory variable to the regression models, but it is hard to assort and categorize each KOSPI stock into the smallest to the largest decile group, since it is ambiguous to set up the criteria. In model 2, defining risk events as a proxy for default risk of SKENK is not the best option. If the actual default risk data for the chosen five companies were available, it would be the most suitable data to represent the variable default risk. Unfortunately, the aforementioned data is not available to general user – it is only accessible to corporate or individual businesses. As the next-best option, risk events are selected and the relevant data are collected one by one, by oneself. The potential error may lead the deterioration of objectivity and reliability of the proxy. Also, only five companies for only 3 years come into consideration in model 2, so it will be desirable to contain more samples with longer observation periods to figure out the generalizable relation. Lastly, the explanatory power is particularly low in the second model. Low R^2 does not necessarily mean that the model is wrong or bad, but it can be improved by adding more relevant explanatory variables. To improve it, more diverse explanatory variables should be considered.

There can be room of further researches regarding the topic. Since academic research dealing with the subject of KOSPI market and SKENK is in a beginning stage, it is expected to be widen and intensified. For instance, since the omitted variable bias occurs largely in model 2, certain future researches with aims to find out some specific political and financial factors related to SKENK

performances are expected to be held. This will contribute to forecast and earn better profit from the anomalies in stock investment, and provide more accurate prospect of risk volatility of stocks to investors. Deeper knowledge of stock investment strategy for the anomaly of stock returns may be developed through those further studies.

Appendix A: Tables

Company Name	KOSPI ISIN Code	Company Name	KOSDAQ ISIN Code
Shin Won Corp. Ltd	KR7009270000	Good People Co Ltd	KR7033340001
In the F CO LTD	KR7014990006	Jaeyoung Solutec Co Ltd	KR7049630007
Green Cross Corp	KR7006280002	J.Estina Co Ltd	KR7026040006
Korea Electric Power Corporation	KR7015760002	Ehwa Technologies Information Co., Ltd.	KR7024810004
Kwang Myung Electric Co Ltd	KR7017040007	Cheryong Electric Co Ltd	KR7033100009
Seondo Electric Co Ltd	KR7007610009	Hyosung ONB Co Ltd	KR7097870000
Lotte Fine Chemical Co Ltd	KR7004000006	Ananti Inc	KR7025980004
Chobi Co., Ltd.	KR7001550003	Daea TI Co Ltd	KR7045390002
Namhae Chemical Corp	KR7025860008	Woowon Development Co Ltd	KR7046940003
Hyundai Elevator Co Ltd	KR7017800004	Puloon Technology Inc	KR7094940004
Daeho AL Co., Ltd.	KR7069460004	LEENOS CORP.	KR7039980008
Il Shin Stone Co., Ltd.	KR7007110000	Nature and Environment Co., Ltd.	KR7043910009
Koas Co Ltd	KR7071950000	Samhyun Steel Co., Ltd.	KR7017480005
DONG YANG STEEL PIPE CO.,LTD	KR7008970006		
Hi Steel Co Ltd	KR7071090005		
Sambu Engineering & Construction	KR7001470004		
Hyundai Engineering & Construction Co.	KR7000720003		

< Table 1, List of Companies of SKENK (South Korean stocks with exposure to North Korea) and ISIN Codes>

Company Name	Industry Field	Description	Market Capitalization
Daea TI Co Ltd	Railroad signal control system engineering	Being engaged to construct railways under the Eurasian railroad project	426.2 billion won (363.8 million US dollars)
Hyosung ONB Co Ltd	Chemical fertilizer manufacturing	Being engaged to support fertilizer toward North Korea in accordance with the aid project of South Korean government	75.4 billion won (64.36 million US dollars)
Shin Won Corp. Ltd	Clothing, fashion industry	Held its own factory located in the Gaesong Industrial Complex[1].	198.7 billion won (169.6 million US dollars)
Hyundai Elevator Co Ltd	Lift, escalator, automation equipment manufacturing	The largest shareholder of Hyundai Asan, which leads Mt. Geumgang[2] tour program in South Korea	2 trillion 535 billion won (2.164 billion US dollars)
Sambu Engineering & Construction	Civil engineering, construction, architectural development	Being engaged to construct railroad and general road which connect South and North Korea	106.8 billion won (91.16 million US dollars)

< Table 2, List of Five Selected Companies of SKENK and their details>

[1] Established as one of the inter-Korean economic cooperation projects in 2000, located in Geasong, North Korea, several South Korean companies are engaged to produce their products by hiring North Korean workers.

[2] Mt. Geumgang is the mountain located in Geumgang-gun (province), Gosung-gun, and Tongchun-gun in North Korea.

Period	Description	Default risk
06/01/2016	North Korea tested Hydrogen bombs	High
08/01/2016	South Korea restarted to broadcast propaganda to North Korea	High
07/02/2016	North Korea launched long-range missile	High
10/02/2016	Shutdown of Gaesong Industrial Complex by North Korea	High
21/03/2016	South Korean government refused authorized visits to North Korea which the emergency measure committee had requested	High
22/05/2016	South Korean government decided to recompense companies related to Gaesong Industrial Complex for loss	Low
06/02/2017	The closure of Gaesong Industrial Complex lasted for 1 year	High
10/02/2017	South Korean Politian 'Moon' made a pledge to reactivate Gaesong Industrial Complex	Low
25/04/2017	No provocation happened on the foundation day of an North Korean army	Low
10/05/2017	Moon is elected new president of South Korea	Low
29/05/2017	North Korea launched ballistic missile	High
04/07/2017	North Korean government forewarned a big announcement	High
17/07/2017	South Korea proposed military talks	Low
07/08/2017	South Korean government got around to encourage firms related to inter-Korean economic cooperation	Low
04/09/2017	North Korea carried out the 6th nuclear test	High
23/11/2017	South Korean government decided to support extra subsidies toward firms in Gaesong Ind. Complex	Low
02/01/2018	Kim from North Korea proposed talks	Low
09/02/2018	South-North Dialogue took place	Low
05/03/2018	South Korea dispatched a presidential envoy to North Korea	Low
07/03/2018	The inter-Korean summit talks was announced to be held	Low
09/03/2018	US president Trump implied the possibility of talks to North Korea	Low

19/03/2018	Discussion for the denuclearization on the Korean Peninsula was held between South Korean, US, and Japanese government	Low
28/03/2018	A summit between North Korea and China was held	Low
18/04/2018	Trump mentioned the termination of the inter-Korean war	Low
23/04/2018	North Korea announced to cease nuclear tests · missile launch	Low
27-29/04/2018	The inter-Korean summit talks was held in the border village of Panmunjom in the Demilitarized Zone	Low
16/05/2018	North Korea postponed the expected ministerial level talks to protest South Korea·US air combat training	High
25/05/2018	The summit between North Korean and US government was cancelled	High
28/05/2018	The cancelled summit was reopened	Low
12/06/2018	The summit conference between North Korea and US was held	Low
26/06/2018	The Korea Chamber of Commerce & Industry held a conference for inter-Korean economic cooperation	Low
09/07/2018	Conflict in point of view between US and North Korea arose	High
24/07/2018	Mutual inspection of Gyeongui railroad, breakup of the Seohae satellite launching site were held	Low
27/08/2018	The secretary of US state Pompeo cancelled to visit North Korea	High
05/09/2018	South Korean envoy visited North Korea	Low
14/09/2018	South-North Korean government liaison office was founded	Low
18/09/2018	The 3rd inter-Korean summit was held, cultural interchange between South and North Korea was involved	Low
24/09/2018	South Korea restarted to promote Mt. Geumgang tour program	Low
10/10/2018	The talks between North Korea and US was postponed	High
07/11/2018	The high-level talks between North Korea and US was postponed	High
23/11/2018	Joint inspection of the Korean Peninsula railroad was	Low

	excluded from the subject of restrictions toward North Korea by UN (United Nations)	
28/12/2018	Investment experts evaluated that stocks with exposure to North Korea have earned high returns in 2018	Low

< Table 3, Timeline for the major risk events in the Korean Peninsula from 2016 to 2018>

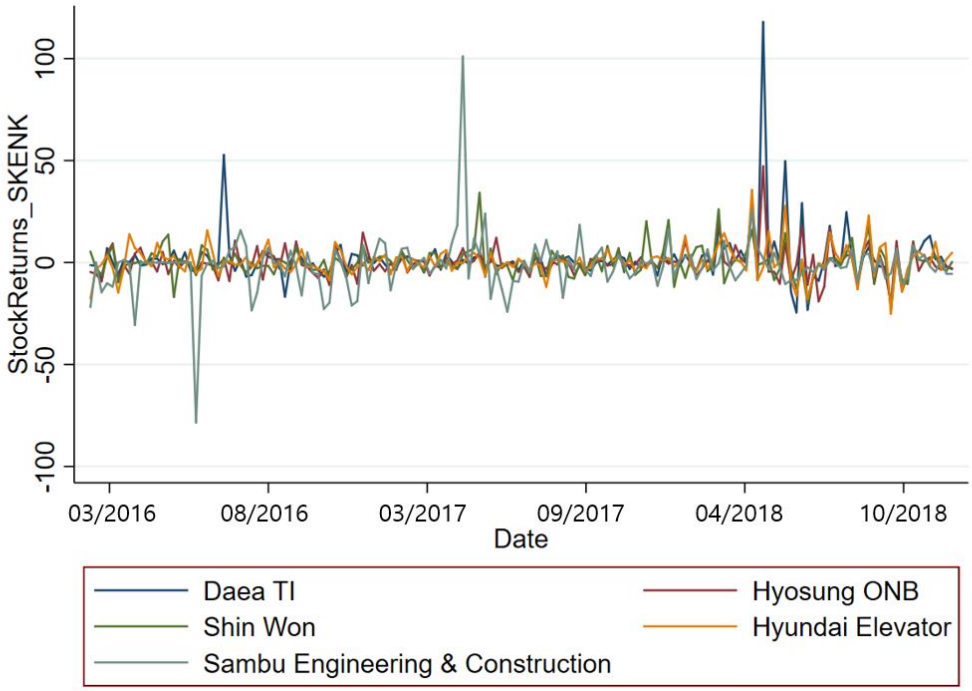
Variable	VIF	1/VIF
KOR5yrsCDS	6.01	0.166526
Stock returns_S&P500	3.78	0.264736
BE/ME	3.37	0.296765
E/P	1.93	0.517585
Mean VIF	3.77	

< Table 4, Variance Influence Factor (VIF) of model 1 >

Variable	VIF	1/VIF
Risk Events	1.79	0.559266
Stock returns_KOSPI	1.83	0.546351
BE/ME	1.20	0.835404
Volatility	1.14	0.875340
Mean VIF	1.49	

< Table 5, Variance Influence Factor (VIF) of model 2 >

Appendix B: Graph



<Graph 1, Stock returns of SKENK change over time across the five companies>

References

Avramov, D., Chordia, T., Jostova, G., & Philipov, A. (2009). Credit Ratings and the Cross-Section of Stock Returns. *Journal of Financial Markets*. doi:10.2139/ssrn.940809

Black, F. (1972). Capital Market Equilibrium with Restricted Borrowing. *The Journal of Business, 45*(3), 444. doi:10.1086/295472

Bloomberg. (n.d.). Retrieved June 3, 2019, from https://www.bloomberg.com/quote/KOSPI:IND

Chava, S., & Purnanandam, A. K. (2010). Is Default Risk Negatively Related to Stock Returns? The Review of Financial Studies. doi:10.2139/ssrn.1003682

Denis, D. J., & Denis, D. K. (1995). Causes of financial distress following leveraged recapitalizations. *Journal of Financial Economics, 37*(2), 129-157. doi:10.1016/0304-405x(94)00792-y

Dichev, I. D. (1998). Is the Risk of Bankruptcy a Systematic Risk? *The Journal of Finance,53*(3), 1131-1147. doi:10.1111/0022-1082.00046

Elton, E. J. (1999). Expected Return, Realized Return, and Asset Pricing Tests. *The Journal of Finance, 54*(4), 1199-1220. doi:10.1111/0022-1082.00144

Ericsson, J., Jacobs, K., & Oviedo, R. (2009). The Determinants of Credit Default Swap Premia. *Journal of Financial and Quantitative Analysis*. doi:10.2139/ssrn.601082

Fama, E. F. (1981). Stock Returns, Real Activity, Inflation, and Money. *The American Economic Review, 71*(4), 545-565.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*(1), 3-56. doi:10.1016/0304-405x(93)90023-5

Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance, 47*(2). doi:10.1111/j.1540-6261.1992.tb04398.x

French, K. R. (1980). Stock Returns and the Weekend Effect. *Journal of Financial Economics, 8*(1), 55-69. doi:10.1016/0304-405x(80)90021-5

French, K. R., Schwert, G., & Stambaugh, R. F. (1987). Expected Stock Returns and Volatility. Journal of Financial Economics, 19, 3-29. doi:10.1016/0304-405X(87)90026-2

Griffin, J. M., & Lemmon, M. L. (2002). Book-to-Market Equity, Distress Risk, and Stock Returns. *The*

Journal of Finance, 57(5), 2317-2336. doi:10.1111/1540-6261.00497

Jung, W., Chae, S., Yang, J., & Moon, H. (2006). Characteristics of the Korean stock market correlations. *Physica A: Statistical Mechanics and Its Applications, 361*(1), 263-271. doi:10.1016/j.physa.2005.06.081

Keim, D. B. (1983). Size-related anomalies and stock return seasonality: Further empirical evidence. *Journal of Financial Economics, 12*(1), 13-32. doi:10.1016/0304-405x(83)90025-9

KDB Bank, Weekly KDB Report. (n.d.). Retrieved June 3, 2019, from https://www.kdb.co.kr/index.jsp

Korea Futures Exchange. (n.d.). Retrieved June 3, 2019, from http://global.krx.co.kr/main/main.jsp

Kwon, H. (2017, April 27). Korean Stock Market and US Stock Market are in the highest state of 'Coupling'. *Yonhap News Agency*. Retrieved from https://www.yna.co.kr/view/AKR20170426077900008

Lee, Y. (2019, March 15). Reports of a possible halt in US-North Korea talks send defense stocks soaring. *CNBC*. Retrieved from https://www.cnbc.com/2019/03/15/stocks-in-south-korea-japan-react-to-north-korea-us-nuclear-news.html

Lenciauskaitė, G. (2012). The Link Between Sovereign CDS and Stock Indexes in the light of Greek Debt Crisis. *Master Thesis in Finance, Tilburg University*.

Lintner, J. (1965). Security Prices, Risk, And Maximal Gains From Diversification. *The Journal of Finance, 20*(4), 587-615. doi:10.1111/j.1540-6261.1965.tb02930.x

Lundblad, C. T. (2006). The Risk Return Tradeoff in the Long-Run: 1836-2003. *Journal of Financial Economics*. doi:10.2139/ssrn.671324

Opler, T. C., & Titman, S. (1994). Financial Distress and Corporate Performance. *The Journal of Finance, 49*(3), 1015. doi:10.2307/2329214

Park, Y., & Choi, H. (2019, March 29). South Korean stocks end higher on trade talks optimism; won rises (U. V., Ed.). *Reuters*. Retrieved from https://uk.reuters.com/article/southkorea-markets-close/south-korean-stocks-end-higher-on-trade-talks-optimism-won-rises-idUKZZN2YJM00

Pastor, L., Sinha, M., & Swaminathan, B. (2006). Estimating the Intertemporal Risk-Return Tradeoff Using the Implied Cost of Capital. *The Journal of Finance*. doi:10.3386/w11941

Pastor, L., & Stambaugh, R. (2003). Liquidity Risk and Expected Stock Returns. *Journal of Political*

Economy, 111(3). doi:10.3386/w8462

Sharpe, W. F. (1964). Capital Asset Prices: A Theory Of Market Equilibrium Under Conditions Of Risk. *The Journal of Finance, 19*(3), 425-442. doi:10.1111/j.1540-6261.1964.tb02865.x

Taly, I. (2015). Study on Return and Volatility Spillover Effects among Stock, CDS, and Foreign Exchange Markets in Korea. *East Asian Economic Review, 19*(3), 275-322. doi:10.11644/kiep.jeai.2015.19.3.299

Vassalou, M., & Xing, Y. (2004). Default Risk in Equity Returns. *The Journal of Finance,59*(2), 831-868. doi:10.1111/j.1540-6261.2004.00650.x

Zingales, L. (2008). Causes and Effects of the Lehman Brothers Bankruptcy. *Oversight and Government Reform US*.