Investor Sentiment, Credit Rating, and Stock Returns

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Abstract

We confront the distress risk puzzle. Conventionally, stocks with high distress risk should yield higher returns. However, this notion is found to be empirically inaccurate. We develop a stock-level investor sentiment measure and find that behaviors of individual investors affect the future excess returns of stocks despite the presence of distress risk. Our findings suggest that net buying by individual investors enhances our understanding of the negative relationship between credit ratings and future stock returns. To do so, we develop a cross-sectional measure of the investor sentiment for each individual stock at each month.

Keywords: investor sentiment, credit rating, buy–sell imbalance, individual stock returns.
JEL Classification: G12, G14, G15.

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I. Introduction

The finance literature makes considerable effort in finding the relationship between the excess stock returns and credibility of a firm using the firm's credit rating. In theory, investors expect higher returns from investments that bear higher risk. Investing in a firm with a bad credit rating is perceived to be risky and thus should grant higher excess returns to the investor, hence the saying "higher risk, higher returns." However, the findings of many empirical studies present evidence to the contrary (Dichev (1998); Griffin and Lemmon (2002); Campbell, Hilscher, and Szilagyi (2008); Garlappi, Shu, and Yan (2008); and Da and Gao (2010)). Previous studies demonstrate that credit risk is negatively related to future stock returns. Because theory and empirical evidence contradict each other, many refer to this quandary as the financial distress anomaly or financial distress risk puzzle. This paper examines why the reality does not match with the theory.

This paper contributes to the literature by considering retail investor sentiment as a factor that identifies one of the channels between credit risk and equity returns. We hypothesize that retail investor sentiment and credit rating reports jointly explain excess stock returns. Our findings suggest that the mismatch between empirical results and the theoretical foundation is alleviated by the inclusion of retail investor sentiment in the model.

How might retail investor sentiment affect the distress risk anomaly? Individual investors lack experience and information when compared with institutional investors. Retail investors commonly neglect the sources that determine the value of firms and bankruptcy risk (i.e., the credit rating), as Avramov et al. (2009) suggest. Consequently, retail investors are likely to invest in speculative stocks solely because of positive expectations. In this study, we suggest that positive sentimental behaviors of retail investors induce a stock to become highly priced despite the firm's credit risk. This leads to low future stock returns.

In addition, Coelho, John, Kumark, and Taffler (2014) find that individual investors pursue lottery-type stocks that have low returns on average but rarely skyrocket. In what is similar to lottery-type stocks, high-credit-risk stocks have low chance of recovery and rarely provide extremely high returns after the recovery. Retail investors speculate with these types of stocks, leading the stock price

to be overvalued. Positive sentimental, risk-loving behavior increases the prices of low-rated stocks, which explains lower future stock returns for riskier stocks. Kim, Sung, and Wei (2011, 2017) also find that investor characteristics are one of the important factors in determining investor behavior.

South Korea provides an ideal dataset for us to test our research hypotheses for three main reasons. First, comprehensive South Korean data provide sufficient observations to investigate the specific buying and selling behaviors for different types of investors. Kumar and Lee (2006) and Barber and Odean (2007) collect individual purchases and sales data from several brokerage and consulting firms. These collections have a range of several years at most and represent the entirety of U.S. individual investors. However, our data covers all monthly transactions from 2001 to 2015. Second, our data is unique in showing the stock trading amount of foreign institutional investors, domestic institutional investors, and individual retail investors separately. This South Korean data allows us to identify the effects of different sentiments formed by various types of investors and thus to focus on the influence of retail investors. The South Korean financial market features diverse investors with various backgrounds, both domestic and foreign. We evaluate whether retail investors play a role in the anomaly. We observe that individual investor sentiment alone can explain the anomaly, while foreigners' and institutions' sentiments cannot. Third, individual investors are influential in the domestic stock market, with domestic individual investors holding as much as 34.6% of total South Korean market capitalization in our sample period (Hong and Lee, 2011).

The rest of the paper is structured as follows. In Section 2, we review the existing literature on credit ratings and investor sentiment. Section 3 explains our key variables and the empirical methodology of our research. In Section 4, we describe the dataset and provide summary statistics. Section 5 presents our main empirical results. Section 6 summarizes and concludes.

II. Literature Review

a. Credit ratings and stock returns

Avramov et al. (2009) uses Standard and Poor's credit ratings to find an inverse relationship between credit risk and stock returns. They suggest that illiquidity and short-sale constraints of

speculative stocks (credit ratings below BBB-) generate relatively overvalued stocks. This credit risk effect is concentrated around downgrades of credit ratings for the lowest-rated stocks. Miller (1977) argues that restrictions on short selling reduce opportunities for rational investors to correct overvaluations. Dichev and Piotroski (2001) employ Moody's credit ratings instead of S&P's. Nevertheless, these papers find that stock returns remain relatively stable for firms with stable credibility but that lower-rated firms experience considerably lower stock return rates.

Coelho, John, Kumark, and Taffler (2014) focus on firms that, being actively traded in financial markets, filed for Chapter 11. They argue that such stocks are traded because retail investors favor lottery-type stocks (i.e., stocks that have a chance of extraordinary excess returns). Retail investors purchase these lottery-type stocks for speculative purposes and thus overprice them, inducing lower returns despite downgrading them. Their findings concur with CAPM, the Fama–French three-factor model, and the Cahart four-factor model, which are the precedent studies related to credit risk and returns.

b. Investor sentiment and stock returns

Many studies dating as far back as Keynes (1936) discuss the impact of investor sentiment on stock returns. Empirical difficulties arise in finding a suitable measure for investor sentiment. The two influential and well-known methods are constructed by Baker and Wurgler (2006, 2007, BW henceforth) and Kumar and Lee (2006). BW (2006) construct a composite index of investor sentiment that is based on six underlying proxies. The proxies include "closed-end fund discount, NYSE share turnover, the number and average first-day returns on IPOs, the equity share granted in new issues, and the dividend premium" (Baker and Wugler, 2006). Kumar and Lee (2006), on the other hand, emphasize the role of retail investors in the market and suggest an investor sentiment index that is based on buy–sell imbalances of individual investors. They find that retail investor sentiment helps explain stock return co-movements. Investor sentiment justifies stock returns for "small stocks, value stocks, stocks with low institutional ownership, and stocks with lower prices" (Kumar and Lee, 2006). They report that when retail investors are optimistic, the entire market's net purchases increases. Their index goes by the

"buy–sell imbalance" (BSI, henceforth).

Using the two aforementioned indices, many research papers discover a role for investor sentiment in influencing stock returns. Stambaugh et al. (2012) find that investor sentiment explains financial anomalies. They show that the significance of sentiment is magnified when the sentiments are high but fades out during downturns. Yu and Yuan (2011) also confirm that investor sentiment affects the risk–return relationship, using variance as their measurement for risk. Because retail investors are not fully apprised of the risks, they cannot fully arbitrage it by demanding higher returns, nor do they exit. Thus, this active speculative participation of retail investors in stock markets affects the risk puzzle.

III. Methodology

a. Key variables

To estimate the effect of investor sentiment on the relationship between credit risk and stock returns, we first need the measures used for credit ratings and retail investor sentiment. In South Korea, corporate credit ratings are published by the National Information and Credit Evaluation, Inc. (NICE Investor Service), the Moody's-affiliated Korea Investor Service, and Korea Ratings. To be conservative with the ratings, we use the lowest rating of the three published as furnishing the representative credit risk. This method also allows us to obtain more observations because the three agencies rate firms slightly differently. As credit ratings are categorical data ranging from AAA to D, we quantify this data by assigning values as follows: AAA = 1, AA+ = 2, AA = 3, AA− = 4, A+ = 5, A = 6, A− = 7, BBB+ = 8, BBB = 9, BBB− = 10, BB+ = 11, BB = 12, BB− = 13, B+ = 14, B = 15, B− = 16, CCC+ = 17, CCC = 18, CCC− = 19, CC = 20, C = 21, D = 22. Higher risk corresponds to higher numbers in the credit rating risk (CRR) variable. This method is similar to that used by Avramov et al. (2009). In addition, we give stocks with higher than a BBB- rating for the indicator variable the value 1, and 0 otherwise. This CRR dummy distinguishes non-investment stocks from stable investments. Bonds with speculative grades may have difficulty financing investments because institutional investors typically omit speculative firms from their portfolios. This implies that the characteristics and behaviors of investors with regard to investment-grade and non-investment-grade stocks are also substantially different.

Moreover, a non-investment-grade stock confers a sudden increase in risk. Overall, using the threshold that institutional investors apply, we distinguish between the two types of grades using a dummy variable.

Kumar and Lee (2006) construct a buy–sell imbalance (BSI) indicator that measures retail investor sentiment. The implication is that unlike institutional investors, individual ones are sensitive to the market mood and likely to enter the market without sophisticated valuation methods and strategies. Kumar and Lee (2006) calculate a time-varying investor sentiment index for the whole market. The BSI uses retail investors' sales and purchases data. High (low) BSI values represents positive (negative) investor sentiment regarding the market. Using their methodology, this paper presents a stock-level sentiment index because investors are likely to form different sentiments for different stocks. Thus, unlike previous studies, we implement a stock-level BSI in an attempt to find out how the risk–return relationship varies, given different levels of investor sentiment regarding sundry credit ratings. The following equation gives a monthly stock-level individual investor sentiment index:

$$BSI_{i,t} = \frac{VB_{i,t} - VS_{i,t}}{VB_{i,t} + VS_{i,t}}$$

where $BSI_{i,t}$ is the investor sentiment index (buy–sell imbalance) for stock i in month t, with $VB_{i,t}$ and $VS_{i,t}$ showing the volumes bought and sold by retail investors of stock i on the last day of month t. A positive BSI indicates that the stock was bought more than it was sold by retail investors, signaling positive sentiment formation. Thus, in our analysis, we form the BSI dummy to indicate whether retail investors had positive sentiment or not. In our empirical setup, we observe the impact of lagged investor sentiment on excess return. Thus, we relate the latest sentiment data available, which is the sentiment measurement of the last day of the month, to future excess return.

Excess returns are monthly stock returns minus the risk-free rate (CD91). Excess market returns are defined as the market return (KOSPI200 monthly return) subtracted by the risk-free rate (CD91). The book-to-market ratio (BTM ratio) is assets / (assets – capital + market capitalization); size is the natural log of market capitalization. A BSI dummy variable is generated and equals 1 if the BSI value is positive, and 0 otherwise. Units are in Won (millions).

b. Empirical specifications

To understand how investor sentiment interacts with credit risk and affects stock returns, the empirical specification is as follows:

$$Excess\ Return_{i,t+1} = \alpha + \beta_1 Credit\ Rating\ Risk_{i,t} + \beta_2 Credit\ Rating\ Risk_{i,t} * BSIdummy_{i,t} + \beta_3 BSIdummy_{i,t} + \beta_4 ExMktRtrn_{i,t} + \beta_5 BTM_{i,t} + \beta_6 Size_{i,t} + \epsilon_{i,t+1} \quad (1)$$

$$Excess\ Return_{i,t+1} = \alpha + \beta_1 Credit\ Rating\ Risk_{i,t} + \beta_2 Credit\ Rating\ Risk_{i,t} * BSIdummy_{i,t} + \beta_3 BSIdummy_{i,t} + \beta_4 ExMktRtrn_{i,t} + \beta_5 SMB_{i,t} + \beta_6 HML_{i,t} + \epsilon_{i,t+1} \quad (2)$$

We run pooled OLS regressions for our analysis using equations above. Future excess return is the dependent variable for firm i and month t. For the main explanatory variables, we have CRR and the BSI dummy variable. We deal with the BSI dummy variable instead of the actual values for two reasons. First, we are only concerned as to whether the retail investors formulated positive sentiments. Second, and interestingly, the magnitude of BSI, which ranges from -1 to 1, has no significant influence on excess return, but the sign does. The CRR is the lowest rating of the three published ratings and is numerated by the aforementioned process. The CRR dummy variable equals 1 if the CRR value is greater than 10, and 0 otherwise. Chen and Chen (1991) and Chen and Zhang (1998) discover that small firms or firms with high BTM ratios have high credit risk. Thus, we include the BTM ratio, firm size, and excess market return as control variables. This empirical specification is similar to BW's, where they use the BTM ratio and size as their control variables. Because we deal with excess returns, we also use the Fama–French (FF) three-factor model. We ~~Although conventionally, contemporary facto~~We report the results with excess market returns, HML and SMB as the control variables. Conventionally,

contemporary factors are used for FF specification. However, we use lagged factors for consistency with BW specification. All regressions were performed again with contemporary factors. Results are similar when contemporary factors are used in our regressions. Overall, we have two main equations to analyze: the BW from equation (1) and FF from equation (2). We first show that CRR is negatively associated with future excess returns, affirming the existence of the distress risk puzzle. We then hypothesize that the interaction term between credit risk and investor sentiment has a negative coefficient and thus mitigates some of the distress risk puzzle.

IV. Data and Statistics

a. Data

In this paper, we utilize the monthly data provided by *DataGuide* that covers the range from January 2001 to August 2015. *DataGuide* provides massive firm-level financial, accounting, management, marketing and banking information. In addition to seeing similar data for Korean firms as provided by WRDS (Wharton Research Data Services) for US firms, *DataGuide* records each stock purchases and sales of different types of investors such as individual, institutional, foreign, etc. All Korean firms submit their financial statements to Financial Supervisory Service and are reported on DART. *DataGuide* collects firms' accounting data and matches those with daily stocks data. We include all public firms (KOSPI and KOSDAQ) except the ones without any credit rating from the three publishers. Further, we drop the financial industry from our sample. To avoid selection bias of only keeping the surviving firms, we keep the firms that delisted within our sample period. Although firms that delisted are too risky to remain in the market, we can observe their stock return movements after their credit rating changes before their exit. The total number of rated firms is 438 with 33,523 observations in our sample. Key variables are obtained from *DataGuide* along with the data needed to construct the investor sentiment variable BSI. Credit ratings data are collected from NICE Investor Service and Korea Ratings.

서식 지정함: 글꼴: 기울임꼴

b. Summary Statistics

Table 1 provides summary statistics of the variables. In Panel A, we have 33,523 observations, with average excess returns of 0.97 percent. The biggest loss that a firm experienced is -81.7 percent. The highest return in our sample is 690.4 percent, which means the stock value skyrocketed by nearly seven times in one month. The mean value of CRR is 8.546, translating into a credit rating between BBB+ and BBB. The standard deviation for CRR is 4.164. The percentage of speculative firms in our sample is 29.2 percent. The BSI index average is -0.039, denoting that retail investors exited more than they entered the market, to a small extent, in our sample period. Excess market returns averaged 0.203 percent, wherein the lowest is -21.458 percent and the highest is 22.595 percent. The BTM ratio average is slightly less than 1, at 0.809, and the average firm size is 12.458.

In Panel B of Table 1, BSI statistics are ordered by investment grade and investor type. We observe that individual investors are dominantly active with non-investment-grade stocks. On one hand, for investment-grade stocks, foreign investors and domestic institutional investors are net buyers on average, while individual investors are not. On the other hand, individual investors and domestic investors are net sellers on average, while foreign investors tend to maintain optimism on average. Another notable feature is that the standard deviations for individual investors are significantly lower than those for foreign and institutional investors. Table 1 generally supports our hypothesis that individual investors tend to underreact to credit risk, a fact that may lead to an overvaluation of a stock's price, causing a negative credit risk–return relationship.

Panel C describes the correlation between the three sentiment variables estimated. The three sentiment measurements are investor, institutional and foreign investor sentiments. While credit risk is positively correlated with retail investor sentiments, the other two types show negative relations. Also, Individual and domestic institutional sentiments are negatively correlated with foreign investor sentiment. Lastly, although correlation between individuals and institutional sentiments is negative, it is not statistically significant.

[Table 1 here]

To evaluate differences in volatility between speculative and stable stocks, we employ the simple volatility of stock returns for the past 20 days and two volatility models: GARCH (1,1) and asymmetric GARCH (1,1). We use the past 20 days' returns because that approximately accounts for a month (assuming there are 20 business days in one month). A GARCH (1,1) model introduced by Bollerslev (1986) estimates conditional variances for monthly stock returns using the weighted sum of unconditional variance, last period's squared residual, and last period's conditional variance. Asymmetric GARCH (1,1) accounts for the asymmetric effect between positive and negative returns. In other words, this modified version of GARCH reflects asymmetric volatility in markets during their ups and downs. We utilize the foregoing volatility measurements to observe and compare the volatilities of both investment and speculative stocks.

Conditional variance is calculated using GARCH (1,1) by the following method:

$$r_{i,t+1} = \mu_i + \varepsilon_{i,t+1},\ where\ \varepsilon_{i,t+1} \mid I_{t+1} \sim N(0, \sigma^2_{i,t+1}); \quad (2)$$

$$\sigma^2_{i,t+1} = \alpha_{i,G} + \beta_{i,G}\varepsilon^2_{i,t} + \gamma_{i,G}\sigma^2_{i,t} \quad (3)$$

where r is the return, μ_i is the conditional mean; $\sigma^2_{i,t}$ is the volatility; and I_{t+1} is an information set with mean 0 and variance $\sigma^2_{i,t+1}$. Subscripts i denote stock *i*, and *t* is the month.

Asymmetric GARCH (1,1) is also used to compare the volatilities.

$$r_{i,t+1} = \mu_i + \varepsilon_{i,t+1},\ where\quad \varepsilon_{i,t+1} \mid I_{t+1} \sim N(0, \sigma^2_{i,t+1}); \quad (4)$$

$$\sigma^2_{i,t+1} = \alpha_{i,A} + \beta_{i,A}\varepsilon^2_{i,t} + \theta_{i,A}d_{i,t}\varepsilon^2_{i,t} + \gamma_{i,A}\sigma^2_{i,t} \quad (5)$$

where $d_{i,t}$ is a dummy variable that has the value 1 if $\varepsilon^2_{i,t}$ is negative, and 0 otherwise. Including this additional term allows us to explain the asymmetric positive and negative effects on return volatility.

Table 2 reports statistics for speculative stocks and investment stocks separately. Excess returns for the two types of stocks are substantially different. While the average monthly stock excess

returns rate for speculative stocks is 0.429 percent, the rate for more stable stocks is 1.193 percent. Interestingly, just by looking at these averages, we can gather that stock returns for speculative stocks are lower than those for stable ones. This result defies the theoretical background that as risk increases, returns do accordingly. Observing the simple monthly volatility measurement, the value of volatility for speculative stocks is over twice that of investment stocks. This observation is consistent for conditional variances estimated by using GARCH and asymmetric GARCH models. Table 2 reports how volatility is higher for firms with high credit risk.

[Table 2 here]

V. Empirical Results

Table 3 summarizes the results for all of the empirical specifications. First, we include the CRR dummy as our key credit risk variable that shows whether the stock is speculative. The CRR indicator is equal to 1 for speculative stocks (i.e., those with a rating lower than BBB-) and 0 for non-speculative ones. Table 3 provides two panels. Panel A based on equation (1) utilizes size, the BTM ratio, and market excess returns as control variables. This equation corresponds to studies related to BW. Panel B based on equation (2) presents the results of the three-factor CAPM model of Fama and French. Column (1) is the baseline regression with only the CRR indicator and confirms the existence of the financial distress anomaly. –Note that higher CRR implies a lower letter credit rating, which, in turn, indicates higher risk. Credit risk is negatively and significantly associated with excess returns. Column (2) shows the results with BSI measure by itself. The coefficient being negative indicates that stocks with high sentiments in the past tends to underperform in the next month. This is consistent with the lottery-type stocks that tend to underperform due to retail investors' irrational behavior. Column (32) reports the estimates that includes only credit risk, investor sentiment (BSI dummy), and the interaction term (CRR indicator × BSI dummy). BSI signals whether retail investors had positive or negative net purchases of a particular stock. The BSI indicator takes the value 1 if retail investors had positive sentiment about a specific stock, and 0 otherwise. Results with the credit risk variable and a set of

control variables are shown in Column (~~43~~4). Even with control variables, the negative relationship between credit risk and excess returns persists. In the final column, which contains our key result, we re-estimate using control variables and variables of interest. The coefficients for the control variables are significant and similar to those in Column (~~34~~3).

The main findings from Column (5) are that credit risk and excess returns remain negatively associated but that the relationship is amplified when retail investors purchase more than they sell. Stocks with positive BSI and speculative status yield 3.034 percent lower monthly excess returns in the ensuing period. However, if BSI is non-positive (i.e., the BSI indicator is 0), future excess returns are 1.308 percent lower for speculative stocks. The BSI indicator thus explains 1.726 percent of the lower excess returns, which supports our hypothesis that investor sentiment plays a role in the anomaly. We hypothesize that institutional investors are less affected by sentiment than retail investors. Our hypothesis is consistent with Odean (1998) and Barber and Odean (2000, 2008). Our findings also support the hypothesis by showing that stocks with net buying by individual investors have a stronger negative relationship between credit ratings and stock returns than other stocks do.

[Table 3 here]

The results are similar when a Fama–French three-factor model is used. The coefficients of BSI and credit rating lose their significance; however, the interaction term remains negative and statistically significant. More importantly, as we include credit ratings and investor sentiment variables along with the control variables, R-squared increases. We utilize the lagged explanatory variables because we endeavor to predict future excess returns that also mitigate endogeneity issues. Performing regressions that control for unobserved heterogeneity and yearly effects increase R-squared and produce similar results.

[Table 4 here]

Table 4 contains the results of regressions that take the values of CRR instead of the dummy variable. Instead of separating the stocks merely by their speculative status, we use the values from 1(AAA) to 22(D) as the measurement for risk. By quantifying the credit risk in this manner, we observe how changes in credit rating and investor sentiment collectively affect returns more specifically. Two sets of results are provided for the BW and Fama–French specifications from equation (1) and (2) as before. The results are consistent with our hypothesis. Credit risk is negatively associated with excess returns, as shown by the interaction term. For our first regression results in Table 4, credit rating and excess returns are negatively associated regardless of investor sentiment. Interestingly, for the second panel with a Fama–French three-factor model, the negative relationship only existed when BSI is positive. In other words, the estimates suggest that the anomaly exists when retail investors form positive sentiments. In addition, we observe that firms with top-five ratings do not suffer from positive investor sentiment as the effect of sentiment outweighs that of credit risk. In both outcomes, we observe that investor sentiment helps in explaining the association between credit risk and excess return, thereby affirming our argument.

VI. Robustness Checks

We perform several robustness tests. First, we selected the lowest credit rating out of the three published sources to show the credit risk facing each firm. This is in order to be most conservative with risk and to expand our observations. To check whether the findings are robust under different rating standards, additional analyses with only the NICE credit ratings are performed. Second, we separate high- and low-volatility firms for further study. Results show that investor sentiment and credit ratings both have a significant impact on excess returns regardless of volatility. Third, we consider the financial crisis of 2008–2009 and find that the explanatory power of retail investor sentiment exists before and after the crisis. Fourth, we include additional control variables that accounts for liquidity and price. Finally, and most importantly, we identify the effect of retail investor sentiment by adding foreign- and institutional-investor sentiment variables. Throughout our robustness checks, BW specification from equation (1) and FF specification from equation (2) are employed.

a. Credit Rating Classification

In the previous analyses, we use the lowest rating of the three published by NICE, Korea Investors Service, and Korea Ratings. Similar results are obtained even when we take only the NICE ratings. We use NICE because their ratings encompass the largest number of observations out of the three published ratings. Table 5 displays the estimates of the robustness test only with NICE credit rating. With the interaction term consistently being negative, we see that the impact that retail investor sentiment has on the relationship between excess returns and credit risk is robust with respect to which credit ratings are used. Estimates are consistent for both Table 3 and Table 4 specifications.

[Table 5 here]

b. Volatility

Our summary statistics, Table 2, show that speculative stocks yield lower excess returns than investment ones do on average. In addition, volatility is higher for stocks with lower credit ratings. Higher returns come with higher volatility in theory; however, we observe the opposite, conflicting result. To reflect on this puzzling observation and to show that our results are uniform throughout different volatilities of stock prices in our robustness test, we divide the observations into two volatility groups: high and low. We classify the top 50 percent in terms of volatility as the high-volatility group and the bottom half as the low-volatility one. Then, we carry out regressions for sub-samples and find that BSI explains the financial anomaly despite the volatility differences. Observation sizes are different for the two groups because we divided by using the total market sample, not just the ones with credit ratings. If we divide those within our sample according to the credit ratings, the results are similar. The estimates in Table 6 suggest that the statistical significance of the interaction term decreases for the high-volatility group, while the negative coefficient remains. Regardless of whether we used the speculative dummy or risk value, our conclusion persists. Interestingly, we find that the coefficient magnitude of the interaction term is larger for low-volatility stocks. Retail investor behaviors could

explain this phenomenon. Retail investors observe higher volatility, thus making the stock less attractive even when positive sentiment prevails. This outcome explains why future excess returns are less affected by investor sentiment for volatile stocks. Across Table 6, the coefficients on the interaction term (BSI and credit risk) are robust.

[Table 6 here]

c. Financial Crisis

In this robustness check, we examine whether the pre- and post-global financial crisis (2008) results differed. It is imperative that we study such periods because regulations changed for investors after the crisis. Regulatory reforms include reorganizing and systemizing financial assets and derivatives to make financial markets more transparent. Under a similar approach to the Dodd–Frank Wall Street Reform and Consumer Protection Act, these changes strengthened the protection of investors through various channels, i.e., improving dispute settlement systems and liabilities for compensations. Table 7 contains the coefficients of separate estimations before and after the crisis. CRR becomes insignificant after the financial crisis. The coefficients of the interaction terms before and after the crisis (-1.81 and -1.86, respectively, for the BW specification and -1.98 and -1.95, respectively, for the Fama–French one) are similar and remain correctly signed and significant. Overall, investor sentiment contributes to the negative credit rating–risk relationship before and after the financial crisis. This outcome suggests that the impact of retail investor sentiment persists even after the regulatory reforms were enacted to protect individual investors.

[Table 7 here]

d. Controlling for price and trade volume

Bad credit ratings on a firm's corporate bonds could create liquidity problems. Stocks of corporations with low ratings are likely to face financing difficulties in the market. To control for the

liquidity issues that credit risk brings, we include additional variables. We include the natural log of stock price and liquidity (the ratio of trade volume and market capitalization) to consider investors' preferences for lower-priced stocks and liquidity constraints. Table 8 shows that excess returns are higher for stocks with lower liquidity but irrelevant in terms of a stock's price. Even after including liquidity and stock price variables in the specification, the results support our hypothesis that sentiment plays a crucial role.

[Table 8 here]

e. Retail, institutional, and foreign investor sentiments

Throughout this paper, we have asserted that retail investor sentiment is an important determinant of excess returns. Their irrational behaviors overvalue assets when positive sentiments are formed, thereby creating the distress risk puzzle. We further test whether retail investor sentiment alone explains the anomaly while foreign and institutional sentiments do not. Table 9 presents results that support our hypothesis. Sentiment variables take the value 1 if BSI is positive for each type of investors indicating a positive view of that stock. For example, if foreign institutional investors bought more (less) of a company's stock than they sold, then foreign sentiment is assigned the value 1 (0). The institutional-investor sentiment variable is constructed similarly. The interaction terms are credit risk multiplied by the sentiment variables. Columns (1) and (2) use the Fama–French specification, while Columns (3) and (4) use the BW equation. Columns (1) and (3) do not control for year effects, while Columns (2) and (4) include year-effect control variables.

We observe that sentiments, arranged according to different types of investors, all have a positive impact on excess returns although they remain statistically insignificant for foreigners. However, the coefficients for the interaction term between credit risk and retail investor sentiment are consistently negative. Regardless of the empirical specifications, institutional sentiment and foreign sentiment have no interacting effect with credit risk. Moreover, the coefficient values are notable. From our regression equation, we can see the marginal effect of retail investor sentiment on excess returns.

From Column (2), we get the following:

$$\frac{\partial \text{ExReturn}_{t+1}}{\partial \text{Retail Sentiment}} = 1.405 - 0.152 \times CR$$

This result shows that the negative relationship between credit risk and return exists for stocks with a credit risk value of 10 or higher. It suggests that speculative stocks in which investments are made by retail investors lead to the distress risk anomaly. We further identify the sole effect of retail investor sentiment more precisely by including institutional and foreign sentiment and find that our results are robust.

[Table 9 here]

V. Conclusion

Empirical findings show that stocks with lower credit ratings have lower future excess returns. These results defy our theoretical backdrop, which asserts that assets with higher risk will yield higher returns. This paper provides evidence to explain why the empirical evidence contradicts the theory. We include retail investor sentiment to justify the empirical relationship between credit rating and excess returns. Along the lines of Kumar and Lee's (2006) sentiment index, we construct a monthly sentiment index for each stock by finding net stock purchases. Using the data from 2001 to 2015, we show that retail investor sentiment, i.e., the buy–sell imbalance, contributes to the negative relationship between credit risk and future excess returns. Stocks with retail investors' positive sentiments tend to yield lower future returns as credit risk increases. The role of investor sentiment remains significant in terms of various robustness checks. In addition, the influence of sentiment has persisted even after the recent regulatory reforms that supposedly have helped protect retail investors after the global financial crisis. Lastly, even after the inclusion of foreign and institutional investors' measures, the influence of individual investor sentiment persisted.

The ratio of retail investors to institutional investors in the South Korean financial market is relatively high when compared with the rest of the world. However, retail investors lack the necessary

information and skills to correctly hedge the credit risk of each firm. Such information asymmetries cause a negative relationship between risk and return on account of sentiment. Our findings are fruitful in understanding how sentiment is bundled with risk and return.

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[Table 1] Summary Statistics

Panel A. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Ex Return$_{t+1}$	33,523	0.970	17.754	-81.688	690.366
CRR	33,523	8.546	4.1636	1.000	22.000
CRRdummy	33,523	0.292	0.455	0.000	1.000
BSI	33,523	-0.039	0.207	-1.000	1.000
Ex Market Return	33,523	0.203	6.957	-21.458	22.595
Book to Market	33,523	0.809	0.574	-0.911	95.512
Size	33,523	12.458	2.001	7.845	18.404

Panel B. BSI according to credit ratings

Variable	Obs	Mean	Std. Dev.	Min	Max
Stocks with investment grades					
BSI of Individual Investor	23,746	-0.053	0.238	-1.000	1.000
BSI of Foreign Registered Investor	19,366	0.054	0.592	-1.000	1.000
BSI of Domestic Institutional Investor	20,912	0.035	0.585	-1.000	1.000
Stocks with speculative grades					
BSI of Individual Investor	9,777	-0.007	0.087	-1.000	0.946
BSI of Foreign Registered Investor	5,648	0.022	0.705	-1.000	1.000
BSI of Domestic Institutional Investor	3,605	-0.228	0.814	-1.000	1.000

Panel C. Correlation between different sentiments

	Credit Risk	Individual Sentiment	Institutional Sentiment	Foreigner Sentiment
Credit Risk	1			
Ind Senti	**0.1056***	1		
Insti Senti	**-0.1338***	-0.4149	1	
For Senti	-0.0131	**-0.2394***	**-0.0849***	1

Notes: Our sample period is from 2001 to 2015. Data are collected from *DataGuide*. Credit rating risk (CRR) is the minimum value of three published corporate ratings. For Panel C, * means statistical significance at 1% level.

서식 지정함: 글꼴: 11 pt
서식 지정함: 글꼴: 10 pt
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서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt, 굵게
서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt, 굵게
서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt
서식 지정함: 글꼴: 10 pt, 굵게
서식 지정함: 글꼴: 10 pt

[Table 2] Volatility Statistics Differences

Panel A. Investment Stocks

Variable	Obs	Mean	Std. Dev.	Min	Max
Ex Return	23,746	1.193	13.994	-66.436	265.731
Simple Vol	23,912	0.027	0.014	0.000	0.135
GARCH Vol	23,912	0.023	0.022	0.001	0.438
Asy GARCH	23,912	0.023	0.022	0.001	0.351
BSI	23,912	-0.052	0.238	-1.000	1.000

Panel B. Speculative Stocks

Variable	Obs	Mean	Std. Dev.	Min	Max
Ex Return	9,777	0.429	24.592	-81.688	690.366
Simple Vol	9,829	0.040	0.020	0.000	0.134
GARCH Vol	9,829	0.049	0.038	0.000	0.531
Asy GARCH	9,829	0.050	0.037	0.000	0.548
BSI	9,829	-0.007	0.087	-1.000	0.946

Notes: Stocks in Panel A are stocks with CRR value lower than 11 (Rating above BBB-). Stocks in Panel B are stocks with a CRR value greater than 10 (Rating below BBB-).

[Table 3] Coefficient Estimates with a Speculative Dummy

Panel A. BW specification

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$	(5) Ex Return$_{t+1}$
CRRdummy	-0.763***	-0.023	-0.023	-2.051***	-1.308***
	(-2.88)	(-0.06)	(-0.06)	(-7.24)	(-3.56)
CRRdummy*BSIdummy		-1.805***	-1.805***	-1.726***	-1.726***
		(-3.43)	(-3.43)	(-3.29)	(-3.29)
BSIdummy		-0.599***	-0.062	0.019	0.019
		(-3.06)	(-0.33)	(0.10)	(0.10)
Ex Mkt Return			0.123***	0.124***	0.124***
			(7.81)	(7.86)	(7.86)
BTM			0.964**	0.954**	0.954**
			(2.49)	(2.48)	(2.48)
Size			-0.481***	-0.467***	-0.467***
			(-8.23)	(-8.03)	(-8.03)
Constant	1.193***	1.211***	1.217***	6.750***	6.566***
	(13.13)	(9.43)	(10.46)	(7.19)	(7.05)
Year effect	No	No	No	No	Yes
Observations	33,523	33,523	33,523	33,523	33,523
R-squared	0.0004	0.0003	0.0012	0.0059	0.0066
Adj. R-squared	0.00035	0.0001	0.0010	0.0057	0.0063

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Panel B. FF specification

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$
CRRdummy	-0.763***	-0.023	-0.746***	0.019
	(-2.88)	(-0.06)	(-2.81)	(0.05)
CRRdummy*BSIdummy		-1.805***		-1.863***
		(-3.43)		(-3.53)
BSIdummy		-0.062		-0.089
		(-0.33)		(-0.48)
Ex Mkt Return			0.152***	0.154***
			(9.70)	(9.79)
HML			-0.219***	-0.219***
			(-8.29)	(-8.30)
SMB			0.064**	0.067**
			(2.00)	(2.07)
Constant	1.193***	1.217***	1.383***	1.417***
	(13.13)	(10.46)	(14.69)	(11.96)

Observations	33,523	33,523	33,523	33,523
R-squared	0.0004	0.0012	0.0065	0.0073
Adj. R-squared	0.000352	0.00108	0.00634	0.00714

Notes: Column (1) provides the basic regression results. Column (2) shows the results with risk, sentiment, and the interaction term. Column (3) shows the existence of the financial distress anomaly in this specification. Columns (4) and (5) use investor sentiment to explain the anomaly. Column (5) includes yearly dummies. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels. CRRdummy takes on a value of 1 if the stock is investment grade, 0 if otherwise. BSIdummy indicates whether individual investors had positive sentiment or not. Ex Mkt Return, HML, SMB are the 3 factors from Fama-French model. BTM is book-to-market ratio and Size is ln(market capitalization).

[Table 4] Coefficient Estimates with Credit Risk Values

Panel A. BW specification

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$
CRR	-0.059*	0.032	-0.315***	-0.231***
	(-1.96)	(0.73)	(-7.01)	(-4.07)
CRR*BSIdummy		-0.201***		-0.162***
		(-3.38)		(-2.71)
BSIdummy		1.136**		0.969**
		(2.57)		(2.19)
Ex Mkt Return			0.124***	0.125***
			(7.90)	(7.92)
BTM			1.027**	1.013**
			(2.44)	(2.41)
Size			-0.685***	-0.654***
			(-8.30)	(-7.88)
Constant	1.474***	0.941***	11.340***	10.421***
	(6.64)	(2.99)	(7.91)	(7.09)
Year Effect	No	No	No	No
Observations	33,523	33,523	33,523	33,523
R-squared	0.0002	0.0010	0.0067	0.0071
Adj. R-squared	0.000162	0.000919	0.00655	0.00697

Panel B. FF specification

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$
CRR	-0.059*	0.032	-0.054*	0.040
	(-1.96)	(0.73)	(-1.78)	(0.91)
CRR*BSIdummy		-0.201***		-0.207***
		(-3.38)		(-3.48)
BSIdummy		1.136**		1.143***
		(2.57)		(2.59)
Ex Mkt Return			0.152***	0.153***
			(9.71)	(9.78)
HML			-0.218***	-0.219***
			(-8.25)	(-8.27)
SMB			0.065**	0.066**
			(2.02)	(2.06)
Constant	1.474***	0.941***	1.624***	1.084***
	(6.64)	(2.99)	(7.31)	(3.46)
Observations	33,523	33,523	33,523	33,523
R-squared	0.0002	0.0010	0.0063	0.0071
Adj. R-squared	0.000162	0.000919	0.00614	0.00697

Notes: Column (1) provides the basic regression results. Column (2) shows the results with risk, sentiment, and the interaction term. Column (3) shows the existence of the financial distress anomaly in this specification. Columns (4) and (5) use investor sentiment to explain the anomaly. Column (5) includes yearly dummies in the regression. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

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[Table 5] Estimates with Alternative Credit Rating Measurement

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$	(5) Ex Return$_{t+1}$
CRR_NICE	-0.045	0.040	-0.244***		
	(-1.29)	(0.82)	(-4.00)		
CRR_NICE*BSIdum		-0.166**	-0.116*		
		(-2.40)	(-1.69)		
CRR_NICEdummy				0.097	-1.048**
				(0.20)	(-2.22)
CRR_NICEdum*BSIdum				-1.940***	-1.788***
				(-2.86)	(-2.64)
BSIdummy		0.786*	0.538	-0.056	0.002
		(1.66)	(1.14)	(-0.27)	(0.01)
Ex Mkt Return		0.150***	0.122***	0.150***	0.120***
		(8.37)	(6.47)	(8.37)	(6.39)
HML		-0.227***		-0.227***	
		(-6.94)		(-6.96)	
SMB		0.074*		0.075*	
		(1.70)		(1.70)	
BTM			4.462***		4.040***
			(5.28)		(4.76)
Size			-0.467***		-0.265***
			(-4.67)		(-3.56)
Constant	1.281***	1.029***	5.394***	1.321***	1.480
	(5.43)	(3.22)	(2.83)	(10.05)	(1.00)
Observations	23,647	23,647	23,647	23,647	23,647
R-squared	0.0001	0.0074	0.0083	0.0079	0.0076
Adj. R-squared	7.20e-05	0.00715	0.00803	0.00761	0.00737

Notes: Column (1) reports simple regression statistics. Columns (2) and (3) report the results with actual values of risk (as Table 4). Columns (4) and (5) show the coefficients with speculative dummy variables (as in Table 3). Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

[Table 6] Influence of Investor Sentiment for High- and Low-Volatility Stocks

Panel A. Speculative Dummy

VARIABLES	(1) Low Volatility Ex Return$_{t+1}$	(2) High Volatility Ex Return$_{t+1}$	(3) Low Volatility Ex Return$_{t+1}$	(4) High Volatility Ex Return$_{t+1}$
CRRdummy	-0.81	-1.74***	0.50	-0.27
	(-1.60)	(-3.02)	(0.95)	(-0.52)
CRRdummy*BSIdummy	-2.31***	-1.26*	-2.48***	-1.39*
	(-3.19)	(-1.67)	(-3.37)	(-1.84)
BSIdummy	0.03	-0.06	-0.04	-0.18
	(0.14)	(-0.15)	(-0.20)	(-0.49)
Ex Mkt Return	0.16***	0.07***	0.19***	0.10***
	(8.67)	(2.58)	(11.23)	(3.29)
BTM	2.80***	0.84***		
	(2.73)	(2.73)		
Size	-0.33***	-0.55***		
	(-4.26)	(-4.63)		
HML			-0.25***	-0.16***
			(-7.62)	(-3.75)
SMB			0.07	0.06
			(1.54)	(1.59)
Constant	3.38**	7.69***	1.47***	1.32***
	(2.02)	(4.64)	(11.33)	(5.45)
Observations	19,282	14,241	19,282	14,241
R-squared	0.0110	0.0043	0.0146	0.0030
Adj. R-squared	0.0107	0.00390	0.0143	0.00255

Panel B.: CRR Value

VARIABLES	(1) Low Volatility Ex Return$_{t+1}$	(2) High Volatility Ex Return$_{t+1}$	(3) Low Volatility Ex Return$_{t+1}$	(4) High Volatility Ex Return$_{t+1}$
CRR	-0.22***	-0.24**	0.11**	-0.01
	(-4.07)	(-2.42)	(2.30)	(-0.09)
CRR*BSIdummy	-0.20***	-0.14	-0.25***	-0.17*
	(-3.05)	(-1.31)	(-3.80)	(-1.69)
BSIdummy	1.10**	0.83	1.36***	0.97
	(2.56)	(0.90)	(3.15)	(1.07)
Ex Mkt Return	0.16***	0.07***	0.19***	0.10***
	(8.68)	(2.66)	(11.25)	(3.29)
BTM	3.18***	0.89***		
	(3.09)	(2.67)		
Size	-0.56***	-0.64***		
	(-5.70)	(-4.31)		
HML			-0.25***	-0.16***
			(-7.60)	(-3.71)
SMB			0.07	0.06
			(1.55)	(1.56)
Constant	7.47***	10.43***	0.75**	1.27*
	(3.76)	(4.07)	(2.50)	(1.90)

Observations	19,282	14,241	19,282	14,241
R-squared	0.0119	0.0046	0.0144	0.0029
Adj. R-squared	0.0116	0.00420	0.0141	0.00249

Notes: This table compares the effect of investor sentiment on future excess return for stocks with different volatilities. In Panel A, a speculative dummy is used. Columns (1) and (2) reflect BW empirical specifications, while Columns (3) and (4) are Fama–French. In Panel B, CRR values are used. Columns (1) and (2) are BW empirical specifications, while Columns (3) and (4) give Fama–French ones. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

[Table 7] Investor Sentiment Before and After the Financial Crisis

Panel A. Speculative Dummy

	(1)	(2)	(3)	(4)
	Before Crisis	After Crisis	Before Crisis	After Crisis
VARIABLES	Ex Return$_{t+1}$	Ex Return$_{t+1}$	Ex Return$_{t+1}$	Ex Return$_{t+1}$
CRRdummy	-1.66***	-0.58	-0.49	0.72
	(-3.55)	(-0.97)	(-1.05)	(1.26)
CRRdummy*BSIdummy	-1.81**	-1.86**	-1.98***	-1.95**
	(-2.50)	(-2.41)	(-2.71)	(-2.52)
BSIdummy	0.02	0.03	-0.05	0.11
	(0.06)	(0.14)	(-0.19)	(0.49)
Ex Mkt Return	0.14***	0.06*	0.19***	0.03
	(7.84)	(1.89)	(10.56)	(0.98)
BTM	0.91**	1.74**		
	(2.48)	(2.32)		
Size	-0.46***	-0.41***		
	(-5.70)	(-4.90)		
SMB			0.12***	-0.14***
			(3.03)	(-3.55)
HML			-0.25***	-0.02
			(-8.45)	(-0.45)
Constant	6.68***	5.01***	1.98***	0.83***
	(5.78)	(3.36)	(11.24)	(5.46)
Observations	18,797	14,726	18,797	14,726
R-squared	0.0079	0.0045	0.0128	0.0024
Adj. R-squared	0.0076	0.0041	0.0125	0.0020

Panel B. CRR Value

	(5)	(6)	(7)	(8)
	Before Crisis	After Crisis	Before Crisis	After Crisis
VARIABLES	Ex Return$_{t+1}$	Ex Return$_{t+1}$	Ex Return$_{t+1}$	Ex Return$_{t+1}$
CRR	-0.28***	-0.19**	-0.02	0.08
	(-3.90)	(-2.04)	(-0.42)	(1.12)
CRR*BSIdummy	-0.18**	-0.17*	-0.23***	-0.20**
	(-2.06)	(-1.92)	(-2.59)	(-2.28)
BSIdummy	1.19	0.90	1.43**	1.15**
	(1.64)	(1.57)	(1.97)	(2.04)
Ex Mkt Return	0.14***	0.06**	0.19***	0.03
	(7.85)	(1.97)	(10.53)	(0.99)
BTM	0.96**	1.94***		
	(2.45)	(2.62)		
Size	-0.62***	-0.67***		
	(-5.72)	(-5.41)		
SMB			0.12***	-0.14***
			(3.03)	(-3.57)

HML			-0.25***	-0.02
			(-8.44)	(-0.45)
Constant	10.51***	9.57***	2.04***	0.41
	(5.84)	(4.10)	(4.48)	(0.93)
Observations	18,797	14,726	18,797	14,726
R-squared	0.0082	0.0060	0.0125	0.0025
Adj. R-squared	0.0079	0.0056	0.0122	0.0020

Notes: This table compares the effect of investor sentiment on future excess returns for stocks before and after the financial crisis. In Panel A, a speculative dummy is used. In Panel B, credit rating risk values are used. Columns (1) and (2) are BW empirical specifications, while Columns (3) and (4) are Fama–French ones. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

[Table 8] Results with Price Effect and Liquidity

Panel A. BW specification with Price and Liquidity

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$
CRRdummy	-1.668***	-1.035***		
	(-5.50)	(-2.67)		
CRRdummy*BSIdummy		-1.544***		
		(-2.95)		
CRR			-0.303***	-0.228***
			(-5.73)	(-3.51)
CRR*BSIdummy				-0.147**
				(-2.46)
BSIdummy		0.061		0.909**
		(0.32)		(2.04)
Ex Mkt Return	0.126***	0.127***	0.128***	0.128***
	(8.01)	(8.05)	(8.11)	(8.12)
BTM	0.926**	0.915**	0.943***	0.931***
	(2.57)	(2.56)	(2.61)	(2.58)
Size	-0.489***	-0.469***	-0.612***	-0.585***
	(-6.26)	(-6.06)	(-7.01)	(-6.71)
Log(Stock Price)	-0.013	-0.030	-0.203*	-0.204*
	(-0.13)	(-0.29)	(-1.76)	(-1.77)
Liquidity	-22.770***	-22.000***	-22.244***	-21.713***
	(-5.11)	(-4.92)	(-4.99)	(-4.86)
Constant	7.204***	7.088***	12.590***	11.776***
	(7.20)	(7.12)	(7.41)	(6.69)
Observations	33,523	33,523	33,523	33,523
R-squared	0.0081	0.0086	0.0089	0.0093
Adj. R-squared	0.00794	0.00837	0.00870	0.00902

Panel B. FF specification with Price and Liquidity

VARIABLES	(5) Ex Return$_{t+1}$	(6) Ex Return$_{t+1}$	(7) Ex Return$_{t+1}$	(8) Ex Return$_{t+1}$
CRRdummy	-1.246***	-0.578		
	(-4.03)	(-1.45)		
CRRdummy*BSIdummy		-1.681***		
		(-3.19)		
CRR			-0.176***	-0.093
			(-3.63)	(-1.52)
CRR*BSIdummy				-0.178***
				(-2.96)
BSIdummy		-0.062		0.975**
		(-0.34)		(2.19)
Ex Mkt Return	0.160***	0.161***	0.160***	0.161***
	(10.15)	(10.22)	(10.18)	(10.23)
Log(Stock Price)	-0.445***	-0.447***	-0.576***	-0.560***
	(-6.13)	(-6.17)	(-5.54)	(-5.34)

Liquidity	-23.560***	-22.621***	-23.613***	-22.844***
	(-5.30)	(-5.08)	(-5.32)	(-5.13)
HML	-0.214***	-0.214***	-0.211***	-0.211***
	(-8.11)	(-8.11)	(-7.96)	(-7.99)
SMB	0.073**	0.075**	0.075**	0.076**
	(2.27)	(2.33)	(2.33)	(2.35)
Constant	6.007***	6.045***	8.376***	7.726***
	(8.05)	(8.07)	(6.40)	(5.61)
Observations	33,523	33,523	33,523	33,523
R-squared	0.0098	0.0104	0.0099	0.0105
Adj. R-squared	0.00959	0.0102	0.00968	0.0103

Notes: This table includes log(stock price) and liquidity measurement and shows the effect of investor sentiment on future excess returns for stocks. In Panel A, all columns use BW specifications. In Panel B, all columns use Fama–French specifications. Columns (1) and (2) use speculative dummies, while Columns (3) and (4) use risk values. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

[Table 9] Different Types of Investor Sentiments

VARIABLES	(1) Ex Return$_{t+1}$	(2) Ex Return$_{t+1}$	(3) Ex Return$_{t+1}$	(4) Ex Return$_{t+1}$
CRR	0.012	-0.008	-0.245**	-0.254**
	(0.13)	(-0.08)	(-2.41)	(-2.49)
Retail Sentiment	1.501***	1.450***	1.054**	1.047**
	(3.12)	(3.03)	(2.19)	(2.18)
Institutional Sentiment	1.328***	1.114**	0.789	0.766
	(2.59)	(2.16)	(1.54)	(1.49)
Foreign Sentiment	0.374	0.327	-0.062	-0.041
	(0.77)	(0.68)	(-0.13)	(-0.08)
CR*Retail Sentiment	-0.168**	-0.152**	-0.130*	-0.119*
	(-2.50)	(-2.27)	(-1.94)	(-1.78)
CR*Insti Sentiment	-0.062	-0.043	-0.039	-0.041
	(-0.89)	(-0.60)	(-0.55)	(-0.58)
CR* For Sentiment	0.038	0.025	0.031	0.030
	(0.56)	(0.37)	(0.46)	(0.46)
Ex Mkt Return	0.153***	0.063***	0.124***	0.035**
	(9.77)	(3.81)	(7.91)	(2.26)
HML	-0.218***	-0.268***		
	(-8.24)	(-9.79)		
HSMB	0.067**	0.034		
	(2.07)	(1.01)		
BTM			1.020**	1.042**
			(2.41)	(2.51)
Size			-0.633***	-0.657***
			(-7.54)	(-7.61)
Constant	0.078	-0.978	9.702***	8.026***
	(0.12)	(-1.11)	(6.05)	(4.66)
Observations	33,523	33,523	33,523	33,523
R-squared	0.0074	0.0204	0.0071	0.0192
Year Effect	No	Yes	No	Yes

Notes: This table includes sentiments of different types of investors and shows the effect of investor sentiment on future excess returns for stocks. Columns (1) and (2) use Fama–French specifications. Columns (3) and (4) give the results from the BW specification. Robust *t*-statistics are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

서식 있음: 양쪽, 단락의 첫 줄이나 마지막 줄 분리 허용, 단어 잘림 허용, 한글과 영어 간격을 자동으로 조절하지 않음, 한글과 숫자 간격을 자동으로 조절하지

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