Market Sentiment Deterioration and Stock Returns: The Case of the Japanese Electric Appliances Industry

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Abstract

This paper aims to clarify the characteristics of the return dynamics of the Japanese electric appliances industry stocks in markets with deteriorated investor sentiment. The contributions derived by our empirical analysis are as follows. First, this paper newly clarifies that high beta stocks show conjunctional behavior when investor sentiment is deteriorated in stock markets. Second, we also clarify that high size stocks also exhibit conjunctional behaviors in markets with deteriorated sentiment. Moreover, we further demonstrate that the conjunctional behaviors of high beta stocks and high size stocks do not have the same behavioral characteristics in markets with extremely declined investor sentiment.

Keywords: high beta stocks, implied volatility, investor sentiment, high size stocks

1. Introduction

Investor sentiment in financial markets is more and more paid attention to by academic researchers and practitioners. Representative academic researches with respect to this market sentiment were implemented by such studies as Lee et al. (1991), Barberis et al. (1998), Neal and Wheatley (1998), Daniel et al, (1998), Baker and Wurgler (2006), and Baker and Wurgler (2007). In addition, many new researches follow the above studies as seen in Tsuji (2006), Kurov (2010), Berger and Turtle (2012), Baker et al. (2012), Alimov and Mikkelson (2012), and Stambaugh et al. (2012). However, as far as we know, there seems to be little study which investigates the stock return dynamics when market sentiment is deteriorated. Focusing on this point, therefore, this paper aims to clarify the characteristics of return dynamics of the Japanese equities when market sentiment is deteriorated. This is our main objective of this paper. We focus on the Japanese electric appliances industry stocks because this is one of the most representative industries in Japan.

Our contributions in this paper are as follows. First, this paper newly clarifies that high beta stocks show conjunctional behavior when investor sentiment is deteriorated in stock markets. Second, we also clarify that large size stocks also exhibit conjunctional behavior when market sentiment is extremely declined. In addition, we further demonstrate that the conjunctional behaviors of high beta stocks and big size stocks do not have the same behavioral characteristics in markets with deteriorated investor sentiment.

The rest of the paper is organized as follows. First, Section 2 conducts literature review, Section 3 explains data and model, Section 4 presents the empirical results and interpretations, and Section 5 summarizes the paper.

2. Literature Review

This section briefly reviews the existing related literature. First, Barberis et al. (1998) and Daniel et al. (1998) build models of investor sentiment, and Lee et al. (1991) analyze the relation between investor sentiment and the closed-end fund puzzle. Further, Neal and Wheatley (1998), Baker and Wurgler (2006, 2007), Tsuji (2006), Berger and Turtle (2012), Baker et al. (2012), and Stambaugh et al. (2012) perform empirical analysis of investor sentiment in stock markets in general contexts. Above are all interesting and exciting studies, however, as we mentioned, there seems to be little study which investigates the stock return dynamics by focusing on the stock markets with deteriorated investor sentiment.

3. Data and Empirical Model

This section explains the data and our empirical model. Regarding the relations between market sentiment and stock

returns, there would not be perfect theory, thus we later introduce the empirical model. First, the full universe of our data of implied volatility (IV), which is an investor sentiment measure, is from January 5, 1998 to April 28, 2011. Namely, our implied volatility data derived from the Nikkei 225 options (from Osaka University) have daily frequency. By using these IV values and other data, we design our empirical research. To design our research effectively, we focus on extremely high IV dates in our above full samples. More specifically, for our empirical tests, we regard extremely high IV dates as those when IV exceeds the value of 80.0. As displayed from Tables 1 to 4, only 11 days are recognized as extremely high IV dates; namely these eleven days are the dates when market sentiment is deteriorated in our setting.

Table 1. The Results of Regressions: October 16, 27, and 28 in 2008

Panel A Statistics of the Japanese Electric Appliances Industry Stock Returns								
	October 16, 2008			October 27, 2008			October 28, 2008		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
	−10.193	−18.957	1.036	−6.677	−26.667	5.213	8.027	−7.216	24.316
	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis
	4.411	0.381	2.642	4.857	−0.447	4.727	6.080	0.220	3.151
Panel B Estimation Results								
	October 16, 2008			October 27, 2008			October 28, 2008		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	−5.681*	11.088**	9.175*	3.290	12.077**	11.300*	9.753**	−14.241*	−15.934*
p-value	0.067	0.033	0.088	0.351	0.035	0.059	0.049	0.087	0.055
BETA	−5.019***		−4.073***	−2.164		−1.638	−1.123		−2.856
p-value	0.001		0.006	0.190		0.327	0.585		0.178
SIZE		−1.471***	−1.237***		−0.786**	−0.709*		2.024***	2.178***
p-value		0.000	0.001		0.045	0.078		0.000	0.000
BM	0.387	−1.547**	−0.748	−1.653	−2.441**	−2.121*	−1.013	0.083	0.718
p-value	0.605	0.032	0.352	0.127	0.012	0.065	0.296	0.924	0.472
VOL	0.015	0.196*	0.184*	−0.024	0.058	0.058	0.027	−0.335	−0.335
p-value	0.854	0.069	0.080	0.783	0.485	0.479	0.799	0.150	0.144
TDTA	0.007	−0.036	−0.007	−0.043	−0.061**	−0.049	0.023	0.027	0.050
p-value	0.823	0.230	0.829	0.238	0.046	0.169	0.646	0.549	0.284
LAR	0.021	0.016	0.013	−0.002	−0.006	0.006	0.040	0.054	0.055
p-value	0.662	0.741	0.760	0.964	0.907	0.914	0.508	0.355	0.336
CFPS	−0.003*	−0.001	−0.001	−0.001	0.000	0.000	0.000	−0.003	−0.003
p-value	0.088	0.476	0.564	0.833	0.887	0.857	0.974	0.222	0.241
BEP	−0.006	−0.204	−0.082	−0.335*	−0.420***	−0.363**	−0.061	−0.046	0.058
p-value	0.963	0.118	0.532	0.053	0.008	0.042	0.750	0.767	0.748
Adj. R^2	0.121	0.135	0.190	0.074	0.088	0.087	−0.028	0.079	0.085
Obs.	116	116	116	116	116	116	116	116	116

Notes: We use the data of the Japanese electric appliances industry and implied volatilities derived from the Nikkei 225 options. Our full samples are 3,274 and the full daily sample period is from January 5, 1998 to April 28, 2011. We regard the markets when IV exceeds 80.0 as stock markets with deteriorated sentiment, and we perform the cross-sectional regressions for the days when market sentiment is deteriorated. Model 1 examines the beta effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Model 2 tests the size effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Further, Model 3 examines both beta and size effects with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. In panel A, 'Min.' denotes minimum value, 'Max.' denotes maximum value, and 'SD.' denotes standard deviation, respectively. In panel B, 'Constant' denotes constant term, BETA denotes the beta values of sample firms, SIZE means the market capitalization values of sample firms, BM denotes the book-to-market ratios of sample firms, and VOL means the yen trading volumes of sample firms. Further, TDTA means debt ratios of sample firms, LAR denotes the short-term liquidity to total asset ratios of sample firms, CFPS means the cash-flow per share, and BEP denotes EBITs to total asset ratios. Moreover, Adj. R^2 denotes the adjusted R-squared values and Obs. means the number of samples in our cross-sectional regressions. Further, we use the method of White (1980), thus p-values are robust to the heteroskedasticity of the error terms of regressions. *** denotes the statistical significance at the 1% level, ** denotes the statistical significance at the 5% level, and * denotes the statistical significance at the 10% level, respectively.

Table 2. The Results of Regressions: October 29, 30, and 31 in 2008

Panel A   Statistics of the Japanese Electric Appliances Industry Stock Returns

	October 29, 2008			October 30, 2008			October 31, 2008		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
	5.759	−9.028	20.253	7.772	−3.049	22.346	−2.536	−19.540	16.076
	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis
	5.526	0.265	3.261	4.332	0.079	3.725	4.476	−0.119	5.948

Panel B   Estimation Results

	October 29, 2008			October 30, 2008			October 31, 2008		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	7.549**	−5.915	−4.629	5.448*	−7.126	−5.290	1.346	22.456***	20.375***
p-value	0.022	0.436	0.547	0.060	0.230	0.382	0.633	0.000	0.000
BETA	3.069*		2.254	3.679***		2.965**	−4.835***		−3.529**
p-value	0.094		0.217	0.006		0.025	0.001		0.013
SIZE		1.147**	1.023*		1.076***	0.899**		−1.816***	−1.629***
p-value		0.028	0.055		0.006	0.024		0.000	0.000
BM	−1.873**	−0.518	−1.014	−1.175*	0.306	−0.384	0.600	−1.588**	−0.742
p-value	0.024	0.526	0.284	0.091	0.632	0.617	0.367	0.013	0.302
VOL	−0.156	−0.330***	−0.327***	−0.009	−0.164	−0.156	−0.091	0.162	0.159
p-value	0.272	0.004	0.004	0.928	0.143	0.170	0.548	0.139	0.156
TDTA	−0.035	−0.004	−0.021	0.005	0.041	0.017	−0.002	−0.048	−0.019
p-value	0.316	0.909	0.552	0.866	0.199	0.607	0.943	0.126	0.566
LAR	−0.093**	−0.086*	−0.086*	−0.003	0.004	0.003	0.053	0.040	0.042
p-value	0.037	0.067	0.057	0.944	0.925	0.938	0.198	0.249	0.244
CFPS	0.006***	0.004**	0.004*	0.002	0.001	0.001	−0.000	0.002	0.002
p-value	0.010	0.047	0.055	0.285	0.521	0.607	0.963	0.595	0.570
BEP	0.053	0.193	0.112	−0.020	0.133	0.028	−0.074	−0.276**	−0.146
p-value	0.749	0.219	0.520	0.876	0.323	0.832	0.588	0.031	0.277
Adj. R^2	0.174	0.195	0.198	0.080	0.087	0.109	0.126	0.214	0.246
Obs.	116	116	116	116	116	116	116	116	116

Notes: We use the data of the Japanese electric appliances industry and implied volatilities derived from the Nikkei 225 options. Our full samples are 3,274 and the full daily sample period is from January 5, 1998 to April 28, 2011. We regard the markets when IV exceeds 80.0 as stock markets with deteriorated sentiment, and we perform the cross-sectional regressions for the days when market sentiment is deteriorated. Model 1 examines the beta effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Model 2 tests the size effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Further, Model 3 examines both beta and size effects with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. In panel A, 'Min.' denotes minimum value, 'Max.' denotes maximum value, and 'SD.' denotes standard deviation, respectively. In panel B, 'Constant' denotes constant term, BETA denotes the beta values of sample firms, SIZE means the market capitalization values of sample firms, BM denotes the book-to-market ratios of sample firms, and VOL means the yen trading volumes of sample firms. Further, TDTA means debt ratios of sample firms, LAR denotes the short-term liquidity to total asset ratios of sample firms, CFPS means the cash-flow per share, and BEP denotes EBITs to total asset ratios. Moreover, Adj. R^2 denotes the adjusted R-squared values and Obs. means the number of samples in our cross-sectional regressions. Further, we use the method of White (1980), thus p-values are robust to the heteroskedasticity of the error terms of regressions. *** denotes the statistical significance at the 1% level, ** denotes the statistical significance at the 5% level, and * denotes the statistical significance at the 10% level, respectively.

Based on the above design, by also using return data and other market and accounting data (They are from Nikkei Inc.), we perform the cross-sectional regressions. Regarding accounting data, we use the data which are published at least six month before the dates of our cross-sectional regressions for the days when sentiment is extremely declined. We take the time span of six months because it needs time for market participants to understand the companies' financial conditions. Further, with respect to return data, they are 116 Japanese electric appliances industry firms' returns, and these firms are listed in the Tokyo Stock Exchange (TSE) First Section. Currently, the largest number of the electric appliances industry firms is included in the Tokyo Stock Price Index (TOPIX). Thus we consider that this industry is highly important for the Japanese equity markets, and thus we use these companies' data in this paper.

Writing our empirical model of cross-sectional regression in full form, the formula is as follows:

$$RET_i = \xi_0 + \xi_1 BETA_i + \xi_2 SIZE_i$$
$$+ \xi_3 BM_i + \xi_4 VOL_i + \xi_5 TDTA_i + \xi_6 LAR_i + \xi_7 CFPS_i + \xi_8 BEP_i + \eta_i \quad (1)$$

Where BETA denotes the beta values of sample firms, SIZE means the market capitalization values of sample firms, BM denotes the book-to-market ratios of sample firms, and VOL means the yen trading volumes of sample firms. Further, TDTA means the debt ratios of sample firms, LAR denotes the short-term liquidity to total asset ratios of sample firms, CFPS means the cash-flow per share, and BEP denotes the EBITs to total asset ratios. We use the method of White (1980) thus statistical significance of the coefficients of our regressions is robust to heteroskedasticity of regression error terms.

Table 3. The Results of Regressions: November 4, 7, and 13 in 2008

Panel A Statistics of the Japanese Electric Appliances Industry Stock Returns

	November 4, 2008			November 7, 2008			November 13, 2008		
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
	5.806	−3.751	34.483	−3.560	−17.836	4.615	−4.562	−17.526	5.988
	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis
	5.557	1.613	8.685	3.432	−0.399	4.806	3.520	−0.383	4.535

Panel B Estimation Results

	November 4, 2008			November 7, 2008			November 13, 2008		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	1.840	−11.739	−9.315	2.433	10.870**	8.833*	−3.821	7.809*	7.659*
p-value	0.580	0.178	0.301	0.237	0.020	0.063	0.131	0.071	0.096
BETA	4.571**		3.710*	−3.821***		−3.408***	−1.148		−0.228
p-value	0.028		0.089	0.000		0.001	0.442		0.883
SIZE		1.168**	0.934		−0.748**	−0.549		−1.006***	−0.991***
p-value		0.047	0.138		0.040	0.146		0.001	0.001
BM	−1.655***	0.105	−0.777	−0.621	−1.790***	−1.024**	0.378	−0.450	−0.400
p-value	0.009	0.904	0.357	0.152	0.001	0.024	0.464	0.400	0.530
VOL	−0.044	−0.187	−0.176	−0.017	0.098	0.090	−0.198***	−0.003	−0.005
p-value	0.614	0.134	0.164	0.808	0.400	0.453	0.002	0.961	0.942
TDTA	0.061	0.100**	0.072	−0.009	−0.042**	−0.016	−0.003	−0.015	−0.014
p-value	0.272	0.043	0.206	0.643	0.026	0.406	0.909	0.491	0.636
LAR	−0.002	0.007	0.006	0.004	−0.004	−0.002	−0.019	−0.026	−0.026
p-value	0.975	0.911	0.931	0.927	0.922	0.965	0.615	0.435	0.440
CFPS	0.000	−0.001	−0.001	0.002	0.003*	0.003*	−0.000	0.001	0.001
p-value	0.871	0.736	0.646	0.142	0.070	0.052	0.698	0.265	0.275
BEP	−0.086	0.099	−0.026	−0.187	−0.327***	−0.211*	0.084	0.019	0.027
p-value	0.474	0.458	0.836	0.101	0.010	0.064	0.564	0.870	0.850
Adj. R^2	0.114	0.111	0.132	0.121	0.078	0.134	0.016	0.090	0.081
Obs.	116	116	116	116	116	116	116	116	116

Notes: We use the data of the Japanese electric appliances industry and implied volatilities derived from the Nikkei 225 options. Our full samples are 3,274 and the full daily sample period is from January 5, 1998 to April 28, 2011. We regard the markets when IV exceeds 80.0 as stock markets with deteriorated sentiment, and we perform the cross-sectional regressions for the days when market sentiment is deteriorated. Model 1 examines the beta effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Model 2 tests the size effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Further, Model 3 examines both beta and size effects with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. In panel A, 'Min.' denotes minimum value, 'Max.' denotes maximum value, and 'SD.' denotes standard deviation, respectively. In panel B, 'Constant' denotes constant term, BETA denotes the beta values of sample firms, SIZE means the market capitalization values of sample firms, BM denotes the book-to-market ratios of sample firms, and VOL means the yen trading volumes of sample firms. Further, TDTA means debt ratios of sample firms, LAR denotes the short-term liquidity to total asset ratios of sample firms, CFPS means the cash-flow per share, and BEP denotes EBITs to total asset ratios. Moreover, Adj. R^2 denotes the adjusted R-squared values and Obs. means the number of samples in our cross-sectional regressions. Further, we use the method of White (1980), thus p-values are robust to the heteroskedasticity of the error terms of regressions. *** denotes the statistical significance at the 1% level, ** denotes the statistical significance at the 5% level, and * denotes the statistical significance at the 10% level, respectively.

Table 4. The Results of Regressions: November 20 and 21 in 2008

Panel A   Statistics of the Japanese Electric Appliances Industry Stock Returns

	November 20, 2008			November 21, 2008		
	Mean	Min.	Max.	Mean	Min.	Max.
	−4.706	−12.141	22.989	3.571	−21.495	13.404
	SD.	Skewness	Kurtosis	SD.	Skewness	Kurtosis
	3.928	2.797	22.495	4.081	−1.958	14.167

Panel B   Estimation Results

	November 20, 2008			November 21, 2008		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	0.715	15.351***	15.096***	4.919**	−2.604	−0.317
p-value	0.782	0.002	0.006	0.028	0.587	0.944
BETA	−1.468		−0.344	3.423**		3.062**
p-value	0.217		0.784	0.010		0.017
SIZE		−1.259***	−1.239***		0.629	0.449
p-value		0.000	0.000		0.121	0.244
BM	−0.038	−1.153***	−1.062**	−1.938**	−0.766	−1.583*
p-value	0.939	0.007	0.035	0.044	0.345	0.080
VOL	−0.153	0.158	0.158	−0.112	−0.232	−0.239
p-value	0.261	0.211	0.212	0.382	0.205	0.193
TDTA	−0.034	−0.049*	−0.046	−0.022	0.006	−0.018
p-value	0.268	0.059	0.141	0.350	0.788	0.447
LAR	0.004	−0.003	−0.003	−0.007	−0.001	−0.004
p-value	0.918	0.926	0.933	0.824	0.973	0.900
CFPS	−0.003**	−0.001	−0.001	0.001	0.000	0.000
p-value	0.043	0.502	0.499	0.506	0.775	0.757
BEP	−0.236	−0.318**	−0.304*	−0.040	0.111	−0.016
p-value	0.148	0.025	0.066	0.745	0.329	0.893
Adj. R^2	0.161	0.250	0.244	0.103	0.079	0.104
Obs.	116	116	116	116	116	116

Notes: We use the data of the Japanese electric appliances industry and implied volatilities derived from the Nikkei 225 options. Our full samples are 3,274 and the full daily sample period is from January 5, 1998 to April 28, 2011. We regard the markets when IV exceeds 80.0 as stock markets with deteriorated sentiment, and we perform the cross-sectional regressions for the days when market sentiment is deteriorated. Model 1 examines the beta effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Model 2 tests the size effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Further, Model 3 examines both beta and size effects with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. In panel A, 'Min.' denotes minimum value, 'Max.' denotes maximum value, and 'SD.' denotes standard deviation, respectively. In panel B, 'Constant' denotes constant term, BETA denotes the beta values of sample firms, SIZE means the market capitalization values of sample firms, BM denotes the book-to-market ratios of sample firms, and VOL means the yen trading volumes of sample firms. Further, TDTA means debt ratios of sample firms, LAR denotes the short-term liquidity to total asset ratios of sample firms, CFPS means the cash-flow per share, and BEP denotes EBITs to total asset ratios. Moreover, Adj. R^2 denotes the adjusted R-squared values and Obs. means the number of samples in our cross-sectional regressions. Further, we use the method of White (1980), thus p-values are robust to the heteroskedasticity of the error terms of regressions. *** denotes the statistical significance at the 1% level, ** denotes the statistical significance at the 5% level, and * denotes the statistical significance at the 10% level, respectively.

More specifically, we perform three types of regressions. First is Model 1, which examines the beta effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Second is the Model 2, which tests the size effect with controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. Finally, Model 3 examines both beta and size effects with again controlling the variables, BM, VOL, TDTA, LAR, CFPS, and BEP. We implement our regressions only for the dates when market sentiment is deteriorated, i.e., when IV exceeds the value of 80.0.

4. Empirical Results and Interpretations

This section describes our empirical results. As we documented, we perform cross sectional regressions by focusing on the dates when market sentiment is deteriorated. First, Table 1 exhibits the regression results of October 16, 27, and 28 in 2008. First, as to October 16, the variables of BETA and SIZE are statistically significant with the same sign as the mean value of returns of all Japanese electric appliances industry firms on the day in Models 1 and 2.

These results do not change in Model 3, which includes both BETA and SIZE in our regression. This means that high beta firms and large size stocks move to the same direction on the day when market sentiment is deteriorated. Further, as to the results of October 27 and 28 in 2008, the same strong results especially for big size stocks are recognized.

Second, Table 2 demonstrates the regression results as to October 29, 30, and 31 in 2008. This table shows that similar and stronger results as those in Table 1. That is, the variables of BETA and SIZE are statistically significant with the same sign as the mean value of returns of all Japanese electric appliances industry firms on those days in Models 1, 2, and 3. Only one exception is the result for BETA in Model 3 of October 29, 2008. Hence Table 2 strongly indicates that high beta firms and large size stocks move to the same direction with conjunctional behavior when market sentiment is extremely declined.

Furthermore, Tables 3 and 4 display the regression results as to November 4, 7, 13, 20, and 21 in 2008. These tables show the similar results as those in Tables 1 and 2. Namely, again the variables of BETA and SIZE are statistically significant with the same sign as the mean value of returns of all Japanese electric appliances industry firms on those days in Models 1, 2, and 3 although some exceptions exist. Therefore, our empirical results shown in Tables 1 to 4 indicate that high beta firms and large size stocks move with showing conjunctional behavior when market sentiment is deteriorated. Further, we can also interpret that high beta stocks and large size firms show some different conjunctional behavior because often both variables of BETA and SIZE are simultaneously significant in Model 3 in Tables 1 to 4.

5. Conclusions

This paper explored the characteristics of stock return dynamics of the Japanese electric appliances industry when market sentiment is deteriorated. The investigations in this paper derived the following novel contributions.

1. First, this paper newly clarified that high beta stocks presented conjunctional behavior when investor sentiment is deteriorated in stock markets.

2. Second, we clarified that high size stocks also exhibited conjunctional behavior in markets with extremely declined investor sentiment.

3. Furthermore, we also demonstrated that the conjunctional behavior of high beta stocks and high size stocks did not have the same behavioral characteristics in markets with deteriorated investor sentiment.

As above, our novel findings demonstrated in this paper will contribute to the body of academic researches of financial economics. We consider that future related works using our findings and related data may be also valuable, and these works are our future tasks.

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