Corporate Social Responsibility and Crash Risk for Japanese Firms

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Abstract

This paper investigates the relationship between corporate social responsibility (CSR) and crash risk of Japanese firms following Kim et al. [2014], who find that the effect of CSR mitigates firms' future stock price crash risk by substituting for a firm's weak governance mechanism. Only since August of this year has the Council of Advisers, conducted by the Financial Service Agency in Japan, started to consider establishing a Corporate Governance Code. It is important to test whether the effect of CSR and governance reduces crash risk of Japanese firms from a practical viewpoint. We find from our regression analysis that CSR practices in Japanese firms has no effect on reducing crash risk. As opposed to the argument of Kim et al. [2014], this result is consistent in firms with a weak governance mechanism. Next, we examine the effect of firms' governance mechanisms on crash risk by repeating the same analysis using several governance factors of the mechanism. However, we find no evidence that the governance mechanism reduces crash risk. Overall, these results suggest that corporate governance mechanism in Japanese firms is less effective.

1. Introduction

This paper investigates the relationship between corporate social responsibility (CSR) and crash risk of Japanese firms following Kim et al. [2014]. Using MSCI ESG date from 1994-2008, and match the data with the 1995-2009 stock return data from the Center for Research in Security Prices (CRSP), they found that corporate social performance is negatively associated with one-year ahead stock price crash risk. This result implies that CSR effects mitigate firms' future stock price crash risk. They also found that this effect is more likely to be observed when firms have weak governance mechanisms. One suggested explanation for socially responsible firms having lower crash risk is because they commit to a high standard of transparency and engage in less bad news hoarding.

Our purpose in this paper is to apply the model created Kim et al. [2014] to the case of Japanese firms. Only since August of this year has the Financial Service Agency set up the Council of Advisers in order to establish the Corporate Governance Code. It is important to test if CSR effects or governance mechanisms reduce crash risk of Japanese firms from a practical viewpoint.

Our findings can be summarized in two points. First, as opposed to the argument of Kim et al. [2014], we find in our regression analysis that CSR practices in Japanese firms have no effect on reducing crash risk. Second, we find no evidence that the firms' governance mechanisms reduce crash risk.

The remainder of the paper is organized as follows. Section 2 discusses variables and empirical methodology. Section 3 presents the results and discusses alternative explanations and their implications. We conclude in Section 4.

2. Methodology

2.1 CSR variables

We calculate each firm's CSR score using the Corporate Social Responsibility Ranking data provided by Toyo Keizai Inc. This data provides four criteria: (i) human resource utilization; (ii) environment; (iii) social performance; and (iv) corporate governance. The CSR score ($CSR_{i,t}$) is a sum of variables (i) to (iii). Corporate governance (iv) was not include to distinguish the effects of governance and CSR. To eliminate the industry bias, we standardized $CSR_{i,t}$ into the $CSR\_SCORE_{i,t}$ by using 33 industry classification from Tokyo Stock Exchange to create ($IND\_CSR_{i,t}$), the CSR score of firms in the same industry. As described below, the $CSR\_SCORE_{i,t}$ is within the range of zero to one.

$$CSR\_SCORE_{i,t} = \frac{CSR_{i,t} - min(IND\_CSR_{i,t})}{max(IND\_CSR_{i,t}) - min(IND\_CSR_{i,t})} \quad - (1)$$

2.2 Measurement of crash risk

We construct two types of the crash risk following the specification of Kim et al. [2014], the yearly negative conditional skewness and down-to-up volatility of the firm-specific weekly returns. The crash risk calculations require two steps. First, we estimate firm-specific weekly returns ($W_{i,s}$) by running OLS regression in Equation (2) as indicated by expanded market model:

$$r_{i,s} = \alpha_i + \beta_{1,i} r_{m,s-2} + \beta_{2,i} r_{m,s-1} + \beta_{3,i} r_{m,s} + \beta_{4,i} r_{m,s+1} + \beta_{5,i} r_{m,s+2} + \varepsilon_{i,s} \quad - (2)$$

$$W_{i,s} = ln(1 + \hat{\varepsilon}_{i,s}) \quad - (3)$$

where $r_{i,s}$ is the stock return of firm *i* in week *s*, and $r_{m,s}$ is the return of TOPIX (Tokyo Stock Price Index) in week *s*. The firm-specific weekly return is defined as Equation (3), which is calculated as the natural logarithm of one plus the residual return estimated from Equation (2). In the second step, we derive two types of the crash risk using the firm-specific return from Equation (3). The first measure $NCSKEW_{i,t}$ is calculated as the yearly negative conditional skewness of firm-specific weekly returns over the fiscal year:

$$NCSKEW_{i,t} = -\frac{n(n-1)^{\frac{3}{2}} \sum_s (W_{i,s} - E[W_i])^3}{(n-1)(n-2)\left(\sum_s (W_{i,s} - E[W_i])^2\right)^{\frac{3}{2}}} \quad - (4)$$

where *n* is the number of observations for firm-specific returns of firm *i*, and $E[W_i]$ is the expectation of the firm-specific returns of firm *i*. The increase of $NCSKEW_{i,t}$ corresponds to an increase of crash risk due to multiplying the right-hand side in Equation (4) by negative one.[1] The second measure $DUVOL_{i,t}$ is calculated as the down-to-up volatility of the firm-specific weekly returns over the fiscal year:

$$DUVOL_{i,t} = log\left[\frac{\sum_{Down}(W_{i,s} - E[W_i])^2/(n_d - 1)}{\sum_{Up}(W_{i,s} - E[W_i])^2/(n_u - 1)}\right]$$

[1] If the crash risk of the firm-specific returns is high, the third moment of firm-specific returns will indicate negative sign due to a left-skewed distribution.

– (5)

where n_u and n_d is the number of observations for the firm-specific returns of firm *i* when the returns are above and below their annual mean, respectively. Equation (5) produces the ratio of the standard deviation of firm-specific returns, which is calculated when the returns is above and below the annual mean, respectively. Therefore, a higher crash risk implies a higher value of $DUVOL_{i,t}$.

2.3 Descriptive statistics and estimation method

The variable definitions are listed in Table 1. Following Kim et al. [2014], we employ the independent variables (Panel B) to investigate the relationship between CSR and the dependent variable crash risk (Panel A). In addition, we test the governance variables (Panel C) with the dependent variable crash risk (Panel A) to examine the effect of firms' governance mechanism on crash risk.

Table 1

Definitions of variables

Variables		Definition
Panel A: Dependent		
Crash risk	$Ncskew_t$	Negative skewness of firm specific weekly returns expressed as Equation 4
	$Duvol_t$	Log of the ratio of the standard deviations of down-week to up-week firm specific weekly returns expressed as Equation 5
Panel B: Independent		
Crash risk	$Ncskew_{t-1}$	Negative skewness of firm specific weekly returns expressed as Equation 4
	$Duvol_{t-1}$	Log of the ratio of the standard deviations of down-week to up-week firm specific weekly returns expressed as Equation 5
CSR score	Csr_score_{t-1}	CSR score expressed as Equation 1 collected from Toyo Keizai Inc.
Return	Ret_{t-1}	Mean of firm specific weekly returns over the fiscal year
Volatility	$Sigma_{t-1}$	Standard deviation of firm specific weekly returns over the fiscal year
Turnover	Dto_{t-1}	ΔAverage of (monthly trading volume / total number of shares outstanding during the month) over the fiscal year
Abnormal accrual	$Abacc_{t-1}$	Absoluet value of discretionary accruals estimated from Jones model
Market to book ratio	Mb_{t-1}	Market value of equity / book value of equity
Firm size	$Size_{t-1}$	Natural logarithm of market value of equity
Long-term debt ratio	Lev_{t-1}	Lont-term debt/Total assets
Return on assets	Roa_{t-1}	Ordinary profit/Total assets
Panel C: Governance		
Governance score	Gdis	Governance score collected from Bloomberg L.P.
Ratio of outside directors	Odr	Number of outside directors/total number of directors
Number of outside directors	NoOd	Number of outside directors
Company with comittees	Comm	Dummy variable that takes the value 1 if a sample firm is a company with comittees and 0 otherwise
Number of independent outside directors	NoID	Number of independent outside directors
Ratio of institutional shareholding	Inst	Percentage of shares outstanding owned by pension and foreign investors

Source: NFI

We next estimate Equation (6) by running the OLS regression:

$$Crash\_risk_t = \beta_0 + \beta_1(Csr\_score_{t-1}) + \beta_2(Crash\_risk_{t-1}) + \beta_3(Dto_{t-1}) + \beta_4(Ret_{t-1}) + \beta_5(Mb_{t-1}) + \beta_6(Size_{t-1}) + \beta_7(Sigma_{t-1}) + \beta_8(Lev_{t-1}) + \beta_9(Roa_{t-1}) + \beta_{10}(Abacc_{t-1}) + \beta_m(IDIndustry_t) + \beta_n(IDYear_t) + \varepsilon_t \quad - (6)$$

where $IDIndustry_t$ are indicator variables for 33 industry sectors defined by the Tokyo Stock Exchange, and $IDYear_t$ are indicator variables for fiscal years. To eliminate the effect of outliers, we winsorize outliers in all variables at the 1% level. We create a one-year lag for all independent variables to reduce a simultaneous bias. Based on the argument of Kim et al. [2014], we predict a negative coefficient of Csr_score_{t-1} if the effect of CSR mitigates firms' future stock price crash risk.

We collected data for companies listed in the first section of Tokyo Stock Exchange from the CSR Database of Toyo Keizai, Inc. ("*CSR Kigyo Soran*"). Our data sample comprises nonfinancial and non-utility firm-years over the period 2006–2013. We exclude from our sample the stock return data with fewer than 26 weeks in a given fiscal year.[2] We collected accounting data from Nikkei Needs and use consolidated accounting data when firms use such data. Table 2 presents the descriptive statistics for variables used in our analysis.

Table 2

Descriptive statistics

	Observations	Mean	Sd.	Min	Max
Ncskew	3,873	-0.142	0.726	-4.665	3.569
Duvol	3,873	-0.077	0.343	-1.461	1.715
Csr_score	3,288	0.573	0.279	0.000	1.000
Ret	3,873	-0.001	0.001	-0.015	0.000
Sigma	3,873	0.037	0.016	0.007	0.161
Dto	3,873	0.003	0.099	-1.095	2.005
Abacc	3,873	0.034	0.034	0.000	0.412
Mb	3,873	1.081	0.730	-0.571	12.502
Size	3,873	11.322	1.695	6.982	16.816
Lev	3,241	0.124	0.104	0.000	0.549
Roa	3,786	0.052	0.051	-0.390	0.517
Gdis	3,291	44.459	7.149	17.857	62.500
Odr	3,289	13.993	15.433	0.000	88.890
NoOd	3,287	1.318	1.493	0.000	13.000
Comm	3,873	0.034	0.181	0.000	1.000
NoID	2,798	0.885	1.321	0.000	13.000
Inst	3,873	0.187	0.134	0.001	0.769

Source: NFI

[2] In FY2014, we exclude the stock return data with fewer than 13 weeks.

3. Empirical results

3.1 Effect of CSR on crash risk

Table 3 presents the regression results of Equation (6). The regression results of the two measures of the crash risk (*Ncskew* and *Duvol*) for the both periods are exhibited in each column. The estimated coefficients on the first line and standard errors in parentheses on the second line are reported in each cell. In addition to our main analysis (model1, model2), we run the regression excluding the period between FY2008 and FY2009 (model3, model4) to deal with the effect of the recent financial crisis.[3] We find that the estimated coefficients for *Csr_score* are insignificant for all models. Contrary to the findings of Kim et al. [2014], these results indicate that the presence of CSR in Japanese firms has no effect on reducing crash risk.

Table 3

Regression results for the effect of CSR on crash risk

	Sample I		Sample II	
	entire period (FY2006-2013)		ex. financial crisis (FY2008-2009)	
	model 1	model 2	model 3	model 4
	Ncskew	Duvol	Ncskew	Duvol
Csr_score	0.046	0.026	0.050	0.024
	(0.068)	(0.033)	(0.084)	(0.042)
Ncskew	0.038*		0.057**	
	(0.020)		(0.023)	
Duvol		0.027		0.052**
		(0.020)		(0.024)
Dto	0.082	0.046	0.035	0.028
	(0.181)	(0.090)	(0.200)	(0.099)
Ret	-86.162	-34.931	-110.129*	-41.792
	(62.526)	(32.378)	(63.077)	(33.369)
Mb	0.041	0.030*	0.054	0.037*
	(0.036)	(0.016)	(0.043)	(0.019)
Size	0.056***	0.021***	0.059***	0.023**
	(0.016)	(0.007)	(0.020)	(0.009)
Sigma	-6.886**	-3.280**	-9.005***	-3.884**
	(3.200)	(1.619)	(3.453)	(1.758)
Lev	-0.179	-0.084	-0.251	-0.128
	(0.166)	(0.081)	(0.198)	(0.095)
Roa	0.711	0.234	0.582	0.057
	(0.445)	(0.211)	(0.558)	(0.264)
Abacc	0.496	0.430**	0.467	0.376
	(0.409)	(0.216)	(0.495)	(0.254)
Constant	-0.297	-0.092	-0.358	-0.159
	(0.265)	(0.141)	(0.283)	(0.146)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Observations	2,757	2,757	2,138	2,138
R-squared	0.074	0.066	0.077	0.064

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: NFI

[3] By doing the same regression excluding the period between FY2010 and FY2011, we confirm that our main results are not affected by the effect of the Great East Japan Earthquake.

Next, we investigate the arguments discussed in Kim et al. [2014], reporting that the mitigating effect of CSR on crash risk only impact firms with weak governance and suggesting that the negative relationship between CSR and crash risk is driven by effective corporate governance. First, we calculate the average corporate governance variables in each sample firm. For example, each firm's governance score (Table 4, Panel A) has been evaluated every year and the average shows the strength of each firm's governance through the entire period. Using the average governance score, we estimate the median and divided sample firms into groups by it. The weak governance firms have lower than the median, and strong governance firms are the remaining firms. Then, we repeat the OLS regression for each subsample of governance type.[4] Following the argument of Kim et al. [2014], we expect that the coefficient of CSR may be significant only for the subsample consisting of firms with weak corporate governance. Table 4 presents the results.

[4] The sample median of corporate governance variables in each panel are 43.53 (Panel A), 9.56% (Panel B), 1 (Panel C), 0.38 (Panel E), and 17.22% (Panel F), respectively. In Panel C, subsample is actually classified by firms with no outside directors and others. The same is true for Panel E. Panel D is excluded.

Table 4

Effect of CSR on crash risk for subsamples classified by corporate governance variables

Panel A: Governance score			
low		high	
Ncskew	Duvol	Ncskew	Duvol
-0.003	-0.013	0.120	0.073*
(0.110)	(0.055)	(0.086)	(0.044)
Panel B: Ratio of outside directors			
low		high	
Ncskew	Duvol	Ncskew	Duvol
0.028	0.017	0.135	0.066
(0.096)	(0.050)	(0.099)	(0.045)
Panel C: Number of outside directors			
small		large	
Ncskew	Duvol	Ncskew	Duvol
0.054	0.021	0.106	0.057
(0.108)	(0.053)	(0.092)	(0.046)
Panel D: Company with comittees			
not applicable		applicable	
Ncskew	Duvol	Ncskew	Duvol
0.401	0.267	0.026	0.016
(1.008)	(0.529)	(0.069)	(0.034)
Panel E: Number of independent outside directors			
small		large	
Ncskew	Duvol	Ncskew	Duvol
0.110	0.051	0.033	0.022
(0.090)	(0.045)	(0.104)	(0.052)
Panel F: Ratio of institutional shareholding			
low		high	
Ncskew	Duvol	Ncskew	Duvol
0.047	0.019	0.121	0.074*
(0.120)	(0.058)	(0.077)	(0.039)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: NFI

This table shows the estimated coefficients of *Csr_score* in Equation (6) examining for subsamples classified by corporate governance variables indicated in each panel. Similar to the results in Table 3, most of the figures in Table 4 are not statistically significant regardless of the strength of firms' corporate governance. The estimates for firms with strong corporate governance, shown in Governance score (Panel A) and Ratio of institutional shareholding (Panel F), are the statistically significant at the 10% level. However, the observed signs are positive, which is inconsistent with Kim et al. [2014]. These results indicate that CSR behavior in Japanese firms has no effect on reducing crash risk regardless of the strength of firms' corporate governance.

3.2 Effect of governance mechanism on crash risk

Finally, we check the direct effect of firms' governance mechanism on crash risk, while using

the subsamples of CSR from the prior section. Therefore, we re-estimate our regression model using each governance variable indicated in Governance (Panel C) of Table 1 instead of *Csr_score*. Table 5 presents the results.

Table 5

Regression results for the effect of corporate governance factors on crash risk

	model 1	model 2	model 3	model 4	model 5	model 6	model 7	model 8	model 9	model 10	model 11	model 12
	Ncskew	Duvol	Ncskew	Duvol	Ncskew	Duvol	Ncskew	Duvol	Ncskew	Duvol	Ncskew	Duvol
$Gdis_{t-1}$	0.004*	0.001										
	(0.002)	(0.001)										
Odr_{t-1}			0.001	0.001								
			(0.001)	(0.000)								
$NoOd_{t-1}$					0.000	0.002						
					(0.010)	(0.005)						
$Comm_{t-1}$							0.037	0.024				
							(0.068)	(0.035)				
$NoID_{t-1}$									0.020*	0.010*		
									(0.011)	(0.005)		
$Inst_{t-1}$											0.182	0.059
											(0.146)	(0.074)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,742	2,742	2,747	2,747	2,746	2,746	3,176	3,176	2,345	2,345	3,176	3,176
R-squared	0.089	0.079	0.085	0.075	0.085	0.074	0.073	0.063	0.086	0.075	0.074	0.063

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: NFI

This table reports the results of the corporate governance variables in place of *Csr_score* in Equation (6). The estimated coefficients of other independent variables are not shown. Although the estimates of model 1, model 9, and model 10 are statistically significant at the 10% level, none of them have a negative sign as predicted. Again, these results indicate that corporate governance factors also have no effect on reducing crash risk, counter to arguments from Kim et al. [2014].

3.3 Further discussion

In this section, we discuss alternative explanations for the lack of effects from our regression analysis between CSR behavior in Japanese firms and reducing the crash risk. Our findings indicate that CSR in Japanese firms is not related to their commitment for financial reporting transparency and their engagement in less bad news hoarding. Furthermore, the lack of effects indicates that corporate governance mechanism in Japanese firms is less effective. In general, Japanese firms allow their CSR departments to function independently of the corporate

business strategy. If an increasing number of Japanese firms strategically coordinate with the other departments such as the IR Department, we may observe the predicted sign of *Csr_score* in our analysis.

However, two caveats should be considered for our findings described above. First, it is not obvious that the effect of CSR mitigates firms' future stock price crash risk. While intuitively plausible, Kim et al. [2014] do not directly confirm that firms' bad news hoarding behavior cause the crash risk. Moreover, as Belghitar et al. [2014] suggest that social responsible investing (SRI) indices have higher risk than conventional ones. This implies that firms with strong corporate governance and advanced CSR may have higher crash risk.[5] In such a situation, we would not be surprised to find results similar to our regression results.

Second, declines in stock prices might have spurious correlation due to the lapse in time between a negative event impacting a firm and its public disclosure. In general, negative events tend to amplify in seriously over time. In other words, the crash risk simply depends on the significance of the event, not on the time of the disclosure. To deal with issues described above in future research, we will have to run the regression analysis controlling for the extent of negative information and the length of time spent on disclosure of it.

4. Conclusion

This paper investigates the relationship between CSR and crash risk of Japanese firms following Kim et al. [2014]. As opposed to the results of Kim et al. [2014], our regression analysis results show that CSR in Japanese firms has no effect on reducing crash risk. This evidence for CSR and crash risk is not impacted by the strength of firms' corporate governance. Finally, we analyze the effect of firms' governance mechanism on crash risk by replacing the CSR variables with several governance factors. However, we find no evidence that the governance mechanism reduces crash risk. Although there are future questions to address, the results of this study suggest that Japanese firms may need to improve their governance mechanism.

[5] Belghitar et al.[2014] show the result that conventional indices have 27% higher skewness and 15% lower kurtosis than SRI ones. They suggest that their findings imply risk averse investors can improve their expected utility by reducing their holdings of SRI firms and purchasing conventional ones.

References

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