The Bidirectional Relationship between CSR Investments and Economic Performance: An Analysis Using a Simultaneous Equations Model

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Abstract

This paper investigates the bidirectional relationship between corporate social responsibility (CSR) investments and economic performance. We analyze three types of CSR investments: investments in environmental protection initiatives (environmental investments), investments in labor-related initiatives particularly those that promote women's employment (female labor-related investments), and investments in all other initiatives that contribute to society (other social investments). Further, we identify the determinants of these CSR investments and determine the effect of each type of investment on firm performance. The analysis uses a simultaneous equations model with a dataset of 185 Japanese firms. We find that environmental investments reduce economic performance, labor-related investments do not significantly affect economic performance, and other social investments increase economic performance. Moreover, we find that economic performance decreases environmental investments, increases labor-related investments, and does not affect other social investments. These results have important implications for both firm managers and policy makers. For managers, the results suggest that CSR investments are not necessarily effective for improving economic performance. However, this does not mean that firms should completely eradicate CSR investments. Rather, this result suggests that CSR investments are a hygiene factor in that they do not necessarily lead to higher performance, but their absence can worsen performance. For policy makers, the results suggest that different approaches may be adopted to encourage firms to increase their CSR investments. For example, policy makers can implement policies to encourage firms or rely on the firms' initiatives. Which approach is effective depends on the type of CSR investment and how the firms view the types of CSR investment.

Keywords: corporate social responsibility; economic performance; simultaneous equations model; corporate reputation; Japanese firms

JEL codes: M21, M14, D22

1. Introduction

Corporate social responsibility (CSR) investments have increased over the past decade owing to the greater number of corporate stakeholders who take such investments into account when choosing which firms to support. According to Jamali and Mirshak (2007), corporate social responsibility is an organization's "obligation to work towards meeting the needs of a wider array of stakeholders." These CSR investments involve corporate efforts toward environmental protection, donations to social activities, and policies for labor issues. Through these investments, a firm can attain recognition as a socially thoughtful firm and consequently gain support from its stakeholders. Thus, the overarching purpose of a firm's CSR investments is to build corporate reputation, which in turn leads to higher profit.

Nevertheless, firm managers sometimes wonder what these investments contribute to firm performance in reality. Although scholars have examined the effect of CSR on firm performance, the findings remain mixed because most studies in this area overlook closely related issues such as the determinants of CSR and the possible bidirectional relationship between CSR and economic performance. This study thus broadens the discussion in order to enable firm managers to improve organizational decision making with regard to CSR.

In this study, we investigate the following two research questions: (1) do CSR investments enhance a firm's economic performance, and furthermore, (2) does the level of CSR investment depend on the firm's economic performance? The first question concerns the effect of CSR investments on economic performance, while the second is about the inverse relationship, namely the effect of economic performance on CSR investments.

Previous studies, such as those by Hart and Ahuja (1996), Waddock and Graves (1997), and Balabanis *et al* (1998), focus exclusively on the first question. Therefore, the purpose of this study is to investigate the above two questions simultaneously in order to capture the potential unknown interactions between CSR investments and economic performance. To do this, we use the simultaneous equations model approach, which has been commonly applied to analyze bidirectional relationships in the literature.

Based on Brammer *et al* (2006), we define three types of CSR investments in our analysis: investments in environmental protection initiatives (hereafter "environmental investments"), investments in labor-related initiatives, particularly those that promote women's employment (hereafter "female labor-related investments"), and investments in all other initiatives that contribute to society (hereafter "other social investments"). Environmental investments, one of the best-known CSR initiatives, include reducing toxic waste, managing supply chain efficiency, and improving operating processes. Female labor-related investments include policies that promote managerial posts and programs for skill improvement for female employees. Other social investments include initiatives such as volunteering and promoting culture, the arts, sports, and education. In order to simplify the analysis, since the last type of investments differs widely by firm, we define this category as all other CSR investments not categorized into either the first or the second types. According to Balabanis *et al* (1998) and Brammer *et al* (2006), these three types of investments capture the majority of CSR investments.

This study makes three contributions to the body of knowledge on this topic. First, we empirically examine the bidirectional relationship between CSR investments and economic performance. Although some previous studies have investigated the effect of CSR investments on a firm's economic performance,

most have overlooked the inverse relationship. In fact, Waddock and Graves (1997) suggest that while CSR can lead to a firm's high performance, an inverse relationship might also be observed in high-performing firms that tend to invest in CSR aggressively. It is well known that ignoring such bidirectional relationships causes severe bias in the estimation, called simultaneity bias, which can lead to a misinterpretation of the results. By focusing only on the effect of CSR investments on economic performance and not on the inverse relationship, we cannot sufficiently determine whether performance increases CSR investments or vice versa.

Second, this study clarifies the determinants of CSR by specifying the investment function of each CSR. As stated above, most previous studies focus on the effect of CSR on economic performance. However, the factors that affect the level of CSR investments have rarely been assessed. By clarifying the determinants of CSR investments, we can provide suggestions for firm managers who want to use CSR to improve firm performance and for policy makers who want to encourage firms to increase their CSR investments.

Third, this study considers several types of CSR investments and determines how each type of CSR investment affects firm performance. The wide variety of possible CSR initiatives may make it difficult for firms to decide which initiatives to invest in. However, most previous studies focus on one type of CSR investment, for example, environmental protection (e.g., Hart and Ahuja, 1996; Stanwick and Stanwick, 1998), or use an integrated indicator such as CSR ratings (e.g., Cochran and Wood, 1984; Marquez and Fombrun, 2005). Focusing on one type of CSR investment and ignoring others can lead to biased results. For example, while studies focusing only on environmental investment argue that it enhances a firm's financial performance (e.g., Stanwick and Stanwick, 1998), studies that consider several types of CSR investments show that environmental investment worsens financial performance (e.g., Brammer *et al*, 2006).

The remainder of this paper is organized as follows. Section 2 reviews the literature and formulates the hypotheses to be tested in the analysis. Based on these hypotheses, section 3 creates the empirical model using a simultaneous equations model and explains the data and defines the variables. Section 4 presents the estimation results and discusses the hypotheses. Section 5 summarizes the major findings.

2. Theoretical Background

2.1 Literature Review

While previous studies provide evidence of the unidimensional relationship between CSR investments and financial performance, most ignore the simultaneous bidirectional relationship between these two factors. For example, Stanwick and Stanwick (1998) suggest that improved environmental performance enhances overall financial performance. Likewise, King and Lenox (2001) and Al-Tuwaijri *et al* (2004) indicate that a firm's environmental performance contributes to its overall financial performance. In addition, Brammer *et al* (2006) show that corporate social performance positively influences financial performance. These studies all assume that CSR investments are a determinant of corporate financial performance and that the level of the investments is determined exogenously.

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However, Waddock and Graves (1997) claim that there may be an inverse relationship between these two constructs, that is, that a firm's economic performance also influences its level of CSR investments. Highly profitable firms can afford to invest in CSR compared with lower performing firms. This inconsistency in the literature suggests the need to further analyze the potential bidirectional relationship between CSR and economic performance.

Some previous studies such as that by Waddock and Graves (1997) recognize the possibility of an inverse causal relation, that is, that financial performance affects CSR investment. However, although Waddock and Graves' (1997) two hypotheses are similar to ours, they investigated the two hypotheses separately, ignoring the potential simultaneous occurrence and hence leading to potentially biased results. In their analysis, CSR investments and firm performance are assumed to be determined exogenously. By considering either performance or CSR investments as a given, their study was not able to capture the simultaneous interaction between these two factors.

The other gap in the body of knowledge on this topic is the failure of previous studies to assess the various types of CSR investments. As mentioned earlier, most previous studies focus on a specific investments such as that in environmental protection (e.g., Hart and Ahuja, 1996; Stanwick and Stanwick, 1998; King and Lenox, 2001; Al-Tuwaijri *et al*, 2004). These studies show that a firm's investment in environmental protection is positively related to its overall financial performance. However, ignoring other CSR investments can lead to biased results. Some studies that examined several types of CSR investments, such as those by Balabanis *et al* (1998) and Brammer *et al* (2006), show that environmental investment has a negative effect on financial performance. The lack of consensus in the existing literature suggests that focusing on one type CSR investment may result in severely biased analyses.

In summary, to the best of our knowledge, no study has investigated the potential simultaneous bidirectional relationship between economic performance and the various types of CSR investments. Some studies have examined the various types of CSR investments but not their potential bidirectional relationship with economic performance, whereas others have examined the potential bidirectional relationship but only consider one type of CSR investment. In this study, we overcome the above limitations by examining three major types of CSR investments using a simultaneous equations model in our empirical analysis.

2.2 Hypotheses Development

We formulate the hypotheses based on the potential bidirectional relationship between each type of CSR investment and economic performance. In this study, we define three types of CSR investments referring to a study by Brammer *et al* (2006): environmental investments, female labor-related investments, and other social investments.

First, we hypothesize that CSR investments will improve a firm's financial performance. In reality, CSR investments can both positively and negatively affect financial performance. For example, by investing in environmental conservation, a firm can become recognized as a "green" company by society and gain approval from shareholders, consumers, community residents, and the government. Similarly, by contributing to initiatives that further women's employment, a firm can become recognized as a company that promotes equal employment opportunities, which then attracts stakeholders that share the same values.

However, such investments require additional costs representing an increase in the firm's expenditures. For example, in order to reduce toxic waste, specific equipment such as filtering apparatus are required. Therefore, these investments can negatively impact financial performance by imposing additional expenditures. However, we hypothesize that the positive effect of such investments on the firm's reputation will outweigh the negative impact of the additional costs. This is because, as Fombrun and Shanley (1990) state, additional costs can be covered by premium prices which occur from improved corporate reputation.

In fact, most empirical studies show that CSR performance positively influences overall financial performance (e.g., Balabanis *et al*, 1998; King and Lenox, 2001; MacInnes, 2005; Brammer *et al*, 2006). Based on the above discussion, we formulate the following hypotheses on the effect of CSR investments on economic performance:

> *[H1a] Environmental investments improve a firm's economic performance.*
> *[H1b] Female labor-related investments improve a firm's economic performance.*
> *[H1c] Other social investments improve a firm's economic performance.*

Next, we hypothesize the effects of economic performance on CSR investments. We expect a firm's economic performance to increase its investment in each type of CSR. According to Waddock and Graves (1997), high-performing firms invest more in CSR since they tend to have more "organizational slack" compared with low-performing firms. Organizational slack refers to the idle resources of a firm, representing extra materials, equipment, and financial and human resources. These slack resources accumulate as a firm's performance improves.

Similarly, O'Riordan and Fairbrass (2008) found that the adoption of CSR initiatives is determined by the level of success of a firm, which is measured by its profitability. According to them, the level of success of the firm is a significant factor that determines the level of CSR investment that stakeholders expect from the firm. Thus, the more successful a firm is, the higher the stakeholders' expectations of the firm's CSR investments, resulting in higher actual CSR investments.

In fact, most empirical studies such as that by such as Chih *et al* (2010) show that high-performing firms tend to behave in more socially responsible ways. Accordingly, our hypotheses on the effects of economic performance on CSR investments are formulated as follows:

> *[H2a] The better a firm's economic performance, the greater its environmental investments.*
> *[H2b] The better a firm's economic performance, the greater its female labor-related investments.*
> *[H2c] The better a firm's economic performance, the greater its other social investments.*

3. Model and Data

3.1 Empirical Model

The model structure used to test the hypotheses described in section 2 is shown in equations (1) and (4). Because we consider economic performance and CSR investments to be simultaneously determined, we formulate the simultaneous equations system as follows:

$$P = \alpha_1 + \alpha_2\, CSR_{ENV} + \alpha_3\, CSR_{WOMEN} + \alpha_4\, CSR_{SOCIAL} + \alpha_5\, ORG_{SIZE} + \alpha_6\, ORG_{SAL} + \alpha_7\, GOV_{CON} + \alpha_8\, GOV_{FOREIGN} + \alpha_9\, GOV_{MANAG} + \alpha_{10}\, GOV_{FINANC} + \alpha_{11}\, IND_{COMP} + \alpha_{12}\, IND_{MANUFAC} \tag{1}$$

$$CSR_{ENV} = \beta_1 + \beta_2\,P + \beta_3\,ORG_{SIZE} + \beta_4\,ORG_{VIS} + \beta_5\,SLACK_{ABS} + \beta_6\,SLACK_{UNABS} + \beta_7$$
$$IND_{GOV} + \beta_8\,IND_{MANUFAC} \qquad\qquad (2)$$

$$CSR_{WOMEN} = \chi_1 + \chi_2\,P + \chi_3\,ORG_{SIZE} + \chi_4\,ORG_{CHILD} + \chi_5\,ORG_{PARENT} + \chi_6\,ORG_{YEAR} + \chi_7$$
$$SLACK_{ABS} + \chi_8\,SLACK_{UNABS} + \chi_9\,IND_{MANUFAC} \qquad\qquad (3)$$

$$CSR_{SOCIAL} = \delta_1 + \delta_2\,P + \delta_3\,ORG_{SIZE} + \delta_4\,ORG_{AGE} + \delta_5\,ORG_{GROWTH} + \delta_6\,SLACK_{ABS} + \delta_7$$
$$SLACK_{UNABS} + \delta_8\,IND_{MANUFAC}, \qquad\qquad (4)$$

where CSR_{ENV} refers to environmental investments; CSR_{WOMEN} refers to female labor-related investments; CSR_{SOCIAL} refers to other social investments; P refers to economic performance; ORG_{SIZE} refers to organizational size; ORG_{SAL} refers to the average annual salary in the firm; ORG_{VIS} refers to organizational visibility; ORG_{CHILD} refers to the ratio of employees who take child-care leave to total employees; ORG_{PARENT} refers to the ratio of employees who take parental leave to total employees; ORG_{YEAR} refers to the average service years in the firm; ORG_{AGE} is the firm age; ORG_{GROWTH} is the firm growth rate; GOV_{CON} is the degree of concentration of the shareholdings; $GOV_{FOREIGN}$ refers to foreign ownership; GOV_{MANAG} refers to ownership by top management; GOV_{FINANC} refers to ownership by a financial institution; $SLACK_{ABS}$ is the absorbed slack; $SLACK_{UNABS}$ is the unabsorbed slack; IND_{COMP} is the degree of competition in the firm's industry; $IND_{MANUFAC}$ is the manufacturing industry dummy; and IND_{GOV} is governmental interference.

Our main research interest is to determine the effects of the *CSR* variables on *P* in equation (1) and the effects of *P* on the *CSR* variables in equations (2) to (4). The other variables are control variables. *ORG* refers to organizational characteristics, *GOV* refers to governance structure, *IND* refers to industrial characteristics, and *SLACK* refers to organizational slack. $SLACK_{ABS}$ represents the organizational slack that has accumulated as extra costs that have already been absorbed by a firm's business activities. Absorbed slack can be transformed into useful resources by reducing inefficiency. $SLACK_{UNABS}$ represents the organizational slack that has accumulated as unused resources that have not yet been absorbed by the firm's business activities and thus are yet to be treated. A firm can invest its unabsorbed slack immediately in various business activities. These control variables are based on Dunbar and Schwalbach (2000) and O'Riordan and Fairbrass (2008).

3.2 Sample and Data Sources

The dataset used in this analysis includes 185 Japanese firms in 2010. The firm data are obtained from NEEDS Financial QUEST by Nikkei Digital Media, while the CSR data are obtained from *CSR Kigyo Soran* provided by Toyokeizai. Taking the intersection of these two data sources generates the above sample dataset. We use data on Japanese firms because they provide significant information on CSR investments and governance structure.

3.3 Definition of the Variables

The definitions and summary statistics of the variables used in the analysis are shown in Table 1. We define ORG_{VIS} as advertising expenses because the more a firm spends on advertising, the more visible

it becomes. Thus, advertising expenses can be a good proxy for a firm's visibility. The definitions of $SLACK_{ABS}$ and $SLACK_{UNABS}$ are based on Riahi-Belkaoui (1998). IND_{COMP} is the inverse of the Herfindahl–Hirschman Index (HHI) based on sales. We take the inverse of the HHI because a high HHI means a high level of monopoly in an industry. By defining IND_{COMP} as the inverse of the HHI, a high level of IND_{COMP} means a high level of competition in an industry.

Table 1: Summary Statistics of the Variables[a]

Variable	Definition	Mean	Std. Dev.	Min	Max
P	Profit/total assets	0.008	0.039	-0.164	0.134
CSR_{ENV}	Investment in environmental protection initiatives (billion yen)	6.129	17.842	0.000	207.400
CSR_{WOMEN}	Ratio of female executives to total executives (%)	2.189	3.263	0.000	23.800
CSR_{SOCIAL}	Investment in all other initiatives that contribute to society (billion yen)	0.338	1.048	0.000	12.100
ORG_{SIZE}	Total assets (billion yen)	608.134	1093.865	6.455	10350.780
ORG_{SAL}	Average annual salary (billion yen)	6744.893	1408.709	4200.000	13215.260
ORG_{VIS}	Advertising expenses (billion yen)	2.782	6.868	0.000	50.723
ORG_{CHILD}	Ratio of employees who take child-care leave to total employees	0.010	0.019	0.001	0.228
ORG_{PARENT}	Ratio of employees who take parental leave to total employees	0.008	0.017	0.000	0.222
ORG_{YEAR}	Average service years in a firm	16.208	3.102	4.400	22.300
ORG_{AGE}	Years since company formation	69.189	22.971	4.000	125.000
ORG_{GROWTH}	Year-on-year percentage increase in revenue	-11.363	12.043	-63.680	33.680
GOV_{CON}	Ratio of stock held by top 10 shareholders	0.446	0.157	0.000	0.815
$GOV_{FOREIGN}$	Ratio of stock held by foreign shareholders	0.175	0.109	0.000	0.585
GOV_{MANAG}	Ratio of stock held by top management	0.011	0.034	0.000	0.289
GOV_{FINANC}	Ratio of stock held by financial institutions	0.309	0.126	0.000	0.548

$SLACK_{ABS}$	Absorbed slack (selling, general, and administrative expenses divided by cost of goods sold)	0.461	1.342	0.009	16.482
$SLACK_{UNABS}$	Unabsorbed slack (sum of cash and securities less current debt divided by sales)	-0.304	0.462	-3.869	1.130
IND_{GOV}	Ratio of stock held by government	0.005	0.043	0.000	0.500
IND_{COMP}	Inverse of the HHI[b] based on sales	10.319	9.565	1.013	48.322
$IND_{MANUFAC}$	Dummy variable for manufacturing industry (manufacturing industry = 1, others = 0)	0.741	0.440	0.000	1.000

[a]The number of the observations is 185 for all variables.

[b]Herfindahl–Hirschman Index.

4. Estimation Results

The estimation results are shown in Table 2. In addition to estimating the equations using three-stage least squares (3SLS), which considers the simultaneity among the equations, we also estimated the equations using ordinary least squares (OLS), which does not consider the bidirectional relationship among the equations but rather independently estimates each one. We start this section with a discussion of the results from the 3SLS regressions and then compare them with those from the OLS regressions.

Table 2: Estimation Results[a,b]

		3SLS		OLS	
Dependent Variable	Independent Variable	Coef.	Std. Error	Coef.	Std. Error
P	CSR_{ENV}	-0.0015**	(0.0007)	-0.0002	(0.0002)
	CSR_{WOMEN}	0.0018	(0.0020)	0.0009	(0.0008)
	CSR_{SOCIAL}	0.0269***	(0.0095)	0.0079	(0.0050)
	ORG_{SIZE}	-2.E-06	(1.E-05)	-4.E-06	(4.E-06)
	ORG_{SAL}	6.E-06*	(3.E-06)	9.E-06***	(2.E-06)
	GIV_{CON}	0.0091	(0.0190)	0.0260	(0.0224)
	$GOV_{FOREIGN}$	0.0135	(0.0236)	0.0178	(0.0295)
	GOV_{MANAG}	0.0172	(0.0699)	0.0393	(0.1056)
	GOV_{FINANC}	0.0027	(0.0214)	-0.0019	(0.0245)
	IND_{COMP}	0.0003	(0.0003)	0.0005*	(0.0003)
	$IND_{MANUFAC}$	0.0071	(0.0096)	0.0125	(0.0082)

	Constant	-0.0496	(0.0318)	-0.0820***	(0.0273)
	R-squared	-0.0471		0.1152	
CSR_{ENV}	P	-199.9629***	(41.2827)	-30.3159**	(14.8631)
	ORG_{SIZE}	0.0124***	(0.0009)	0.0113***	(0.0040)
	ORG_{VIS}	0.2222*	(0.1276)	0.4628	(0.3317)
	$SLACK_{ABS}$	1.4398**	(0.6850)	0.3982	(0.7154)
	$SLACK_{UNABS}$	4.7667**	(2.0621)	2.3596	(3.4187)
	IND_{GOV}	-43.9476**	(17.8362)	-53.9102**	(21.7902)
	$IND_{MANUFAC}$	4.7459**	(2.0367)	5.4549**	(2.4296)
	Constant	-2.9297	(2.0196)	-5.0428*	(2.9811)
	R-squared	0.4884		0.6045	
CSR_{WOMEN}	P	21.5237*	(11.2520)	6.6989	(4.2034)
	ORG_{SIZE}	-3.48E-05	(0.0002)	1.13E-05	(0.0001)
	ORG_{CHILD}	148.4496***	(44.2153)	165.2836*	(90.5992)
	ORG_{PARENT}	-108.9234**	(48.3665)	124.7244	(97.4935)
	ORG_{YEAR}	-0.0228	(0.0707)	-0.0431	(0.1176)
	$SLACK_{ABS}$	0.1059	(0.1931)	0.1768	(1.1469)
	$SLACK_{UNABS}$	0.0033	(0.5766)	0.1584	(0.6305)
	$IND_{MANUFAC}$	-1.2148**	(0.5181)	-1.2735*	(0.6535)
	Constant	2.6743**	(1.2134)	3.1160*	(1.7164)
	R-squared	0.1467		0.1796	
CSR_{SOCIAL}	P	2.3653	(3.8990)	0.7745	(1.4294)
	ORG_{SIZE}	0.0008***	(4.E-05)	0.0008***	(0.0002)
	ORG_{AGE}	2.34E-05	(0.0019)	-0.0006	(0.0017)
	ORG_{GROWTH}	0.0040	(0.0060)	0.0061	(0.0037)
	$SLACK_{ABS}$	1.1522***	(0.0407)	0.1606***	(0.0458)
	$SLACK_{UNABS}$	0.3967***	(0.1307)	0.4179***	(0.1601)
	$IND_{MANUFAC}$	0.3540***	(0.1096)	0.3581**	(0.1442)
	Constant	-0.3137*	(0.1684)	-0.2319*	(0.1302)
	R-squared	0.6438		0.6472	
N		185		185	

[a]Numbers in parentheses are standard errors.

[b]***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.1 Performance Function Results

The results from the performance function show that environmental investments (CSR_{ENV}) reduce economic performance. Thus, *[H1a]* is not supported. This suggests that the negative impact of the environmental investments on economic performance outweighs the positive effect of such investments. Although this finding is inconsistent with those of the previous studies that focus only on environmental investments (e.g., King and Lenox, 2001; Al-Tuwaijri *et al*, 2004), it is consistent with those of the studies

that considered several types of CSR investments (e.g., Balabanis *et al*, 1998; and Brammer *et al*, 2006). Thus, this finding shows the importance of considering the various types of CSR investments simultaneously. Further, the coefficient of CSR_{ENV} is only -0.0015, suggesting that the negative effect of the environmental expenditure on economic performance is minor. In other words, reduction of environmental expenditure by one billion yen increases ROA by only 0.0015, ceteris paribus.

In contrast, the results indicate that investments in female labor-related initiatives (CSR_{WOMEN}) do not have a statistically significant effect on economic performance. Thus, *[H1b]* is not supported. A possible explanation for this finding is that stakeholders consider such labor-related initiatives (e.g., initiatives that promote equal employment opportunities) as a standard part of firm operations. This is in contrast to findings of previous studies (e.g., Balabanis *et al*, 1998; Brammer *et al*, 2006) that found employment policies increase firm performance.

On the other hand, the results indicate that other social investments (CSR_{SOCIAL}) have a positive and significant effect on economic performance. Thus, *[H1c]* is strongly supported. This is consistent with findings of previous studies (e.g., Brammer *et al*, 2006). A possible explanation for this finding is that investing in various initiatives that contribute to society allows a firm to build or strengthen its corporate image, which in turn positively impacts its economic performance. However, the coefficient of CSR_{SOCIAL} is only 0.0269, which indicates that it might be difficult for a firm to actually reap the economic benefits from such investments. In order to increase ROA by 0.0269, ceteris paribus, a firm must increase its contributions to such initiatives by one billion yen. Considering that the average firm contribution to such initiatives is only 0.338 billion yen, one billion yen contribution would be challenging.

4.2 Results from the Investment Functions

First, the results show that the higher a firm's economic performance (*P*), the lesser its environmental investment. Thus, *[H2a]* is not supported. One possible reason for this finding is that investments in environmental protection has become a standard part of a firm's operations so that further investments beyond the minimum amount would not lead to improved reputation, and consequently, to better economic performance. Instead, a firm may choose to invest in other CSR initiatives that may provide further improvements in reputation and economic performance. As a result, the higher the level of a firm's performance, the lesser its investment in environmental protection initiatives. Moreover, the large coefficient of *P* indicates that environmental investments are sensitive to decreases in profitability.

Second, the results show that female labor-related investments increase a firm's performance. Thus, *[H2b]* is supported. By showing significant consideration to issues on women's employment, a high-performing firm demonstrates its sincere engagement in employment issues and consequently improves its reputation among potential employees and other stakeholders. The large coefficient of *P* indicates that the greater a firm's performance, the more it invests in initiatives that promote women's employment.

The results for two control variables, namely the manufacturing industry dummy and organizational slack, are worth discussing. The manufacturing industry dummy has a negative sign, suggesting that firms in other industries may be better engaged in employment issues. This outcome seems reasonable because labor-intensive industries face more labor issues than capital-intensive industries. The fact that both organizational slack variables ($SLACK_{ABS}$ and $SLACK_{UNABS}$) are not significant suggests that

firms view addressing employment issues as a necessary activity rather than a value-adding activity. Thus, the resources that a firm invests toward employment issues might not necessarily be organizational slack but rather resources especially reserved for necessary activities. The positive and significant effect of the organizational slack variables on environmental investments and other social investments indicates that these two types of investments are recognized by firms as value-adding activities, and female labor-related investments as necessary activities.

Third, the results show that other social investments are not influenced by economic performance. Thus, *[H2c]* is not supported. However, the positive sign of the coefficient indicates that high-performing firms tend to invest more in such initiatives. One of the control variables, organizational slack, is worth discussing. The results show that organizational slack increases investments in other social initiatives. This suggests that such investments are regarded by firms as value-adding activities.

4.3 Comparison between the 3SLS and OLS Regression Results

The substantial differences between the 3SLS and OLS regression results suggest the importance of the simultaneous analysis of CSR investments and economic performance. For example, with regard to the performance function, the effects of CSR_{ENV} and CSR_{SOCIAL} differ at a significant level between the 3SLS and OLS regressions. While the 3SLS results show that environmental investments decrease economic performance and that other social investments increase economic performance, the OLS results show that neither type of investment has a significant effect on economic performance. Meanwhile, with regard to the female labor-related function, the 3SLS results show that economic performance significantly increases female labor-related investments, but the OLS results show that economic performance does not significantly affect such investments. The magnitudes of some of the variables in the four equations also vary widely. In particular, the magnitudes of the coefficients of the endogenous variables in the 3SLS estimation are much lower than those in the OLS estimation. These differences suggest that the OLS results, which have been estimated independently rather than simultaneously, may have been influenced by bias caused by ignoring the two-way interaction between CSR investments and economic performance.

4.4 Policy implications

The results of our analysis suggest that CSR may not necessarily be effective investments for enhancing a firm's economic performance. In particular, environmental and female labor-related investments do not necessarily lead to higher performance. Similarly, a firm's other social investments would have to be significant before the firm can see the positive effects on performance. However, even though these results suggest that firms should not expect CSR investments to improve its reputation, this does not mean firms should not invest in CSR entirely. Rather, such investments may be hygiene factors in that they do not necessarily improve performance but their absence can worsen performance. For example, as the results of our analysis show, although female labor-related investments do not enhance economic performance, firms allocate significant resources for such investments. This suggests that since addressing labor-related issues is seen by society as a standard part of a firm's operations, completely eradicating such investments could severely damage a firm's image. Based on these results, we believe that the optimal amount of CSR investments that will help maximize a firm's performance can be determined.

From the policy makers' point of view, different approaches can be adopted in order to encourage firms to invest in CSR, depending on the CSR investment type. For example, to encourage environmental investments, implementing policies that especially encourage famous or large-sized firms may be effective. As our results show, ORG_{VIS} and ORG_{SIZE} increase environmental investment. Relying on firms' initiatives may not be the most effective way to increase such investments, since firms may not necessarily invest beyond the minimum amount they think is required for environmental protection initiatives. As our result of IND_{GOV} suggests, governmental regulation may also be ineffective because firms expect governmental protection from the competitive pressure. In contrast, relying on firms' initiatives can be an effective way to increase female labor-related investments because high-performing firms invest significantly in labor initiatives. As we mentioned previously, firms consider labor-related investments such as those that promote women's employment as a necessary activity, as indicated by the insignificant coefficients of the organizational slack variables. In this case, pressure from society rather than governmental policy may effectively increase such investments. Finally, to increase other social investments, implementing policies that especially encourage large-sized firms may be effective, as suggested by the coefficient of ORG_{SIZE}. It would be easier for policy makers to encourage firms to increase their other social investments than to encourage firms to increase their environmental investments because the effect of a firm's performance on other social investments is relatively neutral while that on environmental investments is strongly negative. As the results of our analysis show, other social investments are the only type of CSR among the three that positively affects economic performance, albeit the magnitude of the effect is small.

5. Conclusion

This study empirically examined the bidirectional relationship between economic performance and three types of CSR investments, namely environmental investments, female labor-related investments, and other social investments. Using a simultaneous equations model, we obtained the following results. First, environmental investments reduce economic performance. This suggests that the significant resources required for such investments outweigh whatever positive impact such investments have on the firm's reputation and consequently its performance. Second, labor investments, particularly those that promote women's employment, do not significantly affect economic performance. This is because stakeholders view a firm's engagement in labor issues as standard in modern enterprises. Third, other social investments have a positive and significant effect on economic performance. This suggests that such investments help improve a firm's reputation and consequently, its performance. Fourth, a firm's high economic performance leads to lesser environmental investments and more female labor-related investments, and does not affect other social investments. Moreover, our results suggest the importance of the simultaneous analysis of CSR investments and economic performance which considers the two-way interaction between them.

The results of our study provide important implications for both firm managers and policy makers. For firm managers, CSR investments may not necessarily be effective for improving economic performance. CSR investments can be a hygiene factor in that they do not necessarily lead to higher performance but their absence can worsen performance. Thus, we believe that the optimal amount of CSR investments that will maximize a firm's performance can be determined. The determination of this optimal amount is an interesting topic that may be explored in future research. Meanwhile, for policy makers,

different approaches can be adopted to encourage firms to increase their CSR investments. Depending on the type of CSR investment, policy makers can either implement policies to encourage firms or rely on firms' initiatives.

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