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Full Length Research Paper

Does corporate sustainability matter to investors?

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The benefits derived from a firm's sustainable development have been widely promoted. However, the influences have inconsistent conclusions from previous empirical studies, especially from the standpoint of firm value. This paper attempts to infer the determinants of a firm's value by exploring whether it predominantly reflects the commonly-used performance criteria in a financial market or a firm's sustainability nature. The Blinder-Oaxaca decomposition is employed to explain why the market value of sustainable leaders is higher, on average, than that of other firms. Our sample consists of U.S. S and P 500 companies from 1999 - 2002. The results suggest that not more than 40% of the difference (gap) can be explained by differing determinants of a firm's operation, financial, growth and industrial variables. It is therefore suggested that 'corporate sustainability' definitely counts as intangible assets that our investors have valued.

Key words: Corporate sustainability, firm value, blinder-oaxaca decomposition.

INTRODUCTION

'Corporate sustainability,' by definition, is a business approach that integrates economic, environmental, and social dimensions, to create long-term stakeholders' and stockholders' value. In other words, asides profit creation, sustainable company leaders capture quail-tative, non-financial criterion as references for their performance such as quality of management, corporate governance structures, reputation risks, human capital management, stakeholder relations, environmental protection, and corporate social responsibility. It is suggested that leading sustainable firms are more likely to produce stable earnings with fewer negative surprises. Corporate sustainability, on the other hand, can be deemed as continuous improvement taking care of multiple facets in which business committed to its stakeholders. Therefore, it can be also treated as a proxy for cultivated and disciplined management.

For a long time now, most investors have sought only financial returns from their investment. Taking sustainable benefits into investment strategies is not widely accepted, primarily because a firm's efforts on their environmental and social performance are considered as an expense, which is a minus to business profitability. However, there are a growing number of investors who are now gaining awareness of the role of a firm's sustainable development policies. For example, the growth rate of sustainability and ethical investments from the financial market is up to 70% per year in Europe and North America. The ethical funds in the UK are between £50 billion to £100 billion, while socially-screened funds are estimated to be 2 trillion US dollars (Knoepfel, 2001). Global indexes, such as FTSE4Good Index and Dow Jones Sustainability Group Indexes, are designed for the purpose of measuring the performance of companies that meet global corporate responsibility standards.

According to Launched (1999), the Dow Jones Sustainability Group Indexes (DJSGI) are the first global indexes to track the financial performance of leading sustainability-driven companies worldwide. Every year, the top 10% leading sustainability companies in each of ten economic sectors (consumer non-cyclical, consumer cyclical, energy, healthcare, financial, telecommunication, basic materials, technology, industrial, and utilities) are selected from the Dow Jones Global Index (DJGI) which includes 2,000 world companies. The DJSGI is a family of 20 different indexes, and 5 of these indexes are geographical in character: the world as a whole, Europe, North America, the Asia-Pacific region, and the U.S.A. A set of criteria and weightings is used to assess the

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performance covering from economic, environmental, and social developments for the eligible companies as shown in Figure 1. The information is from the SAM (Sustainable Asset Management) questionnaire, company documenttation, media and stakeholder reports, other publicly available information, and personal contact with companies. Those companies included in the DJSGI, benefit from the growing demand for sustainability-related investments.

As there is an emerging new investment pattern reconciling corporate sustainability and investment, it is worth asking: Is corporate sustainability accounted as a role while measuring a firm's value? Previous studies relating to this topic are mostly focusing on a firm's corporate social responsibilities (CSR) to its financial performance, but with inconsistent conclusions. While some studies found positive relationship between (CSR) and profitability (Cowton, 1994; Sauer, 1997; Mallin et al., 1995; Cummings, 2000), others found negative or insignificant effects (Langbein and Posner, 1980; Mueller, 1991; Luther et al., 1992; Tippet, 2001; Gregory et al., 1997; Statman, 2000; ΛWagner, 2002; ΛKorhonen, 2003; Bauer et al., 2004; ΛWahba, 2008; Valor et al., 2009). These studies mainly put the research objects on social responsible index or fund. Although there is a substantially body of literature discussing the CSR with financial profitability, very few touches the issue of corporate sustainability which integrates a firm's multiple responsibilities on its value creation for sustainable leaders (Lo and Sheu, 2007; Lo, 2010). The primary motivation for this paper is to examine, from the perspective of investors, whether there is a gap of firm value between sustainable leaders and other firms. If sustainable leaders have a notably higher value than the other firms, then can this gap be traced to differences in a firm's specific characteristics, such as to difference in operation, to differences in financial performance, to differences in industries, or to other unobserved factor, like a firm's 'sustainability' nature?

We use regression analysis to explain a firm's value using its specific factors, that is, operation, financial, growth, and industrial variables. We then employ the decomposition developed by Blinder (1973) and Oaxaca (1973) to determine the sources of this favorable difference for the sustainable firms. The advantage of this method is that it allows for a division of observed firm value into an explained and an unexplained portion.

This paper employs data from all non-financial firms of large U.S. companies from 1998 - 2002. Data and information on this topic are typically well represented in the U.S., and thus this paper tends to focus on the U.S. trends, even though similar cases can been found in Europe and other regions. Our results indicate that not more than 40% of the difference (gap) is explained by commonly-used financial valuation criteria, which leaves more than half of the portion unknown. In this study, we call this unexplained portion as the 'sustainable effect'. This suggests that the sustainable image has played a crucial role to investors during our sample period.

This paper proceeds as follows: firstly, it introduces the measurement of firm value. The decomposition method that is employed is then described. The control variables are then introduced. The next section describes the sample selection and the empirical results are then presented. Finally, concluding remarks are provided.

Measurement of firm value

Our dependent variable is specified as a firm's value from the financial perspective. The financial market assesses a firm's value on the basis of its future profitability. Following Fama's (1970) assumption of an efficient capital market, the price of the security is the best available and unbiased estimate of the firm's present value of discounted future cash flows. In this study, the measurement of firm performance and valuation is based on Tobin's q, which takes price information into account.

Tobin's q, which is defined as the ratio of the market value of a firm to the replacement cost of its assets, has been widely employed in the field of corporate finance. Due to limited information and complex computation for the real q data, we follow Chung and Pruitt's (1994) approximating formulation of Tobin's q as shown in Equation (1):

$$q = \frac{(MVE + PS + DEBT)}{TA}, \quad (1)$$

where MVE is the product of a firm's stock price and the number of common stock shares outstanding; PS is the liquidating value of a firm's outstanding preferred stock; DEBT is the value of a firm's short-term liabilities net of its short-term assets, plus the book value of its long-term debt. Term TA is the firm's book value of total assets. These required data can be obtained from a firm's basic financial reports.

DECOMPOSING THE GAP OF FIRM VALUE

Here, the empirical framework for assessing the value gap between two groups was introduced, sustainable leaders and other firms. This method allows one to determine what portion of the gap is attributed to a firm's specific characteristics such as its financial performance, etc. We employ the Blinder-Oaxaca decomposition which is a common technique from labor economics and is now applied widely for other subjects such as business and education. This technique can be usefully extended to the present context of firm-value comparisons. The method decomposes the overall firm-value gap into a portion that can be explained by the commonly-used valuation criteria between groups (in this study, sustainable leaders and other firms) and another portion that is still unexplained. In this study, we call these two parts as 'firm specific effects' and 'sustainable effects,' respectively. This technique can

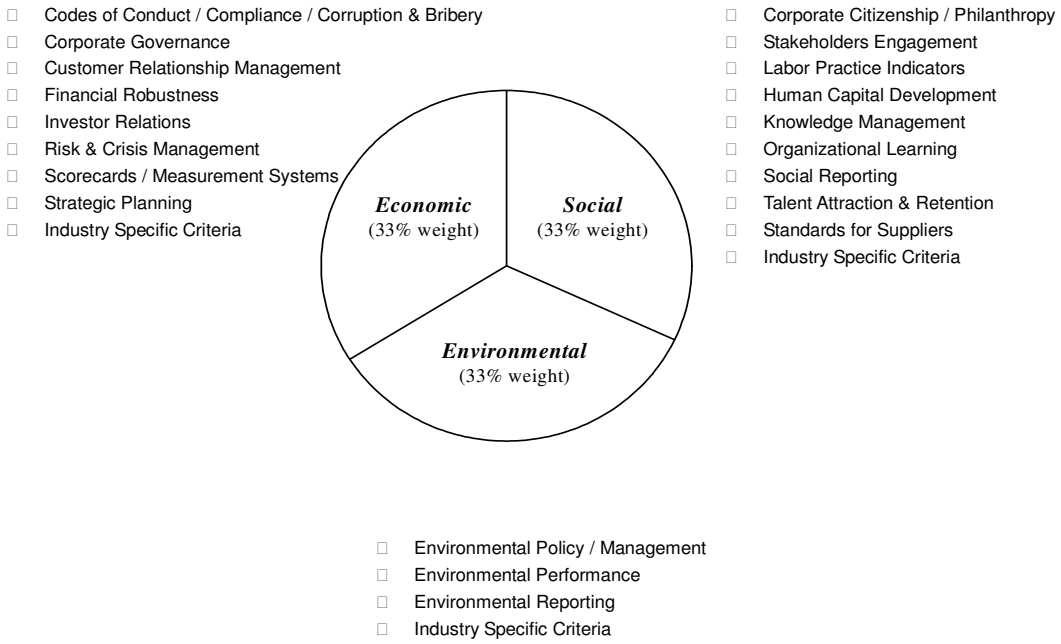

Figure 1. DJSGI corporate sustainability assessment criteria; Information is from Dow Jones Sustainability Indexes website http://www.sustainability-indexes.com

be done by running separate regressions for sustainable leaders and other firms and restructuring the overall firm-value gap in various ways as thus explained.

Suppose that a linear relationship exists:

$$q_i = \alpha + \beta X_i + \varepsilon_i, \quad (2)$$

where the firm's value (qi) of the ith firm is determined by a vector of variables (Xi). The error term (ε_i) captures the unmeasured variables. We then focus on two groups: A group of sustainable leaders (indicated by subscript S) and a group of other firms (indicated by subscript O). Equation (2) is separately estimated by each group running ordinary least squares. The overall gap between average q can be written as:

$$\Delta q = \alpha_S + \beta_S \overline{X}_S - \alpha_O - \beta_O \overline{X}_O . \quad (3)$$

To explore the gap between sustainable leaders and other firms, one can re-write Equation (3) in two ways. The first is based on adding and subtracting $\beta_S \overline{X}_O$, which yields:

$$\Delta q = (\alpha_S - \alpha_O) + (\beta_S - \beta_O)\overline{X}_O + \beta_S(\overline{X}_S - \overline{X}_O) \quad (4)$$

In this case, we assume that q to sustainable leaders' characteristics, β_S, are the baseline. The other decomposition is to add and subtract $\beta_O \overline{X}_S$ to Equation (3), which yields:

$$\Delta q = (\alpha_S - \alpha_O) + (\beta_S - \beta_O)\overline{X}_S + \beta_O(\overline{X}_S - \overline{X}_O) \quad (5)$$

In this case, we assume that *q* to other firms' characteristics, β_O, are the baseline.

In both Equations (4) and (5), the first two terms are the part of the total gap, which is unexplained (or we call it the sustainable effect here) and the third term is the part of the gap due to the explained differences by a firms' specific effects. In the following analysis, our goal is to determine to what extent the value-gap can be attributed to a firm's sustainability, rather than to its other specific characteristics. In other words, our motive seeks to decompose the mean value difference into a firm specific effect and sustainable effect.

Control variables used

In this section we describe the control variables included in the regression analysis and the theoretical reasons for adopting these. The differences explained by these control variables will be treated as a firm's specific effects. We divide the control variables into four categories: Operation variables, financial performance variables, growth variables and industrial variables.

Two variables, size and industrial diversification, are included as operation variables. For the variable of firm size, we use the log of total assets to control the size effect. For industrial diversification, there is substantial empirical evidence showing that industrial diversification is negatively related to firm value (Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996). To control the effect of industrial diversification, we follow Allayannis and Weston (2001) by using a dummy variable which equals one if the firm operates in more than one segment. In our sample, about 65% of the firms are diversified across industries.

Four independent variables, access to financial market, leverage, profitability, and credit quality, are included as financial variables. For the variable of access to financial market, we use a dividend dummy as a proxy for the firm's ability to access the market. This equals one if the firm paid a dividend in the current year. Because

firms are less likely to be capital constrained if they are been paid a dividend, it may thus cause a lower *q*. Therefore, the dividend dummy is expected to be negatively related to *q* (See Lang and Stulz (1994) for a detailed discussion). For the leverage variable a firm's capital structure may have an impact on its value. To control the capital structural effect, we use the debt to equity ratio by dividing total liabilities with total equity. For profitability variable, if a firm is more profitable, then it is more likely to trade with a premium than a less profitable one and thus will increase its *q*. For the control for profitability, we use return on assets (ROA) which is defined as the ratio of net income (loss) to total assets. For the variable of credit quality, credit quality, reflected in the credit rating of a firm's debt, is likely to be associated with the firm's value. We control credit quality by establishing a seven-scaled variable: 7 for AAA firms, 6 for AA+ to AA-, 5 for A+ to A-, 4 for BBB+ to BBB-, 3 for BB+ to BB-, 2 for B+ to B-, and 1 for CCC+ and below.

Two variables, sales growth and investment growth, are included as growth variables. For sales growth, growth in sales is found to be positively correlated with a firm's value (Schmalensee, 1989; Hirsch, 1991). The one-year sales change (percentage) is used to measure a firm's sales growth. For investment growth, firm value also depends on future investment opportunities (Myers, 1977; Smith and Watts, 1992), and as such R&D expenditure is one of the variables that have also been used as a proxy for investment opportunity. However, more than half of R&D observations are missing values in our sample. Following Yermack (1996) and Servaes (1996), we use the ratio of capital expenditure to sales as a proxy for investment growth.

For industrial effect, we control for industrial effects by using economic sectors dummies: consumer non-cyclical, consumer cyclical, energy, healthcare, industries, information technology, materials, telecommunications, and utilities.

Sample selection

Our sample consists of all non-financial firms of U.S. S&P 500 companies from the Compustat database. During the sample period, all the firms included are also listed in the DJGI U.S.A. Firms of small and medium capital which are in the DJSGI U.S.A. but not in the S&P 500 are excluded. Our sample consists of more than sixty percent of the sustainable firms from DJSGI U.S.A. after eliminating financial and small-medium-sized companies. A firm is considered as a sustainable leader if it is listed in the DJSGI U.S.A. for a certain year. We are left with 1276 effective observations from 1999 - 2002 after removing observations with missing data (the DJSGI does not disclose the component firms yearly on their website hereafter).

Table 1 presents the statistics of dependent and control variables for sustainable leaders and other firms, respectively. They reveal considerable differences across these two groups. For instance, with the operation variables, the firm sizes of sustainable leaders are higher than that of other firms. In the financial variables, the sustainable leaders have higher levels of leverage, ROA and credit ratings. In growth variables, other firms' group shows a higher mean of sales growth rate and investment growth rate.

EMPIRICAL RESULTS

Gap of firm value

One of our key findings is that there is a significant gap of firm value between sustainable leaders and other firms in the sample of public-traded firms for the U.S. S&P 500 companies. We present evidence that sustainable leaders are rewarded with a higher valuation by univariate tests. Table 2 presents the mean *q*s for the sample firms: The mean *q*s for sustainable firms is 2.5544, compared with a mean *q* of 1.6579 for others, which results in a sustainable premium of 0.8965. The premium is statistically significant at the 1% level. We also test our hypothesis by using the median *q*s. The median *q* for sustainable leaders is 1.6397, compared with 1.1538 for other firms, with a statistically significant difference of 0.4859. This result is consistent with our hypothesis that there is a significant gap of firm value favoring sustainable leaders.

Separate regression

To conduct the Blinder-Oaxaca decomposition, separate ordinary least squares regressions are estimated. Table 3 presents the group-specific regressions for sustainable leaders and other firms, respectively. For the regression of sustainable leaders, Tobin's *q* is positively related to the operation variables (size and diversification), but is not statistically significant. The signs of the coefficients on the financial variables (access to market, leverage, ROA, and credit rating) and growth variables (sales growth and investment growth) are all predicted and generally statistically significant. Economic sector and year dummies are also included.

For the regression of other firms, the signs of the coefficients of our control variable are alike to that of the sustainable group, except for the operation variables. In comparison with the previous regression, the significant levels of the control variable coefficients are more significant and a higher adjusted R square is achieved for the full model. The result suggests that a firm's market value is affected by characteristics of a firm's operation, financial, and growth variables as well as the industrial effect.

Decomposition of value gaps

The results of the Blinder-Oaxaca decomposition are presented in Table 4. The left-hand side is based on Equation (4) using the sustainable leaders' coefficients to weight the mean differences in the control variables. The right-hand side is based on Equation (5) and the other firms' coefficient.

As shown in Table 2, there is a mean difference of 0.8965 of firm value favoring sustainable leaders. The decompositions suggest that about 10% of the gap is explained by a firm's operation variables, that is, its size and diversification status. A larger portion, which is about 20% of the gap, is explained by the financial variables, notably the ROA and the credit rating. This finding is straightforward since the sustainable leaders are more profitable and have a better rating quality than other

Table 1. Means and standard deviation of sustainable leaders and other firms.

	Sustainable leaders	Other firms
Tobin's *q*	2.5544(2.7121)	1.6579(1.5807)
Operation variables		
Size	9.4712(0.9540)	8.9279(1.0794)
Diversification	0.8243(0.3818)	0.7730(0.4190)
Financial variables		
Access to market	0.7905(0.4083)	0.7757(0.4173)
Leverage	0.8964(1.3699)	0.8672(1.8650)
ROA	0.0584(0.1059)	0.0454(0.0847)
Credit rating	4.9459(0.9532)	4.3998(0.9194)
Growth variables		
Sales growth	0.0768(0.2420)	0.1283(0.4349)
Investment growth	0.0726(0.0533)	0.0933(0.1261)
N	148	1128

Table 2. Comparison of q: sustainable leaders versus other firms.

	Sustainable leaders	Other firms	Difference	t-statistics	p-value
		Difference in means			
Mean	2.5544	1.6579	0.8965	3.93	0.0001
		Difference in medians			
Median	1.6397	1.1538	0.4859		<.0001

p-value for testing the medians is constructed using a rank-sum (Wilcoxon) test.

Table 3. Determinants of valuation, by sustainable leaders and other firms.

	Sustainable leaders	Other firms
Operation variables		
Size	0.1431 (0.5732)	-0.0827 (-2.0404)**
Diversification	0.2388 (0.4422)	-0.2617 (-2.7129)***
Financial variables		
Access to market	-1.5212 (-2.5094)**	-0.2621 (-2.4063)**
Leverage	-0.2893 (-1.9321)*	-0.0289 (-1.4282)
ROA	9.0725 (4.3630)***	6.9405 (13.6617)***
Credit rating	0.1633 (0.5613)	0.2610 (5.3021)***
Growth variables		
Sales growth	2.6509 (3.0907)***	0.1476 (1.6542)*
Investment growth	1.1278 (0.2923)	0.8099 (2.1908)**
Industrial effect		
Consumer-cyclical	—	—
Consumer-non-cyclical	-0.8535 (-1.0291)	0.6369 (4.5115)***

Table 3. Contd.

Energy	-1.9318 (-1.9078)*	-0.2305 (-1.2762)
Health care	-0.0844 (-0.1313)	1.1542 (8.2064)***
Industrials	-1.6071 (-2.4550)**	-0.0066 (-0.0521)
Information technology	0.1199(0.1891)	1.5614 (11.1363)***
Materials	-1.9205 (-2.4447)**	0.0305 (0.2090)
Telecommunications service	—	0.2023 (0.8742)
Utilities	-1.9884 (-2.4361)**	-0.2240 (-1.4740)
Year effect		
1999	—	—
2000	0.0207 (0.0367)	-0.0323 (-0.3078)
2001	-0.7037 (-1.3027)	-0.0681 (-0.6494)
2002	-0.9923 (-1.6831)	-0.2364 (-2.1790)**
Constant	2.0232 (0.9938)	1.0064 (2.7674)***
R^2	0.4427	0.4115
Adjusted R^2	0.3649	0.4014

There are no companies that belong to the sector of telecommunications service in the group of sustainable leaders.

Table 4. Decomposition of value differential between sustainable leaders and other firms.

	Tobin's *q* for sustainable leaders as baseline			**Tobin's *q* for other firms as baseline**		
	Explained gap	**Subtotal**	**% of explained gap**	**Explained gap**	**Subtotal**	**% of explained gap**
Operation variables		0.0900	10.04		-0.0584	-6.51
Size	0.0778			-0.0450		
Diversification	0.0122			-0.0134		
Financial variables		0.1766	19.70		0.2284	25.48
Access to market	-0.0226			-0.0039		
Leverage	-0.0085			-0.0008		
Roa	0.1184			0.0906		
Credit rating	0.0892			0.1425		
Growth variables		-0.1598	-17.83		-0.0244	-2.72
Sales growth	-0.1365			-0.0076		
Investment growth	-0.0233			-0.0168		
Industrial effect		0.3148	35.11		0.1477	16.48
Consumer-cyclical	—			—		
Consumer-non-cyclical	0.0266			-0.0199		
Energy	0.0553			0.0066		
Health care	-0.0055			0.0752		
Industrials	-0.0067			0.0000		
Information technology	0.0055			0.0713		
Materials	0.1805			-0.0029		
Telecommunications service	—			0.0106		
Utilities	0.0591			0.0067		

Table 4. Cont'd.

Year effect		-0.0539	-6.02		-0.0074	-0.82
1999	—			—		
2000	-0.0006			0.0010		
2001	-0.0306			-0.0030		
2002	-0.0228			-0.0054		
Total explained gap		0.3676	41.00		0.2860	31.90

firms. It is worth noting that the industrial effect also plays an important role explaining the difference to the extent of 35%. This phenomenon can be interpreted that the gap of firm value varies from investors according to its industrial sector. By contrast, the difference is not explained properly by a firm's growth opportunity. The decomposition with sustainable leaders' coefficients yields a portion of -17.83% driven mainly by the variable of sales growth. This is based on the fact that sustainable leaders have less sales growth on average. Since this variable is positively related to the gap of firm value, one would expect that other firms' group has a higher growth rate during our sample period. With the other firms' coefficient, this portion produces slightly negative results with only -2.72%. Using Tobin's *q* for sustainable leaders as baseline, about 41% of the gap is explained by the control variables in the sum of a firm's operation, financial, growth and industrial characteristics.

With few exceptions, the results for the other firms' decomposition do not alter this general pattern of results. Overall speaking, the results suggest that only 31.9% of the gap is explained by differing characteristics of the control variables. For this model, the financial variables explain the largest portion of the gap followed by the industrial effect.

No matter how one uses the sustainable leaders' or other firms' coefficients to weight the mean differences in our model, more than half of the gap is left unexplained. We call this unexplained portion as the 'sustainable effect,' which has been emphasized by investors, but still cannot be measured by the commonly-used valuation techniques.

Conclusions

This paper applies the Blinder-Oaxaca decomposition to the problem of explaining the determinants of sustainable and non-sustainable firms' valuation differences. Using data of U.S. S&P 500 non-financial companies as the sample, we decompose a firm's value from the stock market by two parts: The explained part (which is extracted from measurement variables for firm value from the previous literature) as well as the unexplained part (we call it the sustainable effect valued by investors). As for the control variables which are commonly-used by the literature, we have divided these variables into four categories: (1) The components attributable to differing firm operation variables, that is, firm size and diversification variables; (2) The components attributable to differing financial performance, that is, access to market, leverage, return to assets and credit quality; (3) The components attributable to differing growth achievement, that is, sales growth and investment growth; and (4) The components attributable to differing industries. Finally, a residual component cannot be explained by these commonly-used evaluation variables and we call it the sustainable effect.

Our findings suggest the following conclusions: First, there is a significant gap of firm value favoring sustainable leaders. Second, the financial performance variable is a strong and consistent determinant of a firm's market value for all samples. Differences in these variables account for 20 to 25% of the value gap. Third, a firm's value is also related to its industrial sector, whereby 16 - 35% of the value gap is explained by the industrial effect. Fourth, the difference is not explained properly by a firm's growth performance which yields a portion from -3% to -18%, reflecting the fact that sustainable leaders have less sales and investment growth on average in our sample period.

From our empirical results, for a substantial portion of the gap – more than a half – cannot be explained by differing commonly-used evaluating variables that appear frequently in both academics and real financial markets. This result is really tempting to infer that investors in the data are becoming more aware of a firm's sustainable development, aside from its profitability and growth. The results also suggest that besides the publicly-recognized criteria, we still need to develop other evaluation techniques concerning a firm's holistic performance, such as a system monitoring its economic, social, and environmental achievements. To construct a full comprehension of the sustainable effect value, it is hoped that studies of other countries can be applied. Minimally, the results in this paper provide some evidence that corporate sustainability, although hard to detect, definitely matters.

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