Corporate Social Responsibility and Capital Allocation Efficiency: Evidence from Australia and New Zealand

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Abstract

This paper studies the impact of Corporate Social Responsibility on firm's capital allocation efficiency in Australia and New Zealand. I use ESG ratings to measure CSR. The empirical results show that the overall ESG performance, the environmental dimension performance, and the social dimension performance are not significantly associated with a firm's investment efficiency. Only CSR policies or initiatives which are essentially costly to a firm are negatively associated with a firm's investment efficiency. These findings are robust to an alternative measure of corporate investment. The results suggest that when CSR initiatives reduce a firm's capital and other critical resources, those resources are not deployed for identifying and funding growth options, resulting in investment less likely to maximize shareholders' wealth.

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Keywords: CSR; ESG performance; corporate investment; Tobin's Q

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1. Introduction

In the past few decades, a growing body of research has been devoted to Corporate Social Responsibility (CSR). One of the most notable topics on CSR is its impact on firm's financial performance. The extant literature documents mixed results, while some papers observe positive relationship between CSR initiatives and financial performance (e.g., Flammer, 2013; Kim, Li, & Li, 2014 and others), others disagree (e.g., Hong & Kacperczyk, 2009; Krüger, 2015 and others). In recent years, CSR policies and firm's performance have attracted increasing attention from the public. Consequently, companies are increasingly focusing on CSR, and adopting CSR policies and initiatives as a corporate strategy; for example, U.S. companies spend hundreds of millions of dollars on improving their CSR initiatives every year (Hong, Kubik, & Scheinkman, 2012).

Compared to the U.S., the concept of CSR in Australia and New Zealand has emerged relatively recently. Related research on CSR in Australia and New Zealand can be traced back to around the year 2000 (e.g., Anderson & Landau, 2006; Roper, 2004). According to Zappalà and Cronin (2003), about seventy percent of the Australian top companies involved in social initiatives have set up their CSR policies since 2001. Eweje and Bentley (2006) show evidence that the majority of companies in New Zealand have been engaged in environmental and social activities since 2003. Although CSR started relatively recently in Australia and New Zealand, it has gained some momentum and companies are trying to build their reputations (e.g., Lim & Loosemore, 2017; Truscott, Bartlett, & Tywoniak, 2009).

This research studies the relationship between CSR and a firm's performance by investigating whether a company's CSR activities can affect its resource allocation efficiency in Australia and New Zealand.

More specifically, the motivations of this research are as followed:

First, CSR is not designed to create financial profit, but there are many studies which suggest CSR can improve a company's financial performance. It is necessary to have an in-depth study on this topic from a specific point of view.

Second, from the perspective of neoclassic theory (Jorgenson, 1963) and the Q theory (Tobin, 1969) of investment, the corporate investment should only be made to the profitable investment opportunity. The purpose of the corporate investment is to maximize shareholders' wealth. However, CSR in nature is not for maximizing the shareholders' wealth. It is more related to stakeholders' benefit (Garriga & Melé, 2004). Theoretically, investing in CSR should conflict with the interests of shareholders. Therefore, CSR should negatively influence the efficiency of corporate investment and negatively associate with maximizing shareholders' wealth.

Third, as CSR policies have regional differences (Baughn, Bodie, & McIntosh, 2007), the influence of CSR on a firm's investment efficiency may not be exactly the same as in the US in the regions of Australia/New Zealand.

The research combines Australian companies and New Zealand companies in a same sample. The reason is the similarity of corporate cultural, CSR goals, and CSR practices in Australia and New Zealand. Prior literature documents that the corporate culture, including ethical values are similar in Australia and New Zealand (Milton-Smith, 1997). A recent study (Loosemore, Lim, Ling, & Zeng, 2018) shows that the CSR goals and practise in these two countries are similar. In addition, the sample size could be enlarged

by combining these two countries[1], which increases the statistical power of our empirical analysis.

This research studies the effect of CSR on a firm's investment efficiency by adopting the following steps: First, I investigate whether a firm's overall ESG performance is related to its investment sensitivity to Q. Second, I disentangle between two CSR dimensions (an environmental dimension and a social dimension) and study their relations with corporate investment efficiency separately. Third, I concentrate on CSR initiatives that are arguably among the costliest ones. The trade-off theory predicts that this class of CSR initiatives is the most likely to reduce the firm investment efficiency because it corresponds to an actual reallocation of the firm's resources. I find that these specific CSR initiatives are negatively related to a firm's investment efficiency.

2. Literature Review

One of the most accepted definitions of Corporate Social Responsibility (CSR) is provided by McWilliams and Siegel (2001) who describe CSR as: "Actions that appear to further some social good, beyond the interest of the firm and that which is required by law". The relationship between CSR initiatives and financial performance can be tracked back to two fundamental theories: the shareholder theory and the stakeholder theory (Eldar, 2014).

The shareholder theory suggests that managers are obliged to act in the best interests of shareholders to maximise shareholder wealth, because shareholders are the owners of the company (Shleifer & Vishny, 1997). Friedman (1970) argues that CSR is a "mere

[1] I introduce country fixed effects in some of our specifications to control for persistent differences between AU and NZ firms that could potentially explain away our findings.

means to wealth creation for shareholders". As a result, when CSR initiatives are not consistent with shareholder wealth creation, they are not acceptable (Mackey, Mackey, & Barney, 2007; McWilliams & Siegel, 2001).

The stakeholder theory (Freeman & Reed, 1983) addresses moral and ethical issues in managing an organisation and suggests stakeholders' needs, such as social, environmental and community needs, are put at the front of any action taken by the managers. In the spirit of stakeholder theory, prior research (Garriga & Melé, 2004; Kim, Park, & Wier, 2012) develops ethical, intercreative, and political theories of CSR. These theories extend the stakeholder theory and give managers more specific advice, such as how to fulfil management obligations and why they are aligned with stakeholders.

Based on these two fundamental theories, previous studies have produced mixed empirical findings regarding the impact of CSR on firm's performance. Margolis and Walsh (2003) by reviewing over 120 studies between 1971 and 2001, find the link between CSR and financial performance is mixed. By conducting a meta-analysis, Margolis, Elfenbein, and Walsh (2007) show that some research documents a negative effect of CSR on corporate financial performance, while others suggest a positive effect. The average effect of all these studies is approximately zero and statistically insignificant. The empirical results range from a negative to positive relationship. In this case, rather than studying the overall impact of CSR on a firm's financial performance, it is better to investigate this topic from specific points of view.

More recently, McLean et al. (2012), Bhandari and Javakhadze (2017) indicate that CSR can reduce firm-level investment sensitivity to Q so that it distorts a firm's capital allocation efficiency. This is because a firms' resources are limited, and some CSR

activities are costly (Lin & Mills, 2001; Muslu, 2004). Preston and O'bannon (1997) predicted a trade-off hypothesis where a high level of CSR activities should be associated with a low level of a firm's financial performance. More specifically, if a company invests its capital or uses its limited resources in CSR activities, it will drain off either the company's capital or other resources. If a certain profitable investment opportunity appears, the company may not have enough money to make an optimised investment or may miss a growth opportunity. This also violates the core idea of neoclassical investment theory and will put the company at a disadvantage. If a firm is financially constrained, it will be difficult for the firm to invest in new capital, conduct research and development (R&D), or make acquisitions (Rauh, 2006). From the shareholder theory, managers should perform their best to maximise shareholder wealth (Shleifer & Vishny, 1997). If managers concentrate on time-consuming CSR obligations, they may lose focus on their main managerial responsibilities (Jensen, 2010), which is therefore not helpful for shareholder wealth maximisation.

In order to study CSR-related topics more efficiently, it is important to have a better understanding of the definitions and concepts of CSR. The widely accepted concept of CSR includes two fundamental dimensions: the environmental dimension and the social dimension (Capelle-Blancard & Petit, 2015; Van Marrewijk, 2003). In each CSR dimension, there are also many CSR categories and aspects. The companies' CSR policy settings are often based on these specific dimensions, categories and aspects (Escrig-Olmedo, Muñoz-Torres, & Fernandez-Izquierdo, 2010). To ensure the implementation of CSR policies, and enable companies and investors to assess the CSR initiatives, it is also necessary to make these CSR principles into measurable variables (Escrig-Olmedo et al., 2010). One of the most significant CSR indicators is the ESG ratings (Peiró-Signes, Segarra-Oña, Mondéjar-Jiménez, & Vargas-Vargas, 2013),

which mainly evaluates the sustainable development of a company including corporate social responsibility. More specifically, ESG is the acronym for Environment, Social, and Governance. Some rating agencies also define ESG as having four pillars: Environment, Social, Governance, and Economy (Escrig-Olmedo et al., 2010). Investors and companies evaluate the sustainability of a business by its performance of these ESG pillars. In particular, the environmental pillar and the social pillar of ESG rating reflect the environmental dimension and social dimension of CSR. In this study, I follow previous research that only consider the environmental and social pillars of the ESG rating (e.g., Bhandari & Javakhadze, 2017; Mackey et al., 2007). This is because they are the main indicators of CSR. Also, it could be argued that other pillars such as governance actually add benefit to a company's financial performance, because a higher level of governance could lead corporate investment in the profitable projects rather than CSR. In this case, if the governance pillar is included, the effect of CSR on corporate investment efficiency will be reduced.

According to Ferri and Liu (2005), the emergence of ESG ratings are due to two key factors: the growth of regulation on the disclosure of social, environmental and corporate governance information, and expansion of the securities markets. Schäfer (2005) believes that the ESG rating agencies are the link between companies and stakeholders. As ESG ratings play an increasingly significant role in firm valuations (Crifo, Forget, & Teyssier, 2015), research on the ESG rating and rating agencies are also becoming popular. By studying six sustainability indices and ten ESG rating agencies, Escrig-Olmedo et al. (2010) suggest that the criteria and methods of their scoring be different, so that the ESG scores from the various agencies are correspondingly different. This shows a lack of standardisation. Since many CSR-related studies are highly dependent on ESG data, the understanding of ESG data and

the quality of the data are important. This also explains why the same studies using different ESG data may not be able to get the exact same result. However, ESG is still an important indicator that is widely used in CSR related studies, because it explains in most cases the overall ethical and sustainability performance of a company (Escrig-Olmedo et al., 2010).

Moreover, as a company's CSR policies may have different aspects, many ESG rating agencies also provide correspondingly more specific scores for this situation. For example, the Thomson Reuters Asset4 Database divides the environmental dimension into three main categories: resource use, emissions, and environmental protection-related inventions. The social dimension includes four categories: workforce, human rights, community, and product responsibility. Within each category there are also many different indicators (Reuters, 2012). There are studies which show that some of the specific CSR aspects can be costly and significantly affect a firm's financial performance, such as emissions reduction (Muslu, 2004), and employee health and safety (Lin & Mills, 2001). As it has already been verified, firms' investment decisions are highly reliant on their financial statutes (Cleary, 1999), so it could be argued that the CSR policies or performance, especially those costly ones, may have an impact on a firm's investment activities.

3. Research design

This section aims to present the main steps and details of this empirical study, which includes the hypothesis development, empirical model, the measurements of the main variables, and data and sample.

3.1 Hypothesis development

Based on the theories and findings mentioned in the previous sections, here I construct the main hypothesis and provides some explanations on how the hypothesis is developed.

Prior research documents the relationship between the rate of corporate investment and marginal Q (e.g., Hayashi, 1982; Tobin, 1969; Yoshikawa, 1980 and others). This relationship could also be influenced by a third factor (e.g., Bhandari & Javakhadze, 2017; McLean et al., 2012). Following the idea of Bhandari and Javakhadze (2017) and the effects of CSR on investment, the hypothesis of this paper is outlined in the following section.

H_0: CSR reduces a company's investment sensitivity to Q.

From the theoretical perspectives mentioned in the previous sections, it could be deduced that CSR may reduce a company's investment sensitivity in the following ways.

First, if a company uses its resources to implement CSR activities, then these will reduce the company's limited resources (Preston & O'bannon, 1997) for other investment. In this case, once the company encounters a profitable investment opportunity which is presented by Q, its sensitivity to the investment opportunity will be reduced. In other words, a company's social achievement (e.g., community development, donations to charity, environmental protection, and other CSR achievements) can be achieved by sacrificing its investment efficiency.

Second, CSR activities may consume managers' time and effort so that it may lead to their work focus deviating from their main managerial responsibilities (Jensen, 2010),

potentially missing out on profitable investment opportunities.

Third, from the conflict between shareholder theory and stakeholder theory (Smith, 2003), it is difficult to meet the needs of stakeholders and shareholders at the same time. If a company focuses on various stakeholder's needs, it may have to abandon certain profitable investment opportunities that are beneficial to shareholders. From the idea of a firm's optimisation behaviour based on the neoclassic theory of investment (e.g., Hayashi, 1982; Jorgenson, 1963; Tobin, 1969 and others), a company should invest in the projects that maximise their net present value. As the purpose of CSR is not to maximise a company's net present value, investing in CSR may contradict the idea of the neoclassical theory of investment. Therefore, CSR may reduce the company's investment sensitivity to Q.

3.2 Empirical model

The empirical framework of this research follows Bhandari and Javakhadze (2017) study. The details of this framework are as below:

$$INV_{i,t} = \beta_0 + \beta_1 Q_{i,t-1} + \beta_2 ESG_{i,t-1} + \beta_3 Q_{i,t-1} ESG_{i,t-1} + Control\ Variables + Year\ Dummies + Firm\ Dummies/Industry\ Dummies + Country\ Dummies + \varepsilon_{i,t}$$

INV is the corporate investment rate. *Q* presents a company's growth opportunity. *ESG* measures a company's CSR. *Q*ESG* is the interaction term of Q and ESG. The *Control Variables* are a collection which contains the internal generated cash flow *CF*, the interaction term of *CF* and *ESG*, the price to book value ratio *PTBV*, the firm's leverage ratio *LEVERAGE*, the firm size *SIZE*, and the firm age *AGE*. The dummy variables are also adopted for improving the quality of the model and the accuracy of the results. To

investigate how the result could be affected by year fixed effect, firm fixed effect, industry fixed effect, and country fixed effect, the Year Dummy, the Firm Dummy, the Industry Dummy, and the Country Dummy are added to the model accordingly. In addition, the Firm Dummy and the Industry Dummy will not be used at the same time, because the firm characteristics also include that of the corresponding industry.

The key variable in this study is the interaction term of *Q* and *ESG*. As the hypothesis of this research is that CSR reduces a company's investment sensitivity to Q, the coefficient of this interaction term on investment is expected to be negative, that is $\beta_3 < 0$. This is because the investment sensitivity to Q is presented by the coefficient of Q on investment. From the equation above, the coefficient of Q on investment is equal to $\beta_1 + \beta_3 * ESG$ (ESG $\neq$ 0). Only when $\beta_3 < 0$, we can say this coefficient will decrease when the *ESG* increases; or that with the involvement of *ESG*, this coefficient will decrease. So, it could be said CSR reduces investment sensitivity to Q.

3.3 Measurement of variables

Following the studies of Bhandari and Javakhadze (2017) and McLean et al. (2012), this research measures the dependent variable (the corporate investment rate) in two ways. First, the corporate investment rate *INV1* is computed as the capital expenditure scaled by the lagged book value of total assets. It is used in the main part of the empirical research. Second, the alternative measurement of *INV2* is calculated as the yearly changes in property, plant, and equipment (PPE), plus research and development (R&D) spending, all scaled by the lagged book value of total assets. The second measurement is used in the robustness checks. It should be noted that the use of these two *INV*s is different from Bhandari and Javakhadze's (2017) research, where they use the *INV2* in their empirical part, and the *INV1* in the robustness checks. This research

does not fully emulate the previous article. The reason is that the R&D spending information is limited in the Thomson Reuters DataStream. If I use *INV2* as my main dependent variable, the total number of observations will be extremely reduced. The difference between these two measurements is that the capital expenditure is calculated from the changes in PPE but adds the depreciation expense back. It is a good measurement of physical assets investment. However, the second one contains R&D spending, which to some extent relates to the intangible assets investment. These two ways of measuring the corporate investment are both reasonable (McLean et al., 2012).

The main independent variables are computed as follows. The variable *ESG* in this research measures a company's CSR. More specifically, in this research, it refers to a company's CSR initiatives in three stages. In the first stage, I use an equal-weighted score of environmental and social scores to measure the overall CSR initiatives. Secondly, I use the environmental score and social score separately to measure the two main dimensions (Ng & Rezaee, 2015) of CSR. Finally, each CSR dimension contains many detailed CSR aspects. I use the scores of every basic ESG indicator to measure the more detailed CSR aspects of each of them. All the scores are from the Asset4 ESG database. The measurement of *Q* follows the studies of Baker et al. (2003), Bhandari and Javakhadze (2017), and Rauh (2006). It is computed as the market value of equity, minus the book value of equity, plus the book value of assets; all divided by the book value of assets.

The control variables include *CF* (cash flow), *PTBV* (the de-mean value of a company's price to book value ratio), *LEVERAGE* (leverage ratio), *SIZE* (firm size), and *AGE* (firm age). Regarding the prior literature (e.g., Bushman et al., 2011; Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988; Hubbard, 1997 and others), when companies are in financial constraint, their investment will be more sensitive to internally generated cash

flow. The control variable *CF* (cash flow) is estimated as "net income before extraordinary item plus depreciation and amortization expenses plus R&D expenses, all scaled by the book value of total assets" (Bhandari & Javakhadze, 2017; McLean et al., 2012). According to Baker et al. (2003), companies invest more when their stock is overvalued. To control the overvaluation, the *PTBV* is calculated as a company's price to book value ratio minus the mean ratio in the corresponding industry. As a higher leverage ratio is always associated with a lower investment (Aivazian et al., 2005), *LEVERAGE* is the company's total debt divided by its total assets. Prior research shows that there is also a relationship between investment and firm size (Kadapakkam et al., 1998), where *SIZE* is the natural logarithm of a company's total assets. *AGE* is defined as the firm age since incorporation.

3.4 Data and sample

All data used in this research is collected from different datasets. More specifically, companies' financial information is from Thomson Reuters DataStream database; CSR related information (e.g., ESG ratings and CSR indicators) is from the Thomson Reuters Asset4 database; the years of incorporation (firm age) are obtained from the Bloomberg database. The data frequency is yearly.

The initial sample is constructed by all Australian listed firms and all New Zealand listed firms (both active ones and dead ones). The total number of ASX firm is 5003; and the total number of NZX firm is 526. As the Asset4 ESG ratings were started from 2002 (Reuters, 2012), and some variables in this research are computed with lagged values, the initial sample period is seventeen years from 2001 to 2017. To be consistent with the prior research of Bhandari and Javakhadze (2017), the initial sample has been restricted in the following steps: firstly, I require non-missing observations for the main

variables; secondly, the company's book value of assets, capital, and sales should be at least 1 million in local currency; thirdly, to capture the country differences between Australia and New Zealand, those companies listed on both ASX300 and NZX50 have been removed; fourthly, to capture the fluctuation of the data, those companies with a data period less than 3 years are not included; finally, all variables are winsorized at 0.5 and 99.5 percentiles. The final sample of this research is an unbalanced panel with 3,324 firm-year observations from 2004 to 2017.

Table 1 – Panel A shows the sample distribution by year, Panel B reports the sample distribution by country, Panel C explains the sample distribution by industry, and Panel D is the descriptive statistic of the main variables used in this research. *INV* is the main dependent variable representing the firm's investment ratio. It is computed as the capital expenditure scaled by the lagged book value of the total assets. *Q* and *ESG* are the main independent variables, which *Q* summarises the firm's growth opportunity, and ESG represents a firm's overall CSR initiative. *CF*, *PTBV*, *LEVERAGE*, *SIZE*, and *AGE* are control variables. *CF* represents the internal generated cash flow. *PTBV* is the firm's price-to-book value ratio minus the mean ratio of the corresponding industry based on the Global Industry Classification Standard (GICS). The remaining variables are used to replace the *ESG*, so that the impact of CSR can be studied at different levels. For example, *ENV* is the environmental score and *SOC* is the social score. They present the total environmental dimension performance and the total social dimension performance of a company. Moreover, based on Reuters (2012) explanations, the environmental dimension includes three main categories: emissions, resource use, and innovation; the social dimension includes four main categories: human rights, community, product responsibility, and workforce. That workforce can then be divided into four branches: workforce/diversity and opportunity, workforce/employment quality, workforce/health

and safety, and workforce/training and development. Under these CSR categories there are approximately 138 score-measured CSR indicators available in the Assets4 dataset for companies in Australia and New Zealand.

In addition, the *ESG, ENV, SOC*, and all the 138 CSR indicators are scores ranking between zero and one hundred. The variable *COSIND* is a specific CSR indicator that is computed by some potentially costly CSR aspect indicators which are from the set of 138 score-measured basic CSR aspect indicators.

[Insert Table 1]

Table 1- Panel A shows that the number of observations increases as the year increases. It could be explained by the increase of CSR-related data in our sample. The concept of CSR began to be mentioned in Australia and New Zealand starting in early 2000 (Anderson & Landau, 2006; Roper, 2004), and companies in these two countries began to disclose CSR policies or issues even afterwards. Therefore, after removing the observations with missing CSR-related scores, there are fewer observations in the earlier years. Our sample-year distribution is consistent with prior paper of Bhandari and Javakhadze (2017). In their sample, the number of observations in the most recent year is approximately six times of the number of the beginning year.

In the sample distribution by country (Table 1, Panel B), almost 94% observations are from Australia. This is because the market size in Australia is much bigger than it is in New Zealand. Some of the large New Zealand listed companies (with more observations) are also listed on the Australian market. Therefore, after removing the companies that are listed on both markets, the New Zealand sample becomes even smaller.

The industry classification in this research follows the Global Industry Classification

Standard (GICS). There are eleven industry sectors in the Australian and New Zealand markets (Table 1, Panel C). In addition, as prior research (Bhandari & Javakhadze, 2017) does not state that any industry sectors should be excluded, this study includes all eleven industry sectors of the two countries.

The statistical characteristics of the main variables are consistent with Bhandari and Javakhadze (2017)'s research.

4. Empirical results

The empirical results are presented through three steps. First, the overall ESG scores are used in the empirical model to study the effect of the overall CSR on a firm's investment efficiency. Second, the two main CSR dimensions' scores will be tested separately to investigate the effect from each CSR dimension. Finally, a new index that represents the essentially costly CSR activities will be created. The costly indicators of CSR will be used to study how they could affect a firm's investment efficiency.

4.1 The effect of overall CSR on investment efficiency

Table 2 shows the effect of overall CSR initiative on investment efficiency. The results are presented in six columns which are from six different forms of our model. The dependent variable is the corporate investment ratio *INV1*. The regression outputs in column (1) are without any fixed effect. The regression outputs in column (2) are estimated by year fixed only. Results in column (3) are estimated with year fixed effect and industry fixed effect. Column (4) shows the results with year fixed effect and firm fixed effects. The regression outputs in column (5) are estimated with year fixed effect, industry fixed effect and country fixed effect. Finally, column (6) presents the results estimated with the year fixed effect, firm fixed effect and country fixed effect. From

column (1) to column (6), the results are subject to the year fixed effect, industry fixed effect, and firm fixed effect. However, it is not driven by the country fixed effect, because the results remain unchanged while retaining and removing the country fixed effects.

[Insert Table 2]

In Table 2, *ESG* is the equally weighted score consisting of environmental and social dimension scores that present a firm's overall CSR. Models (1) to (6) indicate no statistically significant impact of the overall ESG performance is discovered on a firm's investment sensitivity to Q, because the coefficient of the interaction term *Q*ESG* on *INV1* is not statistically significant. In other words, this result shows that the overall ESG performance cannot significantly affect a firm's investment efficiency. This is not the same as the findings of prior research (Bhandari & Javakhadze, 2017) which documents a significantly negative impact. Moreover, the interaction term *CF* and *ESG* is positively significant in four of the six models. It could be explained as a higher ESG performance increase the company's investment sensitivity to internally generated cash flow. If a company spends more money on the CSR activities, its corporate investment will rely more on its internally generated cash flow. With regards to the coefficients estimate of *ESG* in row 3 model (3) and (5), they are negatively significant. This is because the corporate investment rate *INV1* mainly measures the physical investment, but the CSR initiatives are associated with the intangible assets. If a company invested in CSR initiatives, it may reduce its investment of physical assets. Therefore, within the same industry [column (3) and column (5)], the marginal effect of *ESG* on corporate investment is negative.

4.2 The effects of two CSR dimensions on investment efficiency

In the second step, I test the effects of the environmental and social dimensions of CSR separately. This is because the overall CSR initiative represented by ESG in this research contains two fundamental branches: environmental performance and social performance. As there was no strong effect in the first step, it could be argued that these two dimensions of CSR may affect a firm's investment efficiency differently. For example, a higher environmental achievement may be very expensive for a company (Palmer, Oates, & Portney, 1995), while a higher social achievement may not be that expensive, or even financially benefit the business (Hong & Kacperczyk, 2009). In this case, it is necessary to test these two dimensions separately to study what each of them might influence.

The effect of total environmental performance on investment efficiency

For instance, the overall CSR initiative indicator *ESG* score is replaced by the total environmental score *ENV* to test whether a firm's environmental performance can affect its investment efficiency. The results are shown as below in Table 3.

[Insert Table 3]

In Table 3, the interaction term *Q*ENV* does not have a significant coefficient on *INV1* in any of the six models. In other words, there is no evidence that the total environmental performance can affect the company's investment efficiency. The coefficients estimate on in interaction term of *CF* and *ENV* are all positively significant in model (1) and (2), which means without fixed effect or with year fixed effect only the corporate investment is more relying on the internally generated cash if the environmental performance is higher. Negative coefficients of *ENV* on *INV1* could be

explained as the marginal effect of *ENV* is negatively influencing the corporate investment on the industry level.

The effect of total social performance on investment efficiency

Moreover, the effect of total social performance on investment efficiency has been tested in the same way. The *SOC* represents the total social dimension of CSR. The results are shown as below in Table 4.

[Insert Table 4]

Table 4 shows that the total social performance does not significantly affect a firm's investment sensitivity to Q. Because the coefficient of the interaction term *Q*SOC* is not statistically significant in any of the six columns. The negative marginal effect of *SOC* on corporate investment is existed in the models with industry fixed effect, which presents a negative coefficient of *SOC* on *INV1* within the same industry.

In this step, the effects from the environmental dimension and social dimension of CSR have been tested separately. The results from Table 3 and Table 4 show that neither a total environmental nor total social dimension of CSR has an impact on a firm's investment efficiency. No evidence was discovered in this section that supports a firm's investment sensitivity to Q can be affected by the total CSR dimensions performance. This is different from Bhandari & Javakhadze's (2017) findings that both an environmental and social dimension of CSR negatively affects a firm's investment sensitivity to Q.

4.3 The effect of the costly CSR initiatives and CSR policies

As no evidence was found in step one or step two that the overall ESG performance, the environmental dimension performance or the social dimension performance has a

significant impact on a firm's investment efficiency, it is necessary to have a more in-depth investigation. According to Reuters (2012), each CSR dimension includes many main CSR categories; for example, emissions, resource use, environmental product innovation, human rights, community, product responsibility, and workforce.

Within the main categories there are also many specific CSR aspects that are measured by the most basic ESG indicators. Based on the availability of data, this study selected 138 indicators that belong to all the CSR categories. These indicators are also measured by scores of between 0-100.

As the hypothesis of this research is mainly based on the trade-off hypothesis (Preston & O'bannon, 1997), this suggests that a firm's capital and resources are limited. If they have been used for CSR activities, the firm may not be able to invest to the *Q* measured growth opportunity effectively. Previous literature shows evidence that some of the environmental and social initiatives or policies are essentially costly for a company, for example, the emission reduction (Muslu, 2004), employee health and safety (Lin & Mills, 2001), product innovation (Kessler, 2000), and customer relationship improvement (Berrone, Surroca, & Tribó, 2007). In this case, these costly CSR activities may consume more corporate resources and capital, so that they are more likely to have an impact on the company's investment efficiency. In the third step, some essentially costly CSR indicator scores have been selected accordingly. Combining these indicators, I created a new CSR indicator called *COSIND*. The *COSIND* is designed to present those essentially costly CSR initiatives or policies. It is computed as:

$$COSIND = (DM\_ENERO24S + DM\_SOHSD04S + DM\_ENPIO07S + DM\_SOPRO11S) / 4,$$[2]

[2] The variable names ENERO24S, SOHSD04S, ENPIO07S, and SOPRO11S are the symbols in Asset4 dataset.

where *DM_ENERO24S* is the score of environmental expenditure on emission reduction minus the mean score in the corresponding industry, then *DM_SOHSD04S* is the score of employee health and safety improvements minus the mean score in the corresponding industry. Similarly, *DM_ENPIO07S* is the score of product innovation/renewable/clean energy product minus the mean score in the corresponding industry. *DM_SOPRO11S* is the score of product responsibility/customer controversies minus the mean score in the corresponding industry.

It could be argued that there may be large industry differences existing in the performance of these very specific CSR initiatives. Every industry may have its own focus. For example, a company from the information technology industry may not have to concentrate too much on its emission reduction performance, while a company from the materials or industrials industries may have to. So, the industrial differences on emission reduction performance may exist. This is the reason for removing the industry average performance.

[Insert table 5]

The results as shown in Table 5 can be interpreted as the impact of *COSIND* on investment efficiency is significant. In all six models, the coefficients of *Q* and the coefficients of *Q*COSIND* are all statistically significant at different levels. Particularly, the key coefficient estimates of the interaction term *Q*COSIND* is significantly negative in all six models. This result supports our main hypothesis that CSR reduce a company's investment sensitivity to Q. It is in line with the neoclassic theory, the Q theory and the main argument of the trade-off hypothesis.

4.4 Further analysis of costly CSR indicator on the corporate investment sensitivity to Q

Based on the results obtained in Table 5, this section provides a further explanation of how the costly CSR indicator reduces a firm's investment sensitivity to Q.

For example, in column (6) of Table 5, a firm's investment sensitivity to Q is represented by the coefficient of *Q* on *INV1*. According to the empirical model in this research, the coefficient of *Q* on *INV1* can be presented as:

$$\frac{\Delta INV1}{\Delta Q} = \beta 1 + \beta 3 * COSIND \ ,$$

where β_1 = 1.442 (Table 5, column 6, row 1), β_3 = -0.0793 (Table 5, column 6, row 5) and the COSIND ranged from -8.661 to 3.314 (Table 1, Panel D).

The following Table 6 shows how $\frac{\Delta INV}{\Delta Q}$ changes along with the changing of the costly CSR indicator *COSIND*.

[Insert Table 6]

The values of the *COSIND* in Table 6 are typically selected at its 25th percentile (-8.66), the median (-2.31), and the 75th percentile (3.314). With a *COSIND* increasing from 25th percentile to 75th percentile, the coefficient of Q on corporate investment decreases from 2.2646 to 1.3994. This phenomenon could be explained as when a company is continuously improving its performance on those costly CSR activities, the company's resources and assets will be committed to those activities. This will lead the company to become less and less sensitive to the Q growth opportunities which will reduce the company's investment efficiency. In addition, the results have not captured a significant country differences between Australia and New Zealand. Firstly, on the firm level [model (4) and model (6) of Table 5], the results are remaining the same while retaining and removing the country fixed effects. It means the results are not driven by

the country difference. On the other hand, the R-square and the Adjusted R-square in these two models are same, which refers to the fitness of the models are not driven by the country differences. Second, on the industry level [model (3) and model (5) of Table 5], the coefficients estimate of *Q* are the same. The coefficients estimate of the interaction term *Q*COSIND* are the same. The R-square and the Adjusted R-square are the same. It could be explained as, within the same industry, the negative effect of COSIND on investment efficiency are basically same in Australia and New Zealand. The fitness of the models is not driven by the country differences.

The findings of this research are not exactly same with the findings of prior research (Bhandari & Javakhadze, 2017). However, it is consistent with the trade-off hypothesis outlined by Preston & O'bannon (1997). The findings are also in line with the prior research which suggests that the corporate investment ratio is a function of marginal Q (e.g., Abel & Eberly, 1993; Barnett & Sakellaris, 1998; Blundell et al., 1992; Bolton et al., 2011; Hayashi, 1982; Tobin, 1969; Wildasin, 1984; Yoshikawa, 1980 and others). Based on the empirical findings above, we do not reject the null hypothesis that CSR reduces a company's investment sensitivity to Q. The results show that the costly CSR initiatives or policies could significantly reduce a company's investment sensitivity to Q, therefore, negatively affecting a company's capital allocation efficiency in Australia and New Zealand.

5. Robustness check

The robustness test of this study follows Bhandari and Javakhadze (2017). More specifically, we use alternative measure of corporate investment to check the robustness of our result.

The alternative measure of corporate investment *INV2* is computed as the yearly changes in property, plant, and equipment (PPE), plus the research and development (R&D) spending, all scaled by the lagged book value of assets. This measurement of investment ratio follows Bhandari and Javakhadze (2017) research. This robustness check includes two steps: first, I compute the alternating investment ratio accordingly; second, I compute this ratio by replacing the missing R&D data with 0. This is because the R&D data contains a large number of missing values. The number of observations could be enlarged by replacing the missing value with 0. This measurement of investment ratio follows the method of McLean et al. (2012).

Firstly, as the R&D spending data is very limited in the Thomson Reuters DataStream, in our sample only a small number of companies have R&D spending data available. The alternative investment rate *INV2* therefore has a smaller number of observations of 770. The result (Table 7, Panel A) is consistent with our hypothesis. The coefficient estimate of the interaction term of the costly CSR indicator with Q remains significantly negative in most models.

[Insert Table 7]

Secondly, I replace the missing values in R&D spending with 0 to enlarge the number of observations. The *INV2* now contains 2,852 observations. The results in Panel B of Table 7 are consistent with the main findings. The coefficient estimates of the key interaction term (*Q*COSIND*) remains significantly negative.

6. Discussion

Prior research (Bhandari & Javakhadze, 2017) studies on the effect of CSR on investment efficiency based on the U.S. sample and adopts ESG data from the KLD

dataset. They document that the overall ESG performance, the environmental dimension performance and the social dimension all significantly reduce firm-level investment efficiency. However, in this research, I found that only those CSR indicators which are inherently costly may have such an effect. The findings of this study are slightly different from the findings of the previous study (Bhandari & Javakhadze, 2017). The reason could be attributed to: first, companies' environmental and social policies are value maximising. Some of the environmental and social practices may add value to the companies. Prior research suggests that investors, banks and institutions care about companies environmental and social performance (e.g., Chava, 2014; Hong & Kacperczyk, 2009). More specifically, the better environmental and social performance companies can have a lower cost of equity capital; banks tend to offer a lower interest rate to those companies with better environmental and social performance, which led them to a lower cost of debt capital. External financing is cheaper and easier for them. Therefore, to some extent, environmental and social performance add value to the companies.

Second, ESG ratings are different between different rating agencies. According to Escrig-Olmedo et al. (2010), the ESG rating criteria and method are different among the rating agencies, so the ESG scores from different agencies are correspondingly different. As the ESG scores in this research are obtained from Asset4 dataset, the inconsistent results may also be attributed to the differences in ESG data. However, Bhandari and Javakhadze (2017) use KLD's ESG scores.

Third, the sample size may be not big enough in Australia and New Zealand. The sample size is correspondingly larger in America. In Bhandari & Javakhadze's (2017) research, they adopt 15,670 firm-year observations. Their sample period is about 23

years. While the sample size in this research is about 2,854 firm-years observations, and the sample period is 14 years.

Finally, it could be caused by the specificity of CSR policies or initiatives in Australia and New Zealand. Prior research indicates that firms' CSR policies and initiatives also have county and regional differences (Baughn et al., 2007). It has a strong relationship with the regional economy, and the political and social context. A firms' CSR adaptations in the Australia/New Zealand region is not exactly the same as the America region. Therefore, the effect of CSR on a firm's investment sensitivity in the Australia/New Zealand region may be different with that in the America region.

7. Conclusion

In this research, I investigate whether a company's CSR initiatives could affect its capital allocation efficiency in Australia and New Zealand. More specifically, I test how CSR affects a company's investment sensitivity to Q. I found that the firms' capital allocation efficiency could not be significantly affected by the overall ESG performance, the total environmental performance, or the total social performance. Strong evidence shows that only those essentially costly CSR initiatives or policies (e.g., emission reduction, employee health and safety improvements, clean energy product, customer relationship) are the main factors for reducing a company's investment efficiency.

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Table 1: Sample descriptive statistic

Panel A: Sample distribution by year.

Year	Freq.	Percent	Cum.
2004	65	1.96	1.96
2005	82	2.47	4.42
2006	90	2.71	7.13
2007	96	2.89	10.02
2008	104	3.13	13.15
2009	191	5.75	18.89
2010	269	8.09	26.99
2011	297	8.94	35.92
2012	314	9.45	45.37
2013	349	10.5	55.87
2014	355	10.68	66.55
2015	386	11.61	78.16
2016	374	11.25	89.41
2017	352	10.59	100
Total	3,324	100	

Panel B: Sample distribution by country.

Country	Freq.	Percent	Cum.
Australia	3,108	93.5	93.5
New Zealand	216	6.5	100
Total	3,324	100	

Panel C: Sample distribution by industry sector.

Industry	Freq.	Percent	Cum.
Communication Services	55	1.65	1.65
Consumer Discretionary	530	15.94	17.6
Consumer Staples	207	6.23	23.83
Energy	261	7.85	31.68
Financials	270	8.12	39.8
Health Care	201	6.05	45.85
Industrials	355	10.68	56.53
Information Technology	94	2.83	59.36
Materials	964	29	88.36
Real Estate	250	7.52	95.88
Utilities	137	4.12	100
Total	3,324	100	

Panel D: The descriptive statistics of the main variables

VARIABLES	N	Mean	S.D.	P25	P50	P75
INV1	3,324	8.601	14.53	1.213	4.051	9.32
ESG	3,324	38.86	25.67	16.85	31.33	57.81
ENV	3,324	37.55	27.43	14.37	25.68	57.82
SOC	3,324	40.17	27.39	15.57	33.88	62.23
COSIND	3,324	-0.931	9.859	-8.661	-2.31	3.314
Q	3,324	1.909	1.771	1.013	1.324	2.053
CF	3,324	0.0401	0.227	0.00976	0.0677	0.125
PTBV	3,324	23.43	143.5	-5.018	-1.391	1.437
AGE	3,324	21.4	10.59	14	20	26
SIZE	3,324	14.05	1.933	12.69	13.92	15.24
LEVERAGE	3,324	0.219	0.196	0.055	0.209	0.321

Table 2: The overall ESG performance and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	0.655	0.522	0.880	1.616**	0.881	1.616**
	(0.579)	(0.573)	(0.558)	(0.749)	(0.558)	(0.749)
ESG	-0.0276	-0.0185	-0.0685***	-0.0392	-0.0686***	-0.0392
	(0.0232)	(0.0228)	(0.0241)	(0.0271)	(0.0241)	(0.0271)
Q * ESG	-0.000815	0.00379	0.0127	0.0185	0.0126	0.0185
	(0.0162)	(0.0158)	(0.0149)	(0.0175)	(0.0148)	(0.0175)
CF	-8.846**	-8.546*	-3.105	-4.305	-3.095	-4.305
	(4.470)	(4.461)	(4.399)	(4.421)	(4.406)	(4.421)
CF * ESG	0.352***	0.315***	0.188*	0.144	0.188*	0.144
	(0.112)	(0.112)	(0.109)	(0.117)	(0.109)	(0.117)
PTBV	-0.00211	-0.000436	0.00177	-0.000160	0.00177	-0.000160
	(0.00225)	(0.00235)	(0.00176)	(0.00103)	(0.00176)	(0.00103)
LEVERAGE	1.260	1.159	2.897	-6.087*	2.906	-6.087*
	(2.429)	(2.455)	(2.280)	(3.578)	(2.284)	(3.578)
SIZE	-1.591***	-1.729***	-0.736**	-2.543**	-0.734**	-2.543**
	(0.283)	(0.287)	(0.297)	(1.238)	(0.296)	(1.238)
AGE	0.104***	0.0791**	0.0228	0.295	0.0223	0.295
	(0.0397)	(0.0399)	(0.0360)	(1.591)	(0.0361)	(1.591)
Constant	27.26***	27.15***	17.70***	34.14	17.78***	34.14
	(3.845)	(3.837)	(4.335)	(21.93)	(4.372)	(21.93)
Observations	2,854	2,854	2,854	2,854	2,854	2,854
R-squared	0.085	0.101	0.214	0.648	0.214	0.648
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.0818	0.0948	0.205	0.578	0.205	0.578

Robust standard errors in parentheses

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

Table 3: Total environmental performance and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	0.366	0.234	0.769	1.554**	0.769	1.554**
	(0.581)	(0.573)	(0.564)	(0.758)	(0.564)	(0.758)
ENV	-0.0396*	-0.0375	-0.0699***	-0.0331	-0.0699***	-0.0331
	(0.0233)	(0.0238)	(0.0230)	(0.0240)	(0.0230)	(0.0240)
Q * ENV	0.0161	0.0210	0.0201	0.0240	0.0201	0.0240
	(0.0160)	(0.0159)	(0.0149)	(0.0143)	(0.0149)	(0.0143)
CF	-7.582*	-7.654*	-2.321	-4.140	-2.317	-4.140
	(4.109)	(4.131)	(4.128)	(3.779)	(4.135)	(3.779)
CF * ENV	0.297***	0.274***	0.152	0.138	0.152	0.138
	(0.100)	(0.0998)	(0.103)	(0.0902)	(0.102)	(0.0902)
PTBV	-0.00224	-0.000536	0.00161	-0.000175	0.00161	-0.000175
	(0.00226)	(0.00235)	(0.00175)	(0.00104)	(0.00175)	(0.00104)
LEVERAGE	0.761	0.652	2.613	-6.332*	2.617	-6.332*
	(2.431)	(2.453)	(2.285)	(3.565)	(2.290)	(3.565)
SIZE	-1.633***	-1.726***	-0.777***	-2.541**	-0.776***	-2.541**
	(0.288)	(0.290)	(0.297)	(1.256)	(0.296)	(1.256)
AGE	0.0920**	0.0688*	0.0152	0.320	0.0150	0.320
	(0.0402)	(0.0405)	(0.0350)	(1.600)	(0.0352)	(1.600)
Constant	28.30***	27.55***	18.16***	33.16	18.19***	33.16
	(3.921)	(3.883)	(4.397)	(21.87)	(4.438)	(21.87)
Observations	2,854	2,854	2,854	2,854	2,854	2,854
R-squared	0.086	0.104	0.214	0.649	0.214	0.649
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.0833	0.0976	0.205	0.578	0.205	0.578

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

Table 4: Total social performance and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	0.810	0.707	0.978*	1.743**	0.977*	1.743**
	(0.546)	(0.540)	(0.526)	(0.725)	(0.526)	(0.725)
SOC	-0.0151	-0.00342	-0.0464**	-0.0381	-0.0467**	-0.0381
	(0.0204)	(0.0199)	(0.0218)	(0.0307)	(0.0219)	(0.0307)
Q * SOC	-0.00790	-0.00511	0.00651	0.0117	0.00652	0.0117
	(0.0143)	(0.0139)	(0.0134)	(0.0174)	(0.0134)	(0.0174)
CF	-6.762	-6.528	-1.933	-3.069	-1.917	-3.069
	(4.148)	(4.138)	(4.072)	(4.174)	(4.080)	(4.174)
CF * SOC	0.273***	0.239**	0.147	0.0987	0.147	0.0987
	(0.103)	(0.103)	(0.0973)	(0.108)	(0.0973)	(0.108)
PTBV	-0.00206	-0.000439	0.00186	-9.52e-05	0.00185	-9.52e-05
	(0.00224)	(0.00234)	(0.00176)	(0.00103)	(0.00176)	(0.00103)
LEVERAGE	1.564	1.456	3.148	-5.999*	3.158	-5.999*
	(2.429)	(2.462)	(2.286)	(3.614)	(2.290)	(3.614)
SIZE	-1.585***	-1.726***	-0.849***	-2.499**	-0.845***	-2.499**
	(0.278)	(0.282)	(0.281)	(1.236)	(0.281)	(1.236)
AGE	0.111***	0.0864**	0.0204	0.213	0.0199	0.213
	(0.0396)	(0.0395)	(0.0364)	(1.545)	(0.0365)	(1.545)
Constant	26.71***	26.68***	18.88***	35.88*	18.97***	35.88*
	(3.819)	(3.809)	(4.194)	(20.92)	(4.232)	(20.92)
Observations	2,854	2,854	2,854	2,854	2,854	2,854
R-squared	0.082	0.098	0.211	0.648	0.211	0.648
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.0791	0.0914	0.203	0.577	0.202	0.577

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

Table 5: The costly CSR initiatives and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	-0.351	-0.341	0.393	1.442***	0.393	1.442***
	(0.358)	(0.347)	(0.320)	(0.389)	(0.321)	(0.389)
COSIND	0.206***	0.202***	0.121*	0.0439	0.121*	0.0439
	(0.0674)	(0.0682)	(0.0637)	(0.0705)	(0.0637)	(0.0705)
Q * COSIND	-0.184***	-0.173***	-0.117**	-0.0793*	-0.117**	-0.0793*
	(0.0527)	(0.0520)	(0.0462)	(0.0468)	(0.0462)	(0.0468)
CF	3.810	2.868	3.756	1.796	3.771	1.796
	(2.596)	(2.610)	(2.336)	(1.828)	(2.344)	(1.828)
CF * COSIND	0.115	0.0603	-0.129	0.165	-0.129	0.165
	(0.229)	(0.230)	(0.217)	(0.144)	(0.217)	(0.144)
PTBV	-0.00218	-0.000775	0.00138	0.000206	0.00138	0.000206
	(0.00219)	(0.00226)	(0.00181)	(0.000896)	(0.00180)	(0.000896)
LEVERAGE	1.476	1.384	2.929	-5.318	2.935	-5.318
	(2.133)	(2.176)	(2.049)	(3.248)	(2.052)	(3.248)
SIZE	-1.630***	-1.683***	-0.991***	-2.066*	-0.990***	-2.066*
	(0.261)	(0.262)	(0.257)	(1.142)	(0.256)	(1.142)
AGE	0.118***	0.101***	0.0225	-0.286	0.0221	-0.286
	(0.0391)	(0.0388)	(0.0337)	(1.474)	(0.0339)	(1.474)
Constant	27.80***	27.06***	20.73***	40.38*	20.80***	40.38*
	(3.702)	(3.668)	(4.098)	(20.92)	(4.141)	(20.92)
Observations	2,854	2,854	2,854	2,854	2,854	2,854
R-squared	0.105	0.120	0.235	0.676	0.235	0.676
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.102	0.114	0.227	0.611	0.227	0.611

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

Table 6: The impact of costly CSR indicator on investment sensitivity to Q.

	Delta - method					
	dy/dx	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Q						
_at						
COSIND = P25	2.2646	.6766601	3.35	0.001	.9348485	3.594351
COSIND = P50	1.805737	.5046107	3.58	0.000	.8140922	2.797382
COSIND = P75	1.399401	.5072178	2.76	0.006	.4026326	2.396169

Table 7: The costly CSR initiatives and investment efficiency- robustness check I.

Panel A: INV2 is computed by excluding the missing values.

VARIABLES	(1) INV2	(2) INV2	(3) INV2	(4) INV2	(5) INV2	(6) INV2
Q	2.071***	2.064***	1.925***	0.826	1.933***	0.826
	(0.552)	(0.562)	(0.623)	(0.780)	(0.624)	(0.780)
COSIND	0.250*	0.285**	0.288**	0.0622	0.285**	0.0622
	(0.136)	(0.138)	(0.137)	(0.149)	(0.137)	(0.149)
Q * COSIND	-0.196*	-0.202*	-0.203*	-0.0636	-0.202*	-0.0636
	(0.111)	(0.109)	(0.113)	(0.108)	(0.113)	(0.108)
CF	-0.326	-0.808	1.546	11.53	1.632	11.53
	(6.061)	(5.980)	(6.116)	(8.136)	(6.128)	(8.136)
CF * COSIND	0.436	0.420	0.415	0.115	0.400	0.115
	(0.627)	(0.626)	(0.629)	(0.621)	(0.632)	(0.621)
PTBV	-0.00548***	-0.00463**	-0.00292	-0.00701**	-0.00288	-0.00701**
	(0.00189)	(0.00233)	(0.00253)	(0.00321)	(0.00253)	(0.00321)
LEVERAGE	-0.818	-1.086	0.614	7.044	0.665	7.044
	(3.646)	(3.502)	(3.298)	(5.896)	(3.316)	(5.896)
SIZE	-1.251**	-1.468**	-1.486**	-10.24***	-1.467**	-10.24***
	(0.533)	(0.582)	(0.610)	(3.244)	(0.606)	(3.244)
AGE	0.0851	0.0678	0.0451	-2.373***	0.0403	-2.373***
	(0.0813)	(0.0818)	(0.0738)	(0.601)	(0.0742)	(0.601)
Constant	16.70**	18.96**	15.44	166.9***	15.75*	166.9***
	(7.616)	(8.324)	(9.367)	(38.00)	(9.301)	(38.00)
Observations	770	770	770	770	770	770
R-squared	0.174	0.190	0.236	0.613	0.236	0.613
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.164	0.167	0.203	0.498	0.203	0.498

Robust standard errors in parentheses

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

Panel B: INV2 computed by replacing the missing value with 0.

VARIABLES	(1) INV2	(2) INV2	(3) INV2	(4) INV2	(5) INV2	(6) INV2
Q	2.615***	2.570***	2.812***	3.598***	2.813***	3.598***
	(0.599)	(0.588)	(0.639)	(0.908)	(0.638)	(0.908)
COSIND	0.186*	0.187*	0.157	0.0765	0.157	0.0765
	(0.109)	(0.109)	(0.110)	(0.121)	(0.110)	(0.121)
Q * COSIND	-0.184**	-0.174**	-0.165*	-0.155*	-0.165*	-0.155*
	(0.0871)	(0.0856)	(0.0857)	(0.0832)	(0.0857)	(0.0832)
CF	3.141	1.622	1.988	5.531	1.920	5.531
	(2.937)	(2.925)	(2.942)	(4.060)	(2.954)	(4.060)
CF * COSIND	0.0369	-0.0341	-0.111	0.116	-0.110	0.116
	(0.280)	(0.277)	(0.270)	(0.309)	(0.270)	(0.309)
PTBV	-0.00180	0.000211	0.000999	-0.000857	0.00102	-0.000857
	(0.00144)	(0.00171)	(0.00230)	(0.00224)	(0.00228)	(0.00224)
LEVERAGE	-1.714	-1.746	-1.840	-15.70**	-1.871	-15.70**
	(2.380)	(2.364)	(2.332)	(6.926)	(2.334)	(6.926)
SIZE	-0.215	-0.292	0.223	-7.752***	0.217	-7.752***
	(0.254)	(0.267)	(0.292)	(1.663)	(0.292)	(1.663)
AGE	0.00834	-0.0208	-0.0636	14.89***	-0.0618	14.89***
	(0.0398)	(0.0391)	(0.0400)	(1.986)	(0.0403)	(1.986)
Constant	1.994	1.340	-4.966	-229.3***	-5.283	-229.3***
	(3.835)	(4.023)	(6.751)	(33.79)	(6.834)	(33.79)
Observations	2,852	2,852	2,852	2,852	2,852	2,852
R-squared	0.101	0.117	0.129	0.406	0.129	0.406
Year FE	NO	YES	YES	YES	YES	YES
Industry FE	NO	NO	YES	NO	YES	NO
Firm FE	NO	NO	NO	YES	NO	YES
Country FE	NO	NO	NO	NO	YES	YES
Adjusted R-squared	0.0983	0.111	0.119	0.287	0.119	0.287

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

Appendix: The explanations of the main variables.

Variable Name	Explanation
INV1	The capital expenditure scaled by the lagged book value of total assets.
INV2	The yearly changes in property, plant, and equipment (PPE), plus research and development (R&D) spending, all scaled by the lagged book value of total assets.
Q	The market value of equity, minus the book value of equity, plus the book value of assets; all divided by the book value of assets.
ESG	The equal-weighted score of environmental and social scores.
ENV	The total environmental score.
SOC	The total social score.
COSIND	The equal-weighted score of the essentially costly indicators.
ENERO24S	The score of environmental expenditure on emission reduction.
SOHSD04S	The score of employee health and safety improvements.
ENPIO07S	The score of product innovation/renewable/clean energy product.
SOPRO11S	The score of product responsibility/customer controversies.
CF	The net income before extraordinary item plus depreciation and amortization expenses plus R&D expenses, all scaled by the book value of total assets.
PTVB	The price to book value ratio minus the mean ratio in the corresponding industry.
LEVERAGE	The total debt scaled by the total assets.
SIZE	The natural logarithm of a company's total assets.
AGE	The firm age since incorporation.