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

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Abstract

This paper studies the effect of Corporate Social Responsibility on firm's capital allocation efficiency in Australia and New Zealand. More specifically, I examine whether CSR influences a firm's investment efficiency. 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 a battery of robustness checks. 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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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signature: ____________________

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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. A large amount of research documents a positive relationship between CSR initiatives and financial performance (e.g., Flammer, 2013; Kim, Li, & Li, 2014 and others), while 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 community development have set up their CSR policies since 2001. Eweje and Bentley (2006) show evidence that the majority of companies in New Zealand have been actively engaged in environmental and social activities since 2003. Although CSR started relatively recently in Australia and New Zealand, it has developed very fast 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, this research follows Bhandari and Javakhadze (2017), who provide evidence that CSR negatively affects a firm's resource allocation efficiency by reducing the firm's investment sensitivity to the growth opportunities. As their study was conducted in the U.S., this research tries to answer whether this result also apply to Australia and New Zealand.

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 first 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. Their current focuses are environmental and safety issues. Their goals on the social dimension of CSR have not yet been achieved, particularly in the areas of disability, childcare, community interaction, and ageing. The second reason is the sample size. As the CSR policies and reputations in these two countries are developed relevantly recently (Anderson & Landau, 2006; Roper, 2004), the CSR related data is limited, especially for the ESG ratings. In this case, to increase the statistical power of our empirical analysis, I combine data from these two countries[1].

This research studies the effect of CSR on a firm's investment efficiency by using 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 a firm's investment efficiency separately. Third, I concentrate on CSR initiatives that are arguably

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

among the most costly ones. The trade-off theory predicts that this kind 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.

The contributions and implications of this research are therefore summarized as followed:

First, this research provides evidence that the CSR initiatives or policies are in general not harmful to shareholders. Only in the extreme conditions, CSR can reduce a firm's investment efficiency. For example, if a company is highly ranked in the ESG indicators which are related to the more financially costly CSR initiatives or policies (e.g., emission reduction, employee health and safety improvements, clean energy product, customer relationship), the company's investment efficiency will be influenced. The finding of this research is not exactly same with the finding of prior research (Bhandari and Javakhadze, 2017) which documents all the overall ESG performance, the environment dimension performance, and social dimension performance of ESG negatively influence a company's investment efficiency.

Second, this research extends to Australia and New Zealand and documents the regional specificity of Australia/New Zealand region. The finding of this research may bear importance that the topic on CSR and firm performance in Australia/New Zealand region may not exactly same with the U.S.

Third, this research may be important to business managers, regulators, and investors in Australia and New Zealand, because a better understanding of CSR activities and their influences on a firm's growth is important for setting CSR strategy and evaluating the risks in CSR investing in Australia and New Zealand.

Finally, it may be helpful to researchers who are interested in CSR measurement and CSR evaluation. As ESG ratings may be different from agency to agency. It is important to have a better understanding on the ESG ratings when we do a related research.

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 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 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.

2.1 Neoclassical theory and Q theory of investment

Traditionally, corporate investment mainly refers to a company's investment in its physical assets, such as property, plant and equipment (PP&E) (Peters & Taylor, 2017). Although recent research shows that intangible assets are increasingly important, physical assets are still a companies' main investment target (Corrado & Hulten, 2010). But whether or not companies invest in physical or intangible assets, their ultimate goal is the same – to generate value.

Relevant theories of corporate investment date back to the 1960s or even earlier. Originated by Jorgenson (1963), the neoclassical theory of corporate investment proposes that "the objective of the firm is to maximize the present discounted value of net cash flows subject to the technological constraints summarized by the production function" (Hayashi, 1982). It can also be explained as the maximisation of the present net worth of a firm, or maximisation of the market value of its total outstanding shares (Yoshikawa, 1980). In this case, the firm's investment in a project should only be considered if it adds value to its shareholders. From the idea of a firm's optimisation behaviour, there should be an optimal investment ratio relating to the firm's new installation costs that maximise the net present value of the investment (Hayashi, 1982).

Tobin (1969) indicated that the market value of U.S. listed firms should be equal to the replacement cost of their assets. If we divide the market value by the replacement cost we could obtain a ratio – Tobin's Q ratio. The Q ratio should be theoretically equal to 1, referring to the market value, which should be equal to what they are worth. If the Q ratio deviates from 1, in the long-term the market will drive it back to the equilibrium. From the logic of the economy, the normal equilibrium value of Q being equal to 1 means that "the reproducible assets are in fact being reproduced" (Yoshikawa, 1980), and the speed of corporate growth is equal to the general speed of the economy. If Q is bigger than 1, the reproducible assets are "in excess of requirements for replacement and normal growth" (Yoshikawa, 1980), and the corporate growth is faster than the general economy, therefore, it should stimulate investment. If Q is smaller than 1, it refers to a discouragement of investment, because the cost of installing a new company is greater than its market price. In this case, it does not make sense for a company to invest in new assets. Hayashi (1982) indicated that Tobin's Q perfectly summarised investment opportunity.

Alternatively, just as the security market appraises the investment project, if a project is appraised by investors that its value exceeds its cost, then the company's share price is going to increase to benefit its existing shareholders. In other words, if "the market values the project more than the cash used to pay for it" (Yoshikawa, 1980), when the "company issues new debt or equity securities to raise the cash, the prospectus will lead to an increase of share prices" (Yoshikawa, 1980). This phenomenon also reflects the relationship between investment and the Q (Tobin & Brainard, 1977). As the rate of investment shows "the speed at which investors wish to increase the capital stock" (Tobin, 1969), if the rate of investment has a relationship with anything, it should be with the Q, that is the "value of capital relative to its replacement cost". Finally, Tobin (1969) shows that the rate of investment is a function of marginal Q. Hayashi (1982) explains the marginal Q as "the ratio of the market value of an additional unit of capital to its replacement cost". Marginal Q actually has a regard as to how much a company's market value will increase if the company invests one dollar to its assets (Wildasin, 1984). Therefore, it should affect the company's investment.

During the 1970s and 1980s, many researchers realised that the neoclassical theory and the Q theory of investment are to some extent equivalent (Hayashi, 1982; Yoshikawa, 1980). For example, as cited in Hayashi (1982), Abel and Yoshikawa used different models and got the same conclusion. That is, that the firm's optimal investment ratio is equal to Q minus 1, which is the marginal cost of installing a new company; under certain conditions, the rate of investment that maximises the shareholder's value is indeed a function of marginal Q (Summers, Bosworth, Tobin, & White, 1981). Much of the research done during that period echoes both Tobin's ideas and the neoclassical theory of investment. Therefore, Hayashi (1982) integrates these two theories and shows that the optimal corporate investment rate is a function of marginal Q. As marginal Q is unobservable, Hayashi (1982) proposed and verified that marginal Q can be conditionally represented by the average Q. Also, he defines his research as explaining Tobin's Q theory in a neoclassical view. After this, the average Q is used as a proxy of the marginal Q. The Q theory of investment has been widely studied, and the Q is arguably used as a common variable in many corporate finance related studies (Peters & Taylor, 2017). Moreover, subsequent related research usually regards Tobin's Q theory of investment as the neoclassical theory.

2.2 The practice of the Q theory of investment

Since the average Q can be observed, the Q theory becomes operational. Many researchers have applied this theory in their research in the past decades. According to (Wildasin, 1984), the Q started to be used as an independent variable in empirical investment equations around the 1980s. In the decades that followed, researchers consistently found that Tobin's marginal Q has a positive effect on the rate of corporate investment (Abel & Eberly, 1993; Barnett & Sakellaris, 1998; Blundell, Bond, Devereux, & Schiantarelli, 1992; Bolton, Chen, & Wang, 2011; Wildasin, 1984). The studies relating to the Q theory of investment have also become diversified. Relevant arguments about this include: the impact of adjusted cost on Q (Hayashi, 1982; Summers et al., 1981), the measurement errors of Q (Abel, 2018; Erickson & Whited, 2000), the role of intangible assets in Q theory (Eisfeldt & Papanikolaou, 2013; Peters & Taylor, 2017), the nonlinear relationship between investment and Q (Barnett & Sakellaris, 1998; Bolton et al., 2011), and others.

Many studies found that the rate of corporate investment was not only related to the marginal Q, but other factors could also affect this rate, such as cash flow (Bushman, Smith, & Zhang, 2011; Devereux & Schiantarelli, 1990), adjusted stock price (Baker, Stein, & Wurgler, 2003), leverage (Aivazian, Ge, & Qiu, 2005), firm size (Kadapakkam, Kumar, & Riddick, 1998), firm age (Richardson, 2006) and others. Therefore, the investment equation has also been continuously added to with new independent variables. In this case, Tobin's Q is not the only explanation of corporate investment, but it is still an important one. The marginal Q is not the only variable in the corporate investment equation, but it is still regarded as one of the most important ones. Furthermore, although the Q theory has been proposed and studied for decades, it is still considered to be one of the most important theories in explaining corporate investment, even in the more complex and diversified economic environment of today (Abel, 2018).

In recent years, it has been pointed out that the relationship between the rate of corporate investment and marginal Q (also called the investment sensitivity to Q) actually reflects the firm-level capital allocation efficiency (McLean, Zhang, & Zhao, 2012). If a company's investment rate is relatively more sensitive to its marginal Q, then the coefficient of marginal Q on the investment rate is relatively higher; in general, it means the company's resource use is more effective. This is because the marginal Q captures growth opportunities. Companies should theoretically invest only where there are growth opportunities.

There is also research which shows that firms' capital allocation efficiency could be influenced by other factors. In other words, the existing relationship between corporate investment and Q can be affected by a third party. This makes the investment equation more complicated. For example, McLean et al. (2012) found that a higher level of investor protection can improve the investment sensitivity to Q. In countries with a higher level of investor protection, the firms' investment ratio is more sensitive to the marginal Q, so that the resource allocation is more effective. This is because a stronger investor protection law is associated with: first, encouraging more accurate financial reporting (Leuz, Nanda, & Wysocki, 2003); second, encouraging companies to be involved in value-enhancing projects with external financing (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000; R. Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2002; R. L. Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998); and third, encouraging managers to implement investment activities that are conducive to maximise the interests of shareholders, rather than expropriating a firm's resources (Shleifer & Wolfenzon, 2002; Wurgler, 2000).

Following 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.

2.3 CSR aspects and ESG ratings

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:

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

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 main 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 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 the top 300 Australian listed firms (ASX300 firms) and the top 50 New Zealand listed firms (NZX50 firms). 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 1,847 firm-year observations from 2004 to 2017.

In 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 ranked 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. The variable ***NCOSIND*** is the combination of the remaining variables. It refers to the average score of all indicators except the costly indicator.

Table 1: Sample descriptive statistic

Panel A: Sample distribution by year.

Year	Freq.	Percent	Cum.
2004	42	2.27	2.27
2005	48	2.6	4.87
2006	54	2.92	7.8
2007	58	3.14	10.94
2008	64	3.47	14.4
2009	102	5.52	19.92
2010	126	6.82	26.75
2011	139	7.53	34.27
2012	151	8.18	42.45
2013	176	9.53	51.98
2014	194	10.5	62.48
2015	233	12.62	75.09
2016	235	12.72	87.82
2017	225	12.18	100
Total	1,847	100	

It shows that the number of observations increases as the year increases (Table 1, Panel A). It could be explained by the CSR-related data availability in these two countries. 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. The characteristic of the sample year distribution in this paper is similar to the prior paper of Bhandari and Javakhadze (2017). In their sample, the observations in the most recent year are almost six times more than in the beginning of the year. However, it could be argued that the sample could be improved by adding those companies which had been listed within the sample period but have now been delisted. One of the biggest difficulties in doing this is the availability of data. For instance, those delisted companies are described as inactive or dead companies in the Asset4 dataset. The inactive or dead companies have less data than active companies in the dataset, and in particular, there is little CSR-related data available. In this case, a sub-sample of the most recent years is used for discovering the survival bias in the robustness checks.

Panel B: Sample distribution by country.

Country	Freq.	Percent	Cum.
Australia	1,751	94.8	94.8
New Zealand	96	5.2	100
Total	1,847	100	

In the sample distribution by country (Table 1, Panel B), almost 95% 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.

Panel C: Sample distribution by industry sector.

Industry	Freq.	Percent	Cum.
Consumer Discretionary	280	15.16	15.16
Consumer Staples	126	6.82	21.98
Energy	134	7.26	29.24
Financials	224	12.13	41.36
Health Care	149	8.07	49.43
Industrials	219	11.86	61.29
Information Technology	67	3.63	64.92
Materials	384	20.79	85.71
Real Estate	160	8.66	94.37
Telecommunication Services	27	1.46	95.83
Utilities	77	4.17	100
Total	1,847	100	

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 in the two countries.

Panel D: The descriptive statistics of the main variables.

VARIABLES	N	Mean	S.D.	Min	P25	P50	P75	Max
INV1	1,847	7.318	11.91	0	1.164	3.924	8.092	98.91
Q	1,847	1.912	1.534	0.588	1.059	1.383	2.083	9.91
CF	1,847	0.0851	0.134	-0.644	0.0365	0.0793	0.132	0.528

ESG	1,847	44.56	27.16	7.66	20.08	38.04	69.68	94.77
ENV	1,847	42.81	29.13	9.73	15.52	33.59	71.81	95.21
SOC	1,847	46.31	28.54	4.88	20.04	42.45	72.84	96.35
COSIND	1,847	0.418	10.33	-19.24	-4.32	-0.613	2.643	35.67
NCOSIND	1,847	0.356	5.861	-10.34	-3.916	-0.312	3.908	15.79
LEVERAGE	1,847	0.224	0.159	0	0.103	0.222	0.320	0.932
SIZE	1,847	14.67	1.77	9.613	13.41	14.57	15.71	20.7
AGE	1,847	20.67	23.87	0	9	13	19	132

The statistical characteristics of the main variables are basically consistent with previous studies.

4. Results

This section includes empirical results and robustness checks. In the empirical results part the results will be shown step-by-step. Also, the robustness checks part includes three different ways of checking the robustness of the main findings of this research.

4.1 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 from 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.

4.1.1 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) show the results that 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.

Table 2: The overall ESG performance and investment efficiency.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	INV1	INV1	INV1	INV1	INV1	INV1
Q	0.166	0.151	0.275	1.137	0.271	1.137
	(0.876)	(0.848)	(0.787)	(1.309)	(0.789)	(1.309)
ESG	-0.0226	-0.0154	-0.0876***	-0.0587**	-0.0884***	-0.0587**
	(0.0270)	(0.0264)	(0.0271)	(0.0295)	(0.0276)	(0.0295)
Q * ESG	-0.00178	0.00189	0.0130	0.0191	0.0131	0.0191
	(0.0233)	(0.0223)	(0.0203)	(0.0261)	(0.0203)	(0.0261)
CF	-23.28**	-22.11**	-16.49	-17.09	-16.48	-17.09
	(11.61)	(11.21)	(10.31)	(10.71)	(10.32)	(10.71)
CF * ESG	0.639***	0.594***	0.450**	0.377**	0.450**	0.377**
	(0.228)	(0.219)	(0.200)	(0.185)	(0.201)	(0.185)
PTBV	-0.00502	-0.109	-0.000564	-0.173**	-0.000305	-0.173**
	(0.140)	(0.151)	(0.140)	(0.0794)	(0.140)	(0.0794)
LEVERAGE	-3.452	-3.299	-2.163	-5.415	-2.171	-5.415
	(2.873)	(2.942)	(2.345)	(3.901)	(2.345)	(3.901)
SIZE	-1.425***	-1.679***	-0.651**	-2.279	-0.647**	-2.279
	(0.331)	(0.355)	(0.320)	(1.578)	(0.321)	(1.578)
AGE	0.0267	0.0269	0.00113	2.721***	0.00154	2.721***
	(0.0175)	(0.0181)	(0.0160)	(0.729)	(0.0162)	(0.729)
Constant	28.45***	29.29***	14.39***	0.991	14.38***	0.991
	(5.479)	(5.676)	(4.966)	(20.39)	(4.967)	(20.39)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.087	0.114	0.272	0.645	0.273	0.645
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	0.0823	0.102	0.258	0.577	0.258	0.577

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

In Table 2, the ***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 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 the prior research (Bhandari & Javakhadze, 2017) which documents a significantly negative impact. Moreover, the interaction term ***CF*** and ***ESG*** is positively significant in all 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 from model (3) to (6), 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)], or within the same firm [column (4) and column (6)], the ESG is negatively associated with the corporate investment rate.

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4.1.2 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*** 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.

Table 3: Total environmental performance and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	-0.212	-0.230	0.105	0.961	0.102	0.961
	(0.809)	(0.787)	(0.740)	(1.201)	(0.741)	(1.201)
ENV	-0.0379	-0.0372	-0.0972***	-0.0523**	-0.0976***	-0.0523**
	(0.0288)	(0.0283)	(0.0284)	(0.0258)	(0.0286)	(0.0258)
Q * ENV	0.0173	0.0216	0.0241	0.0314	0.0242	0.0314
	(0.0233)	(0.0224)	(0.0208)	(0.0254)	(0.0208)	(0.0254)
CF	-19.61*	-18.72*	-13.69	-14.11	-13.69	-14.11
	(10.54)	(10.19)	(9.254)	(9.559)	(9.260)	(9.559)
CF * ENV	0.534***	0.498***	0.370**	0.300*	0.370**	0.300*
	(0.197)	(0.189)	(0.173)	(0.154)	(0.174)	(0.154)
PTBV	0.00630	-0.0943	0.00740	-0.181**	0.00742	-0.181**
	(0.138)	(0.149)	(0.140)	(0.0778)	(0.140)	(0.0778)
LEVERAGE	-4.010	-3.903	-2.493	-5.866	-2.496	-5.866
	(2.805)	(2.871)	(2.337)	(4.021)	(2.338)	(4.021)
SIZE	-1.459***	-1.662***	-0.620**	-2.295	-0.619**	-2.295
	(0.342)	(0.358)	(0.311)	(1.580)	(0.311)	(1.580)
AGE	0.0252	0.0263	0.00112	2.849***	0.00136	2.849***
	(0.0177)	(0.0184)	(0.0158)	(0.720)	(0.0160)	(0.720)
Constant	29.28***	29.57***	13.87***	-0.687	13.89***	-0.687
	(5.511)	(5.656)	(4.814)	(20.38)	(4.822)	(20.38)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.090	0.118	0.273	0.646	0.273	0.646
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	0.0850	0.106	0.258	0.577	0.258	0.577

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

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 the six models, which means the corporate investment is more relying on the internally generated cash if the environmental performance is higher. The marginal effect of ***ENV*** is also negatively influencing the corporate investment on the industry level and on the firm 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.

Table 4: Total social performance and investment efficiency.

VARIABLES	(1) INV1	(2) INV1	(3) INV1	(4) INV1	(5) INV1	(6) INV1
Q	0.444	0.451	0.478	1.468	0.476	1.468
	(0.840)	(0.812)	(0.751)	(1.219)	(0.752)	(1.219)
SOC	-0.0145	-0.00378	-0.0578***	-0.0604**	-0.0582***	-0.0604**
	(0.0221)	(0.0219)	(0.0218)	(0.0292)	(0.0224)	(0.0292)
Q * SOC	-0.0143	-0.0122	0.00161	0.00533	0.00164	0.00533
	(0.0195)	(0.0186)	(0.0167)	(0.0208)	(0.0167)	(0.0208)
CF	-22.89**	-21.73*	-16.45	-17.12	-16.44	-17.12
	(11.57)	(11.19)	(10.40)	(10.80)	(10.41)	(10.80)
CF * SOC	0.609***	0.567***	0.433**	0.366**	0.433**	0.366**
	(0.220)	(0.211)	(0.193)	(0.179)	(0.193)	(0.179)
PTBV	0.00537	-0.0938	0.000192	-0.157**	0.000337	-0.157**
	(0.143)	(0.153)	(0.140)	(0.0793)	(0.140)	(0.0793)
LEVERAGE	-3.011	-2.833	-1.689	-4.932	-1.693	-4.932
	(2.889)	(2.964)	(2.366)	(3.793)	(2.365)	(3.793)
SIZE	-1.307***	-1.575***	-0.789**	-2.140	-0.788**	-2.140
	(0.330)	(0.354)	(0.315)	(1.612)	(0.315)	(1.612)
AGE	0.0297*	0.0296	-0.000980	2.557***	-0.000797	2.557***
	(0.0177)	(0.0182)	(0.0164)	(0.761)	(0.0167)	(0.761)
Constant	26.62***	27.70***	15.71***	1.346	15.71***	1.346
	(5.549)	(5.738)	(4.930)	(20.25)	(4.932)	(20.25)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.082	0.107	0.268	0.645	0.268	0.645
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	0.0764	0.0948	0.254	0.576	0.253	0.576

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

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 investment sensitivity to cash flow can be positively affected by the total social performance, because the interaction term of ***CF*SOC*** is significantly positive. The negative marginal effect of ***SOC*** on corporate investment is existed, which presents a negative coefficients of ***SOC*** on ***INV1*** within the same industry or the same firm.

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.

4.1.3 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]

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.

Table 5: The costly CSR initiatives and investment efficiency.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	INV1	INV1	INV1	INV1	INV1	INV1
Q	-1.397***	-1.339***	-0.690*	0.910*	-0.692*	0.910*
	(0.377)	(0.381)	(0.394)	(0.485)	(0.395)	(0.485)
COSIND	0.175*	0.187**	0.0724	0.0429	0.0722	0.0429
	(0.0913)	(0.0908)	(0.0848)	(0.0955)	(0.0849)	(0.0955)
Q * COSIND	-0.276***	-0.273***	-0.182***	-0.123*	-0.182***	-0.123*
	(0.0727)	(0.0703)	(0.0653)	(0.0704)	(0.0653)	(0.0704)
CF	7.158*	6.533*	4.252	-0.517	4.266	-0.517
	(3.856)	(3.793)	(3.350)	(3.765)	(3.352)	(3.765)
CF * COSIND	1.151**	1.050**	0.819*	0.567	0.820*	0.567
	(0.536)	(0.526)	(0.476)	(0.358)	(0.476)	(0.358)
PTBV	0.226	0.151	0.203	-0.0475	0.203	-0.0475

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

	(0.142)	(0.151)	(0.146)	(0.0988)	(0.146)	(0.0988)
LEVERAGE	-3.298	-3.380	-2.596	-5.944	-2.597	-5.944
	(2.404)	(2.466)	(2.251)	(4.256)	(2.251)	(4.256)
SIZE	-1.033***	-1.223***	-0.721***	-2.108	-0.723***	-2.108
	(0.301)	(0.312)	(0.274)	(1.719)	(0.275)	(1.719)
AGE	0.0374**	0.0393**	0.000155	2.460***	0.000360	2.460***
	(0.0189)	(0.0193)	(0.0155)	(0.788)	(0.0156)	(0.788)
Constant	23.48***	24.46***	14.96***	1.885	15.00***	1.885
	(5.071)	(5.187)	(4.369)	(20.98)	(4.399)	(20.98)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.145	0.166	0.294	0.647	0.294	0.647
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	0.140	0.155	0.280	0.578	0.280	0.578

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

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. Moreover, the coefficients estimate on CF are significantly positive in model (1) and model (2). The coefficients estimate on the interaction term of ***CF*** and ***COSIND*** are also significantly positive in model (1), (2), (3), and (5). This could be explained as the association between corporate investment and internally generated cash flow are positive. When a firm invests on those costly CSR initiatives, the corporate investment will increasingly rely its cash flow.

4.1.4 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) 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:

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

where β_1 = 0.910 (Table 5, column 6, row 1), β_3 = -0.123 (Table 5, column 6, row 5) and the COSIND ranged from -19.24 - 35.67 (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***.

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]	
L.Q						
_at						
COSIND = P25	1.440200	0.562085	2.56	0.011	0.332926	2.547473
COSIND = P50	0.985063	0.485291	2.03	0.043	0.029070	1.941057
COSIND = P75	0.586359	0.526419	1.11	0.266	-0.450654	1.623372

The values of the ***COSIND*** in Table 6 are typically selected at its 25th percentile (-4.32), the median (-0.613), and the 75th percentile (2.643). With a ***COSIND*** increasing from 25th percentile to 75th percentile, the coefficient of Q on corporate investment decreases from 1.44 to 0.59. 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 both negative, but slightly different in the third decimal degree. 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 are not driven by the country differences.

The findings of this research is 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.

4.2. Robustness check

In this section, a number of additional tests are performed to confirm the accuracy of the main finding of this research. First, I use the alternative measurement of corporate investment to test whether the results are consistent. This way of testing the robustness follows the studies of Bhandari and Javakhadze (2017). Second, I compute a CSR variable called a ***NCOSIND*** which refers to the combination of the rest of the 134 CSR indicators. Then I test the effect of this variable on investment efficiency. The purpose of doing this is to prove that only those costly CSR aspects are the main factors that drive a company's investment which becomes less sensitive to growth opportunities. Finally, I test the main finding again by using a sub-sample that only includes the most recent year's data – the purpose is to discover the survival bias.

4.2.1 Robustness check I: the alternative measurement of corporate investment

The alternative measurement 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 445. 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.

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

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

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	INV2	INV2	INV2	INV2	INV2	INV2
Q	-0.314	-0.207	-0.0608	-0.811	-0.0745	-0.811
	(0.719)	(0.692)	(0.751)	(1.279)	(0.751)	(1.279)
COSIND	0.192	0.214	0.178	0.0688	0.176	0.0688
	(0.192)	(0.198)	(0.193)	(0.187)	(0.193)	(0.187)
Q * COSIND	-0.324**	-0.338**	-0.262*	-0.207*	-0.263*	-0.207*
	(0.150)	(0.153)	(0.155)	(0.123)	(0.155)	(0.123)
CF	17.35***	16.11***	22.41***	19.79	22.47***	19.79
	(5.901)	(5.699)	(5.644)	(13.12)	(5.649)	(13.12)
CF * COSIND	1.512	1.706	1.666	1.629	1.665	1.629
	(1.064)	(1.091)	(1.120)	(1.289)	(1.119)	(1.289)
PTBV	0.550**	0.545**	0.438**	0.189	0.441**	0.189
	(0.214)	(0.215)	(0.211)	(0.152)	(0.211)	(0.152)
LEVERAGE	-6.580	-6.250	-1.649	4.150	-1.802	4.150
	(5.458)	(5.554)	(5.844)	(13.86)	(5.791)	(13.86)
SIZE	-1.220**	-1.395**	-2.036**	-10.83**	-2.050**	-10.83**
	(0.601)	(0.658)	(0.818)	(5.380)	(0.820)	(5.380)
AGE	0.0520	0.0527	0.0220	1.615***	0.0233	1.615***
	(0.0314)	(0.0327)	(0.0324)	(0.540)	(0.0327)	(0.540)
Constant	22.40**	22.60**	26.59**	127.1*	26.83**	127.1*
	(9.053)	(9.725)	(11.26)	(65.30)	(11.29)	(65.30)
Observations	445	445	445	445	445	445
R-squared	0.166	0.198	0.241	0.608	0.242	0.608
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	0.149	0.158	0.184	0.497	0.183	0.497

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

Secondly, I replace the missing values in R&D spending with 0 to enlarge the number of observations. The ***INV2*** now contains 1,601 observations. The results in Panel B of Table 7 are still consistent with the main findings. The coefficient estimate of the key interaction term (Q*COSIND) remains significantly negative.

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	-0.835	-0.845	-0.627	-0.164	-0.626	-0.164
	(0.684)	(0.695)	(0.728)	(1.518)	(0.732)	(1.518)
COSIND	0.304*	0.330*	0.264	0.277	0.264	0.277
	(0.173)	(0.176)	(0.176)	(0.190)	(0.176)	(0.190)
Q * COSIND	-0.414***	-0.414***	-0.362***	-0.355**	-0.362***	-0.355**
	(0.144)	(0.142)	(0.139)	(0.146)	(0.139)	(0.146)
CF	9.650**	7.942	7.333	12.63	7.326	12.63
	(4.855)	(4.984)	(5.163)	(8.792)	(5.174)	(8.792)
CF * COSIND	1.547**	1.434**	1.300**	0.759	1.299**	0.759
	(0.639)	(0.628)	(0.625)	(0.834)	(0.624)	(0.834)
PTBV	0.756**	0.705**	0.801**	0.424	0.801**	0.424
	(0.323)	(0.326)	(0.327)	(0.293)	(0.327)	(0.293)
LEVERAGE	-6.307*	-6.430*	-5.520	-24.42**	-5.519	-24.42**
	(3.378)	(3.410)	(3.537)	(12.12)	(3.538)	(12.12)
SIZE	-1.341***	-1.641***	-1.319**	-14.23***	-1.318**	-14.23***
	(0.439)	(0.505)	(0.525)	(3.821)	(0.529)	(3.821)
AGE	0.0353	0.0397*	0.0118	-0.547	0.0117	-0.547
	(0.0217)	(0.0231)	(0.0234)	(1.728)	(0.0237)	(1.728)
Constant	25.57***	27.40***	21.09***	227.9***	21.07***	227.9***
	(7.360)	(8.051)	(7.849)	(51.90)	(7.938)	(51.90)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.113	0.136	0.160	0.427	0.160	0.427
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	0.108	0.124	0.144	0.316	0.143	0.316

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

4.2.2 Robustness check II: the effect on the rest of the 134 CSR indicators

In the second robustness check, the average score of the rest of the 134 indicators is computed to present the overall performance on the rest of the 134 CSR initiatives. The descriptive statistics of ***NCOSIND*** is in Table 1, Panel D. The regression outputs are shown in Table 8.

Table 8: The effect of the rest ESG indicators on investment efficiency – robustness check II.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	INV1	INV1	INV1	INV1	INV1	INV1
Q	-0.0195	0.0161	0.516	1.196	0.516	1.196
	(0.682)	(0.705)	(0.671)	(1.358)	(0.671)	(1.358)
NCOSIND	-0.00607	0.0772	-0.00733	-0.215	0.000501	-0.215
	(0.231)	(0.247)	(0.240)	(0.416)	(0.247)	(0.416)
Q * NCOSIND	-0.348	-0.334	-0.262	-0.312	-0.263	-0.312
	(0.211)	(0.207)	(0.194)	(0.279)	(0.194)	(0.279)
CF	13.13**	10.88*	9.746	16.54*	9.717	16.54*
	(5.558)	(5.862)	(5.983)	(9.082)	(5.997)	(9.082)
CF * NCOSIND	5.365***	5.047***	4.291**	3.956**	4.291**	3.956**
	(1.890)	(1.824)	(1.785)	(1.696)	(1.785)	(1.696)
PTBV	0.461*	0.398	0.474*	0.161	0.474*	0.161
	(0.260)	(0.277)	(0.265)	(0.238)	(0.265)	(0.238)
LEVERAGE	-4.199	-4.383	-3.177	-21.98**	-3.168	-21.98**
	(3.737)	(3.761)	(3.544)	(10.92)	(3.545)	(10.92)
SIZE	-1.258**	-1.645***	-1.321**	-13.25***	-1.330**	-13.25***
	(0.486)	(0.591)	(0.654)	(3.916)	(0.654)	(3.916)
AGE	0.0296	0.0304	0.00393	0.150	0.00306	0.150
	(0.0220)	(0.0226)	(0.0253)	(1.835)	(0.0259)	(1.835)
Constant	22.45***	25.45***	18.12*	199.9***	18.23**	199.9***
	(7.746)	(8.865)	(9.201)	(54.43)	(9.201)	(54.43)
Observations	1,601	1,601	1,601	1,601	1,601	1,601
R-squared	0.089	0.110	0.141	0.420	0.141	0.420
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	0.0842	0.0985	0.124	0.308	0.124	0.308

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

The coefficients estimate of the interaction term of Q and NCOSIND are insignificant in all six columns. This result supports the accuracy of the main finding. The costly CSR aspects are the main driver that reduces a company's investment efficiency.

4.2.3 Robustness check III: the results from the sub-sample

A potential limitation of this research could be the sample size. More specifically, the sample used in this study is from the listed companies on ASX300 and NZX50. It should be mentioned that the ASX300 and NZX50 are not two fixed company lists. They are dynamic lists. The listed companies are arranged according to their capital amount. In other words, when companies' capital changed they may move further up or down the list, or even out of the lists. Moreover, companies could be delisted by bankruptcy, change of name, mergers and other reasons. Because of the availability of the ESG data, the sample used in this research is the ASX300 listed firms and the NZX50 listed firms as of the date 1st April 2018. Those companies that were listed but are now delisted or dead are not included. This research could be improved by adding those delisted or dead companies back to enlarge the sample size. On the other hand, the companies used in this research are all the survivors as of the date 1st April 2018. Their characteristics may be different from those of companies that have died. Therefore, the findings from the survivors may not be able to represent those of the dead companies.

In the third robustness check I only use the sub-sample of the most recent eight years of data. This is because the most recent years sample contains more firm-year observations which have the characteristics of both surviving and dead companies. It could be argued that by using sub-samples, the impact of survival bias can be reduced to some extent. The results from the sub-sample are shown in Table 9.

Table 9: The costly CSR initiatives and investment efficiency in sub-sample – robustness check III.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	INV1	INV1	INV1	INV1	INV1	INV1
Q	-1.455***	-1.339***	-0.981**	0.973	-0.979**	0.973
	(0.402)	(0.410)	(0.438)	(0.646)	(0.439)	(0.646)
COSIND	0.247**	0.249**	0.144	0.110	0.144	0.110
	(0.102)	(0.0991)	(0.0968)	(0.134)	(0.0968)	(0.134)
Q * COSIND	-0.324***	-0.317***	-0.231***	-0.164*	-0.231***	-0.164*
	(0.0864)	(0.0824)	(0.0776)	(0.0949)	(0.0776)	(0.0949)

CF	4.730	4.135	2.705	-2.128	2.687	-2.128
	(3.891)	(3.795)	(3.470)	(4.130)	(3.473)	(4.130)
CF * COSIND	0.832	0.731	0.564	0.604	0.563	0.604
	(0.603)	(0.592)	(0.538)	(0.411)	(0.538)	(0.411)
PTBV	0.150	0.0717	0.278	-0.0473	0.278	-0.0473
	(0.181)	(0.193)	(0.169)	(0.108)	(0.169)	(0.108)
LEVERAGE	-2.033	-1.740	-1.295	-6.896	-1.293	-6.896
	(2.956)	(3.008)	(2.774)	(5.505)	(2.776)	(5.505)
SIZE	-1.186***	-1.285***	-0.847***	-5.010***	-0.845***	-5.010***
	(0.304)	(0.311)	(0.282)	(1.549)	(0.283)	(1.549)
AGE	0.0357*	0.0373**	0.00236	3.243***	0.00213	3.243***
	(0.0187)	(0.0189)	(0.0161)	(0.883)	(0.0163)	(0.883)
Constant	25.30***	25.01***	17.28***	35.38**	17.24***	35.38**
	(5.290)	(5.326)	(4.462)	(15.87)	(4.484)	(15.87)
Observations	1,235	1,235	1,235	1,235	1,235	1,235
R-squared	0.170	0.192	0.311	0.697	0.311	0.697
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	0.182	0.296	0.619	0.296	0.619

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

From column (1) to column (6), all the key coefficients are negatively significant. This is consistent with the main finding of this paper. Even in the sub-sample of the most recent years, this effect remains constant. There is no strong evidence discovered that the finding of this research is affected by survival bias.

5. 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 the 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 1,601 firm-years observations, and the sample period is 14 years. It could be argued that the result might be different if the sample of this research is bigger.

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 not be exactly the same as that in the America region.

6. 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. The initial idea of this research follows the studies of (Bhandari & Javakhadze, 2017) and the trade-off hypothesis of (Preston & O'bannon, 1997), who posit that to perform CSR reduces a company's valuable resources and assets which could otherwise be used in certain profitable investment opportunities. In this case, when a growth opportunity appears, the company may not be able to invest efficiently and maximise profits. The findings of this research is not exactly the same as the prior research of Bhandari and Javakhadze (2017). 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.

The empirical analysis of this research is conducted by using a sample of firms listed on ASX300 and NZX50 in Australia and New Zealand. The results show that companies ranking higher in those costly ESG indicators which represent the costly CSR initiatives or policies are less sensitive to a Q measured growth opportunity. This makes the companies invest inefficiently, therefor, potentially affect a company's financial performance. The main result for this research is robust to the alternative measurement of the corporate investment rate; the test on the combination of the rest of the CSR aspects excludes the costly ones and the sub-sample.

This research contributes to the current literature on CSR initiatives and corporate investment efficiency by providing more detailed evidence and explanations on how and why the CSR could negatively associate to corporate investment efficiency. More specifically, this research conducts a more in-depth analysis on this effect from the overall ESG performance to the most basic ESG indicators performance, and shows the essentially costly CSR initiatives or policies are the fundamental reason for reducing the corporate investment efficiency. This negative effect cannot be found from the over ESG performance, the total environmental dimension performance, or the total social dimension performance. Moreover, this research contributes to the current literature by adding evidence from Australia and New Zealand and providing the regional specificity of Australia/New Zealand region. This research may bear importance to corporate managers, regulators, and investors in their CSR strategy settings, CSR regulations, and investment decision-makings in Australia and New Zealand. It may be helpful for them to have a better understanding on how the CSR initiatives could influence a company's capital allocation efficiency and performance. This paper may also bear importance for researchers who are interesting in ESG related topics to consider ESG rating agency differences.

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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.
NCOSIND	The equal-weighted score of the rest CSR 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.