Corporate Social Responsibility and Firm Life-cycles

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Abstract

This paper assesses U.S.-based firms from 2005 to 2015 to determine whether firms with better corporate social responsibility (CSR) performance will allocate capital through their life-cycle to better maintain or extend total assets. We find (1) A firm's equity and debt issuance assume a hump shape over the life-cycle under CSR practice, and higher-CSR firms face fewer significant issues as they mature; (2) payout, RETA, and FCF decreased from high-CSR-performance firms to low-CSR-performance firms; and (3) cash holdings also exhibit a hump shape over the life-cycle and higher CSR practices are associated with significantly lower cash holdings. CSR performance is a useful predictor for forecasting firm life-cycle and superior CSR performance ensures efficient capital allocation throughout firm life-cycle. Furthermore, CSR practice is an indicator of firm life-cycle sustainability and indicates a firm's future cash flow patterns.

Keywords: Corporate social responsibility, life cycle, cash flow, financial decisions

1. Introduction

Corporate social responsibility (CSR) has emerged as a critical issue over the past two decades, not only due to increased consumer awareness, regulation, and corporate governance but also as a factor associated with long-term firm performance (Lin *et al*., 2009; Roberts and Dowling, 2002). This increased attention to CSR has raised several questions: what benefits do firms gain from enhanced CSR practice, and how does CSR relate to managerial performance? Empirical studies have sought to satisfy these questions through investigating various aspects of CSR, including capital allocation efficiency (Bhandari and Javakhadze, 2017), firm cash holdings (Cheung, 2016), cost of equity capital (Gregory *et al.*, 2014; Girerd-Potin *et al.*, 2014; Reverte, 2012), cost of corporate bonds (Ge and Liu, 2015), cost of bank loans (Goss and Roberts, 2011), financial transparency (Dhaliwal *et al.*, 2014), variable competitiveness and increased stakeholder trust (Antonia *et al.*, 2013), dividend policy (Kim and Jeon, 2015), financial risk (Hsu and Chen, 2015), and financial performance (Nelling and Webb, 2009; Surroca *et al.*, 2010).

However, CSR performance has implications for a firm's capital allocation throughout its life-cycle, including financing, capital structure, investment, and cash and dividend (i.e., cash holding, payout ratio, and free cash flow) policies. Empirical results in financial theory suggest that a firm will benefit by reducing financing costs (Gregory *et al*., 2014; Ge and Liu, 2015; Goss and Roberts, 2011) and cash holdings (Cheung, 2016) under higher CSR practice. This study explores whether and how CSR performance affects firm-level capital resource allocation and firm performance under different life-cycles. Life-cycle theory proposes that, as a firm transitions from one stage to another, it will follow a predictable pattern characterized by different development stages which can't be easily reversed (Porter, 2008). Recently studies have suggested that cash flow patterns (Dickinson, 2011), M&A activity (Owen and Yawson, 2010), diversification (Arikan and Stulz, 2016), and dividend policy (Coulton and Ruddock, 2011; DeAngelo *et al.*, 2006) are predictable, are related to a firm's life-cycle stage and highlight the importance of life-cycle to specific aspects of corporate policy. This study proposes to explain of the interdependence of CSR practice with respect to financing, capital structure, investment, and cash holdings. The proposed thesis is based on the

view that in making interdependent corporate decisions, firms are sensitive to the development of future investment opportunities and cash flow patterns under CSR practice over a life-cycle. Based on previous studies (Bhandari and Javakhadze, 2017; Faff *et al*., 2016), this work argues that CSR practice is related to the evolution of a firm's investment opportunities and cash flow, and therefore follow a predictable pattern in line with the firm's life-cycle.

This study finds that, due to a decrease in investment opportunities, a firm with higher CSR performance will issue significantly less equity and debt as it become more mature. In contrast, but firms with worse CSR performance issue more equity and debt as they mature. The development of a firm's equity and debt issuance is also found to exhibit a hump shaped pattern over a life-cycle (Faff *et al*., 2016) under CSR practice.

As a firm moves from growth to maturity, cash holdings and dividend policies maybe help alleviate the agency problem of surplus cash by restricting management's scope to waste firm resources. Although the determinants of cash holdings have been thoroughly explored, the relationship between CSR and cash holdings remains unexplored in the life-cycle context. This study identifies and examines three channels of corporate governance through which CSR may influence cash holdings under different life-cycles, including changes in cash holdings, payout ratio, and free cash flow (FCF). However, there are two competing effects on cash holdings. First, CSR implies better financial performance (Surroca *et al.*, 2010) and is also effective in reducing the agency problem associated with cash holdings decisions, leading to lower cash holdings with stronger CSR performance. On the other hand, under the agency view of CSR, entrenched managers may use CSR activities to connive with stakeholders to receive increased managerial discretion to extract private benefits (Cheung, 2016). As a firm moves toward the maturity stage, the increase in the agency problem of cash holdings results in firms with higher CSR performance paying significantly higher dividends and earning greater FCF as they mature, but firms with worse CSR performance show the opposite results. In addition, firms with higher CSR performance are found to decrease their cash holding and total assets as they move through maturing and declining stages. In addition, cash holdings and total assets assume a hump shape over a life-cycle in firms which practice CSR.

This study focuses on how CSR practice relates to a firm's capital allocation

throughout a firm's life-cycle because it plays a crucial role in a firm's financing and future growth decisions. Specifically, this study poses two research questions: (1) does CSR practice affect capital allocation throughout firm life-cycle? and (2) does CSR practice signal to distinguish financial performance throughout the life-cycle?

To examine these research questions, CSR performance scores sourced from KLD STAT are used to test the hypothesis on a large sample of U.S. firms over the 2005-2015 period. To estimate the propriety proxy for firm life-cycle, based on recent studies, this study uses multiclass linear discriminant analysis (MLDA) (Faff *et al*., 2016; DeAngelo *et al.*, 2010; Grullon *et al.*, 2002) to estimate and verify life-cycle proxies. To ensure the life-cycle stage is not driven by the specific measure of MLDA, Dickinson classification scheme (DCS) (Dickinson, 2011) is used to distinguish firms in different life-cycle phases. The ratio of retained earnings to total assets (RETA) (DeAngelo *et al.*, 2006) is used as another life-cycle proxy.

Various tests are used to establish the robustness of experimental results. We control for firm characteristics (i.e., age, Tobin's Q, size, and financial performance measures) and cash flow uncertainty (i.e., profit, cash holdings, payout ratio, and FCF), and use earnings before income tax (EBIT) and RETA to distinguish the interdependence of CSR practice with respect to life-cycle phase. Additional tests are used to ensure the results are not driven by a correlation between improper life-cycle proxy, specific firm characteristics, and CSR practice.

The remainder of this paper is organized as follows. Section 2 reviews and discusses the related literature and develops the hypotheses. Section 3 describes the key variables, data set, and methodology, while Section 4 reports and discusses the empirical results. Finally, findings are summarized in Section 5.

2. Related research and hypothesis development

Through the existence of asymmetric information and agency problems between managers and investors, a firm's financial decision-making throughout its life-cycle may differ from CSR practice. Cho *et al.* (2013) show that CSR performance plays a positive role for investors by reducing information asymmetry, idiosyncratic risk (Lee and Faff, 2009), and several CSR concern components are positively and significantly

correlated to measures of systematic risk (Oikonomou *et al.*, 2012). Moreover, firms with better CSR performance face significantly lower capital constraints (Cheng *et al.*, 2014) and bank loan interest rates (Goss and Roberts, 2011). However, the role of agency conflicts and information asymmetry in shaping firms' incentives to allocate liquid assets under CSR throughout firm life-cycle is still unexplored.

In this study, we examine the interplay of capital structure, investment, and cash policies of a firm's financial decision-making across the life-cycle and assess the extent to which it is influenced by CSR practice.

2.1 Equity structure and life-cycle

Firms in different life-cycle phases differ in terms of their financing capacity, resources, and investment opportunities to raise funds from the market (Berger and Udell, 1998). Firm resources and capacities change over the life-cycle under different management and business strategies. Empirical results show that a firm’s financial structure changes over the life-cycle, with small and young firms usually turning to private equity and debt markets, while larger and mature ones depend on public markets (Berger and Udell, 1998). Cost of equity is used to estimate investment requirements, equity risk premiums, and return required by shareholders (Câmara *et al.*, 2009). Firm size (Zorn, 2007), age and maturity (Pástor *et al.*, 2008), industry effect (Gebhardt *et al.*, 2001), and CSR performance (Gregory *et al.*, 2014) all influence the cost of equity. Mature firms have existed longer in the market, are better known by investors and provide more precise information to analysts, and thus face less information asymmetry, lower capital costs, and lower risk (Easley and O'hara, 2004), making them more attractive to investors. Albuquerque *et al.* (2014) showed that CSR decreases systematic risk, and empirical results also show a correlation between strong CSR performance and lower information asymmetry through reduced earnings management (Kim *et al.*, 2012), reduced earnings smoothing (Chih *et al.*, 2008), and increased voluntary disclosure of CSR activities (Dhaliwal *et al.*, 2011). Investors perceive socially irresponsible firms as having relatively higher levels of risk and firms with poor CSR records are seen as particularly risky (El Ghoul *et al.*, 2011). Moreover, from the agency perspective, superior CSR performance could reduce contracting costs by limiting opportunistic

behavior (Eccles *et al.*, 2014).

Prior studies have shown CSR to be associated with lower costs for equity capital (El Ghoul *et al.*, 2011) which varies over a firm's life cycle. According to Hasan *et al.* (2015), cost of equity is higher in the introduction and decline phases and lower in the growth and mature phases, assuming a U-shaped pattern. Considering corporate investment and financing, Faff *et al.* (2016) show that investment and equity issuance decrease with firm life-cycle, assuming a hump-shaped pattern. That is to say, when a firm expands from the introduction to mature stages, it faces lower costs of capital, and investment opportunities decline over the life-cycle. In the shake-out/decline stages, what kind of financing strategies are best suited to a firm's long-term sustainability under CSR practice? CSR is defined as actions that appear to further some social good beyond the financial and regulatory interests of the firm. Also, high-performing CSR firms outperformed both non-CSR stocks and the S&P 500 (Statman, 2006) and are less likely to be financed by external funds (Surroca *et al.*, 2010).

More specifically, mature phase firms should be in a better position to raise sufficient capital at a lower cost, offering such firms cheaper and easier sources of finance. However, a lack of growth opportunities will cause management to tend to extend capitalization through acquisitions and diversification in the mature stage (Jensen, 1986). We therefore hypothesize that CSR activities are a good predictor of a firm's capital allocation because CSR practices allows a company to maximize shareholder value, improve its reputation, and ensure long-term viability (Hsu and Chen, 2015).

$H1_a$: *Ceteris paribus*, CSR performance is negatively associated with a firm's equity issuance over the life-cycle as it becomes more mature.

$H1_b$: *Ceteris paribus*, firms with better CSR performance will increase their investment as they move from the introduction stage to the mature stage. Mature and decline firms will reduce investment as they proceed through their life-cycle.

2.2 Cost of debt and life-cycle

Firms with good CSR performance enjoy reduced credit risk, corporate bond spreads, and bankruptcy risk (Hsu and Chen, 2015). CSR performance is negatively associated with the cost of new bond issues and positively associated with credit ratings (Ge and Liu, 2015). Higher CSR strength (concern) is associated with lower (higher) yield spreads, showing that firms with better CSR performance are able to issue bonds at lower cost (Ge and Liu, 2015). For low-CSR firms, banks provide loans with higher spreads and shorter maturity, while high-CSR borrowers face no such penalties (Goss and Roberts, 2011). According to Chang *et al*. (2013), firms with higher CSR ratings tend to have access to lower interest rates for borrowing. The public lending market is another mechanism for supervising corporate financials, including institutional and bank lenders. Creditors use internal information to make initial lending decisions and, after the loan contract is struck, to monitor the firm to ensure repayment, thus firms with better CSR performance face lower bond covenant restrictions (Ge and Liu, 2015)

Shareholders and creditors have different rights to a firm's net assets and thus tend to have conflicting interests (Ahmed *et al.*, 2002) and value a firm's operating volatility in different ways (Merton, 1974). Creditors have no right to claim an extra payoff when the borrower's assets exceed its liabilities, but face the risk of firm liabilities exceeding assets. More importantly, between 2008 and 2016, times of financial crisis and quantitative easing, the total value of U.S. corporate bond issuance amounted to about $11.1 trillion, while the total equity issuance for the same period was only about $1.6 trillion.[1] Therefore, CSR may have significant implications for and play a crucial role in bond issuance throughout firm life-cycle.

Firms issue corporate bond to raise financing for a variety of reasons, including ongoing operations, M&A, and expanding business. Issuing corporate bonds gives firms greater freedom to avoid restrictions associated with bank loans and stock issuance. Unlike corporate bonds, funds raised from the sale of stock does not need to be repaid, but issuing new shares influences a firm's ownership and earnings per share (EPS). However, when a firm issues bonds, it assumes obligations to pay interest and maturity. For more mature firms, asymmetric information and agency problems different CSR

[1] Data source: Securities Industry and Financial Markets Association (http://www.sifma.org)

performance may produce different behavior in bond issuance. In addition, firms experience reduced incentive to invest and issue debt as they become more mature due to the higher agency cost of cash holdings (Faff *et al*., 2016). Thus, we posit that corporate bonds issuance may be a suitable proxy for assessing firm-level CSR initiatives and that assessment will be reflected in life-cycle stages.

Based on the above, we posit that responsible firms have easier access to debt financing and face lower borrowing costs. However, based on long-term sustainability, we expect a negative relation between CSR and bond issuance.

H2: *Ceteris paribus*, CSR performance is negatively associated with a firm's debt issuance as it matures over the life-cycle.

2.3 Cash holdings and life-cycle

Firms in the early introduction stage have greater investment opportunities, but fewer opportunities to generate cash internally. The optimal decision for firms in the early stage is to hold cash to fund growth. As firms become mature, they become more profitable and can internally generate cash in excess of their investment requirements. In the mature or declining stages, the optimal financial policy is to retain sufficient earnings to invest in profitable projects and allocate excess cash to shareholders (Coulton and Ruddock, 2011). The change in cash holdings, dividend payout, and FCF are evidence of a firm developing sustainable profitability. According to Fama and French (2001), firms which pay dividends are significantly larger, more profitable and have fewer growth options than those which do not pay dividends. Otherwise, the probability that a dividend-paying firm will continue to pay is higher than the probability that a non-payer with the same characteristics will start paying dividends, and this lower propensity to pay dividends is associated with firms with negative earnings, smaller capitalization, and many investments. The proportion of a firm's retained earnings to total assets also exhibits a positively association with the probability of paying dividends (DeAngelo *et al.*, 2006) and larger, more profitable firms with higher retain earnings have less growth opportunities and tended to pay dividends during the 1994–2002 period (Denis and Osobov, 2008).

According to DeAngelo *et al.* (2006), the ratio of retained earnings to total assets is a crucial proxy for firm life-cycle, because as firms become more mature they begin to accumulate profits and have higher retained earnings in their capital combination.

Under agency theory, firms have valuable growth opportunities early in their life-cycle. Management will be reluctant to pay out the firm's cash flow to shareholders and tend to acquire and diversify when they have poor growth opportunities under high cash flow conditions (Jensen, 1986). If the agency problem of cash holdings is a function of firm maturity, mature and declining firms will be less willing to issue equity or debt, or to hold surplus cash because doing so is more costly for mature and declining firms. Bassen *et al.* (2006) suggest that a complete lack of CSR engagement exposes a company to unnecessarily high risk, while companies with good CSR performance enjoyed reduced risk exposure.

Based on the above, we hypothesize that a firm's CSR performance is negatively correlated to its cash holdings as they are in the mature and declining stages.

H3: *Ceteris paribus*, CSR performance is negatively associated with a firm's cash holdings over the life-cycle as the firm matures.

3. Data and methodology

3.1 Data

Kinder, Lydenberg, Domini Research & Analytics (KLD) uses a combination of surveys, financial statements and articles in the popular press, academic journals, and government reports to work around the limitation of identifying CSR representatives of individual companies and to assess social performance through dimensions such as community, corporate governance, diversity, employee relations, environmental stewardship, human rights policies, and product quality. Following Kim *et al.* (2012), we used a firm's social performance data as provided by KLD to determine the relative positive indicators (strength) and negative indicators (concerns) of a given firm's social performance. KLD social performance rating scores were used to measure CSR performance, using an initial U.S. based sample of 19,707 firm-year observations from

2005 to 2015. We merged accounting characteristics from Compustat, which formulates life-cycle from a broad set of accounting data. We then obtained various corporate characteristics from the CRSP database and classified all sample firms into five equal groups based on their CSR performance.

3.2 Research design

Life-cycle theory proposes that firms transition from one development stage in a predictable pattern which cannot be easily reversed (Porter, 2008). Empirical results have shown that firm age (DeAngelo *et al.*, 2010), ratio of retained earnings to contributed capital (DeAngelo *et al.*, 2006), cash flow patterns (Dickinson, 2011; Porter, 2008), and asset growth (Grullon *et al.*, 2002) provide some indication of firm maturity. However, according to Dickinson (2011), firm age, size, and asset growth may not be good proxies for life-cycle because these variables might not evolve monotonically across life-cycle phases. For example, firms with low asset growth or cash flow can either be classified in the introduction stage or in the declining stage.

To ensure methodological robustness and to use the life-cycle information provided by these accounting variables. Following Dickinson (2011) and Faff *et al.* (2016), we first classify firms into four groups (introduction, growth, mature, and decline) using the Dickinson (2011) classification scheme (DCS) and then use multiclass linear discriminant analysis (MLDA) as proposed by Faff *et al.* (2016) to generate the main life-cycle proxy. The four life-cycle groups can be separated by the following model:

$$Group_i = \beta_0 + \beta_1 \cdot Age_i + \beta_2 \cdot RETA_i + \beta_3 \cdot EBIT_i + \beta_4 \cdot AGrth_i + \varepsilon_i \qquad (1)$$

where:

Age = firm age.

RETA = retained earnings to total assets ratio.

EBIT = earnings before tax scaled by total assets.

AGrth = assets growth.

Based on Eq. (1), we classify the entire sample into four life-cycle phases and assess

the life-cycle proxy.

$$LC_j = \{Introduce, Growth, Mature, Decline\}; if\ j = 1,\ 0\ otherwise. \quad (2)$$

Furthermore, to capture the relation between life-cycle and a firm's financial decision-making and CSR performance, we estimate the following models:

$$EQUISS_i\ or\ DISS_i = \beta_0 + \beta_1 \cdot [LC\ stage]_i + \beta_2 \cdot [CSR\ variables]_i + \beta_3 \cdot SGrth_i + \beta_4 \cdot ROE_i + \beta_5 \cdot ROA_i + \beta_6 \cdot Size_i + \beta_7 \cdot Age_i + \beta_8 \cdot D/E_i + \beta_9 \cdot Tobin's\ Q_i + \beta_{10} \cdot Profit_i + \beta_{11} \cdot CashHoldings_i + \varepsilon_i \quad (3)$$

$$\Delta Cash_i\ or\ \Delta Asset_i = \beta_0 + \beta_1 \cdot [LC\ stage]_i + \beta_2 \cdot [CSR\ variables]_i + \beta_3 \cdot SGrth_i + \beta_4 \cdot ROE_i + \beta_5 \cdot ROA_i + \beta_6 \cdot Size_i + \beta_7 \cdot Age_i + \beta_8 \cdot D/E_i + \beta_9 \cdot Tobin's\ Q_i + \beta_{10} \cdot Profit_i + \beta_{11} \cdot OCF_i + \beta_{12} \cdot R\&D_i + \varepsilon_i \quad (4)$$

where:

EQUISS or DISS = net equity issuance or long term net debt issuance over total assets, respectively.

ΔCash or ΔAsset = the change in cash and marketable securities or the change in total asset over total assets, respectively.

LC stage = firm life-cycle stage.

CSR variables = net score of CSR ratings, measured as total strengths or concerns in seven social rating categories.

SGrth = sales growth rate at year t.

ROE = return on equity.

ROA = return on total assets.

Size = natural logarithm of the market value of equity at the end of the previous year.

Age = natural logarithm of the year of the firm's establishment.

D/E = total Debt scaled by total Equity.

Tobin's Q = market value over the replacement value of the firm's assets.

Profit = net profit after tax to net sales ratio.

OCF = operation cash flow to total assets ratio.

R&D = research and development to net sales ratio.

4. Emoirical Results

4.1 Descriptive statistics and univariate analysis

In Table 1, we present the sample distribution by the two-digit SIC code industry. The most heavily represented industry is Manufacturing (36.63 percent, 20 ≦ SIC code < 40), followed by Financial Services (22.77 percent, 60 ≦ SIC code < 70), and Services (16.42 percent, 70 ≦ SIC code < 90).

<Insert Table 1 about here>

Panel A of Table 2 reports the statistical data of the overall sample. The dependent variables are, on average, greater than 0 denoting that the related issues discussed are representative. Furthermore, under a firm's life-cycle, financial decisions are closely related to financial profit and cash flow. According to Panel A of Table 2, on average, the independent variables are positive and greater than 0, indicating that firms with outstanding performance face different financial decision-making considerations due to CSR performance and agency problems. In addition, unfavorable firm behavior is more easily reflected in the seven social rating categories than excellent behavior.

Panel B of Table 2 reports the various accounting variables of the five dispersion groups with C1 (C5) denoting the group with the best (worst) CSR performance based on KLD annual reporting. The dispersion group's equity and debt issues increase monotonically as we move from groups C1 to C5, which is consistent with previous findings (Bhandari and Javakhadze, 2017). Group C1 exhibits a significantly lower rate of capitalization change than C5, despite C1 with higher firm size.

The evidence suggests that mean dispersion measures for the best and worst CSR (i.e., C1 versus C5) are still significant. To demonstrate, for the best CSR performance group (C1) the mean dispersion measures based on ROE, ROA, Size, D/E, and Tobin's Q are significantly superior to those of the worst CSR performance group (C5) and enjoy higher profits (consistent with Nelling and Webb, 2009; Surroca *et al.*, 2010).

Similarly, the mean dispersion measures based on cash flow and dividend policy also show that the group with the best CSR performance (C1) has higher OCF, FCF, and dividend payout than the group with the worst CSR performance (C5). The changes in dividend payout and FCF are evidence of a firm having sustainable profitability throughout the life-cycle. In addition, firms which pay dividends are significantly larger, are more profitable and have fewer growth options than those which do not pay dividends (Fama and French, 2001).

<Insert Table 2 about here>

Table 3 presents the correlation among various accounting variables. For capital structure, equity and debt issues are significantly negative to ROE, ROA, and cash flow, indicating that excessive financing may be detrimental to business performance. On the other hand, appropriate asset sizes and cash holdings help firms to significantly improve business performance and firm value.

<Insert Table 3 about here>

How are life-cycle proxies related to CSR? And does the MLDA life-cycle proxy faithfully capture firm life-cycle stage? To better understand the relationship between CSR and life-cycle, Panel A of Table 4 shows the mean between the best (C1) and worst-performing (C5) CSR groups of firm Age, RETA (i.e., retained earnings to total assets ratio), EBIT (i.e., earnings before income tax), and ΔAsset over various life-cycle phases across the life-cycle periods of the MLDA categorization, and the fifth row reports the percentage of overlapping firms under MLDA and DCS categorization.

Firm age exhibits a U-shaped pattern over MLDA life-cycle classification, and the best (C1) CSR groups required significantly longer times to plan, develop and obtain relatively long maturity and a longer life-cycle. That is to say, firms with poor CSR performance grow faster but they also have relative shorter maturity stages and move into the decline stage relatively quickly. Similarly, firms with the best CSR performance (C1) also exhibit higher RETA and EBIT than the worst ones (C5) over the life-cycle. The ΔAsset indicates the C1 group exercises careful control over asset size to avoid

rapid asset expansion in the mature and decline stages. Moreover, there is a reasonable overlap between MLDA and DCS classification between CSR groups, indicating that MLDA is a suitable proxy to capture life-cycle stages.

We are interested in determining how CSR practices impact the likelihood of a firm transitioning from one life-cycle phase to another. It is reasonable to expect a firm will stay in a given life-cycle stage over the coming year and firms in the introduction or growth phases facing uncertainty and are more likely to fail. Panel B of Table 4 shows that the C5 group has relatively unstable stage reversion in the growth stage (consistent with Faff *et al*., 2016) than the C1 group, implying the firms with better CSR practice benefit from more a stable and progressive life-cycle over time.

Panel C of Table 4 shows the CSR performance for the five largest firms through four life-cycles. As expected, Yahoo, oilfield service, and financial service are mainly in the mature and decline stages, whereas the introduction and growth stage contain pharmaceutical, medical, and technological firms (consistent with Faff *et al*., 2016). In brief, the MLDA classification is a suitable proxy for life-cycle, which is consistent with basic intuition. In addition, Fig. 1 also shows that, on average, from 2005 to 2015, the C1 group shows mature stage performance superior to that of C5, especially after the 2008 financial crisis.

<Insert Table 4 about here>

<Insert Figure 1 about here>

4.2 Firm accounting features under CSR performance

According to Coulton and Ruddock (2011), the optimal financial policy is to retain sufficient earnings for investment in profitable projects and to allocate excess cash to shareholders, especially in the mature or declining stages. Table 5 provides the results for the entire sample of payout ratio, RETA, and FCF for high- and low-CSR-performance groups. The average cash holdings proxies significantly indicate that payout, RETA, and FCF decreased from high-CSR-performance (C1) for low-CSR-performance (C5).

DeAngelo *et al.* (2006) show that RETA is a crucial proxy for firm life-cycle and

firms with higher RETA tend to pay dividends (consistent with Denis and Osobov, 2008). Furthermore, regulation of cash flow in the life-cycle is a mechanism for dealing with agency problems (Jensen, 1986). In particular, under the US Federal Reserve's quantitative easing (QE) policies and financial distress risk, the C1 group exhibits outstanding cash flow proxies than the C5 group. This pattern implies that firms with sustainable profitability under the cash holding policy and Table 5, thus supporting H3, which suggests that firms will be less willing to hold surplus cash because doing so imposes additional costs.

<Insert Table 5 about here>

<Insert Figure 2 about here>

4.3 Life-cycle and capital structure policies

CSR performance helps investors by reducing information asymmetry and idiosyncratic risk (Cho *et al.*, 2013; Lee and Faff, 2009), however a firm's financial decision-making may differ from CSR practice throughout its life-cycle. The regression results are shown using the main MLDA life-cycle proxy. Panel A of Table 6 shows the results of the effect of life-cycle on equity and debt issuance under CSR performance. In terms of capital structure, both equity and debt issuance decrease monotonically over a firm's life-cycle. The results are significant and exhibit a hump shape over the life-cycle (consistent with Faff *et al*., 2016) after controlling for various firm-level variables. The empirical results are consistent with the notion that firms will expand their balance sheets by issuing more equity or debt as they move from the introduction stage to the mature stage, and then reduce equity and debt issues in the mature and decline stage. However, to further investigate the impact of lower capital constraints, lower loan interest rate, agency conflicts, and information asymmetry in shaping firms' incentives to issue equity and debt under CSR through the life-cycle, we use critical CSR performance (i.e., *CSR_STR and CSR_CON*) to determine firms' capital structures across the life-cycle.

The regression results show that high-CSR-performance firms significantly reduce equity and debt issuance through the life-cycle which reflects efficient capital allocation (consistent with Bhandari and Javakhadze, 2017) as they face reduced growth

opportunities, thus supporting $H1_a$ and H2. On the contrary, from the agency perspective with low-CSR-performance, management significantly tends to extend capitalization through the mature and decline stage when facing lower capital costs (consistent with Easley and O'hara, 2004), higher bond spreads and shorter maturity (Ge and Liu, 2015), and avoiding restrictions associated with bank loans and equity issuance.

Panel B of Table 6 shows the effect of life-cycle stage on changes to cash holdings and capitalization under CSR performance. We first discuss the relation between life-cycle and cash holdings and then investments under CSR performance. H3 forecasts that firms will increase their cash holdings as they move from the introduction stage to the mature stage; while mature and declining firms will hold less cash given strong CSR performance. Internal cash flow, equity and debt issuance gradually increase in the introduction stage, and investment opportunities gradually decrease when firms enter the mature or decline stages. Considering CSR performance, the decreased internal cash flow and external financing causes mature and declining firms to significantly reduce their cash holdings or negatively impacts their long-term sustainable development, while firms with worse CSR performance exhibit an opposite pattern. Cash holdings also exhibits a hump shape over the life-cycle, thus supporting H3 (consistent with Faff *et al*., 2016). The relation between life-cycle and investments under CSR performance exhibits a monotonic decrease over a firm's life-cycle. After controlling for various variables, the results significantly show that better CSR performance is associated with a decrease in investment and firms with worse CSR performance try to extend their capitalization, which support $H1_b$.

Overall, the evidence in Table 6 suggests that improved CSR performance corresponds with higher financial management discipline while facing lower financial constraints (Cheng *et al.*, 2014), lower cost of equity and debt (Ge and Liu, 2015; Gregory *et al.*, 2014), and higher cash flow (Dickinson, 2011; DeAngelo *et al.*, 2006) through the life-cycle. This is consistent with previous findings, and supports $H1_a$, $H1_b$, H2, and H3, namely that CSR performance is negatively associated with a firm's abnormal financial decisions and the extension of firm life-cycle.

<Insert Table 6 about here>

4.4 Robustness check in Life-cycle classification

Dickinson (2011) proposed a life-cycle classification scheme (DCS) according to firms' cash flow patterns, including operating, investing, and financing cash flow patterns. We use DCS as another life-cycle proxy and firms are classified into four life-cycle stages: introduction, growth, mature, and decline. Because cash flow captures differences in firm profitability, growth and risk, and the combination of cash flow patterns shows firms' resource allocations and operational capabilities interact with their financial strategy choices. Therefore, the cash flow components are derived from economic theory to form the basis of the life cycle proxy (Dickinson, 2011).

Table 7 shows patterns consistent with Table 6 and presents the same behaviors across the life-cycle under the DCS proxy. Similarly in terms of capital structure, both equity and debt issuance decrease monotonically over a firm's life-cycle and firms with high-CSR-performance significantly reduce equity and debt issuance through the life-cycle. On the other hand, firms under low-CSR-performance significantly tend to increase capitalization when facing superior financing conditions. Furthermore, considering CSR performance and life-cycle, cash holdings and investments also significantly exhibit a hump shape over the life-cycle given superior CSR performance. Table 7 again is consistent with previous findings, and supports $H1_a$, $H1_b$, H2, and H3.

<Insert Table 7 about here>

4.5 Additional robustness test

To further assess the robustness of life-cycle results, following DeAngelo *et al.* (2006), we use the ratio of retained earnings to total assets (RETA) as another life-cycle proxy. Firms with a relatively low proportion of retained earnings tend to be in the growth or capital infusion stages, whereas firms with a high proportion of retained earnings tend to be more mature and can generate cash but have fewer growth opportunities (Coulton and Ruddock, 2011), thus the RETA is a useful proxy for firm life cycle (DeAngelo *et al.*, 2006). Table 8 exhibits patterns consistent with the alternative life-cycle proxies in Table 6 and Table 7, where superior CSR performance is

also significantly associated with decreased capital structure, cash holdings and investments through the life-cycle, indicating capital allocation efficiency (consistent with Bhandari and Javakhadze, 2017; Faff *et al*., 2016).

<Insert Table 8 about here>

4.6 Sensitivity analyses

Firms pay high dividends when retained earnings form a large portion of total equity and is also positively associated with the probability of paying dividends (DeAngelo *et al.*, 2006). Regular dividends remain the most popular mechanism for distributing cash to shareholders and dividend paying firms are larger, are more profitable and have fewer growth options than non-dividend paying firms through the life-cycle (Coulton and Ruddock, 2011).

Firms can be valued in various ways such as by cash flow which is the basis for future profit forecasts among investors and analysts. Furthermore, under agency theory, positive cash flow is an indicator of sustainable profitability through life-cycle (Jensen, 1986). Thus, we use the 5-year standard deviation of dividend payout, free cash flow, and RETA as the basis for sensitivity analyses through the life-cycle.

Table 9 shows patterns consistent with the previous results in Tables 6, 7, 8, superior CSR practice is positively associated with financial discipline, primarily due to high CSR firms having stronger financial discipline in their mature and decline stages.

<Insert Table 9 about here>

5. Conclusion

This study examines the relationship between CSR performance and firm life-cycle. Specifically, we investigate whether CSR performance allows firms to extend their life-cycle by determining whether a firm's capital allocation follows its life-cycle under CSR performance, including financing, capital structure, investment, cash holding, payout ratio, and free cash flow policies. Consistent with prior results, firm equity and

debt issuance exhibit a hump shape over the life-cycle (Faff *et al*., 2016) under CSR practices. However, due to a decrease in investment opportunities, a firm with higher CSR performance will issue significantly less equity and debt as it become more mature, while firms with worse CSR performance will issue more equity and debt.

Mature firms benefit from increased exposure and recognition among investors, and tend to provide more precise information to analysts, thus lowering capital costs, reducing risk (Easley and O'hara, 2004) and reducing the cost of equity in the growth and mature phases (Hasan *et al.,* 2015). Firms with better CSR performance face significantly lower capital constraints (Cheng *et al.,* 2014), bank loan interest rates (Goss and Roberts, 2011), and costs for equity capital (El Ghoul *et al.*, 2011). However, as they exhaust growth opportunities, high-CSR firms must enforce strong financial discipline while low-CSR firms significantly tend to extend capitalization during the mature stage. Consistent with Cho *et al.* (2013) and Lee and Faff (2009), CSR performance was found to reduce information asymmetry, reduce idiosyncratic risk, and ensure firm long-term viability by limiting opportunistic behavior (Eccles *et al.*, 2014). Thus, CSR performance clarifies the role of agency conflicts and information asymmetry in shaping firm incentives to allocate liquid assets through the life-cycle. In addition, firm age presents a U-shape pattern over MLDA life-cycle classification, and high-CSR performance firms significantly demand longer time to plan or develop, and exhibit relative long maturity durations and longer life-cycles compared with low-CSR performance firms.

In the evolution of a firm’s life-cycle investment opportunities and cash flow patterns under CSR practices, changes in cash holdings, dividend payouts, and FCF are evidences of a firm achieving sustainable profitability. Also, cash flow patterns (Dickinson, 2011), M&A activity (Owen and Yawson, 2010), diversification (Arikan and Stulz, 2016), and dividend policy (DeAngelo *et al.*, 2006) are predictable and related to a firm’s life-cycle stage. Firms in the early introduction stage have greater investment opportunities and fewer opportunities to generate cash internally. The optimal decision for firms in the early stage is to hold cash to fund growth. As firms mature, they become more profitable and can generate cash in excess of their investment requirements. In the mature or declining stages, the optimal financial policy is to retain sufficient earnings to invest in profitable projects and allocate excess cash to

shareholders (Coulton and Ruddock, 2011). Empirical results indicate the payout, RETA, and FCF decrease from high-CSR-performance firms to low-CSR-performance firms (consistent with Coulton and Ruddock, 2011; Denis and Osobov, 2008; DeAngelo *et al.*, 2006). In addition, cash holdings also exhibits a hump shape over the life-cycle (consistent with Faff *et al*., 2016) and higher CSR practice is associated with significantly lower cash holdings (consistent with Cheung, 2016). Through firm life-cycle, cash flow regulation is a mechanism which can be used to address agency problems (Jensen, 1986). Under CSR practices, mature and declining firms are less willing to issue equity or debt, or to hold surplus cash because of the additional costs incurred. However, low-CSR-performance exposes a company to unnecessarily high risk (consistent with Bassen *et al.*, 2006).

This study makes several contributions to the literature. First, the results indicate that CSR performance is a useful predictor for forecasting capital allocation, cash flow and survival time throughout the life-cycle. Second, superior CSR performance is found to play an important role in efficient capital allocation through a firm's life-cycle. Finally, CSR was found to impact the evolution of a firm's future investment opportunities and cash flow patterns, with high-CSR firms issuing less equity and debt, and paying higher dividends as they matured. These findings suggest that ethical behavior are likely to be of interest to investors and regulators as indicators of firms' sustainable progress through the life-cycle.

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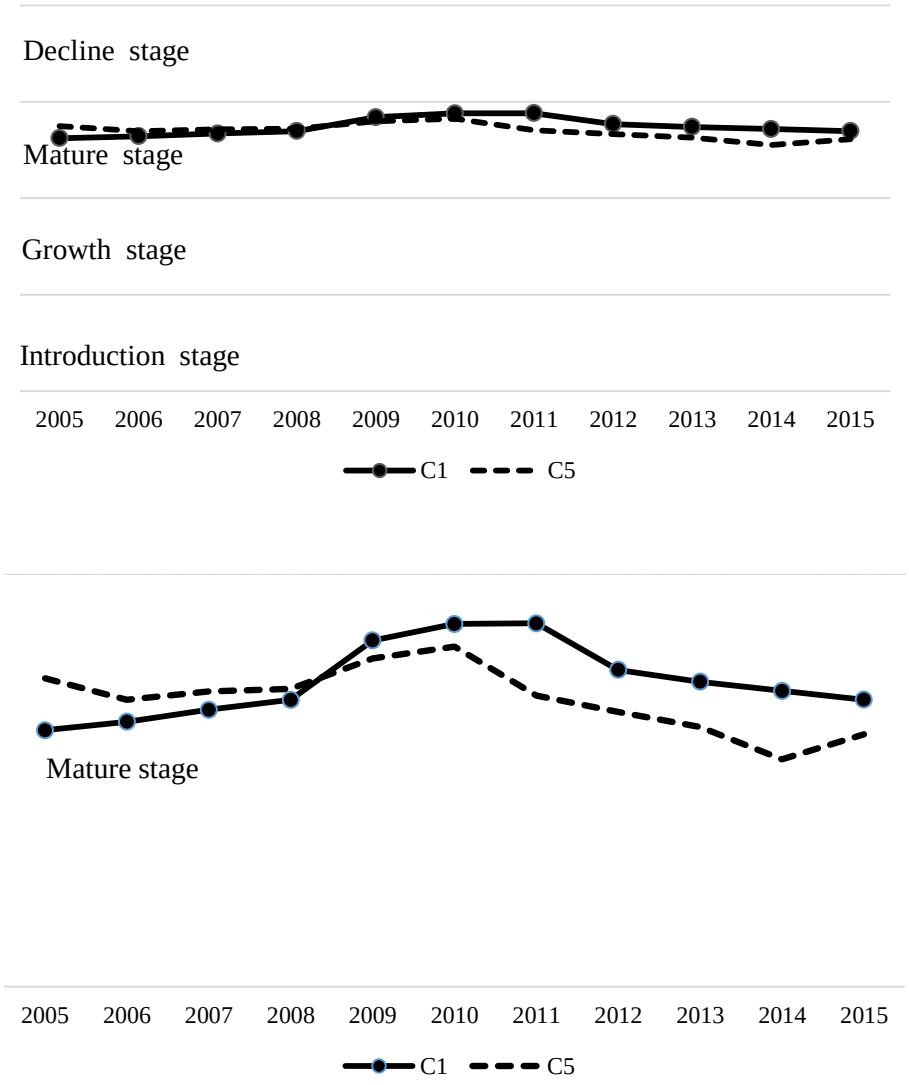

Figure 1. Multiclass linear discriminant analysis (MLDA) under CSR performance Life-cycle of the best (C1) and worst-performing (C5) CSR groups over the period 2005-2015.

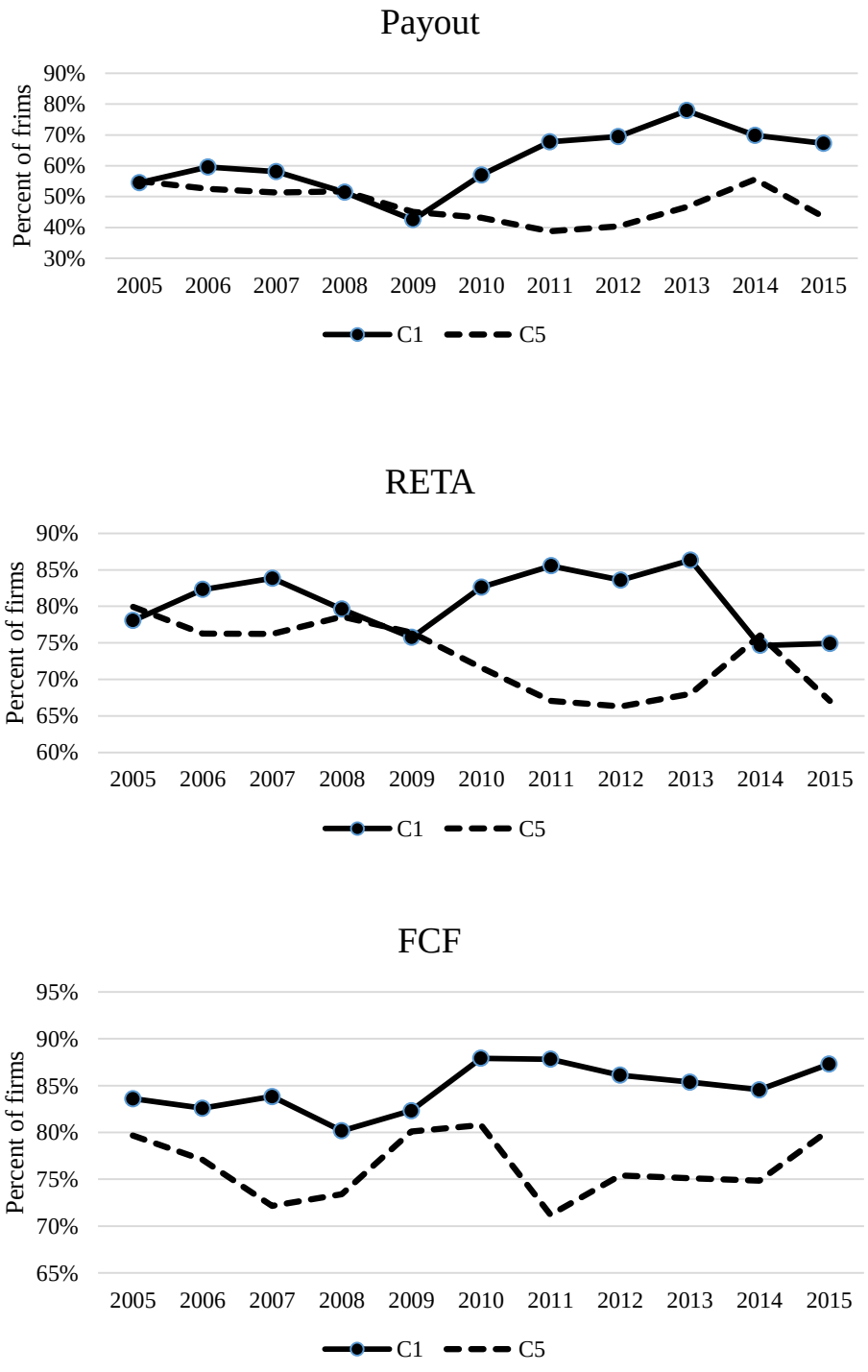

Figure 2. Firm accounting features under CSR performance
Positive payout, RETA, and FCF for the best (C1) and worst-performing (C5) CSR groups over the period 2005-2015.

Table 1
Sample description: distribution of observations by two-digit SIC
The study includes 19,707 samples for US firms from 2005 to 2015 for US firms. Data from Compustat, CRSP, and KLD are merged using firm CUSIP number. All sample firms are classified into ten industries based on their SIC codes. Manufacturing accounts for 36.63% of the sample firms, followed by financial services at 22.77% and services at 16.42%.

Industry	Two-digit SIC	# of Obs.	% of sample	Cumulative Percent
Agriculture	SIC<10	64	0.32%	0.32%
Mining	10≦SIC<15	678	3.44%	3.77%
Construction	15≦SIC<18	288	1.46%	5.23%
Manufacturing	20≦SIC<40	7,218	36.63%	41.85%
Transportation	40≦SIC<50	1,762	8.94%	50.79%
Wholesale Trade	50≦SIC<52	554	2.81%	53.61%
Retail Trade	52≦SIC<60	1,381	7.01%	60.61%
Financial services	60≦SIC<70	4,488	22.77%	83.39%
Services	70≦SIC<90	3,235	16.42%	99.80%
Public Administration	SIC>90	39	0.20%	100.00%
Total		19,707	100.00%	

Notes: *# of Obs. and % of sample denote number of observations and % of sample denotes percentage of certain industry sample in all samples.*

Table 2 Descriptive statistics: CSR in five groups

For each year, all firms rated by KLD are divided into five equal groups based on their CSR performance at time t. For each CSR division, statistical data are taken from Compustat and CRSP. Panel A reports overall statistical data of the sample firms. Panel B reports the two sub-group means. The right-most column reports the difference between the statistical data of the best (C1) and worst-performing (C5) CSR groups.

CSR Group (C1=Best CSR performance, C5=worst CSR performance)

Panel A: Statistics data in overall sample

Variable	Mean	Median	Std.	Min.	Max.
Dependent variable					
EQUISS	0.023	0.006	0.086	-0.214	0.911
DISS	0.083	0.012	0.138	0.000	0.764
ΔCash	0.008	0.003	0.080	-0.577	0.423
ΔAsset	0.108	0.062	0.228	-0.495	1.988
Independent variable					
SGrth	0.107	0.075	0.240	-0.701	2.537
ROE	0.074	0.095	0.249	-3.007	2.694
ROA	0.032	0.037	0.095	-1.448	0.802
Size	7.442	7.334	1.675	2.439	14.761
Age	2.903	2.890	0.713	1.099	4.143
D/E	2.323	1.151	3.156	-9.498	23.124
Tobin's Q	1.797	1.405	1.155	0.419	9.588
R&D	0.134	0.025	0.609	0.000	20.158
Profit	0.020	0.062	0.608	-21.474	0.846
CashHoldings	0.164	0.090	0.184	0.000	0.949
OCF	0.089	0.085	0.104	-0.978	0.914
RETA	0.034	0.121	0.733	-11.321	0.926
Payout	0.328	0.126	0.583	0.000	5.506
FCF	0.039	0.042	0.088	-0.831	0.295
CSR variable					
CSR_STR	1.351	1.000	2.267	0.000	22.000
CSR_CON	-1.587	-1.000	1.730	-17.000	0.000

Panel B: Difference in CSR group

variable	**C1**			**C5**			Difference(C1-C5)	
	Mean	Med.	Std.	Mean	Med.	Std.	Mean T-test	Med. Wilcoxon-test
EQUISS	0.011	0.003	0.075	0.021	0.006	0.080	-0.010≠	-0.003≠
DISS	0.064	0.014	0.113	0.098	0.030	0.145	-0.034≠	-0.016≠
ΔCash	0.009	0.003	0.074	0.008	0.003	0.074	0.001	0.000
ΔAsset	0.093	0.054	0.207	0.104	0.060	0.220	-0.011≠	-0.006≠
SGrth	0.091	0.061	0.212	0.100	0.072	0.239	-0.009+	-0.011≠
ROE	0.106	0.107	0.221	0.081	0.099	0.253	0.025≠	0.008≠
ROA	0.042	0.041	0.080	0.035	0.039	0.094	0.007≠	0.002≠
Size	8.378	8.338	1.897	7.521	7.478	1.524	0.857≠	0.860≠
Age	3.076	3.091	0.714	2.969	2.944	0.716	0.107≠	0.147≠
D/E	2.888	1.368	3.702	2.029	1.233	2.666	0.859≠	0.135≠
Tobin's Q	1.811	1.434	1.120	1.734	1.397	1.052	0.077≠	0.037≠
R&D	0.102	0.037	0.413	0.100	0.014	0.444	0.002	0.023≠
Profit	0.063	0.081	0.419	0.030	0.056	0.458	0.033≠	0.025≠
CashHoldings	0.159	0.094	0.167	0.145	0.082	0.169	0.014≠	0.012≠
OCF	0.097	0.090	0.090	0.093	0.089	0.104	0.004	0.001
RETA	0.133	0.155	0.509	0.052	0.149	0.737	0.081≠	0.006≠
Payout	0.367	0.236	0.547	0.315	0.096	0.594	0.052≠	0.140≠
FCF	0.051	0.048	0.076	0.035	0.039	0.088	0.016≠	0.009≠

Notes: *1. Std., Min., Max., and Med. respectively denote standard deviation, minimum, maximum and median.*

2. ≠ ≠ and $^{+}$ respectively indicate significance at 1%, 5%, and 10%.
3. *EQUISS is net equity issuance over total assets; DISS is long term net debt issuance over total assets; ΔCash is the change in cashholdings, where cashholdings is cash and marketable securities over total assets; ΔAsset is the change in total asset over total assets; SGrth is sales growth rate in sales at year t; ROE is return on equity; ROA is return on total assets; Size is the natural logarithm of the market value of equity at the end of the previous year; Age is the natural logarithm of the year of the firm's establishment; D/E is debt to equity ratio; R&D is the ratio of research and development to net sales; Profit is the ratio of net profit after tax to net sales; OCF is the ratio of operational cash flow to total assets; RETA is the ratio of retained earnings to total assets; Payout is the dividend payout ratio; FCF is ratio of free cash flow to total assets; CSR_STR is the net total strengths score of CSR ratings; CSR_CON is* the net total concerns score of CSR ratings.

Table 3 Pearson correlations among variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(1) EQUISS	1.00																	
(2) DISS	-0.01≠	1.00																
(3) ΔCash	0.24≠	0.00	1.00															
(4) ΔAsset	0.42≠	0.23≠	0.32≠	1.00														
(5) SGrth	0.25≠	0.09≠	0.07≠	0.46≠	1.00													
(6) ROE	-0.29≠	0.01	0.10≠	0.13≠	0.04≠	1.00												
(7) ROA	-0.36≠	-0.02≠	0.19≠	0.19≠	0.08≠	0.74≠	1.00											
(8) Size	-0.21≠	0.05≠	-0.02≠	-0.04≠	-0.10≠	0.17≠	0.11≠	1.00										
(9) Age	-0.19≠	-0.05≠	-0.03≠	-0.16≠	-0.21≠	0.12≠	0.13≠	0.35≠	1.00									
(10) D/E	-0.11≠	0.04≠	-0.03≠	-0.02≠	-0.04≠	0.02≠	-0.11≠	0.41≠	0.02≠	1.00								
(11) Tobin's Q	0.26≠	-0.11≠	0.15≠	0.19≠	0.23≠	0.06≠	0.13≠	-0.31≠	-0.17≠	-0.26≠	1.00							
(12) R&D	0.33≠	-0.07≠	-0.01	0.01	0.05≠	-0.26≠	-0.39≠	-0.15≠	-0.12≠	-0.06≠	0.17≠	1.00						
(13) Profit	-0.31≠	0.02≠	0.04≠	0.05≠	-0.01+	0.34≠	0.48≠	0.14≠	0.08≠	0.05≠	-0.10≠	-0.91≠	1.00					
(14) CashHoldings	0.29≠	-0.27≠	0.25≠	0.06≠	0.11≠	-0.17≠	-0.14≠	-0.42≠	-0.25≠	-0.28≠	0.47≠	0.35≠	-0.23≠	1.00				
(15) OCF	-0.29≠	-0.03≠	0.24≠	0.13≠	0.03≠	0.42≠	0.62≠	-0.04≠	0.05≠	-0.25≠	0.25≠	-0.38≠	0.33≠	0.00≠	1.00			
(16) RETA	-0.34≠	0.03≠	0.05≠	0.02≠	-0.09≠	0.32≠	0.44≠	0.23≠	0.21≠	-0.02≠	-0.15≠	-0.26≠	0.27≠	-0.30≠	0.34≠	1.00		
(17) Payout	0.05≠	0.09≠	-0.11≠	-0.10≠	-0.10≠	-0.11≠	-0.19≠	0.13≠	0.08≠	0.09≠	-0.11≠	-0.20≠	0.06≠	-0.18≠	-0.15≠	-0.02+	1.00	
(18) FCF	-0.34≠	-0.09≠	0.28≠	-0.01	-0.06≠	0.42≠	0.60≠	0.04≠	0.09≠	-0.12≠	0.14≠	-0.39≠	0.36≠	0.00	0.81≠	0.34≠	-0.04≠	1.00

Notes: *1. ≠, ≠, and + respectively indicate significance at 1%, 5%, and 10%.*
2. All variables are defined in Table 2.

Table 4 Firm features under multiclass linear discriminant analysis (MLDA)
For each year, all firms rated by KLD are divided into five equal groups based on their CSR performance at time t. Panel A reports the mean values between the statistical data of the best (C1) and worst-performing (C5) CSR groups for firm age (Age), retained earnings to total assets ratio (RETA), earnings before income tax (EBIT), and change in total assets over total assets (ΔAsset) across the life-cycle periods of the MLDA categorization, and DCS reports the percentage of overlapping firms under categorization by MLDA and the Diskinson classification scheme (DCS) (Diskinson, 2011). Panel B reports the movement of life-cycle stages over the period 2014-2015 in C1 and C5. Panel C reports the five largest firms in each group based on MLDA categorization in 2015.

Panel A. Life-cycle proxies between CSR groups

	C1				C5			
	Intro.	Growth	Mature	Decline	Intro.	Growth	Mature	Decline
Age	3.041	2.698	3.092	3.309	2.527$^{\neq}$	2.648	2.998$^{\neq}$	3.235^{+}
RETA	-0.040	-0.118	0.145	0.102	-0.014	-0.311^{+}	0.073$^{\neq}$	0.001^{+}
EBIT	0.138	0.100	0.151	0.061	0.120	-0.105^{+}	0.106$^{\neq}$	0.015^{+}
ΔAsset	1.669	0.929	0.081	-0.214	1.668	0.885	0.089$^{\neq}$	-0.223
DCS	8.33%	68.00%	52.17%	44.62%	0.00%	68.70%	51.76%	40.28%

Panel B. Life-cycle movement over the period 2014-2015 in C1 and C5

	C1				C5			
2015 \ 2014	Intro.	Growth	Mature	Decline	Intro.	Growth	Mature	Decline
Intro.	-	0.0%	0.0%	0.0%	-	0.0%	0.0%	0.0%
Growth	-	0.0%	1.3%	0.0%	-	12.5%	2.6%	0.0%
Mature	-	100.0%	94.1%	100.0%	-	75.0%	94.7%	100.0%
Decline	-	0.0%	4.6%	0.0%	-	12.5%	2.6%	0.0%
	-	100.0%	100.0%	100.0%	-	100.0%	100.0%	100.0%

Panel C. Five largest firms in C1 and C5 in 2015

C1

Intro.	Growth	Mature	Decline
-	Abbvie Inc.	JPMorgan Chase & Co.	State Street Corp.
	Becton Dickinson & Co.	Bank Of America Corp.	Yahoo Inc.
	Westrock Co.	Wells Fargo & Co New	National Oilwell Varco Inc.
	Smucker J M Co.	Citigroup Inc.	Baker Hughes Inc.
	Albemarle Corp.	Metlife Inc.	Molson Coors Brewing Co.

C5

Intro.	Growth	Mature	Decline
Zimmer Biomet Holdings Inc.	Expedia Inc De	U S Bancorp Del	Chimera Investment Corp.
	New Residential Investment Corp.	Wal Mart Stores Inc.	Steel Dynamics Inc.
	Targa Resources Corp.	Suntrust Banks Inc.	Western Asset Mortgage Cap Corp.
	Platform Specialty Products Corp.	Comcast Corp New	Tetra Technologies Inc.
	Walker & Dunlop Inc.	Regions Financial Corp.	A A R Corp.

Notes: *1. $^{\neq}$, $^{\neq}$, and $^{+}$ respectively indicate significance at 1%, 5%, and 10%.*
2. Intro. denotes firms in introduction life-cycle stage.

Table 5 Firm accounting features under CSR performance

For each year, all firms rated by KLD are divided into five equal groups based on their CSR performance at time t. Table 5 reports positive payout, RETA, and FCF between the best (C1) and worst-performing (C5) CSR groups. The right-most column reports the difference.

	C1							C5							Difference (C1-C5)	
Variable	Mean	Min.	25th	Med.	75th	Max.	Std.	Mean	Min.	25th	Med.	75th	Max.	Std.	Mean T-test	Med. Wilcoxon-test
Payout	0.371	0.000	0.000	0.240	0.474	5.494	0.548	0.321	0.000	0.000	0.105	0.390	5.506	0.598	0.050≠	0.135≠
RETA	0.278	0.000	0.082	0.233	0.420	0.926	0.221	0.267	0.000	0.112	0.239	0.396	0.720	0.184	0.011≠	-0.006
FCF	0.070	0.000	0.024	0.061	0.102	0.294	0.054	0.068	0.000	0.029	0.056	0.092	0.294	0.053	0.002≠	0.005+

Notes: *1. ≠, ≠, and + respectively indicate significance at 1%, 5%, and 10%.*

2. All variables are defined in table 2.

Table 6 Firm accounting features under CSR performance

Panel A. Capital structure

Variable	EQUISS			DISS		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$LC_{Intro.}$	0.204≠	0.234≠	0.204≠	0.155≠	0.183≠	0.155≠
	(25.74)	(25.57)	(25.76)	(10.02)	(11.35)	(10.00)
LC_{Mature}	0.136≠	0.177≠	0.136≠	0.134≠	0.135≠	0.134≠
	(45.43)	(52.46)	(45.40)	(23.32)	(23.26)	(23.23)
$LC_{Decline}$	-0.050≠	-0.014≠	-0.050≠	-0.004	-0.002	-0.002
	(-17.61)	(-4.59)	(-17.51)	(-0.70)	(-0.44)	(-0.36)
CSR_STR		-0.003≠	-0.001≠		-0.004≠	-0.003≠
		(-10.52)	(-3.56)		(-8.79)	(-5.91)
CSR_CON		0.001≠	0.000		0.000	0.001≠
		(3.08)	(1.52)		(0.05)	(2.26)
SGrth	0.040≠		0.039≠	0.032≠		0.032≠
	(18.17)		(18.06)	(7.60)		(7.49)
ROE	-0.006≠		-0.006≠	0.022≠		0.023≠
	(-2.07)		(-2.01)	(3.81)		(3.94)
ROA	-0.303≠		-0.304≠	-0.127≠		-0.127≠
	(-34.40)		(-34.43)	(-7.40)		(-7.40)
Size	-0.001≠		-0.001≠	-0.002≠		0.001
	(-4.07)		(-1.97)	(-3.43)		(0.74)
Age	-0.001		-0.001	-0.015≠		-0.014≠
	(-1.34)		(-1.03)	(-10.23)		(-9.21)
D/E	-0.002≠		-0.002≠	-0.002≠		-0.003≠
	(-9.39)		(-9.48)	(-6.53)		(-7.47)
Tobin's Q	0.013≠		0.013≠	-0.001		-0.000
	(25.27)		(25.53)	(-0.85)		(-0.20)
Profit	-0.011≠		-0.011≠	0.001		0.001
	(-10.59)		(-10.56)	(0.36)		(0.23)
CashHoldings	0.039≠		0.041≠	-0.250≠		-0.244≠
	(12.05)		(12.40)	(-39.66)		(-38.25)
Constant	0.014≠	0.022≠	0.009≠	0.188≠	0.083≠	0.166≠
	(4.32)	(27.97)	(2.39)	(29.61)	(59.83)	(23.32)
R^2	0.370	0.160	0.370	0.133	0.040	0.135
Adj. R^2	0.369	0.159	0.370	0.132	0.039	0.134

Panel B. Change in cash and assets

Variable	ΔCash			ΔAsset		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$LC_{Intro.}$	0.042≠	0.045≠	0.042≠	1.549≠	1.567≠	1.546≠
	(4.65)	(4.85)	(4.62)	(73.55)	(91.92)	(73.64)
LC_{Mature}	0.081≠	0.077≠	0.081≠	0.797≠	0.807≠	0.796≠
	(23.97)	(22.61)	(23.94)	(103.95)	(128.97)	(104.10)
$LC_{Decline}$	-0.054≠	-0.067≠	-0.054≠	-0.263≠	-0.314≠	-0.260≠
	(-16.78)	(-21.73)	(-16.67)	(-33.07)	(-54.31)	(-32.71)
CSR_STR		0.000	-0.001+		-0.002≠	-0.006≠
		(1.81)	(-1.93)		(-4.97)	(-8.13)
CSR_CON		0.000	0.000		0.001+	0.000
		(0.61)	(0.99)		(1.90)	(0.27)
SGrth	-0.009≠		-0.009≠			
	(-3.49)		(-3.52)			
ROE	-0.023≠		-0.023≠	0.041≠		0.040≠
	(-7.05)		(-7.01)	(6.97)		(6.87)

ROA	0.088≠		0.087≠			
	(8.06)		(7.98)			
Size	0.000		0.001	0.002≠		0.008≠
	(0.07)		(1.29)	(2.33)		(6.31)
Age	-0.001		-0.001	-0.024≠		-0.022≠
	(-1.41)		(-1.10)	(-10.34)		(-9.34)
D/E	0.001≠		0.001≠	-0.002≠		-0.002≠
	(7.36)		(6.88)	(-2.30)		(-2.74)
Tobin's Q	0.005≠		0.005≠	0.019≠		0.021≠
	(8.82)		(9.00)	(16.06)		(17.19)
Profit	-0.004≠		-0.004≠	0.028≠		0.029≠
	(-3.53)		(-3.63)	(6.26)		(6.38)
OCF	0.181≠		0.182≠	0.269≠		0.274≠
	(25.47)		(25.57)	(17.00)		(17.34)
R&D				0.019≠		0.021≠
				(3.35)		(3.64)
Constant	-0.018≠	0.008≠	-0.022≠	0.073≠	0.094≠	0.034≠
	(-5.01)	(9.85)	(-5.49)	(8.20)	(63.68)	(3.47)
R^2	0.123	0.051	0.123	0.663	0.598	0.665
Adj. R^2	0.122	0.050	0.122	0.662	0.598	0.664

Notes: *1. ≠, ≠, and + respectively indicate significance at 1%, 5%, and 10%.*
2. All variables are defined in table 2.

Table 7 Robustness using DCS as a life-cycle proxy

Variable	EQUISS		DISS		ΔCash		ΔAsset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
$LC_{Intro.}$	0.135≠	0.065≠	0.035≠	0.055≠	0.001	0.049≠	0.179≠	0.273≠
	(47.04)	(24.34)	(7.49)	(11.00)	(0.48)	(15.44)	(24.3)	(23.19)
LC_{Mature}	0.038≠	0.031≠	0.050≠	0.049≠	0.025≠	0.032≠	0.179≠	0.211≠
	(29.21)	(26.71)	(22.73)	(22.59)	(19.87)	(24.84)	(53.04)	(44.44)
$LC_{Decline}$	0.020≠	0.003+	-0.020≠	0.003	-0.015≠	0.008≠	-0.041≠	-0.008
	(11.18)	(1.91)	(-6.59)	(1.01)	(-8.42)	(4.50)	(-8.82)	(-1.20)
CSR_STR	-0.002≠	-0.001≠	-0.004≠	-0.003≠	0.000	-0.000+	-0.002≠	-0.005≠
	(-8.02)	(-3.17)	(-8.20)	(-5.03)	(1.40)	(-1.65)	(-2.58)	(-5.05)
CSR_CON	0.001≠	0.000	0.000	0.001+	0.000	0.000	0.002+	0.002
	(2.20)	(0.99)	(0.51)	(1.90)	(0.82)	(1.19)	(1.72)	(1.35)
SGrth		0.057≠		0.038≠		-0.003		
		(25.60)		(9.28)		(-1.11)		
ROE		-0.005		0.023≠		-0.021≠		0.086≠
		(-1.60)		(3.98)		(-6.41)		(10.16)
ROA		-0.249≠		-0.103≠		0.136≠		
		(-27.19)		(-6.01)		(12.75)		
Size		0.000		0.001		0.001≠		0.015≠
		(0.50)		(1.15)		(2.92)		(8.29)
Age		-0.002≠		-0.013≠		-0.001		-0.031≠
		(-2.25)		(-8.54)		(-1.28)		(-9.08)
D/E		-0.002≠		-0.004≠		0.001≠		0.001
		(-13.16)		(-10.84)		(3.75)		(0.89)
Tobin's Q		0.013≠		0.000		-0.005≠		0.029≠
		(24.66)		(0.17)		(8.88)		(16.23)
Profit		-0.014≠		-0.002		-0.007≠		0.027≠
		(-12.97)		(-1.23)		(-6.46)		(4.05)
CashHoldings		0.040≠		-0.243≠				
		(11.54)		(-37.43)				
OCF						0.195≠		0.332≠
						(24.64)		(12.33)
R&D								0.044≠
								(5.21)
Constant	0.005≠	-0.009≠	0.071≠	0.144≠	0.001	-0.042≠	0.048≠	-0.075≠
	(4.70)	(-2.38)	(39.80)	(19.97)	(1.16)	(-10.34)	(17.63)	(-4.86)
R^2	0.128	0.315	0.043	0.135	0.032	0.118	0.168	0.280
Adj. R^2	0.128	0.315	0.042	0.134	0.031	0.117	0.167	0.279

Notes: *1. ≠, ≠ and + respectively indicate significance at 1%, 5%, and 10%.*

2. All variables are defined in table 2.

Table 8 Additional robustness using RETA as a life-cycle proxy

Variable	EQUISS		DISS		ΔCash		ΔAsset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
$LC_{Intro.}$	0.041≠	0.012≠	0.005+	0.017≠	-0.003≠	0.002	-0.002	-0.006
	(27.84)	(8.70)	(1.92)	(6.91)	(-0.23)	(1.13)	(-0.56)	(-0.90)
$LC_{Decline}$	-0.016≠	-0.021≠	-0.019≠	-0.005≠	0.003≠	-0.008≠	-0.028≠	-0.036≠
	(-11.28)	(-15.37)	(-7.71)	(-2.04)	(2.17)	(-5.71)	(-7.05)	(-5.69)
CSR_STR	-0.002≠	-0.001≠	-0.004≠	-0.003≠	0.000	-0.001≠	-0.004≠	-0.008≠
	(-7.12)	(-3.37)	(-8.58)	(-5.77)	(0.02)	(-2.26)	(-5.28)	(-7.22)
CSR_CON	0.001≠	0.000	0.000	0.002≠	0.001≠	0.001+	0.004≠	0.003≠
	(2.50)	(0.05)	(0.33)	(2.65)	(1.99)	(1.79)	(4.08)	(2.22)
SGrth		0.068≠		0.056≠		0.009≠		
		(30.39)		(13.56)		(3.64)		
ROE		-0.008≠		0.022≠		-0.024≠		0.076≠
		(-2.46)		(3.80)		(-6.96)		(7.96)
ROA		-0.233≠		-0.103≠		0.138≠		
		(-24.63)		(-5.82)		(12.40)		
Size		0.000		0.001		0.001≠		0.016≠
		(-0.11)		(1.59)		(2.44)		(7.98)
Age		0.001		-0.013≠		-0.002+		-0.050≠
		(1.18)		(-8.14)		(-1.83)		(-12.51)
D/E		-0.003≠		-0.003≠		0.001≠		0.000
		(-13.49)		(-8.68)		(5.29)		(0.32)
Tobin's Q		0.014≠		0.000		0.006≠		0.036≠
		(25.00)		(0.18)		(9.85)		(18.15)
Profit		-0.015≠		-0.002≠		-0.007≠		0.028≠
		(-14.25)		(-0.94)		(-6.02)		(3.82)
CashHoldings		0.039≠		-0.247≠				
		(11.06)		(-38.10)				
OCF						0.169≠		0.228≠
						(23.33)		(8.62)
R&D								0.043≠
								(4.62)
Constant	0.019≠	0.001	0.094≠	0.157≠	0.009≠	-0.023≠	0.130≠	0.135≠
	(16.14)	(0.32)	(46.41)	(20.96)	(7.96)	(-5.39)	(39.46)	(7.38)
R^2	0.086	0.293	0.011	0.110	0.010	0.086	0.010	0.101
Adj. R^2	0.086	0.292	0.011	0.109	0.010	0.085	0.010	0.100

Notes: *1. ≠, ≠, and + respectively indicate significance at 1%, 5%, and 10%.*

Table 9 Sensitivity analyses

Variable	EQUISS		DISS		ΔCash		ΔAsset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Panel A. Dividend payout								
$LC_{Intro.}$	0.186≠	0.166≠	0.220≠	0.181≠	0.011	0.001	1.568≠	1.455≠
	(21.77)	(20.16)	(11.28)	(9.66)	(1.14)	(0.13)	(79.83)	(82.81)
LC_{Mature}	0.127≠	0.111≠	0.151≠	0.139≠	0.039≠	0.033≠	0.843≠	0.759≠
	(39.12)	(34.78)	(20.81)	(19.66)	(10.34)	(8.85)	(112.91)	(111.71)
$LC_{Decline}$	-0.012≠	-0.033≠	0.003	0.009	-0.065≠	-0.056≠	-0.306≠	-0.208≠
	(-4.63)	(-12.22)	(0.64)	(1.48)	(-21.35)	(-17.61)	(-50.74)	(-35.98)
CSR_STR	-0.001≠	-0.001≠	-0.004≠	-0.002≠	-0.000	-0.000	-0.002≠	-0.002≠
	(-8.83)	(-3.43)	(-8.62)	(-4.60)	(-0.29)	(-1.83)	(-5.69)	(-5.46)
CSR_CON	0.000	-0.000	0.000	0.001≠	0.000	0.000	0.000	0.000
	(0.80)	(-1.41)	(0.38)	(2.52)	(0.29)	(0.69)	(1.19)	(0.60)
Payout_STD	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000+	-0.000
	(-0.28)	(0.02)	(-0.64)	(-1.15)	(-0.77)	(-0.40)	(-1.65)	(-1.41)
Control variables		Yes		Yes		Yes		Yes
R^2	0.117	0.197	0.040	0.135	0.034	0.119	0.578	0.669
Adj. R^2	0.117	0.196	0.040	0.134	0.034	0.118	0.578	0.669
Panel B. Free cash flow (FCF)								
$LC_{Intro.}$	0.228≠	0.204≠	0.184≠	0.153≠	0.032≠	0.027≠	1.573≠	1.474≠
	(22.64)	(23.20)	(10.25)	(8.99)	(3.16)	(2.80)	(83.34)	(87.13)
LC_{Mature}	0.181≠	0.141≠	0.130≠	0.133≠	0.079≠	0.081≠	0.812≠	0.753≠
	(50.09)	(43.88)	(20.45)	(21.39)	(21.67)	(22.16)	(119.99)	(121.14)
$LC_{Decline}$	-0.014≠	-0.050≠	0.000	0.001	-0.068≠	-0.058≠	-0.308≠	-0.203≠
	(-4.47)	(-17.22)	(0.09)	(0.28)	(-21.18)	(-17.49)	(-52.23)	(-36.27)
CSR_STR	-0.002≠	-0.000≠	-0.003≠	-0.002≠	0.000	-0.000 +	-0.002≠	-0.003≠
	(-9.72)	(-3.64)	(-8.55)	(-5.46)	(0.62)	(-1.75)	(-4.24)	(-6.33)
CSR_CON	0.000≠	-0.000	-0.000	0.001	0.000	0.000	0.001	0.000
	(2.70)	(-1.26)	(-0.34)	(1.71)	(0.49)	(0.68)	(1.58)	(1.61)
FCF_STD	0.003≠	-0.000	-0.001	0.000	-0.000	-0.000	0.000	-0.001
	(3.03)	(-0.22)	(-0.69)	(0.14)	(-0.90)	(-0.72)	(0.37)	(-0.80)
Control variables		Yes		Yes		Yes		Yes
R^2	0.157	0.359	0.035	0.128	0.053	0.118	0.585	0.672
Adj. R^2	0.157	0.358	0.035	0.128	0.052	0.117	0.585	0.672
Panel C. Retained earnings to total assets (RETA)								
$LC_{Intro.}$	0.229≠	0.204≠	0.184≠	0.153≠	0.032≠	0.027≠	1.573≠	1.474≠
	(22.65)	(23.20)	(10.25)	(8.89)	(3.16)	(2.80)	(83.37)	(87.16)
LC_{Mature}	0.181≠	0.141≠	0.130≠	0.133≠	0.079≠	0.081≠	0.813≠	0.753≠
	(50.13)	(43.88)	(20.46)	(21.40)	(21.68)	(22.17)	(120.05)	(121.17)
$LC_{Decline}$	-0.014≠	-0.050≠	0.000	0.001	-0.068≠	-0.058≠	-0.308≠	-0.203≠
	(-4.46)	(-17.24)	(0.09)	(0.29)	(-21.19)	(-17.50)	(-52.24)	(-36.28)
CSR_STR	-0.002≠	-0.000≠	-0.003≠	-0.002≠	0.000	-0.000+	-0.002≠	-0.003≠
	(-9.77)	(-3.65)	(-8.55)	(-5.45)	(0.64)	(-1.76)	(-4.23)	(-6.32)
CSR_CON	0.000≠	-0.000	-0.000	0.001+	0.000	0.000	0.001	0.000
	(2.72)	(-1.24)	(-0.37)	(1.69)	(0.49)	(0.70)	(1.58)	(1.62)
RETA_STD	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.000	-0.000
	(-0.01)	(-0.77)	(0.11)	(-0.24)	(-0.64)	(-0.59)	(0.12)	(-0.81)
Control variables		Yes		Yes		Yes		Yes
R^2	0.157	0.359	0.035	0.128	0.052	0.118	0.585	0.672
Adj. R^2	0.156	0.358	0.035	0.128	0.052	0.117	0.585	0.672

Notes: *1.* Payout_STD, FCF_STD, and RETA_STD are the dividend payout ratio, free cash flow, and retained earnings to total assets 5 year average standard deviation, respectively.

2. ≠ ≠ *and* + *respectively indicate significance at 1%, 5%, and 10%.*