Management Decision

Does corporate social responsibility extend firm life-cycles?

Feng Jui Hsu,

Does corporate social responsibility extend firm life-cycles?

Feng Jui Hsu
Department of Insurance and Finance,
National Taichung University of Science and Technology, Taichung, Taiwan

Received 18 September 2017
Revised 2 February 2018
Accepted 21 April 2018

Abstract

Purpose – The purpose of this paper is to assess US-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.

Design/methodology/approach – Kinder, Lydenberg, Domini Research & Analytics social performance rating scores were used to measure CSR performance in an initial sample of 19,707 firm-year observations. Firms are first classified into stages including introduction, growth, maturity, and decline, and use multiclass linear discriminant analysis, the Dickinson classification scheme (Dickinson, 2011), and the ratio of retained earnings to total assets (RETA) as life-cycle proxies. Life-cycle was formulated based on a broad set of accounting data sourced from Compustat. Various corporate characteristics from the CRSP database were used to classify all sample firms into five equal groups based on their CSR performance.

Findings – 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; payout, RETA, and free cash flow decreased from high-CSR performance firms to low-CSR performance firms; and cash holdings also exhibit a hump shape over the life-cycle and higher-CSR practices are associated with significantly lower cash holdings.

Originality/value – 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, Cash flow, Life cycle, Financial decisions

Paper type Research paper

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 García-Benau *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).

According to Owen and Yawson (2010), they exhibit a highly significant and positive relation between firm life cycle and the likelihood of becoming a bidder. However, they also show that life cycle has a negative impact on abnormal returns generated on the announcement of a deal, although they were unable to distinguish between the returns received by firms at different stages in their life cycle. This raises the need to understand CSR firms' financial decision-making behavior at different life-cycles. However, CSR

Management Decision

0025-1747
DOI 10.1108/MD-09-2017-0865

performance has implications for a firm's capital allocation throughout its life-cycle, including policies for financing, capital structure, investment, and cash and dividends (i.e. cash holding, payout ratio, retained earnings, and free cash flow (FCF)). Ethical and integrative theories of CSR (Kim *et al.*, 2012) suggest that socially responsible executives/firms tend to stick to a higher standard of corporate behavior consistent with their CSR goals. Thus, firms intent on accounting for global community benefits, human rights, environmental protection, and product safety, must do so in a way that still provides shareholders profits and ensures long-term sustainable operations. Given excess/positive FCF, firms tend to overinvest in negative NPV projects (Richardson, 2006; Jensen, 1986) rather than distribute the cash to shareholders which would leave the firm vulnerable to future acquisition attempts (Zhang, 2016). However, certain governance structures, such as firms with supermajority voting provisions and outstanding shares owned by block holders, appear to mitigate overinvestment activities (Zhang, 2016) to better maintain total assets. Therefore, cash holding, payout ratio, retained earnings, and FCF will be more sensitive to capital allocation in equity or debt issuance for CSR firms throughout their life-cycle. Empirical results in the 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.

The 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). Recent 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. Firm life-cycles are distinct stages that result from changes to internal and external factors, such as strategies, capabilities, resources, and macro-economic conditions. According to Lev and Zarowin (1999), as the rate of change to a firm's performance accelerates, the usefulness of accounting information declines. In addition, using earnings, cash flow and book equity value as proxies shows that the rate of business change has increased and the value-relevance of earnings has decreased over time. Life-cycle stage is also an important determinant of the level and time series properties of profitability (Dickinson, 2011). Overall, empirical findings show that a non-earnings-based measure that reflects a firm's life cycle is useful to stakeholders, creditors, and regulators. However, because a firm is an aggregation of multiple products, technologies, and the impact of globalization, each firm experiences different life-cycle stages which can be difficult to assess. In addition, many industries are characterized by different forms of competition despite a broad variety of product offerings. Nevertheless, empirical studies distinguish life-cycles based on product price and market share (Wernerfelt, 1985), technological change (Jovanovic and MacDonald, 1994), entry and exit rates (Caves, 1998), acquisition rate (Arikan and Stulz, 2016), a separate risk committee (Al-Hadi *et al.*, 2016), and idiosyncratic volatility (Hasan and Habib, 2017). This study uses multiclass linear discriminant analysis (MLDA) as proposed by Faff *et al.* (2016) to generate the main life-cycle proxy and uses more robust cash flow pattern proxies (Dickinson, 2011) and retained earnings (DeAngelo *et al.*, 2006) that can precisely capture a firm's movement across life cycle stages.

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 follows a predictable pattern in line with the firm's life-cycle.

Due to a decrease in investment opportunities, a firm with higher-CSR performance is found to issue significantly less equity and debt as it become more mature. In contrast, 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 may 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 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 holding 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 increase 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 opposite results. In addition, firms with higher-CSR performance are found to decrease their cash holdings and total assets as they move through then 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 its life-cycle as such allocation plays a crucial role in a firm's financing and future growth decisions. Specifically, this study poses two research questions:

RQ1. Does CSR practice affect capital allocation throughout firm life-cycle?

RQ2. Does CSR practice reflect financial performance throughout the life-cycle?

To examine these research questions, CSR performance scores sourced from Kinder, Lydenberg, Domini Research & Analytics (KLD) STAT are used to test the hypothesis on a large sample of US firms from 2005 to 2015. To estimate the propriety proxy for firm life-cycle, based on recent studies, this study uses MLDA (Faff *et al.*, 2016; DeAngelo *et al.*, 2010; Grullon *et al.*, 2002) to estimate and verify life-cycle proxies. To ensure that the life-cycle stage is not driven by the specific measure of MLDA, the 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. I 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 the 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

Over the past two decades, CSR has emerged as an increasingly important issue, and an increasing number of independent firms track and rate CSR performance and provide these ratings to investors. McWilliams and Siegel (2001) define CSR as "actions that appear to further some social good, beyond the interests of the firm and that which is required by law." According to various research reports, CSR measures include a wide variety of positive and negative CSR activities such as community, corporate governance, diversity, employee relations, environmental stewardship, human rights policies, product quality, and several controversial business issues. Employee diversity and corporate governance concerns positively affect a firm's risk (Bouslah *et al.*, 2013) and investing in CSR might provide financial benefits to firms and may be associated with better long-run growth prospects (Gregory *et al.*, 2014). In addition, social concern components (community, employment, and environment) are used as measures of systematic risk. CSR practice has a more statistically significant impact on firm risk for firms in controversial industries (e.g. nuclear power, tobacco, gambling, etc.) after controlling for various firm characteristics (Jo and Na, 2012).

Proponents argue that CSR promotes ethical behavior by managers, which has a positive impact on firm reputation and can thus indirectly enhance firm prospects through improving sales, profitability, and long-term performance while reducing financial risk. Dissenters claim that CSR is expensive and inconsistent with the overriding goal of maximizing the shareholder return. However, the rapid increase in demand for CSR disclosure has raised some questions for researchers. As firms go through different life-cycles, how do their views on capital allocation change, given different CSR performance? Does the disclosure of CSR-related intelligence help predict financial performance throughout the life-cycle?

The existence of asymmetric information and agency problems between managers and investors may cause a firm's financial decision making to differ from CSR practice throughout the firm's life-cycle. 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 that 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 a firm's life-cycle is still unexplored.

This study examines the interplay of capital structure, investment, and cash policies with a firm's financial decision-making across the life-cycle, and assesses 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.* (2013) 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), the 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 over the 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). I 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):

H1a. *Ceteris paribus*: CSR performance is negatively associated with a firm's equity issuance over the life-cycle as it becomes more mature.

H1b. *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 (QE), the total value of US 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 the firm's life-cycle.

Firms issue corporate bonds 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 do not need to be repaid, but issuing new shares influences a firm's ownership and earnings per share. 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 performances may produce different bond issuance behaviors. 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, I 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, I posit that responsible firms have easier access to debt financing and face lower borrowing costs. However, based on long-term sustainability, I expect a negative relation between CSR and bond issuance. Thus, the following hypothesis is proposed:

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, retained earnings, 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 RETA also exhibits a positive association with the probability of paying dividends (DeAngelo *et al.*, 2006) and larger, more profitable firms with higher retained 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 RETA is also a crucial proxy for the firm's life-cycle because as firms become more mature, they begin to accumulate profits and have higher retained earnings in their capital combination.

Under the 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 enjoy reduced risk exposure.

Based on the above, I 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

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. KLD offers the largest multidimensional corporate social performance database available to the public (Deckop *et al.*, 2006), and has been used extensively in academic research to assess the CSR construct (Carroll and Shabana, 2010, which is cited by 2,182 times). Also, Chatterji *et al.* (2009) argue that KLD's social ratings are among the most influential and the most comprehensively accepted CSR measures used by academics, and the KLD data set can be the standard for quantitative measurement of corporate social activities (Mattingly and Berman, 2006). Following Kim *et al.* (2012), for this research, I use a firm's social performance data as provided by KLD to determine the relative positive indicators (strengths) 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 US-based sample of 19,707 firm-year observations from 2005 to 2015. I merged accounting characteristics from Compustat, which formulates life-cycle from a broad set of accounting data. I 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

The 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), I first classify firms into four groups (introduction, growth, mature, and decline) using the DCS (Dickinson, 2011)

and then use 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:

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

where Age = firm age, $RETA$ = retained earnings to total assets ratio, $EBIT$ = earnings before tax scaled by total assets, $AGrth$ = assets growth.

Based on Equation (1), I classify the entire sample into four life-cycle phases and assess the life-cycle proxy:

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

Furthermore, to capture the relation between life-cycle and CSR practice on a firm's financial policies, I use the models proposed by Faff *et al.* (2016) and DeAngelo *et al.* (2010) to examine the impact of life-cycle and CSR performance on a firm's financial decision-making through employing ordinary least squares with clustered standard errors. Moreover, to capture the different life-cycle measures on financial policies, the following empirical models 3 and 4 are used for non-continuous life-cycle classifications (i.e. MLDA and DCS classifications) while models 5 and 6 are used for continuous life-cycle measure (i.e. RETA classification):

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

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

$$\begin{aligned} EQUISS_i \text{ or } DISS_i = {} & \beta_0 + \beta_1 \cdot [LC\ stage]_i + \beta_2 \cdot [CSR \text{ variables}]_i + \beta_3 \cdot SGrth_i \\ & + \beta_4 \cdot ROE_i + \beta_5 \cdot ROA_i + \beta_6 \cdot Size_i + \beta_7 \cdot Age_i + \beta_8 \cdot D/E_i \\ & + \beta_9 \cdot Tobin's\ Q_i + \beta_{10} \cdot Profit_i + \beta_{11} \cdot CashHoldings_i + \varepsilon_i \end{aligned} \quad (5)$$

$$\begin{aligned} \Delta Cash_i \text{ or } \Delta Asset_i = {} & \beta_0 + \beta_1 \cdot [LC\ stage]_i + \beta_2 \cdot [CSR \text{ variables}]_i + \beta_3 \cdot SGrth_i \\ & + \beta_4 \cdot ROE_i + \beta_5 \cdot ROA_i + \beta_6 \cdot Size_i + \beta_7 \cdot Age_i + \beta_8 \cdot D/E_i \\ & + \beta_9 \cdot Tobin's\ Q_i + \beta_{10} \cdot Profit_i + \beta_{11} \cdot OCF_i + \beta_{12} \cdot R\&D_i + \varepsilon_i \end{aligned} \quad (6)$$

For Equations (3) and (4), *LC stage* is the life-cycle indicator variable that takes a value of 1 if a firm is in stage y and 0 otherwise, where y = (Introduction, Mature, and Decline). In addition, for Equations (5) and (6), *LC stage* is the life-cycle indicator variable which takes a value of 1 if a firm's life-cycle measure is in the top (bottom) (i.e. 1/3 of the sample distribution), is in stage y and 0 otherwise, where y = (Introduction and Decline). CSR variables are the control variables for CSR performance (i.e. strength and concern) and *EQUISS*, *DISS*, $\Delta Cash$, and $\Delta Asset$ are the firm financial policies.

Here *EQUISS or DISS* is net equity issuance or long-term net debt issuance over total assets, respectively; $\Delta Cash$ *or* $\Delta Asset$ is the change in cash and marketable securities or the change in total asset over total assets, respectively; *LC stage* is firm life-cycle stage; CSR variables is net score of CSR ratings, measured as total strengths or concerns in seven social rating categories; *SGrth* is sales growth rate at year t; *ROE* is return on equity; *ROA* is return on total assets; *Size* is natural logarithm of the market value of equity at the end of the

previous year; *Age* is natural logarithm of the year of the firm's establishment; *D/E* is total debt scaled by total equity; *Tobin's Q* is market value over the replacement value of the firm's assets; *Profit* is net profit after tax to net sales ratio; *OCF* is operation cash flow to total assets ratio; and *R&D* is research and development to net sales ratio.

4. Results

4.1 Descriptive statistics and univariate analysis

In Table I, I present the sample distribution by the two-digit SIC code industry. The most heavily represented industry is manufacturing (36.63 percent, $20 \leqslant$ SIC code < 40), followed by financial services (22.77 percent, $60 \leqslant$ SIC code < 70), and services (16.42 percent, $70 \leqslant$ SIC code < 90).

Panel A of Table II 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 II, 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, the seven social rating categories are better suited to reflect unfavorable firm behavior than excellent behavior.

Panel B of Table II 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 from groups C1 to C5, which is consistent with previous findings (Bhandari and Javakhadze, 2017). In terms of investment, Group C1 exhibits a significantly lower rate of capitalization change than C5 (i.e. 0.093 vs 0.104), despite C1 having a larger firm size, ROA, and ROE, and under the benefits of lower capital/equity costs. The empirical result shows higher-CSR firms exhibiting lower significant firm size expansion compared with lower-CSR firms. Furthermore, higher-CSR firms also show larger changes in cash holdings, despite groups C1 having higher OCF, FCF, and RETA than group C5 (i.e. 0.009 vs 0.008). Group C1 allocates excess cash by paying a significantly higher dividend to shareholders to meet the optimal financial policy (consistent with Coulton and Ruddock, 2011).

Industry	Two-digit SIC	No. of obs.	% of sample	Cumulative percent
Agriculture	SIC < 10	64	0.32	0.32
Mining	$10 \leqslant$ SIC < 15	678	3.44	3.77
Construction	$15 \leqslant$ SIC < 18	288	1.46	5.23
Manufacturing	$20 \leqslant$ SIC < 40	7,218	36.63	41.85
Transportation	$40 \leqslant$ SIC < 50	1,762	8.94	50.79
Wholesale trade	$50 \leqslant$ SIC < 52	554	2.81	53.61
Retail trade	$52 \leqslant$ SIC < 60	1,381	7.01	60.61
Financial services	$60 \leqslant$ SIC < 70	4,488	22.77	83.39
Services	$70 \leqslant$ SIC < 90	3,235	16.42	99.80
Public administration	SIC > 90	39	0.20	100.00
Total		19,707	100.00	

Notes: 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 percent of the sample firms, followed by financial services at 22.77 percent and services at 16.42 percent; No. of Obs. and % of sample denote the number of observations and the percentage of certain industry sample in all samples, respectively

Table I. Sample description: distribution of observations by two-digit SIC

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
Δ*Cash*	0.008	0.003	0.080	−0.577	0.423
Δ*Asset*	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

	C1			C5			Difference(C1−C5)	
Variable	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*
Δ*Cash*	0.009	0.003	0.074	0.008	0.003	0.074	0.001	0.000
Δ*Asset*	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: *EQUISS* is net equity issuance over total assets; *DISS* is long-term net debt issuance over total assets; Δ*Cash* is the change in cash holdings, where cash holdings is cash and marketable securities over total assets; Δ*Asset* 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. 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, Std., Min., Max., and Med., respectively, denote standard deviation, minimum, maximum and median. *,**,***Significant at 1, 5, and 10 percent, respectively

Table II.
Descriptive statistics: CSR in five groups

The evidence suggests that mean dispersion measures for the best and worst CSR (i.e. C1 vs 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 a 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).

Table III 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.

How are life-cycle proxies related to CSR? And does the MLDA life-cycle proxy faithfully capture the firm life-cycle stage? To better understand the relationship between CSR and life-cycle, Panel A of Table IV shows the mean between the best- (C1) and worst-performing (C5) CSR groups of firm age, RETA ratio, EBIT, and $\Delta Asset$ 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. In contrast to the C5 group, 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. However, the $\Delta Asset$ indicates the C1 group exercises careful control over asset size to avoid rapid asset expansion in the mature and decline stages, though the C1 groups enjoy significantly higher cash flows and stronger debt/equity servicing ability and capacity (consistent with Panel B of Table II), especially in the mature stage. 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.

I am interested in determining how CSR practices impact the likelihood of a firm transitioning from one life-cycle phase to the next. 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 IV 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 a more stable and progressive life-cycle over time.

Panel C of Table IV shows the CSR performance for the five largest firms through four life-cycles. As expected, Yahoo, oilfield services, and financial services are mainly in the mature and decline stages, whereas the introduction and growth stages 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, Figure 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.

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

Table III.
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) Δ*Cash*	0.24*	0.00	1.00															
(4) Δ*Asset*	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: All variables are defined in Table II. *,**,***Significant at 1, 5, and 10 percent, respectively

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**	2.648	2.998*	3.235***
RETA	−0.040	−0.118	0.145	0.102	−0.014	−0.311***	0.073*	0.001***
EBIT	0.138	0.100	0.151	0.061	0.120	−0.105***	0.106*	0.015***
Δ*Asset*	1.669	0.929	0.081	−0.214	1.668	0.885	0.089**	−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			
2014	Intro.	Growth	Mature	Decline	Intro.	Growth	Mature	Decline
2015								
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

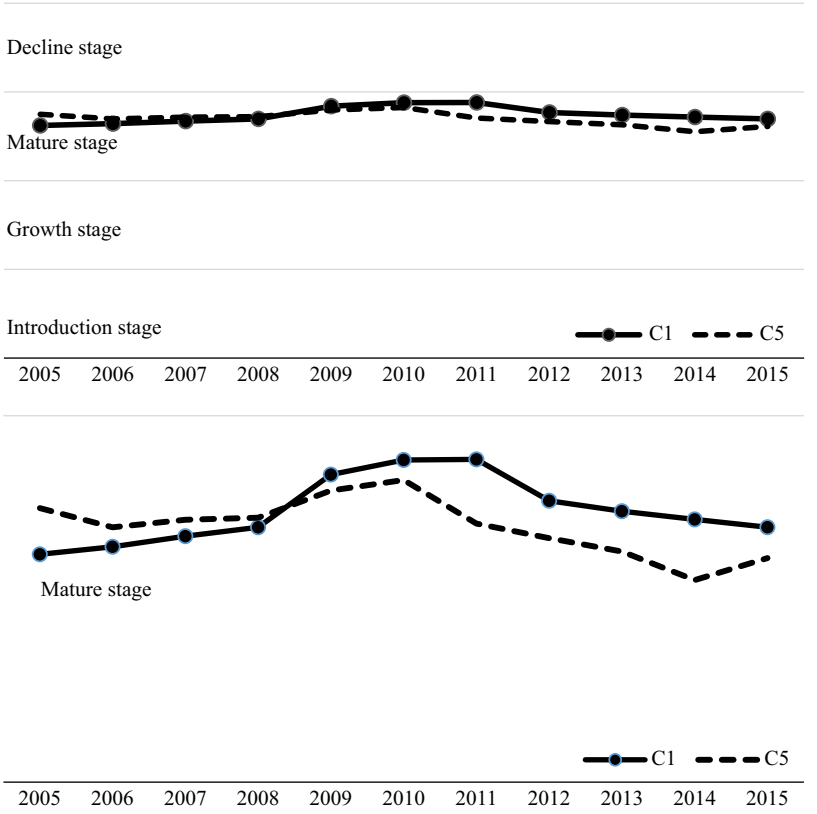
C1			
Intro.	Growth	Mature	Decline
–	Abbvie Inc.	JPMorgan Chase & Co.	State Street Corp.
	Becton Dickinson & Co.	Bank Of America Corp.	Yahoo Inc.
	Westrock Co.	Wells Fargo & Co New	National Oilwell Varco Inc.
	Smucker J M Co.	Citigroup Inc.	Baker Hughes Inc.
	Albemarle Corp.	Metlife Inc.	Molson Coors 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: 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 Dickinson classification scheme (DCS) (Dickinson, 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. Intro. denotes firms in introduction life-cycle stage. *,**,***Significant at 1, 5, and 10 percent, respectively

Table IV. Firm features under multiclass linear discriminant analysis (MLDA)

shareholders, especially in the mature or declining stages. Table V provides the results for the entire sample of payout ratio, RETA, and FCF for high- and low-CSR performance groups. The average cash holding proxies significantly indicate that payout, RETA, and FCF decreased from high-CSR performance (C1) for low-CSR performance (C5).

MD



Note: Life-cycle of the best- (C1) and worst-performing (C5) CSR groups over the period 2005-2015

Figure 1.
Multiclass linear discriminant analysis (MLDA) under CSR performance

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). However, firms have a precautionary motive to hoard cash from cash flow, and financially constrained firms display significantly a high degree of sensitivity to positive cash flow (Almeida *et al.*, 2004). In addition, the corporate tax rate in the USA is 35 percent, which is generally higher than the personal tax rate less the value of each unit of cash holdings. Furthermore, regulation of cash flow in the life-cycle is a mechanism for dealing with agency problems (Jensen, 1986). Thus, Figure 2 exhibits that group C1 pays significantly higher dividends than group C5 through 2005-2015 when facing higher RETA and FCF, even during times of a financial crisis. In Figure 2, the C1 group also shows a long-term pattern that suggests that carrying excess cash may be costly because it could induce agency problems and harm firm value (consistent with Jensen, 1986). In particular, under the US Federal Reserve's QE policies and financial distress risk, specifically depressing long-term bond yields (Jarrow and Li, 2014), the C1 group still exhibits higher payout ratios, retained earnings and FCF than the C5 group. In particular, according to Almeida *et al.* (2004), financially constrained firms should retain more cash following negative macro-economic shocks, while unconstrained firms should not. This pattern implies that firms with sustainable profitability under the cash holding policy and Table V, thus supporting *H3*, which suggests that firms will be less willing to hold

Table V.
Firm accounting performance under CSR practice

	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: For each year, all firms rated by KLD are divided into five equal groups based on their CSR performance at time *t*. Table V reports positive payout, RETA, and FCF between the best (C1) and worst-performing (C5) CSR groups. The right-most column reports the difference. All variables are defined in Table II. *,**,***Significant at 1, 5, and 10 percent, respectively

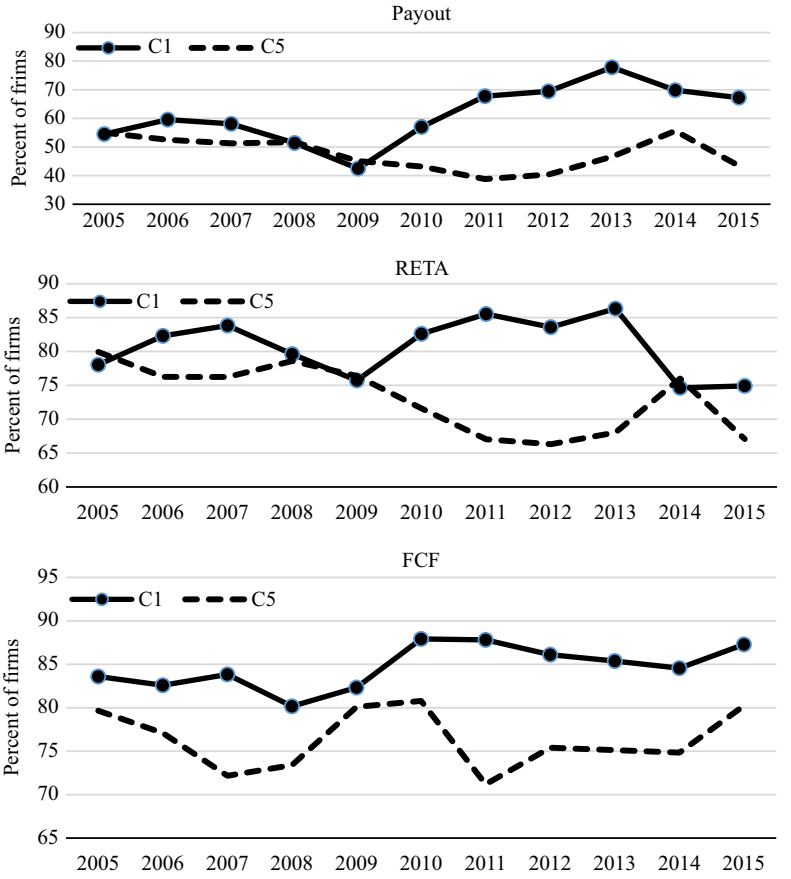


Figure 2.
Firm accounting performance pattern under CSR practice

Note: Positive payout, RETA, and FCF for the best- (C1) and worst-performing (C5) CSR groups over the period 2005-2015

surplus cash because doing so imposes additional costs. In addition, QE lending and increasing the money supply increases default risk in firms with poor CSR performance (Hsu and Liu, 2017).

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), but 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 VI 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

Table VI. Firm accounting features under CSR performance

Panel A: capital structure

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

		ΔCash			*ΔAsset*	
Variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$LC_{Intro.}$	0.042* (4.65)	0.045* (4.85)	0.042* (4.62)	1.549* (73.55)	1.567* (91.92)	1.546* (73.64)
LC_{Mature}	0.081* (23.97)	0.077* (22.61)	0.081* (23.94)	0.797* (103.95)	0.807* (128.97)	0.796* (104.10)
$LC_{Decline}$	−0.054* (−16.78)	−0.067* (−21.73)	−0.054* (−16.67)	−0.263* (−33.07)	−0.314* (−54.31)	−0.260* (−32.71)
CSR_STR		0.000 (1.81)	−0.001*** (−1.93)		−0.002* (−4.97)	−0.006* (−8.13)
CSR_CON		0.000 (0.61)	0.000 (0.99)		0.001*** (1.90)	0.000 (0.27)
SGrth	−0.009* (−3.49)		−0.009* (−3.52)			
ROE	−0.023* (−7.05)		−0.023* (−7.01)	0.041* (6.97)		0.040* (6.87)
ROA	0.088* (8.06)		0.087* (7.98)			
Size	0.000 (0.07)		0.001 (1.29)	0.002** (2.33)		0.008* (6.31)
Age	−0.001 (−1.41)		−0.001 (−1.10)	−0.024* (−10.34)		−0.022* (−9.34)
D/E	0.001* (7.36)		0.001* (6.88)	−0.002** (−2.30)		−0.002* (−2.74)

(*continued*)

Table VI.

Tobin's Q	0.005* (8.82)		0.005* (9.00)	0.019* (16.06)		0.021* (17.19)
Profit	−0.004* (−3.53)		−0.004* (−3.63)	0.028* (6.26)		0.029* (6.38)
OCF	0.181* (25.47)		0.182* (25.57)	0.269* (17.00)		0.274* (17.34)
R&D				0.019* (3.35)		0.021* (3.64)
Constant	−0.018* (−5.01)	0.008* (9.85)	−0.022* (−5.49)	0.073* (8.20)	0.094* (63.68)	0.034* (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: All variables are defined in Table II. *,**,***Significant at 1, 5, and 10 percent, respectively

issues in the mature and decline stages. However, to further investigate the impact of lower capital constraints, lower loan interest rate, agency conflicts, and information asymmetry in shaping firm incentives to issue equity and debt under CSR through the life-cycle, I use critical CSR performance (i.e. *CSR_STR* and *CSR_CON*, respectively, denoting total strengths and concerns of CSR ratings) 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 *H1a* and *H2*. On the contrary, from the agency perspective with low-CSR performance, management significantly tends to extend capitalization through the mature and decline stages 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 VI shows the effect of the life-cycle stage on changes to cash holdings and capitalization under CSR performance. I first discuss the relation between life-cycle and cash holdings followed by 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. Thus, worse CSR firm holdings of liquid assets should increase when cash flows are higher, and thus their cash flow sensitivity of cash is positive. Cash holdings also exhibit 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 supports *H1b* and is consistent with Panel A of Table IV.

Overall, the evidence in Table VI 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 *H1a*, *H1b*, *H2*, and *H3*, namely, that CSR performance is negatively associated with a firm's abnormal financial decisions and the extension of firm life-cycle.

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. I use DCS as another life-cycle proxy, and firms are classified into four life-cycle stages: introduction, growth, mature, and decline. 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). Appendix shows the details of the classification.

Table VII shows patterns consistent with Table VI and presents the same behaviors across the life-cycle under the DCS proxy. Similarly, in terms of capital structure,

Table VII.
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* (47.04)	0.065* (24.34)	0.035* (7.49)	0.055* (11.00)	0.001 (0.48)	0.049* (15.44)	0.179* (24.3)	0.273* (23.19)
LC_{Mature}	0.038* (29.21)	0.031* (26.71)	0.050* (22.73)	0.049* (22.59)	0.025* (19.87)	0.032* (24.84)	0.179* (53.04)	0.211* (44.44)
$LC_{Decline}$	0.020* (11.18)	0.003*** (1.91)	−0.020* (−6.59)	0.003 (1.01)	−0.015* (−8.42)	0.008* (4.50)	−0.041* (−8.82)	−0.008 (−1.20)
CSR_STR	−0.002* (−8.02)	−0.001* (−3.17)	−0.004* (−8.20)	−0.003* (−5.03)	0.000 (1.40)	−0.000*** (−1.65)	−0.002* (−2.58)	−0.005* (−5.05)
CSR_CON	0.001** (2.20)	0.000 (0.99)	0.000 (0.51)	0.001*** (1.90)	0.000 (0.82)	0.000 (1.19)	0.002*** (1.72)	0.002 (1.35)
SGrth		0.057* (25.60)		0.038* (9.28)		−0.003 (−1.11)		
ROE		−0.005 (−1.60)		0.023* (3.98)		−0.021* (−6.41)		0.086* (10.16)
ROA		−0.249* (−27.19)		−0.103* (−6.01)		0.136* (12.75)		
Size		0.000 (0.50)		0.001 (1.15)		0.001* (2.92)		0.015* (8.29)
Age		−0.002** (−2.25)		−0.013* (−8.54)		−0.001 (−1.28)		−0.031* (−9.08)
D/E		−0.002* (−13.16)		−0.004* (−10.84)		0.001* (3.75)		0.001 (0.89)
Tobin's Q		0.013* (24.66)		0.000 (0.17)		−0.005* (8.88)		0.029* (16.23)
Profit		−0.014* (−12.97)		−0.002 (−1.23)		−0.007* (−6.46)		0.027* (4.05)
CashHoldings		0.040* (11.54)		−0.243* (−37.43)				
OCF						0.195* (24.64)		0.332* (12.33)
R&D								0.044* (5.21)
Constant	0.005* (4.70)	−0.009** (−2.38)	0.071* (39.80)	0.144* (19.97)	0.001 (1.16)	−0.042* (−10.34)	0.048* (17.63)	−0.075* (−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: All variables are defined in Table II. *,**,***Significant at 1, 5, and 10 percent, respectively

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 with low-CSR performance significantly tend to increase capitalization when facing improved 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 VII again is consistent with previous findings, and supports *H1a*, *H1b*, *H2*, and *H3*. That is to say, the cash flow patterns explain the varying persistence among firms and distinguish future profitability by life-cycle stage. Furthermore, according to Dickinson (2011), the cash flow pattern proxy not only outperforms other life-cycle proxies but also better explains future profitability.

4.5 Additional robustness test

To further assess the robustness of life-cycle results, following DeAngelo *et al.* (2006), I use the ratio of 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 VIII exhibits patterns consistent with the alternative life-cycle proxies in Tables VI and VII, 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). This empirical result indicates that CSR practice influences the efficiency and strategy of firm-level resource allocation throughout the life-cycle. Moreover, consistent with social preference views, high CSR firms forgo self-interested behavior to exercise social stewardship and restrict opaque investment prospects which can be harmful to various shareholders.

4.6 Sensitivity analyses

Firms pay high dividends when retained earnings form a large portion of total equity and are 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 the agency theory, positive cash flow is an indicator of sustainable profitability through life-cycle (Jensen, 1986). Thus, I use the five-year standard deviation of dividend payouts, FCF, and RETA as the basis for sensitivity analyses through the life-cycle.

Table IX shows patterns consistent with the previous results in Tables VI~VIII, indicating that 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 to maintaining a high standard of financial behavior consistent with their CSR goals.

5. Conclusion

This study examines the relationship between CSR performance and firm life-cycle. Specifically, I 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 FCF policies. Consistent with prior results, firm equity and debt issuance exhibit a hump shape

Table VIII. Additional robustness using RETA as a life-cycle proxy

Variable	*EQUISS*		*DISS*		Δ*Cash*		Δ*Asset*	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
$LC_{Intro.}$	0.041* (27.84)	0.012* (8.70)	0.005*** (1.92)	0.017* (6.91)	−0.003** (−0.23)	0.002 (1.13)	−0.002 (−0.56)	−0.006 (−0.90)
$LC_{Decline}$	−0.016* (−11.28)	−0.021* (−15.37)	−0.019* (−7.71)	−0.005** (−2.04)	0.003** (2.17)	−0.008* (−5.71)	−0.028* (−7.05)	−0.036* (−5.69)
CSR_STR	−0.002* (−7.12)	−0.001* (−3.37)	−0.004* (−8.58)	−0.003* (−5.77)	0.000 (0.02)	−0.001** (−2.26)	−0.004* (−5.28)	−0.008* (−7.22)
CSR_CON	0.001** (2.50)	0.000 (0.05)	0.000 (0.33)	0.002* (2.65)	0.001** (1.99)	0.001*** (1.79)	0.004* (4.08)	0.003** (2.22)
SGrth		0.068* (30.39)		0.056* (13.56)		0.009* (3.64)		
ROE		−0.008** (−2.46)		0.022* (3.80)		−0.024* (−6.96)		0.076* (7.96)
ROA		−0.233* (−24.63)		−0.103* (−5.82)		0.138* (12.40)		
Size		0.000 (−0.11)		0.001 (1.59)		0.001** (2.44)		0.016* (7.98)
Age		0.001 (1.18)		−0.013* (−8.14)		−0.002*** (−1.83)		−0.050* (−12.51)
D/E		−0.003* (−13.49)		−0.003* (−8.68)		0.001* (5.29)		0.000 (0.32)
Tobin's Q		0.014* (25.00)		0.000 (0.18)		0.006* (9.85)		0.036* (18.15)
Profit		−0.015* (−14.25)		−0.002* (−0.94)		−0.007* (−6.02)		0.028* (3.82)
CashHoldings		0.039* (11.06)		−0.247* (−38.10)				
OCF						0.169* (23.33)		0.228* (8.62)
R&D								0.043* (4.62)
Constant	0.019* (16.14)	0.001 (0.32)	0.094* (46.41)	0.157* (20.96)	0.009* (7.96)	−0.023* (−5.39)	0.130* (39.46)	0.135* (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: *,**,***Significant at 1, 5, and 10 percent, respectively

Table IX. Sensitivity analyses

Variable	*EQUISS* Model 1	*EQUISS* Model 2	*DISS* Model 1	*DISS* Model 2	Δ*Cash* Model 1	Δ*Cash* Model 2	Δ*Asset* Model 1	Δ*Asset* Model 2
Panel A: dividend payout								
$LC_{Intro.}$	0.186* (21.77)	0.166* (20.16)	0.220* (11.28)	0.181* (9.66)	0.011 (1.14)	0.001 (0.13)	1.568* (79.83)	1.455* (82.81)
LC_{Mature}	0.127* (39.12)	0.111* (34.78)	0.151* (20.81)	0.139* (19.66)	0.039* (10.34)	0.033* (8.85)	0.843* (112.91)	0.759* (111.71)
$LC_{Decline}$	−0.012* (−4.63)	−0.033* (−12.22)	0.003 (0.64)	0.009 (1.48)	−0.065* (−21.35)	−0.056* (−17.61)	−0.306* (−50.74)	−0.208* (−35.98)
CSR_STR	−0.001* (−8.83)	−0.001* (−3.43)	−0.004* (−8.62)	−0.002* (−4.60)	−0.000 (−0.29)	−0.000 (−1.83)	−0.002* (−5.69)	−0.002* (−5.46)
CSR_CON	0.000 (0.80)	−0.000 (−1.41)	0.000 (0.38)	0.001** (2.52)	0.000 (0.29)	0.000 (0.69)	0.000 (1.19)	0.000 (0.60)
Payout_STD	−0.000 (−0.28)	0.000 (0.02)	−0.000 (−0.64)	−0.000 (−1.15)	−0.000 (−0.77)	−0.000 (−0.40)	−0.000*** (−1.65)	−0.000 (−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* (22.64)	0.204* (23.20)	0.184* (10.25)	0.153* (8.99)	0.032* (3.16)	0.027* (2.80)	1.573* (83.34)	1.474* (87.13)
LC_{Mature}	0.181* (50.09)	0.141* (43.88)	0.130* (20.45)	0.133* (21.39)	0.079* (21.67)	0.081* (22.16)	0.812* (119.99)	0.753* (121.14)
$LC_{Decline}$	−0.014* (−4.47)	−0.050* (−17.22)	0.000 (0.09)	0.001 (0.28)	−0.068* (−21.18)	−0.058* (−17.49)	−0.308* (−52.23)	−0.203* (−36.27)
CSR_STR	−0.002* (−9.72)	−0.000* (−3.64)	−0.003* (−8.55)	−0.002* (−5.46)	0.000 (0.62)	−0.000 *** (−1.75)	−0.002* (−4.24)	−0.003* (−6.33)
CSR_CON	0.000* (2.70)	−0.000 (−1.26)	−0.000 (−0.34)	0.001 (1.71)	0.000 (0.49)	0.000 (0.68)	0.001 (1.58)	0.000 (1.61)
FCF_STD	0.003* (3.03)	−0.000 (−0.22)	−0.001 (−0.69)	0.000 (0.14)	−0.000 (−0.90)	−0.000 (−0.72)	0.000 (0.37)	−0.001 (−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* (22.65)	0.204* (23.20)	0.184* (10.25)	0.153* (8.89)	0.032* (3.16)	0.027* (2.80)	1.573* (83.37)	1.474* (87.16)
LC_{Mature}	0.181* (50.13)	0.141* (43.88)	0.130* (20.46)	0.133* (21.40)	0.079* (21.68)	0.081* (22.17)	0.813* (120.05)	0.753* (121.17)
$LC_{Decline}$	−0.014* (−4.46)	−0.050* (−17.24)	0.000 (0.09)	0.001 (0.29)	−0.068* (−21.19)	−0.058* (−17.50)	−0.308* (−52.24)	−0.203* (−36.28)
CSR_STR	−0.002* (−9.77)	−0.000* (−3.65)	−0.003* (−8.55)	−0.002* (−5.45)	0.000 (0.64)	−0.000*** (−1.76)	−0.002* (−4.23)	−0.003* (−6.32)
CSR_CON	0.000* (2.72)	−0.000 (−1.24)	−0.000 (−0.37)	0.001*** (1.69)	0.000 (0.49)	0.000 (0.70)	0.001 (1.58)	0.000 (1.62)
RETA_STD	−0.000(−0.01)	−0.000 (−0.77)	0.000 (0.11)	−0.000 (−0.24)	−0.000 (−0.64)	−0.000 (−0.59)	0.000 (0.12)	−0.000 (−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: Payout_STD, FCF_STD, and RETA_STD are the dividend payout ratio, free cash flow, and retained earnings to total assets five-year average SD, respectively. *,**,***Significant at 1, 5, and 10 percent, respectively

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. As a firm moves through its life-cycle, it experiences changes to its opportunities for development, corporate governance, and economic regulation, making the corporate life-cycle a critical factor in financial decision making. As many of these changes are largely irreversible, my findings show that in CSR practice, equity and debt issuance follow a predictable pattern over time.

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 a firm's 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-shaped pattern over MLDA life-cycle classification, and high-CSR performance firms significantly require longer times to plan or develop, and exhibit relative long maturity durations and longer life-cycles compared with low-CSR performance firms. Both size and firm age are two crucial proxies for life-cycle estimation. When size and age are used as life-cycle proxies, the implicit assumption is that firms move monotonically over their life-cycle. However, firms face potential challenges throughout the life-cycle, such as product innovations, expansion into new markets, economic shocks, and structural changes can cause firms to move across life-cycle stages non-continuously or decline. Thus, a firm that can maintain a cyclical expansion of capitalization will benefit from a longer mature stage where the reward-risk structure is optimized.

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 evidence 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 exhibit 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 the 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).

Strikingly, these findings show that CSR quality is correlated to financial decision-making, so that mature high-CSR performance firms engage in less capitalization expansion than low-CSR performance firms. This supports the agency theory that management may use improper investment diversification to further their interests when low-CSR performance firms run out of growth opportunities. The empirical results for firms in the mature stage with more stable cash flow also support the agency theory, with low-CSR performance firms holding cash in excess of their growth requirements, generating overinvestment in negative NPVs or agency costs for managers to establish empires. Assuming the reliability of our life-cycle classifications, these findings imply that good CSR practices decrease the agency problem.

In addition, given advantageous financing and a steady positive cash flow, we can expect firms to have good growth opportunities. However, these results are largely dependent on the life-cycle as a whole, so a firm's resource allocation and financial decision making is limited by its life-cycle. Since the development of a life-cycle may be linked to CSR, firms can make proper use of financial resources in the pursuit of their sustainable goals. Through the different life-cycle assessment methods used in this study, I demonstrate that by limiting opportunistic behavior, CSR practice can reduce information asymmetry, reduce idiosyncratic risk and ensure long-term firm viability.

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 behaviors are likely to be of interest to investors and regulators as indicators of firms' sustainable progress through the life-cycle.

In summary, this study investigates the operating consequences of life cycle (as captured by CSR), finding that high-CSR performance can benefit firms that fall into the long-term mature category. Furthermore, according to my findings, life cycle adds important information for assessing a firm's financial stability, with firms exhibiting higher-CSR performance having more stable financial behavior, while lower CSR performance correlates to greater fluctuation in capitalization and cash holdings. I used the KLD database from 2005 to 2015 to determine the strengths and concerns of a given firm's social performance. For older firms, additional research is needed to extend the estimation period with KLD database that can help to get more solid results. Overall, CSR has various applications for forecasting, estimation, and analysis, and is a useful control variable for future research.

Note

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

References

Ahmed, A.S., Billings, B.K., Morton, R.M. and Stanford-Harris, M. (2002), "The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing debt costs", *The Accounting Review*, Vol. 77 No. 4, pp. 867-890.

Albuquerque, R.A., Durnev, A. and Koskinen, Y. (2013), "Corporate social responsibility and firm risk: theory and empirical evidence", CEPR Discussion Paper No. DP9533, available at: https://ssrn.com/abstract=2291334

Al-Hadi, A., Hasan, M.M. and Habib, A. (2016), "Risk committee, firm life cycle, and market risk disclosures", *Corporate Governance: An International Review*, Vol. 24 No. 2, pp. 145-170.

Almeida, H., Campello, M. and Weisbach, M.S. (2004), "The cash flow sensitivity of cash", *The Journal of Finance*, Vol. 59 No. 4, pp. 1777-1804.

Antonia García-Benau, M., Sierra-Garcia, L. and Zorio, A. (2013), "Financial crisis impact on sustainability reporting", *Management Decision*, Vol. 51 No. 7, pp. 1528-1542.

Arikan, A.M. and Stulz, R.M. (2016), "Corporate acquisitions, diversification, and the firm's life cycle", *The Journal of Finance*, Vol. 71 No. 1, pp. 139-194.

Bassen, A., Meyer, K. and Schlange, J. (2006), "The influence of corporate responsibility on the cost of capital", available at: https://ssrn.com/abstract=984406; https://dx.doi.org/10.2139/ssrn.984406; http://dx.doi.org/10.2139/ssrn.984406

Berger, A.N. and Udell, G.F. (1998), "The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle", *Journal of Banking & Finance*, Vol. 22 No. 6, pp. 613-673.

Bhandari, A. and Javakhadze, D. (2017), "Corporate social responsibility and capital allocation efficiency", *Journal of Corporate Finance*, Vol. 43 No. 1, pp. 354-377.

Bouslah, K., Kryzanowski, L. and M'Zali, B. (2013), "The impact of the dimensions of social performance on firm risk", *Journal of Banking & Finance*, Vol. 37 No. 4, pp. 1258-1273.

Câmara, A., Chung, S.L. and Wang, Y.H. (2009), "Option implied cost of equity and its properties", *Journal of Futures Markets*, Vol. 29 No. 7, pp. 599-629.

Carroll, A.B. and Shabana, K.M. (2010), "The business case for corporate social responsibility: a review of concepts, research and practice", *International Journal of Management Reviews*, Vol. 12 No. 1, pp. 85-105.

Caves, R.E. (1998), "Industrial organization and new findings on the turnover and mobility of firms", *Journal of Economic Literature*, Vol. 36 No. 4, pp. 1947-1982.

Chang, Y., Hsieh, C.H., Wang, T.C. and Hsieh, T.Y. (2013), "Corporate social responsibility, cost of equity and cost of bank loan", *International Review of Accounting, Banking, and Finance*, Vol. 6 No. 3, pp. 99-143.

Chatterji, A.K., Levine, D.I. and Toffel, M.W. (2009), "How well do social ratings actually measure corporate social responsibility?", *Journal of Economics & Management Strategy*, Vol. 18 No. 1, pp. 125-169.

Cheng, B., Ioannou, I. and Serafeim, G. (2014), "Corporate social responsibility and access to finance", *Strategic Management Journal*, Vol. 35 No. 1, pp. 1-23.

Cheung, A.W.K. (2016), "Corporate social responsibility and corporate cash holdings", *Journal of Corporate Finance*, Vol. 37 No. C, pp. 412-430.

Chih, H.L., Shen, C.H. and Kang, F.C. (2008), "Corporate social responsibility, investor protection, and earnings management: some international evidence", *Journal of Business Ethics*, Vol. 79 No. 1, pp. 179-198.

Cho, S.Y., Lee, C. and Pfeiffer, R.J. Jr (2013), "Corporate social responsibility performance and information asymmetry", *Journal of Accounting and Public Policy*, Vol. 32 No. 1, pp. 71-83.

Coulton, J.J. and Ruddock, C. (2011), "Corporate payout policy in Australia and a test of the life-cycle theory", *Accounting & Finance*, Vol. 51 No. 2, pp. 381-407.

DeAngelo, H., DeAngelo, L. and Stulz, R.M. (2006), "Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory", *Journal of Financial Economics*, Vol. 81 No. 2, pp. 227-254.

DeAngelo, H., DeAngelo, L. and Stulz, R.M. (2010), "Seasoned equity offerings, market timing, and the corporate lifecycle", *Journal of Financial Economics*, Vol. 95 No. 3, pp. 275-295.

Deckop, J.R., Merriman, K.K. and Gupta, S. (2006), "The effects of CEO pay structure on corporate social performance", *Journal of Management*, Vol. 32 No. 3, pp. 329-342.

Denis, D.J. and Osobov, I. (2008), "Why do firms pay dividends? International evidence on the determinants of dividend policy", *Journal of Financial Economics*, Vol. 89 No. 1, pp. 62-82.

Dhaliwal, D., Li, O.Z., Tsang, A. and Yang, Y.G. (2014), "Corporate social responsibility disclosure and the cost of equity capital: the roles of stakeholder orientation and financial transparency", *Journal of Accounting and Public Policy*, Vol. 33 No. 4, pp. 328-355.

Dhaliwal, D.S., Li, O.Z., Tsang, A. and Yang, Y.G. (2011), "Voluntary nonfinancial disclosure and the cost of equity capital: the initiation of corporate social responsibility reporting", *The Accounting Review*, Vol. 86 No. 1, pp. 59-100.

Dickinson, V. (2011), "Cash flow patterns as a proxy for firm life cycle", *The Accounting Review*, Vol. 86 No. 6, pp. 1969-1994.

Easley, D. and O'hara, M. (2004), "Information and the cost of capital", *The Journal of Finance*, Vol. 59 No. 4, pp. 1553-1583.

Eccles, R.G., Ioannou, I. and Serafeim, G. (2014), "The impact of corporate sustainability on organizational processes and performance", *Management Science*, Vol. 60 No. 11, pp. 2835-2857.

El Ghoul, S., Guedhami, O., Kwok, C.C. and Mishra, D.R. (2011), "Does corporate social responsibility affect the cost of capital?", *Journal of Banking & Finance*, Vol. 35 No. 9, pp. 2388-2406.

Faff, R., Kwok, W.C., Podolski, E.J. and Wong, G. (2016), "Do corporate policies follow a life-cycle?", *Journal of Banking & Finance*, Vol. 69 No. 2, pp. 95-107.

Fama, E.F. and French, K.R. (2001), "Disappearing dividends: changing firm characteristics or lower propensity to pay?", *Journal of Financial Economics*, Vol. 60 No. 1, pp. 3-43.

Ge, W. and Liu, M. (2015), "Corporate social responsibility and the cost of corporate bonds", *Journal of Accounting and Public Policy*, Vol. 34 No. 6, pp. 597-624.

Gebhardt, W.R., Lee, C. and Swaminathan, B. (2001), "Toward an implied cost of capital", *Journal of Accounting Research*, Vol. 39 No. 1, pp. 135-176.

Girerd-Potin, I., Jimenez-Garcès, S. and Louvet, P. (2014), "Which dimensions of social responsibility concern financial investors?", *Journal of Business Ethics*, Vol. 121 No. 4, pp. 559-576.

Goss, A. and Roberts, G.S. (2011), "The impact of corporate social responsibility on the cost of bank loans", *Journal of Banking & Finance*, Vol. 35 No. 7, pp. 1794-1810.

Gregory, A., Tharyan, R. and Whittaker, J. (2014), "Corporate social responsibility and firm value: disaggregating the effects on cash flow, risk and growth", *Journal of Business Ethics*, Vol. 124 No. 4, pp. 633-657.

Grullon, G., Michaely, R. and Swaminathan, B. (2002), "Are dividend changes a sign of firm maturity?", *The Journal of Business*, Vol. 75 No. 3, pp. 387-424.

Hasan, M.M. and Habib, A. (2017), "Firm life cycle and idiosyncratic volatility", *International Review of Financial Analysis*, Vol. 50 No. 1, pp. 164-175.

Hasan, M.M., Hossain, M. and Habib, A. (2015), "Corporate life cycle and cost of equity capital", *Journal of Contemporary Accounting & Economics*, Vol. 11 No. 1, pp. 46-60.

Hsu, F.J. and Chen, Y.C. (2015), "Is a firm's financial risk associated with corporate social responsibility?", *Management Decision*, Vol. 53 No. 9, pp. 2175-2199.

Hsu, F.J. and Liu, I.C. (2017), "Quantitative easing and default probability of corporate social responsibility in US", *Applied Economics Letters*, Vol. 24 No. 10, pp. 681-685.

Jarrow, R. and Li, H. (2014), "The impact of quantitative easing on the US term structure of interest rates", *Review of Derivatives Research*, Vol. 17 No. 3, pp. 287-321.

Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance, and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.

Jo, H. and Na, H. (2012), "Does CSR reduce firm risk? Evidence from controversial industry sectors", *Journal of Business Ethics*, Vol. 43 No. 4, pp. 441-456.

Jovanovic, B. and MacDonald, G.M. (1994), "The life cycle of a competitive industry", *Journal of Political Economy*, Vol. 102 No. 2, pp. 322-347.

Kim, J. and Jeon, Y. (2015), "Dividend policy and corporate social responsibility: a comparative analysis of multinational enterprise subsidiaries and domestic firms in Korea", *Emerging Markets Finance and Trade*, Vol. 51 No. 2, pp. 306-319.

Kim, Y., Park, M.S. and Wier, B. (2012), "Is earnings quality associated with corporate social responsibility?", *The Accounting Review*, Vol. 87 No. 3, pp. 761-796.

Lee, D.D. and Faff, R.W. (2009), "Corporate sustainability performance and idiosyncratic risk: a global perspective", *Financial Review*, Vol. 44 No. 2, pp. 213-237.

Lev, B. and Zarowin, P. (1999), "The boundaries of financial reporting and how to extend them", *Journal of Accounting Research*, Vol. 37 No. 2, pp. 353-385.

Lin, C.H., Yang, H.L. and Liou, D.Y. (2009), "The impact of corporate social responsibility on financial performance: evidence from business in Taiwan", *Technology in Society*, Vol. 31 No. 1, pp. 56-63.

McWilliams, A. and Siegel, D. (2001), "Corporate social responsibility: a theory of the firm perspective", *Academy of Management Review*, Vol. 26 No. 1, pp. 117-127.

Mattingly, J.E. and Berman, S.L. (2006), "Measurement of corporate social action: Discovering taxonomy in the Kinder Lydenburg Domini ratings data", *Business & Society*, Vol. 45 No. 1, pp. 20-46.

Merton, R.C. (1974), "On the pricing of corporate debt: the risk structure of interest rates", *The Journal of Finance*, Vol. 29 No. 2, pp. 449-470.

Nelling, E. and Webb, E. (2009), "Corporate social responsibility and financial performance: the 'virtuous circle' revisited", *Review of Quantitative Finance and Accounting*, Vol. 32 No. 2, pp. 197-209.

Oikonomou, I., Brooks, C. and Pavelin, S. (2012), "The impact of corporate social performance on financial risk and utility: a longitudinal analysis", *Financial Management*, Vol. 41 No. 2, pp. 483-515.

Owen, S. and Yawson, A. (2010), "Corporate life cycle and M&A activity", *Journal of Banking & Finance*, Vol. 34 No. 2, pp. 427-440.

Pástor, Ľ., Sinha, M. and Swaminathan, B. (2008), "Estimating the intertemporal risk-return tradeoff using the implied cost of capital", *The Journal of Finance*, Vol. 63 No. 6, pp. 2859-2897.

Porter, M.E. (2008), *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Simon and Schuster, New York, NY.

Reverte, C. (2012), "The impact of better corporate social responsibility disclosure on the cost of equity capital", *Corporate Social Responsibility and Environmental Management*, Vol. 19 No. 5, pp. 253-272.

Richardson, S. (2006), "Over-investment of free cash flow", *Review of Accounting Studies*, Vol. 11 Nos 2-3, pp. 159-189.

Roberts, P.W. and Dowling, G.R. (2002), "Corporate reputation and sustained superior financial performance", *Strategic Management Journal*, Vol. 23 No. 12, pp. 1077-1093.

Statman, M. (2006), "Socially responsible indexes", *The Journal of Portfolio Management*, Vol. 32 No. 3, pp. 100-109.

Surroca, J., Tribó, J.A. and Waddock, S. (2010), "Corporate responsibility and financial performance: the role of intangible resources", *Strategic Management Journal*, Vol. 31 No. 5, pp. 463-490.

Wernerfelt, B. (1985), "The dynamics of prices and market shares over the product life cycle", *Management Science*, Vol. 31 No. 8, pp. 928-939.

Zhang, N. (2016), "The effects of anticipated future investments on firm value: evidence from mergers and acquisitions", *Review of Accounting Studies*, Vol. 21 No. 2, pp. 516-558.

Zorn, L. (2007), "Estimating the cost of equity for Canadian and US firms", *Bank of Canada Review*, Vol. 2007 No. 1, pp. 28-36.

Appendix. Dickinson's (2011) life-cycle classification scheme (DCS)

Following Dickinson (2011), I classify firms into four into four life-cycle stages according to cash flow patterns: introduction, growth, mature, and shake-out/decline. Life-cycle stages are based on the signs of operating cash flow (OCF), investing cash flow (ICF), and financing cash flow (FCF).

Table AI. Life-cycle classification scheme

	1 Intro.	2 Growth	3 Mature	4 Shake-out	5 Shake-out	6 Shake-out	7 Decline	8 Decline
OCF	−	+	+	+	+	−	−	−
ICF	−	−	−	+	+	−	+	+
FCF	+	+	−	+	−	−	−	+

Note: Intro. denotes firms in introduction life-cycle stage

Corresponding author
Feng Jui Hsu can be contacted at: rickhsutw@nutc.edu.tw