Virtuous nexus between corporate social performance and financial performance:

A study of construction enterprises in China

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Abstract

Although business and society are thought in a vicious relationship for diminishing trust among stakeholders, a few studies indicate the existence of a reciprocal nexus between corporate social performance and corporate financial performance, known as the "virtuous cycle". Despite of some empirical studies in developed countries, little research has been conducted concerning the assumption in emerging markets, where large companies have more responsibilities to create positive and sustainable-shared values. This paper aims to explore the nexus of Chinese companies for their global influential social and environmental impacts together with increasing awareness of corporate social responsibility (CSR). A two-step longitudinal design, including cross-lagged correlation analyses and longitudinal path analyses, is applied to examine the overall and decomposed links between corporate social performance and financial performance. It is found the virtuous cycle does exist in the overall and in most decomposed links within the context of large construction companies in China. These findings are beneficial for interested policy-makers, corporate managers, and the public to create shared value on CSR and therefore contribute to CSR improvements. Analysis results indicate a one-year time lag to be appropriate for examining the lead-lag relationship between corporate social performance and financial performance. The research

also inspires a potential generalisation of the CSP-CFP nexus by similarly examining it in other industries or other countries with diverse CSR contexts.

Key Words: Corporate social responsibility, corporate social performance, corporate financial performance, virtuous cycle, construction industry, China.

1. Introduction

Will investment in corporate social responsibility (CSR) result in better corporate financial performance (CFP)? This question has long been the concern of researchers and corporate managers since the emergence of the term CSR itself (Bowen, 1953). Friedman (1970), for example, famously argued that if CSR causes unnecessary costs and result in lower financial performance, it should be excluded in a company's fiduciary responsibilities. In his view, the only social responsibility of a company is to maximise profits; managers using corporate resources for any cause other than profit maximisation constituting a form of theft (Friedman, 1970). While on the other hand, Samuelson (1971) holds that all companies should assume CSR and do better than ever. CSR thereafter was regarded as a citizen company "good thing to do". This resonates with the statement from the U.S. Committee for Economic Development that the basic purpose of business is to satisfy the public and its changing expectations, also providing a key for future development (Carroll, 1999). In an era where business and society are temporarily caught in the vicious cycle of lack of trust among stakeholders (Porter and Kramer, 2011), it is a legitimate question for companies to ask "whether the 'good thing' is financially beneficial?"

The notion of CSR gained momentum in academia with the vogue of stakeholder theory, in which Freeman (1984) proposed that corporate managers consider not only the interests of shareholders but also other stakeholders such as employees and the community. Porter and Kramer (2006) also assert that corporate bodies must be responsive to stakeholders and that

CSR is a practical approach in gaining competitive advantage. More recently, Porter and Kramer (2011) advocate shifting societal issues from the periphery to the core of a business by "creating shared value", which involves creating economic value in a way that also creates value for society. Such views can be explained by Waddock and Graves' (1997) "good management" and "slack resources" theories. Good management theory holds that good corporate managers ultimately improve shareholder benefits by seeking competitive advantage in satisfying other stakeholders' expectations concerning social responsibility issues (Miles and Covin, 2000). Slack resources theory, on the other hand, makes a natural assumption that firms with better financial performance are able to allocate more slack sources to CSR issues (Waddock and Graves, 1997). This is developed based on the resource-based view and reflected in the often-heard argument that big companies are able to assume more CSR than smaller companies (Barney et al., 2011).

Waddock and Graves (1997) further point out a possible existence of "virtuous cycle", i.e. better CFP results in improved corporate social performance (CSP) and improved CSP leads to better CFP. CSP has been used by some studies as the measurable surrogate of CSR (Lu et al., 2014; Marom, 2006). Understanding this nuanced impact of time factor is of particular managerial significance because not only is time fundamental to measure relationships such as the CSP-CFP nexus, but also in that managers in a business world are commonly under time pressure when they allocate scarce resources to achieve better CSP or CFP. Moreover, the virtuous cycle, or in the other words, the bidirectional causality between CSP and CFP, could take place concurrently (Lev et al., 2010; Orlitzky et al., 2003), or in "quick cycle times", or in a certain time lapse. Following this line of inquiry, McGuire et al. (1988) found accounting-based CFP measures can be better predictors of subsequent CSP than stock-market returns, but prior CSP does not affect current CFP. It is suggested, therefore, that studies should consider the effects of prior, current and future events when

exploring the CSP-CFP nexus (McGuire et al., 1988), due to the dynamic time-sensitive relationship involved. In Nelling and Webb's (2009) regression analyses using the KLD Socrates database, prior (i.e. T) CSP or prior CFP can be a predictor of current (i.e. T+1) CFP or current CSP, respectively. Nevertheless, previous meta-analyses of the CSP-CFP nexus (e.g. Orlitzky et al., 2003) indicate a lack of convincing empirical studies of the virtuous cycle assumption.

Since it has not yet been possible to find a general CSP-CFP relationship, and approaches to CSR change across jurisdictions, it is necessary to consider a specific context. Ward and Smith (2006), for example, suggest that CSR needs to be localised at both conceptual and operational levels so that it becomes more manageable and embedded within an organisation. Likewise, Porter and Kramer (2006) assert that many CSR strategies are ineffective as they consider CSR in a generic way, not in a particular way most appropriate to the firm in question. Similarly, at the operational level, the measurement of CFP is inappropriate for making comparisons across industries (Griffin and Mahon, 1997; Davidson and Worrel, 1988; Callan and Thomas, 2009). In addition, more basic control variables (such as country, industry and company size) need to be taken into consideration (Lu et al., 2014; Callan and Thomas, 2009).

China's construction industry provides a suitable context for exploring the CSP-CFP nexus for several reasons. Firstly, probably no industry offers as many paradoxes as construction CSR (Lu et al., 2015). On the one hand, construction is socially responsible in nature, given its function of materialising the built environment, which is instrumental in influencing human health, economic activities and social behaviour as well as cultural identity and civic pride (Pearce, 2003). On the other hand, construction is intrinsically irresponsible by virtue of it competing with the natural environment and resulting in adverse environmental impacts (Lu and Tam, 2013). Additionally, China has embarked on an ambitious urbanisation agenda

in recent decades and related construction activities have a great social and environmental impact on issues such as land occupation, waste and pollution generation (Zhao et al., 2012).

Secondly, as the world's largest emerging market, China provides an intriguing contrast with previous studies, which are mostly concerned with developed countries. For example, the 81 studies published during 1972-2002 all involve empirical work in developed countries, including the United States, UK and Canada (Allouche and Laroche, 2005). Although studies of the CSP-CFP nexus in developing countries are increasing, only 11.9% of the 84 studies conducted in the later decade (2002-2011) mention their context of specific developing countries (Lu et al., 2014).

Thirdly, with the long history of business but short experience of modern companies, China is a "living fossil" for investigating CSR. While China seems to be reluctant to adopt CSR, many CSR initiatives include laws and regulations, governmental instructions and guidelines, non-governmental standards were actually launched after 2005 (Lin, 2010). Also, CSR is hardly new to Chinese. Its value can be traced back to Confucianism more than 2000 years ago, which admires loyalty, obedience, hard work, modesty, etc. In the decades before the "Open-Door" policy in late 1970s, China's state-owned enterprises (SOEs) had their affiliated schools, canteens and hospitals, undertaking their so-called social responsibilities in addition to being production units. That form of "CSR" could not be sustained owing to the low productivity of the SOEs. Economic reforms were subsequently introduced, e.g. to ignore social responsibilities in favour of market competition whereby efficiency became the mantra. With the many problems emerging (e.g. poor product quality, sweatshops and environmental pollution) in parallel with the country's astonishing economic achievement, the Government is rebuilding a modern form of CSR as the economic norm. This is again imprinted with Chinese characteristics. For example, unlike the usual voluntary nature of modern CSR, CSR in China is regulated by Company Law enforced since 2006, in which Article 5 says:

companies shall abide by laws and regulations, obey social morality and business ethics, uphold principles of trade honesty, accept the supervision of the government and the public, and assume social responsibilities.

By doing so, the oxymoron of CSR is thus doubled in China (Lu et al., 2015). Many domestic and international regulations and policies relating to CSR have been issued, particularly since 2008, and have increasingly gained in popularity in China. A CSR guide specifically for state-owned enterprises (SOEs) was issued in 2008. This guide requires SOEs to build CSR awareness, involving CSR activities and disclosing related information. The Shanghai and Shenzhen Stock Exchanges also issued CSR disclosure guides for listed companies in 2006 and 2008 respectively. However, it often takes time and is not barrier-free for China to engender its own ethical norms (Hanafin, 2002). For example, 1006 companies issued independent CSR reports in 2012, compared with only 32 companies in 2006 (Zhong, Zhang, and Sun, 2012). China's business sectors, including construction, have made significant inroads into the global market. It is envisaged that the CSR policies and practices will inevitably make an impact on the international community but the effects are not entirely clear to date. An empirical analysis is highly desirable to examine the harmony between business and society in China, especially given China's international image associated with sweatshops and environmental pollution.

This paper therefore examines the CSP-CFP nexus in the context of the Chinese construction industry to explore the CSP-CFP nexus especially whether the virtuous cycle exists, or in other words, whether the good management or slack resources theories are most appropriate. It is also important to know whether the CSP-CFP causality is stronger with greater time lapses (i.e. 1 year, 2 years and 3 years). In addition to the overall nexus, the relationships between decomposed CSP and decomposed CFP are tested.

The paper continues as follows. First, the theoretical background is presented covering theories from which the research hypotheses of CSP-CFP causality are developed. Then the

empirical research methods used are described, including the data sources, the measures adopted, cross-lagged panel correlation analyses and longitudinal path analyses. This is followed by the results of the analyses and the validation tests applied in terms of the overall and decomposed CSP-CFP nexus. Finally, the paper closes with a detailed discussion of the results and their implications for theory and practice, the limitations of the study and prospects for future research.

2. Theoretical background and hypotheses development

This section first introduces the theoretical background to cover concepts including stakeholder theory, the social contract, social capital and corporate stakeholder influence capacity from which the research hypotheses of CSP-CFP nexus are developed. Then previous studies on CSP-CFP nexus are reviewed and finally hypotheses are developed.

2.1 Theoretical background on CSR

There have been increasing calls for companies to help the millions of people in misery around the world (Margolis and Walsh, 2003). The lack of normative theories describing the impact of companies on society, however, makes it difficult for managers to make decisions of this nature (Margolis and Walsh, 2003) – begging the question of "what responsibilities to society may businessmen be reasonably expected to assume?" (Bowen 1953). The types of responsibilities involved are well established. Carroll (1979), for example, has proposed four hierarchical social categories of economic, legal, ethical and discretionary responsibilities; while Elkington (1994), on the other hand, extends the traditional business economic "bottom line" to a "triple bottom line" with the addition of social and environmental impact. In terms of extent of responsibilities in practice, however, views range from traditional hard-nosed instrumentalist to the more contemporary "do the good thing".

For the instrumentalist, CSR can be justified only when it means higher profits or

shareholder returns. Friedman (1970), for example, argues that this is the only responsibility of a company, where corporate managers are regarded as agents of shareholders, and extra expenses on philanthropic events with a no commensurate return are a misuse of money (Buchholtz et al., 1999). This is supported by Vance's (1975) early empirical studies that show companies with higher social responsible rankings are correlated with lower stock market performance as measured by change in share price (Orlitzky et al., 2003). Such views are also consistent with contractarianism, which undermines the legitimacy of a socially responsible managers' approach (Donaldson and Dunfee, 1999; Margolis and Walsh, 2003). With the doctrine of "multiple objectives is no objective", Jensen (2001, 2002) claims that two hundred years' experience indicates that social welfare is maximised when each company maximises its market value. However, this is weakening in the contemporary business world, where institutional imperatives are also increasingly driving many businessmen into voluntary CSR activities in order to avoid potentially stricter government interference (Ullmann, 1985). Despite of extra costs, CSR activities also lead to extra revenue and lower costs in other aspects (e.g. the cost of financial capital) for better corporate image (McWilliams and Siegel, 2010).

In contrast, proponents of CSR focus on its moral obligations, necessity for sustainability and corporate competitiveness improvement (Aguinis and Glavas, 2012). As a good citizen, a company with vast resources and expertise should "do the good thing", which is a necessary way to sustainable development (Porter and Kramer, 2006). Brundtland's (1987) definition of sustainable development as "meeting the needs of the present without comprising the ability of future generations to meet their own needs" underlines the belief that social good is not achieved by maximising profits of companies but by each doing the "right thing". For modern companies, this involves facing issues from both internal stakeholders (such as owners, customers, employees and suppliers) and external stakeholders (such as

governmental authorities, competitors, environmentalists and the media) (Freeman, 1984). As Elkington (1998) argues, no company will succeed without meeting economic, social and environmental targets, and establishing partnerships with extensive stakeholders.

In addition to stakeholder theory, other theories have also been developed to explain the assumptions of CSR. For example, CSR is a means of legitimisation (Waller and Lanis, 2009). Companies do not operate in a vacuum; rather, they impact and are impacted upon by the associated socio-political context and stakeholders. There is a "social contract" between a company and society formed by various stakeholders (Deegan, 2002; Mathews, 1993; Patten, 1992). Bound by this contract, firms agree to perform various socially desired actions in return for societal approval of their objectives and other rewards, which ultimately guarantee their continued existence (Deegan, 2002; Brown and Deegan, 1998). Coleman (1988) also introduces the concept of "social capital", which is created and shared by all organisational participants such as managers, employees and other stakeholders instead of monetary capital exclusively for shareholders.

Analysing of interests of stakeholders is also beneficial for corporate strategic management (Freeman, 1984) and many proponents of CSR also believe that strategic management is important for CSP, since companies are driven by human capital and social capital in addition to monetary capital. For example, Porter and Kramer (2006) advocate that companies establish an affirmative social agenda to maximise social benefits by choosing CSR activities that can generate extra competitiveness. Barnett and Salomon (2012) also point out the effect of corporate stakeholder influence capacity (SIC) on turning CSP into profit, and argue that "different firms, at any given point in time, have different profit-maximising levels of CSP due to their different stocks of SIC" (Barnett and Salomon, 2012: 1317).

2.2 Literature review on CSR-CFP nexus

Underpinning the tensions between the two perspectives of CSR is a research question concerning the costs or benefits caused by CSR, and particularly the causal relationship between CSP and CFP. Preston and O'Bannon (1997) proposed six possible forms of this:

1. the social impact hypothesis, that higher CSP leads to higher CFP;

2. the trade-off hypothesis, that higher CSP results in lower CFP;

3. the available funds hypothesis, that higher CFP leads to higher CSP;

4. the managerial opportunism hypothesis, that higher CFP results in lower CSP;

5. the positive synergy hypothesis, that a virtuous cycle exists; and

6. the negative synergy hypothesis, the a vicious circle exists.

A few theoretical explanations of the CSP-CFP nexus have been developed. Good management theory holds that the final goal of good corporate managers is to maximise shareholder benefits by seeking competitive advantages that include satisfying the expectations of other stakeholders concerning social responsibility issues (Miles and Covin, 2000; Waddock and Graves, 1997), which can also meet the increasing expectations of companies over social issues (Freeman, 1984; Margolis and Walsh, 2003). Reversing the cause and effect of good management theory, slack resources theory states that better past financial performance results in the better social performance of the more slack sources available for CSR issues (McGuire et al., 1988, Ullmann, 1985). Combining both theories provides a virtuous cycle, indicating a reciprocal CSP-CFP nexus in which CSP leads to better CFP and vice versa (Waddock and Graves, 1997).

More than 200 empirical studies of the CSP-CFP nexus have been identified and reviewed in previous research (Allouche and Laroche, 2005; Griffin and Mahon, 1997; Lu et al., 2014; Margolis and Walsh, 2003; Orlitzky et al., 2003; Ullmann, 1985) and a positive correlation has been confirmed in the majority of these. For example, Margolis and Walsh's (2003) analysis of 127 studies of the CSP-CFP nexus published during 1972-2002, found 54 to have a positive relationship and 7 a negative relationship, with the remaining reporting

insignificant or mixed findings. Additionally, Orlitzky et al.'s (2003) meta-analysis of 56 previous studies indicate with great certainty the existence of a CSP-CFP virtuous cycle, meaning that financially successful companies are able to spend more on social activities, and better CSP helps them become more financially successful. A critical review of CSP-CFP publications during 2002-2011 by Lu et al. (2014) also found a positive effect of CSP reputation ratings on accounting-based CFP measures and a positive effect of accounting-based CFP on CSP reputation ratings – supporting the media advocacy that people are increasingly accepting that CSR can be reciprocal to both business and society (Liu et al., 2011).

2.3 Hypotheses development

In addition to the above discussion, a little mentioned aspect of the CSP-CFP virtuous cycle is the time lag. Researchers have questioned whether the cycle, if it exists, takes place concurrently (i.e. no time lag), or in "quick cycle times" (i.e. some but negligible time lag), or with a significant time lag (e.g. Lu et al. 2014). For example, Chang and Kuo, (2008) found a reciprocal relationship between corporate sustainability performance and financial performance among high performers, and that the effect of sustainability on financial performance should be regarded as contemporaneous, as it may disappear in a later period (year T+1). However, the time lag should be emphasised when considering the impact of financial performance. For example, Preston and O'Bannon (1997) found ROA (return on assets) led correlation to be higher than contemporaneous correlation and ROA lag correlation. In addition, McGuire et al. (1988) found that prior (year T) CFP predicts current (year T+1) CSP, but prior CSP does not affect current CFP. The positive effect of CSP (T) on CFP (T) has been demonstrated in many cross-sectional studies (Lu et al., 2014).

This suggests two alternative hypotheses for testing the CSP-CFP virtuous cycle (positive synergy) conjecture. Consistent with previous research, the test involves the prior

CFP effect on current CSP and the current CSP effect on current CFP as illustrated in Figure 1. That is:

Hypothesis 1 (H1): the CSP-CFP virtuous cycle exists such that CSP (T) affects CFP (T) and CFP (T) affects CSP (T+1).

Hypothesis 1a (H1a): CSP (T) positively affects CFP (T) only

Hypothesis 1b (H1b): CFP (T) positively affects CSP (T+1) only

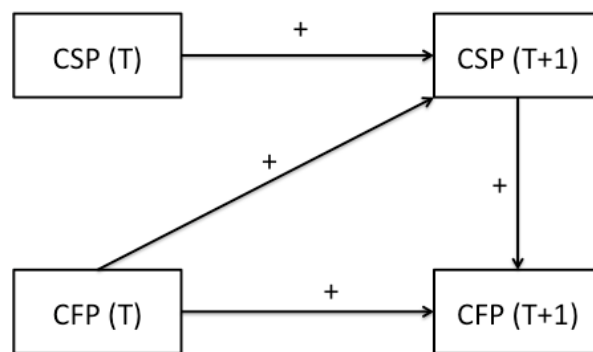*Hypothesis 1 null* (H1n): no significant CSP-CFP relationship

Fig. 1 The conceptual model of the "virtuous" cycle between CSP and CFP

3. Research methods

Based on the literature review and hypotheses development, this section covers empirical research methods including data sources, measures adopted, cross-lagged panel correlation analyses and longitudinal path analyses.

3.1 Data and considerations of control variables

To explore CSR practices especially CSP-CFP nexus, control variables such as country, industry and company size need to be taken into consideration (Lu et al., 2014; Callan and Thomas, 2009). In addition to actual performance, information disclosure varies with these variables as well. For example, CSR disclosure from construction industry and big companies is comparatively more credible than the average, according to a review study by Fernandez-Feijoo et al. (2014). The study by Raufflet et al. (2014) indicates that CSR strategies are responses to domestic and international standards and expectations changing

across jurisdiction and industry. By a survey of senior managers in China, Zhu and Zhang (2015) found that normative consideration and competitive consideration drove companies to be active on CSR in China. CSR issues of large construction companies in China has been increasingly concerned. For example, Zhao et al (2012) developed an indicator system to evaluate CSR of construction companies; Jiang and Wong (2016) identified key activity areas of CSR in construction industry. However, quantitative analyses on CSP-CFP nexus are lacking in the specific context.

The sample for this study, collected from a CSR database developed by Hexun, consists of longitudinal observations of 125 listed construction companies in China during a 4 year time span ranging from 2010 to 2013. Since these firms are within the same industry in the same country, they face a similar external environment such as the legal regulations and issues related to CSR (Griffin and Mahon, 1997). As listed companies, they represent a unique group of large companies, with their reported data being publicly available and therefore reliable due to internal and external audits (Buchholtz et al., 1999). The observation years are chosen based on data availability and indications from previous studies. Although advocacy of CSR existed in the media early in 2001 in China, arguments of necessity have experienced a change due to increased access to the global market and competition according to Liu et al.'s (2011) study of related articles published in Chinese mainstream newspapers during 2001-2008. However, investor behaviour has not observably changed except with the occurrence of a serious social event such as the melamine contamination of baby milk power in 2008 (Wang et al., 2011). Since then, government authorities have realised the importance of CSR and introduced stricter regulations than the simple statement in the 2006 Company Law requiring companies to assume CSR. For example, (especially state-owned) companies are now encouraged or even required to disclose their CSR activities to the general public (Gao, 2009).

3.2 Measures of CSP and CFP

A listed company database developed by Hexun[1] is used to measure corporate social performance and financial performance. Hexun, a former subsidiary organisation of the former China Securities Market Research and Design Center, was founded in 1996 to provide a financial and securities information service for more than 100 million individual and institutional users. By cooperating with Thomson Reuters and the Shanghai Stock Exchange, Hexun ranks the top in providing financial information of publically listed companies according to web hit counts and user satisfaction. Based on publicly available information, including annual financial reports and non-financial reports, Hexun launched the CSR evaluation database of listed companies in 2010[2]. This practice results in an information hub through which the CSP of Chinese companies can be obtained. The use of Hexun's CSR database is comparable with the majority of previous CSP-CFP studies, which also pragmatically circumvented the difficulties in developing their own CSP or CFP database by utilising such agency-based databases as provided by Kinder, Lydenberg & Domini (KLD), Fortune, the Dow Jones Sustainability Index (DJSI) and Canadian Social Investment Database (Lu et al., 2014). For example, McGuire et al. (1988) uses survey data from Fortune while Waddock and Graves (1997) uses KLD to explore the CSP-CFP nexus. However, the companies included in these ratings are mainly from developed countries. Only the Hexun database provides a good data source for researching the CSR of Chinese listed companies.

Hexun's original measurement of CSR, a design based on stakeholder theory, is for five types of uses: by shareholders; by employees; by suppliers, clients and customers; for environmental protection; and for monetary donations. The six critical stakeholder groups proposed by Spiller (2000) are covered comprehensively in this assessment framework, namely the community, environment, employees, customers, suppliers and shareholders. Although making profits for shareholders is regarded as a basic corporate responsibility

(Carroll, 1999; Friedman, 1970), CSP measurement focuses more on stakeholder interests (Johnson, 1971). For example, a widely cited definition of CSR is provided by the Commission of the European Communities, which is that businesses should voluntarily integrate social and environmental concerns into their operations and interaction with stakeholders (Dahlsrud, 2008). The KLD index, widely used when examining the CSP-CFP nexus (e.g. Waddock and Graves, 1997), is concerned mainly with employees, customers, the community and environmental protection (Wood and Jones, 1995). In order to align with previous research and to avoid overlapping with CFP, the CSP measurement used here excludes the part for shareholders. Therefore, CSP is assessed on 4 aspects by 19 items, with a potential maximum score of 70 as presented in Appendix 1.

For CFP measurement, there are 80 indicators used to reflect CFP in previous research, although 57 of these are only used once (Griffin and Mahon, 1997). Although widely used profitability measures of ROE (return on equity), ROA and profit margin have good internal consistency, a broader selection of performance measures is necessary for a comprehensive evaluation (Deng and Smyth, 2014). For example, retained earnings per share is used as a measure to reflect slack resources, as measures such as ROE and profit margins do not reflect exactly how much is left for discretionary use (Seifert et al., 2004). In addition, measures of solvency and stock returns are included to supplement profitability in the measurement of CFP. Using data from the Hexun CSR database, CFP is assessed on the 3 aspects by 14 measures, with a potential maximum score of 21 as shown in Appendix 1. The weights of items to evaluate CSP and CFP follow the Hexun CSR database.

3.3 Cross-lagged panel correlation analysis

Cross-lagged panel correlation is a traditional yet informative method for testing causality or spuriousness by comparing cross-lagged correlations (Kenny, 1975). For

example, Wanous (1974) used the method to explore the causal relationships between job satisfaction and job performance. Berger and Karabenick (2011) also developed a cross-lagged correlation model to test the relationships between student motivation and learning strategies. Recent applications of such analyses are usually combined with structural equation modelling (SEM) (e.g. Arnett et al., 2012; Feldt et al., 2004). In this research, a longitudinal SEM is developed to conduct the cross-lagged panel correlation analyses. After assessing variable X and Y at time 1 and time 2, four measures (i.e., X_1, X_2, Y_1 and Y_2) and six correlations are generated, including two autocorrelations, two synchronous correlations and two cross-lagged correlations. The core of this method is to calculate the cross-lagged difference (i.e. $rx_1y_2 - rx_2y_1$) after meeting two assumptions in terms of synchronicity and stationarity: if X causes Y, then the cross-lagged differential should be significantly positive; while if Y causes X, the differential should be significantly negative. When this differential is not significant, it can be attributed to (1) the variables not causing each other but sharing some common causes; or (2) X and Y cause each other in a positive loop (Kenny, 1975).

As indicated in previous meta-analyses (e.g. Lu et al., 2014; Margolis and Walsh, 2003; Orlitzky et al., 2003), both causal directions of the CSP-CFP nexus are widely positive and a CSP-CFP virtuous cycle may exist. Therefore, it would be reasonable to expect positive cross-lagged correlations and non-significant differences as a result if a reciprocal CSP-CFP nexus exists. To test significance of cross-lagged differences, the ZPF statistics developed by Raghunathan, Rosenthal and Rubin (1996), based on the Pearson-Filon (PF) method from the 1890s, are used. Another issue for this method is the selection of time lags (Berger and Karabenick, 2011; Kenny, 1975). The measured lag may not correspond to the causal lag, as the measured lag is usually chosen for convenience. Therefore, it is suggested by Kenny (1975) that it is better to test a cross-lagged difference across different time lags. For this study, three time lags of 1 year, 2 years and 3 years are used to assess suitability.

3.4 Longitudinal path analysis

Path analysis (PA) models are original, and special, applications of structural equation modelling (SEM), involving analysing only variables in the structural model without considering any measurement constructs (Xiong et al., 2015). In spite of its simple form, PA has been widely used. For example, of approximately 500 applications of SEM published in 16 psychology journals between 1993 and 1997, 25% are PA applications (Maccallum and Austin, 2000). In addition to its wide use in cross-sectional designs, path analysis can also handle longitudinal data. Longitudinal path analysis, also known as linear panel models, is especially capable of identifying relationships between variables over time (Selig and Little, 2012). For example, Farrell (1994) applied longitudinal PA to examine the links between anger and peer alcohol use by using data at three time points; and Taylor et al. (2013) used longitudinal PA to examine the relationships between peer victimisation, threat appraisals and self-aggression, with data at three time points. As discussed in the literature review, the interactions between CSP and CFP are dynamic. A longitudinal PA design is therefore suitable for the current study to examine the relationships between CSP and CFP over time with data at four time points.

4. Results and discussion

This section introduces the results of the analyses and the validation tests applied in terms of the overall and decomposed CSP-CFP nexus. Table 1 gives the descriptive statistics for all the variables used. Cross-lagged panel correlation analyses are firstly conducted as a step before longitudinal path analysis and to determine suitable time lags for further analysis.

Table 1. Descriptive statistics of CSP and CFP scores

Mean (SD)	2010	2011	2012	2013
CSP	11.269 (14.698)	12.705 (16.781)	13.580 (16.945)	14.857 (18.641)
employees	3.066 (3.697)	3.547 (3.893)	4.173 (4.369)	3.547 (4.249)
suppliers and customers	1.872 (4.080)	2.328 (4.862)	2.424 (4.658)	2.328 (5.650)

environmental protection	3.152 (6.863)	3.564 (7.493)	3.984 (7.605)	3.564 (8.071)
social donations	3.179 (1.857)	3.266 (2.369)	2.999 (2.395)	3.266 (2.235)
CFP	8.551 (4.180)	8.004 (5.496)	7.776 (5.324)	8.266 (6.048)
profitability	4.929 (3.017)	3.975 (3.946)	3.676 (3.846)	3.769 (4.195)
solvency	1.54 (0.711)	1.484 (0.328)	1.508 (0.320)	1.508 (0.299)
stock returns	2.082 (2.421)	2.544 (2.245)	2.592 (2.108)	2.989 (2.476)

4.1 Cross lagged correlation tests

The correlations between CFP and CSP over the 2010-2013 period are given in Table 2. Models examining the correlations between variables with a 1, 2 and 3-year time lag are presented in Figures 2a, 2b and 2c respectively. These correlations are used for cross-lagged correlation tests. Table 3 summarises the tests for stationarity and correlation differences. With non-significant synchronous correlation differences, the stationarity requirement can be met. Two findings are derived from the test. Firstly, no significant results deny the two possibilities that solely CSP causes CFP or vice versa. This may be attributed to the existence of the assumed virtuous cycle. Secondly, since the results of the three time lags are not significantly different, the 1 year time lag should be selected as providing more data and being comparable with previous studies.

Table 2 Correlation matrix between CSP and CFP over 2010-2013

Correlations	CSP 10	CSP 11	CSP 12	CSP 13	CFP 10	CFP 11	CFP 12	CFP 13
CSP 10	1							
CSP 11	.935***	1						
CSP 12	.819***	.862***	1					
CSP 13	.760***	.782***	.901***	1				
CFP 10	0.163*	.176**	.181**	.178**	1			
CFP 11	0.148*	.205**	.187**	.217**	.706***	1		
CFP 12	0.103	0.162*	.198**	.258***	.450***	.676***	1	
CFP 13	0.145	.193**	.220**	.292***	.480***	.637***	.728***	1

Note: ***, **, * indicate the correlation is significant at the 0.01, 0.05, 0.1 level respectively.
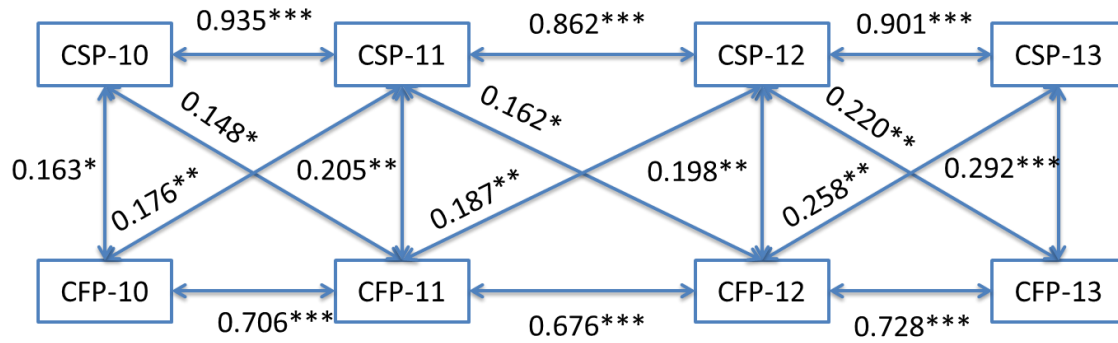
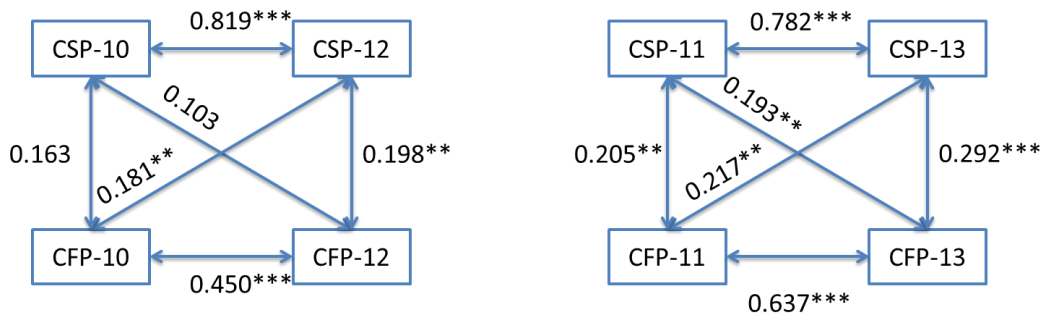Fig.2a Causal correlation dynamic test (one-year time lag)

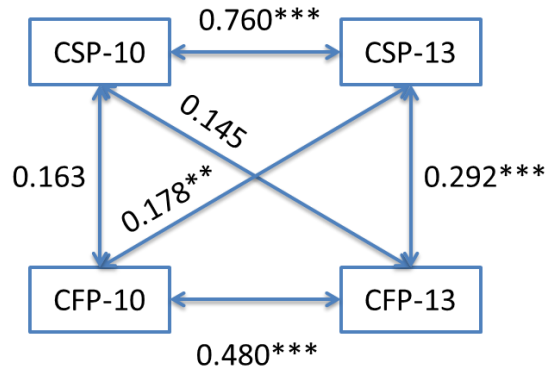Fig. 2b Causal correlation dynamic test (two-year time lag)

Fig.2c Causal correlation-dynamic test (three-year time lag)

Table 3 Cross lagged correlation tests

Time lag	Type	Correlation type	ZPF	p
1 year	2010-2011	synchronous correlation difference	-0.579	0.562
		cross lagged correlation difference	-0.379	0.705
	2011-2012	synchronous correlation difference	0.088	0.930
		cross lagged correlation difference	-0.307	0.759
	2012-2013	synchronous correlation difference	-1.306	0.192
		cross lagged correlation difference	-0.521	0.602
2 years	2010-2012	synchronous correlation difference	-0.353	0.724
		cross lagged correlation difference	-0.777	0.437
	2011-2013	synchronous correlation difference	-1.014	0.311

		cross lagged correlation difference	-0.270	0.787
3 years	2010-2013	synchronous correlation difference	-1.329	0.184
		cross lagged correlation difference	-0.328	0.743

The correlation test results summarised in Table 4 are conducted to clarify the time lags of the CSP-CFP nexus. The formulae developed by Steiger (1980) are used and show that: (1) the correlations between CSP (T+1) and CFP (T+1) are significantly higher than that of CSP (T) and CFP (T+1) for T=2010 and T=2012 at the p<0.1 level; and (2) the correlation between CFP (T) and CSP (T) is not significantly different from CFP (T) and CSP (T+1). These results are therefore supportive of the hypothetical conceptual model in Figure 1, i.e. CFP (T) affects CSP (T+1) while CSP (T) affects CFP (T).

Table 4 Correlation comparison tests

Type	Correlation type	Z	p
2010-2011	r (CSP-10, CFP-11)vs r(CSP-11, CFP-11)	-1.755*	0.079
	r(CFP-10, CSP-10) vs r(CFP-10, CSP-11)	-0.404	0.686
2011-2012	r(CSP-11, CFP-12) vs r(CSP-12, CFP-12)	-0.768	0.442
	r(CFP-11, CSP-11) vs r(CFP-11, CSP-12)	0.386	0.699
2012-2013	r(CSP-12, CFP-13) vs r(CSP-13, CFP-13)	-1.831*	0.067
	r(CFP-12, CSP-12) vs r(CFP-12, CSP-13)	-1.520	0.129

Note: * p<0.1; ** p<0.05; *** p<0.01

4.2 Longitudinal path validations

4.2.1 Overall CSP-CFP nexus

A longitudinal path model is developed as depicted in Figure 3. The unconstrained model has a good fit (Chi-square/df=1.340 with df=57, p=0.044, GFI=0.933, RMSEA=0.037, CFI=0.989). The squared multiple correlations of the six dependent variables (i.e. R^2 of CSP and CFP over 2011-2013) are satisfactory and even better than many previous studies with M=0.657, SD=0.176. In model comparisons, potential alternative models including a model with b=d=f=0, a model with c=e=g=0 and a model with b=c=d=e=f=g=0 are developed for alternative hypotheses, but are significantly worse than the unconstrained model. A constrained model assuming fixed effects with b=d=f and c=e=g is further developed to

examine whether these effects are consistent over time. Being more parsimonious, the constrained model shows an equivalently good model fit, which is not significantly (p=0.308) worse than the unconstrained model. In the unconstrained model, the virtuous cycle does not emerge until 2012-2013. If we assume the CSP-CFP nexus has the same unstandardized coefficients over the 2010-2013 period (as assumed in the constrained model), then the CSP-CFP virtuous cycle exists over the whole period. Results of both the unconstrained and constrained models are given in Table 5. In spite of these differences, therefore, both models demonstrate the existence of a CSP-CFP virtuous cycle for the listed construction companies involved.
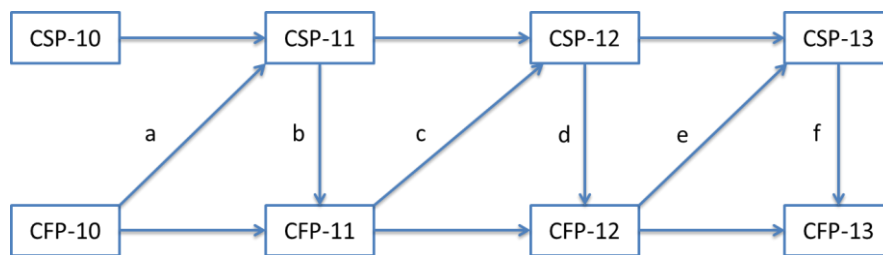

Fig.3 Illustration of the longitudinal path model between CSP and CFP

Table 5 Parameter estimates and effect evaluations

Standardised regression weights			Unconstrained		Constrained	
			Estimate	P	Estimate	P
CSR_2011	<---	CSR_2010	0.933	***	0.93	***
CSR_2011	<---	CFP_2010	0.014	0.552	0.029	0.041
CFP_2011	<---	CFP_2010	0.697	***	0.693	***
CFP_2011	<---	CSR_2011	0.059	0.17	0.074	0.004
CSR_2012	<---	CSR_2011	0.861	***	0.854	***
CSR_2012	<---	CFP_2011	0.008	0.8	0.037	0.041
CFP_2012	<---	CFP_2011	0.667	***	0.661	***
CFP_2012	<---	CSR_2012	0.053	0.262	0.077	0.004
CSR_2013	<---	CSR_2012	0.889	***	0.896	***
CSR_2013	<---	CFP_2012	0.076	0.006	0.033	0.041
CFP_2013	<---	CFP_2012	0.7	***	0.712	***
CFP_2013	<---	CSR_2013	0.114	0.01	0.075	0.004

4.2.2 Decomposed CSP-CFP nexus

In addition to the overall CSP-CFP nexus, it is also meaningful to explore the

relationships between decomposed CSP dimensions and decomposed CFP dimensions. To do this, as CSP includes four dimensions and CFP three dimensions, nineteen additional longitudinal path models are developed, including four models describing the relationship between decomposed CSP dimensions and the overall CFP, three models describing the relationship between overall CSP and decomposed CFP, and twelve models describing the relationship between decomposed CSP and decomposed CFP. Therefore, even though the unconstrained model is not significantly better than the constrained one, the constrained model is used for the decomposed analyses as it is more parsimonious.

As introduced in the hypotheses development, the four possible results of (decomposed) CSP-CFP links comprise: "H1" for virtuous cycle, "H1a" for (decomposed) CSP (T) affects positively on (decomposed) CFP (T) only; "H1b" for (decomposed) CFP (T) affects positively on (decomposed) CSP (T+1) only, and "H1n" for no significant (decomposed) CSP-CFP nexus. In Table 6, the results are given at the $p < 0.05$ level, with those for $p < 0.1$ being presented in parentheses.

The virtuous cycle (H1) can be used to describe most overall and decomposed CSP-CFP links. However, it is found that solvency correlates little with (decomposed) CSP. Other findings are that CSP on employees affects stock returns only but not in the reverse order; CFP affects environmental protection positively only at $p < 0.05$ but the virtuous cycle is observed at $p < 0.1$; CSP on suppliers, clients and customers affects overall CFP, profitability and stock return only at $p < 0.05$ but the virtuous cycle is observed at $p < 0.1$. Such results demonstrate the necessity for examining the relationships between decomposed CSP and decomposed CFP and to define concepts clearly when examining CSP-CFP.

Table 6 Overall and decomposed CSP-CFP links

Nexus category	CSP	Employees	Supplier, client and customer	Environmental protection	Monetary contribution
CFP	H1	H1	H1a (H1)	H1b (H1)	H1
Profitability	H1	H1	H1a (H1)	H1	H1
Solvency	H1n	H1n	H1n	H1n (H1a)	H1n

Stock return	H1a	H1a	H1a (H1)	H1	H1

4.3 Discussion

Several findings have been achieved by examining the overall and decomposed CSP-CFP nexuses using cross-lagged correlation tests and longitudinal path analysis models. Firstly, a CSP-CFP virtuous cycle is demonstrated by a longitudinal path model analysis; the existence of a positive and bidirectional causality is confirmed. The cross-lagged correlation analyses does not convincingly support the alternative assumption that CSP solely causes CFP or *vice versa*. This adds empirical support to the few previous empirical studies of virtuous cycle theory, such as Orlitzky et al.'s (2003) confirmatory meta-analyses. In doing so, implied support is also provided for Porter and Kramer's (2006) advocacy that better CSP can lead to increased competitive advantage, and that companies having better financial performance tend to undertake more socially responsible activities. Both good management theory and slack resources theory, therefore, hold in this study.

Secondly, the relationships between the decomposed CSP and CFP were explored, where the CSP dimensions concerning stakeholders include employees, suppliers, clients, the environment, governmental authorities and the public. As indicated in Table 6, all four CSP dimensions have significant reciprocal relationships with overall CSP ($p < 0.1$). The improved CSP of suppliers and clients causes better CFP, while better CFP causes an improved environmental protection performance ($p < 0.05$). These findings enrich current understanding of the CSP-CFP nexus. For example, King and Lenox (2001) found a positive relationship between environmental performance - especially pollution reduction - and financial performance; Horváthová's (2010) analysis of 64 results of 37 studies of the relationships between environmental and financial performance, identified 10 negative and 35 positive relationships; while Chang and Kuo (2008) found a reciprocal relationship between sustainability performance and financial performance. For the effects of supply chain

management and product quality management on financial performance, Kaynak (2003) found positive effects of product quality management practices on CFP and Wagner et al. (2012) found the supply chain fit has a positive effect on CFP. It is surprising to find that monetary donations are a contributor of CFP rather than a cost, which may indicate these companies are practising an intentional strategic philanthropy as suggested in Smith (1994).

In this study, the CFP dimensions comprise profitability and solvency from the shareholder perspective of company and stock returns. The relationships between these dimensions and CSP are also explored. On the one hand, the profitability dimension has a reciprocal relationship with overall CSP and the three other CSP dimensions. On the other hand, the stock return dimension is reciprocal with environmental protection performance and monetary donations. This finding can be linked with Orlitzky et al. (2003), in that the virtuous cycle between CSP and the accounting-focused CFP on profitability is more obvious than that between CSP and market-focused CFP on stock return. However, solvency does not seem to be affected by CSP. This is a new finding, since few studies have explored the nexus between CSP and corporate solvency.

5. Conclusion

Studies of the CSP-CFP nexus have been continuing over the past four decades. Most of them utilise cross-sessional data from multiple industries; but rarely cover a unitary industry from emerging markets. This study aimed to remove this knowledge void by exploring the causal relationships between CSP and CFP in the Chinese construction industry over the 2010-2013 period. Several theoretical and practical contributions are made by demonstrating the reciprocal CSP-CFP nexus in this context.

The study enriches the understanding of CSR development in China. The transition from a centrally planned economy to a "socialist-market" economy in the late 1970s resulted in widespread corruption, making it a systematic problem for Chinese society (Wang, 2003),

during which time China's international image was associated with sweatshops, serious environmental pollution, substandard products and unsatisfactory working conditions (Lin 2010). The worldwide boycott of sweatshops and the requirement of Social Accountability 8000 (SA8000) acted as economic drivers to raise awareness of CSR in early 2000s. In addition to many CSR initiatives since 2006, some incidents caused by low CSR (such as the melamine contamination of baby milk power in 2008) resulted in changes of company evaluation in the stock market, especially in terms of investor preference (Wang et al. 2011). The reciprocal CSP-CFP nexus demonstrated in this study indicates the current harmonious interaction between business and society. This supports Hanafin's (2002) argument that China will evolve its own ethical norms although it will be challenging and time-consuming. In terms of theory, both slack resource theory and good management theory have their places in explaining CSP-CFP nexus. Compared with existing studies in China, such as by He et al (2007), this is a longitudinal design rather than a cross sectional study. Since China is the world's largest emerging market, the study also offers implications in both global and comparative senses. As a pioneering and pilot study of the CSP-CFP nexus in the construction context, this study has important managerial implications. The results provide contrary evidence for managers still convinced that CSR activities solely involve costs without commensurate benefits. Higher social performance concerning employees, suppliers and clients, environmental protection and even monetary donations are found to lead to higher financial outcomes. From the perspective of either responsible social citizens or strategic management, managers are encouraged to improve social performance, as there is a reciprocal CSP-CFP nexus. As suggested by Barnett and Salomon (2012), strategic decisions are necessary in practice since the ability to turn CSP into CFP is affected by variables such as corporate stakeholder capacity.

There are some caveats that also need to be mentioned. For instance, unlike developed

indices such as KLD, the Hexun database is comparative new. This means that, although this database has a major potential to be as well developed as KLD in the future, only data during the 2010-2013 period were available for this study. Another limitation is that the 125 construction companies are listed companies and therefore their CSP can be reasonably assumed higher than their unlisted counterparts even if not higher than some in other industries. This may be an important issue for, as Brammer and Millington (2008) note, the CSP-CFP nexus differs for unusually good/poor CSP companies. Therefore, the virtuous cycle existing in companies with high CSP may not exist in the ones with low CSP (Chang and Kuo, 2008) – which may possibly account for the mixed results in some previous studies and is an aspect in need of addressing in future. The study also sheds light on the length of payback period, providing a further question for future research.

Similarly, it would be interesting to expand the exploration of the CSP-CFP nexus in other specific industries and/or in other countries. At the same time, the much neglected area of micro analysis is needed for, as Porter and Kramer (2006) assert, many CSR strategies are ineffective as they consider CSR in a generic way, not in a particular way most appropriate to the firm in question – a view echoed by Ward and Smith (2006), who suggest that CSR needs to be localised at both conceptual and operational levels so that it becomes more manageable and embedded within an organisation. For strategic management, it is also important to understand who benefits from the CSP-CFP virtuous cycle and what strategies are available for different companies. Therefore, exploring the factors affecting corporate ability to turn CSP into CFP promises to make a worthy contribution. Finally, answers to the question of when, where and how the virtuous cycle exists are similarly important. Analyses of common causes within the political, economic, social, technological, environmental and legal background would make valuable additional contributions.

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