Environmental policy, environmental performance and financial distress in China

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Environmental Policy, Environmental performance and financial distress in China: Do top management team characteristics matter?

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Environmental Policy, Environmental performance and financial distress in China: Do top management team characteristics matter?

Abstract

This study investigates the effect of environmental performance that is driven by good environmental policies, regulations and management on firm's financial distress, and consequently, ascertains the extent to which top management teams' (TMT) characteristics can moderate the environmental performance–financial distress nexus in China using 749 firms over the 2009-2014 period (i.e., generating over 3,000 individual observations). Our findings are two-fold. First, our results indicate that increased environmental performance that is driven by good environmental policies tend to strategically reduce the extent of firm financial distress. Second, this nexus is moderated by TMT gender diversity, foreign exposure and political connection. We interpret our findings within neo-institutional, upper echelons and risk management theoretical perspectives. The findings are robust to the use of alternative measures of financial distress, estimation techniques and endogeneity problems.

Keywords: Environmental policy, environmental management and performance; business strategy and financial distress; TMT characteristics; risk management perspective, upper echelons perspective, China

Introduction

In this study, we investigate the impact of firm's environmental performance that is driven by good environmental policies, regulations and management on financial distress, and consequently, ascertains the extent to which such a nexus can be moderated by top management team (TMT) characteristics using a sample of Chinese firms. We do this specifically by employing unique "Rankins Ratings (RKS)", as a proxy for the quality of environmental performance in China – along with the previously unexplored newly designed China-specific financial distress measure, named "Altman Z_{China} Score" – introduced by Altman et al. (2007).

Our empirical analysis is informed by theoretical insights drawn from neo-institutional (Scott, 2001), upper echelons (Hambrick and Mason, 1984; Hambrick, 2007) and risk management (Godfrey et al., 2009; Minor and Morgan, 2011) theoretical perspectives.

Theoretically, Scott's (2001) neo-institutional view stresses the significance of institutional pressures (of political and socio-economic establishments) in strategically shaping the way firms engage in social and environmental practices (Ntim and Soobaroyen, 2013a; Soobaroyen and Ntim, 2013). In particular, firms are motivated by (a) legitimacy; and (b) efficiency strategic needs, while responding to the key institutional pressures, namely coercive, cognitive and normative forces (as discussed by DiMaggio and Powell, 1983). Accordingly, firms seek to: (i) conform to institutional regulations (e.g., environmental policies and regulations) by making strategic choices, which can enhance their legitimacy in the broader society (Ntim, 2016; Oliver, 1991); and (ii) engage in socio-environmental management activities to strategically increase financial outcomes, and thereby enhance shareholder's welfares (Aguilera et al., 2007). Recently, business strategy scholars (Godfrey et al., 2009; Minor and Morgan, 2011) have extended neo-institutional argument beyond traditional financial performance towards the protection against negative financial outcomes. This is likely to be significant in the context that firms' environmental commitments and management activities will not only enhance their social legitimacy (symbolically) or efficiency (substantively), but will also strategically provide cover against financial uncertainties. Subsequently, firm's pursuance of environmental practices may be motivated by a business strategy that seeks to proactively, but symbolically prevent the occurrence of adverse financial situations instead of substantively focusing on mitigating real environmental concerns. Moreover, strategic choices concerning environmental activities are particularly taken by TMT (Hambrick and Mason, 1984), who can either enhance or exacerbate the firm's environmental policies, regulations, management and, ultimately environmental performance.

Consequently, a limited number of studies have been conducted in this area of business strategy and environmental research (Gross, 2009; Haque and Ntim, 2017; Price and Sun, 2017; Tang et al., 2018). For instance, some studies have highlighted that environmental or social performance can: (i) reduce financial risk and bad reputation (Minor and Morgan, 2011; Moser and Martin, 2012); (ii) diminish stakeholders' negative decisions about the firm (Godfrey et al., 2009); and mitigate potential bankruptcy or financial distress (Al-Hadi et al., 2017; Gross, 2009). However, these studies suffer from a number of limitations. First, such studies have been conducted in the developed markets by using financial distress measures (e.g., Almeida and Campello, 2007; Altman, 1968; Berger et al., 1996) specifically designed for those markets. However, findings of such studies are inconclusive and cannot be generalised to an emerging

economy like China; due to the wide differences in the financial, accounting and economic structures (as cited in Altman et al., 2007; Zhang et al., 2010).

Second, little is known about how this nexus changes in the presence of specific features of the TMT. Preceding studies have examined board and governance characteristics, as the main determinants of firm's social/environmental management and financial performance (Ben-Amar and McIlkenny, 2015; Chang et al., 2015; Eleftheriadis and Anagnostopoulou, 2015; Galbreath, 2010, 2017; Haque and Ntim, 2017; Jizi, 2017; Lau et al., 2016; McGuinness et al., 2017; Ntim, 2016; Sullivan and Gouldson, 2017). Nevertheless, these scholars have neither investigated the impact of TMT characteristics on environmental performance/financial distress nor how they can moderate environmental performance–financial distress nexus. In China, political connections, gender diversity and foreign exposure of such TMT members are particularly important (Lau et al., 2016; Marquis and Qian, 2014) and may, therefore, be useful in altering the afore-mentioned nexus. In particular, through the communist party, political appointments to corporate boards is distinctively dominant than anywhere in the world (Li and Zhang, 2007; Marquis and Qian, 2014). At the same time, board gender diversity whilst observably improving, still discernibly substantially lacks behind that of developed countries (Liao et al., 2015; McGuinness et al., 2017), often with board members having limited foreign experience and insights through foreign exposure (Lau et al., 2016). Yet the extent to which TMT characteristics, and particularly, extensive political connections, limited gender diversity and foreign exposure impact on environmental performance remains largely unexplored in China (Lau et al., 2016; Marquis and Qian, 2014; McGuinness et al., 2017), where excessive manufacturing and production has resulted in harmful and serious environmental concerns, including pollution, and therefore, firms are under immense institutional pressures to follow good statutory and global environmental management practices in order to increase their environmental performance (Wang et al., 2018).

Third, the implementation of good environmental policies, management and regulations worldwide, but in China in particular demands firm's long-term devotion to monetary, human and infrastructural resources to ensure long-term positive effects (as discussed by Liao et al., 2015). However, with the exception a few studies (e.g., McGuinness et al., 2017; Shahab and Ye, 2018), there is clear dearth of studies that conduct longitudinal investigation of Chinese firm's environmental management practices and performance despite being a major global polluter of the environment, as well as facing serious environmental problems. Finally, despite recent calls for theoretical integration (see Lau et al., 2016; Ntim, 2016), limited studies (e.g., Haque and Ntim, 2017; Ntim and Soobaroyen, 2013a) have attempted to draw insights from multi-theoretical perspectives to inform their empirical analyses. Considering the theoretical relevance of neo-institutional theory on environmental performance, we attempt to fill this interesting gap by employing insights from a neo-institutional view of Scott (2001) along with insights from upper echelons (Hambrick and Mason, 1984) and risk management (Godfrey et al., 2009) theories in examining how institutional pressures in China govern firms' socio-environmental performance.

Accordingly, this paper aims to contribute to the existing literature by addressing these shortcomings in the literature by investigating: (i) the impact of environmental performance on financial distress; and (ii) the moderating impact of TMT characteristics (i.e., gender diversity, foreign exposure and political connections) on the environmental performance-financial distress nexus.

We focus on China because the current alarming situation of environmental hazards in the country is the consequence of government's excessive focus in the past on economic growth (through massive production and manufacturing) at the expense of good environmental policies, management, regulations and performance (Wang et al., 2018). These serious consequences (e.g., deteriorating health arising from CO₂ emissions, air pollution and hazardous environmental waste) of environmental damage compelled the government to pursue good environmental policies aimed at addressing these environmental challenges. Specifically, with the aim of reversing the adverse environmental situation, the "Environmental Protection Law" and "State Environmental Protection Administration", emerged as key factors in the implementation of good environmental policies and regulations in China (Chang et al., 2015). Moreover, the two stock exchanges (Shanghai and Shenzhen) recommended to listed firms to follow the "Global Reporting Initiatives (GRI)" guidelines for environmental reporting and disclosure (Yang et al., 2015). Further, China is a major signatory to the 2016 "Paris Climate Agreement" (Tang et al., 2018), with a clear commitment to meeting the targets set in the accord. However, despite these recent good environmental policies, regulations and management from state, regulatory and civil bodies to enhance environmental performance in the country, the environmental problems are still prevalent. In particular, the disclosure of environmental and socially responsible activities is still voluntary for Chinese firms, who strive to attain social legitimacy and efficiency within the society. Further, except independent RKS Ratings (recently developed following GRI and other international standards), no standard measurement for firm's environmental or social performance currently exists in China. This calls for further investigation of the environmental performance of Chinese firms by using independent ratings (Chang et al., 2015; Lau et al., 2016) and how such good environmental policies can strategically be used to drive financial outcomes (particularly distress situations), which is still unexplored in the literature.

Consequently, we make significant contributions to the current literature in the following ways. Firstly, we extend the risk management perspective to examine the impact of environmental performance on financial distress in China. This study uniquely employs the financial distress model of Altman et al. (2007) for Chinese market instead of relying on the previous models (Almeida and Campello, 2007; Altman, 1968; Berger et al., 1996) used in the developed markets (e.g., Al-Hadi et al., 2017; Gross, 2009). We contribute to the literature by arguing that these models (mentioned previously) are inappropriate in the context of Chinese firms due to the wide differences in the financial, accounting and reporting structure and generalisability of the results will be compromised (as discussed by Altman et al., 2007; Zhang et al., 2010). Accordingly, we employed the previously unexplored China-specific Z_{China} Score model (Altman et al., 2007) to provide more robust evidence for the Chinese market. Consistent with the predictions of risk management and neo-institutional perspectives, our findings reveal that good corporate environmental management/performance mitigates negative financial outcomes, when firms respond to institutional pressures (e.g., environmental regulations in China).

Secondly, we contribute to the upper echelons perspective by examining how the different features of the TMT affect the negative relationship between environmental performance and financial distress. Studies have highlighted the significance of certain TMT features, such as female presence (Hobblar et al., 2016; Liable, 2013), foreign exposure (Klotz et al., 2014; Lau et al., 2016) and political connections (Gu et al., 2013; Lin et al., 2015; Marquis and Qian, 2014) in

determining the firm's strategic choices. Our empirical evidence shows that firms, whose TMTs are female-driven and politically connected respond more actively to the institutional pressures and intensify the negative link between environmental performance and financial distress in China.

Thirdly, we employ an extensive longitudinal dataset of RKS ratings from HEXUN site (as used in Lau et al., 2016; Li and Foo, 2015) and other variables collected from a renowned Chinese database (i.e., CSMAR) for 749 Chinese listed firms from 2009 to 2014. We also capture a diverse range of industries instead of just focusing on polluting industries and analysed their environmental performance. Previously, a few studies (Marquis and Qian, 2014; McGuinness et al., 2017) have used the longitudinal dataset from China, and Lau et al. (2016) have also highlighted this shortcoming of studies related to environmental and social concerns that have been conducted in China. Finally, to control for the potential issues of endogeneities and interaction effects (as underlined in Andersson et al., 2014; Bettis et al., 2014), we used two-stage least squares (2SLS) and generalised methods of moments (GMM) following the techniques of Buam et al. (2007) and Wooldridge (2010). Overall, our findings shed new insights on neo-institutional, upper echelons and risk management perspective in understanding the relationship among environmental performance, TMT characteristics and financial distress in China.

The remainder of the paper is structured as follows. The next section discusses the contextual settings of the study. The third section discusses the theoretical framework. Section four presents literature review and hypotheses of the study. The fifth section provides research design followed by empirical findings and discussions. The last section provides a conclusion with a brief discussion of the practical implications of the findings and potential future research directions.

Environmental policy, environmental performance, financial distress and TMTs in China

China has made remarkable economic progress over the past few decades and claimed the title of world's main "manufacturing hub". The drive to become world's second-biggest economy (at present) has had its repercussions for China, especially in the form of environment and ecological deterioration. In the past, Chinese government, firms and enterprises entirely ignored environmental policies, rules and regulations with sole intention of meeting economic needs through massive production and using coal as main source of power/fuel in the industries. Consequently, China's emergence as the biggest economy was accomplished by compromising on the environment and climate. For example, China remains the world's leading emitter of CO₂ along with having the world's twenty most polluted cities (Dhakal, 2009; Tang et al., 2017). In other words, the emergence of modern-day China was achieved with a heavy price (i.e., a compromise on environmental condition). However, the mounting environmental issues, for instance, poor health conditions, smog, pollution and rising carbon emissions among others, stimulated the state and other regulatory bodies to introduce good environmental policies and regulations.

Particularly, in the late 1990s, multinational corporations stimulated the need for environmental and corporate social practices in China, which resulted in a tensed situation for domestic firms, who were only focusing on profits. Evidently (Harvey, 1999; Yin and Zhang, 2012), Chinese firms focused on financial objectives at the cost of environment and ethics to stay in the fierce market competition. However, after joining World Trade Organization (WTO) in the early 2000s, institutional pressures in the form of improvements in “Company Law” and “Labour Law” (in 2008) were made. In particular, Chinese government’s focus on a “harmonious society” and “greener economy” started a new wave of voluntary environmental and social performance by Chinese firms, which helped them to gain social legitimacy in the broader society (Moon and Shen, 2010; See, 2009; Wang and Juslin, 2011). This trend towards greener environment is also evident from RKS ratings, where the number of firms (who are being evaluated on their environmental and social performance) is increasing every year. Moreover, different environmental policies, rules and protocols for instance: (a) “Environmental Protection Law”; (b) “State Environmental Protection Administration”; (c) “Global Reporting Initiatives (GRI)” guidelines; and (d) “Paris Climate Agreement”, among others, have been adopted and likely to act as stimulating levers in the effective implementation of environmental standards that can enhance: (i) environmental performance; and (ii) corporate financial outcomes in China (Chang et al., 2015; Tang et al., 2018; Yang et al., 2015).

With respect to financial distress, in March 1998, China’s Securities Regulatory Commission (CSRC) introduced the policy of “special treatment (ST)” to distinguish financially distressed firms from others. Firms with: (a) consecutive two years of negative aggregate incomes or a net asset value per share lower than the book value; (b) adverse incomes for one year; and (c) negative opinion from the auditors that firm’s “going concern” is uncertain, will be included in these ST firms. Initially, such firms are given a chance to improve their financial positions, and in case of failure “particular transfer (PT)” warning is issued, and those firms are delisted from the stock market in case of continued financial instability in the subsequent year. These ST and PT firms are considered financially distressed in the context of China (Altman et al., 2007; Fan et al., 2013; Zhang et al., 2010). These dissimilarities in financial distress settings (from developed markets) necessitate the need to use distress measure specifically designed for Chinese market instead of previous financial distress models.

Moreover, Shanghai Stock Exchange (SSE) encouraged firms to disclose their social and environmental friendly activities to be included in the “corporate governance index”, which implies a strong link of the environmental performance of the firms with their good and sustainable governance (Yang et al., 2015). Consequently, the role of Chinese top management (who are responsible for these strategic choices) is vital to increasing environmental performance in China (Gu et al., 2013; Lau et al., 2016; Marquis and Qian, 2014; McGuinness et al., 2017; Wei and Lau, 2012). Further, due to the significant influence of state and politically connected CEOs (Marquis and Qian, 2014), diversity, especially gender diversity in TMTs remained limited in Chinese firms. In the past, these politically connected top managers exploited their networks to gain access to crucial information, policies and government favors (in both financial and non-financial forms). Such politically connected top managers remained a hindrance in the inclusion of ethnic minorities and women in the top management and boards, and are instrumental in the implementation of environmental policies and procedures (Berrone and Gomez-Mejia, 2009; Li and Zhang, 2007; Lin et al., 2015; Marquis and Qian, 2014). Indeed, there was limited gender diversity in boards and females’ participation in the corporate boards

was discouraged until recently (Lau et al., 2016). It implies that during the initial instigation of environmental policies and strategies in previous decades, boards and top management were less diverse and their male counterparts played influential role in the delayed implementation of environmental policies in the Chinese firms. Similarly, the previous generation remain confined to the domestic market in China (to a great extent). The flux of Chinese individuals to the international markets occurred very late, who gained education and exposure there and return back to China with foreign ideas and knowledge. Nevertheless, foreign exposure in the top management of Chinese corporations was very limited in the past (Lau et al., 2016). However, now due to refined institutional transformations in environmental policies, TMTs are steadily becoming diverse by including minorities in the form of females and members with foreign exposure/experiences. Consequently, it is important to examine the unique settings of TMTs and their role in mitigating environmental and societal concerns in China.

The present institutional background of China (regarding environmental performance, financial distress and TMT) makes our study a timely investigation of the way in which TMT characteristics influence the nexus between environmental performance and financial distress in the world's biggest manufacturing economy.

The theoretical framework

Despite growing calls for theoretical integration, studies on environmental or social performance, governance mechanism and financial outcomes have mainly employed single theoretical perspective (e.g., Branzel et al., 2004; El Ghouli et al., 2016; Liao et al., 2015; Luo and Tang, 2014). Moreover, rather a few studies have used an integrative approach in this area (Lau et al., 2016; Ntim and Soobaroyen, 2013a). However, no study so far (to our best knowledge) has studied how the institutional environmental policies and regulations influence the environmental performance and subsequently reduces negative financial outcomes in China. Lau et al. (2016) integrated institutional theory with governance mechanism, while examining the corporate social/environmental responsibility in the context of China using a cross-sectional data. Following arguments of prior literature (Haque and Ntim, 2017; Lau et al., 2016; Ntim and Soobaroyen, 2013a), we contend that studies based on single perspective can weaken the examination of environmental performance in connection with institutional environmental management and policies and governance mechanism, and better insights can be ascertained by integrating multiple theoretical lenses. Also, the contemporary institutional background of China provides us appropriate settings to integrate neo-institutional (Scott, 2001); upper echelons (Hambrick and Mason, 1984) and risk management (Godfrey et al., 2009) theoretical perspectives to empirically test our theoretical framework in China.

According to neo-institutional theory (Scott, 2001), organisations can attain legitimacy by assimilating the developed institutional norms, official rules, strategies, and practices into the structural processes. When organisations conform to institutional forces for example “coercive/regulative, cognitive/mimetic, normative” (as discussed by DiMaggio and Powell, 1983), the financial consequences of the firm changes positively. Thus, both legitimacy and efficiency are achieved when firms respond actively to the institutional pressures. In the context of environmental performance, the commitment and conformance to the agenda of institutional

forces (who are the enforcer of environmental policies and strategies) enable organisations to receive the benefits in the form of corporate acceptability (legitimacy) and better financial results (efficiency). Further, upper echelons theory (Hambrick and Mason, 1984; Hambrick, 2007) indicates that better organisational results are attained when top managers are working as a team. These upper echelons members (TMT) with their specific characteristics (both psychological and observable) affect the firms' strategic choices, and consequently enhance firm's performance (in the form of profits, growth and survival).

In terms of applicability to our study, we first integrate neo-institutional and risk management theoretical perspectives. We argue that risk management practices are valuable in reducing the effect of financial distress in corporations (Gordon, 1971). Further, institutionally driven environmental policies and regulations result in increased environmental performance, which can further enhance firms goodwill, and subsequently offer the firm with an insurance-like cover against negative financial outcomes. Second, we integrate upper echelons and neo-institutional perspectives. As TMT members are directly involved in firm's strategic management process, we argue that their certain characteristics will augment firm's commitment towards the environmental performance through more adherence to environmental regulations and standards. Specifically, in the top management of Chinese corporations, limited female presence and limited foreign exposure (Lau et al., 2016) and extensive political connections (Li and Zhang, 2007; Marquis and Qian, 2014) will be influential in the execution of environmental policies leading to improved environmental performance. Finally, while assimilating these three perspectives, this study theorises that the insurance-like cover nature of environmental or social performance on financial distress can be modified in the presence of TMT with specific characteristics (female members, foreign education and working experience, and political connections of female members). Thus, by drawing on these three strands of literature, the main theoretical framework of this study has been proposed in Figure 1. Accordingly, the hypotheses of the study have been proposed.

INSERT "FIGURE 1" ABOUT HERE

Literature review and hypotheses development

Environmental performance and financial distress

Firms in financial distress: (a) face increased stakeholders' pressures, loss of reputation and business clients, and (b) struggle to overwhelm the adverse situation by engaging in activities that can lead to positive sanctions. According to the risk management perspective (Godfrey et al., 2009; Moser and Martin, 2012), corporate social performance acts as a risk-mitigating tool by providing an insurance-coverage and changing the firm's adverse scenario into a favourable one. Accordingly, this risk shielding nature of corporate social and environmental performance is not just limited to cost of equity capital (Dhaliwal et al., 2014; El Ghouli et al., 2016; La Rosa et al., 2017), credit risk (Stellner et al., 2015), credit ratings (Attig et al., 2013), and tax avoidance (Huseynov and Klamm, 2012; Hoi et al., 2013), but also has been extended to financial distress (Al-Hadi et al., 2017; Gross, 2009; Gupta and Krishnamurti 2016).

Noticeably, the prevalent literature is scarce in investigating the relationship between corporate social performance and financial distress. Gross (2009) found a significant impact of

ratings of socially responsible firms in the determination of the firm distress level by examining data from Kinder, Lydenberg and Domini (KLD) for 650 companies from the U.S. Gupta and Krishnamurti (2016) found that social and environmental engagement help firms, which are already in bankruptcy stage in the U.S. They found that moral and exchange capitals increase the firm's chances of recovering from the bankruptcy, and the ability of moral capital to take the firm out of the adverse situation is more than exchange capital. Al-Hadi et al. (2017) studied the corporate social responsibility (CSR) and financial distress nexus by empirically examining 651 Australian listed firms from 2007 to 2013 period. Their findings reveal that positive engagement in social activities significantly decreases the financial distress of Australian firms.

Inferring from these theoretical perspectives and empirical findings, we argue that the engagement in and signals of better environmental activities (through enhanced adherence to environmental strategies) will create an insurance-type cushion for firms in reducing their financial distress. In addition to this, the limited evidence so far has only been investigated in the developed markets by employing different models of financial distress (Almeida and Campello, 2007; Altman, 1968; Berger et al., 1996), but application of these models is not justifiable to an economy like China (as argued by Altman et al., 2007; Zhang et al., 2010). A new model, namely, Z_{China} score has been specifically developed to tackle this issue by Altman et al. (2007) and Zhang et al. (2010). Accordingly, we are among the pioneers to utilise this Z_{China} score and expect a negative relationship between environmental performance and financial distress of Chinese listed firms. In the institutional context of China, firms will: (i) respond keenly to the institutional oriented environmental regulations to enhance social legitimacy and efficiency; and (ii) consequently, will reduce negative financial circumstances through insurance-like protection. In light of the above discussion, our first hypothesis is as follows:

Hypothesis 1: Environmental performance is negatively associated with the financial distress level of Chinese listed firms.

TMT characteristics, environmental performance and financial distress

The role of corporate governance varying mechanism in improving firm's financial performance is evident in both developed and developing markets (Ntim, 2016; Ntim et al., 2012; Ntim and Soobaroyen, 2013a & 2013b; Price and Sun, 2017; Rodriguez-Fernandez, 2016; Wang and Qian, 2011). Particularly, in relevance to financial distress, Lee and Yeh (2004) found that the positive impact of weaker governance features (i.e., director's ratio, ownership concentration and pledge ratio) on firm's financial distress using data of Taiwanese firms. Similarly, Wang and Deng (2006) found that state ownership, large shareholder's ownership and board independence are negatively linked with the prospect of Chinese firm's financial distress. Miglani et al. (2015) shown that the implementation of specific governance features (block holder-ship, directors' ownership and presence of separate audit committee) is favourable for the Australian firms in reducing the chances of financial distress.

Luo et al. (2017a) study of Chinese firms is pivotal in highlighting the importance of female CEOs in reducing the firm's operational and information risk. They argued that females are more risk-averse, participate less in opportunistic behaviour and deliver greater earnings in comparison to their male counterparts. Consequently, the banks put a low cost on borrowings of firms with female CEOs and vice-versa. This modifying effect of females' presence at the top level position

is prominent in non-state owned firms, politically unrelated firms and during stable financial periods (Luo et al., 2017a). Drawing on the theoretical perspective of upper echelons, it implies that female representation in Chinese top management serves as a magnifying lever in not only increasing the social performance (as shown by McGuinness et al., 2017) and effective pursuance of environmental policies, but it also serves as a crucial factor in reducing the firm's financial risk (Luo et al., 2017a). These findings are also in relevance to the critical mass theory, according to which the presence of minorities in the form of females mitigates the negative effects of firm's wrongdoings and increases its inclination towards environmental and social activities (Bear et al., 2010; Kramer et al., 2006).

Building on the arguments of upper echelons (Hambrick, 2007; Wei and Lau, 2012), we propose that the presence of female members in the top management teams (TMTs), will not only increase the Chinese firm's inclination towards environmental regulations and policies, but will also intensify the ability of such performance to further reduce the financial distress level of the firms. From risk management perspective, with the inclusion of females in TMTs, the risk-mitigating nature of environmental performance will be amplified. Specifically, in China, there was limited gender diversity in the past and now the involvement of females in TMT is rising. Further, the institutional environmental policies and regulations directed to Chinese firms provide interesting platforms to examine these perspectives in connection with the financial distress. In light of these arguments, our next hypothesis is as follows:

Hypothesis 2a: Environmental performance's ability to reduce the financial distress increases in the presence of female members in TMTs of Chinese listed firms.

A limited number of studies have examined different features of TMTs in connection with the environmental policies and corporate social performance. For instance, Waldman et al. (2006) examined 561 firms from 15 different countries and found that specific cultural dimensions (e.g., power distance, institutional collectivism, CEO far-sighted leadership and veracity) helps in envisaging the social responsibility values on the part of TMT members. Alexiev (2010) revealed that heterogeneity in TMTs positively influences the firm's internal advice and the product innovation process. They also found that diversity of TMTs is less effective to force the external guidance and follow experimental novelty. Further, Wei and Lau (2012) discussed the significance of TMTs in the Chinese firms and found empirical evidence on the moderating impact of functional team characteristics on the nexus of TMT diversity and innovation drive of the firm. Lau et al. (2016) highlighted that majority of the previous studies on governance, and social performance nexus has emphasised on the composition of the board and has neglected the role of TMTs to a great extent. Drawing on the future directions of Klotz et al. (2014), Lau et al. (2016) argued that TMT with special backgrounds (in the form of foreign exposure) are more inclined towards social and environmental engagement and they will consequently result in increased environmental performance. They examined corporate social and environmental performance of Chinese firms by utilising the data from RKS for one year period (i.e., 2011) and found a positive impact of TMTs with foreign exposure on the RKS ratings.

Accordingly, we argue that the individuals who have foreign exposure in the form of foreign education or jobs are more likely to utilise their foreign experiences in modifying the thinking style of other members in TMTs by using their social network ties (Westphal and Milton, 2000).

We further argue that such diverse TMTs with foreign exposure are more likely to intensify the insurance-like property of environmental performance on the ground of two key reasons. First, the state of implementation of environmental policies and standards is much ahead in the developed markets in comparison to emerging markets. We argue that the experience or knowledge gained by working in developed financial markets is likely to enable the members of TMTs to introduce and replicate those environmental friendly practices in Chinese firms, and they will strive hard to the exploit the full benefits of being socially responsible. Second, Chinese firms joined international market very late and their corporate boards lacked foreign exposure until recently. We argue, therefore, that the inclusion of individuals with foreign exposure in the TMT will not only increase firm's environmental performance, but it will also further reduce the negative financial outcomes. To the best of our knowledge, the literature is silent on examining the impact of TMT's characteristics on the financial distress mechanisms of firms. We have also tried to bridge this gap by proposing our next hypothesis in light of the above argument as follows:

Hypothesis 2b: Environmental performance's ability to reduce the financial distress increases in the presence of individuals with foreign exposure in TMTs of Chinese listed firms.

Further, a distinct feature of Chinese enterprises is politically connected boards and top management (Lin et al., 2015; Marquis and Qian, 2014). It is argued that political connections be nurtured by firms to gain access to crucial information, resources and financing from the state and eventually to avoid the uncertain risks and unforeseen situations (Hillman, 2005). Faccio et al. (2006) conducted extensive research of 450 firms from 35 countries between the period 1997 and 2002. While investigating these politically linked firms, they revealed that in events of economic distress, politically connected firms are more probable to be bailed out in comparison to other firms. Gu et al. (2013) also found a positive association between the firm's "political connectedness" and willingness to pursue socially responsible activities in particular areas of ecological and charitable actions. Huang and Zhao (2016) found that political connection has a positive impact on the social performance of Chinese private firms (non-state owned firms), and such politically connected firms are noticeably healthier than the ones with no political connections.

Marquis and Qian (2014) pointed out two types of political connections in the board or top management of Chinese enterprises. First, the connection of board executives or top managers as a member of the main legislative body in China, i.e. National People's Congress (NPC) or Chinese People's Political Consultative Conference (CPPCC). Second, the top management or board members may hold government offices at present or in the past. Relevant studies show that the first kind of political connection is linked with "greater symbolic benefit", while the second type is associated with "greater material benefit" (Li and Zhang, 2007; O'Brien, 2008). Lin et al. (2015) found that in politically connected firms' social and environmental performance increases first, and consequently, results in a favourable financial environment for the firm in the form of enhanced government subsidies and firm's financial performance.

We build our argument on the premise of "greater symbolic benefit" (O'Brien, 2008), "greater material benefit" (Li and Zhang, 2007) and that of Lin et al. (2015). We propose that, on the one hand, implementation of institutionally-driven environmental strategies and regulations channelled through politically connected TMT will result in an increased environmental

performance and a positive image in the eyes of various stakeholders (symbolic benefit). On the other side, from risk management perspective, such channelling of environmental engagement through politically connected TMT will materially benefit firms by providing it with an insurance-sort of cover in case of financial distress (material benefit). In contrast to previous literature, we further argue that this moderating impact of political connection will be greater if the politically connected TMT's member is female. As discussed in the arguments for hypothesis 2(a), we propose that politically connected female members of TMTs will be more inclined to engage in environmental friendly practices, and will further reduce the firm's financial distress level. In light of these arguments, our final hypothesis is as follows:

Hypothesis 2c: Environmental performance's ability to reduce the financial distress increases in the presence of politically connected female members in TMTs of Chinese listed firms.

Research design

Data and sample

Our initial sample is comprised of 3343 firm-year observations on Rankins Ratings (*RKS*) from “*HEXUN*” website for Chinese listed firms from 2009 to 2014. Following previous studies (Lau et al., 2016; Li and Foo, 2015; Luo et al., 2017b; McGuinness et al., 2017) from China, we used these quality ratings as a proxy for environmental performance. We collected data on TMT characteristics, financial distress and control variables from the widely renowned “China Stock Market and Accounting Research” (*CSMAR*) database. We then deleted 172 observations with missing year data for our variables. This study captures the data on RKS ratings from 2009 because these ratings were initiated in 2009 and data is available from 2009 onwards. Lastly, following (Lau et al., 2016; McGuinness et al., 2017) our data is from 16 different industries from China. Table 1 depicts the industry-and-year wise distribution of the total sample. Firms from ‘manufacturing industry’ constitute around 53.55% of the total sample. Lau et al. (2016) also utilised RKS data of 471 firms for only one year, i.e. 2011 and found quite a similar percentage for the ‘manufacturing industry’ (50.53%) depicting that majority of the Chinese listed firms lie under manufacturing sector.

INSERT “TABLE 1” ABOUT HERE

Econometric model and variables

The study uses two panel-regression models (least squares dummy variable (LSDV) technique for panel data estimation) while controlling for industry and year fixed-effect, to empirically test the proposed hypotheses. We winsorised all the continuous variables at 1% in order to control for the influence of extreme values/outliers. The first model determines the relationship between environmental performance and financial distress level in the presence of the control variables. The model is as follows:

$$FD_SCORE_{it} = b_0 + \beta_1 EN_P_{it} + \sum_{i=1}^n \beta_i CONTROLS_{it} + \varepsilon_{it} \quad (1)$$

The second model determines the relationship between environmental performance and financial distress level in the presence of the interaction terms and control variables. The model is as follows:

$$FD_SCORE_{it} = b_0 + \beta_1 EN_P_{it} + \beta_2 TMT_C_{it} + \beta_3 EN_P * TMT_C_{it} + \sum_{i=1}^n \beta_i CONTROLS_{it} + \varepsilon_{it} \quad (2)$$

In equations (1) and (2), “*FD_SCORE*” represents our main outcome variable “financial distress”, and “*EN_P*” indicates our main predictor variable, (i.e., “environmental performance”). In equation (2), we introduced our moderating variable for TMT characteristics (i.e., “*TMT_C*”) and generated interaction terms between “*EN_P*” and “*TMT_C*” (i.e. “*EN_P*TMT_C*”) to measure the moderating impact of TMT features on the environmental performance-financial distress relationship. We followed previous studies (Al-Hadi et al., 2017; Gross, 2009; Lau et al., 2016) to employ firm characteristics, as control variables in our analyses. These are included in equations (1) and (2) as “*CONTROLS*”, which refers to TMT size, firm size, quick ratio, net profit margin, leverage, cash to assets ratio, loss, industry and year dummies. Table 2 provides the detailed description of all the variables used in this study.

INSERT “TABLE 2” ABOUT HERE

Empirical Results

Descriptive statistics

Table 3 illustrates the detailed descriptive statistics for all the variables used in the study. On average, the “*FD_SCORE*” for Chinese listed firms is 0.92 with the 5th percentile of 0.065 and 95th percentile of 2.094. It implies that majority of Chinese listed firms are in potential distress zone by the mean value and 5th percentile (see Table 2 for the categorisation of distress score according to Altman et al., 2007; Zhang et al., 2010). Regarding environmental performance (*EN_P*), the average value is 36.48 and the 95th percentile of 65.78 for a total of 3,171 observations. Mc McGuinness et al. (2017) used the same RKS ratings for the period from 2009 and 2013 and stated an average of 35.46 for 2,412 firms’ year observations. The average of “*EN_P*” in our study also quietly matches to that of McGuinness et al. (2017).

In terms of “*TMT_C*”, on average 56% of Chinese listed firms have at least one female top management team member, 45% of Chinese listed firms have at least one member with foreign exposure (in the shape of foreign job or education experience), 34% of Chinese listed firms have at least one female among those TMT members who are or have remained government official in any government institution and 36% of Chinese listed firms have at least one female among those TMT members, who are or have remained part of Chinese state bodies. Marquis and Qian (2014) examined Chinese CEO’s political connection by employing a dataset from 2006 to 2009 and found that on average 16.1% CEOs are or have remained as government officials and around 4% CEOs are or have remained part of NPC or CPPCC. However, to the best of our knowledge, no study has so far examined the female TMT members’ association with the Chinese

government. Therefore, a comparison with previous studies is not done. Overall, our results relating to the descriptive statistics are in line with those of the relevant previous studies (Lau et al., 2016; Marquis and Qian, 2014; McGuinness et al., 2017; Zhang et al., 2010).

INSERT TABLE 3 ABOUT HERE

Table 4 contains the correlation matrix for all the variables in the study to check for multicollinearity. Noticeably, the correlations among the variables are not high, implying no issue of multicollinearity. The correlation between “*EN_P*” and “*FD_SCORE*” is -0.04 (significant at 5% level), while the correlation between all the variables related to “*TMT_C*” and “*EN_P*” is positive and significant. We have also presented the ‘variance inflation factors (VIF)’ for the variables and found *VIF* values ranging from 1.06 to 2.71, which is well below the standard threshold of 5.

INSERT TABLE 4 ABOUT HERE

Regression results and discussion

Table 5 contains the regression results with industry and year fixed-effects. Model (1) shows significant results for all the control variables. Specifically, the coefficients for quick ratio, leverage and loss are negative with statistically significant *p*-values. While, the coefficients for firm size, net profit margin and cash to assets are positive with significant *p*-values. Model (2) represents the results of our first main hypothesis (i.e., the impact of environmental performance) (*EN_P*) on financial distress (*FD_SCORE*) of Chinese listed firms.

First, in support of our “*hypothesis 1*”, we found a positive and significant coefficient (0.058 at 5% or better) between “*EN_P*” and “*FD_SCORE*”, showing a negative relationship between firm’s environmental performance and financial distress. A high positive coefficient represents a decreased level of financial distress and vice-versa. The policy implication of our findings is that, on average, firms with better environmental performance are more likely to reduce their levels of financial distress. From economic significance, it depicts that a 1% increase or decrease in a firm’s environmental performance can be expected to be associated with a 5.8% decrease or increase in the financial distress level of that firm.

From models (3) to (6), we added three proxies for “*TMT_C*” and additional control variable related to “*TMT_C*”. We find quite similar results for our main variable, i.e. “*EN_P*”. We found similar positive and significant coefficients of “*EN_P*” in all these models, strengthening our first hypothesis even in the presence of TMT characteristics. However, apart from the TMT related control variable (i.e., TMT size), no other TMT variable was found to have a significant association with financial distress. We also controlled for industry and years effect to control for the heterogeneity across the industries in our analysis, however, for brevity we have not reported the results. Overall, in all the models, we found strong values for *R*-square and significant values for *F*-statistics, showing a strong overall model fit.

INSERT TABLE 5 ABOUT HERE

Table 6 contains the regression results for the interaction effects of the “*TMT_C*” on the relationship between “*EN_P*” and “*FD_SCORE*”. We introduced three interaction terms: (i)

“*EN_P*Female TMT*”; (ii) “*EN_P*FE TMT*”; and (iii) “*EN_P* Female TMT_GO*” to test our remaining hypotheses. We also included the control variables (“*CONTROLS*”) in all the four models (Models 1 to 4) in Table 6 and found similar results, as have been reported in the previous table.

Second, in support of our “*hypothesis 2a*”, we found a positive and significant coefficient of 0.187 (at 10% level or better) for our first interaction term (*EN_P*Female TMT*) in the model (1). In Table 5 (see Model 2), the results show a small coefficient for *EN_P* and *FD_SCORE* nexus, however, in the presence of interaction term (*EN_P*Female TMT*), the coefficient increases to a great extent (as shown in Table 6, Model 1), showing the positive effect of females presence in TMT on the relationship between environmental performance and financial distress. The policy implication of our empirical result is that those firms who are effectively pursuing environmental activities and have increased environmental performance besides the presence of female members in their top management teams are more able to reduce the financial distress levels in comparison to firms without females in their TMTs.

Third, against our “*hypothesis 2b*”, we found a negative and significant coefficient of 0.081 (at 5% level or better) for our second interaction term (*EN_P*FE TMT*) in the model (2). It shows that the foreign exposure instead of increasing the “*EN_P*’s” ability to reduce the financial distress, reduces the impact of environmental performance on financial distress. The findings can be associated with the much-debated differences in the financial and corporate practices of Chinese and foreign markets (as cited in Altman et al., 2007, Zhang et al., 2010). It can be argued that those TMT members who have gained foreign education or work experience in foreign countries, might have applied the tacit knowledge of free foreign markets in Chinese controlled market without giving attention to the dynamics of Chinese market structure. However, future research on this moderating effect of foreign exposure in TMT may offer new insights on our findings.

Fourth, in support of our “*hypothesis 2c*”, we found a positive and significant coefficient of 0.082 (at 5% level or better) for our last interaction term (*EN_P* Female TMT_GO*) in model (3). It implies that the presence of politically connected females in TMT increases the *EN_P*’s ability to reduce the financial distress level of Chinese listed firms. The negative effect of environmental performance on financial distress (as shown in Table 5) is magnified in the presence of our last interaction term (*EN_P* Female TMT_GO*), showing strong support for our hypothesis. In model (4), we included all the interaction terms and found quite similar results with same signs for the coefficients.

INSERT TABLE 6 ABOUT HERE

Theoretically, our findings (*hypothesis 1*) seem to be consistent with the arguments of neo-institutional (Scott, 2001) and risk management (Godfrey et al., 2009) theoretical perspectives. Specifically, firms respond to institutional pressures and conform to environmental policies and regulations in order to enhance their legitimacy and to attain efficiency in financial terms (DiMaggio and Powell, 1983; Scott, 2001). Our empirical evidence validates the efficiency perspective more (relatively to legitimacy view) of neo-institutional theory (Scott, 2001). Although firms seem to engage in environmental practices (in response to environmental policies and regulations) to increase social legitimacy, they appear to enjoy ‘insurance-type protection’ of

such practices in the events of financial mishaps (Godfrey et al., 2009; Hoi et al., 2013; Moser and Martin, 2012) and to achieve better financial outcomes and increased wealth (efficiency view). Previously, Al-Hadi et al. (2017) used different measurement models of financial distress (Almeida and Campello, 2007; Altman, 1968; Berger et al. 1996) and found similar impact of social performance on financial distress in the context of Australian firms. However, our evidence further extends and adds to the literature by presenting the mitigating effect of environmental performance on financial distress with employment of newly developed distress model for Chinese firms (Altman et al., 2007; Zhang et al., 2010).

Further, in coherence with the upper echelons perspective (Hambrick and Mason, 1984; Hambrick, 2007), our evidence (*hypothesis 2a*) confirms that the involvement of females in TMT management is an influencing factor in achieving both financial (as discussed by Liu et al., 2014; McGuinness et al., 2017; Ntim and Soobaroyen, 2013a) and non-financial objectives (responsible investment) in the shape of successful implementation of environmental strategies. The positive impact of female CEOs in reducing the firm's information and operational risk was also found by Luo et al. (2017a). Our findings further extend their work by validating that female's presence in the TMT moderates the nexus between environmental performance and financial distress relationship; which is also in relevance with the arguments of critical mass theory (Bear et al., 2010; Kramer et al., 2006).

Finally, our results (from *hypothesis 2c*) are in line with the arguments of previous studies (Faccio et al., 2006; Hillman, 2005) that politically connected firms are more able to enjoy privileged benefits in the form of information and resource access, government funding to avoid the uncertain adverse situations. Also, politically connected firms are more inclined to pursue environmental policies (Berrone and Gomez-Mejia, 2009; Gu et al., 2013; Huang and Zhao, 2016; Marquis and Qian, 2014), and consequently brings positive impact on the firm's financial outcomes (Lin et al., 2015). Similarly, Li and Zhang (2007) and Peng and Luo (2000) argued that politically connected corporate executives result in greater "material benefit". Our findings from risk management perspective (Godfrey et al., 2009) also support these claims, as the influence of females' TMT members who enjoy political connections can result in "material benefits" for the firms by further reducing the financial distress level through environmental performance (Li and Zhang, 2007).

Endogeneity and sensitivity analysis

Further, to control the potential issues of endogeneity (i.e., reverse causality or simultaneity) (as highlighted by Bettis et al. 2014) in our main regression analysis (Table 5), we followed the approach of Baum et al. (2007) and Wooldridge (2010). We employed instrumental variable techniques by running two-stages least squares (2SLS) following Baum et al. (2007) and Generalized Method of Moments (GMM) following Roodman (2006) to address the issues of reverse causality and omitted variable bias (Wooldridge 2010). We used '*Industry Mean EN_P*' as an instrumental variable for our endogenous variable (i.e., environmental performance, as used in related studies) (Al-Hadi et al., 2017; Cai et al., 2011; Shahab et al., 2018). McWilliams and Siegel (2001) and Waddock and Graves (1997) argued that due to differences in the products' nature, monitoring setting and varying norms of society, the level of firm's social and environmental performance significantly varies across different industries. Table 7 contains the results of endogeneity tests by utilisation of 2SLS and GMM. We found similar findings that

environmental performance reduces the financial distress level of Chinese listed firms. The second half of Table 7 represents various standard tests of Baum et al. (2007) for the validation and checking the strength of the instrumental variable used in the study. According to these tests, the under-identification test with “*Kleibergen-Paap rk LM statistic*” should be significant and the value of “*Cragg-Donald Wald F statistic*” should be greater than 10 to show a strong instrument. Also, for weak identification test, the “*Kleibergen-Paap rk LM statistic*” should be greater than the 10% maximal IV size under “*Stock-Yogo weak ID test critical values*”. Our endogeneity tests meet all these criteria (specifically the value of our *F*-statistic is 48.582) and represent the use of a valid and strong instrumental variable. Moreover, the results of Hansen test and Arellano Bond (AR-2) show that the potential issue of endogeneity has been tackled effectively.

INSERT TABLE 7 ABOUT HERE

We also conducted sensitivity analysis to determine the robustness of our findings. Table 8 presents the detailed results of our sensitivity analysis. In Model (1), we replaced our main predictor variable ‘CSR performance’ with its “*lag EN_P*” and re-estimated our main model for *hypothesis 1*. We found similar results for “*lag EN_P*” variable (i.e., a positive and significant coefficient of 0.049) (at 10% level), again depicting that environmental performance of previous year also reduces firm’s financial distress level. From Models (2) to (5), we employed alternative proxies¹ of “*TMT_C*”, i.e. *Female TMT %*, *FE TMT%* and *Female TMT_GB* to check our arguments in the presence of alternative TMT features in reference to previous studies (Lau et al., 2016; Marquis and Qian, 2014). In Model (6), we created interaction terms between “*EN_P*” and these alternative proxies to ascertain the moderating impact of “*TMT_C*” on “*EN_P*” and “*FD_SCORE*” relationship. We found similar results (as reported earlier) for our alternative interaction terms in Model (6). We further conducted difference in difference (DID) regression in Models (7) and (8), as part of our sensitivity analysis and found quite similar results to our previously reported findings. Our sensitivity analysis presents robustness results in coherence with our primary regression analysis².

INSERT TABLE 8 ABOUT HERE

Conclusions

Environmental management, policies and regulations, mounting ecological issues and climate change have emerged, as the major issues of concern of this century. Particularly, China’s rapid economic growth is often seemed to be associated with a compromise on environmental policies, regulations, management and performance in the past. Although in recent years, the Chinese state, regulatory bodies and non-governmental organisations have pressed these issues and are encouraging corporations to move from ‘dirty’ energy and manufacturing practices to a ‘cleaner/greener’ or environmental friendly economy, China still leads the world substantially when it comes to carbon emissions, for example (Dhakal, 2009; Tang et al., 2017). It is, therefore, important to examine how Chinese firms: (a) respond to institutional-oriented environmental guidelines; (c) pursue environmentally friendly activities; and (c) how they can be further motivated to engage in and adopt environmentally friendly policies. Consequently, the

¹See Table 2 for the detailed description of all these variables.

²For brevity results are not explained, but are available upon request.

objective of this study is to integrate neo-institutional, risk management and upper echelons theories, to examine a novel and the previously unexplored positive consequences of environmental performance (as a result of firm's adoption of environmental standards and directives) on financial distress, and the impact of TMT characteristics on the above relationship, in the context of China.

We contribute to the extant literature in the following unique ways. First, we highlight an important aspect of pursuing environmental management guidelines and engaging in environmental performance from risk management standpoint that firms can adopt such institutional policies and reduce their financial distress levels. Our argument is based on the notion that various stakeholders respond positively to the environmentally and socially responsible firms, and this can result in positive goodwill due to increased CSR performance. Consequently, good environmental management, policies and regulations can result in the creation of an insurance-like cover for socially responsible firms, which can help in mitigating the implications of negative financial outcomes (e.g., financial distress). Further, we argue that the previous models for measuring financial distress levels are only suitable for developed markets, and thus are not appropriate for the Chinese market. Our study indicates that the financial distress developed by Altman et al. (2007) is the most suitable indicator to measure Chinese firms' financial distress level.

Second, drawing on the extant argument of upper echelons (Hambrick and Mason, 1984; Hambrick, 2007; Wei and Lau, 2012), we examine the moderating impact of specific TMT characteristics (female presence in TMT, foreign exposure of TMT and politically connected female TMT members) on the association between environmental performance and financial distress of Chinese listed firms. Previous literature has not examined such a relationship, whereby Chinese boards and top management are characterised by limited female presence, exclusive political connections and limited foreign exposure. Third, this study is among the pioneers, to the best of our knowledge, to investigate the impact of environmental performance on the financial distress level of Chinese listed firms by employing a dataset of 3,171 firm's year observations from reliable Chinese databases. Lau et al. (2016) stressed upon the use of longitudinal data for investigation of the determinants and consequences of Chinese firms' environmental practices. This study bridges this gap as well. We employed panel regression estimation techniques (with industry and year fixed effects) by using an unbalanced panel data of 3,171 firm-year observations, covering six years (from 2009-2014) and used a valid indicator of environmental performance in China (i.e., RKS ratings). Our findings are robust to different sensitivity analysis and endogeneity problems.

Our findings show that Chinese firm's environmental performance significantly reduces the levels of financial distress, while acting as a risk-mitigating tool. The current limited empirical evidence is in line with similar findings in the context of developed markets by using different models to measure financial distress (Al-Hadi et al., 2007; Gross, 2009). Further, the findings of this study indicate that the different dynamics of top management teams (TMT) influence the link between environmental performance and financial distress. In particular, the presence of traditional TMT minorities (e.g., females) and politically connected females in the TMT positively magnify the negative impact of environmental performance on financial distress of Chinese firms. However, we found a negative impact of foreign exposure of the TMT members on the above-mentioned connection. The empirical findings of data from China represent that

environmental performance is fitting to mitigate the negative financial outcomes, especially financial distress level with a number of characteristics of the TMT increasing this mitigation effect.

This study also offers some policy recommendations to regulatory bodies and corporations. To address the growing concerns of: (i) environmental costs and carbon emission; and (ii) limited implementation of environmental policies and rules, Chinese firms may need to engage more actively in environmentally friendly activities in order to gain the financial and material benefits in the form of reduced financial distress. Also, the involvement of females in the TMT is critical for the effective formulation and implementation of activities that can enhance environmental management and performance. Furthermore, the political connections of females in TMTs are also crucial in increasing the risk preventive role of environmental performance within Chinese listed firms.

Although our findings are important and robust, there are a number of limitations that need to be explicitly acknowledged. First and similar to archival/quantitative studies of this nature, our proxies for financial distress and environmental performance, amongst others, may or may not reflect practice. In this case, future research may offer new insights by conducting in-depth interviews and case studies with corporate managers, government officials and regulatory authorities. Second, due to its role in global environmental pollution and climate change, we have focused on China, a single country. Future research can, however, adopt a broader perspective by conducting a cross-country and cultural analysis by collecting data on large number of countries from both developed and developing countries. Finally, we have relied on three theories – neo-institutional, upper echelons and risk management theories – future research may rely on other theories, such as agency, legitimacy, resource dependence, stakeholder and stewardship theories in informing their analyses.

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Table 1. Industry- and year-wise breakdown of the total sample

Industry	200 9	201 0	201 1	201 2	201 3	201 4	Total	Percent
Farming, Forestry, Animal Husbandry and Fishery	2	4	7	7	8	9	37	1.17%
Mining sector	13	22	21	28	30	32	146	4.60%
Manufacturing industry	167	248	251	310	353	369	1,698	53.55%
Production & Supply Of Power, Heat, Gas & Water	21	27	31	34	35	38	186	5.87%
Construction industry	7	12	10	18	21	23	91	2.87%
Wholesale and retailing	14	26	27	29	31	34	161	5.08%
Transportation, storage and postal services	23	32	36	38	38	38	205	6.46%
Accommodation and catering	1	1	1	1	1	1	6	0.19%
Information technology	14	19	20	22	26	27	128	4.04%
Finance and insurance	20	31	33	40	41	44	209	6.59%
Real state	22	34	35	40	41	42	214	6.75%
Learning and business services	3	5	4	5	5	6	28	0.88%
Water, environment and public facilities management industry	1	1	2	2	5	4	15	0.47%
Health and social work	0	0	1	1	1	2	5	0.16%
Culture, Sports and Entertainment	1	2	2	2	3	7	17	0.54%
Complex industries	4	5	5	3	4	4	25	0.79%
Total	313	469	486	580	643	680	3,171	100%

Table 2. Variables definitions

Variables	Symbols	Details
<i>Dependent Variable</i>		
Financial Distress	FD_SCORE	FD_SCORE greater than 0.90 represents healthy firm; between 0.5 and 0.9 represents potentially distressed firm; and less than 0.5 shows a distressed firm. FD_SCORE is calculated as: $FD_SCORE = 0.517 - 0.460 \times (Total\ Liabilities / Total\ Assets) + 9.320 \times (Net\ profit / Total\ Assets) + 0.388 \times (Working\ Capital / Total\ Assets) + 1.158 \times (Retained\ Earnings / Total\ Assets)$ (as cited in Altman et al., 2007; Zhang et al., 2010)
<i>Independent Variable</i>		
Environmental Performance	EN_P	EN_P represents RKS quality ratings (scaled from ‘0’ i.e. ‘lowest rating’ to ‘100’ i.e. ‘highest rating’) to measure environmental performance of Chinese listed firms (Li and Foo, 2015).
<i>TMT Variables</i>		
TMT Characteristics	TMT_C	TMT features introduced in equation (2) and details are provided as follow:
Female TMT members	Female TMT	A dummy variable which is equal to ‘1’ if there is a female member on TMT and ‘0’ otherwise (Lau et al., 2016).
Female TMT Percent	Female TMT%	Percentage of female to total number of members of TMT of a firm for a given year (Lau et al., 2016).
TMT Foreign exposure	FE TMT	A dummy variable which is equal to ‘1’ if any of the TMT member has foreign exposure (job or working experience and ‘0’ otherwise (Lau et al., 2016).
TMT Foreign exposure Percentage	FE TMT%	Percentage of TMT members with foreign exposure to the total members of TMT in a firm for a given year (Lau et al., 2016).
Political connections of Female TMT members	Female TMT_GO	A dummy variable which is equal to ‘1’ if any of the TMT female member is or has remained government official in the past and ‘0’ otherwise (Marquis and Qian, 2014).
	Female TMT_GB	A dummy variable which is equal to ‘1’ if any of the TMT female member is or has remained attached to the government bodies e.g. NPC, CPPCC in the past and ‘0’ otherwise (Marquis and Qian, 2014).

Variables	Symbols	Details
<i>Interaction variables</i>		
Interaction terms	EN_P*TMT_C	Interaction terms of each TMT variable with EN_P were created to determine our proposed hypotheses and for sensitivity analysis.
<i>Instrument variable</i>		
Industry Mean Environmental Performance	Mean EN_P	Industry mean RKS ratings have been used as an instrumental variable for endogeneity check-in relevance with previous studies (Al-Hadi et al., 2017; Cai et al., 2011)
<i>Control Variables</i>		
Control Variables	CONTROLS	Following control variables have been introduced in our regression models in accordance with the previous studies (Al-Hadi et al. 2017; Gross, 2009; Lau et al. 2016)
TMT Size	TMT_S	Equals to the total number of members in TMT of the firms for a given year.
Firm Size	Firm_S	Natural logarithm of the total assets of the firms for a given year.
Quick Ratio	Quick_R	Cash plus receivables divided by current liability of the firms for a given year.
Net Profit Margin	NPM	The ratio of net profit to the total sales of the firms for a given year.
Leverage	Lev	The ratio of total liabilities to total assets of the firms for a given year.
Cash to assets	Cash_A	The ratio of cash plus cash equivalents to the total assets of the firms for a given year.
Loss	Loss	Dummy variable equal to '1' if firm's total income is negative for a year or '0' otherwise.
Industry	Industry FE	Industries dummies to control the industry effects of 16 industries in China.
Year	Year FE	Year dummies to control the year effects of six years from 2009-2014.

Table 3. Descriptive statistics

Variables	Obs.	Mean	Std. Dev	5 th Percentile	Median	95 th Percentile
<i>Dependent Variable:</i>						
FD_SCORE	3096	0.92	0.65	0.065	0.83	2.094
<i>Independent Variable:</i>						
EN_P	3171	36.48	12.98	21.77	33.12	65.78
<i>TMT Variables:</i>						
Female TMT	3171	0.56	0.50	0	1	1
Female TMT%	3171	11.89	14.01	0	10	40
FE TMT	3171	0.45	0.50	0	0	1
FE TMT%	3171	13.42	21.18	0	0	60
Female TMT_GO	3171	0.34	0.47	0	0	1
Female TMT_GB	3171	0.36	0.48	0	0	1
<i>Control Variables:</i>						
TMT_S	3164	2.00	0.38	1.39	2.08	2.64
Firm_S	3171	23.13	1.74	20.81	22.87	26.43
Quick_R	2984	0.99	1.37	0.14	0.58	3.35
NPM	3171	0.11	0.13	-0.02	0.076	0.39
Lev	3171	0.52	0.21	0.15	0.54	0.84
Cash_A	3171	0.167	0.13	0.02	0.13	0.44
Loss	3171	0.08	0.27	0	0	1

Note: Please see Table 2 for variable definitions.

Table 4. Variance Inflation Factor (VIF) and Correlation matrix

Variables	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1 FD_SCORE	-	1												
2 EN_P Female	1.51	-0.04*	1											
3 TMT	1.14	0.10*	0.05*	1										
4 FE TMT Female	1.12	0.03	0.25*	0.05*	1									
5 TMT_GO	1.06	-0.02	0.09*	0.15*	0.06*	1								
6 TMT_S	1.21	-0.07*	0.27*	0.11*	0.19*	0.01	1							
7 Firm_S	2.08	-0.25*	0.52*	-0.05*	0.25*	0.16*	0.31*	1						
8 Quick_R	2.39	0.43*	-0.04*	0.08*	0.09*	-0.04*	-0.09*	-0.34*	1					
9 NPM	1.79	0.54*	0.12*	0.10*	0.12*	0.16*	-0.02	0.21*	0.29*	1				
										-				
10 Lev	2.71	-0.67*	0.19*	-0.07*	0.06*	0.10*	0.21*	0.59*	-0.62*	0.16*	1			
											-			
11 Cash_A	1.8	0.41*	-0.11*	0.08*	0.04*	-0.02	-0.05*	-0.27*	0.62*	0.18*	0.37*	1		
						-						-		
12 Loss	1.28	-0.43*	-0.05*	-0.03	0.03*	-0.02	0.01	-0.07*	-0.07*	0.39*	0.12*	0.11*	1	
													-	
13 Mean EN_P	-	-0.11*	0.48*	0.01	0.17*	0.12*	0.16*	0.34*	0.02	0.26*	0.19*	0.09*	0.01	1

Note: *represents significant at 5% level.

Please see Table 2 for variable definitions.

Table 5. Regression results for the relationship between environmental performance, financial distress and TMT's characteristics

	Financial Distress (FD_SCORE)					
	(1)	(2)	(3)	(4)	(5)	(6)
EN_P		0.058**	0.042*	0.043*	0.044*	0.041*
		[0.017]	[0.087]	[0.082]	[0.075]	[0.092]
Female TMT			0.013			0.015
			[0.307]			[0.255]
FE TMT				0.004		0.004
				[0.737]		[0.738]
Female TMT_GO					-0.011	-0.013
					[0.390]	[0.309]
TMT_S			0.079***	0.081***	0.082***	0.078***
			[0.000]	[0.000]	[0.000]	[0.000]
Firm_S	0.042***	0.036***	0.033***	0.032***	0.032***	0.033***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Quick_R	-0.064***	-0.064***	-0.065***	-0.065***	-0.065***	-0.065***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
NPM	2.745***	2.751***	2.752***	2.755***	2.759***	2.756***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Lev	-1.636***	-1.624***	-1.642***	-1.645***	-1.645***	-1.640***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cash_A	1.084***	1.078***	1.065***	1.066***	1.069***	1.068***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Loss	-0.368***	-0.367***	-0.367***	-0.366***	-0.366***	-0.366***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	0.343***	0.278**	0.255**	0.276**	0.269**	0.262**
	[0.006]	[0.028]	[0.045]	[0.034]	[0.034]	[0.046]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,984	2,984	2,977	2,977	2,977	2,977
R-squared	0.756	0.757	0.759	0.759	0.759	0.759
F-Stat	284.5***	276.2***	263.4***	262.3***	261.3***	245.8***

Note: ***, ** and * denotes 1%, 5% and 10% significance levels respectively. The figures in parenthesis are robust p-value. Please see Table 2 for variable definitions.

Table 6. Regression results for the interaction effects of TMT features on the relationship between environmental performance and financial distress

	Financial Distress (FD_SCORE)			
	(1)	(2)	(3)	(4)
EN_P	-0.063** [0.048]	0.083** [0.011]	0.016 [0.569]	-0.038 [0.334]
Female TMT	-0.644*** [0.000]			-0.618*** [0.000]
EN_P * Female TMT	0.187*** [0.000]			0.180*** [0.000]
FE TMT		0.291** [0.041]		0.302** [0.033]
EN_P * FE TMT		-0.081** [0.043]		-0.085** [0.035]
Female TMT_GO			-0.300** [0.036]	-0.215 [0.139]
EN_P *Female TMT_GO			0.082** [0.043]	0.057 [0.167]
TMT_S	0.078*** [0.000]	0.083*** [0.000]	0.082*** [0.000]	0.079*** [0.000]
Firm_S	0.032*** [0.000]	0.033*** [0.000]	0.032*** [0.000]	0.033*** [0.000]
Quick_R	-0.064*** [0.000]	-0.064*** [0.000]	-0.065*** [0.000]	-0.064*** [0.000]
NPM	2.748*** [0.000]	2.753*** [0.000]	2.764*** [0.000]	2.754*** [0.000]
Lev	-1.630*** [0.000]	-1.641*** [0.000]	-1.641*** [0.000]	-1.622*** [0.000]
Cash_A	1.061*** [0.000]	1.065*** [0.000]	1.068*** [0.000]	1.063*** [0.000]
Loss	-0.366*** [0.000]	-0.367*** [0.000]	-0.366*** [0.000]	-0.366*** [0.000]
Constant	0.638*** [0.000]	0.125 [0.429]	0.378*** [0.008]	0.548*** [0.002]
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	2,977	2,977	2,977	2,977
R-squared	0.761	0.759	0.759	0.762
F-Stat	255.3***	252.8***	252.4***	223.7***

Note: ***, ** and * denotes 1%, 5% and 10% significance levels respectively. The figures in parenthesis are robust p-value. Please see Table 2 for variable definitions.

Table 7. Endogeneity tests using 2SLS and GMM techniques

Financial Distress (FD_SCORE)				
	2SLS Approach		GMM Approach	
	(1)	(2)	(3)	(4)
	1 st Stage	2 nd Stage	GMM	GMM
EN_P	0.445** [0.019]	0.418** [0.034]	0.090* [0.080]	0.089* [0.085]
Female TMT		0.002 [0.895]		-0.010 [0.739]
FE TMT		-0.013 [0.401]		-0.027 [0.325]
Female TMT_GO		-0.014 [0.297]		-0.012 [0.587]
TMT_S		0.050** [0.039]	0.029 [0.494]	0.032 [0.424]
Firm_S	-0.003 [0.896]	-0.002 [0.933]	-0.040 [0.562]	-0.040 [0.564]
Quick_R	-0.064*** [0.000]	-0.064*** [0.000]	-0.024* [0.065]	-0.024* [0.067]
NPM	2.791*** [0.000]	2.794*** [0.000]	3.303*** [0.000]	3.301*** [0.000]
Lev	-1.545*** [0.000]	-1.565*** [0.000]	-0.920*** [0.001]	-0.917*** [0.001]
Cash_A	1.035*** [0.000]	1.033*** [0.000]	0.023 [0.896]	0.029 [0.867]
Loss	-0.354*** [0.000]	-0.354*** [0.000]	-0.197*** [0.000]	-0.196*** [0.000]
Constant	-0.157 [0.519]	-0.167 [0.511]	-0.147 [0.415]	-0.136 [0.334]
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	2,984	2,977	2,221	2,221
R-squared	0.735	0.739	-	-
F-Stat/ Wald Chi ²	242.9***	215.7***	1369.2***	1515.0***
<i>Under identification tests:</i>				
Kleibergen-Paap rk	40.117***	37.37***	-	-
LM statistic				

Financial Distress (FD_SCORE)				
	2SLS Approach		GMM Approach	
	(1)	(2)	(3)	(4)
	1 st Stage	2 nd Stage	GMM	GMM
<i>Weak identification tests:</i>				
Cragg-Donald Wald F statistic	48.582	45.768	-	-
Kleibergen-Paap rk LM statistic	44.804	41.376	-	-
<i>Stock-Yogo weak ID test critical values:</i>				
10% maximal IV size	16.38	16.38	-	-
AR(2)- P-Value	-	-	0.774	0.740
Hansen Test Chi ²	-	-	2.43	2.51
Hansen Test (P-Value)	-	-	0.119	0.113

Note: Under identification, weak identification tests, and Stock-Yogo weak ID test critical values are provided. ***, ** and * denotes 1%, 5% and 10% significance levels respectively. The figures in parenthesis are robust p-value. Please see Table 2 for variable definitions.

Table 8. Sensitivity analysis for the nexus among environmental performance, financial distress and TMT features.

	Financial Distress (FD_SCORE)						Difference in Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lag EN_P	0.049* [0.069]						
EN_P		0.042* [0.087]	0.045* [0.068]	0.044* [0.073]	0.044* [0.078]	-0.003 [0.929]	0.057** [0.047]
Female TMT %		0.000 [0.396]			0.001 [0.259]	-0.015*** [0.005]	
FE TMT %			-0.000 [0.395]		-0.000 [0.448]	0.008** [0.020]	
Female TMT_GB				-0.023* [0.076]	-0.024* [0.058]	-0.323** [0.025]	
EN_P * Female TMT %						0.004*** [0.003]	
EN_P * FE TMT %						-0.002** [0.015]	
EN_P * Female TMT_GB						0.084** [0.038]	
TMT_S		0.083*** [0.000]	0.080*** [0.000]	0.082*** [0.000]	0.082*** [0.000]	0.079*** [0.000]	0.088*** [0.000]
Firm_S	0.032*** [0.000]	0.033*** [0.000]	0.033*** [0.000]	0.032*** [0.000]	0.034*** [0.000]	0.035*** [0.000]	0.027*** [0.000]
Quick_R	-0.055*** [0.000]	-0.065*** [0.000]	-0.064*** [0.000]	-0.065*** [0.000]	-0.065*** [0.000]	-0.065*** [0.000]	-0.063*** [0.000]
NPM	2.803*** [0.000]	2.752*** [0.000]	2.753*** [0.000]	2.766*** [0.000]	2.761*** [0.000]	2.751*** [0.000]	2.758*** [0.000]
Lev	-1.589*** [0.000]	-1.644*** [0.000]	-1.648*** [0.000]	-1.644*** [0.000]	-1.643*** [0.000]	-1.634*** [0.000]	-1.614*** [0.000]
Cash_A	1.115*** [0.000]	1.066*** [0.000]	1.067*** [0.000]	1.071*** [0.000]	1.072*** [0.000]	1.071*** [0.000]	1.082*** [0.000]
Loss	-0.357*** [0.000]	-0.366*** [0.000]	-0.366*** [0.000]	-0.365*** [0.000]	-0.365*** [0.000]	-0.367*** [0.000]	-0.357*** [0.000]
Constant	0.416*** [0.003]	0.249* [0.052]	0.247* [0.060]	0.274** [0.031]	0.229* [0.087]	0.379** [0.016]	0.304** [0.040]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,226	2,977	2,977	2,977	2,977	2,977	2,222
R-squared	0.761	0.759	0.759	0.759	0.759	0.761	0.745

F-Stat	213.6***	263***	262.4***	260.6***	245.1***	222.3***	252.2***	2
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Note: ***, ** and * denotes 1%, 5% and 10% significance levels respectively. The figures in parenthesis are robust p-value.

Please see Table 2 for variable definitions.

Figure 1: Proposed integrated main theoretical framework of the study