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Regulatory Ties and Corporate Compliance Strategies

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ABSTRACT

By integrating the environmental regulation literature and managerial ties theory, this research explores the role of regulatory ties and firm visibility in shaping formalism and self-determination, two distinct corporate coping strategies for complying with environmental regulatory demands. Based on survey data collected in China, our empirical results show a U-shaped relationship between firms' regulatory ties and their strict adherence to formal rules (formalism), and an inverted U-shaped relationship between regulatory ties and firm discrepancy in complying with regulations (self-determination). Further, the inverted U-shaped relationship is stronger among firms with less organizational and environmental visibility. Additional analysis further indicates that these relationships are particularly evident in privately owned enterprises. Our study contributes to the public performance literature by furthering our understanding of regulatory ties as a double-edged sword in corporate compliance.

Keywords: corporate coping strategy; environmental regulation; regulatory ties

Firms use a wide variety of strategies to comply with government regulations (Desai, 2016). In the public performance literature, however, little has been written on how business firms respond to government regulations and assess government performance (Wang & Yu, 2017). In recent years, the "rules versus discretion" dichotomy has been discussed extensively in the literature. On the one hand, the regulatory literature suggests that no single policy instrument can be a panacea for poor environmental enforcement and compliance (Fiorino, 2006; Kagan, Gunningham, & Thornton, 2003). Instead, flexible instruments such as voluntary regulation and information-based tools are usually adopted to complement the traditional command-and-control (CAC) regulatory methods (Ashford & Caldart, 2001). One of the most-advocated complementary instruments nowadays is the voluntary approach, which emphasizes corporate voluntariness and self-discretion in contrast to strict adherence to formal regulations and standards. Consistent with the regulatory literature, on the other hand, the management research has also identified the important role of managerial discretion in responding to regulatory demands and institutional pressures (Crilly, Zollo, & Hansen, 2012). However, less understood is how the distinctions between rule-based and self-determined environmental coping strategies are shaped by institutional and organizational factors. Recognizing these mechanisms is important in understanding how firms vary in their adaptation to changing regulatory demands.

To address this research gap, we examine the role of regulatory ties and firm visibility in shaping two key corporate strategies in coping with environmental regulations – formalism and self-determination. Following the conceptual framework developed in Liu et al.'s study (Liu et al., 2016), we differentiate between "rules" and "discretion", which emphasize managing environmental issues by the letter of the law (formalism) and by organizational pragmatism (self-

determination) respectively. We are interested in exploring the regulatory ties configuration of the rule-based and self-determined approach in preference to other types of coping strategies, for two important theoretical reasons. From the perspective of environmental regulation, a combination of mandatory and flexible regulatory tools sets both legal boundaries and practical flexibilities for regulated firms to decide how to manage corporate environmental performance (Majumdar & Marcus, 2001). End-of-pipe programs usually specify the technologies and timetable on pollution control and do not leave much room for corporate discretion, while many non-mandatory programs may provide regulatees with both time and latitude to seek optimal environmental practices (Delmas & Keller, 2005). Similarly, the perspectives of environmental management also emphasize the differences between reactive and discretionary approaches in dealing with environmental issues, with the former usually driven by legal threats and pressures (Lodhia, Jacobs, & Park, 2012; Rowe & Guthrie, 2010), while the latter is mainly management driven (May, 2004). These two lines of literature thus provide solid theoretical foundations enabling us to narrow down and focus on formalism and self-determination as two distinct corporate coping approaches.

By integrating the environmental regulation literature and managerial ties theory, we then explore the role of external regulatory ties in shaping the extent of formalism and self-determination adopted by regulated enterprises in complying with environmental regulations. As a sub-form of managerial ties (Peng & Luo, 2000; Walls & Hoffman, 2013), regulatory ties embrace channels and relationships that firms have established and maintained with various regulatory actors in order to access information and policy favors on environmental issues. Unlike internal managerial support, which directly improves organizational capacity, corporate

assets in external ties are not always advantageous (Li, Poppo, & Zhou, 2008), yet very few studies have addressed this issue. Built on the environmental regulation literature and research on managerial ties, we are able to examine not only how regulatees benefit from such resource endowment, but also how dependencies on the external environment affect the benefits derived from them. Specifically, we focus on the micro-perspective of reciprocation in developing and sustaining regulatory ties, in order to understand its role as a double-edged sword.

Our empirical investigation is based on questionnaire survey data collected from 192 manufacturing firms in China (see also Liu et al., 2016, 2018). The results support our hypothesis regarding the curvilinear connections between a firm's regulatory ties and both types of corporate environmental coping strategy. Specifically, we found a U-shaped relationship between regulatory ties and formalism, and an inverted U-shaped relationship between regulatory ties and self-determination. Interestingly, the inverted U-shaped relationship was stronger in both less organizationally and less environmentally visible firms. This negative moderating effect of firm visibility was not detected in the relationship between regulatory ties and formalism. Our additional analysis further reveals these findings to be particularly evident in privately owned enterprises.

The rest of this article proceeds as follows. We begin with an overview of the literature and develop the research hypotheses. Next, we introduce the research methodology, data analyses, and empirical results. Then, we discuss the theoretical contributions and practical implications of this research for the public performance literature, and we conclude this paper by exploring the directions for future research.

Theory and Hypotheses

Rule versus discretion in environmental regulatory compliance

Regulators may choose either a rigid legalistic approach or discretionary strategies when enforcing environmental laws (Tang et al., 2003; Liang, 2014; Wang et al. 2014; Zhan, Lo, & Tang, 2014; Liu et al., 2018). Similarly, regulatees also exhibit the division between rule and discretion in complying with environmental regulations. Specifically, efforts to differentiate between rule-based and self-determined coping strategies have emerged in recent regulatory compliance studies. Following the conceptual framework developed by Liu et al. (2016), formalism is defined as a conventional and inflexible strategic approach that strictly follows the formal benchmark of environmental regulation (Winter & May, 2001). Dominated by a legal orientation, firms achieve regulatory compliance via the closest adherence to laws and regulations, transforming the legal pressures into internal environmental practices. For instance, a formalistic complying firm installs pollution abatement devices to ensure its COD discharge is below the wastewater emission standard, in order to achieve the minimum compliance.

It appears that formalism is the primary coping strategy in corporate compliance under a government-dominated mode of regulation. Emphasizing this legal orientation of regulatees is of particular importance in regulatory settings where enforcement is usually weak and deliberate evasion of environmental regulation is both pervasive and relatively easy (Van Rooij, 2006). However, the focus on mechanistic responses to legal prescriptions may neglect the fact that firms interpret and deal with environmental issues in very different ways. Prior studies have also found that formalism is a less promising compliance approach for pursuing beyond-compliance,

partially due to the fact that command-and-control regulations in emerging economies may not be able to provide strong incentives to encourage firms to actively seek innovative environmental initiatives and identify the strategic value embedded in them. Firms have their own corporate priorities and standards for complying with regulatory requirements, especially when considering the trade-off between short-term investment in pollution control facilities and long-term financial gains (Darnall & Edwards, 2006). When managerial attention is focused on seeking the optimal solution, firms may only employ the compliance approaches that are in line with their own contextual situations (Boiral, 2007; Etzion, 2007; Oliver, 1991).

According to Liu et al. (2016), self-determination can be defined as a substitutive and flexible compliance approach that emphasizes intellectual flexibility, pragmatism, and autonomy. In contrast to the formalistic approach defined and driven by external pressure, the coping strategy of self-determination prioritizes regulatees' self-interest and the strategic implementation of environmental practices with limited external influence and interference (Sharma, 2000). By doing this, firms can make more efficient use of the available resources and see value in corporate environmental commitment[1] (King & Lenox, 2002). For example, Huising and Silbey (2011) found that environment, health, and safety (EHS) coordinators developed their own compliance approach and made sure these practices were largely compatible with regulatory standards. In a study of the environmental behavior of multi-national corporations (MNC) across countries, Christmann (2004) found that the strategy of standardization was adopted in order to accommodate different stakeholders' demands. A similar pragmatic spirit was also observed in the implementation of the ISO 14001 EMS, with some firms following the desirable step of a third-party audit, and others adopting it without obtaining formal certification (King, Lenox, &

Terlaak, 2005). However, when firms are using a self-determination strategy, they may make more effort to go beyond compliance, or to evade laws and regulations. The evasion element in self-determination thus corroborates with the decoupling strategy discussed in Borial's work (2007). As a result, some firms may not be subject to government pressures, since managers' perceived discretion may deviate from the goal of compliance and thus lead to less environmental effort (Delmas & Keller, 2005).

Regulatory ties as a double-edged sword

The management literature defines managerial ties as "managers' boundary-spanning activities and their associated interactions with external entities" (Peng & Luo, 2000). In this study, we focus on regulatory ties, which can be viewed as a sub-form of managerial ties in the domain of regulatory compliance. Specifically, we define regulatory ties as channels and relationships that firms establish and maintain with the regulatory agency and its enforcement officials through various interactions, in order to access information and obtain policy favors on environmental issues in the regulatory process. Such ties can be formed at either the personal or the organizational level, such as the informal relationship between firm executives and local environmental protection bureau officials, or formal working channels that allow information transmission between a regulated enterprise and the regulatory agency. In addition, firms' prior environmental reputation in the eyes of regulators could also be considered as another facet of regulatory ties, since it could facilitate mutual trust and cooperation between regulators and regulatees (May & Wood, 2003). In sum, the aforementioned various elements of regulatory ties become a business external asset that is expected to affect the extent to which formalism and self-determination are adopted in complying with regulatory demands.

Several recent studies have suggested that ties with government agencies and political leaders work as a double-edged sword (Li, Poppo, & Zhou, 2008; Marquis & Qian, 2014). In addition, the value of political ties is usually dynamic and may further rely on both organizational and environmental conditions (Wang & Yu, 2017; Zhang et al., 2016). In the exchange of resources and favors obtained through regulatory ties, firms usually need to accommodate and support the state's strategic objectives. The principle of reciprocity means that firms pay rents to maintain such ties by conforming to (sometimes extra) government demands. For instance, firms may need to proactively cooperate in environmental policies in order to get more financial support for pollution control. Recent corporate environmental studies embedded in resource dependence literature also suggest that when firms become highly dependent on regulators, regulators may use a direct or indirect strategy to influence corporate environmental decisions (Kassinis & Vafeas, 2006). Following this body of literature, we develop hypotheses concerning the relationship between regulatory ties and formalism and self-determination, as well as how firm visibility moderates these relationships. Figure 1 shows the conceptual framework and hypotheses.

Insert Figure 1 about here

A firm's regulatory ties affect the way it interprets and deals with environmental issues. On the one hand, a firm can benefit from such ties through obtaining transaction cost advantages and bargaining power in compliance activities (Wang et al., 2003; Xin & Pearce, 1996). The *guanxi* literature argues that managerial ties may enable firms to get access to important regulatory information and obtain political favors (Park & Luo, 2001; Wang 2016). For instance, when

joining a government-sponsored voluntary environmental program, firms can avoid red tape and get a speedier audit. Also, a symbolic environmental effort may be acceptable because firms can rely on their ties with local environmental protection bureaus (EPBs) to avoid being inspected or punished for non-conformance. On the other hand, firms pay to maintain the regulatory ties by entertaining regulatory stakeholders' demands. As suggested by the resource-dependence theory, strong relational networks may facilitate organizational conformity to pressures from the external institutional environment (Oliver, 1991).

By integrating the regulation literature and managerial ties theory (Fisman & Wang, 2015; Peng & Luo, 2000; Wang, 2015), we propose that the associations between regulatory ties and formalism and self-determination are theoretically more complex than a linear relationship. There is also a threshold at which the double-edged sword role of regulatory ties is validated. Regarding formalism, strong regulatory ties such as *guanxi* with the local environmental agency usually give firms greater bargaining power in environmental compliance, and firms are therefore less likely to strictly follow the legal benchmarks (Wang & Wheeler, 2005). After moving beyond the threshold, however, resource dependence on the government will increase corporate responsiveness to affirmative action pressure and hence the likelihood of formal compliance. In an authoritarian setting, firms with stronger regulatory ties are more likely to be a regulatory priority to achieve short-term environmental targets (Liu et al., 2015). With respect to self-determination, firms can first benefit from regulatory ties through close and regular interactions with regulators to assist them in becoming better informed of the regulatory demands in making independent compliance decisions. The cost of maintaining good regulatory connections may gradually increase when firms become more dependent on regulators. In these

circumstances, firms will have less latitude to make their own environmental decisions and are likely to take regulatory demands more seriously.

To sum up, we expect that with a low-to-moderate degree of regulatory ties, the bargaining power obtained from regulatory ties will reduce the level of formalism. Meanwhile, the information adequacy attained by regulatory ties will facilitate organizational discretion in managing environmental issues. However, as the degree of regulatory ties exceeds a certain threshold level, the dependence on external networks will make conformance increasingly necessary as a result of reciprocity, leaving less room for internal autonomy. Therefore, we propose that:

Hypothesis 1a. There is a U-shaped relationship between firms' regulatory ties and the degree of formalism in corporate regulatory compliance.

Hypothesis 1b. There is an inverted U-shaped relationship between firms' regulatory ties and the degree of self-determination in corporate regulatory compliance.

The moderating effect of organizational visibility

The existing literature on corporate environmental strategy has identified various types of firm visibility that would affect the way firms deal with institutional pressure in general (Greenwood et al., 2011; Yu, Lo & Li, 2017) and external demands on environmental issues specifically (Desai, 2016; Marquis & Toffel, 2012). For example, Marquis and Toffel (2012) distinguish between generic visibility and domain-specific visibility, which shape firms' responses to institutional pressure. More specifically, Desai (2016) examines how collaboration between regulated enterprises and the regulatory agency is shaped by three forms of firm visibility,

namely regulatory visibility (e.g. prior inspection and visits by regulators), social visibility (e.g. diversity of involved stakeholder groups), and political engagement (e.g. lobbying expenditures).

Drawing on this body of literature, we focused on two types of firm visibility—organizational visibility and environmental visibility—to examine how they moderate the relationship between regulatory ties and environmental coping strategies. Organizational visibility is manifested in a firm's production or employee scale, which can be physically observed by external stakeholders, while environmental visibility refers to the observable industrial features that make certain firms (e.g. chemical plants, steel companies) highly visible to regulatory stakeholders. For example, compared with a packaging plant, a chemical plant is usually regarded as a case with a higher degree of environmental visibility. Our focus is thus in line with Marquis and Toffel's (2012) classification of generic and domain-specific visibility. Unlike previous studies that focused on how visibility explains corporate environmental performance (that is, the main effect of visibility), we are interested to see whether and how the relationship between regulatory ties and corporate environmental coping strategies is contingent upon firm visibility.

The extant literature considers the effectiveness of managerial ties as contingent upon firm- and market-level features (Li, Poppo, & Zhou, 2008; Peng & Luo, 2000). Heterogeneity in firm visibility may moderate the impact of regulatory ties on the degree of formalism and self-determination. When making compliance decisions, regulated firms are usually sensitive to both formal regulators and societal stakeholders in local communities. The degree of external pressure may grow corresponding to the firm size. A high degree of visibility, either organizational or environmental, will normally place firms under more regulatory stringency and greater public scrutiny of their environmental performance (Wang & Wheeler, 2005). These firm-level features

may weaken the impact of regulatory ties on both formalism and self-determination. For instance, the existing literature suggests that regulator-manager negotiations are sensitive to firm features, and that the higher the negative social impact of a firm's pollution (e.g. the number of complaints from local residents), the smaller its bargaining power with regulatory authorities (Wang et al., 2003). Similarly, highly visible firms are also expected to obtain lesser internal discretion due to external constraints. Large firms usually have other forms of ties (either formal or informal) with the government, and may therefore be less dependent on regulatory ties. Compared to their small counterparts, the impact of regulatory ties on corporate environmental practices in large polluting enterprises may even be substituted or crowded out by other types of managerial ties (Lorentzen, Landry, & Yasuda, 2014).

Therefore, we expect the impact of regulatory ties on formalism and self-determination to be mitigated by the level of a focal firm's organizational and environmental visibility. This leads to two hypotheses regarding the negative moderating effect of firm visibility.

Hypothesis 2a. The higher the level of a firm's organizational/environmental visibility, the weaker the U-shaped relationship between its regulatory ties and the degree of formalism.

Hypothesis 2b. The higher the level of a firm's organizational/environmental visibility, the weaker the inverted U-shaped relationship between its regulatory ties and the degree of self-determination.

Methods

Data collection

We focused our empirical investigation of rule versus discretion in corporate environmental compliance on manufacturing enterprises located in the Pearl River Delta (PRD) region of Guangdong province, China. Several special features make it a proper case for answering our research questions. The province used to share the weak rule of law observed in most parts of China. Empirical evidence has begun to emerge that shows some degree of firms' balancing between legal-oriented basic compliance and proactive practices to deal with specific gestures of enforcement officials (Yee, Tang, & Lo, 2016). At the same time, this region was also considered to be among the front-runners in local environmental governance reforms in China in the past decade, as manifested in the growing variety of official measures adopted to combat industrial pollution, with rising mandatory regulatory standards, diversified innovation and reform in policy instruments for pollution control, and greater involvement and commitment of local political leaders in environmental causes (Zhan, Lo, & Tang, 2014). These evolving dynamics thus provide a rich context to study the relationship between regulatory ties and corporate coping strategies in environmental compliance.

We administered two rounds of a questionnaire survey with manufacturing firms in the PRD region. The first was conducted at a business seminar organized in 2010. Participants in this seminar were either senior executives or managers responsible for the environmental compliance of manufacturing plants. A total of 71 questionnaires were received out of 110 distributed, representing a 64.5% response rate. The second round was administered in early 2011 among

senior executives and environmental managers from 300 enterprises in four industrial parks, with a satisfactory response rate of 40.3% (121 responses).

Measurement

We measured all variables using items on a seven-point Likert scale. Details of these items are provided in Appendix 1.

***Dependent variables*.** We used three items to measure each dependent variable of formalism and self-determination. We asked respondents to reveal the degree of formalism (focusing on strictly following formal rules) and self-determination (emphasizing organizational discretion) of their firms?. The Cronbach's alphas of formalism and self-determination were 0.70 and 0.73 respectively.

Regulatory ties. Four items were adopted to measure a firm's regulatory ties in environmental compliance. The question "To what extent do you agree that…?" was followed by four items: (1) The firm has abundant access to government environmental policies; (2) The firm has abundant access to technical-related information in environmental compliance; (3) The firm possesses a good environmental reputation in regulatory stakeholders' eyes; and (4) The firm has a close relationship with regulatory stakeholders. The Cronbach's alpha was $\alpha = 0.81$.

***Moderators*.** The first moderator – organizational visibility (O-visibility) – was measured by firm size, which is commonly used in corporate environmental studies (Marquis & Toffel, 2012). We used the number of employees to measure firm size. A binary dummy, O-visibility, was adopted to differentiate organizationally less visible firms (O-visibility = 0, the number of employees < 500) from more visible ones (O-visibility = 1, the number of employees > 500).

The second moderator – environmental-visibility (E-visibility) – was captured by industry variance in pollution levels. Environmental visibility was measured by the vice-deputy chief's assessment of the firm's pollution visibility due to observable industrial features that make certain firms highly visible (e.g. chemical plants and steel companies). Specifically, we defined three groups, namely, high-level polluting, medium-level polluting, and low-level polluting firms. We used a dummy variable, E-visibility, to differentiate less environmentally visible firms (E-visibility = 0, low pollution level) from more environmentally visible ones (E-visibility = 1, medium and high pollution levels). Theoretically, such measurement was in line with our conceptualization based on prior studies that focused on "domain-specific visibility" (as opposed to "generic visibility"). Similar conceptualizations can be seen in the work of Marquis and Toffel (2012), and Yu et al. (2017). Practically, our conceptualization reflects China's industrial environmental regulations, which subject particularly highly polluting industries to greater regulatory stringency[2].

Controls. We used the following control variables in our analysis: (1) headquarters (1 = headquartered overseas); (2) years of operation in the current location; (3) export proportion; (4) number of annual inspections conducted by the local regulatory agency; (5) ownership (1 = non-private enterprises, 0 otherwise); (6) degree of demand from government stakeholders on environmental issues; (7) environmental demand from non-government stakeholders; and (8) managerial support. To measure managerial support for corporate environmental management, we looked at seven key aspects: financial support, top managerial responsibility for environmental performance, inter-departmental coordination, environmental manager being a

member of the top management team, human resource adequacy, employee participation, and the professional knowledge of environmental staff[3]. The Cronbach's alpha was 0.86.

Empirical Results

In Table 1, we present the descriptive statistics and correlations of major variables. To alleviate concerns regarding multicollinearity, we calculated the variance inflation factor. The average variance inflation factor was 1.8, below the threshold of 10 (with a maximum of 2.64, non-government demand)[4]. On average, the surveyed enterprises scored higher on formalism ($\bar{x}$ = 5.74) than on self-determination ($\bar{x}$ = 5.25).

Insert Table 1 about here

We employed hierarchical multiple regressions to test the hypotheses, with control variables entering the regression first, followed by independent variables and then interaction terms. To address the problem of multicollinearity and unstable regression estimates, variables were centered before being entered into the regression. Tables 2 and 3 present the regression results of formalism and self-determination respectively.

Insert Table 2 about here

Insert Table 3 about here

Model (i) shows the results with only control variables entered in the regression. Compared with locally headquartered firms, firms headquartered overseas scored lower in formalism (b = -0.50, $p < 0.05$) but higher in self-determination (b = 0.47, $p < 0.05$). Firms with a higher

proportion of exports tended to adopt a more self-determined coping strategy (b = -0.11, $p < 0.05$). We found no significant differences between private firms and non-private firms in the extent of either formalism or self-determination. We also found that firms with more managerial support were likely to score higher in both formalism (b = 0.42, $p < 0.001$) and self-determination (b = 0.41, $p < 0.001$). We then entered the independent variable (regulatory ties) and the two moderators (organizational and environmental visibility) into the regression. As can be seen in model (ii), more organizationally visible firms tended to score higher in self-determination (b = 0.37, $p < 0.05$). This result corroborates the literature showing that large firms have more discretion in deciding how to comply with government regulations (Okhmatovskiy & David, 2012).

Model (iii) provides the regression results with the quadratic term regulatory ties-squared added to the model. A curvilinear effect is supported if the addition of the nonlinear term results in significant increases in variance after the linear relationships are controlled (Cohen et al., 2003). As shown in Table 2, the incremental variance explained by model (ii) relative to model (i) is statistically significant ($\Delta R^2 = 0.025$, $p < 0.05$). As we hypothesized, the quadratic term has a positive and significant impact on the coping strategy of formalism (b = 0.08, $p < 0.05$). The plot of this relationship (Figure 2a) shows that before the inflexion point, an increase in regulatory ties decreased the level of formalism. After the inflexion point, however, an increase in regulatory ties increased the level of self-determination. These findings support H1a, that there is a U-shaped impact of regulatory ties on formalism.

Insert Figure 2 about here

In Table 3, model (ii) indicates that the quadratic regulatory ties term was negative and statistically significant (b = -0.08, $p < 0.05$), explaining an additional three percent of the variance ($\Delta R^2 = 0.02$, $p < 0.05$) in self-determination relative to model (i). A plot of the relationship (figure 2b) shows that the positive relationship was initially strong but weakened as regulatory ties increased above the mean. Thus Hypothesis 1b, regarding a U-shaped association between regulatory ties and self-determination, was supported.

Interaction between regulatory ties and firm visibility

Models (iii) and (iv) present the moderating effects of organizational and environmental visibility respectively. Model (v) shows the comprehensive model. Model (v) in Table 2 suggests that the squared interaction term for regulatory ties and organizational visibility (b = 0.03, n.s.), the squared interaction term for regulatory ties and environmental visibility (b = -0.02, n.s.), and the incremental variance ($\Delta R^2 = .01$, n.s.) were all insignificant. Thus, the results fail to support Hypothesis 2a. Model (v) in Table 3 shows that the squared interaction term for regulatory ties and organizational visibility (b = 0.13, $p < 0.05$), the squared interaction term for regulatory ties and environmental visibility (b = 0.17, $p < 0.05$), and the incremental variance ($\Delta R^2 = 0.03$, $p < 0.1$) are all significant. Therefore, Hypothesis 2b is supported.

To better interpret our empirical results, we plotted the relationship between regulatory ties and self-determination with high and low degrees of organizational and environmental visibility,

respectively. As Figures 3(a) and 3(b) show, the direction of the moderation is as expected: when firms are more visible, the rate of increase in self-determination associated with increasing ties is slower, whereas the rate of decline in self-determination is faster when firms are less visible.

Insert Figure 3 about here

Additional slope analysis (Greene, 1997: 391) confirms the moderating effects. Among firms with a low degree of organizational visibility, the simple slope of the regression curve had a positive value at low degrees of regulatory ties (b = 0.34, $p < 0.05$). However, it was not significantly different from zero at medium levels of regulatory ties (b = 0.14, n.s.). At high degrees of regulatory ties, the regression curve declined significantly (b = -0.47, $p < 0.05$). In the case of high organizational visibility, the simple slope was positive at low degrees of regulatory ties (b = 0.25, $p < 0.05$). The simple slope was not significantly different from zero at either medium (b = -0.06, n.s.) or high levels of regulatory ties (b = 0.04, n.s.). When environmental visibility was low, the simple slope of the regression curve was positive at low levels of regulatory ties (b = 0.49, $p < 0.01$). The simple slope did not differ significantly from zero at medium levels of regulatory ties for self-determination (b = 0.04, n.s.). At high levels of regulatory ties, the regression curve declined significantly (b = -0.41, $p < 0.05$). In the case of high environmental visibility, the simple slopes of the regression line were not significantly different from zero at low, medium, and high values of regulatory ties.

Additional Analyses

We also ran separate regression models with non-private and privately owned firms, with interesting new insights worth noticing (tables 4 and 5). For example, we found that the

hypothesized U-shaped relationship between regulatory ties and formalism was observed in privately owned enterprises (model (i), table 4), but there was no significant evidence of any such relationship among their non-privately owned counterparts (model (ii), table 4). Similarly, the hypothesized inverted-U relation between regulatory ties and self-determination was detected in privately owned enterprises only (models (i) and (ii), table 5). In other words, being private firms may strengthen the impact of regulatory ties on their coping strategies for compliance. In addition, the moderating effect of both types of visibility on the relation between regulatory ties and self-determination was also only detected in privately owned enterprises (models (iii) and (iv), table 5). Taken together, these findings are in line with the corporate political strategy literature that detected significant evidence of the double-edged sword role of firms' political ties (Li, Poppo, & Zhou, 2008; Marquis & Qian, 2014). In this study, one possible explanation is that privately owned enterprises are more sensitive to influence from regulatory stakeholders, probably because their connections with regulators are more likely to be achieved instead of ascribed. Such distinctions could be seen in a recent study revealing that ascribed connections to government are more likely to serve as a buffer from regulatory pressure, while achieved connections tend to bind firms to the government and accommodate political pressure (Zhang et al., 2016).

Insert table 4 about here

Insert table 5 about here

Discussion and Conclusion

In environmental governance, there is no single regulatory approach to ensuring corporate environmental compliance. This study has examined the distinctions between two distinct corporate environmental coping strategies in terms of how they are related to firms' regulatory ties. As hypothesized, the relationship between external regulatory ties and formalism is U-shaped, while that between regulatory ties and self-determination is inverted U-shaped. The latter suggests that the degree of self-determination is highest at the mid-level of regulatory ties. Although deviance in either direction will undermine internal discretion, a stronger regulatory tie is still better than a weak one. Further, organizational characteristics, including organizational and environmental visibility, moderated the inverted U-shaped relationship. Our study thus represents one of the first efforts to understand the double-edged sword role of regulatory ties in corporate environmental compliance with a multi-theoretical explanation.

We did not find strong support for the hypothesis on the moderating effect of firm visibility on the relationship between regulatory ties and either of the coping strategies. In other words, neither the value nor the constraints brought by regulatory ties on firm discretion in compliance are contingent on the dynamics of firm visibility. One possible explanation may build on the unique regulatory context in the PRD region, where our survey data was collected. A longitudinal study by Lo et al. (2016), tracing the evolving environmental regulatory control in this region, shows that there has been an increasing lack of discretionary power among enforcement officials between 2006 and 2013. As this trend may imply greater enforcement uniformity in checking the compliance status of regulated enterprises (Lo et al., 2016), firms

with varying visibility may share quite similar patterns in the way they benefit or lose from regulatory ties when adhering to formal rules.

Our study contributes to the public performance literature in three aspects. First, it enriches the environmental management literature by differentiating the two key components – "rule" and "discretion". Our empirical results suggest that such distinctions exist in environmentally regulated firms. Second, we extend the current linear perspective of regulatory ties on corporate environmental management to consider it as a double-edged sword by adopting the multi-theoretical lenses of the environmental regulatory compliance and managerial tie perspectives. We further examine how firms' regulatory ties relate to the degree of formalism and self-determination in environmental compliance. Our findings on the resource configurations of formalism and self-determination are far more complex than a single perspective may suggest. Last, the conventional wisdom mainly looks at the direct relationship between organizational visibility, such as firm size, and ultimate corporate environmental performance (Gray & Shadbegian, 2005; Gunningham, Thornton, & Kagan, 2005). Our investigation of the moderating role of firm visibility further adds to the current understanding of how organizational characteristics modify the degrees of benefit and control embedded in external ties.

This research has practical implications for both government officials and business managers because it emphasizes the importance of firm-level diversity in environmental coping strategies. Since the relationships between regulatory ties (as formed between interactions with regulators) and the two studied coping strategies are more complex than a linear perspective would explain, policy makers and regulators need to carefully design the appropriate combination of policy instruments in achieving the balance between control and flexibility in regulatory enforcement.

Public policy makers and street-level governmental officials may work as "public choice architects" (Thaler & Sunstein, 2008), trying to encourage firms with different environmental preferences to comply with government regulations and even to go beyond full compliance. Bridging the gap between regulatory enforcement and corporate compliance strategy, however, may require a more flexible design in regulatory instruments.

This research has a few limitations, and therefore we suggest several directions for future work. First, we administered the survey in one region in China, hence one has to be cautious when generalizing our results to cover other geographical locations or other regulatory contexts (even within China). Future studies may seek to explore whether our framework applies to other regulatory contexts in China that share similar institutional features or regulatory constraints. In this study, we mainly investigate how the role of regulatory ties is susceptible to firm characteristics such as organizational and environmental visibility. A potential direction for future research is thus to understand the moderating effect of local institutional environments. Second, perhaps different (sub)types of strategies could be identified within both formalism and self-determination. For instance, beyond-compliance and evasion may co-exist in the self-determination category. Unfortunately, the current measurement does not allow us to explore these sub-components. Future studies could look deeper into whether and how such variations are connected with firms' regulatory ties. Third, organizational and environmental visibility were measured in this study by self-reported firm size and independent regulator official assessment respectively. Future research may refine the measurement by adopting more objective data. Last, future studies may explore the consequences of formalism and self-determination with regard to both compliance performance and environmental proactiveness.

Since firms using self-determination may choose either compliance or evasion, it would be interesting to explore the mediating effects of formalism and self-determination, which explain the relationship between regulatory ties and corporate environmental performance.

Notes

1. As we discussed, the differentiation between formalism and self-determination is somewhat similar to that between the more commonly used terms, compliance and self-regulation, as in the extant literature. That being said, a low level of formalism does not necessarily imply a high level of self-determination. For example, some enterprises are not willing to stick to the letter of the law, neither are they motivated to initiate internally driven environmental activities. Theoretically, the correlation between formalism and self-determination could be either negative or positive. (As our empirical results suggest later, the correlation is positive and significant.)
2. For instance, the Corporate Social Responsibility (CSR) disclosure mandate enacted in 2008 requires listed companies from 13 highly polluting industries to conduct an environmental audit or CSR disclosure.
3. The seven items used in the survey are as follows:

    1. We have sufficient financial support to deal with environmental issues.
    2. Managers are taking more responsibility for firms' environmental performance than before.
    3. Inter-departmental coordination on environmental issues is guaranteed.
    4. Our top management team includes an environmental manager.
    5. We have adequate human resources to work on environmental issues.
    6. The firm encourages employees to engage in environmental protection.
    7. All managerial staff are familiar with environmental standards and policies.

4. In an additional analysis, we combined three highly correlated variables (government demand, non-government demand, and managerial support) by a factor score to save some degrees of freedom. The results were largely consistent with our main analysis, and are available from the authors upon request.

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Appendix.
Survey Measures

Formalism (three items, Cronbach's $\alpha = 0.70$)
1. We emphasize whether we meet the formal environmental standards
2. Our most important duty is to strictly follow environmental laws
3. Formal regulation is our compliance benchmark and guideline

Self-determination (three items, Cronbach's $\alpha = 0.73$)
1. We have our own plan in environmental protection
2. We have our own understanding of greening the company
3. We have our own environmental performance evaluation system

Regulatory ties (four items, Cronbach's $\alpha = 0.81$)
1. We have abundant access to government policies on environmental issues
2. We have abundant access to technical-related information in environmental compliance
3. We have a good environmental reputation in regulatory stakeholders' eyes
4. We have a close relationship with regulatory stakeholders

Table 1. Descriptive Statistics and Correlations.

Variable	**Mean**	**s.d.**	1	2	3	4	5	6	7	8	9	10	11	12
1.Headquarters overseas	0.16	0.37												
2.Operational years	2.31	1.32	0.26*											
3.Export proportion	3.62	1.57	0.26*	-0.02										
4.Prior inspections	2.51	2.71	0.02	0.05	-0.07									
5.Non-private firms	0.32	0.47	0.45*	0.35*	0.22*	0.16*								
6.Government demand	5.15	1.21	-0.27*	-0.23*	-0.07	0.10	-0.26*							
7.Non-government demand	4.99	1.17	-0.29*	-0.21*	-0.12	0.05	-0.43*	0.74*						
8.Managerial support	5.36	0.99	-0.10	-0.11	-0.12	0.11	-0.17*	0.39*	0.43*					
9.Regulatory ties	5.32	1.22	-0.12	-0.10	-0.09	0.12	-0.19*	0.40*	0.40*	0.64*				
10.O-visibility	0.60	0.49	0.13	0.52*	-0.06	0.02	0.27*	-0.17*	-0.17*	-0.06	-0.11			
11.E-visibility	0.57	0.50	-0.13	0.02	0.02	0.28*	-0.07	0.07	0.09	-0.07	-0.08	-0.09		
12.Formalism	5.74	1.00	-0.18*	0.02	-0.16*	0.12	-0.05	0.18*	0.15*	0.48*	0.38*	-0.04	0.03	
13.Self-determination	5.25	1.20	0.08	0.05	-0.18*	0.07	-0.01	0.19*	0.16*	0.46*	0.35*	0.15*	-0.14	0.25*

Notes: * $p < 0.05$, N = 192

Table 2. Results of Regression Analysis (Formalism).

	Dependent variable: Formalism					
Variable	**Model (i)**	**Model (ii)**	**Model (iii)**	**Model (iv)**	**Model (v)**	**Model (vi)**
Headquarters overseas	-0.502*	-0.498*	-0.395	-0.386	-0.370	-0.362
	(-2.53)	(-2.50)	(-1.97)	(-1.91)	(-1.85)	(-1.80)
Operational years	0.059	0.079	0.064	0.057	0.050	0.046
	(1.13)	(1.35)	(1.10)	(0.97)	(0.84)	(0.77)
Export proportion	-0.044	-0.051	-0.073	-0.074	-0.070	-0.072
	(-1.04)	(-1.20)	(-1.71)	(-1.72)	(-1.65)	(-1.67)
Prior inspections	0.019	0.010	0.006	0.006	0.010	0.011
	(0.79)	(0.39)	(0.23)	(0.26)	(0.42)	(0.42)
Non-private firms	0.140	0.187	0.238	0.239	0.196	0.197
	(0.82)	(1.08)	(1.39)	(1.39)	(1.13)	(1.14)
Government demand	0.03	0.014	-0.017	-0.017	-0.02	-0.019
	(0.38)	(0.17)	(-0.21)	(-0.22)	(-0.25)	(-0.24)
Non-government demand	-0.082	-0.094	-0.060	-0.061	-0.077	-0.078
	(-0.95)	(-1.09)	(-0.69)	(-0.70)	(-0.88)	(-0.89)
Managerial support	0.489***	0.424***	0.427***	0.426***	0.440***	0.441***
	(6.98)	(5.05)	(5.16)	(5.06)	(5.31)	(5.22)
O-visibility		-0.144	-0.132	-0.170	-0.124	-0.162
		(-0.96)	(-0.89)	(-0.98)	(-0.83)	(-0.94)
E-visibility		0.099	0.088	0.096	0.141	0.142
		(0.73)	(0.65)	(0.71)	(0.88)	(0.88)
Regulatory ties		0.110	0.198*	0.143	0.330**	0.286*
		(1.59)	(2.59)	(1.38)	(3.22)	(2.22)
Regulatory ties^2			0.079*	0.065	0.081	0.065
			(2.54)	(1.47)	(1.35)	(0.87)
Regulatory ties × O-visibility				0.098		0.071
				(0.79)		(0.57)
Regulatory ties^2 × O-visibility				0.028		0.028
				(0.47)		(0.45)
Regulatory ties × E-visibility					-0.236	-0.229
					(-1.90)	(-1.82)
Regulatory ties^2 × E-visibility					-0.027	-0.024
					(-0.40)	(-0.33)
Constant	3.382***	3.306***	3.834***	3.881***	3.869***	3.899***
	(7.16)	(6.85)	(6.79)	(6.77)	(6.72)	(6.70)
Total R^2	0.276***	0.292***	0.316***	.319***	0.330***	0.332***
ΔR^2		.016	.025*	.002	0.014[a]	0.015[a]

N = 192

Notes: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Unstandardized regression coefficients are reported.

[a] compared to model (iii)

Table 3. Results of Regression Analysis (Self-determination).

	Dependent variable: Self-determination					
Variable	**Model (i)**	**Model (ii)**	**Model (iii)**	**Model (iv)**	**Model (v)**	**Model (vi)**
Headquarters overseas	0.472*	0.472*	0.371	0.400	0.362	0.396
	(2.15)	(2.16)	(1.69)	(1.82)	(1.65)	(1.81)
Operational years	0.045	-0.018	-0.004	-0.016	-0.012	-0.021
	(0.79)	(-0.29)	(-0.06)	(-0.24)	(-0.18)	(-0.33)
Export proportion	-0.120*	-0.109*	-0.088	-0.091	-0.086	-0.090
	(-2.55)	(-2.35)	(-1.87)	(-1.94)	(-1.83)	(-1.94)
Prior inspections	-0.005	0.003	0.007	0.008	0.008	0.009
	(-0.17)	(0.11)	(0.25)	(0.30)	(0.29)	(0.32)
Non-private firms	0.052	0.004	-0.045	-0.042	-0.084	-0.080
	(0.28)	(0.02)	(-0.24)	(-0.22)	(-0.44)	(-0.43)
Government demand	0.096	0.087	0.117	0.117	0.127	0.129
	(1.11)	(1.01)	(1.35)	(1.35)	(1.47)	(1.50)
Non-government demand	-0.047	-0.045	-0.078	-0.079	-0.111	-0.114
	(-0.49)	(-0.47)	(-0.83)	(-0.84)	(-1.16)	(-1.20)
Managerial support	0.483***	0.395***	0.392***	0.400***	0.385***	0.400***
	(6.22)	(4.29)	(4.31)	(4.35)	(4.24)	(4.38)
O-visibility		0.370*	0.358*	0.220	0.395*	0.210
		(2.24)	(2.19)	(1.16)	(2.41)	(1.12)
E-visibility		-0.141	-0.131	-0.111	-0.306	-0.319
		(-0.95)	(-0.88)	(-0.75)	(-1.76)	(-1.83)
Regulatory ties		0.107	0.0221	-0.102	0.040	-0.086
		(1.42)	(0.26)	(-0.90)	(0.36)	(-0.62)
Regulatory ties^2			-0.076*	-0.126**	-0.189**	-0.276***
			(-2.24)	(-2.63)	(-2.89)	(-3.41)
Regulatory ties × O-visibility				0.219		0.211
				(1.62)		(1.56)
Regulatory ties^2 × O-visibility				0.0975		0.131*
				(1.50)		(1.98)
Regulatory ties × E-visibility					0.017	0.038
					(0.13)	(0.28)
Regulatory ties^2 × E-visibility					0.146	0.173*
					(1.94)	(2.24)
Constant	2.647***	2.546***	3.173***	3.239***	3.446***	3.514***
	(5.06)	(4.82)	(5.12)	(5.18)	(5.46)	(5.57)
R^2	0.260***	0.293***	0.312***	0.325***	0.328***	0.344***
ΔR^2		0.033*	0.019*	0.012	0.016	0.032†

N = 192

Notes: † $p < 0.1$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Unstandardized regression coefficients are reported.

Table 4. Results of Regression Analysis by Group.

Variable	Dependent variable: Formalism			
	Model (i) Private firms	Model (ii) Non-private firms	Model (iii) Private firms	Model (iv) Non-private firms
Headquarters overseas	-0.05	-0.60*	-0.06	-0.72*
	(-0.12)	(-2.18)	(-0.17)	(-2.65)
Operational years	0.11	-0.01	0.06	-0.03
	(1.17)	(-0.06)	(0.65)	(-0.33)
Export proportion	-0.09	-0.06	-0.09	-0.08
	(-1.54)	(-0.81)	(-1.59)	(-1.04)
Prior inspections	0.01	-0.02	0.03	-0.05
	(0.29)	(-0.56)	(0.60)	(-1.25)
Government demand	-0.02	-0.11	-0.04	-0.18
	(-0.17)	(-0.58)	(-0.45)	(-0.97)
Non-government demand	-0.10	0.08	-0.15	0.15
	(-1.03)	(0.38)	(-1.49)	(0.76)
Managerial support	0.40***	0.61***	0.40***	0.57**
	(3.78)	(3.75)	(3.63)	(3.51)
O-visibility	-0.14	-0.38	-0.13	-0.92*
	(-0.73)	(-1.24)	(-0.60)	(-2.37)
E-visibility	0.16	0.23	0.31	0.57
	(0.96)	(0.77)	(1.55)	(1.64)
Regulatory ties	0.23*	0.12	0.49**	-0.03
	(2.59)	(0.68)	(3.20)	(-0.10)
Regulatory ties^2	0.08*	0.07	0.09	-0.10
	(2.23)	(0.93)	(1.00)	(-0.50)
Regulatory ties × O-visibility			0.07	0.04
			(0.44)	(0.12)
Regulatory ties^2 × O-visibility			-0.01	0.32
			(-0.14)	(1.54)
Regulatory ties × E-visibility			-0.46**	0.33
			(-3.06)	(1.16)
Regulatory ties^2 × E-visibility			-0.04	-0.09
			(-0.50)	(-0.54)
Constant	4.10***	3.40**	4.50***	4.20***
	(5.79)	(3.39)	(6.22)	(3.86)
R^2	0.277	0.442	0.339	0.511

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. Results of Regression Analysis (Self-determination).

Variable	Dependent variable: Self-determination			
	Model (i) Private firms	Model (ii) Non-private firms	Model (iii) Private firms	Model (iv) Non-private firms
Headquarters overseas	0.35	0.32	0.26	0.37
	(0.81)	(1.20)	(0.60)	(1.35)
Operational years	0.08	-0.11	0.06	-0.12
	(0.76)	(-1.31)	(0.59)	(-1.36)
Export proportion	-0.09	-0.12	-0.10	-0.13
	(-1.49)	(-1.73)	(-1.58)	(-1.72)
Prior inspections	0.05	-0.07	0.06	-0.06
	(1.01)	(-1.78)	(1.27)	(-1.24)
Government demand	0.13	0.21	0.16	0.19
	(1.29)	(1.23)	(1.54)	(1.00)
Non-government demand	0.00	-0.30	-0.06	-0.29
	(0.03)	(-1.58)	(-0.54)	(-1.45)
Managerial support	0.26*	0.55**	0.32*	0.52**
	(2.19)	(3.48)	(2.57)	(3.19)
O-visibility	0.15	0.69*	-0.04	0.85*
	(0.69)	(2.33)	(-0.18)	(2.17)
E-visibility	-0.12	0.08	-0.37	-0.06
	(-0.64)	(0.28)	(-1.67)	(-0.17)
Regulatory ties	-0.04	0.21	-0.15	-0.02
	(-0.38)	(1.30)	(-0.90)	(-0.09)
Regulatory ties^2	-0.11**	-0.02	-0.34***	-0.03
	(-2.68)	(-0.26)	(-3.48)	(-0.15)
Regulatory ties × O-visibility			0.19	0.38
			(1.15)	(1.21)
Regulatory ties^2 × O-visibility			0.17*	0.03
			(2.02)	(0.16)
Regulatory ties × E-visibility			0.08	-0.11
			(0.45)	(-0.38)
Regulatory ties^2 × E-visibility			0.21*	-0.01
			(2.26)	(-0.06)
Constant	3.31***	3.16**	3.47***	3.25**
	(4.20)	(3.26)	(4.25)	(2.96)
R^2	0.269	0.551	0.312	0.570

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Attached Figures

Figure 1. Conceptual Framework

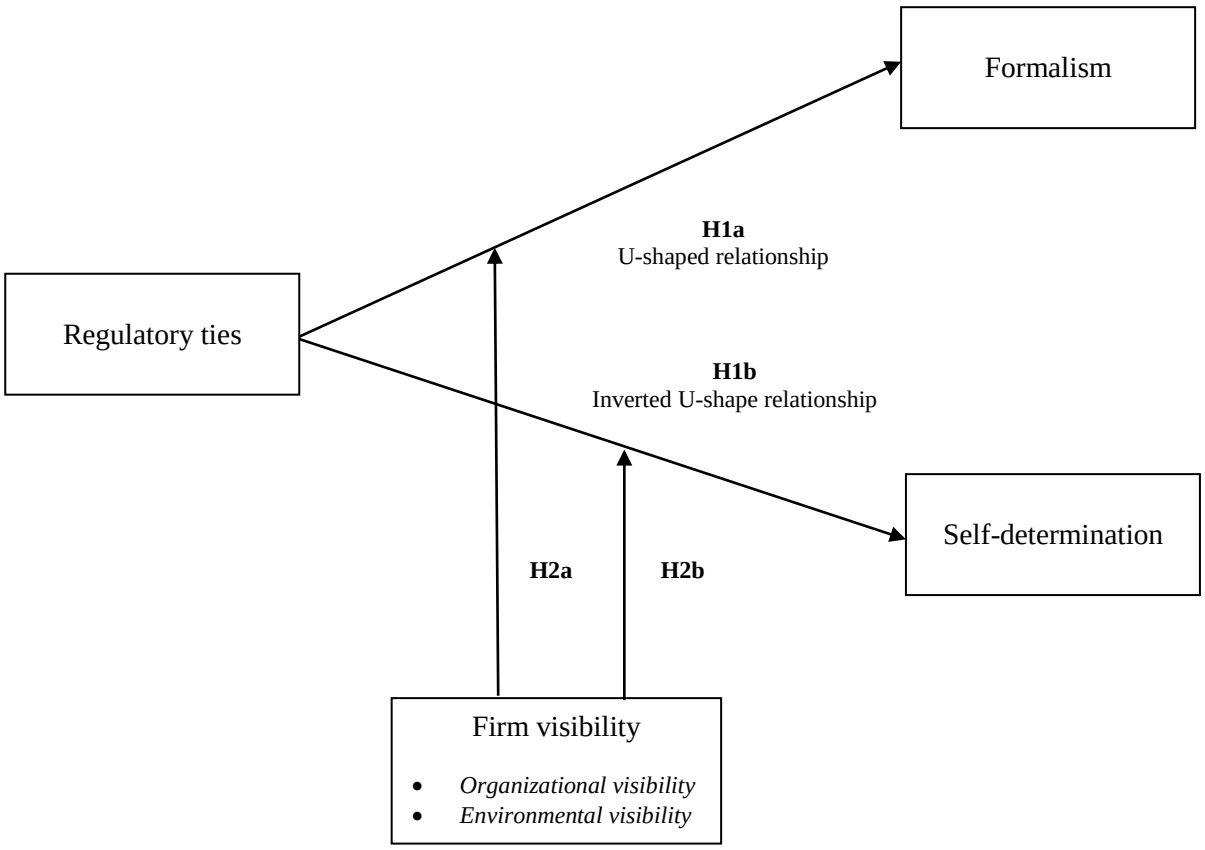

Figure 2. Curvilinear Relationships between Regulatory Ties and Formalism (2a) and Self-determination (2b)

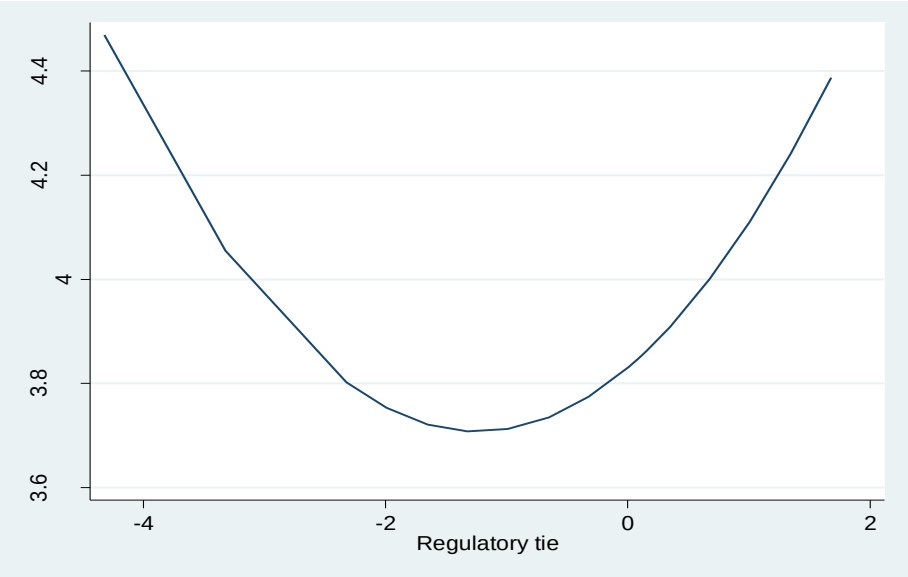

Figure 2a

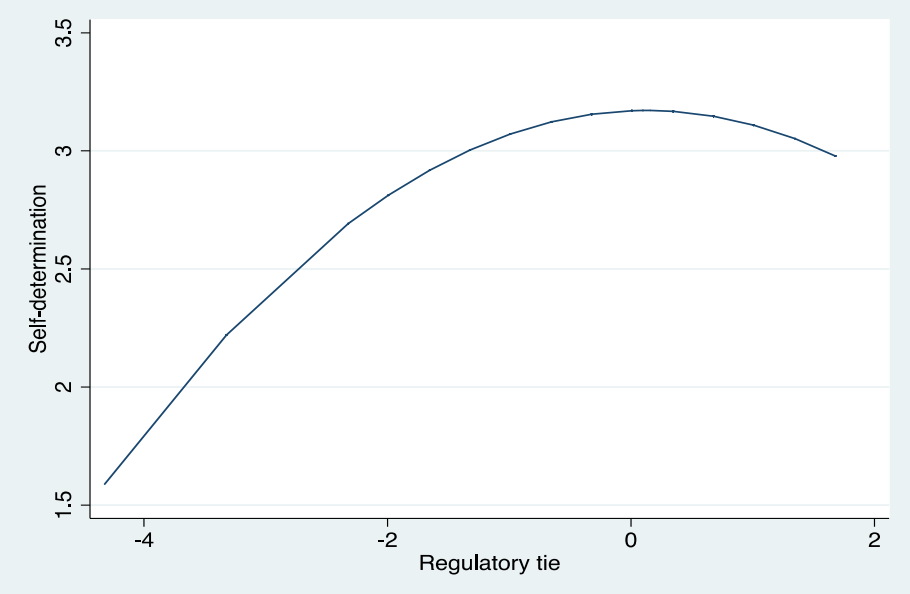

Figure 2b

Figure 3. The Moderating Effect of Organizational Visibility (3a) and Environmental Visibility (3b) on the Curvilinear Relationship between Regulatory Ties and Self-determination

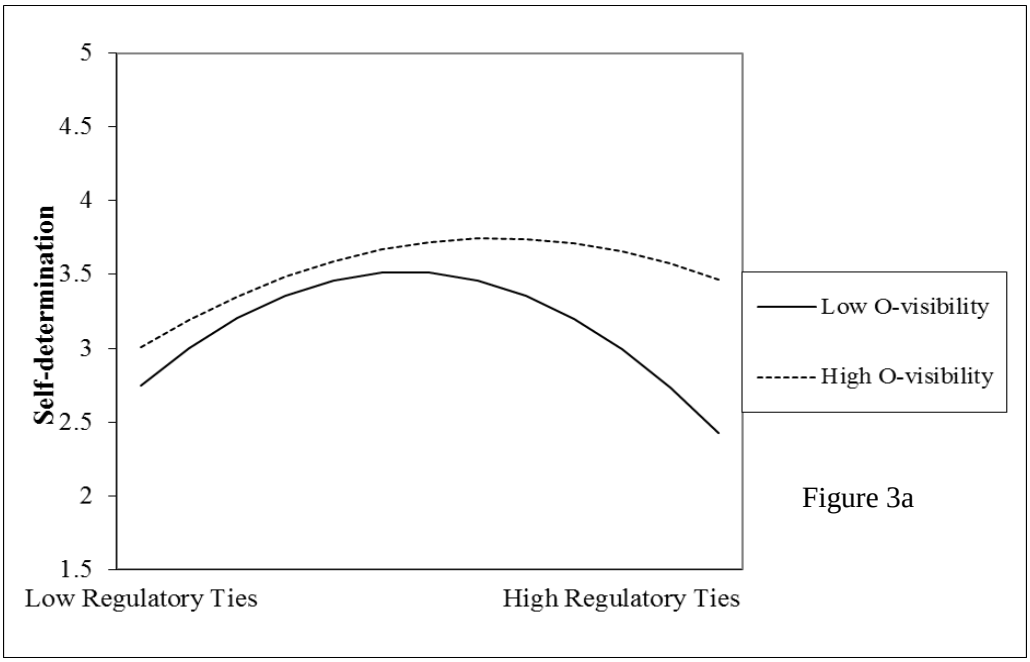

Figure 3a

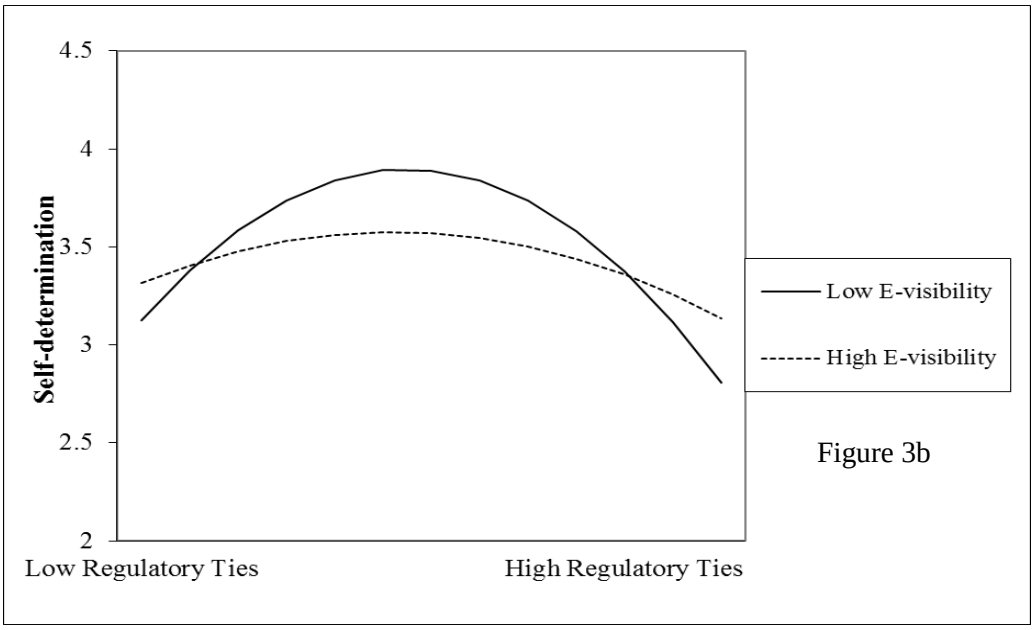

Figure 3b