

# Heterogeneous Choice of Environmental Strategy for Heavily Polluting Firms Under Institutional Pressure in China

Sen Wang (✉ [gltwangsen@bnu.edu.cn](mailto:gltwangsen@bnu.edu.cn))

Beijing Union University <https://orcid.org/0000-0002-9853-4072>

Jianhua Yin

University of International Business and Economics

Xiaomei Zhu

Beijing Union University

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## Research Article

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# Abstract

The impact of institutional pressure on the environmental strategy was analyzed and the heterogeneous choices available for corporate environmental strategy. A total of 597 publicly listed companies in heavily polluting industries were selected using multiple Logit models for empirical research. The results show that more companies choose environmental leadership strategies when the policy pressure is greatest; however, more companies choose pollution prevention strategies when the regulatory and public pressures are greatest; finally, organizations with more redundant resources and strong asset specificity are more inclined to choose environmental leadership strategies as institutional pressures increase. The findings provide a decision-making framework to promote environmental protection measures related to policy formulation, government supervision and public participation. Our study also provides empirical evidence to guide environmental strategic choices for heavily polluting enterprises.

## Introduction

In China today, a series of problems that include air pollution, water pollution and land desertification have become increasingly prominent. All sectors of society want to solve the environmental crisis and advocate green development (Marquis, Jackson, and Li 2015; D. Yang et al. 2019). In recent years, the number of environmental regulations and documents has increased dramatically (Fan, Shao, and Tang 2013), the media has paid more attention to environmental events (Y. Wang et al. 2017), and the number of public complaints about environmental protection has also increased (Kassinis and Vafeas 2006). In spite of this, China still faces serious environmental pollution. One metric for atmospheric conditions is the amount of fine inhalable particles with diameters typically 2.5 micrometers and smaller ( $PM_{2.5}$ ). As an example, the annual average  $PM_{2.5}$  concentration of 338 cities at and above the prefectural level is  $39 \text{ g/m}^3$ , far exceeding the  $10 \text{ g/m}^3$  standard set in the air quality guidelines of the World Health Organization. Heavily polluting enterprises are the “perpetrators” of most environmental problems. The implementation of advanced environmental management practices can effectively promote the green and high-quality development of China (Luo and Lai 2016). A survey of the social responsibility reports of listed companies shows that heavy polluters show great differences in environmental management practices. A small number of enterprises reduce the environmental load on the supply chain by adopting advanced environmental management technology. Enterprise source prevention and process control are also found, but many enterprises still adopt terminal management and passive environmental protection.

The emerging “strategy-as-practice” holds that environmental management practice is the concrete expression of the enterprise environmental strategy (Kaplan 2011), and the difference of environmental management practice is reflected in the heterogeneity of the enterprise environmental strategy. Why do enterprises implement differentiated environmental strategies? Under what conditions does the enterprise adopt this kind of environmental strategy? In the published literature, research on environmental strategy selection mainly focuses on the institutional level, studies look at the institutional causes behind strategic choices. For example, formal and informal institutional pressure, such as environmental protection laws and regulations issued by the government (Clemens and Douglas 2006; Pope et al. 2020), regulatory flexibility (Winter and May 2001) and environmental protection organizations (Reid and Toffel 2009), has a significant

impact on the environmental strategic choices of enterprises. Studies focusing on public pressure to analyze the environmental strategic responses of enterprises are rarely involved. However, the increasing attention and participation of the public on environmental issues often influences organizational behavior by putting pressure on the government (Zheng et al. 2013). The strategic choice of enterprises is analyzed from the perspective of the public, which appropriately complements the theory of environmental strategic choice.

Institutional research can be traced back to the “Ceremony Conformity” view of the new institutionalist school, which emphasizes that enterprises conform to institutional rules in structure by means of compulsory, imitative and normative convergence (DiMaggio and Powell 1983) to obtain legitimacy (Meyer and Rowan 1977). Oliver (1991) introduced this institutional theory into the field of strategy, and pointed out that there is a differentiated response to organizational strategy under the constraints of institutional environment. A few scholars explored the heterogeneous response of enterprise environmental strategy under the pressure of similar systems from the perspectives of the awareness of managers and the enterprise life cycle (Yin, Wang, and Zhang 2019). However, research on the heterogeneous selection of enterprise environmental strategy based on resource characteristics is relatively deficient. Sharfman et al. (1988) pointed out that resources provide enterprises with choices to adapt to the external environment, which may affect the relationship between institutional pressure and environmental strategies of heavily polluting enterprises (Y. Yang, Wei, and Luo 2015). This paper attempts to answer the question of institutional pressure on the heterogeneous selection of environmental strategies in heavily polluting enterprises from the perspectives of organizational slack and asset specificity. Environmental investment arising due to institutional pressure places a serious demand on resources for enterprises with heavy pollution. Organizational slack to a certain extent not only compensates for the resource loss of environmental investment but also facilitates the integration of resources to make enterprises implement more positive environmental strategies. The higher the degree of asset specificity, the higher the default risk and cost of ignoring institutional pressure, which forces enterprises to implement more forward-looking environmental strategies.

We integrate institutional theory and environmental strategic choice theory, analyze the influence of different institutional pressures on the choices of environmental strategy for heavily polluting enterprises, and look at organizational slack and asset specificity as heterogeneous environmental strategic responses to institutional pressures. A total of 597 listed companies were selected from the heavily polluting industries in China, and a number of Logit models were adopted for empirical research. The results show that companies choose environmental leadership strategies when the policy pressure is greatest; however, they choose pollution prevention strategies when the regulatory and public pressures are greatest; finally, organizations with more redundant resources and strong asset specificity are more inclined to choose environmental leadership strategies as institutional pressures increase.

This study has several theoretical implications for institutional theory and the growing literature on environmental strategies. First, we extend the relationship between institutional pressure and environmental strategy. We find that increased regulatory or public pressure does not prompt enterprises to choose the environmental leadership strategy. Our results differ from earlier research that concludes that companies are more active in corporate environmental strategy as institutional pressure increases (Menguc, Auh, and Ozanne 2010). Second, this study also contributes to environmental strategies literature. Research on the

heterogeneous selection of enterprise environmental strategy has based on enterprise life cycle and managers' cognition (Yin, Wang, and Zhang 2019), resource characteristics is relatively deficient, we analyze the heterogeneous choices of environmental strategies for heavily polluting enterprises under the pressure of similar systems taking into consideration organizational slack and asset specificity. This expands, to a certain extent, the heterogeneity studies of environmental strategies. Third, this study also contributes to the growing literature on emerging economies. This research focuses on China, the country is facing serious threat of environmental pollution along with its rapid economic growth, and has underdeveloped legal systems of inefficient legal implementation due to the transition from a planned economy into a market-based economy. The findings will thus be of value for other emerging economies in pushing forward corporate environmental protection.

The remaining sections of this study are arranged as follows: The second part is the theoretical basis and research hypothesis; the third part describes the research methods; the fourth part covers the analysis of the empirical results; and the fifth part is the conclusion.

## **Theory And Research Hypothesis**

# **Institutional Pressure and Environmental Strategy Choice of Heavily Polluting Enterprises**

The classification of environmental strategy in academic circles has not been unified. Yin et al. (Yin, Wang, and Zhang 2019) used studies of the literature, investigations and interviews with heavy polluters to divide environmental strategy into reactive, pollution prevention and environmental protection leadership at low to high levels. Reactive environmental strategy focuses on terminal pollution control and passively responds to the environmental requirements of stakeholders; pollution prevention focuses on the prevention of pollution at the source of production, and adopts the methods of replacing raw materials and recycling to reduce and prevent waste generation; environmental protection leadership integrates external stakeholders into product procurement, design, production, sales and other areas, and coordinates with upstream- and downstream-related enterprises to reduce emissions to minimize the environmental burden in the product life cycle.

The choice of environmental strategy for heavily polluting enterprises is limited by external institutional pressure, which includes policy pressure from strictly following government policies, laws and regulations, and regulatory pressure from accepting government environmental supervision (Freeman 2010). There are similarities between policy pressure and regulatory pressure in the environmental strategic choices of enterprises. The pollutant discharge standards of heavy polluters are usually higher when the government policies and regulations are stricter. Therefore, enterprises need to adopt diversified environmental protection practices such as source prevention or recycling to meet the policy requirements (Buisse and Verbeke 2003). Companies are more inclined to choose pollution-prevention or environmental-protection leader-type environmental strategies rather than reactive environmental strategies. In addition, the social costs paid by enterprises for their pollution violations, which include higher fines or closer environmental supervision, become higher as the policies and regulations become more stringent (Berrone et al. 2013). Such default risks force enterprises to implement more active environmental strategies. The difference between policy

pressure and regulatory pressure on the selection of environmental strategy for enterprises is reflected in that government policy provides financial subsidy or differentiated policy support for environmental protection enterprises to encourage enterprises to choose a more positive environmental strategy (D. Williamson, Lynch-Wood, and Ramsay 2006). However, the regulatory pressure focuses on the warning and punishment of environmental violations by heavily polluting enterprises, and no effective incentive mechanism has been put in place (Vannoorenberghe 2012). Enterprises are unwilling to invest more resources to implement an environmental protection leadership strategy when they can avoid the risk of environmental violation by implementing a prevention strategy for environmental pollution.

Informal institutional pressure comes from the behaviors and standards established for enterprises by professional organizations and social actors (Hu, Song, and Wang 2017), which are mainly manifested as the need for enterprises to keep in line with social norms (Clarkson et al. 2008). A large number of studies have shown that although social norms are not formal institutions, they play a decisive role in corporate strategic decision-making (Lounsbury, Ventresca, and Hirsch 2003). As a part of informal organizations, the public can make a collective voice through newspapers, the Internet and other news media, directly pressuring enterprises (King 2008). The public can also indirectly transmit complaints to enterprises about pollution and advocate environmental protection to the government, which forces enterprises to choose a positive environmental strategy. In a way that is similar to regulatory pressure, social organizations and the public focus on whether enterprises comply with environmental protection regulations, which makes it difficult to effectively motivate enterprises to comply and choose more advanced environmental strategies.

H1a, H1b and H1c are proposed based on the aforementioned analysis.

H1a: Heavy polluters will more likely choose environmentally friendly leader-oriented environmental strategies as policy pressure increases;

H1b: Heavy polluters will more likely choose a pollution-prevention environmental strategy as regulatory pressure increases;

H1c: Heavy polluters will more likely choose pollution-prevention environmental strategies as public pressure increases.

### The Moderating Effect of Resource Characteristics on Institutional Pressure and Environmental Strategic Choice of Heavily Polluting Enterprises

Enterprises in the same industry and region, which are constrained by a set of environmental regulations, government regulations and public supervision, may face similar institutional pressures. Enterprises should adopt a homogeneous environmental strategy as described in Meyer's "protocol consistency" viewpoint (Meyer and Rowan 1977). In practice, the strategic response of enterprises to institutional pressures is heterogeneous. Why do enterprises choose heterogeneous strategy? This paper attempts to give an explanation from the perspective of resource characteristics.

Both the institutional theory and the resource-based view fully affirm the importance of resources in the process of strategic selection of enterprises. Institutional theory holds that enterprises can obtain scarce

resource input through establishing relations with stakeholders to meet their legitimacy (Baum and Oliver 1992). Heavy polluters can build a good environmental image and improve their corporate reputation by creating and maintaining stakeholders concerned with environmental responsibility, environmental litigation and corporate environmental protection practices (Huang and Chen 2015). The resource-based view points out that irreplaceable, valuable and hard-to-imitate resources are an important consideration for the strategic decisions of enterprises (Barney, Wright, and Ketchen Jr 2001). The differences in resources lead different enterprises to choose the differentiation strategy most suitable for external requirements (Carnes et al. 2019). Specifically, the influence of institutional pressure on the strategic choice of enterprise environment may depend on two internal resource differences: organizational slack and asset specificity.

Organizational slack is the stock of idle resources that an organization can transfer or redeploy to achieve organizational goals (C. Chen, Wan, and Zhu 2019). Bradley et al. (2011) believe that organizational slack enhances organizational adaptability, enables it to adapt to changes in the external environment, and is capable of adopting diversified strategies and even triggering strategic changes (Zhao, Zhang, and Chen 2014). As external institutional pressures increase, for example when the government raises pollutant discharge standards and imposes stricter pollution penalties, resource-rich enterprises are better able to ensure the necessary resources and talents, promote active environmental management practices and implement more advanced environmental strategies. In contrast, when the organizational slack is relatively small, enterprises often make use of scarce resources to meet their most urgent needs, focusing on the business efficiency of enterprises, ignoring environmental requirements or responding to external pressure in a greenwash way, and environmental strategy is more passive. In addition, organizational slack can effectively buffer the uncertain risks generated by enterprise investment and research and development (Xie and Wei 2016). Heavily polluting enterprises are more inclined to choose more positive environmental strategies as the external institutional pressure increases, which is followed by the introduction of more environmental protection equipment and resources for clean production and green innovation. Enterprises face the risk of loss of fixed assets caused by the renewal of new environmental protection equipment, as well as the risk of failure of green research and development. Enterprises with more organizational slack are more conducive to buffering these risks and promoting the implementation of advanced environmental strategies. The following hypotheses are proposed based on the aforementioned analysis:

H2a: Heavy polluters that are more redundant organizations will be more inclined to choose environmental leadership strategies as policy pressure increases;

H2b: Heavy polluters that are more redundant organizations will be more inclined to choose environmental leadership strategies as regulatory pressure increases;

H2c: Heavy polluters that are more redundant organizations will be more inclined to choose environmental leadership strategies as pressure from public opinion increases.

Asset specificity refers to the extent to which an asset can be redeployed and utilized by users without sacrificing its production value (O.E. Williamson 1984). It also reflects to some extent the submerged characteristics of asset specificity (Pang and Zhuang 2017). The value loss of organizations with a high degree of asset specificity in the case of default is much higher than that of enterprises with a low degree of

asset specificity. Therefore, with the strengthening of external institutional pressure, changes to the existing environmental management practices are difficult to meet the environmental needs of stakeholders. Failure to adopt a more active environmental strategy will lead to the loss of more environmentally sensitive investors and customers or result in higher legal costs and government sanctions (Kassinis and Vafeas 2009). Conversely, if an enterprise avoids default and redeploys proprietary assets away from existing uses, its productive value will be lost (Yao, Tang, and Pan 2009). Environmentally concerned corporate stakeholders will force enterprises to allocate resources to further advanced environmental practices as government environmental policies become more stringent or regulation becomes more frequent. The value of these proprietary assets will be greatly reduced if they are allocated and tilted towards the environmental protection. Therefore, enterprises with strong proprietary assets will be more inclined to seek more positive environmental strategies to cope with these pressures as institutional pressure increases. The following hypotheses are proposed based on the aforementioned analysis.

H3a: Heavy polluters that have a higher degree of asset specificity will be more inclined to choose an environmental leadership strategy as policy pressure increases;

H3b: Heavy polluters that have a higher degree of asset specificity will be more inclined to choose an environmental leadership strategy as regulatory pressure increases;

H3c: Heavy polluters that have a higher degree of asset specificity will be more inclined to choose an environmental leadership strategy as public pressure increases.

## Research Methods

### Sample Selection and Data Collection

We used the definition and classification of heavily polluting industries described in the Guidelines for Environmental Information Disclosure of Listed Companies (Draft for Comments) issued by the Ministry of Environmental Protection. In this paper, 640 enterprises in heavily polluting industries were selected according to industry classification from the Guotai'an database.

Problems existing in the data, for example outliers and absence of data, were dealt with before the model was built as follows. (1) Companies marked as ST (stocks that have lost money for two consecutive years) in 2015 were manually deleted; (2) Observation values that were missing or zero values for core indexes, such as enterprise fixed assets, return on assets and listing time in the database, were supplemented using information obtained from the annual reports of enterprises. Finally, 597 enterprises were selected for our analysis.

### Measurement of Variables

Here we describe the explained, explanatory and moderator variables used in our study.

Explained variables. Environmental strategy (EnvStr), which refers to the environmental strategy measurement method proposed by Lin (2012), analyzes and codes relevant environmental protection

practices in the social responsibility reports of listed companies as follows. When words such as “waste of energy,” “sewage treatment” and “environmental clean-up” appear in the report, it means that the enterprise implements reactive environmental strategy (ReaStr), and the environmental strategy is encoded as 1; when the words “reuse,” “recycle” and “source control” appear in the report, it indicates that the enterprise adopts the pollution prevention strategy (PreStr), and the code number is 2; when the report mentions words such as “product life cycle,” “supply chain participation” and “green products,” companies implement green leadership strategy (LeaStr), which is coded 3; when keywords representing different types of environmental strategies appear in the sample of enterprises, it is considered that the enterprise has implemented a relatively higher level of environmental strategy. In addition, some enterprises have not released their social responsibility reports. In these cases, we searched their official websites and screened out relevant environmental protection information for coding using the aforementioned principles. Finally, in order to reduce subjective bias in the process of artificial coding, this study involved a double-blind coding method. The degree of matching for the final two codes is as high as 92.8%, which indicates relatively high reliability.

**Explanatory variables.** Policy pressure (Pol) refers to the way in which different scholars use different measures to measure policy pressure. This paper adopts a number of environmental administrative regulations issued by local governments based on the research of Wang and Xu (2015).

Regulatory pressure (Reg) is defined as follows in our study. Berrone et al. (2013) used the number of inspections by regulated entities to measure regulatory pressure in their research. This is based on the premise that companies in provinces with more inspections by regulated entities face greater regulatory pressure than those in provinces with less inspections by regulated entities. We use the number of administrative punishment cases of local governments as a proxy variable of regulatory pressure by referring to the measurement method of Berrone et al. (2013).

Public pressure (Pub) is defined as follows in our study. Dasgupta & Wheeler (1997) used letters of public complaints on local problems to represent the attention of the public to environmental protection, and believed that enterprises in regions with many telephone and Internet complaints faced a relatively high level of public pressure. Clarkson et al. (2008), when investigating the impact of supervision on public opinion for corporate environmental behavior, used relevant environmental reports by the media as proxy variables for the effect of supervision on public opinion. We believe that media reports focus more on the pressure of public opinion faced by enterprises, and most of the attitudes and opinions of the public on environmental pollution and other issues are not reflected through media channels. The number of public complaints about environmental issues was therefore used to represent the public pressure by referring to the research of Dasgupta & Wheeler (1997).

**Moderator variables.** The ratio between working capital and sales was selected as the proxy variable of organizational slack (Slack) according to the existing literature (Fleming and Bromiley 2003). Asset specificity (Speci) takes into account that the investment of enterprises in production plants and machinery equipment is not easy to be redeployed. The logarithm of the ratio of fixed assets to the number of employees of the company was adopted as the proxy variable of asset proprietary taking Berrone (2013) as a reference.

In addition, we controlled environmental strategy influencing factors from the perspectives of enterprises and executives to eliminate the influence of other factors on the regression model and data analysis according to previous research literature (2013). Factors at the enterprise level include enterprise size(Size), industry type (Indu), time to market(Time), and financial performance (ROA); factors at the executive level include age of the chairman(Age) and education (Educ). Table 1 describes the relevant variables.

Table 1  
Description of major variable measures

<b>Variable categories</b>	<b>Variable name</b>	<b>Variable symbol</b>	<b>Variable measure</b>
Explained variable	Environmental strategies	EnvStr	Code of the relevant environmental protection practices in the social responsibility reports of listed companies
Explanatory variables	Policy pressure	Pol	Number of environmental administrative regulations issued by local governments
	Regulatory pressure	Reg	Number of administrative punishments imposed by local governments
	Public pressure	Pub	Number of public complaints on environmental issues
Regulating variables	Organizational slack	Slack	Ratio of working capital to sales
	Asset specificity	Speci	Ratio of fixed assets of a company to the number of employees

## Analysis Of Research Results

### Descriptive Statistics and Correlation Analysis

All continuous variables were treated with WinSOR1% to remove the influence of outliers on the regression results. Descriptive statistics and correlation analysis results, excluding major variables outside the industry, are reported in Tables 2 and 3, respectively.

Table 2  
Descriptive statistics of key variables

variable	The mean	The standard deviation	The maximum	The minimum
EnvStr	1.63	0.60	3	1
Poli	1.52	1.64	9.33	0
Reg	9.05	5.55	27.02	0.991
Peo	54.75	92.89	443.27	2.287
Slack	0.038	0.705	8.58	-10.32
Speci	11.32	3.13	16.57	0
Size	22.42	1.36	27.04	18.19
ROA	0.03	0.09	0.392	-0.884
Time	17.54	4.64	25	4
Age	53.51	6.84	75	29
Educ	3.50	0.94	6	1

Table 3  
Pearson correlation coefficient between major variables

variable	1	2	3	4	5	6
EnvStr	1.00					
Poli	0.22***	1.00				
Reg	0.043	0.2***	1.00			
Peo	0.019	-0.12***	-0.30	1.00		
Slack	0.021	-0.014	0.024	0.065	1.00	
Speci	0.15***	-0.014	0.032	-0.008	0.027	1.00
* P < 0.1, ** P < 0.05, *** P < 0.01.						

The correlation coefficient between policy pressure and environmental strategy was 0.22, and there was a positive correlation (Table 3). The correlation between regulatory pressure, public pressure and environmental strategy was not significant, which preliminarily indicated the rationality of hypothesis H1. The correlation coefficients of all explanatory variables were less than 0.4, and there was no serious multicollinearity.

## Regression Analysis of the Relationship Between Institutional Pressure and Environmental Strategy of Heavily Polluting Enterprises

The environmental strategy-type of explained variable belongs to ordered multi-categorical variables, which are estimated by a multi-logit model. The regression results of the relationship between institutional pressure and environmental strategy are shown in Table 4. Models M1 to M4 successively added explanatory variables for policy, regulatory and public pressure. As can be seen from the estimation results of model M4, the influence of policy pressure on enterprises to choose a responsive and environmentally friendly leadership environmental strategy was negative ( $\beta=-0.288, P<0.01$ ) and positive ( $\beta=0.221, P<0.05$ ), respectively. The more heavily polluting enterprises reject the reactive strategy and were more likely to choose an environmental leadership strategy as policy pressure increased. H1a was verified. The influence of regulatory pressure on the choice of a reactive environmental strategy was significantly negative ( $\beta=-0.0438, P<0.05$ ), and the influence on the choice of an environmental leadership strategy by an enterprise was not significant. This indicated that enterprises tend to choose pollution prevention strategies as the government strengthens regulatory pressure. The results verified hypothesis H1b. The influence of public pressure on the choice of a reactive environmental strategy by an enterprise was significantly negative ( $\beta=-0.007, P<0.01$ ), and the influence on the choice of an environmental leadership strategy by an enterprise was not significant. This indicated that enterprises tend to choose pollution prevention strategies as the government strengthens public pressure. The empirical results confirmed hypothesis H1c.

Table 4

Regression results of the relationship between institutional pressure and corporate environmental strategy

Explanatory variables	Explained variable							
	M1		M2		M3		M4	
	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr
Poli			-0.28*** (-3.78)	0.21** (2.19)	-0.26*** (-3.48)	0.214** (2.19)	-0.288*** (-3.69)	0.221** (2.25)
Reg					-0.017 (-0.90)	0.007 (0.22)	-0.0438** (-2.11)	0.0113 (0.30)
Peo							-0.007*** (-3.55)	0.001 (0.47)
Size	-0.136* (-1.78)	-0.0849 (-0.53)	-0.16** (-2.05)	-0.074 (-0.46)	-0.16** (-2.05)	-0.074 (-0.46)	-0.140 (-1.73)	-0.102 (-0.65)
ROA	0.872 (0.72)	2.706 (0.98)	0.525 (0.42)	3.102 (1.15)	0.468 (0.37)	3.158 (1.16)	-0.0641 (-0.28)	0.0479 (1.08)
Time	0.00278 (0.15)	0.0784** (2.03)	-0.001 (0.05)	0.08** (1.96)	-0.002 (-0.01)	0.078** (1.97)	0.00614 (0.39)	0.0192 (0.59)
Age	0.00264 (0.39)	0.0209 (0.66)	0.002 (0.01)	0.029 (0.87)	0.001 (0.06)	0.0274 (0.82)	-0.154 (-1.31)	0.554** (2.16)
Educ	-0.181 (-1.61)	0.517** (2.03)	-0.194* (-1.69)	0.56** (2.13)	-1.96* (-1.70)	0.557** (2.13)	-0.153*** (-4.36)	-0.106 (-1.63)
Indu	-0.136*** (-4.08)	-0.102 (-1.60)	-0.14*** (-4.17)	-0.10 (-1.54)	-0.14*** (-4.21)	-0.10 (-1.53)	5.319** (2.42)	-3.784 (-0.90)
Cons	4.134** (2.04)	-3.703 (-0.87)	5.301** (2.52)	-4.962 (-1.2)	5.44*** (2.58)	-5.01 (-1.16)	-0.288*** (-3.69)	0.221** (2.25)

The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; \*p < 0.1\*\*, P < 0.05, \*\*\* P < 0.01

Explanatory variables	Explained variable							
	M1		M2		M3		M4	
	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr
observations	597		597		597		597	
LR chi2	37.14		62.21		64.19		37.89	
Prob > chi2	0.0002		0.0000		0.0000		0.0040	
Pseudo R2	0.1011		0.1424		0.1610		0.1050	
The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; *p < 0.1**, P < 0.05, *** P < 0.01								

## Analysis of the Moderating Effect of Organizational Slack

The regression results of multiple logit models for the adjustment effect of organizational slack are shown in Table 5. Models M5, M6 and M7 use multiple logit models in turn to challenge the consistency of “etiquette,” which verified that organizational slack is a heterogeneous choice for the environmental strategy of heavily polluting companies under policy, regulatory and public pressures. The estimation result of model M5 showed that the coefficients of the interaction terms between redundant resources and policy pressure were  $\beta = -0.00725$  ( $P < 0.1$ ) and  $\beta = 0.0676$  ( $P < 0.1$ ), which indicated that the more redundant organizations of heavily polluting enterprises and the increase in policy pressure make enterprises more inclined to choose environmentally protection-led environmental strategies. Hypothesis H3a was verified. In model M6, the coefficients of the interaction terms between redundant resources and regulatory pressure were  $\beta = -0.065$  ( $P < 0.05$ ) and  $\beta = 0.17$  ( $P < 0.1$ ), respectively. This indicated that enterprises with abundant organizational slack reject reactive strategies and prefer environmental leadership strategies as regulatory pressure increases. Hypothesis H3b was verified. Model M7 showed that the interaction term coefficient between redundant resources and public pressure was not significant, and the empirical results did not adequately verify H3c.

Table 5

Regression results of organizational slack on heterogeneous response to environmental strategy of heavily polluting enterprises under institutional pressure

Explained variable						
Explanatory variables	M5		M6		M7	
	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr
Poli	-0.00167 (-0.21)	0.0153 (0.92)	-0.6*** (-3.48)	0.24** (2.19)	-0.2*** (-3.69)	0.221** (2.25)
Reg	-0.085*** (-3.47)	0.0247 (0.74)	-0.017 (-0.90)	0.007 (0.22)	-0.04** (-2.11)	0.0113 (0.30)
Peo	-0.004* (-2.46)	-0.00057 (-0.29)	-0.007*** (-3.56)	0.00121* (2.59)	-0.07*** (-3.55)	0.001 (0.47)
Slack	-0.0881 (-0.52)	1.001 (1.50)	-0.05 (-1.43)	1.062 (1.50)	-0.15 (-1.83)	1.117 (1.32)
Poli*Slack	-0.00725* (-2.44)	0.0676* (2.55)				
Reg*Slack			-0.065** (-2.94)	0.17* (2.12)		
Peo*Slack					-0.00003 (-0.05)	0.00151 (1.36)
Size	-0.171* (-2.01)	-0.05 (-0.29)	-0.16** (-2.05)	-0.074 (-0.46)	-0.140 (-1.73)	-0.102 (-0.65)
ROA	0.801 (0.53)	1.527 (0.49)	0.468 (0.37)	3.158 (1.16)	-0.0641 (-0.28)	0.0479 (1.08)
Time	0.0792 (0.26)	0.08** (1.96)	-0.002 (-0.01)	0.078* (1.97)	0.00614 (0.39)	0.0192 (0.59)
Age	0.0130 (0.81)	0.00663 (0.21)	0.001 (0.06)	0.0274 (0.82)	-0.154 (-1.31)	0.554** (2.16)
Educ	-0.191 (-1.62)	0.555* (2.16)	-1.96* (-1.70)	0.557** (2.13)	-0.13*** (-4.36)	-0.106 (-1.63)

The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; \*p < 0.1, \*\* P < 0.05, \*\*\* P < 0.01

Explained variable						
Indu	-0.141*** (-4.06)	0.116* (1.79)	-0.4*** (-4.21)	-0.10 (-1.53)	5.319** (2.42)	-3.784 (-0.90)
Cons	4.942* (2.31)	-2.824 (-0.66)	5.44*** (2.58)	-5.01 (-1.16)	-0.8*** (-3.69)	0.221** (2.25)
observations	597		597		597	
LR chi2	62.21		64.19		92.63	
Prob > chi2	0.0000		0.0000		0.0040	
Pseudo R2	0.1149		0.1230		0.1472	
The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; *p < 0.1, ** P < 0.05, *** P < 0.01						

## Analysis of the Regulatory Effect of Asset Specificity

The regression results of multiple logit models for the proprietary regulatory effect of assets of heavily polluting enterprises are shown in Table 6. Models M8, M9 and M10 successively adopt a number of logit models, which challenges the idea of “etiquette” consistency from the perspective of asset ownership. This verified the regulating effect of asset ownership on the relationship between policy pressure, regulatory pressure, public pressure and environmental strategy for heavily polluting enterprises. In model M8, the coefficients of the interaction terms between asset specificity and policy pressure were  $\beta = -0.0244$  ( $P < 0.05$ ) and  $\beta = 0.0653$  ( $P < 0.1$ ), respectively. This result showed that enterprises tend to choose a more positive environmental strategy when the policy pressure increases and the asset specificity is higher. Hypothesis H4a was verified. In model M9, the coefficients of the interaction terms between asset specificity and regulatory pressure were  $\beta = -0.0154$  ( $P < 0.1$ ) and  $\beta = 0.00358$  ( $P < 0.1$ ), respectively. This indicates that enterprises tend to choose an environmental leadership strategy as the regulatory pressure increases. Hypothesis H4b was verified. In model M10, the coefficients of the interaction terms between asset specificity and public pressure were  $\beta = -0.0004$  ( $P < 0.1$ ) and  $\beta = 0.1676$  ( $P < 0.05$ ), respectively. This indicated that the probability of enterprises choosing reactive, pollution-defense and environmental leadership strategies increased successively as the pressure exerted by the public on enterprises increased. The empirical results confirmed H4c.

Table 6

Regression results of asset specificity in heterogeneous response to environmental strategy of heavily polluting enterprises under institutional pressure

Explained variable						
Explanatory variables	M8		M9		M10	
	ReaStr	LeaStr	ReaStr	LeaStr	ReaStr	LeaStr
Poli	-0.292*** (-3.52)	0.252* (2.48)	-0.302*** (-3.69)	0.233* (2.33)	-0.319*** (-3.76)	0.238* (2.26)
Reg	-0.0444* (-2.10)	0.0091 (0.24)	-0.0557* (-2.43)	0.0123 (0.32)	-0.0605* (-2.39)	0.0122 (0.36)
Peo	-0.007*** (-3.62)	0.00084 (0.40)	-0.007*** (-3.56)	0.00121 (0.59)	-0.00525** (-2.94)	-0.00226 (-0.6)
Speci	-0.0781 (-1.62)	1.001 (1.50)	-0.05 (-1.43)	1.062 (1.50)	-0.0781 (-1.62)	1.101* (1.99)
Poli* Speci	-0.0244** (-2.62)	0.0653* (2.23)				
Reg* Speci			-0.0154* (-2.41)	0.00358* (2.22)		
Peo* Speci					-0.0004* (-2.14)	0.1676** (2.85)
Size	-0.126 (-1.46)	0.0125 (0.07)	-0.135 (-1.56)	0.00924 (0.05)	-0.147 (-1.70)	-0.0211 (-0.11)
ROA	0.387 (0.25)	0.662 (0.19)	0.426 (0.28)	1.001 (1.16)	0.651 (0.43)	1.306 (0.37)
Time	0.0848 (0.29)	-0.627 (-0.93)	-0.0203 (-1.02)	0.0858* (2.08)	-0.016 (-0.80)	0.0165 (0.59)
Age	0.00768 (0.48)	0.0194 (0.54)	0.00927 (0.57)	0.0289 (0.83)	0.0104 (0.64)	0.0245 (0.71)
Educ	-0.135 (-1.13)	0.560* (2.05)	-0.113 (-0.94)	0.557** (2.13)	-0.152 (-1.27)	0.498 (1.87)

The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; \*p < 0.1, \*\* P < 0.05, \*\*\* P < 0.01

Explained variable						
Indu	-0.156*** (-4.35)	-0.095 (-1.44)	-0.158*** (-4.41)	-0.0980 (-1.48)	-0.148*** (-4.17)	-0.0814 (-1.24)
Cons	4.961* (2.24)	-6.201 (-1.32)	5.165* (2.32)	-6.586 (-1.43)	5.034* (2.28)	-5.325 (-1.15)
Observations	597		597		597	
LR chi2	90.31		90.93		91.59	
Prob > chi2	0.0000		0.0000		0.0040	
Pseudo R2	0.1612		0.1638		0.1701	
The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; *p < 0.1, ** P < 0.05, *** P < 0.01						

## Robustness Test

A robustness test was carried out to investigate the robustness of the main effect. First, the proxy variable of regulatory pressure was replaced by the number of staff in regional environmental protection agencies to verify whether the above conclusions were still valid. Second, multiple Probit regression was used for verification since the dependent variable belongs to the ordered multiple categorical variables (Q. Chen 2014). The substitution of regulatory pressure proxy variables and the adoption of multiple Probit model regression showed that the empirical results and conclusions were unchanged (Table 7). The empirical results were stable and robust.

Table 7  
Regression results of robustness test

Explanatory variables	Explained variable			
	Sample Total Logit of alternative regulatory pressures(M13)		Multinomial Probit Regression of sample population (M14)	
	ReaStr	LeaStr	ReaStr	LeaStr
Poli	-0.299*** (-3.68)	0.210** (2.07)	-0.226*** (-3.81)	0.126* (1.80)
Reg	-0.0592** (-2.38)	0.00465 (0.14)	-0.0401** (-2.31)	0.004 (0.16)
Peo	-0.00517*** (-3.06)	0.00089 (0.47)	-0.00547*** (-3.87)	0.000151 (0.10)
Size	-0.152* (-1.87)	-0.0866 (-0.54)	-0.119 (-1.75)	-0.0839 (-0.79)
ROA	0.376 (0.28)	3.062 (1.16)	0.320 (0.29)	2.174 (1.20)
Time	-0.00659 (-0.34)	0.0777* (1.98)	-0.00661 (-0.40)	0.0538** (2.06)
Age	0.00744 (0.47)	0.0280 (0.83)	0.00504 (0.37)	0.0162 (0.72)
Educ	-0.172 (-1.45)	0.559* (2.14)	-0.122 (-1.23)	0.329 (1.94)
Indu	-0.149*** (-4.25)	-0.0974 (-1.52)	-0.133*** (-4.52)	-0.0773* (-1.80)

The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; \*p < 0.1, \*\* P < 0.05, \*\*\* P < 0.01.

Explanatory variables	Explained variable			
	Sample Total Logit of alternative regulatory pressures(M13)		Multinomial Probit Regression of sample population (M14)	
	ReaStr	LeaStr	ReaStr	LeaStr
Constant term	5.340** (2.46)	-4.770 (-1.11)	4.512** (2.48)	-2.309 (-0.38)
Observations	597		597	
LR chi2	86.54		N	
Wald chi2	N		72.55	
Prob > chi2	0.0000		0.0000	
The baseline group is the environmental strategy of pollution prevention; Z value in parentheses; *p < 0.1, ** P < 0.05, *** P < 0.01.				

## Research Conclusions And Implications

### Main Conclusions

This paper focuses on how heavily polluting enterprises choose heterogeneous environmental strategies, analyzes the relationship between institutional pressures and environmental strategic choices for such enterprises, and explores the heterogeneous choices of enterprise environmental strategy from the perspective of resources available. The main conclusions are as follows.

The influence of different institutional pressures on the choice of environmental strategy differs. Firstly, enterprises were more likely to adopt an environmental leadership strategy if the policy pressure was greater. Secondly, enterprises increasingly rejected the reactive environmental strategy if the regulatory pressure or public pressure increased, but there was no significant impact on whether the company made a choice for an environmental leadership strategy under these conditions. Our results differ from earlier research that concludes that companies are more active in corporate environmental strategy as institutional pressure increases (Menguc, Auh, and Ozanne 2010). Our study subdivides the types of environmental strategies. It finds that increased regulatory or public pressure does not prompt enterprises to choose the environmental leadership strategy because the two kinds of pressure do not form an effective incentive mechanism for enterprises.

Organizational slack makes the response of corporate environmental strategy induced by institutional pressure heterogeneous. Organizational slack positively regulated the relationship between policy pressure and environmental strategy selection for heavily polluted enterprises. Similarly, enterprises were more inclined to choose advanced environmental strategies, the higher the organizational slack for heavily polluting enterprises, and the greater the regulatory pressure on these companies. This paper verifies that redundant resources can effectively buffer enterprise resource shortages and make enterprises better adapt to the

external institutional environment, and is consistent with most of the research results on organizational slack (Kuusela, Keil, and Maula 2017). However, previous studies mostly focused on the role of organizational slack in the field of enterprise capability and innovation (Geiger and Makri 2006; Iyer and Miller 2008). Our paper extended organizational slack to the level of enterprise strategy and found that redundant resources promoted enterprises to implement more advanced environmental strategies.

The relationship between institutional pressure of asset specificity promotion and environmental strategic choice was investigated. For enterprises with strong proprietary assets, the greater the public and regulatory pressure or public pressure, the more inclined they were to choose the environmental leadership strategy. Research on asset specificity in transaction economic theory mostly uses the degree of asset specificity to weigh whether an organization implements vertical integration strategy (H. Wang, Zhao, and Chen 2017). Our paper takes asset specificity as an important strategic resource for heavily polluting enterprises who want to cope with external institutional pressure and implement active environmental protection practices. It thus extends the research to include asset specificity. In addition, the heterogeneity rather than the homogeneity of the responses to institutional pressure on corporate environmental strategy was studied from the perspective of organizational slack and asset specificity. This has enriched research on the heterogeneous selection of environmental strategies by heavily polluting enterprises under the institutional isomorphism.

## **Policy Proposal**

Our paper proposes the following policy recommendations for government and relevant private sector enterprises based on our research findings.

At the government level, the first step is to actively promote the implementation of environmental governance policies. The central government has improved the top-level design of environmental governance policies. Local governments, which have focused on the central policies and guidelines and the current situation for regional pollution, have formulated policies and measures suitable for local green development. These measures include pollution control, ultra-low emission subsidies, carbon emission trading and others. At the same time, relevant government departments should increase the frequency and availability of supervision, and correctly guide and advocate the participation of all people in pollution measures. Central and local environmental protection supervision should act alternately and complement each other. This will help to reduce the “fluke mentality” of enterprises and the opportunistic behavior to engage in activities with illegal emissions. Also, the Internet should be used as the channel to increase the exposure of inspection results and force enterprises to pay attention to the treatment of pollutants at source. In general, institutional incentives and pressure should be combined to jointly promote the sustainable development of heavily polluting enterprises.

At the enterprise level, it is suggested that enterprises with abundant organizational slack tilt and allocate resources to environmental governance. In the face of increasingly strict requirements for environmental protection systems, enterprises respond in different ways to institutional pressure. Enterprises that have more redundancy within their organization can realize upgrades to environmental strategy by allocating redundant resources to environmental protection. This alleviates the impact of external pressure on enterprises. If an enterprise has a high degree of proprietary assets, it should implement a strategy to avoid environmentally

sensitive external stakeholders taking measures such as divestment, which will cause losses to the enterprise and threaten its survival.

## Declarations

### Compliance with Ethical Standards

The authors have no relevant competing interests to disclose.

Human Participants and Animals are not involved in the research.

### Consent to Participate and Publish

The authors approve the version to be participated and published.

### Author contributions

Sen WANG and Jianhua YIN conceived the study and were responsible for the design and development of the data analysis. Xiaomei ZHU was responsible for data collection and analysis.

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## References

1. **Barney, Jay, Wright, Mike, and Ketchen Jr, David J.** 2001. "The resource-based view of the firm: Ten years after 1991." *Journal of management*, 27 (6): 625-641. <https://doi.org/10.1002/smj.4250160303>.
2. **Baum, Joel AC, and Oliver, Christine.** 1992. "Institutional embeddedness and the dynamics of organizational populations." *American sociological review*. 540-559. <https://doi.org/10.2307/2096100>.
3. **Berrone, Pascual, Fosfuri, Andrea, Gelabert, Liliana, and Gomez-Mejia, Luis R.** 2013. "Necessity as the mother of 'green'inventions: Institutional pressures and environmental innovations." *Strategic Management Journal*, 34 (8): 891-909. <https://doi.org/10.1002/smj.2041>.
4. **Bradley, Steven W, Shepherd, Dean A, and Wiklund, Johan.** 2011. "The importance of slack for new organizations facing 'tough'environments." *Journal of Management Studies*, 48 (5): 1071-1097.

<https://doi.org/10.1111/j.1467-6486.2009.00906.x>.

5. **Buysse, Kristel, and Verbeke, Alain.** 2003. "Proactive environmental strategies: A stakeholder management perspective." *Strategic management journal*, 24 (5): 453-470.  
<https://doi.org/10.1002/smj.299>.
6. **Carnes, Christina Matz, Xu, Kai, Sirmon, David G, and Karadag, Reha.** 2019. "How Competitive Action Mediates the Resource Slack–Performance Relationship: A Meta-Analytic Approach." *Journal of Management Studies*, 56 (1): 57-90. <https://doi.org/10.1111/joms.12391>.
7. **Chen, Cheng, Wan, Shan, and Zhu, Le.** 2019. "Executive Compensation of state-owned enterprises and corporate Social responsibility—Organizational slack and the moderating effect of marketization process." *China Soft Science*, 6: 129-137.
8. **Chen, Qiang.** 2014. *Advanced Econometrics and Stata Applications (2nd Edition)*. Higher Education Press.
9. **Clarkson, Peter M, Li, Yue, Richardson, Gordon D, and Vasvari, Florin P.** 2008. "Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis." *Accounting, organizations and society*, 33 (4-5): 303-327. <https://doi.org/10.1016/j.aos.2007.05.003>.
10. **Clemens, Bruce, and Douglas, Thomas J.** 2006. "Does coercion drive firms to adopt 'voluntary' green initiatives? Relationships among coercion, superior firm resources, and voluntary green initiatives." *Journal of business research*, 59 (4): 483-491. <https://doi.org/10.1016/j.jbusres.2005.09.016>.
11. **Dasgupta, Susmita, and Wheeler, David.** 1997. *Citizen complaints as environmental indicators: evidence from China*. The World Bank.
12. **Dimaggio, Paul J, and Powell, Walter W.** 1983. "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields." *American sociological review*. 147-160.  
<https://doi.org/10.2307/2095101>.
13. **Fan, Qunlin, Shao, Yunfei, and Tang, Xiaowo.** 2013. "The impact of environmental policy, technological progress, and market structure on environmental technology innovation." *Science Research Management*, 6.
14. **Fleming, Lee, and Bromiley, Philip.** 2003. *A prospect theory model of R&D allocation and invention*. Harvard Business School Working Paper Series.
15. **Freeman, R Edward.** 2010. *Strategic management: A stakeholder approach*. Cambridge university press.
16. **Geiger, Scott W, and Makri, Marianna.** 2006. "Exploration and exploitation innovation processes: The role of organizational slack in R & D intensive firms." *The Journal of High Technology Management Research*, 17 (1): 97-108. <https://doi.org/10.1016/j.hitech.2006.05.007>.
17. **Hu, Jun, Song, Xianzhong, and Wang, Hhongjian.** 2017. "Informal institution, hometown identity and corporate environmental governance." *Management World*, 3: 76-94.
18. **Huang, Rongbing, and Chen, Danping.** 2015. "Does environmental information disclosure benefit waste discharge reduction? Evidence from China." *Journal of Business Ethics*, 129 (3): 535-552.  
<https://doi.org/10.1007/s10551-014-2173-0>.
19. **Iyer, Dinesh N, and Miller, Kent D.** 2008. "Performance feedback, slack, and the timing of acquisitions." *Academy of Management Journal*, 51 (4): 808-822. <https://doi.org/10.5465/amr.2008.33666024>.

20. **Kaplan, Sarah.** 2011. "Research in cognition and strategy: Reflections on two decades of progress and a look to the future." *Journal of Management Studies*, 48 (3): 665-695. <https://doi.org/10.1111/j.1467-6486.2010.00983.x>.
21. **Kassinis, George, and Vafeas, Nikos.** 2006. "Stakeholder pressures and environmental performance." *Academy of Management Journal*, 49 (1): 145-159. <https://doi.org/doi.org/10.5465/amj.2006.20785799>.
22. **George, Kassinis, and Nikos, Vafeas** 2009. "Environmental performance and plant closure." *Journal of Business Research*, 62 (4): 484-494. <https://doi.org/10.1016/j.jbusres.2008.01.037>.
23. **King, Brayden G.** 2008. "A political mediation model of corporate response to social movement activism." *Administrative Science Quarterly*, 53 (3): 395-421. <https://doi.org/10.2189/asqu.53.3.395>.
24. **Kuusela, Pasi, Keil, Thomas, and Maula, Markku.** 2017. "Driven by aspirations, but in what direction? Performance shortfalls, slack resources, and resource-consuming vs. resource-freeing organizational change." *Strategic management journal*, 38 (5): 1101-1120. <https://doi.org/10.1002/smj.2544>.
25. **Lin, Haiying.** 2012. "Cross-sector alliances for corporate social responsibility partner heterogeneity moderates environmental strategy outcomes." *Journal of Business Ethics*, 110 (2): 219-229. <https://doi.org/10.1007/s10551-012-1423-2>.
26. **Lounsbury, Michael, Ventresca, Marc, and Hirsch, Paul M.** 2003. "Social movements, field frames and industry emergence: a cultural-political perspective on US recycling." *Socio-economic review*, 1 (1): 71-104.
27. **Luo, Danglun, and Lai, Zaihong.** 2016. "Investment of heavily polluting enterprises and promotion of local officials-based on the practical investigation of data for prefectural cities during 1999-2010." *Accounting Research*, 4: 42-48.
28. **Marquis, Chris, Jackson, Susan E, and Li, Yuan.** 2015. "Building sustainable organizations in China." *Management and Organization Review*, 11 (3): 427-440.
29. **Menguc, Bulent, Auh, Seigyoung, and Ozanne, Lucie.** 2010. "The interactive effect of internal and external factors on a proactive environmental strategy and its influence on a firm's performance." *Journal of Business Ethics*, 94 (2): 279-298. <https://doi.org/10.1007/s10551-009-0264-0>.
30. **Meyer, John W, and Rowan, Brian.** 1977. "Institutionalized organizations: Formal structure as myth and ceremony." *American journal of sociology*, 83 (2): 340-363. <https://doi.org/10.1086/226550>.
31. **Oliver, Christine.** 1991. "Strategic responses to institutional processes." *Academy of management review*, 16 (1): 145-179. <https://doi.org/10.5465/amr.1991.4279002>.
32. **Pang, Fanglan, and Zhuang, Guijun.** 2017. "Commitment to asymmetric trading of proprietary assets and inter-firm trust." *Industrial Engineering and Management*, 22 (3): 128-134.
33. **Pope, Holly C, Draper, Carrie, Younginer, Nicholas, Whitt, Olivia, and Paget, Christopher.** 2020. "Use of decision cases for building SNAP-Ed implementers' capacities to realize policy, systems, and environmental strategies." *Journal of nutrition education and behavior*, 52 (5): 512-521. <https://doi.org/10.1016/j.jneb.2019.09.020>.
34. **Reid, Erin M, and Toffel, Michael W.** 2009. "Responding to public and private politics: Corporate disclosure of climate change strategies." *Strategic Management Journal*, 30 (11): 1157-1178.

<https://doi.org/10.1002/smj.796>.

35. **Sharfman, Mark P, Wolf, Gerrit, Chase, Richard B, and Tansik, David A.** 1988. "Antecedents of organizational slack." *Academy of Management review*, 13 (4): 601-614.  
<https://doi.org/10.5465/amr.1988.4307484>.
36. **Vannooenbergh, Gonzague.** 2012. "Firm-level volatility and exports." *Journal of International Economics*, 86 (1): 57-67. <https://doi.org/10.1016/j.jinteco.2011.08.013>.
37. **Wang, Heli, Zhao, Shan, and Chen, Guoli.** 2017. "Firm-specific knowledge assets and employment arrangements: Evidence from CEO compensation design and CEO dismissal." *Strategic Management Journal*, 38 (9): 1875-1894. <https://doi.org/10.1002/smj.2604>.
38. **Wang, Shubin, and Xu, Yingzhi.** 2015. "Environmental regulation and haze pollution decoupling effect: based on the perspective of enterprise investment preferences." *China Industrial Economics*, 4: 18-30.
39. **Wang, Yun, Li, Yanxi, Ma, Zhuang, and Song, Jinbo.** 2017. "Media coverage, environmental regulation and corporate environment behavior." *Nankai Business Review*, 12: 42-54.
40. **Williamson, David, Lynch-Wood, Gary, and Ramsay, John.** 2006. "Drivers of environmental behaviour in manufacturing SMEs and the implications for CSR." *Journal of business ethics*, 67 (3): 317-330.  
<https://doi.org/10.1007/s10551-006-9187-1>.
41. **Williamson, Oliver E.** 1984. "The economics of governance: framework and implications." *Zeitschrift für die gesamte Staatswissenschaft/Journal of Institutional and Theoretical Economics* (H. 1): 195-223.
42. **Winter, Søren C, and May, Peter J.** 2001. "Motivation for compliance with environmental regulations." *Journal of Policy Analysis and Management: The Journal of the Association for Public Policy Analysis and Management*, 20 (4): 675-698. <https://doi.org/10.1002/pam.1023>.
43. **Xie, Weimin, and Wei, Huaqian** 2016. "Market competition organizational slack and enterprise R & D investment." *China Soft Science*, 8: 102-111.
44. **Yang, Defeng, Wang, Aric Xu, Zhou, Kevin Zheng, and Jiang, Wei.** 2019. "Environmental strategy, institutional force, and innovation capability: A managerial cognition perspective." *Journal of Business Ethics*, 159 (4): 1147-1161. <https://doi.org/10.1007/s10551-018-3830-5>.
45. **Yang, Yang, Wei, Jiang, and Luo, Laijun.** 2015. "Who is using government subsidies to innovate? –Joint adjustment effect of ownership and distortion of factor market." *Management World*, 1: 75-86.
46. **Yao, X., Tang, X. W., and Pan, J. M. .** 2009. "Research on supply chain Partnership and Alliance Profit Model based on asset specificity." *China Soft Science*, 23 (1): 118-122.
47. **Yin, Jianhua, Wang, Sen, and Zhang, Lingling.** 2019. "Heterogeneous Response of Corporate Environmental Strategy under Institutional Isomorphism." *Journal of Beijing Institute of Technology (Social Sciences Edition)*, 21 (4): 47-55.
48. **Zhao, Yapu, Zhang, Wenhong, and Chen, Silei.** 2014. "Impact of organizational slack on firm exploration in a dynamic environment." *Science Research Management*, 35 (2): 10-16.
49. **Zheng, S. Q., Wan, G. H., Sun, W. Z., and Luo, D. L.** 2013. "Public demands and urban environmental governance." *Management World*, 6: 72-84.