

RESEARCH ARTICLE

Is enterprise environmental protection investment responsibility or rent-seeking? Chinese evidence

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Abstract

Having enterprises engaged in environmentally friendly behavior is an important part of reducing negative environmental impacts. This study makes a quantitative analysis against the backdrop of China's transitional economic system. The results show that politically-connected enterprises significantly reduce environmental expenditure, but this only holds for state-owned enterprises; private enterprises with political connections spend significantly more. Analysis of the efficiency of environmental expenditure indicates that, for private enterprises, environmental spending is used as a way to maintain political connections, with rent-seeking as the likely motivation. Politically-connected private enterprises have not reduced their emissions to the same extent as state-owned enterprises, despite increased expenditure. Given the scale of environmental degradation in China during a period of massive economic and social upheaval, the results of this analysis provide a quantitative case for policy change: governments should shift focus to the results that environmental spending produces.

Keywords: corporate environmental expenditure; economic consequence; political connections; property rights nature

JEL classification: P26; Q51; Q56

1. Introduction

In recent years, 'haze', 'air pollution', and 'environmental degradation' have frequently appeared in news reports in China. That China pollutes the environment has become an indisputable fact, yet ruining or overusing resources, as described in Lloyd's tragedy of the commons (Hardin, 1968), is difficult to eliminate overnight. According to Samuelson's (1954) theory of public goods, ecological resources are non-competitive and non-exclusive, and therefore the government should regulate society's behavior with a 'visible hand' to ensure those resources are allocated equitably. The Chinese government has, for some time, strictly controlled the allocation of scarce resources. However, given the

level of environmental degradation, the government's 'visible hand' is now extending to resource harm, not just distribution. For example, the '13th Five-year Plan for Economic and Social Development of The People's Republic of China' states that China's government will 'set up comprehensive environmental governance' and 'intensify ecological conservation and restoration'.

However, the inconsistency between the central government's willingness to improve the environment and any picture of the Beijing sky reveals a disconnect. Success in the government's plans depends not only on whether its policies are formulated and implemented completely, but also on the attitudes and willingness of the main sources of environmental harm. Most enterprises are aware of whether or not their production and operation processes negatively impact the environment, but curtailing those impacts through investment in more environmentally friendly practices does not usually come with a direct economic benefit. In fact, it may reduce profits. Hence, one would expect all economically-rational companies to minimize environmental expenditure and allocate their spending and resources to profit-making activities.

Given the increasingly stricter environmental controls imposed by China's central government, is there any heterogeneity in the decisions made by enterprises to invest in environmentally friendly practices? This question needs to be discussed in the context of the specific characteristics of the enterprise and, in this case, the unique context of China. The literature contains many studies on the various corporate behaviors influenced by government-enterprise connections (Dinç, 2005; Fan *et al.*, 2007; Wu *et al.*, 2018). Most studies in the Chinese context assert that: China is still in a period of economic transformation and has not yet fully formed a market-led resource allocation system; industry access restrictions have not been fully liberalized; and the government still controls a large number of scarce resources and retains administrative approval rights over their use. However, this does not mean there is no space for discretionary corporate behavior (Park and Luo, 2001; Schuler and Cramer, 2002; Acquaah, 2007).

Unlike Western countries, China does not have channels like lobbying to establish and maintain influential political connections. So, in a relationship-oriented society like China, political connections are instead built through personal relationships between senior executives. A senior executive in a company has a link to a senior executive in a government agency; hence, that business finds favorable conditions. These links are undoubtedly an important resource for enterprises. Relationships with governments can ease barriers to accessing scarce resources, which can improve a company's ability to compete in the market. They can reduce the cost of doing business, help secure preferential tax treatments (De Soto, 1989; Agrawal and Knoeber, 2001; Chen *et al.*, 2018), provide avenues to credit rationing (Dinç, 2005; Jing *et al.*, 2018) or government subsidies (Johnson and Mitton, 2003; Zhang *et al.*, 2014), and many other benefits. The logic is that political connections offer shelter from government interference or penalties. This raises a question: given that stricter environmental controls impose extra costs that many enterprises likely do not want to bear, do political connections affect environmental expenditure?

Property rights and the duality of enterprise structures in China is another important consideration. State-owned enterprises are essentially an extension of the government's administrative functions and, as such, are required to be more socially responsible. Additionally, the political connections were there from the beginning, and their inherent political connections often serve as a strong bargaining chip in gaining favorable business conditions. Conversely, private enterprises must constantly maintain their political connections, and being seen to support the government's agenda is a common

approach. It would be interesting to explore whether these structural differences have any bearing on the level of an organization's investment into environmental practice. If so, what intrinsic motivations are behind these expenditure decisions? And are they effective?

To answer these questions, we assembled data on A-share companies listed on the Shanghai and Shenzhen stock exchange from 2008 to 2016 and conducted a quantitative analysis of the impact of political connections on environmental investment – wholly and differentiated by property rights. We further analyzed the impact of polluting category, substitution effects and expenditure efficiency. Our results show that state-owned enterprises with political connections spend significantly less on environmental concerns. Private enterprises with political connections, however, spend significantly more. A series of further analyses indicates the difference in behavior is likely due to rent-seeking on the part of private enterprises. For example, a regression study on substitution effects shows that environmental expenditure by private enterprise decreases in companies which make more philanthropic donations. In examining the correlations between political connections and resource acquisition, we find that increased environmental expenditure by politically-connected private enterprises does tend to result in more government subsidies, which shows that environmental expenditure is an effective form of rent-seeking.

However, the notion that a company may not have discretionary power over how it allocates its expenditure, despite appearances to the contrary, cannot be ignored. In a politically-connected business landscape, investments into environmentally friendly practices may not be as voluntary as they seem. Therefore, to assure the motivation is rent-seeking, we conducted further analyses finding that non-pollution-intensive companies maintain levels of environmental expenditure as high as, if not higher than, their pollution-intensive counterparts despite much lower impacts on the environment, as do private sector companies in eastern China despite less local government intervention.

Notably, an analysis of environmental expenditure versus reductions in waste gas emissions reveals that the increased investment by private enterprises has not translated into proportionally more reduction in pollutants than state-owned enterprises, especially with those that have political connections. This speaks to the low efficiency of politically-connected private enterprises' environmental expenditure and whether government pressure is effective in improving the quality of our environment.

This paper makes several contributions to the literature. Few studies examine the logic behind corporate investment in environmental practice in the context of more stringent government regulation, particularly from the perspective of corporate property rights. The insights from our analysis should help to refine the principles upon which environmental regulation is based. The existing literature discusses the influence of political connections on the capital investment behavior of enterprises. Compared with capital investment, outlay into environmental protection has costs of a different nature, expenses that do not enable organizations to derive direct income. Therefore, one question is how those political connections will affect enterprise investment in environmental practices and whether the heterogeneity of property rights exists. This study adds to the literature on the economic consequences of political connections. It adopts the perspective of a different kind of enterprise expenditure and demonstrates that government pressure to direct corporate expenditure toward environmental goals does not necessarily result in actual improvements to the environment. The empirical evidence here shows that, given the same regulatory conditions, private enterprises invested in

rent-seeking behavior with poorer environmental outcomes while state-owned enterprises assumed more environmental responsibility, investing their money more wisely in creating better environmental outcomes.

2. Literature review and research hypotheses

The existing literature on corporate investment in the environment in China mainly focuses on the government's stance on environmental protection and the consequences of its policies or lack thereof. All levels of government in China are concerned with aspects of the environment, and this has provided rich fodder for examination of subsidy schemes, efficiency evaluations, regional versus national impacts and so on. Studies have found that the Chinese government has invested heavily in the environment, but the efficiency of those investments tends to be low (Zhang and Wen, 2008; He *et al.*, 2011) with no obvious differences in efficiency across regions (Han *et al.*, 2009). Research on corporate environmental expenditure in China shows that environmental pollution has negative externalities. Most Chinese enterprises are profit-oriented. Hence, overall, they neither care about the impact of their own behavior on the external environment nor are they motivated to invest in environmental protection. For this reason, governments need to intervene with a 'visible hand' (Liu *et al.*, 2017; Zhang, 2018).

Research framed by regulation theory points out that corporate investment in environmentally friendly practices is a passive response to external pressure for organizational legitimacy. There is a wealth of empirical evidence to support this conclusion from around the globe. Ghobadian *et al.* (1995) believe that external regulatory pressure serves to increase awareness of corporate responsibility in this regard. But, once made aware, whether an organization takes action depends on the opportunities and threats environmental issues present to their firm. Generally, enterprises tend not to invest more in environmental protection than is necessary. Fortunately, there is a positive spin to this lackluster effort because many studies have found that organizations do at least meet their minimum legal and regulatory requirements. For example, a survey of Canadian corporate executives shows that 70 per cent of respondents believe government regulation is the greatest source of pressure for undertaking environmental protection activities (Doonan *et al.*, 2005; Murovec *et al.*, 2012). In a study on Spanish manufacturing companies, Costa-Campi *et al.* (2017) highlight that strict government controls are the strongest impetus for corporate investment in environmental concerns. In perhaps some of the most relevant evidence, Tang *et al.* (2013) find that there is a non-linear relationship between the intensity of environmental regulation and the scale of environmental investments by listed companies in China: corporations spend less when there are fewer environmental regulations. Interestingly, however, expenditure grows with more and stricter regulations but only to a point, after which investment declines. Tang *et al.* (2013) conclude that organizations invest in the environment for reasons specific to themselves and, therefore, are only passively catering to government regulations. This conclusion accords with a general consensus in the literature that organizations invest in good environmental practices due to government pressure, and that government pressure in the form of regulations can increase corporate investment in environmental protection.

However, an unanswered question remains in all these studies: What role do a company's relationships with government agencies play in their decisions to invest in good environmental practices? It is generally accepted that companies can create better connections to government departments by hiring executives who are working or have

previously worked in those departments. These links can bring a range of precious benefits such as tax incentives, credit rationing, government subsidies and so on (De Soto, 1989; Agrawal and Knoeber, 2001; Johnson and Mitton, 2003; Dinç, 2005; Chen *et al.*, 2018). Moreover, strong links to government give firms greater power to soften regulatory controls or lessen scrutiny over their operations, at least to some extent (Macneil, 2002; Jia *et al.*, 2016). In contrast, spending money on environmental issues is simply an additional cost that detracts from business performance for little perceived benefit.

In this context, the cost-benefit principle should dictate that enterprises will try to avoid investing in environmental protection. But, in China, the cultural dynamic of ‘guanxi’ – that is, the doctrine of trust and reciprocity in interpersonal relationships – takes precedence (Xin and Pearce, 1996; Park and Luo, 2001). Enterprises with close political connections to the government are treated preferentially in nearly all respects, including in how they implement environmental regulations and how their operations in this regard are scrutinized (Jia *et al.*, 2016). Therefore, in the face of increasing environmental regulation, enterprises with political connections are likely to suffer lower penalty costs for harming the environment, which may reduce their environmental expenditure. Hence, the following hypothesis is proposed.

Hypothesis 1: Excluding other factors, enterprises with political connections will have lower environmental expenditure.

Another factor that must be considered in the context of China is the dual nature of corporate property rights. State-owned enterprises are an institutional arrangement that extend the government’s administrative functions in different economic fields (Huang and Yu, 2006; Li *et al.*, 2015a; Liu and Zhang, 2017; Xiao, 2018). Hence, state-owned enterprises are expected to be socially responsible, and their efforts to carry out the government’s will tend to be supported readily with government resources (Wang *et al.*, 2008; Chen *et al.*, 2011; Li *et al.*, 2015a). Protecting the environment and improving its quality is a priority for the government. So, a state-owned enterprise will inevitably be under more pressure to demonstrate environmentally friendly behavior and will receive more government support to do so, both financially and otherwise. However, allocating resources to environmental protection can undermine profits, which affects the interests of executives and shareholders. Therefore, we argue that a state-owned enterprise will try to reduce its environmental expenditure by exploiting its political connections to bargain with the government and offset the cost of complying with environmental regulations.

Private enterprises, on the other hand, lack ‘paternalism’ from the government. Yet the government retains strong control over scarce resources. Therefore, private enterprises have a strong resource dependency on the government (Li, 2012). Given the cost exchange associated with a lack of resources (Yuan *et al.*, 2015), establishing political connections is one of the most viable approaches to continued operations (Jiang and Zhang, 2017). Maintaining these connections typically comes at the cost of some form of patronage – philanthropic donations, jobs, visible support for policies, etc. Thus, it is reasonable to assume that, if environmental protection is a priority for the government, private corporations may pay tribute to this cause in the form of higher environmental expenditure. Doing so could maintain or strengthen their political connections, ensure an uninterrupted supply of resources, and attract subsidies or preferential treatment, i.e., rent-seeking.

Political connections can bring scarce resources to enterprises and, on the other hand, it can help enterprises reduce possible penalties. However, from the perspective of the nature of property rights, the degree of scarcity of political connections in different enterprises is different. Because state-owned enterprises need to bear more social responsibilities, they will acquire more resources from the government. Complementing this, their political connections are inborn and less scarce, meaning the motivation of politically-connected, state-owned enterprises to maintain this link is weak. Instead, they may use political connections to negotiate with the government to avoid punishment and finally reduce their environmental protection expenditure. However, political connections in private enterprises are scarcer. Based on the motivation of acquiring other subsequent resources, private enterprises will strive to maintain the political connections they have established by increasing environmental protection outlay. Therefore, the following hypothesis is proposed.

Hypothesis 2: Excluding other factors, political connections will decrease environmental expenditure for state-owned enterprises and increase environmental expenditure for private enterprises.

3. Research design

3.1 Sample selection and data sources

Our data sample to test these hypotheses comprised A-share Chinese companies listed on the Shanghai and Shenzhen exchange during the period 2008 to 2016. A company was excluded if: it was within a special treatment category; it operates in the finance sector; its IPO occurred less than 12 months before listing; or the company record contained missing data. All continuous variables were winsorized at the upper and lower 1 per cent quantile. The level of environmental spending by each company was sourced and manually collated from disclosed corporate social responsibility reports. Data related to environmental regulation was obtained from the WIND database. The marketization index score was taken from China's provincial marketization index report database. Other data was sourced from the CSMAR database.

3.2 Model construction and variable definitions

The study makes use of a firm-level fixed-effect regression estimation procedure with standard errors clustered in the firm level to ascertain the results of our proposed model. The following model was used to verify the proposed hypotheses and, to alleviate reverse causality problems, variables on the right-hand side of the specification are lagged one period:

$$EI_{i,t} = \alpha_0 + \alpha_1 Rel_{i,t-1} + \alpha Controls_{i,t-1} + \sum Firm + \sum Year + \varepsilon_i \quad (1)$$

The dependent variable is the renminbi (RMB) value of the organization's environmental expenditure. This is the spending incurred by an enterprise to reduce the pollutants generated in its operation, including direct pollution-control costs and the expense of purchasing pollution-control equipment. Specifically, we constructed a relative indicator EI_1 and an absolute indicator EI_2 , following Wei *et al.* (2017), Jiang and Akbar (2018) and Chi (2019). EI_1 represents the proportion of environmental expenditure against the company's operating income. EI_2 represents the amount of environmental expenditure

Table 1. Definitions of the variables

Symbol	Definition of variables
El_1	$100 \times$ total environmental investment/operating income
El_2	Total environmental investment (Unit: tens of millions RMB)
<i>Rela</i>	Binary: 1 if the chairman or CEO has a government background, and 0 otherwise
<i>State</i>	Binary: 1 if the enterprise is owned by the state, and 0 otherwise
<i>Size</i>	The natural logarithm of the total assets
<i>Roe</i>	Net profit/net assets
<i>Lev</i>	Total assets/total liabilities
<i>Ocf</i>	Operating cash flow/total assets
<i>Growth</i>	Current operating income/(current operating income-previous operating income)
<i>Cash</i>	Cash holding amount/total income
<i>Tobin's Q</i>	Market value/asset replacement cost
<i>First</i>	Percentage of shares held by the largest shareholder
<i>Dual</i>	Binary: 1 if the chairman and CEO are the same person, and 0 otherwise
<i>Age</i>	Average age of chairman and CEO
<i>Gender</i>	Binary: 1 if the chairman or CEO is male, and 0 otherwise
<i>Comm</i>	Number of enterprise committees
<i>Ddrate</i>	Percentage of independent directors on the board
<i>Hold</i>	Shares held by senior managers/total shares of enterprise
<i>Iscurp</i>	Binary: 1 if the chairman or CEO has a position in the shareholder firm, and 0 otherwise
<i>Stime</i>	Time since listing
<i>Area</i>	Natural logarithm of provincial level area of monitoring equipment space
<i>Fee</i>	Natural logarithm of operating funds for provincial environmental monitoring
<i>Score</i>	Score of provincial marketization index
<i>GDP</i>	Gross domestic product at the provincial level (Unit: trillion RMB)

in tens of millions of RMB. The independent variable, *Rela*, is a dummy variable to indicate whether the Chair or the CEO were, or had ever been, administration officials, NPC deputies, CPPCC members, etc. If true, a political connection exists and $Rela = 1$, and 0 otherwise. Following Li (2010), Li *et al.* (2015b) and Zhang *et al.* (2020), we introduced a range of control variables including: enterprise scale, net asset return rate, assets and liabilities ratio, operating cash flow rate, enterprise growth ratio, cash holding ratio, Tobin's Q, shares held by the largest shareholder, duality, age, gender of chairman and CEO, number of enterprise committees, independent director ratio, shares held by senior managers, position status in the shareholder firm of chairman and CEO, time since listing, area of monitoring equipment space, operating funds for government environmental monitoring, score of marketization index and regional GDP. We added a further control variable for year. Definitions for each variable are listed in [table 1](#).

Table 2. Descriptive statistics of variables

Variable	N	Mean	Std Dev	Min	Max
<i>EI</i> ₁	9,982	0.528	2.044	0.000	14.566
<i>EI</i> ₂	9,982	1.651	6.654	0.000	41.796
<i>Rela</i>	9,982	0.396	0.489	0.000	1.000
<i>Size</i>	9,982	21.938	1.246	19.341	25.357
<i>Roe</i>	9,982	0.080	0.110	-0.479	0.419
<i>Lev</i>	9,982	0.449	0.212	0.049	0.954
<i>Ocf</i>	9,982	0.077	0.206	-0.948	0.745
<i>Growth</i>	9,982	0.333	0.750	-0.523	3.403
<i>Cash</i>	9,982	0.441	0.483	0.021	2.382
<i>State</i>	9,982	0.496	0.500	0.000	1.000
<i>Tobin's Q</i>	9,982	2.113	1.932	0.203	11.557
<i>First</i>	9,982	0.361	0.150	0.088	0.709
<i>Dual</i>	9,982	0.223	0.416	0.000	1.000
<i>Age</i>	9,982	48.350	5.963	34.000	64.000
<i>Gender</i>	9,982	0.989	0.104	0.000	1.000
<i>Comm</i>	9,982	3.913	0.515	1.000	7.000
<i>Ddrate</i>	9,982	0.370	0.055	0.091	0.800
<i>Hold</i>	9,982	0.055	0.127	0.000	0.579
<i>Iscurp</i>	9,982	0.254	0.436	0.000	1.000
<i>Stime</i>	9,982	9.804	6.009	1.000	25.049
<i>Area</i>	9,982	11.350	0.720	8.857	13.179
<i>Fee</i>	9,982	9.792	0.906	6.528	13.247
<i>Score</i>	9,982	7.420	1.697	-0.230	10.000
<i>GDP</i>	9,982	2.982	1.899	0.070	7.281

4. Empirical results

4.1 Descriptive statistics of the variables

The descriptive statistics of the variables appear in table 2. The average environmental expenditure (*EI*₂) was RMB ¥16.51 million with a maximum investment of ¥417.96 million, and the average proportion of investments (*EI*₁) was 0.528 per cent with a maximum of 14.566 per cent. Notably, the amount of investment across the sample varied widely and the reasons why are certainly worth exploring. Some 39.6 per cent of the companies had political connections (*Rela*), which shows how common connections between government and private enterprises are in China.

The statistical analysis of the control variables shows a standard deviation in enterprise size (*Size*) of 1.246, which indicates great variation across the sample. The average asset-liability ratio (*Lev*) of 0.449 indicates that these companies are using debt financing appropriately, and the largest proportional shareholding was 0.361, on average,

Table 3. Mean value *T*-test analysis of *EI* variables

	State-owned enterprise		Private enterprise	
	<i>EI</i> ₁	<i>EI</i> ₂	<i>EI</i> ₁	<i>EI</i> ₂
Connected	0.35	1.51	0.62	1.45
Non-connected	0.57	2.45	0.51	0.97
Diff	-0.22***	-0.95***	0.011*	0.48***

*Significance at the 10% level, ***significance at the 1% level.

which is reflective of the Chinese tendency toward dominant stockholders. The statistical characteristics of the other control variables are largely consistent with the literature.

We also compared the average value difference in environmental expenditure between state-owned and private enterprises based on political connections. As shown in table 3, in the state-owned group, there is a significant difference in environmental expenditure between the politically-connected enterprises and those without such connections, with the former spending significantly less. In the non-state-owned enterprise group, there is also a significant difference in environmental expenditure between the politically-connected enterprises and those lacking political connections, with the politically-connected spending substantially more. This result provides preliminary evidence for our hypothesis.

4.2 Regression analysis

4.2.1 Political connections and environmental expenditure

Our first hypothesis suggests that political connections will shelter enterprises from government oversight, resulting in reduced levels of expenditure on environmental concerns. We tested this notion through model (1) and show the regression results in table 4. The dependent variables are the relative (*EI*₁) and absolute amounts (*EI*₂) of corporate environmental expenditure. The results show that the coefficients for *Rela* are negatively correlated with both these variables at the 10 per cent (*EI*₁) and 1 per cent (*EI*₂) significance levels. In other words, a enterprise’s political connections will reduce the money it invests in environmental practices. Therefore, hypothesis 1 is supported.

We believe the logic behind this phenomenon is that expending company resources on environmental impact undermines profit. An economically-rational enterprise will try to reduce operating costs and maximize profits where possible and, if an enterprise does not need to take responsibility for damaging the environment, investing in good environmental practices makes little sense. However, as environmental issues become more of a priority for governments, companies with political connections will need to spend less to ameliorate the effects of stricter government oversight and harsher penalties on their bottom line.

4.2.2 The influence of property rights

Property rights in China are dualistic. A listed company is either fully private or the state has an ownership stake in the enterprise. There are many differences between state-owned enterprises and private enterprises, which raises the question of whether a company’s property rights influence its decisions over environmental expenditure. If heterogeneity exists, what is the logic behind it? The regression results for this analysis are listed in table 5. From the results, we can see clear differences in the level of

Table 4. Political connections and environmental expenditure

	$El_{1,t}$	$El_{2,t}$
$Rela_{t-1}$	-0.053* (-1.67)	-0.318*** (-5.16)
$Size_{t-1}$	0.004 (0.25)	0.508*** (7.75)
Roe_{t-1}	0.674*** (9.92)	2.053*** (5.56)
Lev_{t-1}	0.097 (0.62)	1.268*** (7.45)
Ocf_{t-1}	-0.077*** (-2.60)	0.086 (1.05)
$Growth_{t-1}$	-0.002 (-0.17)	0.034 (0.93)
$Cash_{t-1}$	0.106*** (3.52)	-0.032 (-0.55)
$State_{t-1}$	0.109 (0.54)	0.167 (0.69)
$Tobin's\ Q_{t-1}$	0.005 (0.93)	0.006 (0.24)
$First_{t-1}$	0.483*** (2.87)	2.357*** (3.53)
$Dual_{t-1}$	0.175** (2.49)	0.073 (0.71)
Age_{t-1}	0.002 (1.41)	0.015*** (3.43)
$Gender_{t-1}$	0.076*** (6.76)	0.122 (1.42)
$Comm_{t-1}$	-0.018 (-1.09)	0.056 (0.48)
$Ddrate_{t-1}$	-0.055 (-0.60)	-1.014* (-1.93)
$Hold_{t-1}$	-0.430*** (-2.84)	-0.132 (-0.40)
$Iscocurp_{t-1}$	0.029** (2.09)	0.236* (1.84)
$Stime_{t-1}$	0.050*** (4.27)	0.177*** (2.92)
$Area_{t-1}$	-0.195*** (-5.52)	-0.730*** (-6.21)
Fee_{t-1}	0.057*** (7.06)	0.021 (0.76)
$Score_{t-1}$	-0.063* (-1.84)	-0.247** (-2.28)
GDP_{t-1}	0.007 (0.35)	0.054 (0.34)

(continued)

Table 4. Continued.

	$EI_{1,t}$	$EI_{2,t}$
Cons	1.633*** (3.26)	-3.630** (-2.01)
FIRM	Control	Control
YEAR	Control	Control
N	9,982	9,982
R ²	0.006	0.010
F	248.385	181.706

*Significance at the 10% level, **significance at the 5% level, ***significance at the 1% level.

environmental expenditure for state-owned versus private enterprises. For state-owned enterprises, the political connection decreases the level of environmental expenditure. However, for private enterprises, political connections significantly increase environmental expenditure. Therefore, hypothesis 2 is supported.

Our assertion is that private enterprises are far more dependent on the favor they can curry with the government than state-owned enterprises. Therefore, if a company can ‘buy’ favor by appearing to support priority government issues, they will do so. The government wants enterprises to invest in developing more positive environmental practices. Therefore, companies with a need to maintain their political connections will demonstrate their support through higher levels of investment. This is rent-seeking behavior.

State-owned enterprises suffer more direct interference by the government and, being expected to bear more social responsibility, will be given additional scarce resources because they function as an extension of government in the economic field. However, their political connections are secure, which means they only need to meet their minimum regulatory requirements and will draw on informal ‘bargaining’ channels through political connections, to the greatest extent possible, to reduce their expenditure on environmental impact control.

5. Robustness tests and further analysis

5.1 Is rent-seeking through environmental expenditure effective?

With the knowledge that private enterprises invest more heavily in environmental practices to maintain political connections to leverage government benefits, the next question is: Is this effective? We chose government subsidies that the enterprise receives as the dependent variable (*Sub*) and conducted a regression study on the private enterprise sample to determine whether the level of environmental expenditure (EI_1 and EI_2) impacts the level of subsidies received and whether this relationship is more pronounced in politically-connected firms. In order to reduce the collinearity of the model, we centered the *Rela* and *EI* variables before regression. The results, shown in table A1 in the online appendix, indicate a significant positive correlation between proportional expenditure (EI_1) and total expenditure (EI_2) for private enterprises. The interaction terms are all positively significant (1 and 5 per cent level), meaning that private enterprises with political connections can acquire increased subsidies through higher levels

Table 5. Political connections and environmental expenditure based on property rights

	State-owned enterprises		Private enterprises	
	El_1	El_2	El_1	El_2
$Rela_{t-1}$	-0.141*** (-8.62)	-0.703*** (-9.62)	0.144** (2.43)	0.272*** (3.66)
$Size_{t-1}$	-0.133*** (-3.93)	0.333** (2.42)	0.065 (1.49)	0.792*** (4.41)
Roe_{t-1}	0.698*** (3.10)	2.263** (2.37)	0.439 (1.29)	1.095 (1.29)
Lev_{t-1}	-0.052 (-0.51)	0.658 (1.48)	0.408* (1.82)	1.819*** (4.03)
Ocf_{t-1}	0.013 (0.32)	0.509*** (4.29)	-0.198*** (-5.57)	-0.332*** (-3.50)
$Growth_{t-1}$	-0.020 (-1.07)	0.008 (0.10)	0.027** (2.10)	0.115** (2.48)
$Cash_{t-1}$	-0.068 (-1.39)	-0.014 (-0.17)	0.188*** (5.90)	-0.015 (-0.17)
Tobin's Q_{t-1}	-0.003 (-0.33)	0.000 (0.01)	0.010 (1.04)	0.027 (0.87)
$First_{t-1}$	1.030*** (5.18)	2.705** (2.04)	0.116 (0.69)	2.374*** (5.43)
$Dual_{t-1}$	0.162** (2.49)	0.417*** (3.98)	0.350*** (3.48)	0.208 (0.97)
Age_{t-1}	0.006 (1.61)	0.016 (0.89)	-0.001 (-0.41)	0.009 (0.64)
$Gender_{t-1}$	-0.058* (-1.78)	0.025 (0.18)	0.138*** (3.54)	0.195** (2.37)
$Comm_{t-1}$	-0.022 (-1.58)	-0.020 (-0.14)	-0.071 (-1.26)	0.055 (0.74)
$Ddrate_{t-1}$	-1.179*** (-7.88)	-3.386*** (-3.75)	1.288*** (6.32)	1.774*** (3.06)
$Hold_{t-1}$	20.998*** (5.94)	46.073*** (6.51)	-0.932*** (-4.60)	-0.677** (-2.01)
$Iscocurp_{t-1}$	0.127*** (8.31)	0.740*** (6.38)	-0.129*** (-3.22)	-0.531** (-2.57)
$Stime_{t-1}$	0.082*** (5.03)	0.228** (2.56)	0.003 (0.30)	0.063 (1.18)
$Area_{t-1}$	-0.148*** (-2.65)	-0.753*** (-4.86)	-0.228*** (-5.20)	-0.588*** (-5.33)
Fee_{t-1}	0.083*** (11.34)	0.077** (2.08)	0.041*** (3.32)	-0.009 (-0.30)
$Score_{t-1}$	-0.019 (-0.55)	0.038 (0.33)	-0.093** (-2.33)	-0.567*** (-3.23)
GDP_{t-1}	-0.120*** (-2.78)	-0.230 (-0.96)	0.175*** (7.35)	0.465*** (4.57)

(continued)

Table 5. Continued.

	State-owned enterprises		Private enterprises	
	E_{I_1}	E_{I_2}	E_{I_1}	E_{I_2}
<i>Cons</i>	3.592*** (6.26)	-1.194 (-0.37)	0.792 (1.05)	-9.678*** (-2.70)
<i>FIRM</i>	Control	Control	Control	Control
<i>YEAR</i>	Control	Control	Control	Control
<i>N</i>	4,955	4,955	5,027	5,027
R^2	0.023	0.016	0.010	0.017
<i>F</i>	88.828	30.801	33.166	53.113

*Significance at the 10% level, **significance at the 5% level, ***significance at the 1% level.

of expenditure in their environmental investments. So, this rent-seeking behavior is effective.

5.2 Do the correlations change for pollution-intensive versus non-pollution-intensive enterprises?

To better understand rent-seeking in private enterprises, we conducted a study on pollution-intensive versus non-pollution-intensive private companies. Companies in pollution-intensive industries present more risks to the environment. Therefore, it is reasonable to assume that they would devote more expenditure to environmental concerns as a natural countermeasure. Additionally, the significant positive impact of political connections on environmental expenditure should still exist. However, non-pollution-intensive industries have less scope to engage in environmentally friendly practices: their expenditure is more ‘voluntary’ in nature. Hence, if environmental expenditure in a non-pollution-intensive company remains high, it is likely for the purposes of maintaining political connections. Referring to the works of Cui and Jiang (2019) and Lu *et al.* (2019), we accordingly define the pollution-intensive companies as those in the following industries: mining, food and beverage, textile, clothing and fur, paper making, printing, petroleum, chemical plastics and plastics, metal and non-metal, medicine, biological products, electricity, and gas and water production and supply. Companies in other industries are defined as non-pollution-intensive companies. The regression results of this analysis are provided in online appendix table A2.

The results show that politically-connected private companies in pollution-intensive industries do invest more in environmental issues. However, politically-connected private companies in non-pollution-intensive industries also have more environmental expenditure. These results offer further support for rent-seeking motivations.

5.3 Is tacit government intervention a factor?

A further factor to consider is whether there is hidden intervention by the government to ensure that private companies are seen to be taking its agenda seriously. In China, the government maintains strong institutional control over business, which might – below the surface – translate into demands for certain environmental action, especially for

politically-connected enterprises. Such tacit pressure is not beyond the realm of possibility. Therefore, an alternative explanation for the positive correlations between political connections and environmental expenditure in private enterprises is passive feedback by private enterprises to meet government requirements. One way to test this is through geography. China is a vast territory with fundamental differences between its eastern, central, and western regions. The eastern region is more open, progress toward marketization is more advanced, and the degree of local government intervention is lower. Hence, if government interference is responsible for the positive correlations found in this study, private companies in the eastern region should prove the exception with significantly lower environmental expenditure.

However, the results of a regression analysis with only private enterprises in China's eastern region show that support for [hypothesis 2](#) has not changed (see online appendix table A3). Political connections are still significantly correlated to the level of environmental expenditure for these companies. From these results, we draw the conclusion that environmental expenditure is not a passive feedback mechanism in response to strong intervention by the government.

5.4 *Are corporate efforts to improve the quality of the environment effective?*

Another way to test the motivations behind environmental expenditure is to test the efficiency of that spending. If a company was genuinely interested in improving the environment, one would expect that its investment in good environmental practices should provide 'value for money'; that is, the improvements to the environment should be proportional to the amount of expenditure. However, if there are other reasons behind the investment, such as rent-seeking, the efficiency of that investment becomes somewhat moot. To test this notion, we conducted a regression study with dust removal (*Reduce*) as the dependent variable, and the relative (EI_1) and absolute levels (EI_2) of environmental expenditure as the independent variables. Dust removal data comes from the China Stock Market & Accounting Research Database. The results are shown in online appendix table A4. Here, we see that environmental expenditure (EI_1 and EI_2) only significantly reduces emissions (at the 1 per cent level) for state-owned enterprises. For private enterprises, environmental expenditure has no significant impact on positive environmental outcomes and, in fact, may bring increased waste emissions given that EI_2 has a significantly negative correlation. The coefficients of the interaction terms of enterprise expenditure and political connections all show no significant impact on the dust removal in state-owned firms, although the political connections help to save the environmental expenditure. The politically-connected, state-owned operations can still protect the environment because of their duty to fulfill the will of the government. They can target their environmental expenditure astutely. This not only can reduce environmental safeguarding costs but can also bring positive protection results. But, for private enterprises, the coefficients of the interaction terms are significantly negative, indicating environmental protection results are even worse in private enterprises that are politically-connected. We believe these results reflect a fundamental motivational difference between state-owned and private enterprises. Even though state-owned enterprises reduce their environmental expenditure through political connections, the money they do spend is more effective. As part of the government's administrative system, their ultimate goal is to improve quality of life for the public. Private enterprises have different goals – such as survival, a competitive edge, profit – all of which require political connections to achieve. Environmental expenditure is not aimed at improving the environment;

it is aimed at maintaining government relationships for benefits and favorable operating conditions in return.

5.5 Is substitution a factor in the private enterprise correlations?

Without taking property rights into consideration, the results of the overall regression analysis show that political connections do reduce the level of corporate environmental expenditure. However, this negative correlation does not hold in the analysis for private enterprises. Yet it stands to reason that some private companies should follow the overarching trend of the full sample. In this context, it is interesting to explore the factors that have allowed some private enterprises to behave more like state-owned enterprises and reduce their environmental expenditure in line with the strength of their political connections. Assuming that the rent-seeking motivation stands, we should find that these companies have or are maintaining their political connections in other ways.

Philanthropic donations are an alternative means to gain favor from the government. Therefore, private companies that have donated more should show a corresponding drop in environmental expenditure. We tested this substitution effect and provide the results in table A5 (online appendix). Corporate donation data comes from the Chinese Research Data Services Platform. Taking the average value of donation amount as the grouping basis, it is clear that the companies with relatively low donations followed the same trend as found in the property rights analysis, i.e., private companies with political connections have significantly higher environmental expenditure. However, private companies with higher donations spent significantly less on environmental concerns. This is similar to the overall and state-owned trends. Donations appear to be a more cost-effective means of maintaining the relationship. This confirms a substitution effect and offers further support for rent-seeking as a motivation behind environmental expenditure of private enterprises.

5.6 Other robustness checks

To verify the reliability of the baseline results, we used the *level* of political connections to quantify an enterprise's political relationships. *Level* measures the strength of the political connection, designed to better grasp the influence political connections have on environmental expenditure. A score of 0 indicates that the Chair or CEO hold no government position, 1 indicates that the Chair or CEO hold/held a government position at the town level or below, 2 means county level, 3 is municipal level, 4 is provincial level, and 5 is the central government. The results in online appendix table A6, indicate that the above findings have not changed.

Then we changed the measure of enterprise environmental expenditure: (1) defined as $100 \times \text{total environmental investment}/\text{operating income}$ in the first sample year. (2) defined as $100 \times \text{total environmental investment}/\text{total assets}$ in the first sample year. (3) defined as $100 \times \text{total environmental investment}/\text{total assets}$. (4) defined as the natural logarithm of the amount of total environmental investment plus one. Again, the results stay the same.

To overcome the potential for endogeneity in the baseline results, following Ma *et al.* (2019) and Luo and Liu (2019), we employed an instrumental variable – the mean value of *Rela* in the same industry year – and carried out a 2SLS regression. The results in online appendix table A7 indicate that *Rela* still correlated with reduced environmental

expenditure in both the full sample regression and state-owned enterprise sample regression, and *Rela* maintained correlation with increased environmental outgoings in private sample regression (EI_2 is verified). From this we determine that the baseline conclusion is largely unchanged.

6. Conclusion and discussion

The serious pollution problem in China has not escaped the government's attention. Enterprises that negatively impact the environment are falling under increasingly stricter regulations and harsher penalties for environmental damage. Making appropriate investments in environmentally friendly practices can offset these penalties; however, in China, so can closer political connections. So, what choices will enterprises make? We examined the behavior of listed companies in China to determine whether the underlying logic of decisions about environmental expenditure holds true. Our statistical analysis reveals that a company's political connections do significantly reduce expenditure levels, but only for state-owned enterprises. Private enterprises invest more in environmental practice.

This dichotomy is characteristic of the nature of property rights. State-owned enterprises do not need to curry favor with the government through political connections. However, for private enterprises, fully embracing the government's agenda is a means to maintaining the valuable political connections they have sought to create. In other words, rent-seeking behavior sits at the core for private enterprises.

A good relationship with the government is an important link to accessing scarce resources, especially for private companies that do not hold other forms of leverage and, hence, need to spend more. Several of our further analyses show strong support for the rent-seeking motivation of private enterprises. For example, environmental expenditure is lower in private companies with higher philanthropic donations, and the efficiency of environmental spending is lower in private enterprises, especially those with political connections, which speaks to the authenticity of their commitment to environmental concerns. It is interesting to note that our results show that rent-seeking through environmental spending is not an empty pursuit. Private companies with higher environmental expenditure find this does help them use political connections to receive more government subsidies.

The efficiency of environmental expenditure is worthy of further discussion. Politically-connected private enterprises invest more but their expenditure has less impact, while state-owned enterprises spend less for more effect. Governments should be aware that playing on rent-seeking motivations may well increase corporate efforts, but those efforts may not translate into actually improving the environment. Existing research on corporate expenditure toward creating environmentally friendly behavior in China is based on a passive response to the pressure of environmental regulation by governments. Our research reveals the deep-seated logic behind environmental expenditure by Chinese corporations in a political context. Under the shadow of government paternalism, state-owned enterprises have 'baked in' access to rents like resource access and subsidies. Private enterprises lack this inherent shelter and so must do more to stay in the government's good graces. Supporting priority initiatives, like environmental concerns, is a means to this end. It is a signal motivated by rent-seeking, not a sign of commitment to environmental protection. As shown, private companies immediately substitute environmental expenditure for a cheaper option if it is available.

Efforts by enterprises to reduce their negative impacts on the environment are critical to environmental quality and protection. However, in China, these good governance efforts appear to have been co-opted by economic motivations, especially in private enterprises, which is not conducive to genuine environmental protection. Our analysis reveals a great deal that needs further investigation. How can private enterprises establish political connections through more standardized and more appropriate channels? How can governments allocate scarce resources more equitably to avoid the need for political connections? How can environmental expenditure be made more efficient? Most crucially, how can Chinese enterprises develop more awareness of the importance of genuine corporate social responsibility given the current state of their environment? These are urgent calls to researchers, enterprises and government policymakers.

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References

- Acquaah M** (2007) Managerial social capital, strategic orientation, and organizational performance in an emerging economy. *Strategic Management Journal* **28**, 1235–1255.
- Agrawal A and Knoeber CR** (2001) Do some outside directors play a political role? *The Journal of Law and Economics* **44**, 179–198.
- Chen CJ, Li Z, Su X and Sun Z** (2011) Rent-seeking incentives, corporate political connections, and the control structure of private firms: Chinese evidence. *Journal of Corporate Finance* **17**, 229–243.
- Chen YS, Meng QY and Yuan C** (2018) Effectiveness of relational tax preferences and tax policies: implicit tax perspective. *Accounting Research* **39**, 41–47 (in Chinese).
- Chi Z** (2019) Research on the relationship between enterprise environmental protection investment and anti-ecological dumping. *RESEARCH on Financial Issues* **41**, 58–64 (in Chinese).
- Costa-Campi MT, Garcia-Quevedo J and Martínez-Ros E** (2017) What are the determinants of investment in environmental R&D? *Energy Policy* **104**, 455–465.
- Cui G and Jiang Y** (2019) Impact of environmental regulation on corporate environmental governance behavior: a quasi-natural experiment based on the new environmental protection law. *Business Management Journal* **41**, 54–72 (in Chinese).
- De Soto H** (1989) *The Other Path: The Invisible Revolution in the Third Worlds*. New York: Harper and Row Publishers.
- Diñç IS** (2005) Politicians and banks: political influences on government-owned banks in emerging markets. *Journal of Financial Economics* **77**, 453–479.
- Doonan J, Lanoie P and Laplante B** (2005) Determinants of environmental performance in the Canadian pulp and paper industry: an assessment from inside the industry. *Ecological Economics* **55**, 73–84.
- Fan JPH, Wong TJ and Zhang T** (2007) Politically connected CEOs, corporate governance, and post-IPO performance of China’s newly partially privatized firms. *Journal of Financial Economics* **84**, 330–357.
- Ghobadian A, Viney H, James P and Liu J** (1995) The influence of environmental issues in strategic analysis and choice: a review of environmental strategy among top UK corporations. *Management Decision* **33**, 46–58.
- Han Q, Cao HJ and Su J** (2009) Positive analysis on investment efficiency of China’s environment protection in industry. *Business Management Journal* **31**, 162–168 (in Chinese).
- Hardin G** (1968) The tragedy of the commons. *Science (New York, N.Y.)* **162**, 1243–1248.

- He PL, Liu JP and Wang XX** (2011) Data envelope analysis of financial investment efficiency: based on environmental protection investment. *Public Finance Research* **32**, 30–34 (in Chinese).
- Huang SJ and Yu J** (2006) The nature, objectives and social responsibility of state-owned enterprises. *China Industrial Economy* **23**, 68–76 (in Chinese).
- Jia M, Tong L and Zhang Z** (2016) Does incentive on top managers influence corporate pollution practices? *Management Review* **28**, 149–165 (in Chinese).
- Jiang X and Akbar A** (2018) Does increased representation of female executives improve corporate environmental investment? Evidence from China. *Sustainability* **10**, 4750.
- Jiang X and Zhang D** (2017) Enterprise rent-seeking and efficiency of government subsidy utilization: empirical evidence from enterprise investment activities. *Investment Research* **36**, 4–18 (in Chinese).
- Jing LD, Li JC and Gu GD** (2018) Ownership discrimination in credit: political connection effect and informational release effect. *China Economic Studies* **60**, 80–92 (in Chinese).
- Johnson S and Mitton T** (2003) Cronyism and capital controls: evidence from Malaysia. *Journal of Financial Economics* **67**, 351–382.
- Li SH** (2010) Institutional environments, political relationship and corporate donation. *China Accounting Review* **8**, 161–178 (in Chinese).
- Li SH** (2012) Manager's background characteristics and corporate donation behavior. *Business Management Journal* **34**, 138–152 (in Chinese).
- Li S, Song X and Wu H** (2015a) Political connection, ownership structure, and corporate philanthropy in China: a strategic-political perspective. *Journal of Business Ethics* **129**, 399–411.
- Li WA, Wang PC and Xu YK** (2015b) Philanthropy, political connection and debt finance: reciprocal behavior of governments and private enterprises. *Nankai Business Review* **18**, 4–14 (in Chinese).
- Liu X and Zhang C** (2017) Corporate governance, social responsibility information disclosure, and enterprise value in China. *Journal of Cleaner Production* **142**, 1075–1084.
- Liu W, Wei Q, Huang S-Q and Tsai S-B** (2017) Doing good again? A multilevel institutional perspective on corporate environmental responsibility and philanthropic strategy. *International Journal of Environmental Research and Public Health* **14**, 1283.
- Lu H, Deng T and Yu J** (2019) Can financial subsidies promote the “greening” of enterprises? A study based on China's heavy pollution listed companies. *Business Management Journal* **41**, 5–22 (in Chinese).
- Luo X and Liu W** (2019) Political association and enterprise environmental violation punishment – asylum or supervision: evidence from IPE database. *Journal of Shanxi University of Finance and Economics* **41**, 85–99 (in Chinese).
- Ma Z, Novoselov KE, Zhou K and Zhou Y** (2019) Managerial academic experience, external monitoring and financial reporting quality. *Journal of Business Finance & Accounting* **46**, 843–878.
- Macneil I** (2002) Adaptation and convergence in corporate governance: the case of Chinese listed companies. *Journal of Corporate Law Studies* **2**, 289–344.
- Murovec N, Erker RS and Prodan I** (2012) Determinants of environmental investments: testing the structural model. *Journal of Cleaner Production* **37**, 265–277.
- Park SH and Luo Y** (2001) Guanxi and organizational dynamics: organizational networking in Chinese firms. *Strategic Management Journal* **22**, 455–477.
- Samuelson PA** (1954) The pure theory of public expenditure. *Review of Economics and Statistics* **36**, 387–389.
- Schuler DA and Cramer RR** (2002) Pursuing strategic advantage through political means: a multivariate approach. *The Academy of Management Journal* **45**, 659–672.
- Tang GP, Li LH and Wu DJ** (2013) Environmental regulation, industry attributes and corporate environmental investment. *Accounting Research* **34**, 83–89 (in Chinese).
- Wang Q, Wong TJ and Xia L** (2008) State ownership, the institutional environment, and auditor choice: evidence from China. *Journal of Accounting and Economics* **46**, 112–134.
- Wei F, Ding B and Kong Y** (2017) Female directors and corporate social responsibility: evidence from the environmental investment of Chinese listed companies. *Sustainability* **9**, 2292–2313.
- Wu H, Li S, Ying SX and Chen X** (2018) Politically connected CEOs, firm performance, and CEO pay. *Journal of Business Research* **91**, 169–180.
- Xiao HJ** (2018) The development and evolution of social responsibility of state-owned enterprises: based on 40 years of review and depth observation. *Business Management Journal* **40**, 5–22 (in Chinese).

- Xin KK and Pearce JL** (1996) Guanxi: connections as substitutes for formal institutional support. *Academy of Management Journal* **39**, 1641–1658.
- Yuan JG, Hou QS and Cheng C** (2015) Curse effect of corporate political resources: an investigation based on political connection and corporate technological innovation. *Management World* **31**, 139–155 (in Chinese).
- Zhang PD** (2018) Do local governments' environmental protection really work? An empirical study based on fiscal decentralization. *Business Management Journal* **40**, 23–37 (in Chinese).
- Zhang K and Wen Z** (2008) Review and challenges of policies of environmental protection and sustainable development in China. *Journal of Environmental Management* **88**, 1249–1261.
- Zhang H, Li L, Zhou D and Zhou P** (2014) Political connections, government subsidies and firm financial performance: evidence from renewable energy manufacturing in China. *Renewable Energy* **63**, 330–336.
- Zhang L, Ren S, Chen X, Li D and Yin D** (2020) CEO Hubris and firm pollution: state and market contingencies in a transitional economy. *Journal of Business Ethics* **161**, 459–478.

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