

Original Research

# Can Green Mergers and Acquisitions Curb the Financialization of Heavily Polluting Enterprises? Evidence From China

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### Abstract:

Realizing the harmonious coexistence of environmental and economic benefits is an inevitable requirement, and promoting the sustainable development of corporate environmental governance and physical enterprises “from virtual to real” is the essence. Using a sample of Chinese A-share listed heavily polluting enterprises from 2004 to 2020, the impact mechanism of green mergers and acquisitions (M&A) on corporate financialization is investigated through multiple regression analysis. The results show that green M&A can inhibit corporate financialization, with government environmental concerns playing a negative moderating role and corporate governance capabilities playing a positive moderating role. Further results on the transmission mechanism show that financing constraints mediate the relationship between green M&A and corporate financialization. The results of the study not only show that green M&A is a “sincere” behavior of enterprises to promote sustainable development, but also reveal the “dynamic” role of government environmental concerns and corporate governance capabilities. In addition, the “reservoir” effect of corporate financialization is also confirmed.

**Keywords:** green M&A, corporate financialization, government environmental concerns, corporate governance capabilities

## Introduction

## Background and Motivation

High-quality economic development and environmental sustainability are challenged by economic “shifting from real to virtual” and environmental pollution [1]. On the one hand, the continuous expansion of capital and the fierce market competition have led to difficulties in physical investment [2]. To maximize profits and avoid risk, enterprises will choose more profitable financial investments [2, 3]. Many non-financial enterprises derive cross-industry value creation from financial investments,

exacerbating the trend of “shifting from real to virtual” of enterprises [4]. The profit-oriented attributes of capital have caused finance to deviate from its original purpose of serving the real economy, and the main business of non-financial enterprises has been compressed [5]. Entity enterprises have turned to financial sectors such as insurance and real estate, and have become more dependent on financial investment returns [6]. Therefore, as China’s economy enters a new normal, the phased decline in economic growth is causing more and more non-financial enterprises to invest in financial investments. Heavily polluting enterprises, which have played an enormous role in socio-economic development, have also invested their

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From the above studies, it can be seen that research on corporate environmental governance and financialization

To answer these questions, we formulate relevant hypotheses from theoretical arguments and empirically test them with data. Specifically, using a sample of A-share listed heavily polluting enterprises in China from 2004 to 2020 as an empirical study, we discuss the impact of green M&A on corporate financialization, and further explore the influence mechanisms of external governmental environmental concerns and internal corporate governance capabilities. In addition, we also explore the “reservoir” and “investment substitution” effects of corporate financialization.

- (1) We enrich the research on corporate environmental governance and corporate financialization. Realizing a harmonious symbiosis between the environment and the economy is an eternal theme for promoting sustainable social development [25]. Corporate financialization is affected by a variety of factors inside and outside the enterprise, and corporate environmental governance has its specificity among the many factors. Green business practices, green technological innovation, and other corporate environmental governance behaviors will have an impact on corporate financialization [17, 23]. Green M&A, as an emerging corporate environmental governance behavior, also has important research value in its impact on corporate financialization.
- (2) We contribute to the study of green M&A. As the government has increased its concerns for the environment, enterprises have also increased their environmental management efforts. The concept of green M&A has been formalized as an important tool for corporate environmental governance [24]. Some scholars suggest that green M&A is the best way for enterprises to survive and transform, a kind of “sincere” behavior [13, 26], but some scholars question that green M&A is only a tactical tool to shift public opinion, and cannot realize the substantive transformation of enterprises [27]. Enterprise transformation is an inevitable part of historical development, and the focus of attention

The external policy environment affects corporate financialization, as do internal enterprise factors. On the one hand, the gap between physical and financial investments is an important factor impacting corporate financialization. Du et al. [53] argued that the gap between physical and financial returns on investment has caused non-negligible damage to the enterprise's main business, and that the decline in the importance of the core business has led to a skewing of resource allocation towards the financial sector. Further, Demir [40] and Tang & Zhang [54] pointed out that as the gap between physical and financial returns increases, enterprise fixed investments are compressed, and more resources are

of the enterprise's business structure, Jiangxi Black Cat Carbon Black Inc., Ltd. acquired Jiangxi Jonway Energy Conservation and Environmental Protection Technology Co., Ltd. In short, green M&A for different purposes can have different impacts on the production operations of the enterprise.

Existing research on the economic consequences of green M&A has focused on enterprise value creation. While not nearly as much research has been conducted in this niche, the results mainly point to the opposite of M&A in general, i.e., green M&A leads to better M&A performance for the acquirer [62]. Specifically, Eisenbach et al. [63] argued that acquirers receive positive abnormal returns when acquiring renewable energy enterprises. Also targeting the acquisition of renewable energy enterprises, Basse-Mama et al. [64] and Yoo et al. [65] further refined the differential impact of acquirer industry characteristics. If the acquirer is a renewable energy enterprise, it can achieve more positive returns compared to non-renewable energy enterprises. Based on this, Salvi et al. [24] proposed the concept of green M&A. They argued that in traditional technology acquisitions, acquirers do not improve their performance, but rather show a downward trend. However, if the acquisition target is a “green” enterprise, M&A performance shows differential results, i.e., green M&A has positive performance returns. The reason for this, investors’ positive attitude and market reaction to green M&A deals [63], is the expectation of high future returns [24, 66].

The relationship between green M&A and enterprise green behavior has also been the focus of scholarly research. On the one hand, green M&A can significantly improve the enterprise's green innovation capabilities [67, 68]. According to Huang & Yuan [67], the impact of green M&A on green innovation is mainly bridged by the support of external stakeholders. Specifically, relative to non-green M&A, green M&A facilitates enterprises to gain more organizational legitimacy, and government subsidies and commercial credits are more available, thus lower financing constraints lead to stronger green innovation. For heavily polluting enterprises, green M&A can also promote green innovation. The difference is that Liang et al. [68] suggested that government subsidies play a moderating role in this process. On the other hand, green M&A can promote enterprise environmental protection investment [14], and reduce environmental violations [13]. But the relationship between green M&A and corporate environmental protection investment is not completely linear, but U-shaped. Lu [14] believed that green M&A inhibits environmental protection investment by increasing M&A costs and management costs, and promotes environmental protection investment by improving enterprise reputation, environmental awareness, financing ability, and government subsidies.

In addition, green M&A intuitively reflects an enterprise's concern for the environment and is a manifestation of the enterprise's commitment to environmental responsibility. Therefore, green M&A gains more external support by enhancing the organizational

1&A are relatively common in the



legitimacy of enterprises and continuously improving their risk-taking capacity [16]. More importantly, green M&A can also reduce the cost of capital of enterprises [69, 70], thus improving their operational performance [62, 71] and export performance [72].

In conclusion, research on the economic consequences of green M&A has focused on corporate value creation and green behavior. For enterprise value creation, scholars generally believe that green M&A plays a facilitating role in enterprise value creation; for enterprise green behaviors, such as green innovation, environmental protection investment, legitimacy, and risk-taking, all show positive effects.

## Literature Summary

There are fewer studies on internal factors affecting corporate financialization. Existing research on factors affecting corporate financialization mainly focuses on external policies. Research on internal factors also focuses on managerial characteristics and other perspectives, with less research at the strategic level, such as corporate M&A; research on green M&A has emerged late and has not yet formed a perfect system. In addition to the study of conventional economic consequences such as enterprise value creation and green behavior, more research perspectives should be added to the research system of green M&A. Therefore, it is urgent to study the relationship between green M&A and corporate financialization, which is both a complement to the internal influencing factors of corporate financialization and a powerful exploration of the impact of green M&A on other corporate behaviors.

The mechanism of the impact of green M&A and corporate financialization is unclear. The research on green M&A and corporate financialization is still in the exploratory stage due to the small number of studies on green M&A. How to argue the relationship between green M&A and corporate financialization has become a key link. Tracing back to the origin, existing research proves that there is a relationship between corporate environmental governance and financialization, and green M&A also belongs to one of the ways of corporate environmental governance. Therefore, it is necessary to make an in-depth analysis of the influence mechanism of green M&A and corporate financialization.

The study of green M&A affecting corporate financialization is feasible. Both macroeconomic policy factors and managerial characteristics factors, as well as the physical and financial investment gap, directly or indirectly influence corporate financialization through preventive and speculative motives. For example, economic policy uncertainty can stimulate precautionary motives, the managerial-financial background can stimulate speculative motives, and the gap between real and financial investments can directly induce enterprise speculative motives, thus enhancing corporate financialization. Meanwhile, green M&A usually shows positive economic consequences. Positive responses,

such as abnormal M&A returns, corporate performance, and green innovation, are a guarantee of more rational corporate investment behavior and can reduce corporate financialization incentives. Therefore, there is a theoretical basis for studying the influence mechanism of green M&A and corporate financialization.

## Theoretical Basis and Research Hypothesis

According to the theory of corporate financialization, enterprises allocate financial assets mainly because they have higher operational flexibility and can earn high returns in the short term [73]. In other words, the motivations for corporate financialization include mainly preventive and speculative motives, which are reflected in the “reservoir” effect and the “investment substitution” effect, respectively [1, 28].

The “reservoir” theory is based on the precautionary saving theory [74]. According to the “reservoir” theory, compared with physical investment, financial assets have stronger liquidity and lower adjustment costs [74]. The “reservoir” theory suggests that enterprises will make financial investments because of the liquidity of financial assets, thus coping with various types of uncertain risks that may be encountered in business operations, such as a break in the financial chain [37, 39]. More vividly, the precautionary nature of financial assets is like a cistern, storing water when the rains are plentiful and allowing for emergencies when the weather is dry. For business operations, investing in financial assets when the enterprise has sufficient funds, which can not only increase the liquidity of the assets, but also improve enterprise profits [75]. On the contrary, the sale of financial assets when the enterprise has financial difficulties can not only supplement the enterprise’s cash flow, but also can help the enterprise out of the financial crisis as soon as possible [1, 76]. Thus, reducing the motives of enterprises to prevent saving can discourage corporate financialization.

Green M&A can reduce the precautionary motives of enterprises. Based on the signal transmission theory, green M&A strengthens an enterprise's reputation and environmental image [14], enhances organizational legitimacy [16], and sends a green development signal [27]. These positive signals optimize the financing environment for enterprises. First, green M&A makes it easier for enterprises to access commercial credit resources from banks and other financial institutions [16, 67]. Enterprises with green M&A demonstrate stronger capital strength and a stronger sense of social responsibility [72], which is conducive to obtaining higher bank credit ratings and thus more financing opportunities and scale [72, 77]. Second, green M&A is often accompanied by greater enterprise environmental awareness, which facilitates close collaboration with suppliers and customers [67]. Green M&A can enhance organizational legitimacy and support from more external stakeholders (e.g., suppliers and customers), which in turn can lead to more commercial credits [78]. Third, green

[64, 88]. In detail, green M&A leads to significant cost and competitive differentiation advantages [68, 71], enhanced operational and financial synergy effects [14, 85], resulting in improved operational performance [62, 71] and reduced incentives for enterprise speculation.

Overall, corporate financialization is driven by both precautionary and speculative motives. However, green M&A can reduce enterprises' financing constraints by obtaining more external support, thus reducing the precautionary motive. At the same time, green M&A can also enhance enterprises' cost and differentiation advantages by improving the enterprise's main business performance, thus reducing the speculative motive. Therefore, this paper proposes the following hypothesis:

Government environmental concerns are environmental regulations enacted by the government to promote ecological harmony and build a low-carbon life with a better environment [89, 90], such as carbon taxes and natural resource rents [91]. From the trial implementation of China's first Environmental Protection Law in 1979 to its official implementation in 1989, and from the passage of the Environmental Protection Tax Law in 2016 to its official implementation in 2018, these demonstrate the Chinese government's environmental concerns [92]. At the same time, it also means that China's heavily polluting enterprises face increasingly stringent financing constraints [16].

Thus, we argue that government environmental concerns increase financing constraints and enhance enterprises' precautionary incentives, thereby strengthening the tendency of corporate financialization. This makes the disincentive effect of green M&A on corporate financialization even stronger. Therefore, this paper proposes the hypothesis:

*H2: Government environmental concerns negatively moderate the inhibitory effect of green M&A on corporate financialization, i.e., the higher the local government environmental concerns, the stronger the inhibitory effect of green M&A on corporate financialization.*

Corporate governance research originated with Berle & Means [96]. Their core argument pointed to managers maximizing their interests rather than shareholders. The resulting reflection on the principal-agent problem has become the focus of corporate governance research [97]. At the same time, Denis & Mcconnell [98] proposed that corporate governance is the sum of the internal and external mechanisms of an enterprise, which can prompt managers pursuing personal interests to make decisions based on the principle of maximizing the interests of the enterprise's owners. Referring to Bai et al. [97], the mechanism of the role of corporate governance capacities has been studied mainly in terms of equity structure and board supervision.

Excellent corporate governance capabilities can effectively monitor and incentivize management [99], thereby reducing the incentive for enterprises to speculate. First, good corporate governance is characterized by chief executive officer (CEO) non-duality. CEO duality is defined as having one person serving as both CEO and chairman of the board of directors [100]. Since CEO non-duality indicates that the CEO and the board chairman are not the same person, the board is better able to monitor the CEO and limit the use of the CEO's power [101, 102]. Thus, good corporate governance (i.e., CEO non-duality) enhances board oversight, thereby reducing managerial speculation. Second, good corporate governance is demonstrated by a high proportion of outside directors. The core of outside directors is "outside", which means that these directors are not internal to the enterprise and do not have the function of managing the daily operations of the enterprise [103]. The independence of outside directors means that they are expected to safeguard the interests of all shareholders and their oversight role over management can be fully utilized [104, 105], thus reducing managerial speculation. In addition, executive shareholding [106], equity concentration [107], and equity checks and balances [108] also indicate corporate governance capabilities, and these can also reduce managerial speculation.

Therefore, we argue that corporate governance capacities reduce enterprises' speculative incentives, and thus reduce the tendency of corporate financialization. This makes the disincentive effect of green M&A on financialization even weaker. Therefore, this paper proposes the hypothesis:

*H3: Corporate governance capacities positively moderate the inhibitory effect of green M&A on corporate financialization, i.e., the higher the corporate governance capacities, the weaker the inhibitory effect of green M&A on corporate financialization.*

## Research Design

## Model Design

In this paper, we design the following model to test H1: where *FIN* denotes corporate financialization, *GMA* denotes green M&A, *Controls* denotes relevant control

variables,  $i$  denotes the company and  $t$  denotes the year, and  $YEAR$  and  $IND$  denote the year and industry dummy variables. If  $\beta_i$  is significantly less than 0, it indicates that green M&A is negatively related to corporate financialization. Specifically, compared to non-green M&A, green M&A can inhibit corporate financialization, supporting H1.

$$FIN_{i,t} = \beta_0 + \beta_I \times GMA_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + IND_{i,t} + \varepsilon_{i,t}$$

To test the moderating effect of government environmental concerns on the relationship between green M&A and corporate financialization, we construct the following model: where  $ER$  denotes government environmental concerns and the other variables are consistent with the above. If  $\beta_3$  is significantly less than 0, it indicates that government environmental concerns negatively moderate the relationship between green M&A and corporate financialization.

$$FIN_{i,t} = \beta_0 + \beta_1 \times GMA_{i,t} + \beta_2 \times ER_{i,t} + \beta_3 \times GMA_{i,t} \times ER_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + IND_{i,t} + \varepsilon_{i,t}$$

To test the moderating effect of corporate governance capacities on the relationship between green M&A and corporate financialization, we construct the following model: where  $CG$  denotes corporate governance capacities and the other variables are consistent with the above. If  $\beta_3$  is significantly greater than 0, it indicates that corporate governance capacities positively moderate the relationship between green M&A and corporate financialization.

$$FIN_{i,t} = \beta_0 + \beta_1 \times GMA_{i,t} + \beta_2 \times CG_{i,t} + \beta_3 \times GMA_{i,t} \times CG_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + IND_{i,t} + \varepsilon_{i,t}$$

### Variable Definition

Corporate financialization. Enterprise assets include operating and financial assets, where corporate financialization is the ratio of enterprise financial assets to total assets [38, 40]. Drawing on the study by Du et al. [53] and Peng et al. [41], financial assets mainly include: trading financial assets, derivative financial assets, loans and advances granted net, available-for-sale financial assets net, held-to-maturity investments net, and investment properties net. It should be noted that although monetary funds are also financial assets, operating activities themselves generate money [53]. Therefore, monetary funds are not included in the financial assets in this paper. As a result of China's real estate market reform, China's investment properties are increasingly showing the characteristics of financial assets and gradually becoming an important investment product [109], so this paper defines it as a special financial product.

Green M&A. Green M&A is an enterprise M&A aimed at energy saving, emission reduction, and environmental protection, and in this way to achieve low

mechanisms (i.e., the foundation of the legal system and the protection of small and medium-sized investors' rights and interests, etc.), and mechanisms with Chinese characteristics (i.e., state-owned legal entity shares). It mainly includes eight variables: (1) CEO duality. Whether the CEO also serves as the (vice) chairman of the board of directors; (2) the proportion of outside directors. The ratio of outside directors to the number of board members; (3) executive compensation. Expressed as the ratio of executive shareholding; (4) the ratio of shareholding of the first largest shareholder; (5) the ratio of shareholding of the second to tenth largest shareholders; (6) whether there is a parent company; (7) whether it is listed on other markets; and (8) whether it is state-controlled.

Control variables. Referring to Li et al. [16] and Zhang et al. [1], control variables are set in terms of M&A characteristics, financial characteristics, and corporate governance characteristics. (1) M&A characteristics. M&A ratio (*RATIO*) and payment method (*CASH*); (2) financial characteristics. Firm scale (*SIZE*), leverage (*LEV*), total asset turnover (*ATO*), fixed assets ratio (*FIXED*), audit opinion (*OPIN*), firm growth (*GROW*), and market-to-book ratio (*MB*); (3) corporate governance characteristics. Equity concentration (*TOP1*), equity balance (*BAL*), and property of nature (*SOE*). Variable definitions are detailed in Table 1. Additionally, we incorporate time-fixed (*YEAR*) and industry-fixed (*IND*) effects.

Table 1. Variable definitions

Category	Name	Symbol	Definition
Dependent variable	Corporate financialization	<i>FIN</i>	Financial assets / total assets in the year of M&A
Independent variable	Green M&A	<i>GMA</i>	Value of 1 if this M&A of an enterprise is a green behavior; 0 otherwise
Moderating variable	Government environmental concerns	<i>ER</i>	Frequency of words related to “ecological environment” / number of words in the full text of local government work reports
	Corporate governance capacities	<i>CG</i>	Constructing a comprehensive indicator system by principal component analysis
Control variables	M&A ratio	<i>RATIO</i>	The M&A transaction share acquisition ratio
	Payment method	<i>CASH</i>	Value of 1 if the payment method is cash; 0 otherwise
	Firm scale	<i>SIZE</i>	The natural logarithm of total assets in the year of M&A
	Leverage	<i>LEV</i>	Total liabilities / total assets in the year of M&A
	Total asset turnover	<i>ATO</i>	Operating income / average total assets
	Fixed assets ratio	<i>FIXED</i>	Fixed assets / total assets in the year of M&A
	Audit opinion	<i>OPIN</i>	The standard unqualified opinion takes 1; 0 otherwise
	Firm growth	<i>GROW</i>	The growth rate of operating income in the M&A year
	Market-to-book ratio	<i>MB</i>	Stock market value / book value of stock
	Equity concentration	<i>TOP1</i>	The shareholding ratio of the largest shareholder
	Equity balance	<i>BAL</i>	Shareholding of the second largest shareholder / shareholding of the first largest shareholder
	Property of nature	<i>SOE</i>	Value of 1 if it is a state-owned enterprise; 0 otherwise



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	<i>FIN</i>	<i>GMA</i>	<i>ER</i>	<i>CG</i>	<i>RATIO</i>	<i>CASH</i>	<i>SIZE</i>	<i>LEV</i>	<i>ATO</i>	<i>FIXED</i>	<i>OPIN</i>	<i>GROW</i>	<i>TOPI</i>	<i>BAL</i>	<i>MB</i>	<i>SOE</i>
<i>FIN</i>	1															
<i>GMA</i>	-0.094***	1														
<i>ER</i>	0.033	0.132***	1													
<i>CG</i>	-0.092***	0.011	0.001	1												
<i>RATIO</i>	-0.022	0.045	0.035	-0.047*	1											
<i>CASH</i>	-0.011	-0.159***	-0.034	0.029	-0.229***	1										
<i>SIZE</i>	-0.034	0.103***	0.156***	0.559***	0.015	-0.004	1									
<i>LEV</i>	-0.119***	0.049*	0.007	0.399***	-0.030	0.074***	0.529***	1								
<i>ATO</i>	-0.075***	-0.146***	-0.048	0.030	0.005	0.029	-0.039	-0.011	1							
<i>FIXED</i>	-0.252***	0.101***	-0.014	0.472***	-0.032	0.038	0.360***	0.412***	-0.150***	1						
<i>OPIN</i>	-0.056**	0.013	0.027	0.011	0.036	0.036	0.065**	-0.04	0.060**	0.052*	1					
<i>GROW</i>	-0.044	0.079***	0.042	-0.04	0.113***	-0.331***	-0.009	0.007	0.105***	-0.02	0.069**	1				
<i>TOPI</i>	-0.056**	0.023	0.054*	0.433***	0.016	0.024	0.272***	0.137***	0.115***	0.239***	0.048*	0.070**	1			
<i>BAL</i>	0.022	-0.026	-0.045	-0.196***	0.012	-0.087***	-0.059**	-0.092***	-0.070**	-0.173***	-0.008	-0.004	-0.616***	1		
<i>MB</i>	-0.083***	0.077***	0.008	0.432***	-0.011	0.059**	0.624***	0.594***	-0.145***	0.407***	-0.004	-0.087***	0.145***	-0.059**	1	
<i>SOE</i>	-0.092***	0.038	0.011	0.768***	-0.079***	0.027	0.448***	0.377***	-0.019	0.471***	0.039	-0.061**	0.292***	-0.193***	0.426***	1

Table 4 presents the correlation analysis of the main variables, where the correlation between green M&A and corporate financialization is -0.094 ( $p < 0.01$ ), which initially confirms the hypothesis that green M&A is negatively correlated with corporate financialization. Meanwhile, corporate governance capacities (*CG*), leverage (*LEV*), total asset turnover (*ATO*), fixed assets ratio (*FIXED*), audit opinion (*OPIN*), equity

Table 5. Baseline regression results

	(1)	(2)
	<i>FIN</i>	<i>FIN</i>
<i>GMA</i>	-0.010***	-0.012***
	(-3.770)	(-4.027)
<i>RATIO</i>		-0.006
		(-0.891)
<i>CASH</i>		-0.003
		(-0.619)
<i>SIZE</i>		0.003*
		(1.905)
<i>LEV</i>		-0.022*
		(-1.824)
<i>ATO</i>		-0.012***
		(-2.896)
<i>FIXED</i>		-0.089***
		(-7.348)
<i>OPIN</i>		-0.014
		(-0.703)
<i>GROW</i>		-0.002
		(-0.550)
<i>TOPI</i>		-0.015
		(-1.159)
<i>BAL</i>		-0.012**
		(-1.978)
<i>MB</i>		0.001
		(0.381)
<i>SOE</i>		0.003
		(0.748)
<i>_cons</i>	-0.002	0.031
	(-0.565)	(0.740)
<i>YEAR</i>	Yes	Yes
<i>IND</i>	Yes	Yes
r2_a	0.070	0.123
N	1307	1307

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

concentration (*TOPI*), market-to-book ratio (*MB*), and property of nature (*SOE*) show a significant negative relationship with corporate financialization.

## Multiple Regression Analysis

Table 5 presents the results of the regression analysis, with all models using corporate financialization as the dependent variable and controlling for industry-fixed and time-fixed effects. In particular, column 1 is analyzed with green M&A as an independent variable, and column 2 adds control variables. The results show a negative correlation between green M&A and corporate financialization ( $\beta=-0.012$ ,  $p<0.01$ ). This suggests that

green M&A can inhibit corporate financialization, i.e., the inhibitory effect of green M&A on corporate financialization is more pronounced compared to non-green M&A, and the results support hypothesis 1.

### Moderating Effects Test

Table 6 shows the results of the moderating effect test of government environmental concerns and corporate governance capacities. To avoid the problem of multicollinearity, we centered green M&A and government environmental concerns, and added the interaction term after centering them into the model. The results show that the cross term of green M&A and government environmental concerns is significantly negatively related to corporate financialization ( $\beta = -4.272$ ,  $p < 0.05$ ). This indicates that the higher the government's environmental concerns, the stronger the inhibition effect of green M&A on corporate financialization, which supports Hypothesis 2. Similarly, the cross-term of green M&A and corporate governance capabilities after centralization is significantly positively related to corporate financialization ( $\beta = 0.005$ ,  $p < 0.05$ ). This indicates that the higher the corporate governance capacities, the weaker the inhibitory effect of green M&A on corporate financialization, supporting Hypothesis 3.

## Further Analysis

The main driving mechanisms of corporate financialization are precautionary and speculative motives [1, 4]. The “reservoir” theory suggests that corporate entities financialize out of consideration of financing constraints [112, 113], and the “investment substitution” theory suggests that corporate entities financialize because of the gap between the return on physical and financial investments [79, 114]. Meanwhile, based on the previous theoretical analysis, it is known that green M&A can reduce enterprises’ precautionary and speculative motives. Therefore, drawing on Wang et al. [109], we also argue that the alleviation of financing constraints can reduce enterprises’ preventive motives and the improvement of main business performance can reduce enterprises’ speculative motives.

### *Preventive Motivation Mechanism*

We construct a stepwise regression model to test the mediating effect of financing constraints. Drawing on Hadlock & Pierce [115], two exogenous variables, firm size and age, are used to construct the SA index, i.e.,  $SA = -0.737Size + 0.043Size^2 - 0.004Age$ , where *Size* is the natural logarithm of the total assets of the enterprise, and *Age* is the length of time the enterprise has been in existence. In addition, since the SA index is negative, we use the natural logarithm of the absolute value of the SA index to measure the enterprise financing constraints (*FC*), and a larger value indicates a higher enterprise financing constraint.

Table 6. The moderating effect test of government environmental concerns and corporate governance capacities

	(1) <i>FIN</i>	(2) <i>FIN</i>
<i>GMA</i>	-0.011*** (-3.348)	-0.011*** (-3.859)
<i>ER</i>	1.493 (1.219)	
<i>GMA*ER</i>	-4.272** (-2.155)	
<i>CG</i>		-0.001 (-0.474)
<i>GMA*CG</i>		0.005** (2.275)
<i>RATIO</i>	-0.008 (-1.164)	-0.006 (-0.996)
<i>CASH</i>	-0.001 (-0.255)	-0.003 (-0.551)
<i>SIZE</i>	0.003 (1.600)	0.003* (1.876)
<i>LEV</i>	-0.012 (-0.851)	-0.022* (-1.794)
<i>ATO</i>	-0.012*** (-2.677)	-0.011*** (-2.801)
<i>FIXED</i>	-0.087*** (-6.345)	-0.089*** (-7.274)
<i>OPIN</i>	-0.033 (-1.354)	-0.015 (-0.740)
<i>GROW</i>	-0.000 (-0.002)	-0.002 (-0.537)
<i>TOPI</i>	-0.009 (-0.665)	-0.012 (-0.921)
<i>BAL</i>	-0.007 (-1.055)	-0.011* (-1.810)
<i>MB</i>	0.000 (0.042)	0.001 (0.478)
<i>SOE</i>	0.004 (0.861)	0.005 (0.916)
_cons	0.026 (0.543)	0.003 (0.069)
<i>YEAR</i>	Yes	Yes
<i>IND</i>	Yes	Yes
r2_a	0.117	0.124
N	1069	1307

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

To verify the mediating effect of financing constraints, we add the following model based on the benchmark regression model, where  $FC$  denotes the enterprise financing constraints, and other variables are set consistent with the previous section.

$$FC_{i,t} = \beta_0 + \beta_1 \times GMA_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + \varepsilon_{i,t}$$

$$IND_{i,t} = \beta_0 + \beta_1 \times GMA_{i,t} + \beta_2 \times FC_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + \varepsilon_{i,t}$$

Table 7 shows the results of the mediation model test. Column 1 takes financing constraints as the dependent variable and green M&A as the independent variable. Column 2 takes corporate financialization as the dependent variable, and adds green M&A and financing constraints as independent variables. All the above models include relevant control variables.

The table shows that green M&A has a significant negative relationship with financing constraints (Column 1;  $\beta = -0.009$ ,  $p < 0.05$ ), and financing constraints are significantly and positively associated with corporate financialization (Column 2;  $\beta = 0.070$ ,  $p < 0.01$ ). In addition, the  $\beta$ -value of green M&A and corporate financialization increases from  $-0.012$  to  $-0.011$  (Column 2;  $p < 0.01$ ) compared to the benchmark regression. This proves that financing constraints play a partially mediating role between green M&A and corporate financialization, i.e., the inhibitory effect of green M&A on corporate financialization is generated by alleviating financing constraints.

### *Speculative Motivation Mechanism*

We also construct a stepwise regression model to test the mediating effect of the improvement of main business performance. Referring to Wang et al. [32], the main business performance of the enterprise is measured in the following way, i.e.,  $COREPERF_{i,t} = (OP_{i,t} - IR_{i,t} - CIFV_{i,t} + IAJV_{i,t}) / ATA_{i,t}$ , where  $COREPERF$  denotes main business performance,  $OP$  denotes operating profit,  $IR$  denotes investment returns,  $CIFV$  denotes the change of income fair value,  $IAJV$  denotes investment income in associates and joint ventures, and  $ATA$  denotes average total assets.

To verify the mediating effect of the improvement of main business performance, we add the following model based on the benchmark regression model. Related variables are defined above.

$$\begin{aligned} COREPERF_{i,t} &= \beta_0 + \beta_1 \times GMA_{i,t} + \sum \beta \times Controls_{i,t} + \\ &YEAR_{i,t} + IND_{i,t} + \varepsilon_{i,t} \quad FIN_{i,t} = \beta_0 + \beta_1 \times GMA_{i,t} + \beta_2 \times \\ &COREPERF_{i,t} + \sum \beta \times Controls_{i,t} + YEAR_{i,t} + IND_{i,t} + \varepsilon_{i,t} \end{aligned}$$

As can be seen in Table 7, the green M&A in column 3 shows a positive but insignificant relationship with main business performance improvement ( $\beta=0.004$ ,  $p>0.10$ ). The improvement of main business performance in column 4 shows a negative relationship with corporate financialization ( $\beta=-0.114$ ,  $p<0.05$ ). Therefore, we perform the Sobel test to further verify the mediation effect, but the results show that it still fails the test. This indicates that the main business performance improvement does not play a mediating role.

Considering the rigor, we again use the difference between physical and financial investment returns to verify the mediating effect. Referring to Wang et al. [109], the specific procedure for calculating the difference between physical and financial investment returns is as follows, where  $OA$  denotes operating assets,  $ASSET$  denotes total



Table 7. Mechanism test results

	(1) <i>FC</i>	(2) <i>FIN</i>	(3) <i>COREPERF</i>	(4) <i>FIN</i>	(5) <i>GAP</i>	(6) <i>FIN</i>
<i>GMA</i>	-0.009** (-2.467)	-0.011*** (-3.878)	0.004 (0.934)	-0.014*** (-3.588)	0.016 (1.067)	-0.011** (-2.105)
<i>FC</i>		0.070*** (3.035)				
<i>COREPERF</i>				-0.114** (-1.972)		
<i>GAP</i>						-0.020 (-0.921)
<i>RATIO</i>	0.006 (0.777)	-0.006 (-0.953)	-0.000 (-0.020)	-0.004 (-0.420)	0.011 (0.391)	0.000 (0.007)
<i>CASH</i>	-0.008* (-1.722)	-0.003 (-0.512)	0.021*** (3.796)	-0.005 (-0.638)	0.021 (0.717)	-0.011 (-1.046)
<i>SIZE</i>	-0.012*** (-5.463)	0.004** (2.418)	0.011*** (4.782)	0.004* (1.720)	-0.001 (-0.091)	0.005** (2.020)
<i>LEV</i>	0.071*** (5.554)	-0.027** (-2.135)	-0.140*** (-10.238)	-0.033* (-1.755)	-0.217*** (-3.463)	-0.022 (-1.059)
<i>ATO</i>	-0.004 (-0.790)	-0.011*** (-2.832)	0.026*** (4.835)	-0.016*** (-2.819)	0.046*** (2.635)	-0.020*** (-3.003)
<i>FIXED</i>	0.049*** (3.577)	-0.093*** (-7.379)	0.030** (2.202)	-0.108*** (-6.806)	-0.045 (-0.514)	-0.111*** (-4.970)
<i>OPIN</i>	-0.008 (-0.637)	-0.014 (-0.673)	0.067*** (2.629)	-0.019 (-0.530)	0.565 (1.390)	0.045 (1.641)
<i>GROW</i>	0.007** (2.397)	-0.002 (-0.735)	0.019*** (2.994)	-0.000 (-0.013)	0.034** (2.260)	-0.003 (-0.745)
<i>TOP1</i>	-0.148*** (-8.621)	-0.004 (-0.341)	0.036** (2.267)	-0.028* (-1.895)	0.098 (1.304)	-0.028 (-1.507)
<i>BAL</i>	-0.061*** (-7.984)	-0.008 (-1.294)	0.007 (0.794)	-0.021** (-2.503)	-0.013 (-0.436)	-0.025** (-2.383)
<i>MB</i>	-0.005** (-2.173)	0.001 (0.591)	-0.009*** (-4.667)	-0.001 (-0.339)	-0.002 (-0.206)	0.001 (0.334)
<i>SOE</i>	0.013*** (3.235)	0.002 (0.509)	-0.015*** (-3.148)	0.007 (1.340)	-0.004 (-0.164)	0.012 (1.537)
<i>_cons</i>	1.535*** (31.996)	-0.076 (-1.463)	-0.239*** (-4.362)	0.055 (0.879)	-0.434 (-0.858)	-0.033 (-0.518)
<i>YEAR</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>IND</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>r2_a</i>	0.397	0.128	0.343	0.193	0.174	0.198
<i>N</i>	1307	1307	801	801	514	514

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

assets, and *FA* denotes financial assets. It should be noted that although monetary funds are not included in the measurement of corporate financialization, monetary funds are financial assets, so they are not included in operating assets. Meanwhile, *RO* denotes the return on investment of the entity, i.e.,  $RO_{i,t} = OP_{i,t} - INTEREST_{i,t} - CIFV_{i,t} - IR_{i,t} + IAJV_{i,t}$ . *RF* denotes financial investment income, i.e.,  $RF_{i,t} = INTEREST_{i,t} + CIFV_{i,t} + IR_{i,t} - IAJV_{i,t}$ . *INTEREST* denotes interest revenue, and the other variables are defined above. In addition, *ro* denotes the rate of return on physical

investment and  $r_f$  denotes the rate of return on financial investment  $r_f$  denotes the financial investment returns, and  $GAP$  denotes the difference between the physical and financial investment returns.

$$OA_{i,t} = ASSET_{i,t} - FA_{i,t}$$

$$ro_{i,t} = RO_{i,t} / OA_{i,t}$$

$$rf_{i,t} = RF_{i,t} / FA_{i,t}$$

$$GAP_{i,t} = ro_{i,t} - rf_{i,t}$$

and corporate financialization remains significantly negative (Column 3;  $\beta=-0.013$ ,  $p<0.01$ ), proving the robustness of the benchmark results.

## Robustness Tests

## Discussion

## Discussion About Green M&A Affecting Corporate Financialization

The dampening effect of green M&A on non-financial corporate financialization provides support for some previous studies. First, the findings confirm the role of green M&A as a catalyst for other non-financial investments. For example, green M&A promotes corporate environmental protection investments [14] and innovation investments [68]. This implies that there may be a paradigm of “green M&A – corporate financialization – other corporate investments”. Secondly, the results of the study also confirm that enterprises engage in green M&A “sincere” rather than “hypocritical” [13, 26]. This provides evidence that green M&A enhances corporate sustainability [61], which is also favorable evidence that corporations can achieve economic and ecological coexistence through green management practices [25].

## Discussion About Moderating Effects

The moderating effect of internal and external factors of enterprises is a refinement of the mechanisms influencing green M&A and corporate financialization, which also validates some of the existing arguments. First, the moderating effect of government environmental concerns confirms to some extent that government environmental regulation increases the financing constraints of heavily polluting enterprises [94]. And it also confirms the dynamic role of government environmental concerns in enterprise investment [90]. Secondly, the moderating effect of corporate governance capacities confirms that good corporate governance improves corporate transparency

Table 8. Robustness tests

	(1) <i>FIN</i>	(2) <i>FIN</i>	(3) <i>FIN</i>	(4) <i>FIN</i>
<i>GMA</i>		-0.009***	-0.013***	-0.009***
		(-2.669)	(-3.708)	(-2.649)
<i>GMA2</i>	-0.011***			
	(-3.894)			
<i>RATIO</i>	-0.005	0.015**	-0.006	-0.003
	(-0.751)	(2.611)	(-0.904)	(-0.453)
<i>CASH</i>	-0.002	-0.002	-0.003	0.000
	(-0.377)	(-0.372)	(-0.668)	(0.035)
<i>SIZE</i>	0.003*	-0.003	0.003*	0.003*
	(1.857)	(-0.739)	(1.938)	(1.798)
<i>LEV</i>	-0.023*	0.002	-0.022*	-0.023*
	(-1.851)	(0.078)	(-1.855)	(-1.862)
<i>ATO</i>	-0.011***	-0.005	-0.012***	-0.011**
	(-2.843)	(-0.800)	(-2.946)	(-2.341)
<i>FIXED</i>	-0.089***	-0.065***	-0.089***	-0.071***
	(-7.330)	(-3.210)	(-7.445)	(-5.172)
<i>OPIN</i>	-0.015	-0.060**	-0.014	0.006
	(-0.713)	(-1.991)	(-0.713)	(0.731)
<i>GROW</i>	-0.002	0.003	-0.002	-0.000
	(-0.712)	(0.953)	(-0.537)	(-0.118)
<i>TOPI</i>	-0.015	-0.016	-0.015	-0.032**
	(-1.206)	(-0.608)	(-1.180)	(-2.572)
<i>BAL</i>	-0.012**	0.004	-0.012**	-0.014*
	(-1.980)	(0.383)	(-2.022)	(-1.800)
<i>MB</i>	0.001	-0.003	0.001	0.000
	(0.362)	(-1.488)	(0.368)	(0.108)
<i>SOE</i>	0.003	0.014**	0.003	0.008
	(0.815)	(2.206)	(0.752)	(1.586)
<i>_cons</i>	0.031		0.023	-0.004
	(0.730)		(0.531)	(-0.104)
<i>YEAR</i>	Yes	Yes	Yes	Yes
<i>IND</i>	Yes	No	Yes	Yes
r2_a	0.120	0.561	0.123	
N	1307	1076	1307	792

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.10$ .

and oversight mechanisms, leading to more effective investment decisions [116]. It also demonstrates that corporate governance, such as equity concentration, can affect enterprise investment by influencing the first type of agency costs [107].

### Discussion About the Transmission Mechanism

The results of the transmission mechanism test show that green M&A inhibits corporate financialization by reducing enterprise financing constraints. This implies that the main mechanism by which green M&A inhibits corporate financialization is the precautionary motive. The preventive motive and the speculative motive are

the two main motives for corporate financialization, and most scholars believe that corporate financialization in China is primarily driven by speculative motives [1, 28, 29]. We speculate that the result may be related to the characteristics of green M&A. Since green M&A can enhance enterprise legitimacy and obtain more resources and external support [16], it makes enterprises have fewer worries and less desire to make financial investments out of the precautionary motive. Conversely, to gain legitimacy benefits and avoid illegitimacy penalties, enterprises use green M&A as a sincere green action [13, 26]. Then, enterprises will be less likely to consider speculative arbitrage.

## Conclusions and Managerial Implications

The financialization of non-financial enterprises and environmental issues are two major problems facing China. On the one hand, the financialization of non-financial enterprises makes enterprises gradually deviate from their main business, which is not conducive to the sustainable development of enterprises; on the other hand, with the development of human economic activities, the environmental problems of the Earth are becoming more and more urgent. Scholars have focused their research on how to realize the transformation of enterprises “from virtual to real” and the protection of the environment. However, existing research focuses on corporate environmental governance mainly including green business practices, green investment, green technological innovation, etc. There is a lack of research on how green M&A affects corporate financialization. Therefore, we theoretically propose and empirically test the influence mechanism between green M&A and corporate financialization.

Using Chinese heavily polluting enterprises as a sample, our empirical results show that: (1) Green M&A can inhibit corporate financialization; (2) Government environmental concerns negatively moderate the inhibitory effect of green M&A on corporate financialization; (3) Corporate governance capabilities positively moderate the inhibitory effect of green M&A on corporate financialization; (4) The transmission mechanism show that financing constraints mediate the relationship between green M&A and corporate financialization.

Our research can guide enterprise managers and government policymakers:

- (1) For enterprise managers, green M&A is an important environmental strategy for heavily polluting enterprises to remain sustainable. Enterprises acquire green resources and organizational legitimacy through green M&A, and achieve endogenous growth through external resource acquisition. At the same time, the external resources acquired through green M&A can strengthen and expand the core business and maintain the long-term healthy development of the enterprise. In addition, enterprises need to optimize the shareholding structure, compensation incentive mechanism, etc., to mitigate agency conflicts and improve corporate governance. The improvement of governance capacities can better bring into play the dual benefits of environmental protection and economic growth, and realize the green growth of enterprises.
- (2) For government policymakers, it is crucial to follow a path where economic and environmental benefits go hand in hand. On the one hand, policymakers should encourage enterprises to carry out green M&A, which is not only conducive to environmental protection, but also helps to inhibit enterprises from moving away from the real to the virtual; on the other hand, the government should take the initiative to guide enterprises to establish a correct concept of

development: the real economy is the foundation of a country's economy and the fundamental source of wealth creation. It should give full play to the role of financial service entities and encourage banks and other financial industries to set more lenient financing conditions for heavily polluting enterprises. At the same time, policymakers should provide multi-channel financing tools to continuously reduce enterprise financing constraints.

There are also some limitations to our study, and these limitations provide directions for future research. First, our study finds that the mechanism by which green M&A inhibits corporate financialization works mainly through precautionary motives. The study mainly tests the “reservoir” effect of financialization in terms of financing constraints, and there may be a more complex relationship mechanism in this influence mechanism. In the future, we need to consider a more in-depth and detailed analysis from the perspective of the preventive motive of corporate financialization. Second, our study confirms that green M&A can inhibit corporate financialization, but it does not reveal whether corporations have realized a shift “from virtual to real”. In the future, we need to consider further verifying whether enterprises’ investments are shifted to real investments and whether their main businesses have achieved long-term healthy development after green M&A have suppressed their financialization. Finally, our study focuses on the Chinese market, which is mainly applicable to emerging economies and developing countries, and the applicability of the conclusions to developed countries such as Europe and the United States may not be sufficient. In the future, we will consider including comparative studies of different countries to make our conclusions more generalizable.

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### Conflict of Interest

The authors declare no conflict of interest.

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## Appendix 1

Table A1. The Main Keywords for Green M&amp;A

Main Keywords		
Air Purification	Energy Right Trading	Pollution Prevention and Control
Air Quality	Energy Saving	Power Demand Side Management
All Natural	Environmental	Pumped Storage Power Plants
Alternative Power	Environmental Pollution	Recycling
Anaerobic Digestion	Environmental Protection	Remanufacturing
Battery Power	Environmental Technology	Resources Protection
Biobased	Environmentally Friendly	Resource Saving
Biodegradable	Gas Turbine	Reusable Energy
Biodynamic	Geothermal	River Outfall
Bioenergy	Green	Road Dump Transport
Biogas	Green Technology	Seawater Desalination
Biomass	Greenway System	Shared Transportation
Carbon Emissions	Healthy	Smart Power
Chemical Free	Heat Pump	Soil And Water Conservation
Circular Economy	Hydrogen	Solar
Clean Centralized Heating	Hydropower	Sponge City
Clean Energy	Installed Building	Storage and Transportation Peaking
Clean Production	Integrated Energy Supply	Sustainable
Clean Technology	Intelligent Transportation	Tailings Pond Remediation
Coal Mining Sinkhole Remediation	Lithium Battery	Thermal Power Flexibility
Cogeneration	Low Carbon	Thin Film Energy
Comprehensive Utilization	Low Emission	Unconventional Oil and Gas Extraction
Container Multimodal Transport	Low Energy Consumption	Unconventional Water Sources Utilization
Contract Energy Management	Marine Energy	Urban Slow-Moving System
Desulfurization, Denitrification and Dust Removal	Multi-Energy Complementary	Vibration And Noise Reduction
Disaster Management	Natural Gas	Waste Heat, Waste Pressure and Waste Gas Utilization
Distributed Energy	Nature Reserves	Waste Management
Dust Remediation	New Energy	Water Body Protection
Eco-Friendly	Non-Toxic And Harmless	Water Purification
Ecological	Nuclear Power	Water Rights Trading
Efficient Utilization	Organic	Water Treatment
Electric Vehicle	Photovoltaic	Water-Saving
Energy Management System	Pollution Permit Trading	Wind Power

Note: Only the main keywords are listed, but synonyms or near-synonyms are used as references in the analysis.