

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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funds in the financial sector under the double pressure of economic downturn and environmental protection [7, 8].

On the other hand, with economic development and social progress, the ecological environment of the Earth in the context of the new era is precarious. The melting of glaciers and the rise in sea level caused by the greenhouse effect, as well as other accompanying disasters, not only jeopardize human health, but also impede economic development [9, 10]. The wanton destruction of the ecological environment by mankind and the excessive use of non-renewable energy sources have caused the greenhouse effect, and climate disasters such as global warming and severe weather are becoming more frequent [11]. The enactment of the Paris Agreement in 2015 was an effort by all of humanity to combat climate change. China's rapid economic development also inevitably generates a large amount of carbon emissions, which is of paramount importance to whether the world's carbon reduction targets can be realized [12]. To fulfill China's key role in the world's emission reduction targets, the dual carbon target was born: "carbon peaking by 2030 and carbon neutrality by 2060". However, enterprises are the carriers of the economy, and their participation is indispensable to combating environmental pollution [13]. To satisfy the public's environmental preferences, corporate environmental governance will become an important strategy for enterprises to gain a competitive advantage [14]. The harmonious coexistence of environmental and economic benefits is the key to the sustainable development of enterprises [15, 16].

Therefore, does a framework exist that incorporates both corporate environmental governance and financialization? Combing the existing literature, we find some traceable phenomena. Huang & Mirza [17] argued that green business practices can promote corporate financialization. However, this conclusion is not validated in the case of small and medium enterprises. Jiang et al. [18] indicated that corporate financialization will make enterprises gradually deviate from their main business and produce resource crowding-out effects, reducing their willingness to invest in green investments. Further, Tao et al. [19] also confirmed that the stronger the corporate financialization, the less green investment, and further suggested that the crowding-out effect is stronger for long-term financial assets. Similarly, Li et al. [20] argued that corporate financialization also has a crowding-out effect on green technology innovation, with the difference that this crowding-out effect is stronger in short-term financial investments. Unlike Li et al. [20] who suggested that risk-taking and research and development (R&D) investment play a mediating role between corporate financialization and green technology innovation, Huang et al. [21] argued that it should be financial leverage. In conclusion, almost all studies support that corporate financialization has a crowding-out effect on green technology innovation [22]. While Sui & Yao [23] believed that green technology innovation can also inhibit corporate financialization.

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

has been conducted, mainly including green business practices [17], green investment [18, 19], and green technology innovation [20-23]. As an attempt at corporate environmental governance [13], green mergers and acquisitions (M&A) are a path for enterprises to take the initiative to assume social responsibility and cope with external pressure [16]. In short, green M&A not only contains the characteristics of corporate technology M&A, but also integrates the concept of environmental protection [24]. Confusingly, can green M&A be effective in curbing the trend of corporate financialization? Is the inhibition effect of green M&A on corporate financialization influenced by internal and external factors of enterprises?

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.

The Innovation and Contribution

Our study focuses on the relationship between green M&A and corporate financialization. Therefore, our theoretical contributions also focus on these:

- (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

is on whether corporations can develop sustainably. Therefore, our study focuses on whether green M&A can inhibit corporate financialization, enable non-financial enterprises to return to their main business, and achieve sustainable development.

- (3) We reveal the impact mechanism between green M&A and corporate financialization. Our study verifies the inhibitory effect of green M&A on corporate financialization, and that this effect is affected by government environmental concerns and corporate governance capabilities. An interesting point is that we confirm the role of precautionary motives between green M&A and corporate financialization, but not speculative motives. Contrary to what existing scholars have argued, corporate financialization in China is primarily driven by speculative motives [1, 28, 29]. This result suggests that the financialization of Chinese enterprises is not entirely driven by speculation, and at least the precautionary motive plays a dominant role when enterprises engage in green M&A behavior.

The rest of the paper is organized as follows. Section 2 is the literature review, combing the relevant literature on corporate financialization and green M&A; Section 3 is the theoretical foundation and research hypotheses, proposing the research hypotheses of this paper from the relevant theories; Section 4 is the research design, introducing the model construction, variable definition, and sample selection of this paper; Section 5 analyzes the results of the study, and tests the relevant hypotheses; Section 6 is the discussion, comparing the similarities and differences with the previous studies; Section 7 is the conclusion and managerial implications, which gives the corresponding policy recommendations and future research directions based on the findings of this paper.

Literature Review

Corporate Financialization

Corporate financialization refers to the trend that non-financial enterprises reduce physical investment [8, 30] and increase financial investment [31, 32]. There is a gradual trend towards a shrinking share of profits from real operations and an expansion of profits from financial investment returns (e.g., real estate) [7, 33]. Specifically, there exists an enterprise that has progressively downsized its original business in the face of significantly higher returns on financial investments than on physical investments [32, 34]. By investing a large amount of capital in financial investments, and in this way obtaining returns that far exceed those of the main business [7]. Overall, the business practice of non-financial enterprises to make profits from the purchase of financial products such as financial derivatives and trading financial assets, as well as real estate with financial attributes, is corporate financialization [35, 36].

For non-financial enterprises, financialization as an investment strategy can be beneficial not only for

getting out of financial distress, but also for obtaining short-term returns [6, 37]. The liquidity advantage of financial assets has attracted more non-financial enterprises to become deeply involved, exacerbating the financialization of the heavy pollution industry while also promoting its progress [1, 37]. However, from the perspective of industry progress, financialization leads to real and virtual economies going their separate ways [6]. For non-financial enterprises, financialization reduces physical investment only as the most immediate consequence. More seriously, corporate financialization hurts both innovation and financial performance [8, 38], undermining healthy business operations [4]. The reason for this is that financial investment is characterized by uncertainty, and high returns in the short term are accompanied by high risks [4]. In conclusion, according to the “reservoir” effect, financialization behaves as a catalyst for physical investment [37, 39]. However, the “investment substitution” effect is more widely recognized, whereby corporate financialization crowds out physical investment [8, 40], inhibits enterprise innovation [32], and increases stock price crash risk [41].

Scholars have conducted numerous studies on the factors influencing corporate financialization. In terms of the external policy environment, economic policy uncertainty occupies an important position [5]. He [42] and Duong et al. [43] argued that economic policy uncertainty is positively related to corporate financialization, which is manifested as a precautionary motive. On the contrary, Huang et al. [44] and Peng et al. [5] suggested a negative correlation between the two, manifesting a speculative motive. Further, Zhao & Su [45] proposed a U-shaped relationship between the two. Interestingly, climate policy uncertainty can also dampen corporate financialization [12]. In terms of other economic policies, raising the minimum wage increases corporate financialization [46, 47]. Policies such as tax cuts [48, 49], accelerated depreciation of fixed assets [2], green credit [1], digital finance [4], and social security fund holdings [50] can also discourage corporate financialization. However, the impact of environmental policies presents two different views. Liu & Liu [51] believed that the implementation of the new Environmental Protection Law can inhibit corporate financialization, while Xie et al. [52] believed that the implementation of the new Environmental Protection Law will increase corporate financialization.

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

devoted to financial investments. In more detail, from the perspective of physical investment return enhancement, Xu et al. [29] believed that the better the main business performance and the higher the profitability, the lower the degree of corporate financialization.

On the other hand, managerial characteristics are also an internal influence on corporate financialization. Du et al. [55] and Lun [56] argued that the financial background of executives promotes corporate financialization. Similarly, Shi et al. [28] argued that the financial background of controlling shareholders also promotes corporate financialization. Moreover, Chen et al. [57] argued that the family enterprise whose executives are second-generation successors is also more inclined to financial investment. However, executives' overseas background [58] and institutional investor ownership [59] can inhibit corporate financialization. What's more, good corporate governance, by reducing management myopia, also inhibits corporate financialization [30, 60].

In conclusion, regarding the factors influencing corporate financialization, they include three main aspects: (1) macroeconomic policies, mainly including economic policy uncertainty, minimum wage, tax cuts, and other policies; (2) physical and financial investment gap; (3) managerial characteristics, mainly including financial background, overseas background, institutional shareholding, and corporate governance.

Green M&A

Green M&A refers to the acquisition and merger activities of enterprises to acquire green resources, technology, and management experience [14, 24]. As one of the green investment models for corporate environmental governance, green M&A has led to a green transformation of heavily polluting enterprises by directing more capital into the green sector [14, 16]. On the one hand, green technologies acquired through green M&A can promote their technological upgrading and improve resource utilization, thereby enhancing the comprehensive competitiveness of enterprises [61]; on the other hand, the green identity that accompanies green M&A can enhance the investment and financing capacity of enterprises and meet the expectations of green development, thus strengthening the green competitive advantage of enterprises [14, 24]. In addition, green M&A often implies that it will lead to better economic performance, i.e., enhancement of corporate financial performance through the exogenous growth model of green M&A [24].

Cases of green M&A are relatively common in the actual production and operation of enterprises. For example, in 2021, Jiangsu Fasten Co., Ltd. acquired Dalian Guangtaiyuan Environmental Protection Technology Co., Ltd., which is mainly engaged in the development and production of domestic waste leachate treatment equipment, thus promoting Fasten's transformation from the traditional metal products industry to environmental protection business. In 2016, to achieve diversification

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

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 [1, 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

M&A brings more government support to enterprises [16], such as access to more government subsidies [14, 72], and lower tax burden [16]. As a result, green M&A enables enterprises to obtain more stakeholders' support from financial institutions, suppliers, customers, and the government [16]. More support and commercial credit alleviate the financing constraints of enterprises [16, 67], thus reducing the precautionary motives of enterprises.

The "investment substitution" theory suggests that corporate financialization is motivated by speculative motives and that financial investments are made primarily to maximize profits [6]. More lucrative financial investments are crowding out physical investments of enterprises, and more funds will flow to the financial sector [40, 79]. Specifically, Hu et al. [80] and Peng et al. [5] argued that the main motivation for the financialization of Chinese enterprises is speculative, i.e., driven by the need to obtain financial investments that can generate more profits for the enterprise. On the one hand, declining returns on physical investment will drive corporate financialization [73]. Over the same period, it has been difficult to obtain higher profits from physical investments, and it is usually financial investments that have yielded higher returns [47]. The greater investment of enterprise capital in the financial sector is a consequence of shrinking returns on physical investment [40, 81]. On the other hand, rising returns on financial investments will also drive corporate financialization [8]. Chinese enterprises always seem to make better returns on their financial investments [75], a situation that has attracted more enterprises to join the financial investment camp [2]. Enterprises are inevitably influenced by capital for profit to make financial investments [82]. Thus, reducing enterprises' speculative motives (e.g., improving main business performance) can discourage corporate financialization.

Green M&A can reduce the speculative motives of enterprises. Obviously, it is more reliable to improve the return on physical investment than to reduce the return on financial investment. According to competitive advantage theory, technology can influence enterprises' competitive advantage through cost leadership and differentiation strategies [83]. On the one hand, green M&A can enhance enterprises' cost advantage. With the continuous development of clean technology, the cost of clean technology for enterprises has been lower than traditional technology [84]. Therefore, enterprises reduce production costs by acquiring clean technologies through green M&A [85]. Its green properties can also reduce capital costs [69, 70], resource acquisition costs [61], governance costs [24], and labor costs [86]. On the other hand, green M&A can enhance enterprises' differentiation advantage [72]. Specifically, green M&A facilitates enterprises to produce green products that meet consumer preferences [72, 87] and thus enter green markets [85, 86]. Further, the green technology and good reputation acquired through green M&A enhances enterprises' product quality and pricing capacity [72], and continuously increases the market share of the enterprise's products [72, 85]. In summary, green attributes can pay off for enterprises

[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:

H1: *Green M&A can inhibit corporate financialization.*

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].

Government environmental concerns increase enterprises' financing constraints, which further enhance the precautionary motive for financialization. When local government environmental concerns are strong, enterprises face more stringent environmental regulations [89, 90]. Increasingly stringent environmental regulations limit the source of financing, increase the cost of financing [93], and affect the scale of financing [94]. Specifically, the main sources of enterprise financing include debt and equity financing [95], of which banks are the main financing institution of Chinese enterprises [93]. Government environmental concerns will prompt banks to conduct more stringent environmental compliance reviews of the enterprise commercial loan, which will increase the cost of financing for enterprises [93]. In addition, heavily polluting enterprises face regulatory pressure from government environmental concerns. This pressure has forced banks to adopt more stringent scrutiny of heavily polluting enterprises, thus affecting the scale of enterprise financing [94].

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 β_1 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.

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

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 β_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 β_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

pollution and low energy consumption transformation [16]. Drawing on the study by Pan et al. [27] and Lu [72], by manually collecting M&A announcements of heavily polluting enterprises and analyzing the background and purpose of M&A, the main business of both parties of M&A, and the impact of M&A on the future. If this M&A of an enterprise is a green behavior, it is marked as 1, otherwise it is 0. Referring to Salvi et al. [24] and Jørgensen [85], combined with the “Green Industry Guidance Catalogue” and “Strategic Emerging Industry Key Products and Services Guidance Catalogue”, the keywords for determining whether an enterprise M&A is a green behavior include clean technology, green, carbon emissions, etc., as shown in Appendix 1.

Government environmental concerns. Referring to Chen & Chen [110] and Chen et al. [94], the text analysis method is used to construct indicators of government environmental concerns. The construction process is as follows: (1) collect government work reports of prefecture-level cities; (2) identify keywords related to the ecological environment, mainly including environmental protection, green, low carbon, etc.; (3) count the frequency of the occurrence of ecological environment-related words and calculate their proportion to the number of words in the full text of government work reports.

Corporate governance capacities. Referring to Bai et al. [97] and Zhou et al. [99], principal component analysis is used to construct comprehensive indicators from both internal mechanisms (i.e., the board of directors, executive compensation, equity structure, etc.), external

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 (*TOPI*), 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>TOPI</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 | |

Table 2. Distribution characteristics of the sample industries

| Industry name | Industry code | Number of <i>GMA</i> | Average <i>FIN</i> level |
|--|---------------|----------------------|--------------------------|
| Coal mining and washing | B06 | 12 | 0.286% |
| Oil and gas extraction | B07 | 8 | 1.450% |
| Ferrous metal mining and processing | B08 | 0 | 0.000% |
| Non-ferrous metal mining and processing | B09 | 9 | 3.150% |
| Non-metallic mining | B10 | 0 | 0.635% |
| Alcohol, beverage, and refined tea manufacturing | C15 | 1 | 0.450% |
| Textile industry | C17 | 6 | 6.517% |
| Textile clothing, apparel industry | C18 | 0 | 8.664% |
| Leather, fur, feathers, and their products and footwear | C19 | 0 | 4.142% |
| Paper and paper products | C22 | 9 | 1.767% |
| Petroleum processing, coking, and nuclear fuel processing | C25 | 7 | 0.763% |
| Chemical raw materials and chemical products manufacturing | C26 | 133 | 1.879% |
| Chemical fiber manufacturing | C28 | 7 | 4.216% |
| Rubber and plastic products | C29 | 30 | 1.132% |
| Non-metallic mineral products | C30 | 38 | 2.054% |
| Ferrous metal smelting and rolling processing | C31 | 8 | 0.672% |
| Non-ferrous metal smelting and rolling processing | C32 | 37 | 1.942% |
| Metal products | C33 | 18 | 2.953% |
| Electricity, heat production, and supply | D44 | 117 | 1.686% |

Table 3. Descriptive statistics

| Variable | Obs | Mean | SD | P25 | Median | P75 | Min | Max |
|--------------|------|--------|-------|--------|--------|--------|--------|--------|
| <i>FIN</i> | 1307 | 0.022 | 0.054 | 0.000 | 0.002 | 0.017 | 0.000 | 0.503 |
| <i>GMA</i> | 1307 | 0.337 | 0.473 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000 |
| <i>ER</i> | 1069 | 0.003 | 0.001 | 0.002 | 0.003 | 0.004 | 0.000 | 0.012 |
| <i>CG</i> | 1307 | 0.156 | 1.036 | -0.658 | 0.286 | 0.989 | -2.156 | 3.079 |
| <i>RATIO</i> | 1307 | 0.772 | 0.232 | 0.513 | 0.817 | 1.000 | 0.301 | 1.000 |
| <i>CASH</i> | 1307 | 0.846 | 0.361 | 1.000 | 1.000 | 1.000 | 0.000 | 1.000 |
| <i>SIZE</i> | 1307 | 22.647 | 1.352 | 21.621 | 22.440 | 23.577 | 19.406 | 26.395 |
| <i>LEV</i> | 1307 | 0.470 | 0.182 | 0.331 | 0.477 | 0.605 | 0.031 | 0.897 |
| <i>ATO</i> | 1307 | 0.706 | 0.413 | 0.429 | 0.612 | 0.877 | 0.056 | 2.775 |
| <i>FIXED</i> | 1307 | 0.327 | 0.169 | 0.197 | 0.301 | 0.441 | 0.003 | 0.801 |
| <i>OPIN</i> | 1307 | 0.982 | 0.134 | 1.000 | 1.000 | 1.000 | 0.000 | 1.000 |
| <i>GROW</i> | 1307 | 0.301 | 0.519 | 0.044 | 0.186 | 0.376 | -0.588 | 4.330 |
| <i>TOPI</i> | 1307 | 0.373 | 0.155 | 0.250 | 0.361 | 0.483 | 0.088 | 0.758 |
| <i>BAL</i> | 1307 | 0.339 | 0.283 | 0.097 | 0.259 | 0.523 | 0.002 | 1.000 |
| <i>MB</i> | 1307 | 1.280 | 1.254 | 0.489 | 0.874 | 1.556 | 0.051 | 8.686 |
| <i>SOE</i> | 1307 | 0.435 | 0.496 | 0.000 | 0.000 | 1.000 | 0.000 | 1.000 |

Data and Sample Selection

We choose Chinese heavily polluting enterprises as the sample, considering that heavily polluting enterprises are not only the main part causing environmental problems, but also the main part aggravating the real economy “shifting from real to virtual” [1]. On the one hand, the green M&A practices of China’s heavily polluting enterprises

are developing rapidly in response to environmental problems and to achieve the dual carbon goal [111]; on the other hand, the financialization of heavily polluting enterprises will further squeeze enterprise environmental expenditures, leading to stronger negative externalities for environmental protection [1]. According to the “List of Listed Companies’ Environmental Protection Verification Industry Classification and Management”, and with

Table 4. Correlation analysis

| | FIN | GMA | ER | CG | RATIO | CASH | SIZE | LEV | ATO | FIXED | OPIN | GROW | TOPI | BAL | MB | SOE |
|-------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|---------|-----------|-----------|-----------|----------|-----|
| FIN | 1 | | | | | | | | | | | | | | | |
| GMA | -0.094*** | 1 | | | | | | | | | | | | | | |
| ER | 0.033 | 0.132*** | 1 | | | | | | | | | | | | | |
| CG | -0.092*** | 0.011 | 0.001 | 1 | | | | | | | | | | | | |
| RATIO | -0.022 | 0.045 | 0.035 | -0.047* | 1 | | | | | | | | | | | |
| CASH | -0.011 | -0.159*** | -0.034 | 0.029 | -0.229*** | 1 | | | | | | | | | | |
| SIZE | -0.034 | 0.103*** | 0.156*** | 0.559*** | 0.015 | -0.004 | 1 | | | | | | | | | |
| LEV | -0.119*** | 0.049* | 0.007 | 0.399*** | -0.030 | 0.074*** | 0.529*** | 1 | | | | | | | | |
| ATO | -0.075*** | -0.146*** | -0.048 | 0.030 | 0.005 | 0.029 | -0.039 | -0.011 | 1 | | | | | | | |
| FIXED | -0.252*** | 0.101*** | -0.014 | 0.472*** | -0.032 | 0.038 | 0.360*** | 0.412*** | -0.150*** | 1 | | | | | | |
| OPIN | -0.056** | 0.013 | 0.027 | 0.011 | 0.036 | 0.036 | 0.065** | -0.04 | 0.060** | 0.052* | 1 | | | | | |
| GROW | -0.044 | 0.079*** | 0.042 | -0.04 | 0.113*** | -0.331*** | -0.009 | 0.007 | 0.105*** | -0.02 | 0.069** | 1 | | | | |
| TOPI | -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 | | | |
| BAL | 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 | | |
| MB | -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 | |
| SOE | -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 |

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

reference to Lu [14] and Lu [72], the heavily polluting enterprises were defined as 19 industries, including coal mining and washing, oil and gas extraction, etc. The information about the industries of heavily polluting enterprises is shown in Table 2.

Therefore, we choose Shanghai and Shenzhen A-share listed companies of Chinese heavily polluting enterprises from 2004 to 2020 as the research object. M&A data from WIND database, screening criteria are as follows: (1) M&A equity greater than 30%; (2) total value of M&A transactions greater than 1 million; (3) transaction progress is completed; (4) buyer is a listed company; (5) retain the buyer as a heavily polluting enterprises; (6) exclude multiple M&A subjects joint M&A; (7) exclude ST and *ST enterprises; (8) exclude the sample of those who held more than 30% of the target enterprise's equity before the M&A; (9) keep the first M&A case per company per year. The above conditions were used to filter out 1307 M&A events.

Combined with the M&A sample screened from the WIND database, the M&A announcements from the WIND database are used as the basis, and the M&A announcements from the Shanghai and Shenzhen stock exchanges are collected as a supplement. Through data cross-checking and supplementation, we can ensure the completeness and accuracy of M&A information. Data on M&A transactions are from the WIND database, and other enterprise financial data are from the CSMAR database. To eliminate the effect of extreme values, the main continuous variables are winsorized by 1% up and down.

Analysis of Empirical Results

Descriptive Statistics

Table 3 shows the results of descriptive statistics of the main variables, where the mean value of corporate financialization is 2.2%, the maximum value is 50.3% and the 75th percentile is 1.7%. It can be seen that although the level of financialization of heavily polluting enterprises varies widely, the overall financialization level of the industry is low. The mean value of green M&A is 0.337 and the median value is 0. It is clear that non-green M&A is more predominant in the M&A of heavily polluting enterprises. In addition, combined with Table 2, it is also clearer that even within the heavily polluting industries, the financialization and green M&A of enterprises in different secondary industries show large differences.

Correlation Analysis

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) <i>FIN</i> | (2) <i>FIN</i> |
|--------------|-----------------------|-----------------------|
| <i>GMA</i> | -0.010*** (-3.770) | -0.012*** (-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 (-0.565) | 0.031 (0.740) |
| <i>YEAR</i> | Yes | Yes |
| <i>IND</i> | Yes | Yes |
| <i>r2_a</i> | 0.070 | 0.123 |
| <i>N</i> | 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.

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

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

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 β -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.

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

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

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

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

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

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

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

To verify the mediating effect of the difference between physical and financial investment returns, we add the following model based on the benchmark regression model. Related variables are defined above. Table 7 gives the results of the test for the mediating effect of the difference between the returns to physical and financial investment. The results in columns 5 and 6 show that the relationship between green M&A and *GAP* is not significant ($\beta=0.016, p>0.10$), and the relationship between *GAP* and corporate financialization is not significant ($\beta=-0.020, p>0.10$), so *GAP* does not play a mediating effect between green M&A and corporate financialization.

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

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

Robustness Tests

Replace Core Variables

According to Lu [72], to determine whether an enterprise action is a green M&A, factors such as the background, purpose, business scope, and future impact of the M&A need to be considered. However, from the basic concept of green M&A, more emphasis is placed on the purpose of M&A, i.e., whether it can promote energy conservation and environmental protection. Therefore, we adopt more stringent criteria to judge green M&A. The purpose of the M&A must be clearly stated in the M&A announcement as a “green” consideration. According to this criterion, we construct the *GMA2* and brought this into the model. The results in Table 8 show that the negative relationship between green M&A and corporate financialization remains significant (Column 1; $\beta=-0.011, p<0.01$), supporting the original conclusion.

Replace the Fixed Effects Model

The inhibitory effect of green M&A on corporate financialization may also be affected by endogenous issues due to omitted variables. To reduce the impact of individual company-level factors, we re-run the regression using a firm and region fixed effects model. The results in Table 8 show that the negative relationship between green M&A and corporate financialization still holds (Column 2; $\beta=-0.009, p<0.01$), further confirming H1.

Instrumental Variable Regression

To mitigate endogeneity issues such as reverse causality, we use the industry mean of green M&A as an instrumental variable. We add instrumental variables to the baseline model and analyze them using two-stage least squares (2SLS). The second-stage regression results in Table 8 show that the relationship between green M&A

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

Using Propensity Score Matching Method

The propensity matching method can reduce endogeneity problems. Green M&A is used as the treatment group and non-green M&A is used as the control group. We set control variables as covariates and test whether the covariates are balanced between the treatment and control groups. The results show that the standardized deviation of the variables after matching is within 10%, and the t-test results do not reject the original hypothesis. This indicates that the PSM reduces the bias of the study results and passes the balance test. Removing the observations that do not satisfy the common area assumption and regressing again with the matched data, the results still support the negative relationship between green M&A and corporate financialization (Table 8, Column 4; $\beta=-0.009, p<0.01$).

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 |
| <i>r2_a</i> | 0.120 | 0.561 | 0.123 | |
| <i>N</i> | 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.

References

1. ZHANG Y., XIE H., LI J. Does green credit policy mitigate financialization? evidence from Chinese heavily polluting enterprises. *Environmental Science and Pollution Research.*, 1-22, **2022**.
2. MA C., BEI H., WANG C., CHEN G. Accelerated depreciation tax credit and corporate financialization based on the PSM-DID model. *Wireless Communications and Mobile Computing.* **2020** (1), 1, **2020**.
3. CHENG H., SU Z., XIONG N., XIAO Y. Energy-efficient node scheduling algorithms for wireless sensor networks using Markov Random Field model. *Information Sciences.* **329**, 461, **2016**.

4. LIU Y., JIN D., LIU Y., WAN Q. Digital finance, corporate financialization and enterprise operating performance: An empirical research based on Chinese A-share non-financial enterprises. *Electronic Commerce Research*, 1-26, **2022**.
5. PENG Y. C., HAN X., LI J. J. Economic policy uncertainty and corporate financialization. *China Industrial Economics*, **1**, 137, **2018**.
6. LEI L., ZHENG D., CHEN X. Corporate social responsibility and corporate financialization—Based on information effect and reputation insurance effect. *Plos One*, **17** (7), e271552, **2022**.
7. KRIPPNER G. R. The financialization of the American economy. *Socio-Economic Review*, **3** (2), 173, **2005**.
8. ORHANGAZI Ö. Financialisation and capital accumulation in the non-financial corporate sector: a theoretical and empirical investigation on the US economy: 1973–2003. *Cambridge Journal of Economics*, **32** (6), 863, **2008**.
9. GUHA-SAPIR D., SANTOS I., BORDE A. The economic impacts of natural disasters. Oxford University Press. **2013**
10. DUAN K., REN X., SHI Y., MISHRA T., YAN C. The marginal impacts of energy prices on carbon price variations: evidence from a quantile-on-quantile approach. *Energy Economics*, **95**, 105131, **2021**.
11. HILL M. K. Understanding environmental pollution. Cambridge, UK: Cambridge University Press. **2020**
12. REN X., LI W., DUAN K., ZHANG X. Does climate policy uncertainty really affect corporate financialization? *Environment, Development and Sustainability*. 1-19, **2023**.
13. ZHAO X., MING J., ZHANG Z. Sincerity not hypocrisy: green M&A and corporate environmental governance. *Academy of Management Proceedings*, Academy of Management Briarcliff Manor, NY 10510. **2021**.
14. LU J. Can the green merger and acquisition strategy improve the environmental protection investment of listed company? *Environmental Impact Assessment Review*, **86**, 106470, **2021**.
15. BANERJEE S. B. Corporate environmentalism: The construct and its measurement. *Journal of Business Research*, **55** (3), 177, **2002**.
16. LI B., XU L., MCIVER R., WU Q., PAN A. Green M&A, legitimacy and risk-taking: evidence from China's heavy polluters. *Accounting & Finance*, **60** (1), 97, **2020**.
17. HUANG C., MIRZA S.S. Green business practices and corporate financialization: Role of female directors in Chinese small and medium enterprises (SMEs). *Journal of Corporate Accounting & Finance*, **34** (1), 137, **2023**.
18. JIANG Y., GUO C., WU Y. Does digital finance improve the green investment of Chinese listed heavily polluting companies? The perspective of corporate financialization. *Environmental Science and Pollution Research*, **29** (47), 71047, **2022**.
19. TAO L., CHEN L., LI K. Corporate financialization, financing constraints, and environmental investment. *Sustainability*, **13** (24), 14040, **2021**.
20. LI W., CHEN L., HE S. The effect of enterprise financialization on green innovation: Evidence from Chinese A-share non-financial listed enterprises. *Environmental Science and Pollution Research*, **30** (19), 56802, **2023**.
21. HUANG Z., LI X., CHEN S. Financial speculation or capital investment? Evidence from relationship between corporate financialization and green technology innovation. *Frontiers in Environmental Science*, **8**, **2021**.
22. GUO Y., FAN L., YUAN X. Market competition, financialization, and green innovation: Evidence from China's manufacturing industries. *Frontiers in Environmental Science*, **10**, **2022**.
23. SUI B., YAO L. The impact of digital transformation on corporate financialization: The mediating effect of green technology innovation. *Innovation and Green Development*, **2** (1), 100032, **2023**.
24. SALVI A., PETRUZZELLA F., GIAKOUMELOU A. Green M&A deals and bidders' value creation: the role of sustainability in post-acquisition performance. *International Business Research*, **11** (7), 96, **2018**.
25. XIE X., ZHU Q. How Can green innovation solve the dilemmas of "Harmonious Coexistence". *Journal of Management World*, **37** (9), 128, **2021**.
26. ZHAO X., JIA M. Sincerity or hypocrisy: can green M&A achieve corporate environmental governance? *Environmental Science and Pollution Research*, **29** (18), 27339, **2022**.
27. PAN A., LIU X., QIU J., SHEN Y. Can green M&A of heavy polluting enterprises achieve substantial transformation under the pressure of media. *China Industrial Economics*, **2**, 174, **2019**.
28. SHI X., BU D., WEN C., LAN Z. Financial background of controlling shareholder and corporate financialization. *China Journal of Accounting Studies*, **9** (3), 383, **2021**.
29. XU C., WANG M., ZHANG H., HONG X. Do the government subsidies inhibit the entity over-financialization? Fresh evidence from China. *Economic Research-Ekonomika Istraživanja*, 1-23, **2022**.
30. STOCKHAMMER E. Financialisation and the slowdown of accumulation. *Cambridge Journal of Economics*, **28** (5), 719, **2004**.
31. CAI M., REN S. Corporate financialization: a literature review. *Finance & Economics*, **7**, 41, **2014**.
32. WANG H., CAO Y., YANG Q., YANG Z. Does the financialization of non-financial enterprises promote or inhibit corporate innovation. *Nankai Business Review*, **20** (1), 155, **2017**.
33. ARRIGHI G. The long twentieth century: Money, power, and the origins of our times. London: Verso. **1994**
34. ZHANG C., ZHANG B. The falling real investment puzzle: a view from financialization. *Economic Research Journal*, **51** (12), 32, **2016**.
35. QI Y., ZHANG R. Z. The empirical research on the impact of the financial asset allocation on firm value. *Finance & Trade Economics*, **39** (5), 38, **2018**.
36. WANG H., LI Q., LIU F. Government subsidies: relief for the emergency or the poor? an empirical evidence from loss-making firms. *Nankai Business Review*, **18**, 42, **2015**.
37. SMITH C.W., STULZ R.M. The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis*, **20** (4), 391, **1985**.
38. HUANG B., CUI Y., CHAN K. C. Firm-level financialization: contributing factors, sources, and economic consequences. *International Review of Economics & Finance*, **80**, 1153, **2022**.
39. STULZ R. M. Rethinking risk management. *Journal of Applied Corporate Finance*, **9** (3), 8, **1996**.
40. DEMIR F. Financial liberalization, private investment and portfolio choice: Financialization of real sectors in emerging markets. *Journal of Development Economics*, **88** (2), 314, **2009**.
41. PENG Y.C., NI X.R., SHEN J. The effect of transforming the economy from substantial to fictitious on financial market stability: an analysis on stock price crash risk. *Economic Research Journal*, **53** (10), 50, **2018**.
42. HE M. Economic policy uncertainty and enterprise financialization under the condition of informationization. *E3S Web of Conferences*, EDP Sciences. **2021**.
43. DUONG H.N., NGUYEN J.H., NGUYEN M., RHEE S.G. Navigating through economic policy uncertainty: The role of corporate cash holdings. *Journal of Corporate Finance*, **62**, 101607, **2020**.

44. HUANG J., LUO Y., PENG Y. Corporate financial asset holdings under economic policy uncertainty: Precautionary saving or speculating? *International Review of Economics & Finance*. **76**, 1359, **2021**.
45. ZHAO Y., SU K. Economic policy uncertainty and corporate financialization: Evidence from China. *International Review of Financial Analysis*. **82**, 102182, **2022**.
46. HOU Q., TANG X., TENG M. Labor costs and financialization of real sectors in emerging markets. *Pacific-Basin Finance Journal*. **67**, 101547, **2021**.
47. YE Y., CHEN S., CAO Y., WANG H. The cost shock, margin gap and enterprise financialization: An exogenous shock based on minimum wage. *China Journal of Accounting Studies*. **9** (4), 490, **2021**.
48. PENG Y., LIU D., GU L. Can tax cuts ease the economy's transforming from substantial to fictitious? *Taxation Research Journal*. **8**, 93, **2017**.
49. XU C., PANG B., ZHANG C. Whether the reduction of the real tax burden can curb the manufacturing "shifting from real to virtual". *Statistical Research*. **36** (6), 42, **2019**.
50. TANG D., WU J., CHEN Z. Does the social security fund help non-financial enterprises to transform from the virtual to the real? *China Journal of Accounting Research*. **15** (2), 100238, **2022**.
51. LIU X., LIU F. Environmental regulation and corporate financial asset allocation: a natural experiment from the new environmental protection law in China. *Finance Research Letters*. **47**, 102974, **2022**.
52. XIE G., YANG Y., JIANG K., CHEN Z. The effect of the new environmental protection law on corporate financialization in China. *Environmental Science and Pollution Research*. **29** (55), 83596, **2022**.
53. DU Y., ZHANG H., CHEN J. The impact of financialization on future development of real enterprises' core business: promotion or inhibition. *China Industrial Economics*. **12**, 113, **2017**.
54. TANG H., ZHANG C. Investment risk, return gap, and financialization of non-listed non-financial firms in China. *Pacific-Basin Finance Journal*. **58**, 101213, **2019**.
55. DU Y., XIE J., CHEN J. CEO's financial background and the financialization of entity enterprises. *China Industrial Economics*. **5**, 136, **2019**.
56. LUN B. Research on CEO financial background, corporate performance and financialization of entity enterprises. *Applications of Decision Science in Management: Proceedings of International Conference on Decision Science and Management (ICDSM 2022)*, Springer. **2022**.
57. CHEN J., ZHOU F., HE Z., FU H. Second-generation succession and the financialization of assets: An empirical study of Chinese family firms. *Emerging Markets Finance and Trade*. **56** (14), 3294, **2020**.
58. LIANG Y., LU S. The Overseas Background of Executives and The Financialization of Entity Enterprise study based on STATA. 2020 16th Dahe Fortune China Forum and Chinese High-educational Management Annual Academic Conference (DFHMC), IEEE. **2020**.
59. HE J., LIU J., QIU H., ZHAI K. Does institutional investor ownership reduce corporate financialization? An empirical study for Chinese enterprises. 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022), Atlantis Press. **2022**.
60. WANG Y., HUANG X. Internal control and financialization of entity enterprises: Governance effect or boost effect. *Finance & Economics*. **2**, 26, **2020**.
61. LI B., LIU X., LIU Y., LIU M. Green M&A, business model innovation and sustainability of heavy polluters: evidence from the China's "environmental protection storm". Available at Ssrn 3597310, **2020**.
62. KLEMP A. Acquirers' value creation in green M&A Deals: a cross-sectional analysis of North America and Europe. Lisbon: Nova School of Business and Economics. **2020**
63. EISENBACH S., ETTEHUBER C., SCHIERECK D., VON FLOTOW P. Beginning consolidation in the renewable energy industry and Bidders' M&A-success. *Technology and Investment*. **2** (2), 81, **2011**.
64. BASSE-MAMA H., KOCH N., BASSEN A., BANK T. Valuation effects of corporate strategic transactions in the cleantech industry. *Journal of Business Economics*. **83**, 605, **2013**.
65. YOO K., LEE Y., HEO E. Economic effects by merger and acquisition types in the renewable energy sector: an event study approach. *Renewable and Sustainable Energy Reviews*. **26**, 694, **2013**.
66. CORDING M., CHRISTMANN P., WEIGELT C. Measuring theoretically complex constructs: the case of acquisition performance. *Strategic Organization*. **8** (1), 11, **2010**.
67. HUANG W., YUAN T. Green innovation of Chinese industrial enterprises to achieve the 'dual carbon' goal—based on the perspective of green M&A. *Applied Economics Letters*. **1-5**, **2022**.
68. LIANG X., LI S., LUO P., LI Z. Green mergers and acquisitions and green innovation: an empirical study on heavily polluting enterprises. *Environmental Science and Pollution Research*. **29** (32), 48937, **2022**.
69. SHARFMAN M.P., FERNANDO C.S. Environmental risk management and the cost of capital. *Strategic Management Journal*. **29** (6), 569, **2008**.
70. NG A.C., REZAEE Z. Business sustainability performance and cost of equity capital. *Journal of Corporate Finance*. **34**, 128, **2015**.
71. ZHOU L., LI W., TEO B.S., YUSOFF S.K.M. The effect of green transformation on the operating efficiency of green M&A enterprises: Evidence from China. *The Journal of Asian Finance, Economics and Business*. **9** (1), 299, **2022**.
72. LU J. Green merger and acquisition and export expansion: evidence from China's polluting enterprises. *Sustainable Production and Consumption*. **30**, 204, **2022**.
73. QI Y., YANG Y., YANG S., LYU S. Does government funding promote or inhibit the financialization of manufacturing enterprises? Evidence from listed Chinese enterprises. *The North American Journal of Economics and Finance*. **58**, 101463, **2021**.
74. KEYNES J.M. *The general theory of interest, employment and money*. London: MacMillan. **1936**
75. ZHANG Y., ZHUO C., DENG, F. Policy uncertainty, financialization and enterprise technological innovation: A way forward towards economic development. *Frontiers in Environmental Science*. **10**, **2022**.
76. WANG C. A literature review on corporate financialization. *American Journal of Industrial and Business Management*. **9** (3), 647, **2019**.
77. LI C., GUO H., TIAN X. Time-domain finite element analysis to nonlinear transient responses of generalized diffusion-thermoelasticity with variable thermal conductivity and diffusivity. *International Journal of Mechanical Sciences*. **131-132**, 234, **2017**.
78. PUJARI D. Eco-innovation and new product development: Understanding the influences on market performance. *Technovation*. **26** (1), 76, **2006**.
79. TORI D., ONARAN Ö. The effects of financialization on investment: evidence from firm-level data for the UK. *Cambridge Journal of Economics*. **42** (5), 1393, **2018**.

80. HU Y., WANG X., ZHANG J. Motivation of financial asset allocation: “reservoir” or “replacement”? evidence from Chinese listed companies. *Economic Research*. **52** (1), 181, **2017**.
81. ORHANGAZI Ö. Financialization of the United States economy and its effects on capital accumulation: A theoretical and empirical investigation. Massachusetts: University of Massachusetts Amherst. **2006**
82. ZHU H., GU H., HALEPOTO H. Can fulfillment of social responsibility enable enterprises to innovate? The role of corporate financialization and agency costs. *Sustainability*. **14** (21), 13799, **2022**.
83. PORTER M.E. Technology and competitive advantage. *Journal of Business Strategy*. **5** (3), 60, **1985**.
84. LORENCZIK S., KIM S., WANNER B., BERMUDEZ MENENDEZ J.M., REMME U., HASEGAWA T., KEPPLER J.H., MIR L., SOUSA G., BERTHELEMY M. (2020). Projected costs of generating electricity-2020 edition. Organisation for Economic Co-Operation and Development.
85. JØRGENSEN T.D. Mergers for the future: the post-acquisition performance of green M&A. Oslo: University of Oslo. **2021**
86. FALCONE P.M. Green investment strategies and bank-firm relationship: A firm-level analysis. *Economics Bulletin*. **38** (4), 2225, **2018**.
87. MANTOVANI A., VERGARI C. Environmental vs hedonic quality: which policy can help in lowering pollution emissions? *Environment and Development Economics*. **22** (3), 274, **2017**.
88. BİÇAKÇIOĞLU N., THEOHARAKIS V., TANYERI M. Green business strategy and export performance: An examination of boundary conditions from an emerging economy. *International Marketing Review*. **37** (1), 56, **2020**.
89. JORDAN A., LENSCHOW A. Environmental policy integration: A state of the art review. *Environmental Policy and Governance*. **20** (3), 147, **2010**.
90. FAROOQ U., AHMED J., TABASH M.I., ANAGREH S., SUBHANI B.H. Nexus between government green environmental concerns and corporate real investment: Empirical evidence from selected Asian economies. *Journal of Cleaner Production*. **314**, 128089, **2021**.
91. WAN Q., MIAO X., AFSHAN S. Dynamic effects of natural resource abundance, green financing, and government environmental concerns toward the sustainable environment in China. *Resources Policy*. **79**, 102954, **2022**.
92. WANG R., HOU J., JIANG Z. Environmental policies with financing constraints in China. *Energy Economics*. **94**, 105089, **2021**.
93. HE Y., DING X., YANG C. Do environmental regulations and financial constraints stimulate corporate technological innovation? Evidence from China. *Journal of Asian Economics*. **72**, 101265, **2021**.
94. CHEN Z., YIN M., ZHOU M. Does environmental regulatory pressure affect corporate debt financing? *Resources, Conservation and Recycling*. **184**, 106405, **2022**.
95. WILLIAMSON O.E. Corporate finance and corporate governance. *The Journal of Finance*. **43** (3), 567, **1988**.
96. BERLE A.A., MEANS G.C. The modern corporation and private property. New York: Macmillan. **1932**
97. BAI C., LIU Q., LU Z., SONG M., ZHANG J. An empirical study on Chinese listed firms’ corporate governance. *Economic Research Journal*. **2**, 81, **2005**.
98. DENIS D.K., MCCONNELL J.J. International corporate governance. *Journal of Financial and Quantitative Analysis*. **38** (1), 1, **2003**.
99. ZHOU X., XU X., LU Z. Deleveraging, who is more positive and conservative? *Management World*. **36** (8), 127, **2020**.
100. KRAUSE R., SEMADENI M., CANNELLA A.A. CEO duality: A review and research agenda. *Journal of Management*. **40** (1), 256, **2014**.
101. FINKELSTEIN S. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*. **35** (3), 505, **1992**.
102. FINKELSTEIN S., HAMBRICK D. C., CANNELLA A.A. Strategic leadership: Theory and research on executives, top management teams, and boards. *Strategic Management*. **2009**
103. JOHNSON J.L., DAILY C.M., ELLSTRAND A.E. Boards of directors: A review and research agenda. *Journal of Management*. **22** (3), 409, **1996**.
104. WALSH J.P., SEWARD J.K. On the efficiency of internal and external corporate control mechanisms. *Academy of Management Review*. **15** (3), 421, **1990**.
105. PENG M.W. Outside directors and firm performance during institutional transitions. *Strategic Management Journal*. **25** (5), 453, **2004**.
106. HUANG W., BOATENG A. Executive shareholding, compensation, and analyst forecast of Chinese firms. *Applied Economics*. **49** (15), 1459, **2017**.
107. WANG J., WANG H., WANG D. Equity concentration and investment efficiency of energy companies in China: Evidence based on the shock of deregulation of QFIIs. *Energy Economics*. **93**, 105032, **2021**.
108. XIAO X., LI R., XIAO X., GAO Z. The relationship between executive salary stickiness, equity checks and balances and enterprise innovation investment based on multiple regression model. 2020 2nd International Conference on Economic Management and Model Engineering (ICEMME), **2020**.
109. WANG H., BI Z., SUN C. Can core competence restrain the financialization of entity enterprises? —empirical evidence based on textual analysis. *China Soft Science*. (1), 114-133, **2023**.
110. CHEN S.Y., CHEN D.K. Air pollution, government regulations and high-quality economic development. *Economic Research Journal*. **53** (2), 20, **2018**.
111. ZHANG Y., SUN Z., SUN M., ZHOU Y. The effective path of green transformation of heavily polluting enterprises promoted by green merger and acquisition—Qualitative comparative analysis based on fuzzy sets. *Environmental Science and Pollution Research*. **29** (42), 63277, **2022**.
112. DUCHIN R., GILBERT T., HARFORD J., HRDLICKA C. Precautionary savings with risky assets: When cash is not cash. *The Journal of Finance*. **72** (2), 793, **2017**.
113. SUN H., ZHENG L., LIAO J. Monetary policy, credit term structure and the corporate financialization. *Studies of International Finance*., 13-21, **2021**.
114. ORHANGAZI Ö. Financialization and the US Economy. Edward Elgar Publishing. **2008**
115. HADLOCK C.J., PIERCE J.R. New evidence on measuring financial constraints: Moving beyond the KZ index. *The Review of Financial Studies*. **23** (5), 1909, **2010**.
116. CHEUNG Y., STOURAITIS A., TAN W. Corporate governance, investment, and firm valuation in Asian emerging markets. *Journal of International Financial Management & Accounting*. **22** (3), 246, **2011**.

Appendix 1

Table A1. The Main Keywords for Green M&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.