businesses

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Negative Media Coverage and Corporate ESG Performance: Evidence from China

Caixiaoyang Ge

Business School, Xinjiang University, Ürümqi 830046, China; gcxygen@163.com

Abstract: Using Chinese A-share listed companies from 2011 to 2020 as a research sample, this paper examines the relationship between negative media coverage and corporate ESG performance using a two-way fixed-effects model. It is found that, first, negative media coverage can effectively promote corporate ESG performance. Second, the mediation mechanism study shows that negative media coverage positively promotes corporate ESG performance by increasing the degree of corporate financing constraints and information asymmetry and prompting corporations to change their ESG governance level. Third, the results of the heterogeneity test find that the positive relationship between negative media coverage and corporate ESG performance is more pronounced among firms without executives with overseas backgrounds, and the positive relationship between the two is more significant after the promulgation of China's Code of Governance for Listed Companies in 2018. Fourth, further discussion revealed that negative media coverage has the strongest promotion effect on the performance of corporate environmental governance, followed by social governance performance, and lastly, corporate governance performance. The research in this paper contributes to an in-depth understanding of the impact of negative media coverage on corporate ESG performance and provides empirical evidence to facilitate policy formulation related to the role of media monitoring and to fully utilize the media's role in corporate ESG governance.

Keywords: negative media coverage; corporate ESG performance; financing constraints; information asymmetry

Citation: Ge, C. Negative Media Coverage and Corporate ESG Performance: Evidence from China. *Businesses* **2024**, *4*, 96–114. https://doi.org/10.3390/businesses4010007

Academic Editors: Simon Huston, Jaliyyah Bello, Obinna Ugwu and Lincoln C. Wood

Received: 7 November 2023
Revised: 5 March 2024
Accepted: 12 March 2024
Published: 14 March 2024

1. Introduction

ESG (Environmental, Social, and Governance) as a corporate investment strategy has quickly become a focal point of global sustainability in recent years. E (Environmental) mainly highlights the environmental responsibilities that enterprises undertake in terms of environmental protection, green output, and resource recycling; S (Social) mainly showcases the social responsibility of enterprises in coordinating their relationships with their stakeholders in areas such as human rights, product safety, and labor standards; G (Governance) mainly reflects the modern corporate governance system constructed by enterprises in terms of internal governance concepts, governance frameworks, and governance mechanisms. In today's era, where environmental protection and social responsibility are in the spotlight, a systematic and comprehensive assessment and review of a company cannot be conducted by considering financial indicators alone. Non-financial and ESG indicators are becoming increasingly important in investment and corporate decision-making, and an increasing number of stakeholders are considering ESG indicators as core elements in assessing corporate sustainability and long-term value creation. Therefore, companies that focus on managing and building ESG systems can achieve better corporate performance and higher cumulative excess returns on their stocks [1], which has led many companies to actively improve their ESG performance [2], thereby enhancing their sustainability and attractiveness [3].

In the context of the "New Media" era, the role of the media as an "Information Intermediary" between information users and producers has become increasingly prominent,

playing an increasingly important role in disseminating information and monitoring public opinion [4]. At the present stage, a large body of literature has discussed the governance role of media coverage on enterprises, including the positive governance role of media coverage on board governance [5], surplus management [6], environmental information disclosure [7], over-investment [8], executive on-the-job spending [9], executive compensation [10], corporate tax avoidance [11] and corporate listings [12]. Among them, scholars have found that negative media coverage strengthens the auditing efforts of accounting firms [13] to curb executive corruption [14] and overinvestment [15], which promotes corporate performance [16] and lifts corporate stock prices [17], ultimately boosting corporate tax incentives [18] and increasing corporate acquisitions [19]. However, some scholars argue that the media's role in corporate governance is not significant, and that the media may confuse the public in pursuit of maximizing their utility to win a good social reputation and the commercial benefits that come with it [20]. Considering that the media has the effect of a rumor mill, some media may deliberately cater to the needs of listed companies because of the existence of interests and selectively report information that meets corporate expectations [21,22].

Regarding the influencing factors that drive the enhancement of corporate ESG performance, scholars mainly approach the research from the perspectives of internal influencing factors and a few external influencing factors. From the perspective of internal influencing factors, scholars not only fully affirm the positive impact of board independence on corporate ESG performance [23], but also argue from the perspective of CEO tenure that frequent CEO replacement is not conducive to the improvement of corporate ESG performance [24]. In addition, the higher the investment efficiency of a company, the more it tends to carry out ESG management and construction, which in turn suggests that the managerial ability of managers can have an impact on the company's ESG performance [25]. In terms of external influences, scholars have found that the introduction of relevant policies and regulations can incentivize companies to increase their investment in environmental protection and green innovation, thus continuously improving their ESG performance [26]. In addition, based on institutional theory, it is found that mandatory and imitative institutional pressures can promote firms' ESG performance, while normative institutional pressures can inhibit firms' ESG performance [27].

The above literature review reveals a lack of in-depth research on how negative media coverage affects corporate ESG performance. This begs the question, does negative media coverage have an impact on a company's ESG performance? If so, then how? And does it vary under different scenarios, given the crucial role played by the media in promoting corporate governance today, as well as the increasing emphasis placed by investors and policy makers on corporate ESG? At the same time, there are many facts that exist today to show that negative media coverage can have an impact on corporate ESG performance, for example, one of the more typical cases is the exclusion of Tesla from the S&P 500 ESG Indices rankings in 2022; one of the major reasons is that it was reported by the media that the company had a history of negative news about racial discrimination and social governance, which has caused a widespread concern. Therefore, it is worthwhile to conduct an in-depth and comprehensive study on the channels through which negative media coverage affects corporate ESG performance. Based on the above, this paper selects 1033 Chinese A-share listed companies from 2011 to 2020 as the research sample to analyze the effect of negative media coverage on corporate ESG performance, and on this basis, conducts mediating mechanism tests, heterogeneity tests and further discussion.

Compared with previous studies, the incremental contribution of this paper is mainly reflected in the following points: first, most of the existing literature focuses on the study of the economic consequences and internal influences on corporate ESG performance, but the research on the external influences on firms has not been sufficient. This study explores the impact of negative media coverage on ESG performance from the perspective of external influences, enriches and expands the research on the external influences on corporate ESG performance, and deepens the understanding of how negative media coverage plays

a role in the mechanism of promoting firms' ESG performance by revealing the paths of influence of negative media coverage on corporate ESG performance. Second, most current research on negative media coverage focuses on its role in corporate governance and monitoring, but no study has yet discussed the relationship between negative media coverage and corporate ESG performance. By focusing on the role of negative media coverage in enhancing corporate ESG performance, this study expands and deepens the research on the economic consequences of negative media coverage and fills this research gap. Third, for the portrayal of the variable of negative media coverage, previous studies have generally chosen a wide range of corporate reports. In this paper, the negative media coverage data are all news related to corporate ESG, which has stronger relevance and higher validity than the data of previous studies and provides a better guarantee for the reliability of the research conclusions.

2. Theoretical Basis and Research Hypothesis

2.1. Negative Media Coverage and Corporate ESG Performance

Compared to traditional financial assessment indicators, ESG focuses more on the coordinated and unified development of the external environment, society, and internal corporate governance. In the stage of high-quality economic development, enterprises, as micro entities promoting economic development, need to actively fulfill environmental, social, and internal governance responsibilities to gain the trust of stakeholders such as the government, the public, and employees. By shaping a development perspective that promotes economic value and social value in parallel, they continuously improve their ESG performance, in order to form a positive interaction and obtain more resource support and competitive advantages.

With the increasing use of media by the public, the media, as an important independent third party in the market economy, is seen as an important force in promoting corporate social responsibility [28]. Based on the media monitoring theory, the media acts as an information intermediary in capital markets [29] and is known as the "Fourth Power", and acts as an important extra-legal monitoring system [30]. Media monitoring is seen as an effective alternative to the limitations of judicial protection in capital markets, and competition among media will reduce the biased nature of media coverage, enabling the media to have an effective governance effect on companies [9]. In capital markets, there are two main ways in which the media can play a role in corporate governance. First, they can directly produce information to expose corporate misconduct through questioning, investigation, and analysis [31]. Second, the media can generate widespread public concern about corporate misconduct by employing reprints, in-depth investigations, and continuous reporting, creating public pressure on companies to correct their misconduct [32]. As the number of media exposures increases, so does the probability that listed companies will correct their violations. In particular, in-depth media coverage and negative coverage involving serious violations to investors can show more significant corporate governance effects [33]. Accordingly, based on this above, H1 is proposed as follows:

H1. *Negative media coverage has a governance effect on corporate, negative media coverage can effectively promote corporate ESG performance.*

2.2. Negative Media Coverage, Financing Constraints, and Corporate ESG Performance

Based on signaling theory, negative media coverage can convey negative information about a company to the capital market, thus causing a strong reaction in the stock market and putting downward pressure on share prices [34]. According to the Global Sustainability Investment Alliance (GSIA), global ESG investment has experienced significant growth in the last five years and ESG investment has become a global hotspot for sustainable investment. This has made investors increasingly sensitive to negative ESG news about companies, which can lead investors to reduce or abandon their investments in companies with highly negative ESG coverage to avoid risks. As equity financing is an important

external financing tool for companies, this will undoubtedly exacerbate their financing constraints and affect their long-term development. To regain consumer confidence to continue to receive investment and reduce financing constraints, companies will improve their ESG governance to enhance their ESG performance to convey to the outside world that they value ESG performance [35]. Therefore, H2 is proposed as follows:

H2. *Negative media coverage can exacerbate corporate financing constraints, thereby forcing companies to improve their ESG performance.*

2.3. Negative Media Coverage, Information Asymmetry, and Corporate ESG Performance

According to the work from Based on Brooks et al. [36], positive media coverage can reduce information asymmetry in ESG investments between companies and their investors. In contrast, can we assume that negative media coverage reinforces the information asymmetry in ESG investments between companies and investors?

The theory of strategic corporate media disclosure suggests that in the process of corporate disclosure, companies tend not to proactively disclose negative information as they will first consider their interests, and many corporate scandals are first uncovered by the media, which leads to the media often acting as the first disclosure of information in the process [37]. Thus, based on the theory of information asymmetry, more negative media coverage of a company's ESG represents less information for investors from proactive corporate disclosure; the lower the quality of the company's disclosure, the stronger the information asymmetry between the two parties. Also based on the media monitoring theory, the information-generating function of the media is conducive to exposing information asymmetry in corporate governance, thereby forcing corporate executives to change their behavior and improve corporate ESG performance. As the information asymmetry problem between firms, external investors and regulators increases, the latter will require firms to continuously enhance external disclosure and improve the reliability of information disclosure [38]; for example, through inquiry letters or exchange interactive platforms, which will force firms to improve their ESG performance. Hence, based on the above discussion, H3 is proposed as follows:

H3. *Negative media coverage can increase the level of information asymmetry between companies and stakeholders, and companies are pressured by investors to improve their ESG performance.*

3. Methods

3.1. Sample and Procedure

This study examines the impact of negative media reports on the ESG performance of A-share listed companies in China from 2011 to 2020 as the initial sample. The detailed distribution of the sample by year, ownership and industry can be found in Tables A1–A3. On this basis, the sample is processed as follows: First, in view of certain operational risks of delisted enterprises, PT enterprises, *ST enterprises and ST enterprises, these enterprises in the sample are excluded. Second, considering that financial and insurance companies are not the real economy and have many characteristics such as high leverage, and that there are great differences between financial and insurance companies and other industries in asset evaluation methods and accounting standards which are likely to cause statistical deviation, financial and insurance companies are excluded. Third, considering the completeness of the research sample data, companies that lack one of the three factors: enterprise ESG information data, negative media coverage data, and enterprise financial data are excluded from the research sample. Fourth, due to the approach of lagging the independent and control variables by one period in this study, the sample of enterprises with a year $\leq$2 does not have strong statistical explanatory power and is excluded from the statistical sample. After the above processing methods, this study obtains the data of 1033 listed companies and a total of 7410 observations. Meanwhile, to reduce the effect of extreme values, all continuous variables were Winsorized at the 1% and 99% quartiles. In

addition, the study uses Stata 17.0 software for data processing and regression analysis, is adjusted for clustering at the individual firm level, and uses cluster robust standard errors.

Data on corporate ESG performance were obtained from the Bloomberg database, data on negative media ESG news were obtained from the DATAGO database, and all other corporate financial data were obtained from the CSMAR and CNRDS databases.

3.2. Analytical Model

3.2.1. Main Regression Model

From the time dimension, it takes time for ESG third-party rating agencies to interpret the ESG performance of enterprises reported by the media. Negative media coverage in the current period may not directly affect the ESG scores of enterprises in the current period, and there may be an endogeneity problem of mutual causality between the dependent and independent variables in this study. Given this, the independent and control variables are lagged by one period, and a two-way fixed-effects model is used in the regression [39]. The specific model is shown in Equation (1).

$$ESGscore_{i,t+1} = \propto_0 + \propto_1 Negmedia_{i,t} + \Sigma Controls_{i,t} + Dum\_Year + Dum\_Industry + \varepsilon_{i,t} \quad (1)$$

In model (1), i and t denote firm and year, respectively; the dependent variable $ESGscore_{i,\,t+1}$ represents the ESG performance of firm i in year t + 1; the independent variable $Negmedia_{i,\,t}$ is the negative media coverage of firm i in year t; $\Sigma Controls_{i,\,t}$ is the control variable; $\varepsilon_{i,\,t}$ is the random disturbance term; Dum_Year is the year dummy variable; $Dum\_Industry$ is the industry dummy variable.

3.2.2. Regression Models for Mediating Variables

To test the mediation hypothesis, this study used Baron and Kenny's (1986) procedure, and constructs the mediating effect model as follows:

$$Mediating_{i,t+1} = \mu_0 + \mu_1 Negmedia_{i,t} + \Sigma Controls_{i,t} + Dum\_Year + Dum\_Industry + \varepsilon_{i,t} \quad (2)$$

$$ESGscore_{i,t+1} = \mu_0 + \mu_1 Negmedia_{i,t} + \mu_2 Mediating_{i,t+1} + \Sigma Controls_{i,t} + Dum\_Year + Dum\_Industry + \varepsilon_{i,t} \quad (3)$$

In model (2) and (3), the remaining variables are the same as those above, with financing constraints and information asymmetry as the mediating variables ($Mediating_{i,t+1}$).

3.3. Variables

3.3.1. Dependent Variable: Corporate ESG Performance

This study uses the ESG scores of Chinese A-share listed companies published in the Bloomberg database to measure corporate ESG performance. The database assesses companies' ESG disclosure on several items, including climate change, air quality, water and energy management, human capital and diversity, employee health and safety, board remuneration and structure, forming an indicator that varies in the range of [0, 100], which directly reflects the ESG performance of companies.

3.3.2. Independent Variable: Negative Media Coverage

This study used data on negative media news reports from the DATAGO Newspaper News ESG quantitative public opinion database as the independent variable. The database uses a natural language processing model (NLP) to classify news about all listed companies in China, and filters and cleans the news according to the source and content of the news (filtering out about 80% of invalid news); thus, the database has a better guarantee of news validity than the news used in previous studies. Second, the media reports selected from the database are all news items that contain information about companies E, S, and G, and therefore have a high relevance to the subject of this study. The data on negative media coverage are taken from the sum of the number of negative news stories about companies' ESG in the database, and the natural logarithm is calculated by adding 1 to the data.

3.3.3. Control Variables

The level of corporate governance of a company usually affects its ESG performance. Cucari et al. emphasize the importance of board independence and fully acknowledge the positive impact of board independence on corporate ESG performance [23]. Mcbrayer argues from the perspective of CEO tenure that frequent CEO changes are detrimental to corporate ESG performance [40]. Welch and Yoon state that managers improving their management capabilities can effectively improve the ESG performance of their firms [25]. Husted and Sousa-Filho found that the integration of chairman and general manager is not conducive to improving the quality of ESG information disclosure in enterprises [41]. Thus, concentration of shareholders, the board size, board independence, and two offices in one, which represent corporate governance, are selected as control variables.

Also, the characteristics of a company can have an impact on its ESG performance. Drempetic et al. found a positive correlation between firm size and firm ESG scores [42]. Harymawan et al. found that the more efficient the firm's investment, the more inclined it was to engage in ESG management and construction; this means that ESG performance is better for companies with a high return on total assets or high growth capacity [24]. A company's overheads usually include the cost of greening the business, employee benefits and labor insurance, so how much is spent on this cost can also affect a company's ESG performance. Thus, corporate size, gearing ratio, return on total assets, growth capacity, and the management expense ratio, which represent corporate characteristics, are also selected as control variables.

In addition, year and industry dummy variables are included in the regression model to control the effect of economic cycles and industry environment on the regression results, both by year and by industry.

3.3.4. Mediating Variables

In this study, the mediating variables include financing constraints and information asymmetry.

Financing constraints are measured using the SA index of financing constraints, calculated as SA = $-0.737 \times$ Size + $0.043 \times$ Size^2 $- 0.04 \times$ Age. Among them, Size is the natural logarithm of the total assets of the enterprise, Age is the number of years of listing and SA index is generally negative. Compared to the WW and KZ indices, the SA index has the advantage of excluding endogenous financial variables and reducing measurement error, and is therefore increasingly used as a measure of financing constraints in the literature, with a larger SA value representing a greater financing constraint for the firm [43].

Information asymmetry was portrayed using a modified KV index for information disclosure quality. In contrast to the surplus management index, Kim and Verrecchia's approach avoids several problems arising from the use of accounting variables such as discretionary profit accruals and surplus management [44]. However, the variables of the traditional KV model use the absolute change in trading volume, which can easily lead to misleading statistical comparisons if the number of shares available for market trading between two companies is significantly different. In response, Xu S.F and Xu L.B use the absolute change in stock trading volume as a measure of the variable [45], as calculated in the following model:

$$\mathrm{Ln}|(P_t - P_{t-1})/P_{t-1}| = \lambda_0 + \lambda(Vol_t/VOL_0 - 1) + \varepsilon \quad (4)$$

In model (4), P_t and Vol_t are the closing price and trading volume of stocks on day t, respectively, and VOL_0 is the average daily trading volume of all trading days during the study period, using the OLS method to regress each listed company in the sample to obtain the λ value to construct the KV index. A higher KV index indicates that the market relies more on trading volume than on information disclosed by companies; the poorer the quality of information disclosure by listed companies, the stronger the information asymmetry (see Table 1 for specific variable definitions).

Table 1. Definition of variables.

Variable Type	Variable Name	Variable Symbols	Variable Description
Dependent Variable	Corporate ESG performance	ESGscore	Bloomberg ESG score
Independent Variable	Negative media coverage	Negmedia	Ln(1 + Negative corporate ESG coverage)
Mediating Variables	Financing constraints	Financing	SA Index
	Information asymmetry	Asymmetry	KV Index
	Corporate size	Size	Natural logarithm of the total assets of the enterprise
	Gearing ratio	Lev	Total liabilities/Total assets
	Return on total assets	Roa	Total profits/Total assets
	Management expense ratio	Expense	Administrative expenses/Main operating income
	Growth capacity	Growth	Operating income growth rate
Control Variables	Concentration of shareholders	TOP	The shareholding ratio of the largest shareholder
	The board size	Board	The number of board of directors is taken as the natural logarithm
	Board independence	Inr	Percentage of independent directors on the board of directors
	Two offices in one	Dual	If the chairman and the general manager are combined, take 1, otherwise take 0
	Year	Year	Dummy Variables
	Industry	Industry	Dummy Variables

4. Results

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics for the main variables. The mean value of ESG performance was 20.514 with a standard deviation of 6.559, the maximum value was 44.628, and the minimum value was 9.091, which indicates that the overall ESG performance of Chinese enterprises is poor and there are significant differences between enterprises. Furthermore, the mean value of negative media coverage was 4.527, with a standard deviation of 1.130, a maximum value of 7.619, and a minimum value of 1.946. This indicates that the ESG performance of different companies is affected by negative media coverage with some deviation but within a reasonable range. The results of the descriptive analysis of the control variables are similar to the findings in the literature, and none of them have abnormal extreme values, indicating that the selection of variables in this study is reasonable.

Table 2. Descriptive statistics.

Variable	N	Mean	SD	Min	p50	Max
ESGscore	7410	20.514	6.559	9.091	19.835	44.628
Negmedia	7410	4.527	1.130	1.946	4.466	7.619
Size	7410	23.063	1.311	20.430	22.950	26.950
Lev	7410	0.468	0.197	0.069	0.479	0.881
Roa	7410	0.048	0.054	−0.188	0.040	0.211
Expense	7410	0.080	0.060	0.007	0.066	0.369
Growth	7410	0.173	0.373	−0.498	0.111	2.474
Top	7410	0.381	0.160	0.082	0.369	0.774
Board	7410	9.037	1.848	5	9	15
Inr	7410	0.375	0.055	0.333	0.364	0.571
Dual	7410	0.197	0.398	0	0	1

4.2. Correlation Analysis

Table 3 presents the correlation analysis for the main variables. To test the correlation between the main variables, Pearson correlation coefficient and Spearman correlation coefficient tests were conducted. It can be seen that both the Pearson and Spearman tests show a significant positive correlation between negative media coverage and corporate ESG performance (correlation coefficients = 0.16, 0.1; $p < 0.01$), which tentatively verifies

that negative media coverage promoting corporate ESG performance is initially validated. In addition, the study examined the variance inflation factor (VIF) values of the main variables and found that the mean VIF value was 2.85, which was far below the critical value of 10, indicating that the model did not have multicollinearity problems.

Table 3. The correlation coefficient matrix.

	ESG	Negmedia	Size	Lev	Roa	Expense	Growth	Top	Board	Inr	Dual
ESG	1	0.10 ***	0.36 ***	0.17 ***	−0.07 ***	−0.18 ***	−0.07 ***	0.09 ***	0.11 ***	0.02	−0.11 ***
Negmedia	0.16 ***	1	0.35 ***	0.18 ***	0.03 ***	−0.06 ***	−0.00	0.09 ***	0.08 ***	0.09 ***	−0.01
Size	0.44 ***	0.40 ***	1	0.55 ***	−0.18 ***	−0.44 ***	−0.01	0.24 ***	0.19 ***	0.07 ***	−0.15 ***
Lev	0.17 ***	0.17 ***	0.55 ***	1	−0.51 ***	−0.40 ***	−0.03 **	0.09 ***	0.11 ***	0.01	−0.10 ***
Roa	−0.05 ***	0.06 ***	−0.13 ***	−0.47 ***	1	0.08 ***	0.31 ***	0.05 ***	−0.06 ***	−0.01	0.10 ***
Expense	−0.19 ***	−0.05 ***	−0.38 ***	−0.36 ***	0.00	1	−0.07 ***	−0.16 ***	−0.08 ***	0.00	0.11 ***
Growth	−0.07 ***	0.00	0.00	0.01	0.21 ***	−0.07 ***	1	−0.05 ***	−0.05 ***	−0.00	0.10 ***
Top	0.10 ***	0.10 ***	0.25 ***	0.09 ***	0.06 ***	−0.16 ***	−0.01	1	0.01	0.07 ***	−0.11 ***
Board	0.11 ***	0.12 ***	0.23 ***	0.12 ***	−0.05 ***	−0.09 ***	−0.06 ***	0.03 ***	1	−0.42 ***	−0.19 ***
Inr	0.04 ***	0.09 ***	0.10 ***	0.03 **	0.01	0.02 **	−0.00	0.09 ***	−0.39 ***	1	0.08 ***
Dual	−0.11 ***	−0.01	−0.14 ***	−0.10 ***	0.08 ***	0.10 ***	0.07 ***	−0.11 ***	−0.17 ***	0.09 ***	1

Note: ** $p < 0.05$ *** $p < 0.01$ indicates 5%, and 1% significance levels, respectively.

4.3. Main Regression Results

Columns (1)–(3) of Table 4 present the results of the empirical analysis of the main hypothesis. Column (1) shows the regression result of not putting in the control variables with industry effects, while Columns (2) and (3) are the regression results of whether or not to control for industry effects after adding in the control variables. Columns (1)–(3) of Table 4 show that the correlation coefficients between negative media coverage and ESG performance are significantly positive at the 1–5% level (correlation coefficients = 0.254, 0.209, 0.215; $p < 0.01$, $p < 0.05$, $p < 0.05$), regardless of whether industry effects are controlled for and whether control variables are included. This suggests that negative media coverage can effectively promote corporate ESG performance, and hypothesis H1 is better tested.

Table 4. Impact of negative media coverage on corporate ESG performance.

	(1) $ESGscore_{i,t+1}$	(2) $ESGscore_{i,t+1}$	(3) $ESGscore_{i,t+1}$
$Negmedia_{i,t}$	0.254 ***	0.209 **	0.215 **
	(0.094)	(0.092)	(0.092)
$Size_{i,t}$		0.797 ***	1.061 ***
		(0.229)	(0.238)
$Lev_{i,t}$		0.582	0.451
		(0.861)	(0.867)
$Roa_{i,t}$		3.483 **	4.299 ***
		(1.574)	(1.581)
$Expense_{i,t}$		−2.636	−1.532
		(2.145)	(2.122)
$Growth_{i,t}$		−0.277 **	−0.256 *
		(0.135)	(0.137)
$Top_{i,t}$		2.606 **	2.799 **
		(1.168)	(1.159)
$Board_{i,t}$		−0.014	−0.022
		(0.083)	(0.085)
$Inr_{i,t}$		1.589	1.049
		(1.851)	(1.876)
$Dual_{i,t}$		−0.045	−0.004
		(0.230)	(0.230)
Constant	17.403 ***	−2.060	−10.163 *
	(0.455)	(5.164)	(5.480)
Industry	No	No	Yes
Year	Yes	Yes	Yes
N	7410.000	7410.000	7410.000
R^2	0.242	0.252	0.265

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ indicates 10%, 5%, and 1% significance levels, respectively.

4.4. Robustness Tests for Main Regression

4.4.1. Discussion of Endogeneity Issues

In the above, the paper uses a fixed effects model and lagged one-period variable regression in the main regression model to effectively address the possible endogeneity problem caused by omitted variables and two-way causality. However, endogeneity problems may also be caused by sample selection bias, so the Heckman two-stage regression model was chosen to conduct a robustness check on the endogeneity problem of sample selection.

Following the approach of Liang, a first-stage regression model is constructed [46]. The selected first-stage regression model has a dummy variable ($HighNegmedia_{i,t}$) as the dependent variable, representing whether negative media coverage exceeds the annual industry median in the main regression model. It is set to 1 if negative media coverage exceeds the median, otherwise it is set to 0. The specific model is as follows:

$$HighNegmedia_{i,t} = \theta_0 + \theta_1 Size_{i,t} + \theta_2 Soe_{i,t} + \theta_3 Age_{i,t} + \theta_4 Tobin'Q_{i,t} + Dum\_Year + Dum\_Industry + \varepsilon_{i,t} \quad (5)$$

The control variables in the model (5) include the firm size ($Size_{i,t}$), which consistent with the definitions in Table 1. Nature of ownership ($Soe_{i,t}$) is assigned a value of 1 for state-owned firms and 0 for non-state-owned firms. Firm age ($Age_{i,t}$) is equal to the difference between the accounting year and the year the firm was founded. Firm value ($Tobin'Q_{i,t}$) is equal to the ratio of market value to total assets.

The Heckman two-stage regression results are presented in Table 5, in which Column (1) presents the regression results of the main regression model, Column (2) shows the regression results for the inverse Mills ratio (*IMR*) calculated using model (5) (Heckman first-stage), and Column (3) presents the regression results of the main regression model after adding the IMR (Heckman second-stage). The regression results show that negative media coverage is consistently and significantly positively correlated with corporate ESG performance, regardless of whether IMR is controlled for (correlation coefficients = 0.324, 0.363; $p < 0.01$, $p < 0.01$), which is consistent with the main findings of this study and indicates that there is no sample selection bias in the sample selected for this study. In addition, the VIF value of the Heckman two-stage regression model was 2.84, which was well below the critical value of 10, indicating that there was no problem of multicollinearity.

Table 5. Robustness tests: discussion of endogeneity issues.

	(1) **$ESGscore_{i,t+1}$**	**(2)** **$HighNegmedia_{i,t}$**	**(3)** **$ESGscore_{i,t+1}$**
$Negmedia_{i,t}$	0.345 ***		0.386 ***
	(0.080)		(0.108)
$Size_{i,t}$		0.463 ***	
		(0.013)	
$Soe_{i,t}$		−0.239 ***	
		(0.031)	
$Age_{i,t}$		−0.005 **	
		(0.002)	
$Tobin'Q_{i,t}$		0.168 ***	
		(0.012)	
IMR			−0.067
			(0.118)
$Controls_{i,t}$	Yes	Yes	Yes
Constant	−31.686 ***	−10.755 ***	−31.780 ***
	(1.861)	(0.311)	(1.868)
Industry	Yes		Yes
Year	Yes		Yes
N	7410	8695	7410
R^2	0.292		0.292

Note: *t*-values for clusters at the firm level are in parentheses; ** $p < 0.05$ *** $p < 0.01$ indicates 5%, and 1% significance levels, respectively.

4.4.2. Replacement of Independent Variables

This study uses the following two approaches to replace independent variables.

First, we constructed the variable of "Excess Negative Media Coverage". Media attention and coverage of a company are influenced by many factors, such as company size, profitability, fluctuations in cash flow from operating activities, and fluctuations in cash flow from financing activities [47]. To control the impact of these factors on negative media coverage, this study constructs model (6) to estimate the variable of excess negative media coverage and then conducts regression tests. The model for estimating excess negative media coverage is as follows:

$$Negmedia_{i,t} = \gamma_0 + \gamma_1 Size_{i,t} + \gamma_2 Lev_{i,t} + \gamma_3 Roa_{i,t} + \gamma_4 Growth_{i,t} + \gamma_5 Tobin'Q_{i,t} + Dum\_Year + Dum\_Industry + \varepsilon_{i,t} \quad (6)$$

In the above equation, variables are defined as above; the residual of model (6) is the "Excess Negative Media Coverage ($Negmedia1_{i,t}$)".

Second, as the influence of originality and unoriginality of media coverage in the online media era is somewhat different, if both can have a significant positive impact on corporate ESG performance, then the findings of this study are more robust and generalizable. Therefore, this study divides the available data into original negative media coverage ($Negmedia2_{i,t}$) and unoriginal negative media coverage ($Negmedia3_{i,t}$) as alternative explanatory variables for negative media coverage. The data are treated in the same way as above by adding one to them and taking the natural logarithm value.

The results of the regression analysis using the above-mentioned replacement variables ($Negmedia1_{i,t}$, $Negmedia2_{i,t}$, and $Negmedia3_{i,t}$) brought into Equation (1) are shown in Table 6. As can be seen from Table 6, the coefficient of Negmedia1 is significantly positive at the 5% level (correlation coefficient = 0.194, $p < 0.05$), the coefficient of Negmedia2 is significantly positive at the 10% level (correlation coefficient = 0.222, $p < 0.1$), and the coefficient of the variable Negmedia3 was significantly positive at the 1% level (correlation coefficient = 0.176, $p < 0.01$), indicating that regardless of whether the independent variables are excess negative media coverage or whether the negative media coverage is original, it is able to positively contribute to the ESG performance of the firm, and the above robustness tests support the main findings of this study.

Table 6. Robustness tests: replacement of independent variables.

	(1) **$ESGscore_{i,t+1}$**	**(2)** **$ESGscore_{i,t+1}$**	**(3)** **$ESGscore_{i,t+1}$**
$Negmedia1_{i,t}$	0.194 **		
	(0.093)		
$Negmedia2_{i,t}$		0.222 *	
		(0.122)	
$Negmedia3_{i,t}$			0.176 ***
			(0.065)
$Controls_{i,t}$	Yes	Yes	Yes
Constant	−10.309 *	−9.820 *	−10.254 *
	(5.487)	(5.463)	(5.485)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	7410	7410	7410
R^2	0.264	0.264	0.265

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ indicates 10%, 5%, and 1% significance levels, respectively.

4.4.3. Adjusting the Sample Period

As the sample period chosen in this study is 2011 to 2020, the sample period spans a long period and therefore may be subject to the following three factors that may interfere with the results of the empirical analysis: (1) the long time span is susceptible to more

unknown confounding factors; (2) the degree of online media development and social ESG management awareness has a large chronological gap and may have an impact on the empirical results; and (3) China's revised Labor Contract Law in 2013 and Anti-Unfair Competition Law in 2019, which are the first government legislation and management system markers related to corporate ESG management, respectively, may affect the empirical results due to the vulnerability of the data to government policies in these two years. In summary, this paper re-selected 2014–2018 as the new sample interval for testing, and the regression results are shown in Column (1) of Table 7. The regression results show that negative media coverage and corporate ESG performance are significantly positive at the 5% level (correlation coefficient = 0.196, $p < 0.05$), consistent with the main findings of this study.

Table 7. Robustness tests: adjusting the sample period and supplementary dummy variables.

	(1) **$ESGscore_{i,2014\sim2018}$**	**(2)** **$ESGscore_{i,t+1}$**
$Negmedia_{i,t}$	0.196 **	0.215 **
	(0.097)	(0.092)
$Controls_{i,t}$	Yes	Yes
Constant	4.274	−10.163 *
	(5.336)	(5.480)
Industry	Yes	Yes
Year	Yes	Yes
Province	No	Yes
N	4140	7410
R^2	0.216	0.265

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ indicates 10% and 5% significance levels, respectively.

4.4.4. Supplementary Dummy Variables

Considering that there are large differences in the level of economic development, environmental awareness, and human environment in different provinces in China, there are large differences in the attention and importance that companies in different provinces pay to ESG management. If province-fixed effects are not included, there is a risk of missing important variables that do not change over time in the provinces, thus leading to biased and inconsistent regression results [48]. To avoid this problem, we add province dummy variables to the main regression model; the regression results are shown in Column (2) of Table 7. The regression results show that negative media coverage and corporate ESG performance are significantly positive at the 5% level (correlation coefficient = 0.215, $p < 0.05$), consistent with the main findings of this study.

4.5. Regression Results for Mediating Variables

4.5.1. Mediating Effect of Financing Constraints

Columns (1) and (2) of Table 8 show the test results for the mediating variables of financing constraints. Column (1) shows that negative media coverage and corporate financing constraints are significantly positive at the 1% level (correlation coefficient = 0.004, $p < 0.01$). Column (2) shows that financing constraints and ESG performance are significantly positive at the 1% level (correlation coefficient = 12.812, $p < 0.01$). The results show that more negative media coverage sends negative signals to investors who have less confidence in the company and exit the market, leading to an increase in corporate financing constraints. To regain investors' confidence and reduce their financing constraints, companies take the initiative to improve their ESG governance, thereby improving their ESG performance.

Table 8. Mediating mechanism test.

	(1) $Financing_{i,t+1}$	(2) $ESGscore_{i,t+1}$	(3) $Asymmetry_{i,t+1}$	(4) $ESGscore_{i,t+1}$
$Negmedia_{i,t}$	0.004 ***	0.171 *	0.019 ***	0.201 **
	(0.001)	(0.088)	(0.004)	(0.095)
$Financing_{i,t+1}$		12.812 ***		
		(1.884)		
$Asymmetry_{i,t+1}$				0.979 ***
				(0.271)
$Controls_{i,t}$	Yes	Yes	Yes	Yes
Constant	−4.666 ***	47.997 ***	−0.486 **	−10.831 *
	(0.133)	(9.416)	(0.210)	(5.792)
Sobel Tests		2.109 **		2.105 **
		Proportion: 4.1%		Proportion: 14.4%
Indirect effect		0.009 ** (0.002–0.019)		0.030 ** (0.002–0.061)
Direct effect		0.202 *** (0.071–0.359)		0.178 ** (0.042–0.332)
Total effect		0.210 *** (0.076–0.365)		0.208 *** (0.078–0.361)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	7410	7410	7142	7142
R^2	0.792	0.288	0.164	0.270

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ indicates 10%, 5%, and 1% significance levels, respectively.

In addition, the *p*-value of the Sobel test for the mediating variables of financing constraints is less than 0.05, and the proportion of the mediating effect to the total effect is 4.1%, indicating that financing constraints have a partial mediating effect on the path of negative media coverage, affecting corporate ESG performance. According to the above analyses, H2 is verified.

4.5.2. Mediating Effect of Information Asymmetry

Columns (3) and (4) of Table 8 show the test results for the mediating variable of information asymmetry. Column (3) shows that negative media coverage and information asymmetry are significantly positive at the 1% level (correlation coefficient = 0.019, $p < 0.01$). Column (4) shows that information asymmetry and ESG performance are significantly positive at the 1% level (correlation coefficient = 0.979, $p < 0.01$). The results suggest that more negative media coverage reveals a stronger information asymmetry between companies and investors, which, to a certain extent, undermines investors' rights and interests. Companies are forced to enhance their ESG disclosure due to investors' pressure to disclose more information, leading to an increase in corporate ESG performance.

Additionally, the *p*-value of the Sobel test for the mediating variable of the information asymmetry was less than 0.05, and the proportion of the mediating effect to the total effect was 14.4%, indicating that information asymmetry has a partial mediating effect on the path of negative media coverage affecting corporate ESG performance. According to the above analyses, H3 is verified.

Finally, this study applies the Bootstrap method to test the robustness of the mediating mechanism of financing constraints and information asymmetry. After the 1000 random samplings, the test intervals for the total, direct and indirect effects after adjusting for bias do not contain 0, verifying the robustness of the conclusions of hypotheses H2 and H3.

5. Heterogeneity Test

5.1. Heterogeneity Test Based on Whether Executives Have Overseas Backgrounds

Senior echelon theory suggests that the educational qualifications, career experiences, and other background characteristic variables of the executive team shape the values and cognitive abilities of executives, which in turn determine their strategic choices and subsequently have an impact on corporate development [49]. Environmental and social

responsibility education in developed Western countries is far more mature than the Chinese education system, and policies and regulations on ESG disclosure are better formulated. Under the influence of the foreign environment, Chinese companies with overseas executives are more inclined to choose strategies conducive to social responsibility implementation [50], which makes companies with overseas executives perform better in terms of ESG [51]. The marginal effect of negative media coverage in enhancing the ESG performance of firms with overseas executives is relatively small, as firms with overseas executives already have better ESG governance and performance. Therefore, this study expects that negative media coverage will have a more significant effect on the ESG performance of firms without overseas executives.

The dummy variable $Oversea_{i,t}$ is set to 1 if the firm has an executive with an overseas background in the year, and 0 otherwise. The dummy variable Oversea and its interaction with negative media coverage ($Oversea \times Negmedia_{i,t}$) are put into model (1), and the results are shown in Column (1) of Table 9. The results show that the interaction term between overseas executives and negative media coverage ($Oversea \times Negmedia_{i,t}$) is significantly negative at the 10% level (correlation coefficient = −0.253, $p < 0.1$), indicating that negative media coverage has a more significant effect on the ESG performance of companies without overseas executives. The regression results are in line with the expectations of this study.

Table 9. Heterogeneity test.

	(1) **$ESGscore_{i,t+1}$**	**(2)** **$ESGscore_{i,t+1}$**
$Negmedia_{i,t}$	0.365 ***	−0.077
	(0.119)	(0.095)
$Oversea_{i,t}$	1.059 *	
	(0.605)	
$Oversea \times Negmedia_{i,t}$	−0.253 *	
	(0.135)	
$Policy_{i,t}$		0.638
		(0.600)
$Policy \times Negmedia_{i,t}$		0.882 ***
		(0.129)
$Controls_{i,t}$	Yes	Yes
Constant	−10.922 **	−7.692
	(5.493)	(5.381)
Industry	Yes	Yes
Year	Yes	Yes
N	7410	7410
R^2	0.268	0.279

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ indicates 10%, 5%, and 1% significance levels, respectively.

5.2. Heterogeneity Test Based on Whether the Code on Governance of Listed Companies Is Introduced

In 2018, the China Securities Regulatory Commission (CSRC) issued a revised version of The Code on Governance of Listed Companies (hereinafter referred to as "The Code"), which established for the first time the basic requirements for the disclosure of environmental, social responsibility, and corporate governance information of listed companies. Based on legitimacy theory and pressure theory, companies will improve the quality of ESG information disclosure due to the "self-interest mentality" and media monitoring pressure to obtain higher scores from third-party assessment agencies, in order to demonstrate the legitimacy of their operations and build a good corporate image for the government and the public [52]. This study expects that the revision of The Code has increased the importance of ESG information to enterprises and the media and can strengthen the contribution of negative media coverage to the ESG performance of enterprises.

The dummy variable $Policy_{i,t}$ is set to indicate whether The Code is revised in year t, with an assignment of 1 in 2018 and beyond, and 0 otherwise. The policy and its interaction term with negative media coverage ($Policy \times Negmedia_{i,t}$) are put into model (1)

for regression, and the results are shown in Column (2) of Table 9. The results show that the cross-multiplier between policy and negative media coverage ($Policy \times Negmedia_{i,t}$) is significantly positive at the 1% level (correlation coefficient = 0.882, $p < 0.01$), indicating that the contribution of negative media coverage to corporate ESG performance is more pronounced after the promulgation of The Code. The regression results are in line with the expectations of this study.

6. Further Discussion

In the previous section, this paper proved that negative media coverage has a facilitating effect on the corporate ESG performance, so the current question that remains for us is whether negative media coverage has different facilitating effects on the performance of firms in terms of E, S, and G.

Columns (1), (2), and (3) of Table 10 show the results of the effect of negative media coverage on firms' E, S and G performance, respectively. As shown in Column (1), negative media coverage and environmental governance performance ($Escore_{i,t+1}$) is significantly positive at the 5% level (correlation coefficient = 0.350, $p < 0.05$), indicating that negative media coverage is effective in promoting firms' environmental governance performance. As shown in Columns (2) and (3), negative media coverage, social governance ($Sscore_{i,t+1}$) and corporate governance ($Gscore_{i,t+1}$) are significantly positive at the 10% level (correlation coefficient = 0.159, $p < 0.1$; correlation coefficient = 0.063, $p < 0.1$), indicating that negative media coverage can also effectively promote the performance of social governance and corporate governance.

Table 10. Further discussion.

	(1) $Escore_{i,t+1}$	(2) $Sscore_{i,t+1}$	(3) $Gscore_{i,t+1}$
$Negmedia_{i,t}$	0.350 **	0.159 *	0.063 *
	(0.148)	(0.133)	(0.085)
$Controls_{i,t}$	Yes	Yes	Yes
Constant	−7.386	−31.379 ***	30.160 ***
	(9.022)	(8.562)	(4.242)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	7410	7410	7410
R^2	0.190	0.146	0.216

Note: *t*-values for clusters at the firm level are in parentheses; * $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ indicates 10%, 5%, and 1% significance levels, respectively.

From the above results, we can find that the correlation coefficient between negative media reports and corporate environmental governance is the highest at 0.350, the correlation coefficient with social governance is the second highest at 0.159, and the correlation coefficient with corporate governance is the lowest at 0.063, which indicates that negative media coverage has the strongest promotion effect on the performance of corporate environmental governance, followed by social governance performance, and lastly, corporate governance performance. In addition, it also shows that enterprises react and pay more attention to their negative environmental coverage and are more willing to take relevant actions to improve their environmental governance performance, while the reaction to negative coverage on corporate governance is more moderate.

7. Conclusions

7.1. Research Conclusions

This study selected Chinese A-share listed companies from 2011 to 2020 as a research sample and empirically examined the relationship and mechanism of action between negative media coverage and corporate ESG performance. The study found that, first, negative media coverage can effectively promote corporate ESG performance. Second,

the mediation mechanism study shows that negative media coverage positively promotes corporate ESG performance by increasing the degree of corporate financing constraints and information asymmetry and prompting corporations to change their ESG governance level. Third, the results of the heterogeneity test find that the positive relationship between negative media coverage and corporate ESG performance is more pronounced among firms without executives with overseas backgrounds, and the positive relationship between the two is more significant after the promulgation of China's Code of Governance for Listed Companies in 2018. Fourth, further discussion revealed that negative media coverage has the strongest promotion effect on the performance of corporate environmental governance, followed by social governance performance, and lastly, corporate governance performance.

What needs to be noted in response to the above research conclusions is that, first, as this paper adopts an empirical study with a large data sample, even if there are subjective tendencies in some media reports or ESG scores of some enterprises due to political, cultural, ideological and economic interests, resulting in the existence of biased media reports or ESG scores of some enterprises, it is difficult to have a large impact on the conclusions of the study; therefore, the research conclusions of this paper have a strong reliability. Second, as the research object of this paper is Chinese A-share listed companies, considering that the sample ratio of state-owned and non-state-owned enterprises in the research sample is close to 1:1, as well as the deepening of China's marketisation and economic globalization nowadays, the conclusions of this paper are applicable to the vast majority of countries where a market economy exists, and therefore have a strong general applicability.

7.2. Theoretical and Practical Contributions

The theoretical contribution of this paper is that, first, it provides a more in-depth analysis of the external governance role of the media on corporate ESG performance and enriches the theory of media monitoring. In the previous literature, some scholars have explored the impact of media attention on corporate ESG performance, but the concept of media attention is too general, as the role of neutral media coverage in media attention may not be effective in governing corporate ESG performance. Instead, this paper explores the role of negative media coverage on corporate ESG governance, identifying more precisely which categories of media coverage can play an external governance role in the process of corporate governance. Second, this paper expands the research on the mechanisms of media influence on corporate ESG performance, bridging the gap in the existing literature on relevant mediating mechanisms.

The practical contribution of this paper is that, first, for corporate managers, in the current context of increasing media attention to corporate ESG-related information, managers should actively follow the trend of the times, take the initiative to improve ESG-related management and disclosure, improve the effectiveness of corporate ESG information and ESG performance, and avoid negative ESG coverage that leads to corporate financing difficulties and loss of investor trust. Second, for the media, considering the two-sided nature of the media and its role as an amplifier, the media should uphold the concept of rational information delivery, regulate the content of corporate information reporting and reasonably play the role of public opinion monitoring by the media.

7.3. Recommendations and Suggestions

First, vigorously strengthen the construction of public opinion environment and fully leverage the role of media governance. At present, media coverage has a significant promoting effect on the improvement of corporate ESG performance. Therefore, it is necessary to promote the independence and marketization of the media, and actively play the role of the informal media system in promoting corporate ESG performance.

Second, expand the channels for corporate ESG information disclosure and improve the efficiency of ESG information flow. In addition to disclosing ESG information through regular reports, the development of big data technology has made it possible for news media to become a channel for publishing corporate ESG information. Expanding the

dissemination channels of corporate ESG information is beneficial for the effective flow of corporate ESG information, and thus more effective in leveraging the media's role in promoting corporate ESG performance.

7.4. Limitations and Future Directions

The research limitations of this paper are, first, the selection of control variables in this paper are based on existing literature and the authors' own subjectivity, with some selection bias. Second, this paper only examines two mediating paths, financing constraints and information asymmetry, and there may be other mediating variables that need to be further explored in the future. Third, the paper lacks an analysis of the financial or economic consequences of negative media coverage through its impact on corporate ESG performance.

As an outlook for future research, this paper speculates that there may be an n-curve relationship between negative media coverage and the ESG performance of firms. An old Chinese saying is that "Things will develop in the opposite direction when they become extreme" and too much negative media coverage may be detrimental to firms' ESG performance. In addition, there are financial or economic consequences of negative media coverage through its impact on corporate ESG performance that await further discovery and research in the future. At the same time, there are more mediating mechanisms waiting to be discovered and proven. This needs to be verified by the author or other scholars in the future.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Distribution of sample enterprises by year.

Year	Freq	Percent
2011	702	8.07%
2012	759	8.73%
2013	799	9.19%
2014	789	9.07%
2015	919	10.57%
2016	921	10.59%
2017	946	10.88%
2018	966	11.11%
2019	967	11.12%
2020	927	10.66%
Total	8695	100%

Table A2. Distribution of sample enterprises by ownership.

Ownership	Freq	Percent
state-owned	4595	52.85%
non-state-owned	4100	47.15%
Total	8695	100%

Table A3. Distribution of sample enterprises by industry.

Industry	Freq	Percent
Professional and technical services	33	0.38%
Specialised Equipment Manufacturing	331	3.81%
Internet and related services	113	1.30%
Warehousing Industry	10	0.12%
Instrument and meter manufacturing	59	0.68%
Accommodation Industry	24	0.28%
Public Facilities Management	12	0.14%
Other Manufacturing	28	0.32%
Agricultural	59	0.68%
Agricultural Food Processing Industry	130	1.50%
Chemical raw materials and chemical products manufacturing	496	5.70%
Chemical fibre manufacturing	85	0.98%
Pharmaceutical Manufacturing	632	7.27%
Hygiene	45	0.52%
Printing and Recording Media Reproduction	42	0.48%
Business Services	118	1.36%
Civil engineering and construction	224	2.58%
Furniture manufacturing	12	0.14%
Radio, television, film and video recording production industry	55	0.63%
Comprehensive Utilisation of Waste Resources	19	0.22%
Building decoration and other construction industries	47	0.54%
Mining auxiliary activities	28	0.32%
Real estate industry	418	4.81%
Wholesale industry	233	2.68%
Culture and art industry	21	0.24%
Manufacture of literary, educational, industrial, sports and recreational articles	20	0.23%
News and Publishing	82	0.94%
Non-ferrous metal smelting and rolling processing industry	285	3.28%
Non-ferrous Metal Mining and Processing	123	1.41%
Forestry	9	0.10%
Rubber and Plastic Products	82	0.94%
Water transport	137	1.58%
Water production and supply	59	0.68%
Automobile manufacturing	222	2.55%
Fishing industry	10	0.12%
Coal Mining and Washing	153	1.76%
Gas Production and Supply	57	0.66%
Ecological protection and environmental management industry	73	0.84%
Telecommunications, radio and television broadcasting and satellite transmission services	53	0.61%
Electricity, heat production and supply industry	323	3.71%
Electrical machinery and equipment manufacturing	444	5.11%
Animal husbandry	46	0.53%
Leather, fur, feather and their products and footwear industry	19	0.22%
Petroleum Processing, Coking and Nuclear Fuel Processing Industry	70	0.81%
Oil and gas extraction industry	42	0.48%
Research and experimental development	8	0.09%
Rental and leasing industry	10	0.12%
Textile industry	90	1.04%
Textile, clothing and apparel industry	107	1.23%
Consolidation	50	0.58%
Air transport	73	0.84%
Loading and unloading handling and transport agency industry	6	0.07%
Computer, communications and other electronic equipment manufacturing	641	7.37%
Software and Information Technology Services	333	3.83%
General Equipment Manufacturing	237	2.73%
Paper and paper products industry	86	0.99%
Road transport	163	1.87%
Postal industry	24	0.28%

Table A3. *Cont.*

Industry	Freq	Percent
Wine, Beverage and Refined Tea Manufacturing	205	2.36%
Fabricated metal products	103	1.18%
Railway, ship, aerospace and other transport equipment manufacturing industry	179	2.06%
Railway transport	38	0.44%
Retail trade	243	2.79%
Non-metallic Mineral Products	222	2.55%
Food Manufacturing	102	1.17%
Ferrous metal smelting and rolling processing industry	183	2.10%
Ferrous Metal Ore Mining and Processing	9	0.10%
Total	8695	100%

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