

Study on The Influence of Green Credit Policy on The Stock Price Synchronicity of Enterprise

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Abstract. Stock price synchronicity is an important indicator reflecting the information efficiency of the capital market. In order to effectively reduce stock price synchronicity, this paper is based on the data of Chinese A-share listed enterprises from 2008 to 2020, and takes the implementation of *the Green Credit Guideline* in 2012 as the natural experiment. This paper discusses the relationship between green credit policy and stock price synchronicity of high-polluting enterprises and its inner mechanism by building a DID model. According to the baseline regression, green credit policy can significantly reduce the stock price synchronicity of enterprises. The mechanism verification finds that this impact is due to the promotion of enterprise information disclosure driven by green credit policies and the mitigation of financing constraints. Heterogeneity analysis shows that green credit policy has a more significant impact on stock price synchronicity of enterprises that are with more analysts' attention, in highly competitive industry, larger and state-owned. This study complements the discussion on the factors affecting the stock price synchronicity, and provides valuable thinking for reducing the stock price synchronicity and promoting the healthy development of Chinese capital market.

Keywords: Green credit policy; stock price synchronicity; difference-in-differences model; information disclosure; financing constraints.

1. Introduction

The stock price synchronicity reflects the correlation between the change of individual stock price and the average change of the market, which is manifested as the phenomenon of "simultaneous rise and fall" in the market. Due to the immaturity and imperfection of the current Chinese capital market and the lack of disclosure of enterprise-specific information, traders blindly chase up and down, which makes the enterprise's stock price seriously affected by market fluctuations and shows a high price synchronicity. It further weakens the price transmission mechanism of the capital market, and intensifies the information asymmetry between investors and enterprises, and may increase the risk of stock price collapse of enterprises. Therefore, the research on the influencing factors and mechanism of stock price synchronicity is helpful to provide the focus of management, and has certain theoretical and practical significance for reducing the stock price synchronicity and promoting the healthy development of Chinese capital market.

At present, many scholars have studied stock price synchronicity from different perspectives. In terms of enterprise characteristics, scholars have discussed the impact of information transparency, the shareholding ratio of institutional investors and the largest shareholder, the participation of minority shareholders in enterprise decision-making, and the quality of accounting information on stock price synchronicity (Hutton et al., 2009; Wang et al., 2009; Shen et al., 2021; Zhou, 2014; Jin, 2010). Some scholars have studied the external environment, such as the relationship between political relations, news media reports, analyst tracking, government regulation, tax collection and management and the stock price synchronicity (Tang et al., 2011; Huang and Guo, 2014; Chan and Hameed, 2006; Zhou et al., 2016; Gu et al., 2016; Cai et al., 2022).

The Green Credit Guideline (hereinafter referred to as *the Guideline*) is a government policy to promote the green development of enterprises by setting up green credit, which has a series of economic impacts on enterprises. First, the promulgation of *the Guideline* has directly affected the investment and financing behavior of enterprises. Green credit policy can inhibit the financing of high-polluting enterprises (Ding, 2019), increase the financing cost of such enterprises (Liu et al.,

2019), and reduce their excessive investment behavior by adjusting the debt maturity structure of high-polluting enterprises (Yang, 2018). Second, *the Guideline* can affect the operation, management and green development of enterprises. Relevant studies have found that highly polluting enterprises, influenced by green credit policy, have relatively increased earnings management activities, accelerated capital structure adjustment, and significantly improved environmental and social responsibility (Yu and Cao, 2021; Ning and Shi, 2021; Si and Cao, 2022), and encourage high-polluting enterprises to carry out green innovation transformation and improve innovation performance (Liu, 2020; Wang et al., 2021; Tian et al., 2022; Hu et al., 2022). In addition, some scholars have analyzed the effects of *the Guideline* on enterprises' total factor productivity, M&A performance, and labor income share (Liu et al., 2022; Wang et al., 2021; Fan and Li, 2022). Based on the above analysis, this paper finds that few scholars have studied the relationship between green credit policy and the stock price synchronicity of enterprises.

Therefore, based on *the Guideline* issued by former China Banking Regulatory Commission in 2012, this paper constructs a DID model to evaluate the impact of green credit policy taking *the Guideline* as an example on the stock price synchronicity of enterprises, and further identifies the possible inner mechanism. The contribution of this paper may have the following points: First, it enriches the research on the influencing factors of stock price synchronicity. Existing studies have analyzed stock price synchronicity based on the characteristics of enterprises themselves and the external supervision environment. Based on the perspective of government fiscal policy, this paper explores the impact of green credit policy on the stock price synchronicity of enterprises, making up for the lack of research on the external influencing factors of stock price synchronicity. Secondly, in the study of the impact of green credit policy on the capital market, only the risk of stock price crash is discussed (Zhang and Jiang, 2023). This paper supplements the effect of the policy implementation of *the Guideline* from the perspective of stock price synchronicity. Furthermore, through empirical tests, this paper puts forward the mechanism framework of the influence of green credit policy-information disclosure, financing restraint-stock price synchronicity, and clarifies the heterogeneity of *the Guideline* in terms of analyst tracking, industry competition, enterprise scale, and property right nature. Finally, this paper draws a conclusion that green credit policies can reduce the stock price synchronicity of enterprises, which proves a new path for government behavior to affect enterprise management and provides a theoretical basis for improving the phenomenon of "simultaneous rise and fall" in the capital market.

2. Theoretical Analysis

2.1 The Influence and Mechanism of Green Credit Policy on Stock Price Synchronicity

Stock price synchronicity reflects the degree of correlation between the stock price of a single enterprise and the stock price of the whole market. When enterprises hide their own information, external investors will be at an information disadvantage. When the cost of information acquisition is higher than the expected return, investors will give up collecting the enterprise's characteristic information and turn to the average value level of the capital market to judge the price change of the enterprise. Therefore, information asymmetry results in the phenomenon that enterprise stock prices rise and fall at the same time as market stock prices (Li and Myers, 2006). The information asymmetry between investors and enterprises is usually caused by subjective and objective factors. At the subjective level, some enterprises intentionally hide the real information of enterprises in order to obtain good news, or try to cover up the disclosed negative news, which makes it difficult for investors to make an objective judgment on the enterprise, thus leading to the "Herd Effect" of stock market investment; There are also some enterprise executives out of professional status, salary and private interests and other considerations, having the motivations to hide bad news, blocking the transmission and use of internal information (Li and Myers, 2006). On the objective level, it is caused by the lack of reliability of investors' access to information channels, the low comprehensibility of listed

enterprises' annual reports, and the different ability of investors to interpret information (Li and Lu, 2022; Sun, 2004; Li and Zhu, 2011), making information ineffective.

In view of the above two causes of information asymmetry, green credit policy can cause internal and external pressure on enterprises, and solve the problem of information asymmetry from the subjective and objective perspective, thereby reducing the stock price synchronicity. First, from the perspective of enterprise internal power to analyze. *The Guideline* pays attention to the environmental performance of enterprises and requires banks to issue credit based on this evaluation index, thus forcing enterprises to take the initiative to carry out green transformation (Wang et al., 2021). At the same time, high-polluting enterprises are encouraged to win the trust of financial institutions and strive for more green credit by increasing the independent disclosure of positive information, so as to alleviate the financing constraints after the promulgation of the policy. Second, from the perspective of external supervision. Article 15 of *the Guideline* states: "Banking financial institutions shall strengthen credit due diligence, and clarify the content of environmental and social risk due diligence according to the industry and regional characteristics of customers and their projects, to ensure that the investigation is comprehensive, in-depth and detailed. When necessary, it can seek the support of qualified and independent third parties and relevant authorities ", where environmental and social risks refer to "the environmental and social hazards and related risks that customers of banking financial institutions and their important affiliates may bring to the environment and society in the construction, production and business activities". Therefore, as a national policy guidance, *the Guideline* require financial institutions, rating agencies and investors to pay more attention to the performance of enterprises in terms of green development, and increase the investigation and audit of enterprises' green performance. Objectively, it improves the degree of mining and disclosure of enterprise characteristic information, alleviates the problem of information asymmetry between investors and enterprises, and reduces the synchronicity of enterprise stock prices.

It can be seen that green credit policy can improve the high stock price synchronicity of enterprises by improving the transparency of enterprise information and removing the dilemma of financing constraints. Based on the above discussion, this paper proposes the following hypotheses:

H1: The implementation of green credit policy can reduce the stock price synchronicity of enterprises.

H2a: Green credit policy reduces stock price synchronicity by encouraging enterprises to increase the information disclosure.

H2b: Green credit policy reduces stock price synchronicity by easing the financing constraints of enterprises.

2.2 Heterogeneity Analysis of The Influence of Green Credit Policy on Stock Price Synchronicity

For enterprises affected by different external environment and different intrinsic characteristics, the effect of green credit policy on stock price synchronicity is different. First, in addition to having high professional quality and being able to deeply dig and interpret the information disclosed by enterprises, securities analysts also have rich channels of information dissemination, which can play a bridge role between the enterprise and the outside world (Pan et al., 2011), and timely convey the enterprise's characteristic information to rating agencies and investors, thus improving the efficiency of reducing information asymmetry. Therefore, when affected by government behaviors and policies, the changes in stock price synchronicity of enterprises that receive high attention from analysts will be more significant (Chen and Yao, 2018). Second, Johnson et al. (2000) found that in the case of high competitive pressure in the product market, enterprises tend to minimize information asymmetry to increase external financing. Therefore, for enterprises with a high degree of competition in the industry, after being affected by green credit policy, these enterprises will have stronger motivation to improve enterprise information transparency than other enterprises with lower competitive pressure, and the reduction effect of stock price synchronicity is more obvious. Third, Zheng (2007) believes that large-scale enterprises have stronger commitment to social responsibility and stronger ability to

fulfill social responsibility. Tang et al. (2006) also found that the level of environmental information disclosure was positively correlated with the scale of enterprises. Whether affected by external attention pressure or their own subjective motivation, large-scale enterprises will actively respond to policy requirements, actively promote environmental protection concepts, and seek transformation. Fourth, compared with non-state-owned enterprises, state-owned enterprises have special social and political responsibilities, including the active implementation of national economic policies (Xu and Zou, 2011). Therefore, after the promulgation of the green credit policy, state-owned enterprises will take the lead in carrying out green reform and disclose relevant information in a timely manner. Therefore, green credit policy has a more significant impact on the stock price synchronicity of these enterprises. Based on the above analysis, this paper proposes hypothesis H3:

H3: The green credit policy has a stronger inhibitory effect on the enterprises' stock price synchronicity which with more attention of analysts, in the more competitive industry, having larger scale and state-owned.

3. Research Design

3.1 Sample Selection and Data Source

This paper takes Chinese A-share listed enterprises from 2008 to 2020 as the initial sample, and the relevant data of enterprises are all from the CSMAR database. In order to ensure the accuracy of the results, the initial data were processed as follows: the listed enterprises in the financial industry were excluded, the ST, *ST and PT enterprises were excluded, and the enterprises with missing key variable data were excluded. Finally, the annual panel data of 26,679 enterprises are obtained.

This paper refers to the practice of Pan et al. (2019) and according to the Classified Management List of Environmental Protection Verification Industries of Listed Enterprises published by the former Ministry of Environmental Protection in 2008 and the Guidelines for Environmental Information Disclosure of Listed Enterprises published by the former Ministry of Environmental Protection in 2010 to define high-polluting industries. According to the Guidance on Industry Classification of Listed Enterprises revised by the China Securities Regulatory Commission in 2012, the corresponding codes for highly polluting industries are B06, B07, B08, B09, C17, C19, C22, C25, C26, C28, C29, C30, C31, C32 and D44. Therefore, this paper identifies listed enterprises in the above 15 categories of high-pollution industries as enterprises restricted by green credit policy, as the experimental group; and the rest of the enterprises as a control group.

3.2 Model Construction and Variable Definition

In order to study the impact of *the Guideline* on the stock price synchronicity of enterprises, this paper constructs the following differential model:

$$SYN_{i,t} = \alpha_0 + \alpha_1 * Treat_i * Post_t + \beta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

1. Explained variables

The explained variable $SYN_{i,t}$ represents the stock price synchronicity of the listed enterprise i in the t year. This paper refers to the stock price synchronicity index constructed by Xu (2011) and uses the data calculated by CSMAR submarket circulation market average method for calculation.

2. Explanatory variables

Explanatory variable is the interaction term of $Treat$ and $Post$, where $Treat_i$ indicates whether enterprise i is an enterprise restricted by green credit policy, if it is, then $Treat_i$ is 1; if it is not, then $Treat_i$ is 0; $Post_t$ is a dummy variable of the implementation time of *the Guideline*. When t is greater than 2012, the value is 1, and when t is less than or equal to 2012, the value is 0.

3. Control variables

$X_{i,t}$ represents a series of control variables that may affect the synchronicity of a firm's stock price. With reference to relevant existing literature, this paper selected the following indicators as control variables: Asset-liability ratio (lev), return on total assets (ROA), market-to-book ratio (MB), Board

independence (*boardind*), largest shareholder ownership (*first*), enterprise age (*age*), earnings quality (*ABACC*), auditor governance (*big4*) and fixed assets ratio (*rofa*).

Table 1 Variable declaration

Variable type	Variable symbol	Variable definition
Explained variables	<i>SYN</i>	Stock price synchronicity (Submarket average method).
Explanatory variables	<i>Treat</i>	Enterprises restricted by green credit policy. When the value is 1, which indicates the experimental group; Otherwise, the value is 0, which indicates the control group.
moderating variables	<i>Post</i>	After 2012, the value is 1; Otherwise, the value is 0.
	<i>analyst</i>	ln(Number of analyst teams + 1)
	<i>HHI</i>	Listed industry Herfindahl Index
	<i>size</i>	ln(Total assets at year end)
	<i>soe</i>	Property rights. The value of state-owned enterprises is 1, the value of non-state-owned enterprises is 0.
Control variables	<i>ABACC</i>	Measured in absolute terms as discretionary accruals, where discretionary accruals are calculated using the revised Jones model.
	<i>age</i>	ln(Year of listing - 1)
	<i>big4</i>	Auditor from the domestic Big four accounting firms value 1, otherwise 0.
	<i>boardind</i>	Number of independent directors / Total number of board members
	<i>first</i>	The proportion of the largest shareholder
	<i>lev</i>	Total liabilities / Total assets
	<i>MB</i>	Market capitalization / Total assets
	<i>ROA</i>	Net profit / Total assets
	<i>rofa</i>	Fixed assets / Total assets

4. Empirical Result

4.1 Descriptive Statistics and Correlation Analysis

A descriptive statistical analysis of the variables was carried out in this paper, and the results are shown in Table 2. The average value of stock price synchronicity (*SYN*) is 0.47, the maximum value is 0.87, and the minimum value is 0.02, indicating that the stock price synchronicity of different enterprises is different. The mean value of the experimental variable (*Treat*) is 0.31, indicating that 31% of enterprises are restricted by green credit policy. The mean value of the time variable (*Post*) is 0.71, indicating that the samples after the implementation of the *Guideline* accounts for 71% of the total samples. The mean value of *Treat*Post*, as an explanatory variable, is 0.21, indicating that 21% of restricted enterprises' stock price synchronicity will be affected after the implementation of green credit policy. To sum up, both the explained variables and the explanatory variables in this paper have variability, and the data obtained are not too different from those in the existing literature. At the same time, the correlation coefficients between the control variables are all less than 0.5, indicating that there is no serious collinearity problem.

Table 2 Descriptive statistics of variables

Variable	Sample size	Mean value	Standard deviation	Minimum value	Maximum value	Median
<i>SYN</i>	26679	0.47	0.19	0.02	0.87	0.47
<i>Treat</i>	26679	0.31	0.46	0	1	0
<i>Post</i>	26679	0.71	0.45	0	1	1
<i>Treat*Post</i>	26679	0.21	0.41	0	1	0
<i>ABACC</i>	26679	0.07	0.07	0.00	0.44	0.05
<i>age</i>	26679	2.19	0.75	0.69	3.33	2.30
<i>big4</i>	26679	0.06	0.24	0	1	0
<i>boardind</i>	26679	0.37	0.05	0.31	0.57	0.33
<i>first</i>	26679	0.35	0.15	0.09	0.75	0.33
<i>lev</i>	26679	0.44	0.21	0.05	0.91	0.44
<i>MB</i>	26679	1.96	3.20	0.03	349.01	1.40
<i>ROA</i>	26679	0.04	0.06	-0.26	0.28	0.04
<i>rofa</i>	26679	0.22	0.17	0.00	0.70	0.19

4.2 Baseline Regression Result

In the process of baseline regression, in order to solve the endogeneity problem, this paper uses the Differences-in-Differences Method to regression, and the results are shown in Table 3. Column (1) shows the baseline regression results without adding control variables, and the regression coefficient of explanatory variables is significantly negative at the level of 1%. After adding control variables to column (2), the result is still significantly negative at the 1% level, but the significance of regression is improved; Column (3) indicates that after controlling a series of variables, firm fixed effect and year fixed effect are added, and the regression results are still significant. These results show that the implementation of *the Guideline* can significantly reduce the stock price synchronicity of enterprises, so hypothesis H1 passes the test.

Table 3 Baseline regression result

Variable	(1)	(2)	(3)
<i>Treat*Post</i>	-0.047*** (-16.54)	-0.059*** (-20.42)	-0.011** (-2.22)
<i>ABACC</i>		-0.009 (-0.55)	-0.052*** (-3.38)
<i>age</i>		0.017*** (9.97)	0.007 (1.19)
<i>big4</i>		0.061*** (11.62)	-0.006 (-0.50)
<i>boardind</i>		-0.016 (-0.70)	-0.004 (-0.13)
<i>first</i>		0.076*** (9.22)	0.011 (0.56)
<i>lev</i>		-0.007 (-0.85)	-0.084*** (-6.62)
<i>MB</i>		-0.005** (-2.53)	-0.004* (-1.79)
<i>ROA</i>		0.123*** (5.50)	-0.074*** (-2.93)
Constant	0.477*** (361.22)	0.402*** (35.47)	0.698*** (37.42)
Firm fixed effect	NO	NO	YES
Year fixed effect	NO	NO	YES
N	26679	26679	26679
R ²	0.010	0.046	0.209

Note: *, ** and *** are significant at the level of 10%, 5% and 1% respectively, and the values in parentheses are t-values. The meanings in the following table are the same.

4.3 Robustness Test

Although the results obtained by using the Differences-in-Differences Method in Table 3 above are significant, reflecting that the implementation of green credit policy reduces the stock price synchronicity of restricted enterprises, endogenous problems such as missing variables, measurement bias and the influence of enterprises' own factors cannot be completely excluded. Therefore, the following series of tests are carried out to ensure the reliability of the results.

1. Parallel trend test

The premise assumption of the validity of the Differences-in-Differences Method is the parallel trend assumption. Figure 1 shows the parallel trend of enterprises restricted by green credit policy from 2009 to 2015. The sample period is divided into pre-policy implementation (2009-2012) and after-policy implementation (2013-2015) with the year of promulgation of *the Guideline* as the boundary. It can be found that before the implementation of *the Guideline*, the coefficients are evenly distributed around 0, indicating that important variables are not omitted in the setting of the model. However, after the implementation of *the Guideline*, the coefficient is significantly higher than 0, indicating that the changes of enterprises' stock price synchronicity are entirely caused by the implementation of green credit policy. Therefore, the DID model constructed in this paper passes the parallel trend test.

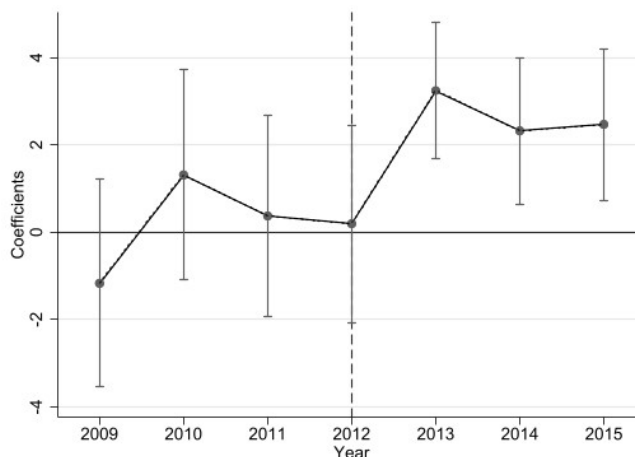


Fig. 1 Parallel trend test

2. Placebo test

To further enhance the robustness of the results, a placebo test is performed on the baseline regression results reported in column (3) of Table 3. The above regression process is repeated 500 times, and the probability density distribution diagram of the regression estimation coefficient is drawn. Figure 2 shows that the coefficients of the differential term in the experiment are centrally distributed around 0, indicating that the model established in this paper does not have serious missing variables and the core conclusion is reliable.

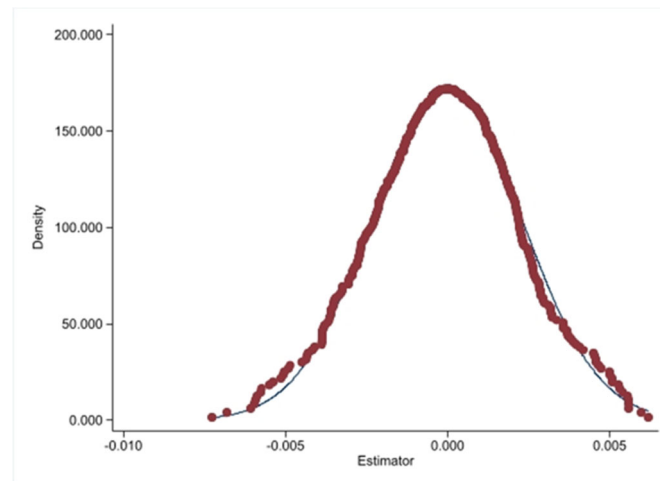


Fig. 2 Placebo test

3. Increased the fixed effect of cities and industries

Considering that the specific regulatory measures of green credit policy may be different in different regions or different industries, this paper adds fixed effects of cities and industries respectively on the basis of controlling firms and years. The regression results are shown in Table 4 (1). It is not difficult to find that the estimated coefficient is significantly negative and the regression results are still robust.

4. Change the explained variable

In order to further test the robustness of the results, this paper changes the calculation method of the explained variable *SYN*. *SYN1* and *SYN2* calculated by the sub-market total market value average method and the comprehensive market circulation market value average method respectively replace the share price synchronicity *SYN* obtained by the sub-market circulation market value average method, and conduct a regression again. The results are shown in columns (2) and (3) in Table 4. After replacing the explained variables, the conclusion that the implementation of green credit policy reduces the synchronicity of stock prices is still valid, verifying the rationality of hypothesis H1.

Table 4 Robustness test results

	<i>SYN</i> (1)	<i>SYN1</i> (2)	<i>SYN2</i> (3)
<i>Treat*Post</i>	-0.023*** (-5.64)	-0.009** (-1.75)	-0.015*** (-2.89)
Contronls	YES	YES	YES
Constant	0.647*** (38.89)	0.722*** (39.03)	0.645*** (35.20)
Firm fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
City fixed effect	YES	NO	NO
Industry fixed effect	YES	NO	NO
N	26654	26679	26679
R ²	0.276	0.191	0.229

5. Further Analysis

5.1 Mechanism Verification

According to the above analysis, on the one hand, the implementation of green credit policy may reduce the information asymmetry by increasing the information disclosure behavior of enterprises, thus reducing the stock price synchronicity of enterprises; On the other hand, it may reduce the stock

price synchronicity by easing the financing constraints of enterprises. In this regard, this paper refers to the practice of Wen et al. (2004) and further establishes the following two regression models on the basis of model (1) :

$$M_{i,t} = \alpha_3 * Treat_i * Post_t + \beta X_{i,t} + \mu_{i,t} \quad (2)$$

$$SYN_{i,t} = \alpha_0 + \alpha_1 * Treat_i * Post_t + \alpha_4 M_{i,t} + \beta X_{i,t} + \varepsilon_{i,t} \quad (3)$$

Among them, two mechanism variables are the degree of enterprise information disclosure and the degree of financing constraints. In this paper, the virtual variable of whether the annual report of listed enterprises discloses environment-related information is used to measure the information disclosure behavior of enterprises. If the annual report discloses environment-related information, it is recorded as 1. Or else, it is recorded as 0. As a measure of financing constraints, the SA index calculated by Hadlock et al. (2010) and Ju et al. (2013) is selected. In this paper, the two indicators are used as explained variables to regression the core explanatory variables, and the regression results are reported in Table 5. Column (1) indicates that the implementation of the green credit policy can enable enterprises to proactively disclose environment-related data in the enterprise's annual report, and it passes the significance test with a significance level of 1%. Column (2) further reports the conclusion that the increase in information disclosure significantly reduces the synchronicity of the enterprise's stock price. The regression results of column (3) are also established at the significance level of 1%, and the estimated coefficient is negative, indicating that green credit policy significantly reduces the degree of enterprise financing constraints. Moreover, according to the regression of column (4), the increase of SA index will significantly improve the stock price synchronicity of enterprises. Based on the above regression results, the two mechanisms of enterprise information disclosure behavior and financing constraint degree are established.

Table 5 Mechanism verification results

	<i>Disclosure</i> (1)	<i>SYN</i> (2)	<i>SA index</i> (3)	<i>SYN</i> (4)
<i>Treat*Post</i>	0.184*** (38.39)		-0.067*** (-19.94)	
<i>Disclosure</i>		-0.042*** (-15.43)		
<i>SA index</i>				0.179*** (37.26)
Contronls	YES	YES	YES	YES
Constant	0.721*** (32.73)	0.429*** (36.29)	-3.621*** (-257.22)	1.048*** (48.64)
Firm fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
N	26679	26679	26679	26679
R2	0.044	0.040	0.273	0.077

5.2 Heterogeneity Analysis

The moderating variables in this paper include four groups of variables: analyst attention (*analyst*), industry competition degree (*HHI*), enterprise size (*size*) and enterprise property right nature (*soe*). Based on model (1), the formula after adding adjustment variables is as follows:

$$SYN_{i,t} = \alpha_0 + \alpha_1 * Treat_i * Post_t * Z + \beta X_{i,t} + \varepsilon_{i,t} \quad (4)$$

1. Heterogeneity analysis based on analyst tracking

Analysts' tracking and interpretation of enterprises will largely change investors' decisions, which in turn will affect the enterprise's stock price. According to model (4), this paper added the interaction term *Treat*Post*analyst* between analyst attention and the dual-difference term. The results are reported in Table 6. Column (1) shows that the regression coefficients of the interaction term and the core explanatory variables are both significantly negative, indicating that the more enterprises

followed by analysts, the greater the impact of green credit policy on their stock price synchronicity. The main reason may be that the more analysts there are, the more characteristic information disclosed by enterprises. The information changed by enterprises under the influence of policies can be transmitted to the market in a timely manner, so that investors can have a more accurate judgment on the stock price of these enterprises, and thus reduce the phenomenon of "rising and falling" of the enterprise's stock price along with the whole stock market.

2. Heterogeneity analysis based on industry competition degree

In the case of different levels of industry competition, enterprises will consider whether to use information disclosure as a means of competition, so the level of industry competition may affect the relationship between other factors and the enterprise's stock price. Column (2) of Table 6 reports the regression results of the interaction term $Treat*Post*HHI$ and the explained variables. The regression coefficient of the interaction term is significantly positive, indicating that the smaller the HHI index is, that is, the greater the industry competition degree is, the more significant the relationship between green credit policy and enterprise stock price synchronicity. It may be because enterprises in more competitive industries will actively disclose enterprise information in order to win the favor of investors. Therefore, after the implementation of the green credit policy, these enterprises will also disclose information in a timely manner to reduce information asymmetry and reduce the synchronicity of stock price.

3. Heterogeneity analysis based on enterprise scale

Enterprises of different sizes have different information disclosure degrees. The higher the information transparency, the lower the stock price synchronicity. In this paper, the interaction term ($Treat*Post*size$) between enterprise size and DID term is also added according to model (4). Column (3) of Table 6 shows that the coefficient of interaction term is significantly negative at the level of 1%, which proves that green credit policy has a more obvious effect on the reduction of stock price synchronicity of large enterprises. Large enterprises often attach importance to the disclosure of information, so they may take the initiative to disclose relevant environmental information after the promulgations of policies. Investors can get more judgment basis, so the stock price synchronicity of large enterprises will be more significantly reduced.

4. Heterogeneity analysis based on property rights

After the promulgation of national policies, the reaction of state-owned enterprises and non-state-owned enterprises is often different. In this paper, the interaction term between the property right dummy variable and the DID term ($Treat*Post*soe$) is used to regression the stock price synchronicity, and the results in column (4) of Table 6 are obtained. This interaction term is significantly negative which is same as the result in the benchmark regression, indicating that property rights can indeed affect the effect of policy on the stock price synchronicity of enterprises. State-owned enterprises usually respond positively to national policies and can play a guiding role in the enterprise, so green credit policy will have a more significant impact on the synchronicity of state-owned enterprises' stock prices.

Table 6 Heterogeneity analysis results

	Tracking (1)	Competition (2)	Scale (3)	Ownership (4)
$Treat*Post$	-0.037*** (-10.01)	-0.070*** (-17.08)	-0.016*** (-4.44)	-0.038*** (-12.35)
Z	0.003*** (16.40)	0.062*** (6.12)	0.038*** (30.81)	0.080*** (26.31)
$Treat*Post*Z$	-0.003*** (-14.11)	0.186*** (5.25)	-0.003*** (-22.93)	-0.044*** (-10.09)
Contronls	YES	YES	YES	YES
Constant	0.404*** (35.42)	0.400*** (35.24)	-0.324*** (-12.25)	0.421*** (38.50)
Firm fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
N	19240	26668	26679	26679
R2	0.073	0.050	0.095	0.071

6. Conclusions and Implications

Based on the data of A-share listed enterprises from 2008 to 2020, this paper constructs a quasi-natural experiment with the implementation of *The Green Credit Guideline*, and uses the DID model to test the impact of green credit policy on the stock price synchronicity of highly polluting enterprises. The results remain valid after robustness tests such as parallel trend test and placebo test. This paper also studies the moderating effects of information disclosure and financing constraints, and discusses the degree of influence of green credit policies on the synchronicity of enterprise stock prices under different analyst attention levels, industries with different competition levels, different scales and different property rights. The results show that: (1) the implementation of green credit policy can significantly reduce the stock price synchronicity of enterprises; (2) Mechanism test shows that green credit policy further reduces the stock price synchronicity of enterprises through two mechanisms: increasing enterprise information disclosure and easing enterprise financing constraints; (3) Further heterogeneity analysis shows that for enterprises with higher analyst attention, more intense industry competition, larger enterprise scale and state-owned enterprises, green credit policy has a more significant effect on reducing the synchronicity of their stock prices.

The research of this paper has the following policy implications and implications: (1) There is an action mechanism between green credit policy and enterprise capital market performance. The government can give full play to the positive incentive effect of green financial tools on the environmental protection awareness of enterprises and the motivation of green transformation, and promote the active disclosure of information by high-polluting enterprises, thus reducing their stock price synchronicity and promoting the benign development of Chinese capital market. (2) This paper finds that analyst tracking can strengthen the effect of green credit policy on the stock price synchronicity of enterprises, so strengthening the supervision of external analysts on high-polluting enterprises and improving the independence of analysts will help further reduce the stock price synchronicity of enterprises and promote the improvement of capital market efficiency. (3) This paper also concludes that the green credit policy has a stronger effect on enterprises in highly competitive industries, which also confirms the advantages of free market competition mechanism. Therefore, the state should further optimize the market economy system, which contributes to the sustainable development of Chinese capital market.

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