Do Green Credit Policies Reshape Corporate Capital Structure? Evidence from China

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Abstract. In 2012, the China Banking Regulatory Commission issued the "Green Credit Guidelines" aimed at guiding bank credit resources away from industries with higher environmental risks. Based on this background, this article explores whether the policy has significantly changed the debt financing choices of Chinese listed companies. The study is based on panel data at the enterprise level and designed using the double difference method to compare heavily polluting industry enterprises and non-heavily polluting industry enterprises before and after policy implementation. The policy coefficients in both models are negative, indicating that the policy may have suppressed debt financing for heavily polluting enterprises. But after controlling for profitability and company size, the absolute value of the coefficient decreases and is not statistically significant. The results indicate that the leverage ratio of affected enterprises may have decreased, but the small sample does not support clear causal inference. This article reveals the potential impact of environmental loan rules on corporate financing decisions and points out the data limitations that future research needs to overcome.

Keywords: Green Credit, Corporate Leverage, Difference-in-Differences, Green Finance.

1 Introduction

Climate change and environmental damage have led many governments to use financial policy as part of their environmental response [1]. Green finance is one such tool because it links the allocation of capital to environmental goals [2]. In 2012, China issued the Green Credit Guidelines. The policy asked banks to be more cautious when lending to heavily polluting industries and to support firms with better environmental performance. These rules can affect the amount of debt firms can obtain and the price they pay for it [3].

Earlier studies mainly examine how environmental rules affect emissions, innovation, productivity, and other operating choices [4]. A separate corporate finance literature studies leverage through factors such as profitability, assets, and access to outside funding. Less attention has been given to the link between these two areas. In particular, it is still useful to ask whether a credit policy designed for environmental purposes also changes capital structure. China is a relevant setting because banks

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remain an important source of finance and policy has a strong role in credit allocation [3].

This paper studies whether the Green Credit Policy is associated with lower leverage among firms in heavily polluting industries. The empirical design uses a Difference-in-Differences (DID) model. Firms in pollution-intensive industries form the treatment group, while firms in other industries form the comparison group. If banks tightened credit for environmentally risky borrowers after 2012, treated firms should show a larger fall in leverage [5]. The estimates are used to assess this prediction, while the limits of the small sample are kept in view.

The paper makes three modest contributions. It first places a corporate finance question inside the study of environmental regulation. It then provides firm-level evidence from China, where green credit is implemented mainly through the banking system. Finally, it discusses financing constraints and borrowing costs as possible channels, although the available data do not allow direct tests of those channels. The main contribution is therefore an initial empirical look at how green lending rules and capital structure may be connected [5-7].

2 Methodology

The sample contains panel observations for Chinese listed companies drawn from a stock market database. It includes two pre-policy years, 2009 and 2010, and four later years, 2022 to 2025. Financial companies are excluded because their balance sheets and leverage measures differ from those of non-financial firms. Observations with missing required values are also removed. Firms are grouped by industry pollution intensity. Companies in heavily polluting industries are treated as more exposed to the Green Credit Policy and enter the treatment group; the remaining firms form the control group.

Corporate leverage is the dependent variable and is calculated as total liabilities divided by total assets. Treat equals one for a firm in a heavily polluting industry. Post equals one for an observation after 2012. Their interaction, Treat × Post, is the main variable of interest. A negative coefficient would mean that leverage fell more for treated firms than for control firms after the policy. The reported controlled model adds return on assets (ROA) and firm size, the two control variables available for the final sample.

This paper estimates the policy relationship with a Difference-in-Differences model. The 2012 guidelines provide the policy date, and firms in polluting industries are assumed to have greater exposure. The design compares the change in leverage across the two groups rather than relying only on their level differences.

The baseline model is specified as follows:

$$Leverage_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 Post_t + \beta_3 TreatPost_{it} + \beta_4 ROA_{it} + \beta_5 Size_{it} + \varepsilon_{it} \quad (1)$$

(where Leverage_{it} is the leverage ratio of firm i in year t, and the coefficient on TreatPost_{it}captures the policy effect.)

Firm fixed effects absorb characteristics that do not change over time, while year fixed effects capture shocks shared by all firms in a given year. The coefficient on Treat × Post measures the additional post-policy change for the treated group. A DID interpretation also requires similar pre-policy trends in the two groups. Because this sample has only two pre-policy years, that assumption cannot be tested with much precision and should be treated as an important limitation.

Two channels could explain a change in leverage. First, banks may apply stricter credit standards to firms with high environmental exposure. Such firms could then have less access to external debt. Second, lenders may charge them a higher interest rate because regulation creates compliance and transition risks. In a larger dataset, the first channel could be studied with a financing-constraint measure such as the SA index, and the second with interest expense divided by total debt.

The present sample is not large enough to test these channels directly. The empirical analysis therefore focuses on leverage and uses ROA and firm size to capture basic differences in profitability and scale. Financing constraints and the cost of debt remain possible explanations rather than tested mechanisms.

3 Results

The regression results are easier to read after first looking at the raw leverage patterns. Figure 1 plots leverage over time for each of the five firms. It gives a simple view of how treated and control firms moved across the observed years, but it does not by itself identify a policy effect.

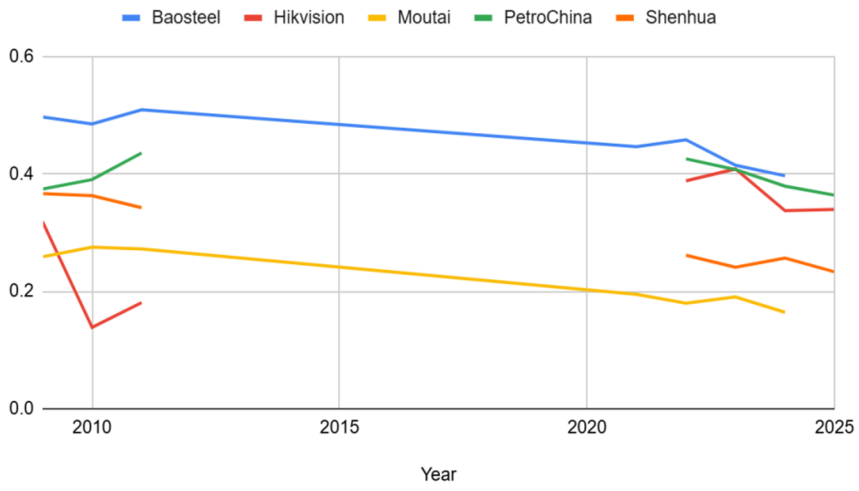


Fig. 1. Leverage Trends by Firm

Figure 1 shows clear differences across the five companies. Baosteel, PetroChina, and Shenhua, which are in heavily polluting industries, often have higher leverage than some firms in the control group. Leverage falls in several treated firms in the later period, although the pattern is not shared by every company. The figure therefore supports a negative relationship in some cases, but it also shows why firm-specific factors need to be considered.

Figure 2 summarizes the same data at the group level. It reports average leverage for treated and control firms in the pre-policy and post-policy periods. This comparison is more direct than the firm-by-firm plot, though it is still only descriptive.

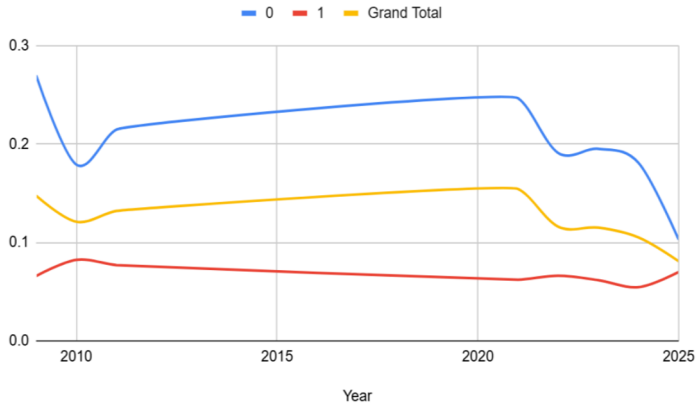


Fig. 2. Average Leverage by Treatment Status

Average leverage is higher in the treatment group, but the gap becomes smaller in the post-policy observations. That movement is consistent with the idea that green credit rules placed more pressure on heavily polluting firms. It is not conclusive, however. The sample contains only five firms and very few observations before 2012, so one or two firms can have a large effect on the group average.

Table 1 reports the DID estimates. Model 1 includes Treat, Post, and their interaction. Model 2 adds ROA and firm size. Comparing the two models shows how the estimated policy coefficient changes after basic firm characteristics are taken into account.

Table 1. Difference-in-Differences regression results.

Variable	Model 1	Model 2
Treat	0.1774***	0.0224
Post	0.0346	-0.0106
TreatPost	-0.0957	-0.0445
ROA		-0.885***
Size		-0.0033
Observations	35	35
R-squared	0.4181	0.629

In Model 1, the coefficient on TreatPost is -0.0957. In practical terms, the estimate corresponds to a 9.57 percentage point relative decline in leverage for treated firms after the policy date. The sign matches the main prediction of the paper.

The estimate is not statistically significant at the conventional 10 percent level: its p-value is 0.104. It is close to that threshold, so the result may be described as suggestive, but it should not be presented as firm evidence. Model 1 also leaves out firm conditions that may be related to both industry status and leverage.

Model 2 adds ROA and firm size. After these controls are included, the TreatPost coefficient remains negative but falls in absolute size to -0.0445. The point estimate now implies a 4.45 percentage point relative decline in treated firms' leverage. The smaller value suggests that profitability and scale explain part of the difference seen in Model 1.

The Model 2 coefficient is not statistically significant at the 10, 5, or 1 percent levels. This change matters for the interpretation. The negative sign is stable across the two specifications, but the size of the estimate is sensitive to the controls. Model 1 may partly capture pre-existing differences between the two groups, especially differences related to profitability. Once ROA and size are held constant, the remaining policy estimate is smaller and imprecise.

Taken together, the regressions do not establish a clear causal effect. They show a negative association between policy exposure and leverage, but the controlled estimate is weak in statistical terms. The results are best read as preliminary. A larger sample, more firms, and additional years before 2012 would make the DID comparison more credible and improve the precision of the estimates.

4 Discussion

The estimates point in the expected direction: firms in heavily polluting industries have a larger post-policy decline in leverage than the control firms. The evidence is not strong enough for a definite causal conclusion, yet the pattern is still useful. It suggests

that an environmental policy delivered through banks can affect financing choices as well as production decisions. When banks reduce lending to environmentally risky borrowers, those firms may have to use less debt or seek other sources of finance.

Banks may have viewed firms in oil, coal, and steel as riskier after the Green Credit Guidelines. These industries face environmental rules, transition costs, and possible future compliance expenses. Bolton et al. explain how climate-related risk can enter asset values and credit risk and can eventually threaten financial stability [2]. A cautious lending response would therefore be understandable even when a borrower remains profitable in the short run. Lower leverage among treated firms is consistent with this explanation, although the present analysis does not observe banks' lending decisions directly.

The result is also related to work on green credit and corporate deleveraging [8]. If banks screen high-polluting borrowers more closely, these firms may receive smaller loans, face tougher terms, or decide not to borrow. Environmental exposure may also raise default concerns [9]. In the current regressions, the TreatPost coefficient becomes smaller after ROA and firm size are added. This suggests that part of the original group difference comes from firm conditions rather than from the policy alone.

There are several reasons for the weak statistical result. Leverage depends on profitability, firm size, asset structure, growth plans, industry conditions, and the availability of credit. The sample cannot control for all of these factors. ROA is especially important in Model 2, and profitable firms may use retained earnings instead of debt. The change between the two models shows that a simple treated-versus-control comparison can overstate the part associated with green credit policy.

Environmental rules can lead firms to change more than their emissions. Porter and van der Linde argue that well-designed regulation may encourage efficiency and innovation rather than only impose costs [6]. Evidence on China's green credit policy also shows that financing behavior can respond to environmental lending rules [4]. For a heavily polluting firm, the response may include lower debt, tighter investment choices, or more spending on cleaner production. This paper observes only the leverage outcome, so it cannot separate these possible responses.

More broadly, green finance changes how environmental information is used in financial decisions [1]. Firms with poor environmental performance may face less favorable credit access, while green credit can encourage heavily polluting firms to transform or diversify their operations [10]. Goss and Roberts also find that weaker corporate social responsibility performance can be linked to higher bank loan costs [5]. These studies give plausible context for the negative coefficient found here, but they do not remove the limitations of this small sample.

5 Conclusion

This paper examines whether China's 2012 Green Credit Guidelines changed the capital structure of heavily polluting firms. The DID estimates compare those firms with a small control group before and after the policy. TreatPost is negative in both models. The coefficient is -0.0957 in the baseline model and -0.0445 after ROA and firm size

are included. The second estimate is not statistically significant. The results therefore suggest a possible fall in debt use among exposed firms, but they do not prove that the policy caused the change.

The analysis still has a useful policy implication. Lending rules may influence corporate leverage when banks treat environmental exposure as a credit risk. The strength of that response is likely to differ across firms, industries, banks, and stages of policy enforcement. Future research should use a larger and more balanced panel with more pre-policy and post-policy years. It should also test financing constraints, borrowing costs, cash flow, and asset tangibility directly. Better data on these channels would allow a clearer estimate of how green credit affects capital structure during China's transition toward a more sustainable economy.

References

1. Zhang, D., Zhang, Z., & Managi, S. (2019). A bibliometric analysis on green finance: Current status, development, and future directions. Finance Research Letters, 29, 425–430.
2. Bolton, P., Després, M., Pereira da Silva, L. A., Samama, F., & Svartzman, R. (2020). The green swan: Central banking and financial stability in the age of climate change. Bank for International Settlements.
3. He, L., Zhang, L., Zhong, Z., Wang, D., & Wang, F. (2019). Environmental regulation, renewable energy, and green credit. Journal of Cleaner Production, 226, 1082–1095.
4. Chai, S., Zhang, K., Wei, W., Ma, W., & Abedin, M. Z. (2022). The impact of green credit policy on enterprises' financing behavior: Evidence from Chinese heavily-polluting listed companies. Journal of Cleaner Production, 363, 132458.
5. Goss, A., & Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. Journal of Banking & Finance, 35(7), 1794–1810.
6. Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. Journal of Economic Perspectives, 9(4), 97–118.
7. Liu, X., Wang, E., & Cai, D. (2019). Green credit policy, property rights and debt financing: Quasi-natural experimental evidence from China. *Finance Research Letters, 29*, 129–135.
8. Li, C., Wang, Y., Sun, W., Yu, Y., & Ding, Y. (2024). Green credit policy and corporate deleveraging: Evidence from China. Finance Research Letters, 66, 105694.
9. Qiu, Q., & Yu, J. (2024). Green credit policy and default risk of the heavy polluting corporations. Journal of Cleaner Production, 455, 142291.
10. Li, R., & Chen, Y. (2022) The influence of a green credit policy on the transformation and upgrading of heavily polluting enterprises: A diversification perspective Economic Analysis and Policy, 74 (2022), 539-552.

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