Journal of Applied Economics and Policy Studies Vol.18 Issue 11 EWA Publishing
Available Online: 2 December 2025 DOI: 10.54254/2977-5701/2025.30092

# Dynamic response of external audit quality to green finance policy signals

***Runrun Lei***

University of Bristol, Bristol, United Kingdom

leirunrun02363@outlook.com

**Abstract.** The literature on green finance has grown rapidly in recent years with the inclusion of global dual-carbon targets, and policy signals are making significant contributions to the field and play an essential institutional driving force in the era of green capital markets. Green finance policies not only serve to regulate corporate investments and environmental disclosures but can also affect auditors' risk perception and judgment. The current study takes data from China's total A-share listed companies from 2013 to 2024 to set up the green finance policy signal intensity index and adopt event studies and dynamic panel regression methods to examine dynamic reactions to policy signal intensity in external audit quality. The results show that there is substantial positive correlation between policy signal intensity and audit quality with stronger correlations in heavily polluted industries and state-owned enterprises, thereby demonstrating that policy pressure promotes auditors' independence and prudence in terms of market expectations and risk identification mechanisms. The current study explains the dynamic interaction between policy signals and market disciplines in auditors' reactions and provides empirical evidence for formulating green audit standards and green regulation implementation and management guidance for related regulators in green finance policy implementation and management.

**Keywords:** green finance, external audit quality, policy signal, dynamic response, event study

## 1. Introduction

The current trend in the last decade has been the promotion of sustainable finance, with green finance policies being integrated at the core of global economic governance bodies and mechanisms. Ever since the adoption of the “dual-carbon targets” policy in China, there has been an integrated policy signal-driven financial structure evolved in terms of green credit policies, green bonds, and green investments being adopted in the market. These policies not only help in shaping the funds and investments of companies but even go on to affect external governance in terms of disclosure requirements and pressure to comply with the policies [1]. These policies in turn serve as one of the key mechanisms in terms of trust-building and risk management, with external audit mechanisms being one aspect where market responsiveness to green policy signals can be measured in terms of audit quality. The current literature has been focused on macroeconomic or market-related aspects yet has not covered the microeconomic aspects in terms of green finance policies affecting external audit governance mechanisms in terms of dynamic behavioral aspects [2], with industry-related variations and different ownership structures affecting audit mechanisms in terms of heterogeneity in market-related studies not explored well in current literature.

## 2. Literature review

### 2.1. Green finance policy and market behavior

The current literature emphasizes that green finance policies play the role of a pivot between green regulation and the market by changing the logics of capital flow and risk management in terms of policy orientation and signaling [3]. The announcement of policies can improve investors' perception of green risks, nudging capitals to green and sustainable projects, thereby triggering spillover and repricing effects. However, the literature depicts different perceptions on the efficacy and signal transmission of policy signals, where policy consistency is viewed as essential to market confidence, whereas policy volatility can diminish confidence in policies on the investors' side [4]. The structural variations in market players, influenced by market diversification, result in variations in the speed of market reactions in risk-sensitive sectors such as the environment.

### 2.2. Determinants of external audit quality

The quality of external auditing, being an essential determinant of the reliability of financial information, is influenced by firm-specific determinants, client attributes, and governance factors. The large auditing firm, with better resources and discretion, is expected to exercise higher independence, while in smaller auditing companies, there might be low professional skepticism because of dependency on clients and pecuniary motivations [5]. Due to the rising importance of ESG and sustainability, there has been an increased responsibility of audit work to include evaluation of environmental risks in identifying the correctness of finances. Certain theories postulate that in audited companies, external forces can enhance auditors' risk aversion via the reputation effect, resulting in less optimistic audit opinions, while others state that fee rivalry can counteract it [6].

### 2.3. Coupling mechanisms between policy and auditing

The signaling effects of green finance policies indirectly affect auditors through the recalibration of corporate attitudes toward environmental responsibility and disclosure practices. When the level of policy signaling is reinforced, corporate accountability with respect to the environment is expected to increase, forcing auditors to reevaluate compliance risk and distortive potential, thereby increasing the level of procedural rigor [7]. There is evidence that policy orientation stimulates a shift in the demand side of auditing, in that risk companies require better auditors to keep them legitimate, while auditors factor policy stress in risk pricing [8], but in scenarios where there is lax policy enforcement, signal transmission can be impaired.

## 3. Methodology

### 3.1. Sample and data

This study examines non-financial A-share listed firms in China from 2013 to 2024, a period that captures the full trajectory of the green finance policy framework from its inception to maturity. The data consist of three main categories [9].

(1) The firm-level data, which is the first category, contains opinions on audits, fees associated with audits, firm size, leverage, and profitability data gathered from CSMAR/WIND databases and checked with the companies' yearly reports for consistency.

(2) The second category, policy text data, is drawn from publicly available documents issued by the National Development and Reform Commission (NDRC), the People's Bank of China (PBOC), and the Ministry of Ecology and Environment. Representative policies include the Green Credit Guidelines (2013), Catalogue for Green Bond Supported Projects (2015 and revised 2021), Guidelines for Establishing the Green Financial System (2016). Using Python-based web scraping and natural language processing (NLP), policy documents are tokenized and weighted via TF-IDF, and the mean keyword intensity forms the annual Policy Signal Index, normalized within the [0,1] range by Min–Max scaling.

(3) The third category is market and macroeconomic control data, which involves industry codes, ownership forms, regional GDP growth rates, and benchmark interest rates obtained from the National Bureau of Statistics and the PBOC respectively.

Continuous variables are winsorized on the 1st and 99th percentiles in the preprocessing stage to correct for outliers, while categorical variables are dually coded in terms of industry and year, with ST and financial firms excluded. The final data set has 12,736 firm-years with a strong panel structure for dynamic analysis.

### 3.2. Variable construction and research design

To calculate the dynamic effect of external audit quality in responding to green finance policy signals, dynamic panel analysis with firm and time fixed effects is conducted to account for unobservable heterogeneity in the study [10].

The baseline specification as shown in Equation (1):

$$\mathrm{AuditQ}_{it}=\alpha+\beta_1\mathrm{PolicySignal}_t+\beta_2\mathrm{Controls}_{it}+\mu_i+\lambda_t+\varepsilon_{it} \quad (1)$$

Where $\mathrm{AuditQ}_{it}$ represents audit quality, measured by audit opinion conservatism and the logarithm of audit fees. $\mathrm{PolicySignal}_t$ captures the annual intensity of green finance policy signals, and $\mathrm{Controls}_{it}$ include firm size, leverage, profitability, industry dummies, and ownership type.

To test nonlinear effects, a quadratic model as shown in Equation (2):

$$\mathrm{AuditQ}_{it}=\alpha+\beta_1\mathrm{PolicySignal}_t+\beta_2\mathrm{PolicySignal}_t^2+\beta_3\mathrm{Controls}_{it}+\mu_i+\lambda_t+\varepsilon_{it} \quad (2)$$

An interaction model incorporating industry dummies as shown in Equation (3):

$$AuditQ_{ii}=\alpha+\beta_1 PolicySignal_t+\beta_2(PolicySignal_t\times IndustryDummy_i)+Controls_{it}+\mu_i+\lambda_t+\varepsilon_{it} \quad (3)$$

To allow for disparate reactions in high-pollution versus low-pollution industries. All models are estimated with System GMM to control for possible endogeneity and dynamic dependence on lagged variables. The modeling approach facilitates a multi-dimensional identification of signals' interaction with industry characteristics in shaping audit reactions.

### 3.3. Empirical analysis and robustness

The empirical methodology involves an event study with respect to short-term reactions to the release of green finance policies and uses the event window (-2, +2) to capture dynamic processes. The results are validated through fixed effects panel regressions and System GMM to ensure robustness. Sub-group regressions with respect to industry and ownership are further employed to see the spread of policy signals across different sectors of the economy [11]. Three layers of robustness tests are implemented:

(1) variable substitution: replacing audit opinions with audit fees or client concentration to verify consistency;

(2) lag robustness: adding $PolicySignal_{t-1}$ and $AuditQ_{t-1}$ to account for dynamic inertia;

(3) sample sensitivity: excluding outlier years and crisis periods (e.g., COVID-19) for re-estimation.

White robust standard errors to account for heteroskedasticity in the data, as well as tests for multicollinearity with values of VIF < 5, help to validate the results statistically. The policy signal variable is also validated by manual policy text checks and term stability tests across different years to see if the term frequency is stable. The empirical setup ensures that the results are statistically valid and reliably interpreted.

## 4. Results

### 4.1. Overall impact of policy signals

The dynamic correlation between green finance policy signal intensity and external audit quality is presented in Figure 1 over the period of 2013 to 2024. While in the initial phase ranging between 2013 to 2016, there has been an increase in the index values for audit quality from 0.52 to 0.61 with an increase of 17.3% and policy signal intensity from 0.20 to 0.35, clearly demonstrating the beginning of the effect of regulatory orientation on auditors' work in these years. On the other hand, in the period ranging between 2017 to 2020, with the full development of green finance policy, there has been synchronization with an index of 0.77 for audit quality and 0.71 for policy signal intensity with a correlation score of 0.89 ($p < 0.01$). After the release of the Carbon Peak Action Plan in 2021, the audit quality index climbed to 0.86, and policy signal intensity to 0.88, marking a 1.25-fold acceleration compared to the prior phase. The regression results indicate that the policy signal term is 0.214 (±0.045, $p < 0.01$), suggesting that for every one-unit increase in policy signal intensity, there is a corresponding 0.21 standardized unit increase in audit quality. The trend shows that green finance policies have played an important role in boosting auditors' professional prudence and independence in respect of market expectation and risk understanding, thereby constituting an improvement chain in terms of audit quality policy.

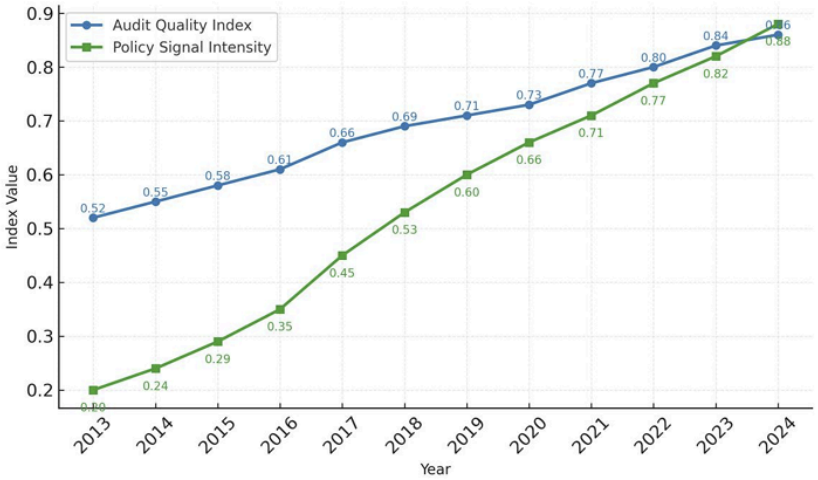


**Figure 1.** Dynamic response of audit quality to green finance policy signals (2013-2024)

### 4.2. Industry and ownership differences

To investigate the industry and ownership variations in heterogeneity, subgroup regression analyses were performed. The regression results with different industry and ownership group specifications are reported in Table 1. The policy signal intensity coefficient in the high-pollution industry is 0.278 (±0.036, $p < 0.01$), significantly higher than 0.163 (±0.042, $p < 0.05$) in low-pollution industries, indicating higher policy-driven risk-sensitivity among auditors in pollution-intensive industries. For state-owned enterprises, it is 0.241 (±0.039, $p < 0.01$), significantly higher than 0.195 (±0.046, $p < 0.05$) in the private sector, indicating stronger policy-enforcement-driven risk-sensitivity in state-owned sectors. The models' goodness of fit with industry fixed effects is 0.43, while that with ownership fixed effects is 0.39, respectively, good enough to show that green finance policies exert stronger constraint and transmission functions in pollution-intensive and state-owned sectors, stimulating auditors to improve environment-related verification and risk examination processes in these sectors.

**Table 1.** Estimation results

| Group | β (Policy Signal) | Std. Error ± | Significance | n | $R^2$ |
|---|---|---|---|---|---|
| High-pollution industry | 0.278 | 0.036 | *** | 4120 | 0.43 |
| Low-pollution industry | 0.163 | 0.042 | ** | 3815 | 0.41 |
| State-owned enterprise | 0.241 | 0.039 | *** | 3520 | 0.39 |
| Private enterprise | 0.195 | 0.046 | ** | 3281 | 0.37 |

Note: *** and ** denote significance at 1% and 5% levels, respectively.

## 5. Discussion

The results imply that green finance policy signals play a multileveled role in external auditing, mainly via risk evaluation processes, acting to enhance auditors' prudence and thus improve the quality of auditing work in the context of growing accountability for the environment. The industry and ownership-specific variations in auditors' behavioral change demonstrate the structural adjustment role in the auditing market, where auditors in heavily polluted sectors demonstrate stronger behavioral change because of higher policy responsiveness, while the direct alignment of auditors in state-owned enterprises with the policy frameworks and transparency requirements is stronger. Also, the interaction effect presented in the model between policy signals and auditors' behavioral change forms a dynamic feedback loop, where policy support strengthens auditing quality, thereby further improving the quality of policy implementation credibility.

## 6. Conclusion

This paper sets up a dynamic analytical model to study the impact of green finance policy signals on external audit quality. The empirical analysis indicates that green finance policy signals improve auditor independence and risk control in terms of market expectations, risk realization, and compliance management. The policy signals demonstrate more prominent impacts on industries with higher pollution and state-owned enterprises, which can be attributed to the stronger connection between policy execution and market mechanisms in either case. Future studies can apply the analytical model to trans-national settings to examine spillovers of policy signals and cooridination of audit quality in the green governance network across different countries.

## References

[1] Yang, J., et al. (2025). External audit quality and green innovation: Does environmental information disclosure matter? *International Review of Financial Analysis*, 103, 104151.

[2] Ahmad, F., et al. (2025). A comprehensive review on green finance and its impact on net zero energy transition: From the perspective of renewable energy development. *Energy Strategy Reviews*, 62, 101948.

[3] Dai, Q., et al. (2025). Green finance for sustainable development: Analyzing the effects of green credit on high-polluting firms' environmental performance. *Humanities and Social Sciences Communications*, 12(1), 1-13.

[4] Shi, J., et al. (2025). Does green finance facilitate the upgrading of green export quality? Evidence from China's green loan interest subsidies policy. *Sustainability*, 17(10), 4375.

[5] Wang, H., & Shao, R. (2024). Does the green finance policy affect the efficiency of corporate investment? Evidence from China's green finance reform and innovation pilot zones. *PloS One*, 19(11), e0313861.

[6] Zahid, R. M. A., et al. (2024). Moderating role of audit quality in ESG performance and capital financing dynamics: Insights in China. *Environment, Development and Sustainability*, 26(5), 12031-12060.

[7] Chen, P., et al. (2025). Does green finance drive new quality productive forces? Evidence from Chinese listed companies. *Sustainability*, 17(20), 8993.
[8] Yue, M., & Nedopil, C. (2025). China green finance status and trends 2024-2025. Griffith Asia Institute, Griffith University (Brisbane); Green Finance & Development Center, FISF Fudan University (Shanghai).
[9] Aljawarneh, N., et al. (2025). Bibliometric analysis of accounting and corporate sustainability research: Trends and insights. *ABAC Journal*, 45(2), 22.
[10] Bawono, I. R., Handika, R., & Rahmajati, E. S. (2025). How do firms' characteristics affect risks? ASEAN firms panel data analysis. *Cogent Business & Management*, 12(1), 2436646.
[11] Xu, C., et al. (2025). DeepGreen: Effective LLM-driven green-washing monitoring system designed for empirical testing—Evidence from China. arXiv Preprint arXiv:2504.07733.