

Driving Mechanisms and Industrial Spillover Effects of Corporate Assistance under the ESG Framework: Evidence from the “Thousands of Enterprises Assist Thousands of Towns” Policy

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Abstract: Amid China’s rural revitalization and common prosperity strategies, the “Thousands of Enterprises Assist Thousands of Towns” policy mobilizes market players to support rural areas. However, current CSR studies lack a dedicated ESG evaluation system for such policy-led corporate aid and seldom examine its internal mechanisms and industrial spillovers. Grounded in stakeholder theory and the resource-based view, this research collects questionnaire data from 170 participating enterprises in Zhaoqing. It establishes an ESG scale covering corporate green investment, rural social development and village governance, and applies PLS-SEM to examine main, moderating, mediating and heterogeneous effects. The empirical results indicate comprehensive corporate ESG input significantly raises assistance intensity; rural institutional environments positively moderate this relationship, and aid intensity generates industrial spillovers through village-industry linkages. Heterogeneity analysis finds manufacturers and enterprises with more than three years of assistance achieve higher resource conversion and industrial driving efficiency. This study enriches localized ESG-CSR research on policy-oriented rural support and puts forward differentiated ESG schemes for enterprises and targeted incentive policies for local governments.

1. Introduction

Since Guangdong rolled out the “Thousands of Enterprises Assist Thousands of Towns” program in 2020, Zhaoqing and other western Guangdong towns have realized full enterprise-town paired support, representing government-guided rural revitalization practice led by market players ^[1]. Existing CSR and ESG research mainly target listed firms’ poverty alleviation disclosures and urban sustainability, without specialized assessment frameworks or micro-mechanism analyses for unlisted industrial and agricultural enterprises engaging in town-level assistance ^{[2][3]}. Prior work merely discusses enterprises’ capital input, overlooking the intertwined environmental investment, rural social governance and institutional coordination logic, and neglects mediating rural industrial

linkages plus industry-term heterogeneity^[4].

In Zhaoqing, obvious gaps exist in support outcomes: manufacturers generate lasting industrial spillovers via technology, while agricultural firms rely solely on capital; short-term donations fail to create long-term industrial value^[5]. Current ESG theories cannot interpret such gaps or quantify the moderating role of village institutions in resource transformation^[6]. To address these deficiencies, this study develops an ESG scale for the policy, collects valid questionnaires from 170 Zhaoqing participating enterprises, and builds a PLS-SEM model covering main, moderating, mediating and multi-group heterogeneous effects. It expands theories of policy-oriented rural CSR and offers micro evidence for differentiated corporate support and governmental ESG incentives^[7].

2. Literature Review & Research Hypotheses

2.1. ESG and Corporate Rural Assistance Behaviour

Stakeholder theory holds that rural communities are core non-market stakeholders of local enterprises, and ESG investment (green technology, public service construction, village governance participation) is an important way to maintain long-term relational capital^[8]. Existing ESG-CSR empirical studies confirm that comprehensive environmental, social and governance input can significantly improve enterprises' willingness and actual investment scale in rural public welfare^[9]. For Chinese policy-driven assistance scenarios, high ESG orientation enables enterprises to match technical, capital and human resources with rural ecological and industrial demands, thus lifting overall assistance intensity. Accordingly, this paper proposes:

H1: Integrated ESG resource input of enterprises has a significant positive effect on rural assistance intensity.

2.2. Moderating Role of Rural Institutional Environment

Rural institutional environment includes informal social trust and formal policy support, which jointly reduce the transaction cost of village-enterprise cooperation^[10]. High-quality institutional conditions can smooth the transformation of enterprise ESG resources into tangible assistance projects; when social trust is insufficient and policy incentives are vague, the conversion efficiency of green technology and social investment will decline sharply^[11]. Therefore:

H2: Rural institutional environment positively moderates the positive relationship between enterprise ESG input and assistance intensity.

2.3. Mediating Effect of Industrial Linkage & Spillover Effect

Corporate assistance intensity is not the final outcome variable; its core long-term value lies in driving rural industrial upgrading through industrial linkage mechanisms such as base construction, order cooperation and talent training^[12]. Strong assistance intensity can build stable village-industry links, generate employment growth and industrial value-added spillover benefits. Thus:

H3: Corporate assistance intensity positively promotes rural industrial spillover effects; assistance intensity plays a partial mediating role between ESG input and industrial spillover.

2.4. Heterogeneity of Industry & Assistance Duration

Resource endowments differ greatly across industries: manufacturing enterprises own low-carbon production technology and complete industrial chains, with stronger ESG conversion capacity; agricultural enterprises mainly rely on single capital input with limited technical spillover^[13]. In terms of cycle, long-term assistance can continuously accumulate social trust and green

operation experience to amplify industrial driving effects ^[14]. Two group heterogeneity hypotheses are put forward:

H4: The positive path of “ESG input – assistance intensity – industrial spillover” is stronger for manufacturing enterprises than agricultural enterprises.

H5: The chain effect of ESG transmission is significantly stronger for enterprises with assistance duration over three years than those with less than one year.

3. Research Design

3.1. Variable Definition & ESG Measurement Scale

Based on the Delphi consultation of local government agricultural and rural cadres, enterprise executives and rural development scholars, a 15-item ESG scale for paired assistance enterprises is formed, consistent with the three-dimensional connotation of environment, society and governance:

(1) Independent Variable (X): ESG Integrated Resource Input (second-order latent variable)

①E Dimension: Green technology investment proportion, project energy-saving transformation, rural ecological restoration input

②S Dimension: Local labour employment ratio, rural medical/education public service investment, village social trust construction

③G Dimension: Participation in village joint governance, transparent disclosure of assistance funds, utilization of government preferential policies

(2) Dependent Mediator (M): Corporate Assistance Intensity (composite index of capital, technology and talent input scale)

(3) Outcome Variable (Y): Rural Industrial Spillover Effect (village industrial output growth, household income increase, local industrial chain extension level)

(4) Moderating Variable (W): Rural Institutional Environment (village social trust + local policy support perfection)

All latent variables adopt 5-point Likert scale (1=strongly disagree, 5=strongly agree).

3.2. Sample & Data Collection

Field questionnaire survey was carried out in Zhaoqing from May 25 to July 15, 2025, covering Duanzhou, Gaoyao, Sihui and other 9 counties/districts. Questionnaires were distributed to project directors or senior managers of enterprises participating in paired assistance. A total of 180 questionnaires were issued, 170 valid samples were recovered, with an effective recovery rate of 95%. Sample distribution: advanced manufacturing 79 firms, modern agriculture 91 firms; assistance duration ≤ 1 year: 62 samples, 1–3 years: 53 samples, >3 years: 55 samples. Common method bias test was conducted via Harman single factor test, and no serious homologous deviation existed.

3.3. Empirical Method: PLS-SEM

This study adopts Partial Least Squares Structural Equation Model (PLS-SEM) for empirical test, which is suitable for small and medium-sized sample survey data and multi-dimensional latent variable research Analysis steps:

①Reliability and validity test of ESG measurement scale (Cronbach’s α , CR, AVE);

②Benchmark main effect regression to verify H1;

③Introduce interaction term to test moderating effect H2, simple slope grouping graph auxiliary

analysis;

- ④ Bootstrap 5000 resampling mediating effect test for H3;
- ⑤ Multi-group comparison to test industry and duration heterogeneity H4, H5;
- ⑥ Model robustness evaluation via SRMR, R^2 , Q^2 indicators.

4. Empirical Results

4.1. Reliability & Validity Test

All latent variables Cronbach's $\alpha > 0.7$, composite reliability CR > 0.8 , average variance extraction AVE > 0.5 ; the square root of AVE of each construct is greater than the correlation coefficient with other variables, indicating the scale has good internal consistency and discriminant validity, and the ESG measurement system is reasonable.

4.2. Main Effect Test (H1 Verification)

Enterprise ESG integrated input \rightarrow assistance intensity path coefficient $\beta = 0.835$, $t = 20.261$, $p < 0.001$, H1 is supported. Environmental green technology input (loading = 0.965) and social local employment (loading = 0.972) are the two strongest sub-dimensions driving assistance scale, which proves technical and human resource investment is the core carrier of enterprise rural support.

4.3. Moderating Effect Test (H2 Verification)

The interaction term of ESG input \times rural institutional environment is significantly positive ($\beta = 0.22$, $p < 0.05$). Simple slope analysis:

- ① High institutional environment group: ESG \rightarrow assistance intensity $\beta = 1.015$ ($p < 0.001$)
- ② Low institutional environment group: ESG \rightarrow assistance intensity $\beta = 0.615$ ($p < 0.001$)

Resource conversion efficiency under high institutional conditions is 33.8% higher, H2 holds. Village social trust and complete policy incentives significantly amplify the stimulating effect of enterprise ESG investment.

4.4. Mediating Industrial Spillover Channel (H3 Verification)

Bootstrap mediating test results:

- ① Direct path ESG input \rightarrow industrial spillover $\beta = 0.402$, $p < 0.001$.
- ② Indirect chain path ESG \rightarrow assistance intensity \rightarrow industrial spillover $\beta = 0.431$, 95% CI [0.327, 0.546], excluding 0.

Assistance intensity plays a significant partial mediating role, the total effect $\beta = 0.833$, H3 is verified. Enterprise multi-dimensional ESG input can not only directly improve rural public resources but also rely on sustained high-intensity assistance to build village-industry linkage and realize income and industrial spillover growth.

4.5. Multi-Group Heterogeneity Test (H4 & H5)

(1) Industry grouping (Manufacturing vs Agriculture)

Manufacturing group full chain path total effect $\beta = 0.88$; agricultural group $\beta = 0.62$, inter-group path coefficient difference $p < 0.01$, H4 supported. Manufacturing's low-carbon technology and complete industrial chain bring stronger spillover capacity than single agricultural capital subsidies.

(2) Assistance duration grouping (> 3 years vs < 1 year)

Long-term assistance total effect $\beta=0.92$; short-term less than one year $\beta=0.65$, gap reaches 41.5%, H5 holds. Long-term continuous ESG investment accumulates village trust and industrial matching resources to form sustainable driving capacity.

4.6. Model Robustness Evaluation

SRMR=0.038<0.08; assistance intensity $R^2=0.723$, industrial spillover $R^2=0.856$; all $Q \geq 0$, the model has good explanatory power and predictive validity, and the empirical conclusions are stable.

5. Discussion

5.1. Core Driving Logic of ESG Integrated Assistance

Different from single financial donation research, this paper verifies that environmental green technology and social local employment are the core driving dimensions of enterprise assistance intensity, rather than simple capital transfer. Under the dual-carbon and rural revitalization composite strategy, enterprises' green ESG investment simultaneously satisfies national ecological governance and rural industrial upgrading demands, forming a win-win matching logic between market strategy and policy goals^[9].

5.2. Institutional Environment as a Conversion Catalyst

Rural formal policy incentives and informal social trust jointly reduce the information asymmetry and cooperation risks between villages and enterprises. When the local government provides tax reduction, land preferential ESG incentives and villages establish regular consultation mechanisms, enterprises are willing to expand long-term technical investment instead of short-term material donation, which explains the huge gap of resource conversion efficiency between high and low institutional environments^[11].

5.3. Industrial Spillover as Long-Term Core Value

The mediating mechanism reveals that assistance intensity is only an intermediate behavior indicator; the fundamental goal of the "Thousands of Enterprises Assist Thousands of Towns" policy is to activate rural endogenous industries. Enterprises that only carry out one-off public welfare donations cannot build industrial linkage channels, so their spillover benefits are extremely limited, which provides empirical basis for local governments to restrict superficial charitable assistance and guide industrialized paired cooperation.

5.4. Heterogeneity Theoretical Explanation

Manufacturing enterprises have technical and chain resource advantages, while agricultural enterprises are restricted by low technical thresholds and narrow value chains; short-term assistance cannot complete the accumulation of social capital and industrial supporting facilities. The two types of heterogeneity determine that governments must implement classified ESG incentive policies for different industries and set minimum assistance cycle thresholds^[14].

6. Conclusions & Policy Implications

6.1. Main Conclusions

① Enterprise multi-dimensional ESG integrated input significantly improves rural assistance intensity under the “Thousands of Enterprises Assist Thousands of Towns” policy, with green technology and local employment as the core driving sub-indicators.

② The rural institutional environment has a significant positive moderating effect on the transformation of enterprise ESG resources into assistance behaviour; high-trust and complete policy environments greatly improve resource utilization efficiency.

③ Corporate assistance intensity partially mediates the relationship between ESG input and rural industrial spillover effects, and sustained village-industry linkage is the core channel to realize farmers’ income growth and rural industrial upgrading.

④ Obvious heterogeneous differences exist: manufacturing enterprises and enterprises with more than three years of assistance have stronger ESG transmission and industrial spillover capacity.

6.2. Targeted Suggestions

6.2.1. Government Level: Build ESG Differentiated Incentive System

① Classified policy subsidies: Set special green technical transformation subsidies for manufacturing enterprises, and support agricultural enterprises to build standardized planting industrial chains; link tax reduction, land preferences with enterprise ESG evaluation scores.

② Optimize rural institutional environment: Launch village-enterprise trust co-construction activities, establish regular joint meeting systems, and release standardized ESG assistance disclosure rules to improve policy transparency.

③ Restrict short-term superficial assistance: Formulate a minimum three-year paired assistance cycle standard, and give priority to resource allocation to long-term continuous participating enterprises.

6.2.2. Enterprise Level: Form Long-Term ESG Integrated Assistance Strategy

① Manufacturing enterprises: Take low-carbon technology popularization and supporting industrial park construction as the core of assistance, build upstream and downstream matching industrial chains in towns.

② Agricultural enterprises: Focus on standardized planting training, rural talent cultivation and sales channel construction, avoid single one-time capital donation.

③ All types of firms: Compile 3–5 years ESG assistance plans, balance environmental ecological investment, social public services and village governance participation.

6.2.3. Rural Community Level: Improve ESG Resource Undertaking Capacity

Set up village enterprise coordination committees, collect industrial and ecological demands regularly, provide local labour and land supporting conditions for enterprise green projects, and supervise the implementation of assistance projects together with government departments.

6.3. Research Limitations & Future Directions

This paper only adopts cross-sectional questionnaire data of Zhaoqing City, lacking

intertemporal panel tracking to capture dynamic changes of ESG assistance behaviours; the sample does not cover state-owned large enterprises in detail. Subsequent research can expand multi-city panel samples and add group comparison of state-owned, private and foreign-funded enterprises; digital technology embedding can be incorporated into the ESG framework to test the digital empowerment regulating path of corporate rural assistance.

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