

Research on the influence mechanism and optimization path of green finance on the value realization of ecological products in Anhui Province from the perspective of new quality productivity

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Abstract

Under the background of the coordinated development of new quality productivity and green finance, the realization of the value of ecological products has become an important proposition to promote the green transformation of regional economy. This paper takes Anhui Province as the research object, based on the core connotation of "technological innovation, factor reconstruction and industrial upgrading" of new quality productivity, and discusses the influence mechanism of green finance on the realization of the value of ecological products. The study shows that green finance promotes the capitalization of ecological resources, scale of ecological industries and marketization of ecological products through resource allocation, risk management and market pricing, but there are bottlenecks such as insufficient policy coordination, lagging product innovation and inadequate application of digital technology. Combined with the practice of Anhui Province, this paper proposes to optimize the path of improving the green finance policy system, strengthening the empowerment of digital technology, and innovating the ecological property rights transaction mode, so as to provide theoretical support and practical reference for the realization of high-quality development of ecological economy.

Keywords

New quality productivity; green finance; ecological product value realization

1. Introduction

Driven by global climate governance and carbon neutrality, the capitalization transformation of ecological resources has become a strategic choice to reshape regional economic competitiveness. According to the United Nations Environment Programme (UNEP) 2023 Ecosystem and Financial Integration Report, global ecological

product transactions grow at an annual average of 19%, but the regional difference in value realization efficiency is 4.7 times. As the world's largest pilot carbon market in China, under the framework of the "two-carbon" target, the Opinions on Establishing and Improving the Mechanism for Realizing the Value of Ecological Products in 2022 clearly proposed to "build a market-oriented channel for the transformation of ecological resources into economic value". As the pilot area of ecological barrier and "double-carbon" action in the Yangtze River Delta, the total value of ecological products (GEP) of Anhui province will exceed 1.2 trillion yuan in 2022. However, according to the monitoring data of the Provincial Department of Ecology and Environment, the conversion rate of ecological value realized through the market mechanism is only 14.3%, which is significantly lower than that of Zhejiang (31.8%) and Fujian (26.4%). This contradiction highlights the structural mismatch between the traditional factor allocation mode and the demand of ecological economic transformation.

The theoretical breakthrough of new quality productive forces provides a new perspective to solve this dilemma. Different from the dependence of traditional productive forces on the scale of elements, new quality productive forces emphasize the transition of value creation paradigm through technological fission, data fusion and institutional reconstruction (Li Yang, 2022). In the practice of Anhui Province, green financial instruments have shown a unique enabling effect on the transformation of ecological capital: by June 2023, the balance of green loans in the province reached 634.2 billion yuan, covering 12 key areas such as clean energy and ecological restoration, forming characteristic practices such as "Huiyin Model". However, most existing studies focus on the environmental benefit assessment of green finance (Wang Yao et al., 2021), lack the dynamic mechanism for the realization of the value of ecological products from the dimension of productivity reform, and see few systematic system design studies for provincial administrative units. As the core carrier of "green productivity", new quality productive forces emphasize the reorganization of production factors and the ecological transformation of industries through technological innovation, and form a strategic coupling with the resource allocation function of green finance. As an ecological barrier and an agricultural province in the Yangtze River Delta, Anhui Province has the dual characteristics of rich ecological resources and the demand for industrial transformation. Its green finance practices (such as "carbon ticket ecological loan" and "EOD mode financing") provide a typical sample for theoretical research. This paper focuses on the new quality of productivity. The synergistic effect with green finance aims to reveal its driving logic for the realization of the value of ecological products and provide a decision-making basis for regional green transformation.

2. Research on the influence mechanism of green finance from the perspective of new quality productivity

2.1 Theoretical coupling of new quality productivity and the value realization of ecological products

The theoretical core of new quality productive forces is reflected in the subversive reorganization of production factors and the coevolution of technology-system-market, and its coupling logic with the realization of the value of ecological products originates from the breakthrough of the traditional productivity paradigm. At the level of factor reconstruction, data elements reshape the value creation equation of ecological capital through the progressive transformation of ecological resources digitalization, asset conversion and capitalization, which is embodied in the realization of the stock of ecological resources under the multiplier effect of technology transformation coefficient and data enabling factor. The depth of the digital technology embedded further deconstruct the value of the traditional ecological products, block chain and Internet of things as the core technology cluster by reducing information asymmetry, effectively cracked the ecological resources of non-exclusive and uncompetitive valuation dilemma, typical cases shows that jin-zhai county in Anhui province "digital tea garden" project with the help of Internet monitoring reduce carbon footprint tracing costs by 67%, the market premium rate increased by 42%. The dimension of system adjustment reveals the internal mechanism of the induced change of green financial policy. By reconstructing the behavior logic and production function of market subjects, the ecological economic system is driven to the higher-order equilibrium. This proves that the carbon intensity of unit output value of the carbon emission trading enterprises in Anhui Province decreases by 4.3% annually.

2.2 The role path of green finance on the realization of ecological product value

The role path of green finance on the realization of ecological product value shows the characteristics of multi-dimensional collaboration. At the level of capital allocation, directional credit rationing and environmental risk pricing mechanism to correct the traditional market resource allocation distortion, Anhui green credit to clean energy and ecological restoration in the field of capital marginal output (MPK) of 2.7, significantly higher than the traditional manufacturing of 1.3, and pollution intensive industry financing cost premium 1.8-3.5% highlights environmental cost internalization market disciplinary effect.

The risk mitigation function solves the cyclical and uncertain risks of ecological investment through the diversified combination of tools. Innovative tools such as emission right mortgage, climate insurance and risk compensation fund reduced the project default rate by 1.8 percentage points, and reduced the volatility of disaster loss from 32% to 18%, thus significantly increasing the willingness of market players to participate.

Technology innovation catalytic effect is green financial tools through signaling, re-

search and development subsidies and market premium third order drive, the formation of "environmental information disclosure-technology research and development investment-product value implementation" positive cycle chain, empirical data shows that the number of green patents every 1% can drive the ecological product value conversion efficiency of 0.34%. Based on the above mechanism, this study constructed a mediation effect model including technological innovation (TECH), risk release (RISK) and capital allocation (CAP). The theoretical expected green finance development index (GFI) has significant positive direct effect on the total ecological product value (GEP), and the intermediary variables are fully intermediary or partially intermediary characteristics by Sobel test, and the spatial measurement results will further reveal the influence of regional heterogeneity.

3. Current status and challenges of the value realization of ecological products in Anhui Province

3.1 Practice progress

Relying on the ecological background advantages of "three mountains, three rivers and two lakes" (Dabie Mountains, southern Anhui Mountains, Jianghuai Hills, Yangtze River, Huaihe River, Xinan River, Chaohu Lake and Taiping Lake), Anhui Province has formed a ecological product value realization mode with regional characteristics driven by system innovation and technology application:

1) Policy system innovation forms an institutional guarantee

a) Breakthrough in top-level design: Anhui Province Implementation Plan in 2023, establish the "1 + 3 + N" policy framework (1 overall plan, 3 supporting mechanisms and N supporting policies), and clarify the definition of ecological resource property rights, value accounting and trading rules. By 2024, the province has established 16 provincial pilot counties (cities) to realize the value of ecological products, among which the "Two Mountain Bank" model in Jinzhai County integrates fragmented ecological resources, revitalizing a total of 126,000 mu of assets such as woodland and water area, and achieving financing of 730 million yuan.

b) Fiscal and financial coordination: Establish a provincial special fund for ecological compensation (the scale will reach 2.8 billion yuan in 2024) to form a linkage with green credit. For example, Huangshan city innovated the combination tool of "ecological restoration fund + green bond", issued the first national "Xinan River Basin Management special bond" of 1.5 billion yuan, and the ratio of social capital investment reached 1:4.5.

2) Innovation of green financial products accelerates resource transformation

a) Diversification of mortgage financing tools: In the field of carbon finance, Chuzhou launched the "double-linked loan for carbon emission reduction", linking the loan interest rate with the double index of project carbon intensity and carbon sink increment. In 2024, a total loan of 4.2 billion yuan was issued, support-

ing 23 photovoltaic and biomass energy projects, and driving the carbon emission reduction to 180,000 tons per year;

b) Pledge of ecological rights and interests: Xuancheng pilot "public welfare forest compensation income right pledge loan", with the ecological compensation funds in the next 10 years as collateral, granted credit to 210 million yuan to 7 forestry enterprises, to solve the problem of short-term cash flow shortage of ecological projects.

c) supply chain financial innovation: Bengbu relying on glass new material industry advantage, development of "green bill discount + carbon footprint certification" mode, to conform to the key industries in Anhui province carbon footprint accounting guide enterprises provide preferential discount rate, 2024 discount scale reached 5 billion yuan, drive the industrial chain comprehensive energy consumption fell by 12%.

3) Digital technology enables value accounting and trading

a) Construction of "digital twin" of ecological assets: Huangshan City has built a digital archive system of ecological products covering the whole city, deployed 23,000 sensors of the Internet of Things, monitored 7 types of ecological indicators such as forest carbon sink and water purification in real time, and realized dynamic accounting of ecological resources. In 2023, the project of "Shexian County Tea Garden Ecological Loan" supported by the system determined the pledge value through the modeling of tea tree growth data, provided loans of 120 million yuan for tea enterprises, and increased the tea premium rate by 25%.

b) Blockchain right confirmation application: Luan has set up a forestry carbon sink blockchain registration platform, realizing the traceability of the whole process of carbon sink generation, trading and cancellation. There are 9 registered carbon sink projects with a cumulative transaction volume of 160,000 tons, reducing the transaction cost by 35% compared with the traditional model.

3. 2 Realistic dilemma

Despite the initial achievements, the value realization of ecological products in Anhui Province still faces multiple structural contradictions:

1) Insufficient policy coordination restricts the efficiency of resource integration

a) Absence of cross-departmental system convergence: there is a gap between the ecological compensation standard (such as 15 yuan per mu of public welfare forest) and the valuation of green financial mortgage. Generally, banks only convert the mortgage rate by 30%~50% of the compensation, resulting in limited financing scale. According to the survey, 37% of forestry enterprises in southern Anhui gave up their loan application due to insufficient mortgage rate.

b) Weak regional coordination mechanism: Although the inter-provincial compensation in Xinan River Basin has been established, the ecological product trading platform of Anhui and Zhejiang provinces has not been interconnected. In

2023, only 12% of the carbon sink trading in Huangshan city flowed to Zhejiang market, and the cross-regional premium has not been fully released.

2) The market trading mechanism limits the value

a) Decentralized trading platforms: There are 9 ecological property rights trading institutions in the province, but they lack unified pricing rules and liquidity support. Taking water rights trading as an example, the transaction price difference between Hefei and Wuhu in 2023 reached 0.8 yuan / cubic meter, and the arbitrage behavior of market entities intensified the market segmentation.

b) Insufficient demand side incentives: The tax deduction policy for enterprises to purchase ecological rights and interests has not yet been implemented. In 2024, the trading volume of voluntary carbon market in The province only accounted for 18% of the total volume in the Yangtze River Delta, lower than that of Zhejiang (32%) and Jiangsu (27%).

3) Unbalanced application of technology widens the transformation gap

a) Weak digital ability of small and medium-sized enterprises: According to the sampling survey, only 29% of eco-related small and medium-sized enterprises in the province are connected to the government monitoring platform, and 51% still rely on manual data, resulting to the lack of credibility of bank risk control model. For example, a aquaculture company in Chizhou city rejected a green loan application of 5 million yuan because it was unable to provide digital aquaculture pollution data.

b) lagging application of cutting-edge technologies: the remote sensing accounting accuracy of ecological products is insufficient (the current resolution is only 10 meters), which is difficult to support the value evaluation of small-scale ecological assets (such as family farm woodland), which restricts the capitalization process of "fragmented resources".

4) Vague definition of ecological property rights leads to transaction risks

a) Incomplete coverage of property right registration: although the confirmation rate of collective forest rights in the province reaches 92%, the confirmation rate of grassland, wetland and other resources is less than 40%, and there is a phenomenon of "multiple certificates in one place" in some regions. In 2023, in a dispute over the pledge of wetland management right in MaAnshan city, the bad debt loss of the bank was 8 million yuan due to the unclear property rights boundary.

b) Different value accounting standards: The current Value Accounting Guide for Ecological Products in Anhui Province does not subdivide regional differences, and the forest carbon sink in the Dabie Mountains and the plain along the Yangtze River adopts the same accounting coefficient, leading to the valuation deviation from the actual ecological contribution. Research estimates shows that oversimplified accounting model may cause undervalued value of 20% to 45%.

3.3 Comparative analysis of typical cases

In order to reveal the regional differences, three typical regions of Anhui Province were selected for comparison (Table 1):

Table 1. Comparative Analysis of Typical Cases

area type	Representative area	Core mode	Main results	bottleneck problem
Mountain county	Jinzhai County	"Two Mountains Bank" resource integration	The revitalization of idle woodland 42,000 mu, driving the annual income of the village collective by 1.2 million yuan	Collateral liquidity is poor and the secondary trading market is missing
City along the river	Wuhu City	"Pollution right + finance" transaction	In 2024, the mortgage loan scale of pollutant emission rights will reach 870 million yuan	The cross-industry trading of pollution rights is limited, and the price difference between chemical industry and textile industry reaches three times
Plain agricultural county	Mengcheng County	"Ecological agriculture + insurance"	The development of "rice and shrimp co-farming risk", the insured area of 120,000 mu	The premium of ecological agricultural products lacks recognition from the consumer end, and the premium rate of the retail end is only 8%

- Through policy innovation and digital practice, Anhui province has made significant progress in the field of ecological resources capitalization, but the deep-seated contradictions such as the absence of policy coordination, the imbalance of technology application and the ambiguity of property rights system still need to be broken through. In the future, it is necessary to take new quality productivity as the core, promote the deep coupling of green financial tools and ecological governance scenarios, and build a whole-chain support system of "right confirmation-pricing-transaction and supervision".

4. From the perspective of new quality productivity, green finance promotes the optimization of the value of ecological products in Anhui Province

4.1 Build a trinity policy coordination system of "system, market and technology"

1) Strengthen the top-level design and dynamic adaptation of institutional supply

a) Improve the value accounting system of ecological products: refer to the Accounting Standards for the Total Value of Ecological Products (Trial) (National Development and Reform Commission, 2023), and refine the regional and type accounting standards based on the regional characteristics of Anhui Province. For example, for the water conservation function in Dabie Mountain area, a differentiated accounting model based on water quantity, water quality and service population is established; and the double carbon correction coefficient of "carbon footprint + soil carbon fixation" is introduced to improve the scientific valuation.

b) Establish a "two-way link" mechanism between green finance and ecological compensation: learn from the experience of "ecological credit score" in Zhejiang Province, and link the ecological protection performance of enterprises (such as pollution emission reduction and carbon sink increment) with the green credit quota and financial subsidies. During the pilot period, AAA-level ecological credit enterprises can be given the incentive to lower the loan interest rate by 50BP and increase the subsidy ratio by 20%.

2) Promote regional market integration and innovation of trading rules

a) Jointly build the Yangtze River Delta Ecological Products Trading Alliance: Relying on Hefei Factor Trading Center, jointly with Shanghai Environment and Energy Exchange and Zhejiang Ecological Trading Center, establish a unified cross-regional trading platform for carbon sink, water rights and emission rights. Implement the pricing mechanism of "benchmark price + floating premium", and charge 10% -15% "cross-domain ecological regulation fee" for Zhejiang ecological products (such as Qiandao Lake water source) imported into Anhui province to feed the local ecological restoration fund.

b) Innovate ecological equity derivative financial instruments: pilot "ecological futures" products in Wuhu, Maanshan and other cities along the Yangtze River, allow enterprises to issue ABS with the proceeds of ecological restoration in the next five years, and introduce insurance institutions to provide credit enhancement. In 2023, similar projects in Chongqing have reduced their financing costs by 2.3 percentage points, which can be replicated in Anhui Province.

4.2 Deepen the empowerment of digital technology, and break the bottleneck of the "resource-asset-capital" transformation

1) Build a provincial ecological asset digital management platform

a) Promote the "one-map management" of ecological resources: integrate the "one-map" database of natural resources, ecological environment monitoring network and credit data of financial institutions, and develop the "Anhui LvTong" ecological asset management system. High-resolution remote sensing satellites (accu-

racy is better than 1 meter) and ground Internet of Things sensors are deployed to realize real-time monitoring and dynamic valuation of seven types of ecological resources, such as forests and wetlands. According to the Bengbu pilot project, digital management can improve the efficiency of ecological asset mortgage loan approval by 40%.

b) Confirmation and circulation of ecological assets enabled by blockchain: promote the promotion of "blockchain + forestry carbon sink" mode in the mountainous area of southern Anhui, and establish a distributed ledger of carbon sink generation, verification and transaction. Referring to the experience of Sanming City, Fujian Province, smart contracts are used to automatically implement carbon sink settlement and capital settlement to reduce the cost of transaction friction. The technology is expected to expand the scale of carbon sink trading in Anhui province by three times by 2025.

2) Strengthen the digital capacity building of small and medium-sized enterprises

a) Implement the "digital green enterprise" cultivation plan: 30% of the plan will be invested by the provincial finance, and cooperate with AliCloud, iFlytek and other enterprises to provide low-cost digital solutions for ecological product operators. Focus on developing three types of tools:

b) Lightweight monitoring equipment: such as portable water quality detector (unit price is less than 5,000 yuan), uav patrol system (annual rent is 12,000 yuan), to reduce the threshold of data collection;

c) SaaS management platform: embedded in the ecological product value accounting module, supporting enterprises to automatically generate asset reports that meet the risk control requirements of banks;

d) Blockchain certification service: provide non-tamper proof storage of carbon sink and ecological labels for small and medium-sized ecological enterprises to enhance the credibility of financing.

4.3 Innovate the ecological property rights transaction mode and activate the multi-level capital market

1) Promote the standardization and securitization of ecological rights and interests

a) Issue "special bonds for ecological restoration": structured bonds with a combination of the proceeds of mine restoration and river basin management projects and a design term of 10-15 years. Tongling city can take the lead in the pilot, taking the restored land development income of Shizishan mining area (estimated annual 120 million yuan) as the source of debt repayment, and the expected issuance interest rate will be 30-50BP lower than that of ordinary local bonds.

b) Develop "ecological bank" intermediary services: set up regional ecological resources collection and storage centers in Hefei and Huangshan Mountain to standardize and integrate, package and increase the credit of fragmented resources. Referring to the "ecological bank" model of Nanping City, through the three-level jump

of "resource custody-asset integration-capital operation", the resource premium rate is increased by 15% -25%.

2) Establish a multi-input mechanism of "government guide fund + social capital"

a) Set up Anhui Provincial Green Industry Parent Fund: the initial scale is 5 billion yuan, and the mode of "sub-fund + direct investment" is adopted, focusing on emerging fields such as ecotourism and biomass energy. Design the differentiated profit-giving mechanism: transfer 80% of the revenue of the early stage projects (seed stage, initial stage), and only 30% of the mature projects (expansion period), so as to attract the participation of social capital.

b) Promote the EOD model of "ecological restoration + industrial introduction": promote the closed loop of "environmental governance-land value-added-industrial feedback" in the Chaohu Lake Basin, allowing developers to include 150% of the ecological restoration cost into the deduction amount of land transfer fee. Through this model, Chuzhou Mingguang Chemical Industry Park has attracted 2.2 billion yuan of social capital, driving the surrounding land price up by 18%.

4.4 Improve the guarantee mechanism for the value realization of ecological products

1) Establish an ecological risk hedge and compensation fund

a) Innovate "ecological insurance + futures" products: develop a combination tool of income insurance and carbon sink futures in the main rice producing areas (such as Anqing and Luan). When the carbon sink price is below the agreed threshold or the natural disaster cuts production, the insurance company shall pay the difference. Anhui Academy of Agricultural Sciences estimates that the tool can increase the stability of farmers expected income by 25%.

b) Establishment of ecological risk compensation fund: the provincial finance shall invest 500 million yuan of the transaction amount to collect 1%~3% of the transaction amount from the ecological product buyers (such as energy-consuming enterprises) as a risk reserve to hedge the bad debt losses of financial institutions caused by the fluctuations of the ecological market.

2) Strengthen the talent and technical support system

a) Establish provincial Ecological finance Research Institute: Relying on University of Science and Technology of China, Anhui University and other universities, carry out research on ecological asset pricing model and green financial tool innovation. Key areas include: ecological product premium measurement technology based on LCA (Life cycle evaluation); green credit risk pricing model under multi-scenario stress test; and blockchain interoperability protocol for cross-border transaction of ecological rights.

b) Implementation of "ecological economist" certification system: formulate professional standards with human resources and social security departments, train and certificate 500 compound talents every year, require to master the

cross skills of ecology, finance and digital technology, and provide ecological asset management and financing scheme design services for enterprises.

5. Conclusion

Anhui province needs to reconstruct the "technology-capital-system" triangle power model to realize the value of ecological products with new quality productivity. Through digital technology to penetrate the bottleneck of resource right confirmation, green financial tools activate the vitality of market and transaction, system innovation guarantees the coordination of multiple subjects, and finally realize the strategic transition from ecological advantage to economic advantage. This path not only provides a practical model for the ecological and green integration of the Yangtze River Delta, but also contributes "Anhui wisdom" to the national ecological civilization system innovation.

References

- [1] Li Yongsheng, Jin Guiying, Zhan Meiting. Theoretical logic and practical exploration of green finance for the realization of ecological product value—— Take the experience of "demonstration of thousands of villages and renovation of thousands of villages" in Zhejiang province as an example [J]. Journal of Heilongjiang Vocational College of Ecological Engineering, 2024,37 (06): 75-82 + 140.
- [2] Shao Jinhua, Zhou Shaoyi. Green finance enables the value realization of ecological products —— Analysis from the perspective of ecological industrialization and industrial ecological development [J]. Western Journal, 2024,(19):1-4+67.DOI:10.16721/j.cnki.cn61-1487/c. 2024.19. 027.
- [3] Thunder ship. Practice and enlightenment on the value realization of financial service ecological products at home and abroad [J]. Gansu Finance, 2024, (06): 22-26.
- [4] Sun Xianfeng. Research on the influence of green finance development level on the value realization of ecological products in central China [J]. Technology and Finance, 2024, (06): 68-76.
- [5] Zang Dungang, Li, Wu Qizhou. Study on the impact of green finance on the realization of ecological product value [J]. Research on Rural Finance, 2024,(04):34-46.DOI:10.16127/j.cnki.issn1003-1812.2024.04.005.
- [6] Li Yan, Yang Yuwen. Research on the value realization path of green product support in border areas under the power of new quality productivity [J]. Journal of Yunnan Minzu University (Philosophy and Social Sciences edition), 2024,41(03):101-109.DOI:10.13727/j.cnki.53-1191/c. 20240422.007.
- [7] Yang Ziming, Wang Ling, Guo Jingyi. Research on the green finance model for the realization of watershed ecological product value [J]. Contemporary Economic Research, 2023, (07): 113-119.