



Financial incentive instruments of regional economy' «green» transformation

Liu Lei¹, Elena I. Lazareva²

^{1,2}Southern Federal University, Rostov-on-Don, Russia

¹Xinyang Agriculture and Forestry University, Xinyang, China

¹leiliu@sfedu.ru, <https://orcid.org/0009-0007-2352-3161>

²elazareva@sfedu.ru, <https://orcid.org/0000-0001-5829-5372>

Abstract. Transformation and development of the economy towards greening is an important measure for different regions to address the global challenges of climate change and rising pollution levels, and a necessary pathway to achieve sustainable development. Whether it is modernization and transformation of green technologies in traditional industries or green management of the public environment, external financial support is needed to compensate for the insufficient investment of micro-economic actors. The *purpose* of the study is to analyze the key financial instruments that stimulate the green transformation of the regional economy, as well as an attempt to determine the directions of using these instruments to increase the effective supply of green funds and ensure their increasing role in promoting economic transformation on the path of building an ecological civilization. The *methodological basis* of the study was formed by analytical and comparative methods, as well as relevant works of scientists devoted to the study of the problems of stimulating environmentally-oriented transformation processes, primarily in the regional context. The *results* of the analysis show that, given the important supporting role of finance in the green transformation of the economy and the fact that the relevant research is still at the initial stage, the systemic mechanism of financial stimulation of the regional economy' green transformation should be based on three elements: financial support, capital allocation and risk diversification. It is demonstrated that the development of green economy cannot be separated from the increasing innovation dynamics of "green" financial products, so it is necessary to increase efforts in the field of development and implementation of financial innovations, to provide priority financial support to key sectors of the green economy.

Keywords: financial stimulation, financial support, economic transformation, green economy, capital allocation, risk diversification

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Проблемы экономики

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Финансовые инструменты стимулирования «зеленой» трансформации региональной экономики

Лю Лэй¹, Елена Иосифовна Лазарева²

^{1,2}Южный федеральный университет, Ростов-на-Дону, Россия

¹Синьянский университет сельского и лесного хозяйства, Синьян, Китай

¹leiliu@sfedu.ru, <https://orcid.org/0009-0007-2352-3161>

²elazareva@sfedu.ru, <https://orcid.org/0000-0001-5829-5372>

Аннотация. Трансформация и развитие экономики в сторону озеленения – важная мера для различных регионов по решению глобальных проблем изменения климата и растущего уровня загрязнения окружающей среды, а также необходимый путь для достижения устойчивого развития. Будь то модернизация и трансформация «зеленых» технологий в традиционных отраслях или «зеленое» управление общественной средой, необходима внешняя финансовая поддержка, чтобы компенсировать недостаточные инвестиции субъектов микроэкономики. Цель исследования – анализ ключевых финансовых инструментов, стимулирующих «зеленую» трансформацию региональной экономики, а также попытка определить направления использования этих инструментов для увеличения эффективного предложения «зеленых» фондов и обеспечения их возрастающей роли в содействии экономической трансформации на пути строительства экологической цивилизации. Методологическую основу исследования составили аналитический и компаративный методы, а также актуальные труды ученых, посвященные изучению проблем стимулирования экологически-ориентированных трансформационных процессов, прежде всего, в региональном разрезе. Результаты анализа показывают, что, учитывая важную вспомогательную роль финансов в «зеленой» трансформации экономики и тот факт, что соответствующие исследования все еще находятся на начальной стадии, системный механизм финансового стимулирования «зеленой» трансформации региональной экономики должен базироваться на трех элементах: финансовой поддержке, распределении капитала и диверсификации рисков. Продемонстрировано, что развитие «зеленой» экономики не может быть отделено от возрастающей инновационной динамики «зеленых» финансовых продуктов, вследствие чего необходимо наращивать усилия в сфере разработки и внедрения финансовых инноваций, обеспечения приоритетной финансовой поддержки ключевых отраслей «зеленой» экономики.

Ключевые слова: финансовое стимулирование, финансовая поддержка, экономические преобразования, зеленая экономика, распределение капитала, диверсификация рисков

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Regional economy' «green» transformation and financial incentives

Given the severity of global environmental protection issues such as climate change, various regions are actively pursuing the path of economic green transformation in order to ensure sustainable and stable economic development. The green economy, as a long-term economic development goal pursued by nations worldwide, inevitably needs to address a series of key issues such as resource consumption, environmental governance, ecological balance, and innovation efficiency throughout its implementation [1, 2]. The successful solution to these problems cannot be achieved without the support of national systems, policies, and means [3, 4].

From a practical perspective, environmental regulatory policies and fiscal transfer payments have always been important macroeconomic control tools for the country to promote environmental governance and achieve green economic transformation. However, as the market economy continues to evolve, the government's intervention has been gradually diminishing year on year. Consequently, the significance of monetary and financial policies implemented by financial regulatory departments in promoting green transformation has been gaining increasing attention domestically and internationally [5-7]. Whether financial support plays a constructive role in climate and environmental governance remains a topic of intense debate among scholars and policymakers at both the domestic and international levels. Presently, China is in the process of establishing a comprehensive green finance system, and has introduced a range of policy frameworks aimed at fostering environmental governance and promoting economic sustainability through the utilization of green finance mechanisms. Countries around the world are also constantly exploring the relationship between financial development and regional green development. The question of how to leverage financial instruments to facilitate the green transition of the regional economy and effectively harness the proactive steering role of finance in the ecological transition of the economy has become an important research topic.

There are obvious shortcomings in the private mobilization and incentive mechanisms of traditional financial instruments in environmental governance. At present, non-governmental participants are mainly public welfare organizations, and their enthusiasm and effectiveness in participating in environmental governance are very limited. In addition, the excessive pursuit of short-term economic growth goals by local governments makes it difficult for environmental policies and regulations to be effectively implemented, and the effectiveness of environmental governance is not satisfactory. Therefore, in the current dual task of environmental governance and economic green transformation, we not only need to strengthen the implementation of environmental policies and regulations, but also fully tap the potential of finance as a market-oriented tool, inject more financial support for economic green transformation, improve the efficiency of economic resource allocation, and use it as a supplement and strengthening of administrative means.

This article attempts to clarify the mechanism of financial support for regional economic green transformation through theoretical analysis, in the context of global economic green transformation and development, referring to existing literature. The aim of this study is to help regions improve the degree of economic greening through financial means more reasonably and effectively, and to provide decision-making basis for leveraging the positive role of financial development in improving regional development quality and transforming development modes.

Methodology for analyzing financial incentive instruments of regional economy' «green» transformation

The analysis objective is to systematize methodologies of the financial incentive instruments of regional economy' «green» transformation studying. The goal attainment was carried out on the basis of the environmentally sustainable development paradigm. In addition, an important place in the methodology was taken by analytical and comparative methods, which allow us to form a complex interrelation of parameters characterizing the instruments of green economic transformation stimulating.

Results of analysis of financial incentive instruments of regional economy' «green» transformation

The promoting role of finance in economic development has been extensively discussed in the theoretical community, and the theoretical basis is relatively clear. This article will start from the financial issues of economic green transformation, and take the conditions of financial support for economic green transformation – the process of financial support for economic green transformation – the effects of financial support for economic green transformation as the research context, revealing the financial support mechanism in the process of regional economic green transformation (fig. 1).

King et al. pointed out that financial markets can transform funds into capital through financing channels, providing a continuous supply of funding needs for enterprises in the market, thereby injecting production, operation, investment and research and development into enterprises, and further improving economic output. The continuous expansion of capital scale is an important cornerstone for the stable operation of the financial system, and it is also an indispensable prerequisite for promoting the green transformation of regional economy [8]. Johnson & Lybecker pointed out that capital support plays a crucial role in the initial stage of "green" entrepreneurship development [9]. Firstly, the financial system is based on the mechanism of capital formation, and through multi-dimensional innovation and transformation such as policy guidance, product innovation, technological innovation, and service upgrading, vigorously gathers private capital and efficiently converts savings into investment, thereby effectively realizing the circulation and growth of the capital pool. Starting from the "demand tracking" thinking mode, the continuous and sufficient financial support of the financial system can help enterprises solve financial constraints, achieve reasonable allocation and normal turnover of funds, and initially improve the economic output of enterprises in terms of scale. At the same time, capital support in terms of scale can be transformed into an improvement in capital efficiency. On the basis of improving environmental regulations and the endogenous mechanisms of corporate pollution externalities, support industrial enterprises in green technology research and innovation, further improve their green output, and meet the regional economic green development goals [10–12].

The capital allocation mechanism refers to the reallocation of capital through financial intermediaries and financial markets. which invests limited resources more into regions or entities with higher productivity and output growth rates.

This mechanism mainly further affects the process of economic green transformation through policies and market guidance, green technology innovation, and other mechanisms.

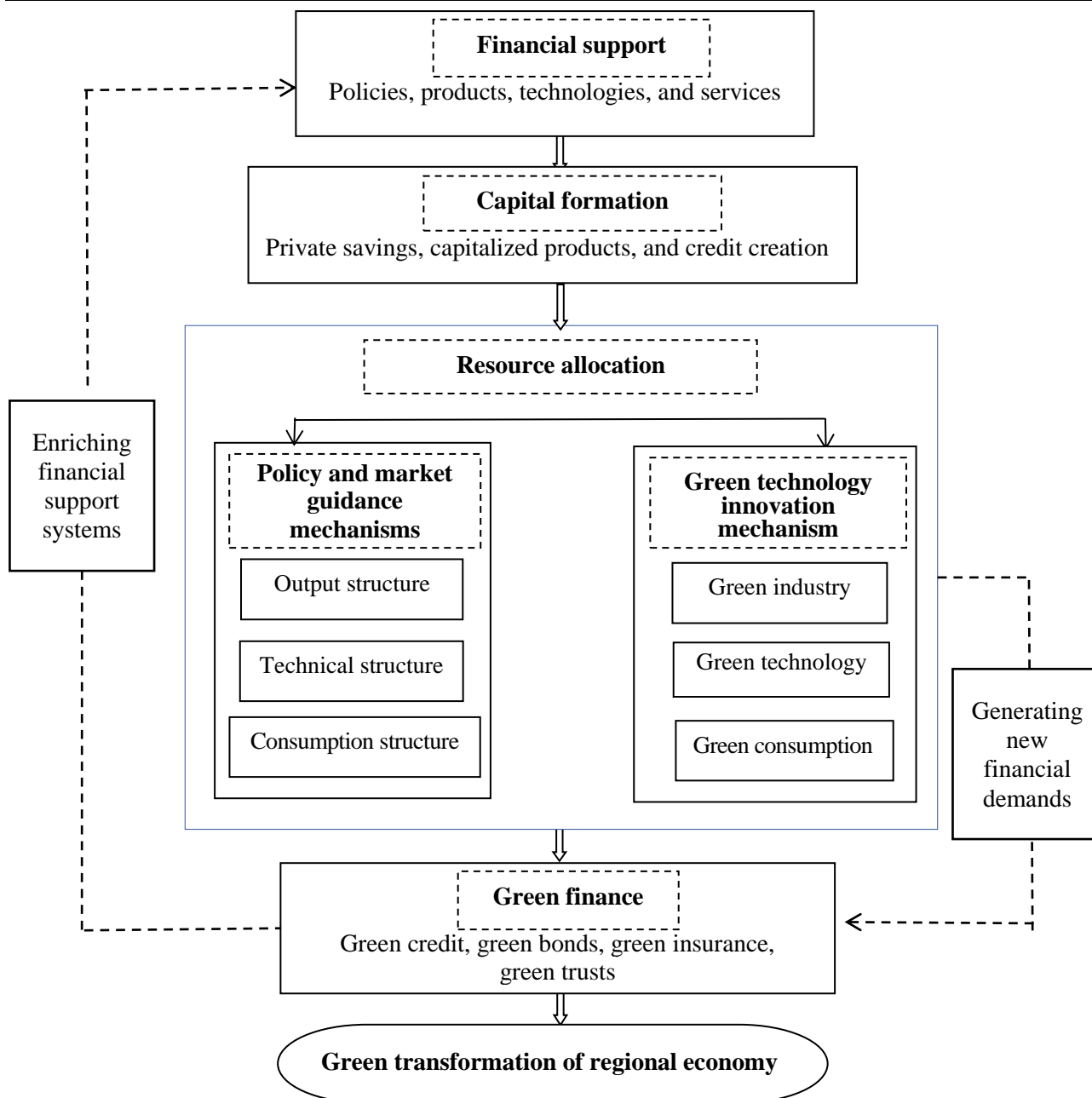


Fig. 1. Mechanism of financial stimulation of regional economy' "green" transformation

Рис. 1. Механизм финансового стимулирования «зеленой» трансформации региональной экономики

Some researchers divided financial support models into two types: demand following and supply leading in the real economy, and believed that supply leading can facilitate innovative investment before sustained economic growth begins [13-16]. In the initial stage of economic green transformation, the traditional financial capital allocation mechanism that relies on market economy spontaneous regulation is difficult to effectively guide capital flow to green industries and environmental protection projects. The financial system's support for green projects often faces problems such as insufficient internalization of environmental externalities, mismatched term structures, insufficient environmental information disclosure, and information asymmetry. The "bottom-up" support model lacks strong government participation and promotion, and progress is slow. Many principled issues require long-term game and adjustment by market participants to gradually solve [17, 18]. Therefore, in the process of promoting green transformation of regional economy, the government's macroeconomic regulation plays a crucial role in "supply guidance". The Organization for Economic

Cooperation and Development (OECD) has clearly pointed out that the three pillars of achieving green economic transformation lie in: firstly, implementing efficient regulatory policies to guide and regulate economic behavior towards a green direction; secondly, convey a strong signal of green and low-carbon development in the market, and use effective market tools to stimulate the green investment and innovation vitality of market entities; thirdly, provide comprehensive support for green technology innovation to promote the research and application of green technologies and promote the sustainable development of the green economy. Altaghlibi et al. pointed out that the monetary and regulatory policies of central banks play a crucial role in the green and low-carbon transformation of the economy, especially in the low-carbon transformation of energy [19].

The government optimizes the financial structure and improves the financial market through policy guidance mechanisms, using monetary policy tools such as credit tilt, preferential interest rates, differential interest rates, and implicit guarantees. The release of policies will have a certain signaling effect on market investment. Based on the price discovery function of financial markets, it can guide resources to tilt towards green industries and green technologies, and promote the development of green industries. At the same time, financial institutions can incentivize enterprises and individuals to participate more in green investment by providing preferential loan policies and reducing the financing costs of green projects. In addition, the financial market can also provide diversified financing channels and risk management tools for green projects through innovative green financial products. Under the dual coordination of policies and market mechanisms, guide financial capital to flow more towards the green sector.

Furthermore, from the perspective of economic green transformation, the key lies in technological progress. Only by accelerating the pace of technological innovation in the green field can we fundamentally enhance the market competitiveness of green related products and enhance their market attractiveness. A typical example is that in recent years, the intelligent driving technology in the field of new energy vehicles is gradually surpassing traditional energy vehicles. Through the effective operation of capital allocation mechanisms, financial institutions can attract more funds to invest in green industries and projects, promote industrial structure optimization and upgrading, and promote the transformation of traditional industries towards green and low-carbon directions. At the same time, this mechanism provides necessary financial support for green technology innovation, effectively promoting the research and application of green technology, thereby improving resource utilization efficiency and reducing environmental pollution.

Finally, under the capital allocation mechanism, financial markets can guide residents to engage in green consumption through interest rate policies. For example, for consumer credit for purchasing new energy vehicles, a lower interest rate policy is set, while for consumer credit for purchasing high-energy consuming products, a higher interest rate is correspondingly set to reflect the consumption support for green and low-carbon products and the consumption suppression of high-energy consuming products. Financial institutions can provide residents with higher quotas for low-carbon product consumption by launching innovative financial products such as low-carbon credit cards, thereby promoting their purchase of more low-carbon products. In terms of financial transaction systems, innovative financial service methods such as mobile banking are used to reduce the energy consumption of residents during the process of handling business due to round-trip travel. The electronic trading method has effectively reduced paper consumption caused by copying, printing, and other operations, further promoting the realization of energy conservation, emission reduction, and low-carbon living. Under the efficiency of capital allocation, enterprises and individuals will pay more attention to environmental protection, and their environmental awareness will be further enhanced, thereby promoting the formation of a good trend of green consumption in the entire society.

In the process of green transformation of regional economy, the risk diversification mechanism of finance also plays a key role. This mechanism mainly provides risk protection for green projects, reduces the risks faced by investors, and attracts more capital to invest in the green industry. Specifically, financial institutions can provide stable funding sources for green projects through issuing green bonds, establishing green funds, and other means, and provide effective risk management tools for investors through risk assessment and pricing mechanisms. At the same time, information disclosure and regulatory mechanisms in the financial market also contribute to enhancing the transparency and credibility of green projects, further reducing investment risks. Through this approach, the risk diversification mechanism of finance can effectively promote the transformation of regional economy towards a green and sustainable direction.

Discussion

To achieve green economic transformation, it is necessary to start from adjusting industrial structure, improving resource efficiency, adjusting consumption structure, curbing luxury consumption, unleashing carbon sequestration potential, and international and domestic economic and technological cooperation [20]. Finance has an impact on the green transformation of the economy, and should play a role in capital support, resource allocation, and investment guidance in these areas. These mechanisms interact and work together to provide strong support and guarantee for the green transformation of regional economy. In practice, each region needs to formulate scientific and reasonable financial policies, strengthen financial supervision, improve the financial market system, promote innovation in financial products and services, and better play the positive role of financial support in regional economic green transformation, in order to achieve sustainable economic and social development, taking into account specific situations such as regional resource endowment differences.

Conclusion

From the mechanism of financial support for regional economic green transformation, the following insights can be drawn: (1) Finance is an important support for achieving economic greening, and taking economic greening as the starting point is an important direction to improve the financial support system. Establishing a mechanism conducive to financial support for economic green development is an effective way to promote coordinated development between the two. Specifically, the responsibilities and obligations of financial institutions in environmental protection can be clearly defined from a legislative level, risk guarantee mechanisms can be improved, and a comprehensive multi-party information sharing and interaction platform can be established to compel enterprises that require investment and financing to disclose environmental information, and to expand information communication and sharing between financial institutions and environmental protection enterprises. (2) The development of green economy cannot be separated from the innovative support of abundant green financial products. Therefore, financial institutions should increase their efforts in financial innovation, analyze local financial needs, innovate financial products and services, and ensure that key areas of green economic development receive priority financial support. For the development of green finance with a focus on environmental information disclosure and sharing mechanisms and fund allocation mechanisms based on environmental information, it is necessary to guard against the existence of "greenwashing". Financial institutions can collaborate with third-party independent institutions to ensure the reliability of environmental information sharing platform information and improve the green benefits of green finance. (3) A professional talent team is an important driving force for economic and social development, as well as an important guarantee for achieving coordinated development of financial support and economic greening. To enhance the positive role of financial support in promoting green economic transformation, attention should be paid to the construction of a comprehensive professional talent team. These talents should not only have solid financial support knowledge, be familiar with ecological environment protection and resource efficiency improvement technologies, but also understand national and local policies, laws and regulations in the economic and environmental protection fields. In this regard, financial support institutions should carry out diversified business skill training to enhance the comprehensive quality and business capabilities of practitioners.

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Информация об авторах

Лю Лэй – аспирант кафедры «Инновационный и международный менеджмент» факультета управления ЮФУ; преподаватель, Синьянский университет сельского и лесного хозяйства.
Е. И. Лазарева – доктор экономических наук, профессор, зав. кафедрой «Инновационный и международный менеджмент» факультета управления ЮФУ.

Information about the authors

Liu Lei – PhD student, Department "Innovative and International Management", Southern Federal University; Lecturer, Xinyang Agriculture and Forestry University.
E. I. Lazareva – Dr. Sci. (Econ.), Professor, Head of Department "Innovative and International Management" of the Faculty of Management, Southern Federal University.

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