

Green Finance Promoting the Growth of Total Factor Productivity

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Abstract. In green finance law as the research object, with green total factor productivity, trying to build green finance law under the market regulation perspective and green, the theoretical framework of total factor productivity, explore green finance law and green total factor productivity of internal logic relationship, in order to get a more objective and robust conclusion, based on the theoretical study, by adopting a measuring model of space, From the static and dynamic dimensions, this paper systematically verifies the effect on the productivity of green total factors in China.

Keywords: Green Finance; the Rule of Law; Total Factor Productivity; the Green Principle; the Economic Law.

1. Research background and significance

Green finance takes resources and environment into consideration as endogenous factors of economic development. By carrying out relevant green credit business and optimizing resource allocation, green finance and green economy can achieve a win-win interaction, which plays a pivotal role in promoting high-quality economic development. Activities in the financial field such as credit business are regulated by contracts and economic laws. Credit business and other financial activities are regulated by contract and economic law. The Civil Code puts the green principle as the basic principle of civil law in the general part. In the civil and commercial fields, the green finance related laws in the field of economic activities are an important tool to escort the green productivity growth activities and ensure their realization in a legal and compliant state. Therefore, paying attention to the development status of green finance in China and exploring the role of green finance law in promoting green productivity in China and its realization path have become important topics in urgent need of research.

As an innovation in the financial field, green finance becomes one of the feasible ways to improve the efficiency of green economy and achieve high-quality economic development in China. As the first country in the world where the central government promotes the development of local green finance, governments at all levels actively develop the green finance market. However, the frontier and intersection of green finance make the research results outside China few, and green finance itself also has many problems to be solved. It is worth thinking about the effect of green finance development. As an important industry of social and resource allocation, finance also injects environmental protection and other concepts into financial products. Green finance emerges at the right moment and becomes a new engine for high-quality economic development under the current environment.

2. Research status

Romer (1986) first started to study that financial development promoted TFP growth through technological progress, and then the classic endogenous growth theory emerged. According to this theory, the financial system's capital support for technological innovation can greatly improve the technical level, and then promote the growth of total factor productivity.

From the perspective of the channels through which financial development affects TFP growth, with the improvement of financial market efficiency, the threshold for enterprises to use foreign advanced technology will be lowered, which will make enterprises have more opportunities to conduct technological research and development (Alfaro et al.,2002; Fisman,2004). Financial

efficiency has a positive impact on technical efficiency of production, and technological progress is the main driving force of TFP growth (Zhang and Jin, 2005; Chen and Li, 2009; Ma, 2014). They found that financial deepening has a significant relationship with TFP growth, and the degree of promoting TFP is closely related to regional differences.

When studying TFP, scholars can consider the impact of undesirable outputs such as environmental pollution and resource waste. The concept of green TFP provides a new direction for research, adds new content to the theoretical system of economics, and provides a theoretical basis for the sustainable economic development of developing and developed countries. Chung et al. (1997) first incorporated emissions as a negative output into efficiency analysis and measured green TFP; Fukuyama (2009) developed a non-radial and non-angular slack based (SBM) model to measure green TFP. With the global economic recovery and growth, resource and environment problems are becoming more and more serious, and the research on total factor productivity considering energy consumption and environmental protection factors has become one of the key topics concerned by scholars. Beck et al. (2000) found that financial development can significantly improve green TFP; (Calderon and Liu, 2003; Rioja and Valev, 2004) argued that financial deepening can drive economic growth by accelerating capital accumulation and TFP; (Chen and Zhu, 2019; Sheng et al., 2020; Zhang and Lin, 2021) based on China's provincial panel data, this study finds that financial structure can significantly improve green TFP, but the improvement effect shows certain differences in different regions.

At present, green finance and green TFP can be roughly divided into two types: qualitative analysis at the theoretical level and quantitative investigation at the empirical level. In terms of theoretical research, scholars at home and abroad mainly focus on the relationship between green finance and sustainable economic development.

Zhang (2017) focuses on the development of financial legislation on climate change, takes improving the special law on green finance as the main line, and drives the relevant legislation on climate change and carbon emission trading (Pan and Yang, 2021) to promote the deep reform of the financial law system with green principles (Wang and Zhu, 2021). In the context of rural revitalization, introducing the concept of sharing economy into green finance and building a rural green finance sharing platform with the help of modern scientific and technological means can promote the depth and breadth of green finance services for rural economy. (Shang, 2021, A Study on the legal system of Green and Shared Finance from the perspective of Rural Revitalization) Combined with the reality of China, with the integration of financial law and environmental law as the theoretical support, this paper puts forward a plan to build the legal system of green bonds in China.

3. Research Review

Through literature research method, qualitative research method, inductive analysis method, comparative research method, system analysis method, empirical analysis method, simulation calibration method, inductive summary method to carry out project problem research, aiming to further promote the introduction of green finance law, form a good interaction with the field of green finance, plan to solve part of the shackles of green finance theory. To solve how to deal with the integration relationship between green principles and green finance, solve the problems related to green securities, green credit and green insurance, and further promote the rule of law of green finance and solve the problem of green finance.

The impact of green finance on economic growth is still a controversial topic, and no consensus has been reached yet. Most scholars believe that the development of green finance can endogenize sustainable development, provide impetus for economic restructuring and upgrading, improve the sustainable utilization rate of resources, and thus promote economic growth (Markandya, 2015; Ruiz, 2016; Zhou, 2020). Some scholars also use different data, different angles and different econometric models to make empirical analysis and come to the opposite conclusion, holding that green finance not only cannot promote economic growth, but will inhibit economic growth (Zhang, 2009; Ning,

2014). Liu (2019) established a simultaneous equation model to test the relationship between green finance and economic growth in five northwest provinces and regions, and found that the overall influence coefficient was significantly positive, but the performance of each province was different. Most scholars believe that green finance can guide funds to enter green industries, optimize resource allocation, and promote the improvement of the overall quality of ecological environment (Luo, 2005; Jeffrey, 2019).

Since the neoclassical economic growth theory proposed that improving total factor productivity is the only source of long-term economic growth, a large number of scholars have tried to explore various mechanisms through which financial development promotes TFP. Robert and Levine(1993) put the financial sector into the framework of endogenous economic growth, and found through deductive reasoning that financial development can improve total factor productivity, thus promoting economic growth. The empirical study of Beck et al. (2000) found that financial development can achieve economic growth through the promotion of total factor productivity, an important channel. Rioja et al. (2004) found that the correlation between financial development and TFP is closely related to economic development, and in countries with high levels of economic development, financial development mainly promotes economic growth by increasing TFP. However, Huang and Lin(2009) came to a different conclusion, believing that the promotion effect of financial development on TFP is more prominent in developing countries. Elhadj (2017) examined the relationship between finance and TFP in 40 African countries, and found that financial development could not promote TFP in either low-income or upper-middle income countries. However, most studies believe that a well-run financial system can accelerate technological innovation and improve TFP, thus achieving sustainable economic growth (Arestis, 2006; Beck, 2009).

At present, the number of academic research results on financial development and green TFP is limited. David(2008) found that finance can support technological innovation, and technological innovation can improve the resource-output ratio, thus improving green TFP. Chinese scholars have conducted a lot of research on financial development and green TFP. Based on China's provincial panel data, Huang (2014) established a spatial econometric model and concluded that financial development can improve green TFP through corporate supervision, capital allocation and other functions. Wang (2017) took Wujiang Ethnic Minority area as a sample and used panel data regression to find that financial development promotes green TFP by promoting technological progress.

(1) Review and summarize the relevant domestic and foreign literature on the spillover effect of financial development on economic growth

Based on the theoretical background of supply-side structural reform, this paper reviews the development process of economic growth theory, and according to the neoclassical economic growth theory, develops from the perspective of overall adjustment, comprehensive reform and coordinated development of economic structure. Based on the existing literature, this paper constructs the LS model with financial variables to explore the effect of green finance on green TFP growth. By introducing interaction terms to consider the scale effect and information spillover effect of green finance, this paper supplements and improves the existing literature on theoretical model and empirical level. At the research content level, this paper mainly introduces the theories and methods related to this study. It includes relevant theories on the development of green finance, green TFP, and the influencing mechanism of green finance on green TFP to provide corresponding theoretical support for the following research.

(2) The effect mechanism and empirical test of green finance rule of law on green TFP growth

This paper builds a theoretical framework of green finance and green TFP in combination with the classical theory and China's economic reality. Firstly, this paper explains and summarizes the causes of green finance from the perspective of geographical differences, government promotion and market selection, and mainly explores the mechanism of green finance spillover effect with the help of local spillover model (LS model). Secondly, this paper makes a reasonable limit on the spillover scope of knowledge in space, and provides a theoretical basis for how to study the agglomeration and diffusion

of industries in space. Finally, the financial industry is included in the theoretical analysis framework, and the research paradigm of spatial economics is used to evaluate and interpret the impact and path of green finance on green TFP from the perspectives of green capital, capital allocation, technological innovation and enterprise supervision. This paper lays a factual foundation for further theoretical analysis and empirical research on the spatial spillover effect of green finance on regional green TFP in China.

4. Conclusion

Considering the spatial correlation of market regulation, a spatial econometric model is established to study the spatial spillover effect of green finance on green TFP, deepen the influence of green finance law on green TFP from the perspective of spatial dynamics, and put forward the view that there is spatial synergy among green finance, economic growth and legal guarantee, so as to improve relevant research theories. To provide relevant legal reference for improving the service function of green finance and regional economic development. This paper not only uses the method of combining static panel and dynamic panel to empirically test the impact of green finance on green TFP at the national level, but also divides the national sample into three sample regions according to geographical location: eastern, central and western regions for heterogeneity test, so as to enhance the explanatory power and robustness of the econometric regression results. This method is more systematic than the existing research results.

It is necessary for the legal research on green finance to keep up with the research process based on green finance to promote green TFP. Therefore, the research and practice of green finance will increase the possibilities of relevant academic theories and practices.

Some studies have examined the impact of green finance on economic growth from an empirical perspective, which is inspiring for further research on green finance. However, most scholars generally use GDP to measure economic development when studying the relationship between green finance development and economic growth. However, GDP cannot reflect the quality of economic growth and evaluate the benefits generated by green finance. However, GDP cannot reflect the quality of economic growth and evaluate the benefits generated by green finance. Moreover, the existing studies discuss the economic and environmental effects of green finance separately. As green finance has the function of both traditional financial resource allocation and environmental protection, it should pay more attention to the economic benefits of green finance considering social and environmental factors.

At present, most of the relevant research on green finance adopts qualitative analysis methods, and a few quantitative research papers only choose a single index to measure its effect on economic growth and environment. Moreover, linear models are mostly used in model setting, without considering that the field of green finance is green industry, which usually has the characteristics of long investment cycle and slow effect. Therefore, non-linear models should be considered when setting models.

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