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Influence of Circular Economy Financial Marketization on Development of Private Economy Based on Input-Output Model

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Abstract: *The private economy can be said to be one of the most important sources of power for rapid economic development and an indispensable force in promoting economic development. The private economy not only provided more than half of the tax revenue, but also provided 80% of the jobs for the market and created more than 60% of the gross domestic product. Therefore, it is of great significance to continuously improve the development environment of the private economy for building a new development pattern. It can be clearly said that the modern private economy is not only an important part of the modern economic system, but the development of the private economy is also related to the progress of high-quality social and economic development. Especially under the influence of factors such as the escalating global and regional frictions and the continued spread of the COVID-19 epidemic, the overall economic development environment is already very bad, and the development of the private economy is particularly important at this time. At present, the main problems that need to be overcome in vigorously developing the private economy are as follows: financing constraints, social credit assessment and legal-related risks. If people want to overcome these problems in a short period of time, they need not only policy backing. Meanwhile, it is necessary to introduce new technologies to promote the growth of the private economy. The circular economy financial marketization based on the input-output model can not only effectively solve the problems related to the development of the private economy, but also propose a set of economic development models to help the development of small private enterprises. This paper studied the various effects of the circular economy financial marketization based on the input-output model on the growth of the private economy, and tested the feasibility of the circular economy financial marketization based on the input-output model to promote the development of the private economy. At the same time, relevant control experiments were designed to simulate the development speed of the private economy itself under the same background and the growth speed of the private economy combined with the circular economy financial marketization based on the input-output model. Comparing the two sets of data, it is found that the impact coefficient of circular economy financial marketization on the growth of the private economy based on the input-output model was about 28.5%.*

Keywords: *Private Economy; Circular Economy; Financial Marketization; Input-Output Model; Economic Development*

1. Introduction

As an important component of the basic economic system, the private economy can not only provide impetus for economic development, but also improve social employment rate and people's life satisfaction. However, in recent years, the private economy itself has fallen into development difficulties due to the impact of the global epidemic. At present, only by combining the input-output model with relevant technologies such as circular economy and financial marketization with the development of the private economy, can we hope to help the private economy get rid of the current predicament.

The private economy is a combination of multiple ownerships and multiple modes of operation arising from the economic system's overhaul. It is a general term for a new economic model that is different from all economic forms of the state-controlled economy under the planned economy model. Ge H used the SDM model to study the impact of digital financial inclusion on the high-quality

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development of the private economy. He used the entropy method to calculate the development index of the private economy, and the research results proved that the development of digital inclusive finance has a positive effect on the high-quality development of the private economy [1]. Xin-Juan Yu studied the growth of the private economy by taking the overseas growth of the cotton industry in cities and towns as a sample. The research results showed that the main driving force of modern social development comes from the challenge of overseas trade, and at the same time had a strong connection with the logic and connotation of regional economic development [2]. Zhang H analyzed the nonlinear relationship between private economic development and innovation drive based on the threshold effect of economic development data from multiple regions. The results showed that there was indeed a double threshold effect between the innovation drive and the development of the private economy [3]. In order to ensure the sustainable development of the private economy, Yang KC conducted a survey on the private economy and constructed a set of monitoring indicators. He used the AHP process to obtain the weights of each monitoring index, and used the fuzzy mathematical theory to establish a private economic development model [4]. Liu D conducted a study on the existing fair competition review system in order to promote the development of the private economy. He clarified that the existing fair competition review system lacked the review of stock policies and regulations, and the competitive neutrality policy was still not perfect, which pointed out the way for the improvement of the fair competition review system [5]. Under the background that economic development has entered a new normal, Zhang H studied the system of private economic development for the purpose of transforming and upgrading the economic structure. He built a private economic development system under the new normal, and he put forward some suggestions for promoting the development of the private economy [6]. Wang C conducted research on the issues affecting the high-standard development of private economic enterprises, and put forward some effective suggestions such as optimizing the internal governance structure, strengthening the construction of talent teams and innovative development [7]. The private economy has always been an important part of economic development, but as the market has been affected by the epidemic in recent times, the growth of the private economy has fallen into a predicament. Therefore, people still need to study how to get rid of the current development dilemma.

In the development process of circular economy financial marketization, the integration of input-output model and circular economy has jointly promoted the development of circular economy financial marketization. Subramanian N studied the effect of traditional concepts and new product development in the performance of private enterprises under the circular economy, and considered the combination of sustainability factors and circular economy to jointly promote economic development [8]. In the current market economy environment, Zhang B analyzed the innovation efficiency of private listed companies in a certain region, and used the data envelopment analysis model to evaluate their efficiency. The results showed that the current private enterprises' innovation input and output were generally not high, which cannot maximize the benefits of investment resources [9]. Sohal A conducted research on the transition of small and medium-sized private enterprises to a circular economy. He demonstrated the importance of reduction, recycling and reuse, and that collaboration was also a critical extrinsic factor for success [10]. Grytsyshen D conducted research on the public-private cooperation system of private enterprises in the implementation of circular economy policy, and proved that circular economy policy does have a positive impact on company-enterprise cooperation [11]. Cheng L analyzed the impact of the new circular economy model on promoting the sustainable development of private enterprises. He carried out sustainable development transformation through a series of methods such as reforming the company's organizational structure, establishing new incentive mechanisms, improving performance appraisal methods and changing models [12]. Yi L conducted research on the circular economy evaluation index system of private enterprises in the construction industry. Combining the characteristics of the circular economy development of construction enterprises, he constructed a new circular economy evaluation index system, which provided a theoretical basis for enterprises in the construction industry to further improve the level of circular economy [13]. Nand AA introduced the basis of circular economy for private enterprises. He used the theory of socio-technical systems to explain how social, technological and environmental characteristics affect the circular economy. He detailed the various drivers of management, policy makers and associations helping SMEs to move towards a circular economy paradigm [14]. Although the development history of circular economy financial marketization based on the input-output model is relatively short, the development speed is very rapid, and it has been widely used in many fields. With the changes in the economic and market environment, its development has also fallen into a predicament.

This paper studied the impact of circular economy financial marketization on the development of private economy based on the input-output model. It was verified that the input-output model and the

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circular economy model have a positive effect on the development of the private economy. The input-output model help private enterprises to calculate the profitability of the enterprise. The circular economy model help enterprises carry out sustainable development reforms, and the two technologies jointly promoted the high-quality development of private enterprises.

2. Circular Economy Financial Marketization Based on Input-Output Model

This chapter mainly introduces and analyzes the circular economy financial marketization based on the input-output model. In order to facilitate understanding, the circular economy financial marketization based on the input-output model is divided into two modules and introduced in turn. First, the input-output model is introduced, and then the circular economy financial marketization is analyzed.

(1) Input-output model

Input-output is mainly a linear model that reflects the relationship between input and output between various departments in the economic system by establishing a corresponding mathematical model through the input-output table. Input-output table refers to a table that can show the relationship between input and output of all products in various departments. The input-output model is widely used in the analysis of regional industrial composition and the analysis of regional interaction. The input-output model can be divided into static input-output model and dynamic input-output model according to time. The static input-output model mainly studies the relationship between various departments in a specific period. The dynamic input-output model aims at several time periods to study the relationship between various departments in the process of reproduction and reproduction.

Input-output models decompose the economy of the subject under study into sectors. Each sector has a complete function of producing products or services, and there is an external demand vector to represent the demand from other regions to the research subject economy. The structure of the input-output model is shown in Figure 1.

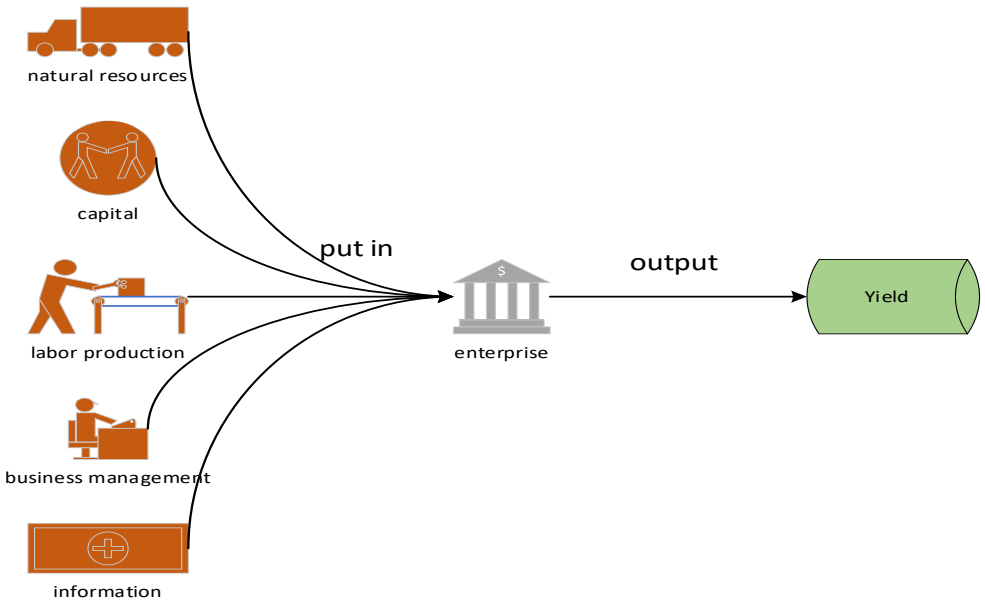

Figure 1: Schematic diagram of the input-output model structure

(2) Marketization of circular economy finance

First of all, we need to understand what circular economy is, that is, all the activities of light-weighting, reuse and recycling in the process of production, transaction and consumption. Circular economy restructures the economic model according to the material and energy circulation laws of the natural ecosystem, perfectly integrates economic development into the circulation process of the natural ecosystem, thereby establishing a new economic model. It is essentially an ecological economy that uses the laws of ecology to lead the economic development in human society. As an important method to achieve resource conservation and environmental friendliness, the importance of circular economy is increasing in all aspects.

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The traditional economic model is a linear economic chain from resources to products to destruction. Under this economic model, people develop the natural resources on the earth to the maximum extent, and at the same time discharge pollution to the natural ecological environment without restraint in the production and processing process [15]. The use of resources in the traditional economy is often used up. Although this model of continuously turning natural resources into waste land has achieved rapid growth of the traditional economy, it has also led to the depletion of many natural resources and caused catastrophic pollution to the natural environment. Different from this, circular economy advocates a development model in which the materials at the source of production are continuously reused. It requires all kinds of economic activities to form a geosphere with repeated flow of resources, products and regeneration materials, minimize the generation of waste in the process of economic development, and fundamentally solve the fundamental contradiction between environment and development. Among them, the process of circular economy model and traditional economy model is shown in Figure 2.

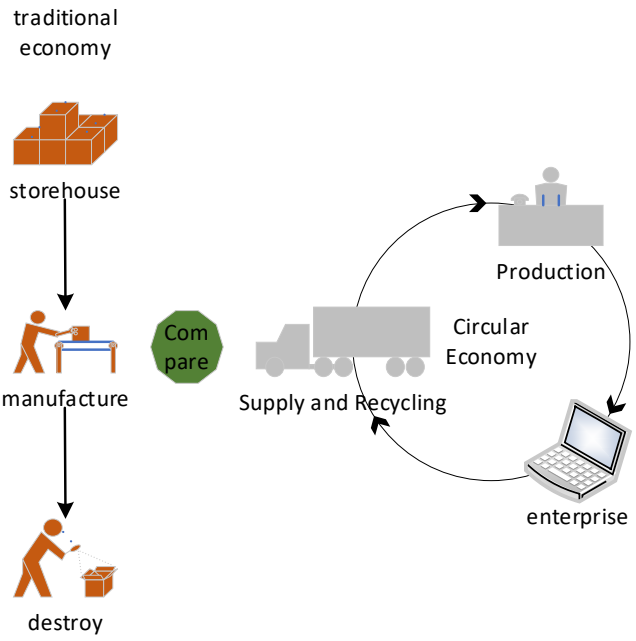

Figure 2: Comparison of circular economy and traditional economy

Circular economy has a new system view, economic view, values, production view and consumption view, which reflect the main characteristics of circular economy. The system of circular economy is a large-scale system covering human, natural and scientific elements. It requires that production and consumption not only consider its own economic principles, but also conform to the economic principles of the entire large system. The economic concept requires more consideration of the carrying limit of the ecological environment in the process of economic development. The values of circular economy require people in economic development, nature and technology to consider each other, not only to develop themselves, but also to bring benefits to the other two. The production concept of circular economy requires maximizing the utilization efficiency of natural resources. The consumption concept of circular economy advocates moderate consumption and hierarchical consumption, and establishes the concept of saving while people consume.

3. Development of Private Economy

According to official documents and related policies, the private economy can be defined as a non-public economy, including individual and private economies. At present, the national economy is divided into three parts by private enterprises, group enterprises and state-owned enterprises. In recent years, the distribution trend of the private economy has become more and more obvious, and its proportion in the gross national product is also increasing [16]. Due to the flexible management mechanism of the private economy, it can fully mobilize the enthusiasm of employees. In addition, it can continuously carry out product innovation, open up new fields, and promote the optimization of the overall structure of a certain field, which greatly promotes the growth of the national economy [17]. The functional structure of a general private enterprise is shown in Figure 3.

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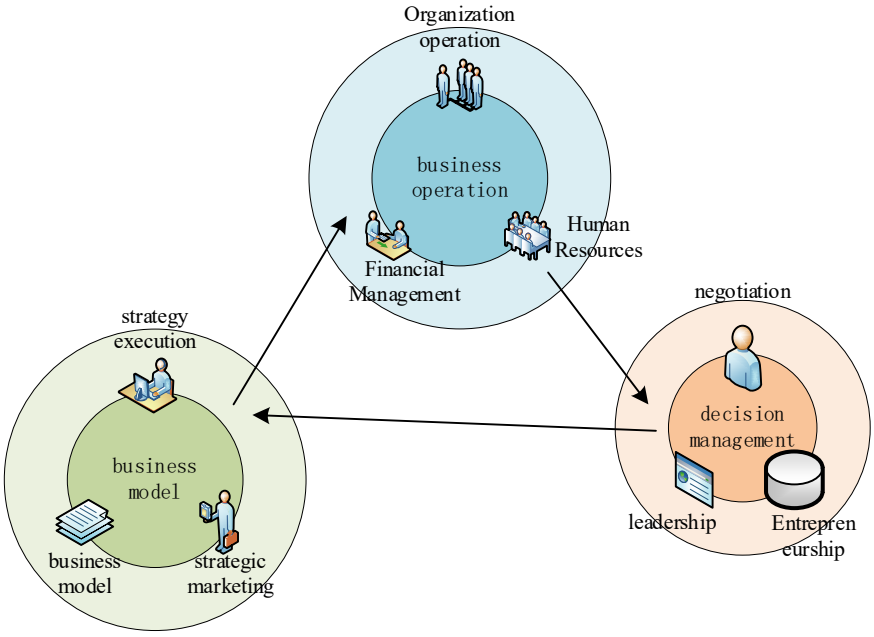

Figure 3: Functional structure of general enterprises in the private economy

However, due to the constraints of the external market environment, the development of the private economy has also fallen into a predicament. Since the development starting point of private enterprises is generally not high, and the blindness of investment is relatively strong, most private enterprises do not pursue long-term development, and it is difficult to achieve good development only by pursuing short-term goals [18]. A small number of decision-makers in private enterprises do not have a strong sense of professional ethics, and abnormal competition occurs from time to time. Because most enterprise decision-makers have not undergone systematic training, they lack a long-term strategic development vision, and their attraction to talents is not as strong as that of state-owned enterprises . In addition, the management system and model of private enterprises often fall into family management. With the continuous development of enterprises, this family management model would only delay the development speed of enterprises. Finally, the ability of private enterprises to withstand market risks and economic cyclical fluctuations is far less than that of state-owned enterprises. For example, the COVID-19 epidemic in recent years has led to the closure of many private enterprises.

If we want to help the private economy to speed up its development, we must face up to and solve some of the difficulties existing in the daily operation of private enterprises. It is necessary to improve the status quo of private enterprises, strengthen their good communication with banks and other financial institutions, and create a good development environment and preferential policies for private enterprises. At the same time, private enterprises should strengthen their own financial management, improve the competitiveness of talents, improve the talent training mechanism and attach importance to the cultivation of corporate culture. At the same time, it is necessary to fully improve the credit management mechanism of enterprises in financial institutions, and financial institutions should develop service fields and develop financial products suitable for private enterprises [19].

4. Input-output Model Algorithm

This paper studies the impact of the circular economy financial marketization on the development of the private economy based on the input-output model, and analyzes the input-output model, the circular economy and the private economy one by one. This chapter mainly studies the algorithms in some input-output models used in this paper, and analyzes some functions of these algorithms in the development of private economy.

The first is to introduce the mathematical model of input and output, assuming that there are n departments in a private enterprise. x_{ij} represents the input of the jth sector, and d_i is used to represent the external demand of the enterprise, then the total output of the ith sector in a certain period can be calculated by formula (1).

$$x_i = \sum_{j=1}^{n} x_{ij} + d_i \tag{1}$$

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Then use formula (2) to calculate the coefficient of the output of the jth sector for the direct consumption of the jth sector.

$$a_{ij} = \frac{x_{ij}}{x_j} \tag{2}$$

At this time, the total output of each department is the same as the total input, so x_j also represents the total input of the j department, and formula (3) is obtained.

$$x_i = \sum_{j=1}^{n} a_{ij} x_j + d_i \tag{3}$$

When the total output x is linear to the external demand d, each time d increases by one unit, the calculation of x is shown in formula (4).

$$\Delta x = (1 - A)^{-1} \Delta d \tag{4}$$

At this time, A in the formula (4) represents the calculation matrix of the direct consumption coefficient, which can be represented by the formula (5).

$$A = (a_{ij})_{n \times n} \tag{5}$$

In addition, the related algorithms of the cobweb model in the market economy are introduced. First, x_k is used to represent the quantity of commodities in the kth period, and the price is marked as y_k. At this time, the calculation formula of commodity prices in the same period is shown in (6).

$$\mathrm{y_k} = \mathrm{f(x_k)} \tag{6}$$

Next, the quantity and price of the commodity are calculated using formula (7) and formula (8), respectively.

$$x_{k+1} = h(y_k) \tag{7}$$

$$y_k = g(x_{k+1}) \tag{8}$$

At this time, h and g reflect the supply relationship of producers, which is also called the supply function. Secondly, the difference formula model is used to calculate f and h near a certain point, and the formulas are expressed as (9) and (10).

$$y_k - y_0 = -\propto (x_k - x_0), \propto > 0 \tag{9}$$

$$x_{k+1} - x_0 = \beta(y_k - y_0), \beta > 0 \tag{10}$$

Eliminating y_k from the two formulas (9) and (10) can obtain a first-order linear constant coefficient difference formula, as shown in formula (11).

$$x_{k+1} - x_0 = -\propto \beta(x_k - x_0), k = 1,2, \ldots \tag{11}$$

Deduce formula (11), then formula (12) can be obtained.

$$\mathrm{x_{k+1} - x_0 = (-\propto \beta)^k (x_1 - x_0)} \tag{12}$$

The function of supply for the two periods is then calculated as shown in (13).

$$x_{k+1} = g(\frac{y_k + y_{k-1}}{2}) \tag{13}$$

At this time, formulas (9) and (10) can be expressed as formula (14).

$$x_{k+1} - x_0 = \frac{\beta}{2}(y_k + y_{k-1} - 2y_0) \tag{14}$$

Secondly, it is assumed that (15) can be obtained by combining formula (10) with formula (13), and formula (15) mainly calculates the increment of the demand function.

$$2x_{k+2} + \propto \beta x_{k+1} + \propto \beta x_k = (1 + \propto \beta) x_0 \tag{15}$$

The characteristic root of formula (15) is judged, and its characteristic formula (16) is obtained.

$$2\lambda^2 + \propto \beta\lambda + \propto \beta = 0 \tag{16}$$

Then calculate its characteristic root, the expression is shown in formula (17).

$$\lambda_{1,2} = \frac{-\propto\beta \pm \sqrt{(\propto\beta)^2 - 8\propto\beta}}{4} \tag{17}$$

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The price model is then calculated using formula (18).

$$p = pA + a \tag{18}$$

At the same time, the factor of price influence is introduced to enhance the accuracy of its calculation, as shown in formula (19).

$$\Delta p = \Delta a_v (1 - A)^{-1} \tag{19}$$

At the same time, the static changes of its price trend are compared, as shown in formula (20).

$$\Delta p_1 = \Delta p_1 A_u + \Delta p_2 A_1 \tag{20}$$

Finally, the value is calculated using formula (21).

$$p = rA_v (1 - A)^{-1} \tag{21}$$

The above analysis is all the calculation models used by the input-output model in this paper. These calculation models calculate the trend and current situation of the growth of the private economy and help people better understand the development of private enterprises.

5. Experimental Study on Growth of Private Economy Based on Circular Economy Financial Marketization Based on Input-Output Model

This chapter studies the impact of the circular economy financial marketization based on the input-output model on the development of the private economy through relevant data and experiments. The development speed and quality of the private economy based on the input-output model of circular economy financial marketization are compared with the development speed and quality of the traditional private economy, and the impact on various industries is collected and expressed using data. It proves that the circular economy financial marketization based on the input-output model can indeed have a positive impact on the development of the private economy. This chapter first collects and analyzes the total input-output value of a certain region in a certain year, as shown in Figure 4.

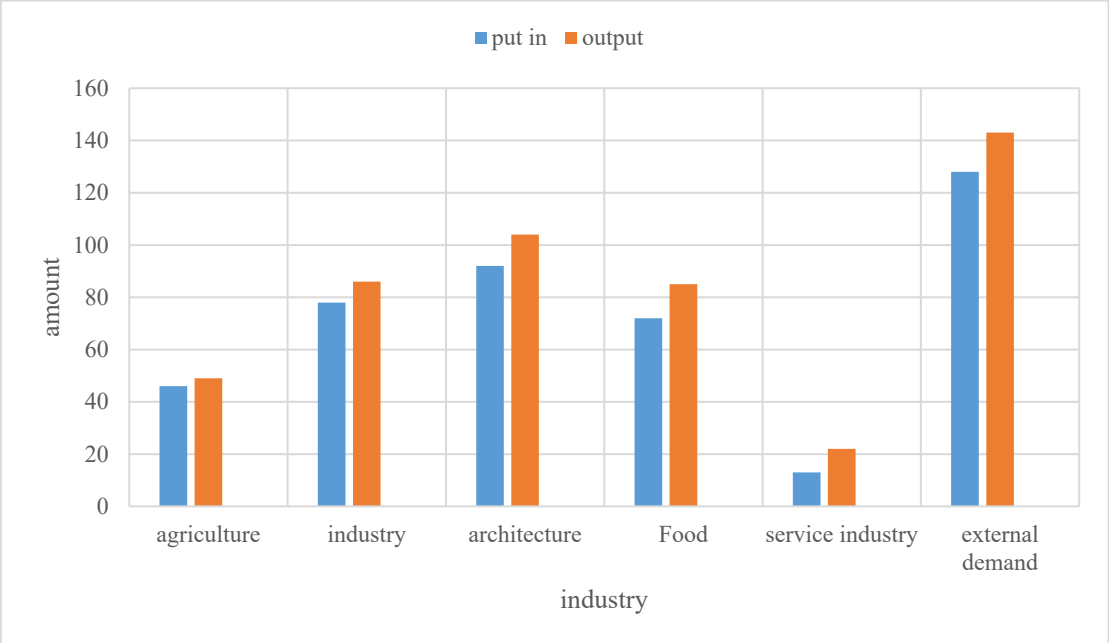

Figure 4: The total value of input and output in a certain region

It can be seen from Figure 4 that the total input-output value of the service industry in a certain period of time in this region is much lower than that of other industries. The total value of the remaining industries is higher in the construction industry, followed by the industry, followed by the catering industry and agriculture. Basically, the output value of all industries is higher than the input value, and the output value of the catering industry is higher than the input value. During this period, due to the impact of the global COVID-19 epidemic market environment, the service industry was relatively sluggish, but there was still a high external demand, so there is still good room for development in various industries in the future.

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Then display the commodity demand and supply data in the region, as shown in Figure 5.

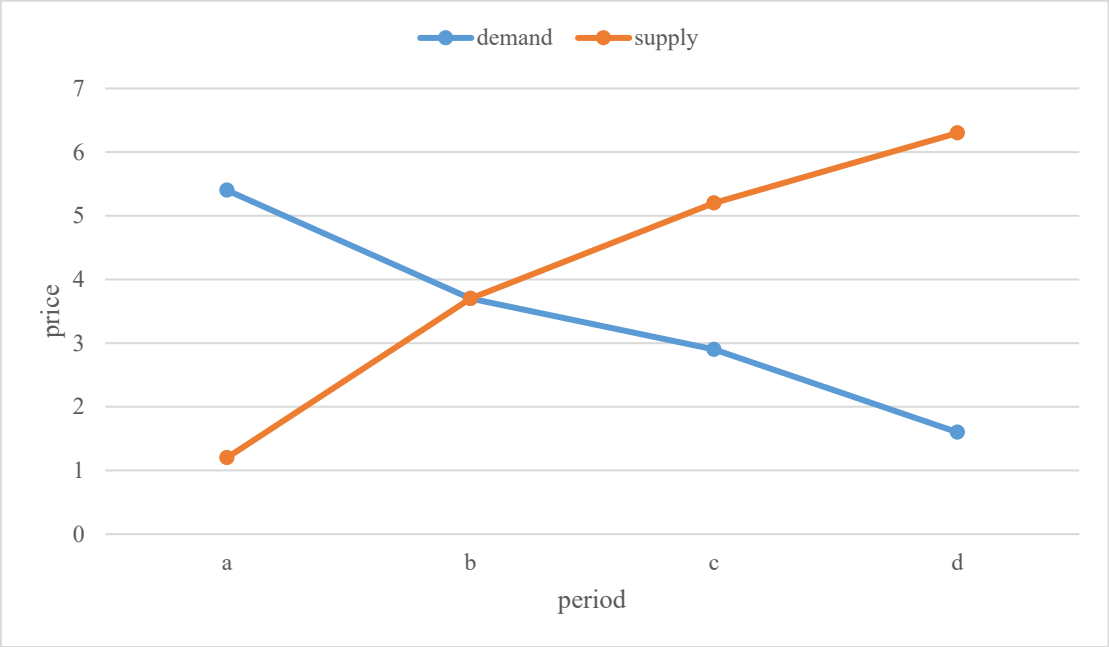

Figure 5: Price trends in a region with changes in supply and demand

Figure 5 shows the data of demand and supply in this region. On the whole, the number of commodities supplied in this region continues to increase as time progresses, and the number of commodity demand decreases, which leads to a gradual decrease in commodity prices. In period b, the demand quantity and supply quantity in this area are equal. Before b, the commodity price is higher because the supply is less than the demand. After the b period, the supply exceeds the demand and the commodity price continues to decrease. This also shows that with the development of the market, the price of commodities would decrease as the number of commodities increases. At this time, private enterprises can survive only by changing their business models.

Next, Figure 6 shows the impact of circular economy financial marketization based on the input-output model on the development of the private economy.

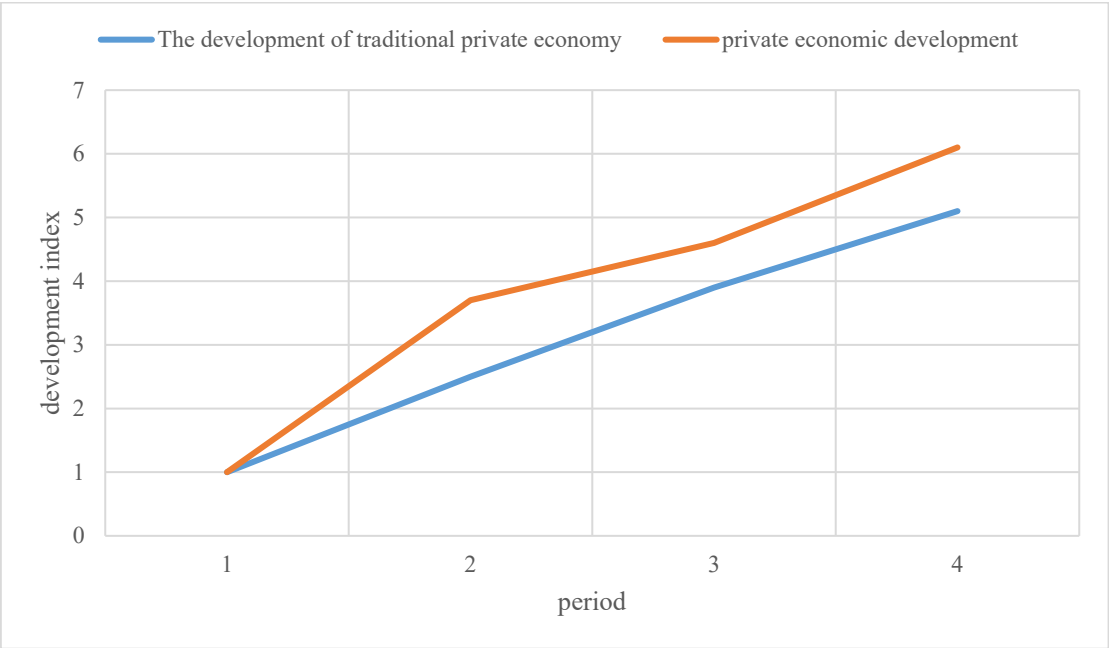

Figure 6: The impact of circular economy financial marketization on the private economy based on the input-output model

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It can be seen from Figure 6 that the circular economy financial marketization based on the input-output model has a positive impact on the development of the private economy. The development trend of the private economy based on the input-output model of circular economy financial marketization is represented by red lines. It can be seen from the figure that the red line is always higher than the blue line, that is, the private economy of circular economy and financial marketization based on the input-output model is of higher quality than the traditional private economy. It can be seen from the calculation of the data in the figure that the influence coefficient of circular economy financial marketization based on the input-output model on the private economy is about 28.5%. It is proved that the circular economy financial marketization based on the input-output model has a good effect on the development of the private economy, but there is still some room for improvement.

6. Conclusion

The development of the private economy has accelerated since the reform and opening up, resulting in uneven professional quality of decision makers in private enterprises, so the development quality of each private enterprise is also different. At present, in order to improve the market economic system and promote the high-quality development of the private economy, various policies to encourage the development of the private economy have been continuously implemented. Measures to promote private-sector development are also continually being refined, and new technology that may aid in the growth of the private economy are continually being suggested. This paper studied the impact of the circular economy financial marketization based on the input-output model on the growth of the private economy, and verified that the circular economy financial marketization based on the input-output model does have a positive impact on the development of the private economy. However, there is still room for improvement in this positive impact, so more research is needed to improve this positive impact and accelerate the high-quality development of the private economy.

References

[1] Ge H, Wu Q. Research on the Spatial Influence of Digital Inclusive Finance on the High-quality Development of Private Economy. Management Science and Research: Chinese and English Versions, 2022, 11(2): 66-76.

[2] Xinjuan Yu. Overseas Trade and the Development of the Private Economy in the Towns South of the Yangtze River: In the Case of the Cotton industry. Journal of Xiamen University (Arts & Social Sciences), 2019, 23(1): 1-6.

[3] Zhang H, Du L. Innovation-driven, Government Role and the Development of the Private Economy: a Threshold Effect Analysis Based on China's 30 Provinces Data. Journal of Henan Normal University (Philosophy and Social Sciences Edition), 2019, 12(3):21-26.

[4] Yang K C. Research on the Prosperity of Private Economy Based on Fuzzy Theory. Design Engineering (Toronto), 2020, 12(10): 794-800.

[5] Liu D, Qiu J. Research on Improving the Fair Competition Review System under the Background of Promoting the Development of Private Economy. Legal Forum, 2019, 20(1): 7-8.

[6] Zhang H, Du L. Research on the Contribution and Dynamic System of Private Economy Development under the New Normal——Taking Jilin Province as an Example. Western China, 2019, 3(4): 67-68.

[7] Wang C. Internal Governance in Need for High Quality Development of Private Economy. Proceedings of the 1st International Symposium on Economic Development and Management Innovation (EDMI 2019), 2019, 23(5): 655-659.

[8] Subramanian N, Gunasekaran A, Wu L. Role of traditional Chinese philosophies and new product development under circular economy in private manufacturing enterprise performance. International Journal of Production Research, 2019, 57(23): 7219-7234.

[9] Zhang B, Li X. Research on Innovation Input-Output Efficiency Evaluation of Private Listed Companies in Liaoning Province. IOP Conference Series Materials Science and Engineering, 2018, 43(9): 32-36.

[10] Sohal A, Vass T D. Australian SME's experience in transitioning to circular economy. Journal of Business Research, 2022, 142(70): 594-604.

[11] Grytsyshen D, Sergiienko L, Ksendzuk V. The System of Public-Private Partnership in the Sphere of State Policy Implementation of Circular Economy. Journal of Corporate Responsibility and, Leadership, 2020, 6(3):29-30.

[12] Cheng L. New Model of Circular Economy For Enterprise Sustainable Development. Hebei

ISSN 2616-5902 Vol. 6, Issue 6: 183-192, DOI: 10.25236/AJBM.2024.060628

Metallurgy, 2017, 131(64): 91-93.
[13] Yi L, Liu Z. The study of evaluation index system on construction enterprise's circular economy. Iop Conference, 2017, 69(1): 111-121.
[14] Nand A A, Goyal P, Bhattacharya A. Developing a circular economy: An examination of SME's role in India. Journal of business research, 2022, 142(3): 435-447.
[15] Li Yu. China's Private Economy Shows Great Development with Growing Market Value. China's Foreign Trade, 2020, 577(1): 60-62.
[16] Yang Y. On Harmony Connotation in the Change of Property Right System of Private Economy in Taizhou. Journal of Taizhou University, 2019, 57(29): 86-91.
[17] Tan J, Hu W, Yu Y. Promoting Zhejiang's Private Economy to Create Advantages with the Spirit of the Red Boat. Journal of Jiaxing University, 2019, 37(2): 1-2.
[18] Kai Li. Innovating Direct Financing Model to Help the Sustainable Development of Private Economy—An Exploration and Practice Based on Chang'an Bank. West China Finance, 2019, 111(3): 71-72.
[19] Huijuan Li. Effectively Guiding the Foreign Economic and Trade Activities of Private Economy Through Data Information Science and Technology. Management & Technology of SME, 2018, 51(35): 90-93.