Article

Analysis of Effects on the Dual Circulation Promotion Policy for Cross-Border E-Commerce B2B Export Trade Based on System Dynamics during COVID-19

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Abstract: In 2020, the cross-border e-commerce industry suffered a setback against the backdrop of the global epidemic. In the context of the global epidemic and economic structural reform and transformation, China has proposed a new economic pattern of "dual circulation" development, and this measure has greatly promoted the development of China's cross-border e-commerce industry. According to relevant data, the export share of China's cross-border e-commerce accounted for 77.6% of its market size in 2020. As a result, this paper studies the influence of the "dual circulation" measure on the development of cross-border e-commerce B2B export trade and classifies and analyzes the policies related to the cross-border e-commerce industry in the "dual circulation" measure. Then, a system dynamics model reflecting the lag effect of this measure on cross-border e-commerce B2B export is also constructed, and the effects of different single policies and different policy combinations on cross-border e-commerce B2B export are simulated successively. The modeling process and simulation results demonstrate that: (1) infrastructure investment of cross-border e-commerce is most affected by policy lag, followed by government supervision and enterprise operation, while talent training of cross-border e-commerce and customs supervision are almost not affected by policy lag; (2) tax policy, customs clearance policy, and fiscal policy have greater effects on the promotion of cross-border e-commerce B2B exports, while the payment policy and talent policy have less impact on them; and (3) from the simulation results of policy combination, it can be seen that the regulatory environment (i.e., regulatory policies) is the most important to promote cross-border e-commerce B2B export trade, followed by financial support, customs environment, and business environment. Finally, this paper gives suggestions for the formulation of relevant government policies to promote the development of cross-border e-commerce B2B export trade and provide some reference values for other governments to develop the cross-border e-commerce B2B export trade industry.

Keywords: dual circulation; cross-border e-commerce B2B; system dynamics; policy effect analysis

1. Introduction

At the beginning of 2020, countries in the world, including China, have slowed down economic development due to COVID-19. The global cross-border e-commerce industries face problems such as tight production supply chain, abnormal market supply and demand, blocked cross-border logistics, and declining consumption power. Specifically, China's total imports and exports in the first quarter of 2020 decreased by 6.4% year-on-year. In this context, the Chinese government, in line with the development trend of the country's economy, proposed a "dual circulation" measure, which indicates to

"accelerate the formation of a new pattern of development in which domestic and foreign circulations reinforce each other" to accelerate economic development. Supported by the "dual circulation" measure, China's cross-border e-commerce industry developed fast in the scale of import and export trade. In 2020, China's cross-border e-commerce import and export volume was USD 266.6 billion, a year-on-year increase of 31.1%, of which exports were USD 176.7 billion with an increase of 40.1%, and imports were USD 89.9 billion with an increase of 16.5%. China's cross-border e-commerce industry concentrates on export, accounting for 77.6%, and the main mode of cross-border e-commerce transactions in China is cross-border e-commerce B2B, and the transaction proportion has reached 77.3%. Based on this, it is more practical to study B2B export trade for cross-border e-commerce. Currently, the "dual circulation" measure for cross-border e-commerce is divided into "domestic cycle" and "international cycle". The purpose of the "domestic cycle" measure is to accelerate the deepening and development of the domestic industrial chain, broaden the domestic market, and integrate the domestic industrial chain with the international industrial chain so as to promote the development of the cross-border e-commerce goods supply chain. The "international cycle" measure involves the establishment of international logistics parks, cross-border e-commerce bases, free trade zones, and other carriers, and continuous improvement of cross-border e-commerce information service systems such as cross-border trade public service platforms, cross-border payment regulations, and cross-border e-commerce infrastructure provides important impetus for the development of cross-border e-commerce in China. It can be seen that the "dual circulation" measure provides an opportunity for the rapid development of cross-border e-commerce B2B exports. At the same time, the relevant data show that when China's import and export trade is frustrated, the export of cross-border e-commerce is still large. Therefore, the impact of the "dual circulation" measure on the development of cross-border e-commerce B2B exports has important practical significance. That is, the results of this study provide some reference values for other countries' governments to formulate policies to support the B2B export trade of cross-border e-commerce by analyzing how the "dual circulation" measure affects the development of the B2B export trade of cross-border e-commerce.

The current analysis of the development of the cross-border e-commerce industry is mainly divided into qualitative and quantitative methods. Qualitative analysis methods mainly include inductive analysis, comparative analysis, structural analysis, and other methods. Generally, scholars often use macro data to qualitatively analyze the development of cross-border e-commerce and mainly study the shortcomings and development prospects of the cross-border e-commerce industry in the context of contemporary social economy and policies. For example, under the background in the "Belt and Road Initiative", Liu [1] studied the development of the cross-border electricity industry in Guangzhou. From the perspectives of cross-border electricity trader enterprises to demand characteristics, combined with the corresponding plan to cultivate talent policy on cross-border electricity businessman's recommendation, she suggested that enterprises, governments, and colleges and universities combined market on cross-border electricity businessmen to the actual demand of the talent training scheme. Yang [2] elaborated on the development scale and prospect of cross-border e-commerce in China, and through the data analysis of the proportion of cross-border e-commerce in foreign trade over the years, he believed that cross-border e-commerce could promote the reform of commercial subjects and production modes, which was a transformation and upgrading of traditional foreign trade. In the context of China's economic structural reform and upgrading, Xu [3] believed that cross-border e-commerce was an innovative trade mode for enterprises, which could help enterprises transform and upgrade. In addition, he analyzed the constraints and optimization strategies of the company's operation mode from the perspective of Chinese enterprises. Wang [4] found that various quality problems and after-sales problems greatly limited the development of cross-border e-commerce. In addition, he thought that it was necessary to make use of big data technology to formulate reasonable management strategies and take advantage of environmental factors conducive to its own development. Xie [5] believed

that advanced information technology could promote the development of cross-border e-commerce, and the application of blockchain technology could establish cross-border goods tracing system. Meanwhile, he put forward the problems and countermeasures faced by the integration of blockchain technology and cross-border e-commerce. Through descriptive statistical analysis of the interview data of 12 Chinese immigrant entrepreneurs living in Australia and New Zealand, Sandhu [6] found that the cross-border e-commerce platform could help the digital entrepreneurship ecosystem and turn the challenges faced by digital entrepreneurship into advantages.

In addition, methods for quantitative research on the development of the cross-border e-commerce industry mainly include text mining, PMC analysis (Product Material Control), regression analysis, structural equation modeling, machine learning, and system dynamics. For example, He [7], taking the OECD countries (Organization for Economic Co-operation and Development) as an example, using the panel data from 2000 to 2018 for econometric analysis, found that, in the long run, there was a significant positive correlation between international logistics and cross-border e-commerce, while in the short run, there was a significant negative correlation between international logistics and cross-border e-commerce. Chang [8] used principal component analysis to analyze the panel data of 11 Southeast Asian countries from 2010 to 2019, evaluated the development level of cross-border e-commerce in each country, and empirically analyzed the impact of cross-border e-commerce level on China's export trade by using a gravity model. His results show that the cross-border e-commerce level in Southeast Asia had a positive impact on China's export. Chen [9] studied the intermediary effect between customer experience and consumer purchase intention in the process of cross-border e-commerce consumption embedded in network structure. He found that the size of the network had no significant impact on consumers' purchase intention, and he believed that this result was due to the homogenization of cross-border e-commerce platforms. Svobodová [10] sampled 89 e-commerce companies that sell electronic products online and identified 15 factors that influenced consumers' online choice and purchase of electronic products. The study found that the majority of e-commerce businesses adopted a balanced e-strategy based on assessing factors of online shopping behavior. At the same time, it found that the strategic behavior of e-commerce enterprises was affected by online shopping behavior factors. Ortiz [11] studied the main variables influencing the development of e-commerce in European countries from 2003 to 2017. It used cross-sectional correlation test (Pesaran test), unit root test (cross-sectional Im, Pesaran, and Shin tests), co-integration test (Kao and Fisher–Johansen tests), and heterogeneity causality test (Hurlin and Dumitrescu tests). It found that the variables studied had the characteristic of transverse correlation, and they were order-integral. In addition, these variables were co-integrated, indicating that there was a long-term relationship equilibrium between these variables. Dospinescu [12] explored what factors affected the customer satisfaction of e-commerce in Romania and Moldova and found that there were differences in the factors that affected the customer satisfaction level of e-commerce in Romania and Moldova. Ma [13] used the panel data of 31 provincial regions in China from 2015 to 2018. He believed that cross-border e-commerce could promote China's economic growth and economic convergence. He suggested promoting infrastructure construction conducive to the development of cross-border e-commerce in economically backward areas, which could accelerate regional economic growth. Based on the supply and demand theory of microeconomics, Wang [14] analyzed the impact of cross-border e-commerce on international market commodities and used the entropy method to quantify the overall development level of China's cross-border e-commerce and calculated the trade cost of China–EU bilateral trade. He believed that cross-border e-commerce could reduce the trade cost of China–EU bilateral trade and increase China's exports of goods to the EU. Through the data analysis of 203 foreign trade companies, Nan [15] found that the cross-border e-commerce business, as an enterprise innovation, played an intermediary role between the government's policies to support innovation and enterprise performance, especially its system innovation and business model innovation. Li [16] studied how cross-border e-commerce stimulated

trade and economic growth and affected the changes in industrial chain layout under the environment of China's new economy. He believed that the development of cross-border e-commerce not only brought opportunities for economic development but also brought adjustments to traditional international trade. China's One Belt One Road country export trade was studied by using a gravity model from 2000 to 2018 in Yin [17]. The results show that the development of cross-border e-commerce had a positive impact on export trade. Du [18] thought that distance and space have different influences on cross-border electricity providers. The analysis of the international trade and cross-border electricity supplier of the "one belt" country, using spatial subcorrelation, multi-dimensional gravity model, and spatial Durbin model, showed that the spatial autocorrelation effect was not existent for cross-border electricity providers, and the geographical distance effect of cross-border electricity providers was not significant. Wang [19] constructed three transnational logistics models. The simulation results show that if cross-border e-commerce B2C wanted to eliminate and reduce product return, it could adjust the delivery to an early schedule under different product purchase and sales prices, commodity tariffs, and international and domestic postage and operating costs. He believed that the O2O (Online To Offline) mode was the best mode for cross-border e-commerce B2C selling high-priced products. Bao [20] mined the antecedent variables of the impact of the Chinese product image on consumption intention from qualitative data and then developed a contextual model of consumer product evaluation and purchase intention. The results show that cross-border e-commerce platforms could enhance consumers' willingness to consume Chinese products by improving product quality, cost control, brand image, and enterprise strength. Ma Fan [21] used system dynamics to study the impact of the "Belt and Road" policy on regional cross-border e-commerce logistics performance. He analyzed the "Belt and Road" policy from three aspects—customs clearance, taxation, and payment—and constructed the system dynamics subsystem. Finally, an empirical analysis was carried out on the logistics performance of cross-border e-commerce in Hangzhou. Zhou [22] analyzed the influence of government behavior on the development of cross-border e-commerce based on an evolutionary game and system dynamics. First, he established an evolutionary game model between government and enterprise, revealed the dynamic evolution process of the two, and constructed a quantitative system dynamics model. Analyzing the impact of government actions on all aspects of the cross-border e-commerce industry, Zhou also found that the government could boost the cross-border e-commerce industry by increasing financial support, increasing cross-border e-commerce infrastructure, optimizing the customs environment, and increasing supervision. However, his study did not specifically analyze and classify government policies and did not consider the government's influence on the cross-border e-commerce industry in a specific period. Elia [23] used a multiple regression model to study the role of digital technology and capability in cross-border e-commerce business from the perspective of RBV and found that both digital technology and capability could help enterprises improve their digital export capability in cross-border e-commerce business. Taherdoost [24] analyzed customer satisfaction by means of content validity, exploratory factor analysis, constructive test, and cluster discrimination, looked for factors affecting customers' satisfaction with cross-border e-commerce from the aspects of cross-border e-commerce performance, availability, and quality, and put forward a scheme on how to improve e-commerce user satisfaction. Goldman [25] studied a sample of 446 small B2C e-retailers in Europe using a structural equation model and an alternative model and found that the deployment of digital marketing strategy had a positive effect on the performance of cross-border e-commerce business.

According to the above-mentioned literature analysis, although many scholars have conducted research on cross-border e-commerce, there are few papers on the quantitative study of the impact of the "dual circulation" measure on cross-border e-commerce B2B export trade. Based on this, this study solved how to quantify the impact of this measure on the B2B export development of cross-border e-commerce. Its quantitative model has certain reference values for future research on the impact of the "dual cycle" measure on

other industries. That is, it can specifically analyze the implementation process of this measure and understand the development and change of the industry from many aspects and levels. In addition, the analysis of the impact of China's dual-cycle measure on the B2B export development of cross-border e-commerce can provide certain reference significances for other governments to formulate policies to support the development of the cross-border e-commerce industry.

Before the quantitative study of the impact of the "dual circulation" measure on the B2B export development of cross-border e-commerce, the following research hypotheses are put forward in this section, which are verified by the research results:

(1) The "dual circulation" measure can promote the B2B export development of cross-border e-commerce.

(2) The tax policy, customs clearance policy, fiscal policy, payment policy, and talent policy all have significant positive impacts on the B2B export development of cross-border e-commerce.

(3) Different policy combinations can have positive impacts on the development of cross-border e-commerce B2B export trade.

In order to quantitatively study the influence of the "dual circulation" measure on the B2B export development of cross-border e-commerce and verify the research hypothesis proposed above, this paper takes the implementation of this measure as the background, first analyzes a series of policies related to the "dual circulation" measure proposed by the government, and then classifies them so as to build a theoretical system of its impact on cross-border e-commerce B2B export trade. Then we establish a system dynamics model to simulate the impact of the "dual circulation" measure on cross-border e-commerce B2B export trade and obtain the effects of different types of policies on it. Finally, this paper analyzes the implementation effects of the issued policies and makes recommendations to promote the development of cross-border e-commerce B2B export trade.

The structure of the paper is arranged as follows: Section 2 classifies a series of policies related to the "dual circulation" measure; Section 3 builds a system dynamics model; Section 4 studies the impact of a series of policies related to the "dual circulation" measure on cross-border e-commerce B2B export trade and studies the implementation effect of the "dual circulation" measure; Section 5 analyzes and discusses simulation results; and Section 6 is a summary of the full text and prospects for future work.

2. Research Framework

First of all, this paper takes the B2B export trade of cross-border e-commerce under the background of the "dual circulation" measure as the research object, selects policies related to the cross-border e-commerce industry in the "dual circulation" measure, and classifies them, mainly including "tax policy", "customs clearance policy", "fiscal policy", "payment policy", and "talent policy". At the same time, the content of policies is analyzed to establish the theoretical basis for the impact of different policies on the cross-border e-commerce industry. Then, a causal analysis reflects the influence process of cross-border e-commerce B2B export trade with different policies. After that, according to the causal analysis, the system dynamics model reflecting the impact of the "dual circulation" measure on cross-border e-commerce B2B export is constructed. Through model verification, the original one is modified to build a system dynamics model including the policy lag factor. Subsequently, the established system dynamics model is used to analyze the impact of single policy and policy combination on cross-border e-commerce B2B export trade. Finally, the simulation results are analyzed and discussed, and the research conclusions are drawn. The detailed research framework of this paper is shown in Figure 1.
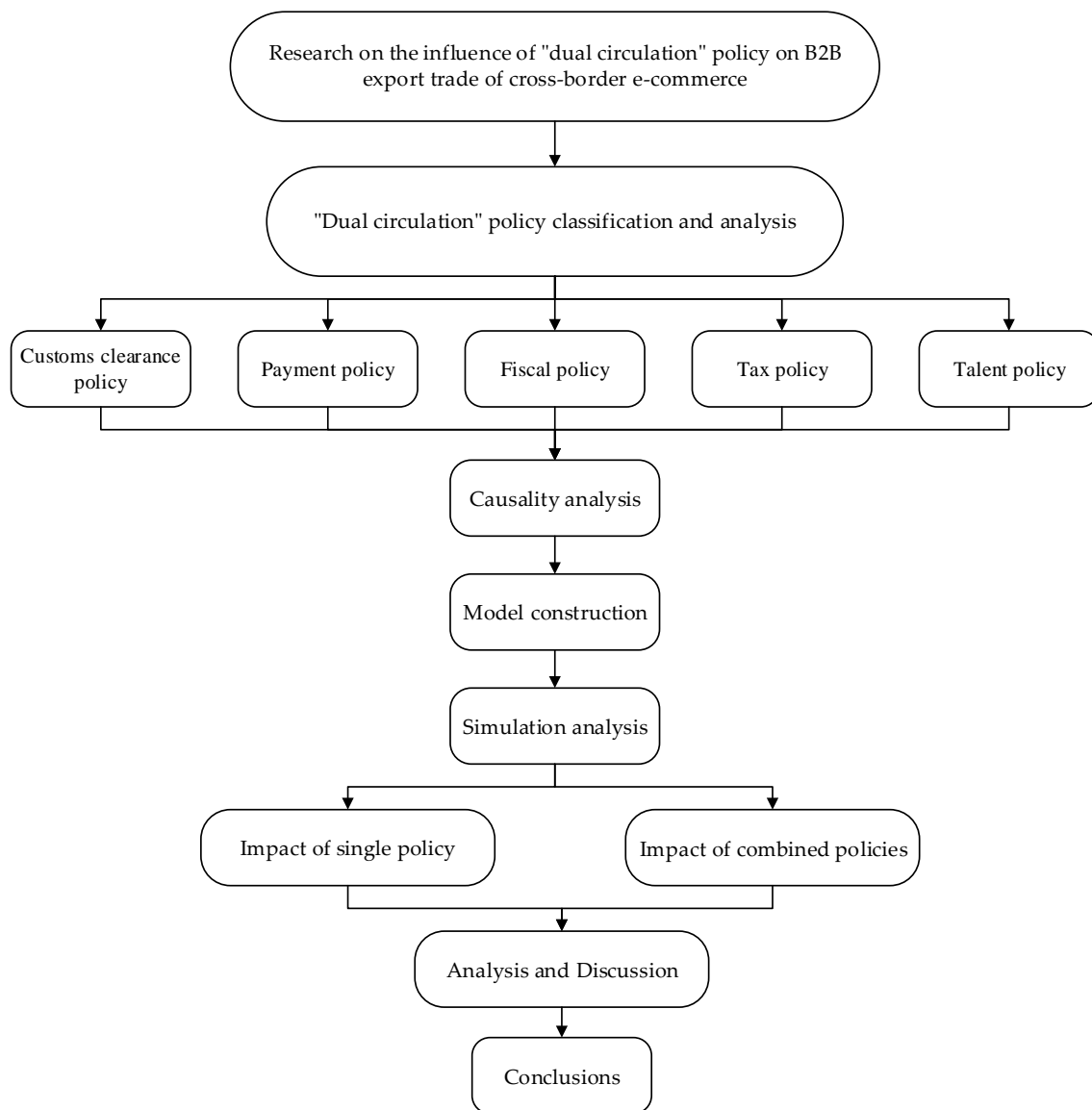
Figure 1. Research framework of this paper.

3. Analysis of Cross-Border E-Commerce Support Policies in the Context of the "Dual Circulation" Policy

This section analyzes the content of the "dual circulation" measure and discusses its impact on the cross-border e-commerce industry.

3.1. Analysis of the Content of the "Dual Circulation" Measure

At present, China attaches great importance to the development of the cross-border e-commerce industry. Since 2013, the state has published many policies to support the development of cross-border e-commerce. Here, by logging into the official websites of the Department of E-commerce and Information Technology of the Ministry of Commerce of the People's Republic of China and the General Administration of Customs, a series of policies related to the "dual circulation" measure regarding the development of cross-border e-commerce are collected. After screening, 34 relevant policies are obtained. Based on department and time dimension, the results are shown in Table 1.

Table 1. The statistics of the policy.

Department	2020.01–03	2020.04–06	2020.07–09	2020.10–12	2021.01–03	2021.04–06	Count
State Council	0	1	4	2	2	2	11
Ministry of Commerce	0	1	9	4	0	0	14
CustomsBureau	1	1	1	0	0	0	3
Other departments	3	2	1	0	0	0	6
total	4	5	15	6	2	2	34

Here, according to the different fields of the "dual circulation" measure, the policies are divided into five categories, namely tax policy, payment policy, customs clearance policy, subsidy policy, and talent policy. The implementation of different policies can reduce the cost of cross-border e-commerce companies, promote the circulation of goods, and contribute to personnel training and infrastructure construction. Therefore, after further screening, the total number of cross-border e-commerce related categories from January 2020 to June 2021 is figured out. The results are shown in Table 2.

Table 2. The statistics of different types of policy.

Policy Category	Count
Customs clearance policy	18
Payment policy	11
Fiscal policy	14
Tax policy	15
Talent policy	2

3.1.1. Customs Clearance Policy

Customs clearance policy mainly includes the supervision of import and export goods during customs clearance, operation time, and customs declaration form filling. Customs clearance policy can directly affect the efficiency of customs clearance, which directly affects the efficiency of cross-border e-commerce trade and, in turn, affects the development of cross-border e-commerce. Based on this, the system regulations on customs clearance policies should be paid attention to.

There are 18 customs clearance policies for cross-border e-commerce published by the National Development and Reform Commission, the General Administration of Customs, the Ministry of Commerce, and the State Council from January 2020 to June 2021. The results are shown in Table 3.

Through the interpretation and analysis of these 18 cross-border e-commerce customs clearance policies, we can find that their contents mainly focus on the supervision of import and export goods, operation time, etc., which aim to expand cross-border e-commerce import and export goods, shorten the customs clearance time, solve export tax rebates, and support the development of cross-border e-commerce companies.

3.1.2. Payment Policy

Cross-border payment refers to the purchase or introduction of goods, technology, or services from other countries by one country and payment for them in the relevant currency. It mainly involves individuals, companies, third-party payment platforms, banks, and other individuals. There are 11 policies related to China's cross-border e-commerce payment policies issued from January 2020 to June 2021 by the State Administration of Foreign Exchange, the State Council, and the Ministry of Commerce. The results are shown in Table 4.

Table 3. The statistics of customs clearance policy.

Date of Issue	Department	Policy Document
13 March 2020	National Development and Reform Commission	Implementation Opinions on Promoting Consumption, Expanding Capacity, Improving Quality, and Accelerating the Formation of a Strong Domestic Market (Development and Reform of Employment 2020 No. 293)
28 March 2020	Customs Bureau	Announcement No. 45, 2020 of the General Administration of Customs (Notice on Regulatory Matters related to Return of Retail Imported Goods in Cross-border E-commerce)
13 April 2020	Ministry of Commerce	Circular of the General Office of the Ministry of Commerce on the Work of Innovating Exhibition Service Model and Fostering New Driving Force for the Development of the Exhibition Industry
13 June 2020	Customs Bureau	Announcement No. 75, 2020 of the General Administration of Customs (Announcement on The Pilot Project of Cross-border E-commerce Enterprise-to-Enterprise Export Supervision)
7 July 2020	State Council	Circular of the State Council on copying and popularizing the experience of the sixth batch of pilot reforms in pilot free Trade zones
12 August 2020	State Council	Opinions of the General Office of the State Council on Further stabilizing Foreign trade and foreign investment
14 August 2020	Customs Bureau	Announcement No. 92, 2020 of the General Administration of Customs (Announcement on Expanding the Scope of Pilot Cross-border E-commerce Enterprise-to-Enterprise Export Supervision)
9 September 2020	Ministry of Commerce	Reply to Recommendation No. 7660 of the Third Session of the 13th National People's Congress
21 September 2020	State Council	Circular of the State Council on printing and distributing the general plan of Beijing, Hunan and Anhui Pilot Free Trade Zone and the Plan of Expanding the area of Zhejiang Pilot Free Trade Zone
28 September 2020	Ministry of Commerce	Letter concerning the reply to Proposal No. 2679 of the Third Session of the 13th National Committee of the CPPCC
28 October 2020	Ministry of Commerce	Reply to Recommendation No. 5338 of the Third Session of the 13th National People's Congress
31 October 2020	Ministry of Commerce	Letter of reply to Proposal No. 3641 (Commerce and Tourism No.073) of the Third Session of the 13th National Committee of the CPPCC
31 October 2020	Ministry of Commerce	Reply to Recommendation No. 6429 of the Third Session of the 13th National People's Congress
31 October 2020	Ministry of Commerce	Reply to Recommendation No. 4991 of the Third Session of the 13th National People's Congress
9 November 2020	State Council	Implementation Opinions of The General Office of the State Council on promoting innovative Development of Foreign Trade
19 March 2021	State Council	Opinions of the State Council on implementing the division of major Work in the *Government Work Report*
7 April 2021	State Council	Opinions of the General Office of the State Council on further improving the Reform of Delegating power, improving regulation and providing services
8 May 2021	State Council	Reply of the State Council on agreeing to carry out cross-border e-commerce retail import drug pilot program in Henan Province

Table 4. The statistics of cross-border payment policy.

Date of Issue	Department	Policy Document
14 April 2020	State Administration of Foreign Exchange	Notice of the State Administration of Foreign Exchange on Optimizing foreign exchange management to Support foreign Business Development
20 May 2020	State Administration of Foreign Exchange	Circular of the State Administration of Foreign Exchange on Supporting the Development of New Forms of Trade
11 June 2020	State Council	Opinions of The State Council on implementing the division of key Work Departments in the *Government Work Report*
12 August 2020	State Council	Opinions of the General Office of the State Council on Further stabilizing Foreign trade and foreign investment
1 September 2020	Ministry of Commerce	Reply to Recommendation No. 5156 of the Third Session of the 13th National People's Congress
7 September 2020	State Council	The Reply of the State Council on deepening the work plan of Beijing's New round of comprehensive pilot projects for further opening up of the service industry to build a National Comprehensive Demonstration Zone for further opening up of the service industry
7 September 2020	Ministry of Commerce	Reply to Recommendation No. 9496 of the Third Session of the 13th National People's Congress
21 September 2020	State Council	Circular of the State Council on printing and distributing the general plan of Beijing, Hunan and Anhui Pilot Free Trade Zone and the Plan of Expanding the area of Zhejiang Pilot Free Trade Zone
28 October 2020	Ministry of Commerce	Reply to Recommendation No. 5338 of the Third Session of the 13th National People's Congress
9 November 2020	State Council	Implementation Opinions of The General Office of the State Council on promoting innovative Development of Foreign Trade
19 March 2021	State Council	Opinions of the State Council on implementing the division of major Work in the *Government Work Report*

Generally speaking, continuous optimization of the convenient and secure cross-border payments can effectively reduce the cost of cross-border online shopping, improve the security of cross-border transactions, and facilitate cross-border payments.

3.1.3. Subsidy Policy

Subsidy policy refers to the state providing subsidies to enterprises or individuals that meet the conditions for financial subsidies in a certain period of time, according to its political, economic, and social development tasks. There are 14 cross-border e-commerce policies issued from January 2020 to June 2021. The results are shown in Table 5.

Through combing the government's financial subsidy policy, our study found that the government has given financial subsidies to cross-border e-commerce infrastructure construction, cross-border logistics construction, and overseas warehouse construction. For example, certain financial support will be given to enterprises whose import and export transaction volume of cross-border e-commerce reaches a certain scale.

3.1.4. Tax Policy

In order to support the development of cross-border e-commerce, the Chinese government has continuously improved its tax system in recent years, such as lowering import tariffs on certain commodities and implementing a "no-ticket exemption" policy for eligible cross-border e-commerce companies. This section collects and sorts out China's tax policies on cross-border e-commerce published from January 2020 to June 2021 with a total of 15 documents issued by the State Administration of Taxation, the National Development and Reform Commission, the Ministry of Commerce, and the State Council. The results are shown in Table 6.

Table 5. The statistics of fiscal policy.

Date of Issue	Department	Policy Document
13 April 2020	Ministry of Commerce	Circular of the General Office of the Ministry of Commerce on the Work of Innovating exhibition Service Model and Fostering New Driving Force for the Development of the Exhibition Industry
11 June 2020	State Council	Opinions of The State Council on implementing the division of key Work Departments in the *Government Work Report*
12 August 2020	State Council	Opinions of The General Office of the State Council on Further stabilizing Foreign trade and foreign investment
1 September 2020	Ministry of Commerce	Circular of the Ministry of Commerce on supplementing national E-commerce Demonstration Bases in 2020
7 September 2020	Ministry of Commerce	Reply to Recommendation No. 9448 of the Third Session of the 13th National People's Congress
9 September 2020	Ministry of Commerce	Reply to Recommendation No. 7660 of the Third Session of the 13th National People's Congress
11 September 2020	Ministry of Commerce	Reply to Recommendation No. 1239 of the Third Session of the National People's Congress
28 September 2020	Ministry of Commerce	Letter of Reply to Proposal No. 3825 (Commerce and Tourism No. 088) of the Third Session of the 13th National Committee of the CPPCC
28 September 2020	Ministry of Commerce	Letter concerning the reply to Proposal No. 2679 of the Third Session of the 13th National Committee of the CPPCC
28 September 2020	Ministry of Commerce	Letter of Reply to Proposal No. 3615 (Commerce and Tourism No.068) of the Third Session of the 13th National Committee of the CPPCC
28 October 2020	Ministry of Commerce	Reply to Recommendation No. 5338 of the Third Session of the 13th National People's Congress
9 November 2020	State Council	Implementation Opinions of The General Office of the State Council on promoting innovative Development of Foreign Trade
10 November2020	State Council	Circular of The General Office of the State Council on printing and distributing the plan for the Division of Key Tasks for the National Teleconference on Deepening the Reform of Delegating Power, Delegating Power, Improving Regulation and Services and Optimizing the Business Environment
24 January 2021	State Council	Opinions of The State Council on Supporting the Revitalization and Development of Old Revolutionary Base Areas in the New Era

Table 6. The statistics of the tax policy.

Date of Issue	Department	Policy Document
28 February 2020	State Administration of Taxation	The Implementation opinions of the National Development and Reform Commission and 23 other government departments on promoting consumption expansion, improving quality, and accelerating the formation of a strong domestic market
13 March 2020	National Development and Reform Commission	Implementation Opinions on Promoting Consumption, Expanding Capacity, Improving Quality, and Accelerating the Formation of a Strong Domestic Market (Development and Reform of Employment 2020 No. 293)

Table 6. *Cont.*

Date of Issue	Department	Policy Document
13 April 2020	Ministry of Commerce	Circular of the General Office of the Ministry of Commerce on the Work of Innovating Exhibition Service Model and Fostering New Driving Force for the Development of The Exhibition Industry
11 June 2020	State Council	Opinions of the State Council on implementing the division of key Work Departments in the *Government Work Report*
3 July 2020	State Administration of Taxation	Several opinions of the Ministry of Industry and Information Technology and other departments on improving the system for supporting the development of small and medium-sized enterprises
12 August 2020	State Council	Opinions of the General Office of the State Council on Further stabilizing Foreign trade and foreign investment
7 September 2020	Ministry of Commerce	Reply to Recommendation No. 9496 of the Third Session of the 13th National People's Congress
11 September 2020	Ministry of Commerce	Reply to Recommendation No. 1239 of the Third Session of the National People's Congress
21 September 2020	State Council	Circular of The State Council on printing and distributing the general plan of Beijing, Hunan and Anhui Pilot Free Trade Zone and the Plan of Expanding the area of Zhejiang Pilot Free Trade Zone
28 September 2020	Ministry of Commerce	Letter of Reply to Proposal No. 3615 (Commerce and Tourism No. 068) of the Third Session of the 13th National Committee of the CPPCC
28 October 2020	Ministry of Commerce	Reply to Recommendation No. 5338 of the Third Session of the 13th National People's Congress
31 October 2020	Ministry of Commerce	Letter of reply to Proposal No. 3641 (Commerce and Tourism No. 073) of the Third Session of the 13th National Committee of the CPPCC
10 November 2020	State Council	Circular of The General Office of the State Council on printing and distributing the plan for the Division of Key Tasks for the National Teleconference on Deepening the Reform of Delegating Power, Delegating Power, Improving Regulation and Services and Optimizing the Business Environment
18 March 2021	State Administration of Taxation	Development and Reform Commission of the Ministry of Commerce, Ministry of Finance, General Administration of Customs, State Administration of Taxation, State Administration of Market Supervision, Circular on Expanding cross-border e-commerce retail import trials and strictly implementing regulatory requirements
19 March 2021	State Council	Opinions of The State Council on implementing the division of major Work in the *Government work Report*

After sorting out tax policy documents, the government has successively simplified the application procedures of tax and fee preferential policies, innovated the retail export supervision system, introduced cross-border e-commerce export merchandise return supervision measures, and granted income tax concessions for small, medium, and micro cross-border e-commerce enterprises. As it turns out, the government enables cross-border e-commerce companies to better carry out export business and promote their healthy development.

3.1.5. Talent Policy

Talent policy refers to the government's introduction, retention, education, and management of talents in order to support the development of the industry. In order to support the development of the cross-border e-commerce industry, the government has proposed a talent policy to cultivate and introduce more cross-border e-commerce talents to help its development. There are two documents about China's cross-border e-commerce talent policies issued from January 2020 to June 2021 by the Ministry of Commerce. The results are shown in Table 7.

Table 7. The statistics of the talent policy.

Date of Issue	Department	Policy Document
1 September 2020	Ministry of Commerce	Circular of the Ministry of Commerce on supplementing national E-commerce Demonstration Bases in 2020
7 September 2020	Ministry of Commerce	Reply to Recommendation No. 9448 of the Third Session of the 13th National People's Congress

Through the review of cross-border e-commerce talent policies, the government has made efforts to absorb and develop industry leaders, professional technical personnel, and experienced management personnel to promote the development of cross-border e-commerce models.

4. The Establishment of a System Dynamics Model of Cross-Border E-Commerce B2B Export Trade under the Background of "Dual Circulation"

In 2020, COVID-19 slowed down China's foreign trade growth. In order to revitalize the foreign trade economy, the Chinese government is speeding up the construction of a domestic and international dual circulation development pattern in which one promotes the other. In this context, the State Council's executive meeting proposed measures to improve cross-border e-commerce development support policies and expand the cross-border e-commerce comprehensive pilot zone to support the development of the cross-border e-commerce industry. According to relevant data, China's cross-border e-commerce exports accounted for 77.6%, and the cross-border e-commerce transaction mode is mainly B2B, accounting for 77.3%. Therefore, this paper studies the impact of the "dual circulation" measure on cross-border e-commerce B2B export trade, constructing its system dynamics model.

4.1. The Construction of System Dynamics MODEL

4.1.1. Model Assumptions

This section constructs a system dynamics model for the "dual circulation" promotion measure for cross-border e-commerce B2B export trade. In order to ensure the accuracy and operability of the model simulation structure, the following assumptions are made:

(1) The model consists of factors related to the "dual circulation" measure, cross-border e-commerce, and economic development, and the development of cross-border e-commerce is only affected by the "dual circulation" measure and socio-economic development factors without considering other industries' impact on cross-border e-commerce.

(2) GDP is selected as an indicator variable to measure the level of economic development.

4.1.2. Causality Analysis

According to the policy analysis in Section 2, the system dynamics causality diagram is constructed as shown in Figure 2.

The causal analysis shown in Figure 2 mainly starts from the different types of policies based on the "dual circulation" measure for the cross-border e-commerce industry, including tax policies, payment policies, customs clearance policies, fiscal policies, and talent policies. Different types of policies comprehensively affect the relevant variables of cross-border e-commerce B2B export trade, including tax incentives, government subsidies, government supervision, customs supervision, cross-border e-commerce talent training, and cross-border e-commerce infrastructure construction. At the same time, the level of social and economic development also affects the "dual circulation" measure and the construction of cross-border e-commerce infrastructure (including the construction of cross-border e-commerce logistics facilities and information construction). Generally speaking, a higher GDP brings more funds to infrastructure construction, which is more conducive

to cross-border e-commerce logistics construction and the development of informatization and ultimately promotes the development of cross-border e-commerce B2B export trade. This paper categorizes the relevant variables related to cross-border e-commerce trade into five major categories, namely, enterprise operation, government supervision, customs supervision, cross-border e-commerce infrastructure investment, and cross-border e-commerce talent training. Here, the causal relationship between the five categories of variable explanatory policies and cross-border e-commerce B2B export company trade is analyzed.

Figure 2. System dynamics causality diagram of cross-border e-commerce export.

From the perspective of business operations, tax policies and fiscal policies directly affect the intensity of tax incentives and government subsidies. Tax incentives and government subsidies can reduce business costs, promote enterprises to increase capital investment, improve the capabilities of cross-border e-commerce companies, promote the enthusiasm of cross-border e-commerce companies, and increase the number of companies.

From the perspective of government supervision, tax policies, payment policies, and customs clearance policies affect the intensity of government supervision. The level of government supervision shows whether it can optimize the cross-border e-commerce market environment and improve the security of cross-border payments. Generally, higher government supervision intensity means a stable market order, which can increase the enthusiasm of cross-border e-commerce companies and optimize the cross-border e-commerce market environment. It can reduce corporate tax evasion, fraudulent compensation, and counterfeit production and sales. At the same time, the security of cross-border payments is also affected by government supervision. Generally speaking, third-party payment institutions that can support cross-border payments must accept the review of relevant state departments and are always subject to government supervision during their operation time. High-security payment methods can effectively promote the development of cross-border e-commerce platforms and expansion of consumer groups.

Customs supervision is affected by customs clearance policies, and its supervision directly affects the efficiency of customs clearance; the efficiency of customs clearance has a huge impact on the transition time of cross-border commodities. Cross-border e-commerce is a mode of e-commerce development, and thus the delivery time of goods is of great significance to its development. Generally speaking, the shorter the delivery time is, the more helpful the development of a cross-border e-commerce platform and the growth of the cross-border e-commerce market scale will be.

Tax policies, delivery policies, customs clearance policies, and fiscal policies all have a crucial influence on investment in cross-border e-commerce infrastructure construction. The main factors affecting the development of cross-border e-commerce B2B export trade are the development of informatization and logistics. The former is mainly affected by the government's investment in information infrastructure construction and the number of scientific and technological talents. Generally, the improvement of the development of informatization can directly promote the development of cross-border e-commerce B2B export trade because its development needs information infrastructure as the support. For example, the development speed of the e-commerce industry under the "4G mobile network" far exceeds that of the "3G mobile network" era. In addition, the development of informatization is also inseparable from the research and innovation of scientific and technological talents. The development of cross-border logistics mainly depends on the impact of infrastructure construction investment, the number of cross-border logistics talents, the level of cross-border logistics informatization, and the cost of cross-border logistics. More complete infrastructure construction is more conducive to cross-border e-commerce logistics and transportation and reduces the time cost of transportation. During cross-border logistics operations, the application of modern information technology can improve the operational efficiency of cross-border logistics and monitor logistics operations. Meanwhile, the development of cross-border logistics is also inseparable from the participation of logistics talents.

The enforcement of the talent policy can effectively promote the training of cross-border e-commerce talents and increase the number of cross-border e-commerce practitioners. As mentioned above, both the development of cross-border logistics and the improvement of informatization are tightly associated with the support of cross-border e-commerce talents. Only after the number of scientific and technological talents and the number of employees increase, can the development of cross-border e-commerce B2B export trade be promoted.

4.1.3. Model Construction

Through the analysis of the causality diagram, Vensim software is used to construct a flow stock diagram for the development of the cross-border e-commerce industry, as shown in Figure 3.

4.1.4. Equation Construction

(1) Data source

The relevant data in the paper mainly come from the National Bureau of Statistics, the General Administration of Customs, the Tonghuashun IFIND database, the China Electronic Commerce Research Center, and related literature. The quantitative data of the related qualitative indicators involved are obtained from existing research reports or related literature. In addition, the quantitative relationship between some variables is obtained through fitting and continuous debugging.

Figure 3. Flow stock for the development of the cross-border e-commerce industry.

(2) Equation construction

The equation expressions of the main variables of the model are as follows:

$$
\begin{aligned}
GDP = WITHLOOKUP(Time, \\
([(0,264976) - (4,290963)], (0,264976), (1,296298), (2,249310), (3,282857), (4,290963)))
\end{aligned}
\tag{1}
$$

$$PZ = 14.1178 \tag{2}$$

$$PCGDP = \frac{GDP}{PZ} \tag{3}$$

$$PLS = \frac{PCGDP}{100,000} \tag{4}$$

The data related to Equations (1) and (2) come from the National Bureau of Statistics and the Tonghuashun IFAND database. The values of Equation (1) are, respectively, the values of China's GDP from the third quarter of 2020 to the third quarter of 2021, measured in CNY 100 million. Equation (2) refers to the total population of China, measured in 100 million people.

$$TP = 15 \tag{5}$$

$$PP = 11 \tag{6}$$

$$CCP = 18 \tag{7}$$

$$FP = 14 \tag{8}$$

$$TAP = 2 \tag{9}$$

Equations (5)–(9) are based on the number of promulgations of each type of policy above.

$$CBEEDL = \frac{(DLI + SCBP + LCBLD + \frac{NCBEE}{10,000} + \frac{NCBEEN}{100} + CBEPDL + CBEPR + CBOSN + CE)}{9} \tag{10}$$

$$NSTT = CSTT \times NCBEE \tag{11}$$

$$\text{CSTT} = 0.3 \tag{12}$$

$$\text{NCBLT} = \text{CBLTC} \times \text{NCBEE} \tag{13}$$

$$\text{CBLTC} = \text{TAP} \times 0.2 \tag{14}$$

$$\text{EGF} = \frac{\text{TAP} \times \text{FP}}{100} \tag{15}$$

$$\text{AVNE} = 5125.65 \times 0.13 \times \text{EGF} \tag{16}$$

$$\text{NCBEE} = \text{INTEG}(\text{AVNE}, 5125.65 \times 0.13) \tag{17}$$

Equations (18)–(30) are established and borrowed from [22]. The relevant data of Equations (12)–(17) are from the China Electronic Commerce Research Center.

$$\text{CBOSN} = 0.4 \times \text{PLS} \tag{18}$$

$$\text{FS} = \frac{(\text{TP} + \text{FP})}{2} \tag{19}$$

$$\text{TCE} = \frac{(\text{TP} + \text{CCP})}{2} \tag{20}$$

$$\text{RRP} = \frac{(\text{PP} + \text{TP} + \text{FP} + \text{CCP})}{4} \tag{21}$$

The construction of Equations (18)–(21) is borrowed from [26].

$$\text{CE} = 0.7 \times \text{TCE} + 0.3 \times \text{DLI} \tag{22}$$

$$\text{CBLIL} = 0.2 + 0.3 \times \text{DLI} \tag{23}$$

$$\text{SFL} = \frac{1}{\text{LCBLD}} \tag{24}$$

$$\text{CBEME} = 0.2 + \text{RRP} \times 0.6 \tag{25}$$

$$\text{DFG} = \frac{1}{(0.2 + \text{RRP} \times 0.6)} \tag{26}$$

$$\text{SCBP} = 0.4 \times \text{RRP} + 0.6 \times \text{DLI} \tag{27}$$

$$\text{EC} = \frac{1}{\text{FS}} \tag{28}$$

$$\text{ICBEE} = \frac{0.7}{\text{EC}} + 0.1 \times \text{DLI} + 0.1 \times \text{LCBLD} + 0.1 \times \text{CBEME} \tag{29}$$

$$\text{CBEPTL} = 0.3 + 0.3 \times \text{DLI} \tag{30}$$

Equations (22)–(30) are established and borrowed from [22].

$$\text{CBEPDL} = 0.5 \times \text{CBEPR} + 0.5 \times \text{CBEPTL} \tag{31}$$

$$\text{CBEPR} = \frac{0.4}{\text{DFG}} + \frac{0.25}{\text{SFL}} + 0.35 \times \text{SCBP} \tag{32}$$

Equations (31) and (32) are based on [27].

$$\text{LICI} = \text{IFATS} \times \text{LCIC} \tag{33}$$

$$\text{LCIC} = \text{FS} \times 0.1 \tag{34}$$

$$\text{IIICN} = \text{IIIC} \times \text{IFATS} \tag{35}$$

$$\text{IIIC} = 0.12 \times \text{FS} \tag{36}$$

Equations (33)–(36) are based on [22].

$$IFATS = -971939 + 14.4079 \times GDP \tag{37}$$

$$LCBLD = 0.5 + 0.2 \times (0.4 \times \frac{LICI}{10,000} + \frac{0.2 \times NCBLT}{1000} + 0.4 \times CBLIL) \tag{38}$$

$$DLI = 0.41532 + 0.1044 \times (\frac{0.5 \times IIICN}{10,000} + \frac{0.5 \times NSTT}{1000}) \tag{39}$$

$$NCBEEN = 86.569 + 457.62 \times ICBEE \tag{40}$$

The establishment of Equations (37)–(40) is based on data fitting. Table 8 below shows the abbreviations for each variable.

Table 8. Variable name and abbreviation.

Variable Name	Abbreviation	Variable Name	Abbreviation
tax policy	TP	number of scientific and technological talents	NSTT
payment policy	PP	investment in fixed assets throughout society	IFATS
customs clearance policy	CCP	investment in information industry construction	IIICN
fiscal policy	FP	development level of informatization	DLI
logistics construction investment coefficient	LCIC	level of cross-border logistics development	LCBLD
funding support	FS	cross-border logistics informatization level	CBLIL
the customs environment	TCE	the initiative of cross-border e-commerce enterprises	ICBEE
rules and regulations policy	RRP	security of cross-border payment	SCBP
employment growth factor	EGF	the number of cross-border logistics talents	NCBLT
number of cross-border e-commerce employees	NCBEE	per capita GDP	PCGDP
added value of the number of employees	AVNE	population size	PZ
coefficient of scientific and technological talents	CSTT	people's living standards	PLS
logistics industry construction investment	LICI	slowness factor of logistics	SFL
enterprise cost	EC	clearance efficiency	CE
information infrastructure investment coefficient	IIIC	cross-border e-commerce market environment	CBEME
cross-border e-commerce platform technology level	CBEPTL	degree of fake goods	DFG
cross-border logistics talent coefficient	CBLTC	cross-border online shopping needs	CBOSN
cross-border e-commerce platform reputation	CBEPR	cross-border e-commerce platform development level	CBEPDL
cross-border e-commerce B2B export development level	CBEEDL	talent policy	TAP
number of cross-border e-commerce enterprises	NCBEEN		

4.2. Model Checking

After establishing the system dynamics model, the correctness and validity of the model need to be tested. The statistics of the General Administration of Customs of China on cross-border e-commerce B2B exports are only from the third quarter of 2020 to the third quarter of 2021. Therefore, this paper uses the cross-border e-commerce B2B export data

from the third quarter of 2020 to the third quarter of 2021 as the test variable and calculates the relative error based on the deviation between the actual value and the simulated value to judge the correctness and effectiveness of the system dynamics model. The test results are shown in Table 9.

Table 9. Simulation value of cross-border e-commerce B2B export transaction value.

Time	Cross-Border E-Commerce B2B Export Transaction Value		
	Actual Value	**Simulation Value**	**Relative Error**
the third quarter of 2020	23.3102	22.5536	3%
the fourth quarter of 2020	25.3076	24.7188	2%
the first quarter of 2021	21.9927	21.4797	2%
the second quarter of 2021	40.8618	23.7926	42%
the third quarter of 2021	49.5835	24.3557	51%

The comparison between the actual value and the simulation value shows that the relative error from the third quarter of 2020 to the first quarter of 2021 is less than 3%, while the relative error from the second quarter of 2021 to the third quarter of 2021 is more than 40%, which indicates that the model constructed in this paper is not suitable for the simulation experiments in the second and third quarters of 2021. Therefore, the model established in this section needs to be modified in the follow-up Section 4.3.

4.3. Model Updating

Policy lag generally exists in the formulation and implementation of public policies. Saite [28] found through research that policy lag could not be eliminated; thus the "dual circulation" measure implementation also has a policy lag. By analyzing the changes in the actual value of B2B export trading volume of cross-border e-commerce, it can be seen that the B2B export trading volume of cross-border e-commerce in the second and third quarters of 2021 achieved substantial growth compared with the time window of the third quarter of 2020 to the first quarter of 2021. The "dual circulation" measure collected in this paper is promulgated from the third quarter of 2020 to the first quarter of 2021. This means that there is a lag between the promulgation of the "dual circulation" measure and its significant promoting effect on the development of cross-border e-commerce B2B export. This section conducts a time-lag analysis on the data of B2B export transaction volume of cross-border e-commerce; that is, it considers that the measure implementation effect from the third quarter of 2020 to the first quarter of 2021 has a lag effect on the second and third quarters of 2021. Since the period from the third quarter of 2020 to the first quarter of 2021 is in the period of policy supply and implementation [29], policy activities during this period have a lag effect on the development of the industry. For example, it is mentioned in the content of tax policy and fiscal policy that the construction of the logistics industry and information industry should be accelerated and improved to promote the development of the B2B export trade of cross-border e-commerce, but the industrial construction will take some time to be realized. Another example is the introduction and training of cross-border e-commerce talents proposed in the talent policy. It takes some time for the implementation and effectiveness of this policy to be achieved, resulting in the lag of the implementation effect of the policy. In the causal analysis in Section 3.1.2, all variables are divided into five categories: enterprise operation, government supervision, customs supervision, cross-border e-commerce infrastructure investment, and cross-border e-commerce talent training. Based on these five categories of variables, the functional relations greatly affected by hysteresis in the model are respectively optimized, and the optimized equation is shown in Table 10.

Table 10. The optimized function equation.

Equation Number	Equation	Explanation
(41)	$\text{ICBEE}_{t_4} = \frac{0.7}{\text{EC}_{t_4}} + 0.1 \times \text{DLI}_{t_4} + 0.1 \times \text{LCBLD}_{t_4} + 0.1 \times \text{CBEME}_{t_4} +$ $0.523 \times \text{ICBEE}_{t_3} + 0.32 \times \text{ICBEE}_{t_2} + 0.257 \times \text{ICBEE}_{t_1} - 0.2685$	The policy lag formula of the initiative of cross-border e-commerce enterprises at time t_4
(42)	$\text{ICBEE}_{t_5} = \frac{0.7}{\text{EC}_{t_5}} + 0.1 \times \text{DLI}_{t_5} + 0.1 \times \text{LCBLD}_{t_5} + 0.1 \times \text{CBEME}_{t_5} +$ $0.4698 \times \text{ICBEE}_{t_3} + 0.2158 \times \text{ICBEE}_{t_2} + 0.12 \times \text{ICBEE}_{t_1} + 0.328$	The policy lag formula of the initiative of cross-border e-commerce enterprises attime t_5
(43)	$\text{NCBEEN}_{t_4} = -562.398 + 457.62 \times \text{ICBEE}_{t_4} + 392.78 \times \text{ICBEE}_{t_3}$ $+ 261.3 \times \text{ICBEE}_{t_2} + 185.634 \times \text{ICBEE}_{t_1}$	The policy lag formula of the number of cross-border e-commerce enterprises at time t_4
(44)	$\text{NCBEEN}_{t_5} = -361.28 + 523.9 \times \text{ICBEE}_{t_5} + 385.96 \times \text{ICBEE}_{t_3}$ $+ 226.7 \times \text{ICBEE}_{t_2} + 1635.568 \times \text{ICBEE}_{t_1}$	The policy lag formula of the number of cross-border e-commerce enterprises at time t_5
(45)	$\text{CBEPR}_{t_4} = \frac{0.41}{\text{DFG}_{t_4}} + \frac{0.3211}{\text{DFG}_{t_3}} + \frac{0.225}{\text{DFG}_{t_2}} + \frac{0.126}{\text{DFG}_{t_1}}$ $+ \frac{0.254}{\text{SFL}_{t_4}} + \frac{0.216}{\text{SFL}_{t_3}} + \frac{0.129}{\text{SFL}_{t_2}} + \frac{0.113}{\text{SFL}_{t_1}}$ $+ 0.351 \times \text{SCBP}_{t_4} + 0.26 \times \text{SCBP}_{t_3} + 0.234 \times \text{SCBP}_{t_2} + 0.129 \times \text{SCBP}_{t_1}$	The policy lag formula of the cross-border e-commerce platform reputation at time t_4
(46)	$\text{CBEPR}_{t_5} = \frac{0.52}{\text{DFG}_{t_5}} + \frac{0.345}{\text{DFG}_{t_3}} + \frac{0.21}{\text{DFG}_{t_2}} + \frac{0.1}{\text{DFG}_{t_1}}$ $+ \frac{0.32}{\text{SFL}_{t_5}} + \frac{0.246}{\text{SFL}_{t_3}} + \frac{0.15}{\text{SFL}_{t_2}} + \frac{0.02}{\text{SFL}_{t_1}}$ $+ 0.41 \times \text{SCBP}_{t_5} + 0.326 \times \text{SCBP}_{t_3} + 0.234 \times \text{SCBP}_{t_2} + 0.147 \times \text{SCBP}_{t_1}$	The policy lag formula of the cross-border e-commerce platform reputation at time t_5
(47)	$\text{CBEME}_{t_4} = 0.263 + \text{RRP}_{t_4} \times 0.6 + \text{RRP}_{t_3} \times 0.326 + \text{RRP}_{t_2} \times 0.234 + \text{RRP}_{t_1} \times 0.12$	The policy lag formula of the cross-border e-commerce market environment attime t_4
(48)	$\text{CBEME}_{t_5} = 0.325 + \text{RRP}_{t_5} \times 0.532 + \text{RRP}_{t_3} \times 0.256 + \text{RRP}_{t_2} \times 0.214 + \text{RRP}_{t_1} \times 0.16$	The policy lag formula of the cross-border e-commerce market environment attime t_5
(49)	$\text{SCBP}_{t_4} = 0.42 \times \text{RRP}_{t_4} + 0.314 \times \text{RRP}_{t_3} + 0.286 \times \text{RRP}_{t_2} + 0.14 \times \text{RRP}_{t_1}$ $+ 0.59 \times \text{DLI}_{t_4} + 0.46 \times \text{DLI}_{t_3} + 0.32 \times \text{DLI}_{t_2} + 0.11 \times \text{DLI}_{t_1}$	The policy lag formula of the security of cross-border payment at time t_4
(50)	$\text{SCBP}_{t_5} = 0.38 \times \text{RRP}_{t_5} + 0.342 \times \text{RRP}_{t_3} + 0.224 \times \text{RRP}_{t_2} + 0.162 \times \text{RRP}_{t_1}$ $+ 0.62 \times \text{DLI}_{t_5} + 0.575 \times \text{DLI}_{t_3} + 0.441 \times \text{DLI}_{t_2} + 0.115 \times \text{DLI}_{t_1}$	The policy lag formula of the security of cross-border payment at time t_5
(51)	$\text{CE}_{t_4} = 0.7 \times \text{TCE}_{t_4} + 0.45 \times \text{TCE}_{t_3} + 0.23 \times \text{TCE}_{t_2} + 0.14 \times \text{TCE}_{t_1}$ $+ 0.3 \times \text{DLI}_{t_4} + 0.22 \times \text{DLI}_{t_3} + 0.109 \times \text{DLI}_{t_2} + 0.09 \times \text{DLI}_{t_1}$	The policy lag formula of theclearance efficiency at time t_4
(52)	$\text{CE}_{t_5} = 0.6 \times \text{TCE}_{t_5} + 0.52 \times \text{TCE}_{t_3} + 0.221 \times \text{TCE}_{t_2} + 0.16 \times \text{TCE}_{t_1}$ $+ 0.4 \times \text{DLI}_{t_5} + 0.301 \times \text{DLI}_{t_3} + 0.2019 \times \text{DLI}_{t_2} + 0.109 \times \text{DLI}_{t_1}$	The policy lag formula of theclearance efficiency at time t_5
(53)	$\text{LCBLD}_{t_4} = 0.5 + 0.08 \times \text{CBLIL}_{t_4}$ $+ 10^{-7} \times (8 \times \text{LICI}_{t_4} + 5.2 \times \text{LICI}_{t_3} + 4.34 \times \text{LICI}_{t_2} + 2.69 \times \text{LICI}_{t_1})$ $+ 10^{-6} \times (4 \times \text{NCBLT}_{t_4} + 3.85 \times 1\text{NCBLT}_{t_3} + 2.7 \times \text{NCBLT}_{t_2} + 1.45 \times \text{NCBLT}_{t_1})$	The policy lag formula of the level of cross-border logistics development at time t_4
(54)	$\text{LCBLD}_{t_5} = 0.36 + 0.096 \times \text{CBLIL}_{t_5}$ $+ 10^{-7} \times (7.3 \times \text{LICI}_{t_5} + 5.6 \times \text{LICI}_{t_3} + 3.44 \times \text{LICI}_{t_2} + 2.26 \times \text{LICI}_{t_1})$ $+ 10^{-6} \times (6 \times \text{NCBLT}_{t_5} + 5.85 \times 1\text{NCBLT}_{t_3} + 3.8 \times \text{NCBLT}_{t_2} + 1.89 \times \text{NCBLT}_{t_1})$	The policy lag formula ofthe level of cross-border logistics development at time t_5
(55)	$\text{DLI}_{t_4} = 0.41532 + 10^{-7} \times (5.22 \times \text{IIICN}_{t_4} + 3.96 \times \text{IIICN}_{t_3} + 2.61 \times \text{IIICN}_{t_2} + 1.2 \times \text{IIICN}_{t_1}$ $+ 5.32 \times \text{NSTT}_{t_4} + 4.06 \times \text{NSTT}_{t_3} + 3.158 \times \text{NSTT}_{t_2} + 2.69 \times \text{NSTT}_{t_1})$	The policy lag formula ofthe development level of informatization at time t_4
(56)	$\text{DLI}_{t_5} = 0.526 + 10^{-7} \times (5.96 \times \text{IIICN}_{t_5} + 4.13 \times \text{IIICN}_{t_3} + 2.96 \times \text{IIICN}_{t_2} + 1.75 \times \text{IIICN}_{t_1}$ $+ 5.13 \times \text{NSTT}_{t_5} + 4.36 \times \text{NSTT}_{t_3} + 3.19 \times \text{NSTT}_{t_2} + 1.52 \times \text{NSTT}_{t_1})$	The policy lag formula of the development level of informatization at time t_5
(57)	$\text{NCBLT}_{t_4} = \text{CBLTC} \times (\text{NCBEE}_{t_4} + 0.45 \times \text{NCBEE}_{t_3} + 0.29 \times \text{NCBEE}_{t_2} + 0.156 \times \text{NCBEE}_{t_1})$	The policy lag formula of the number of cross-border logistics talents at time t_4
(58)	$\text{NCBLT}_{t_5} = \text{CBLTC} \times (\text{NCBEE}_{t_5} + 0.45 \times \text{NCBEE}_{t_3} + 0.29 \times \text{NCBEE}_{t_2} + 0.156 \times \text{NCBEE}_{t_1})$	The policy lag formula of the number of cross-border logistics talents at time t_5

Table 10. *Cont.*

Equation Number	Equation	Explanation
(59)	$\text{NSTT}_{t_4} = \text{CSTT} \times (\text{NCBEE}_{t_4} + 0.37 \times \text{NCBEE}_{t_3} + 0.29 \times \text{NCBEE}_{t_2} + 0.223 \times \text{NCBEE}_{t_1})$	The policy lag formula of the number of scientific and technological talents at time t_4
(60)	$\text{NSTT}_{t_5} = \text{CSTT} \times (\text{NCBEE}_{t_5} + 0.345 \times \text{NCBEE}_{t_3} + 0.262 \times \text{NCBEE}_{t_2} + 0.213 \times \text{NCBEE}_{t_1})$	The policy lag formula of the number of scientific and technological talents at time t_5

Let the third quarter of 2020 be t_1, the fourth quarter of 2020 be t_2, the first quarter of 2021 be t_3, the second quarter of 2021 be t_4, and the third quarter of 2021 be t_5.

Equations (41)–(60) are constructed based on [30] and obtained by data fitting. Equations (41)–(60) respectively measure the influence of policy lag on different variables such as enterprise operation, government supervision, customs supervision, cross-border e-commerce infrastructure investment, and cross-border e-commerce talent cultivation. In this section, the optimization functions of different class variables are substituted into the model for simulation, and the results are compared with the actual values and the simulation results of the original model to analyze the influence of different class variables on policy lag. The results are shown in Table 11. Then, all optimization functions are substituted into the model simulation to obtain the simulation value of the new model, and the relative error is calculated by the deviation between the actual value and the simulation value so as to judge the correctness and effectiveness of the system dynamics model. The results are shown in Table 12.

Table 11. Policy lag effect analysis.

Time	Cross-Border E-Commerce B2B Export Transaction Value						
	Actual Value	Simulation Value of the Original Model	Enterprise Operation	Government Supervision	Customs Supervision	Cross-Border E-Commerce Infrastructure Investment	Cross-Border E-Commerce Talent Training
the third quarter of 2020	23.3102	22.5536	22.5478	22.5478	22.5478	22.5478	22.5478
the fourth quarter of 2020	25.3076	24.7188	24.713	24.713	24.713	24.713	24.713
the first quarter of 2021	21.9927	21.4797	21.4739	21.4739	21.4739	21.4739	21.4739
the second quarter of 2021	40.8618	23.7926	29.789	27.678	23.84	35.123	23.892
the third quarter of 2021	49.5835	24.3557	38.593	32.593	24.668	42.2315	25.125

Table 12. Simulation value of cross-border e-commerce B2B export transaction value after optimization of model.

Time	Cross-Border E-Commerce B2B Export Transaction Value		
	Actual Value	Simulation Value	Relative Error
the third quarter of 2020	23.3102	22.5478	3%
the fourth quarter of 2020	25.3076	24.713	2%
the first quarter of 2021	21.9927	21.4739	2%
the second quarter of 2021	40.8618	40.4225	1%
the third quarter of 2021	49.5835	47.4211	5%

Table 11 shows the simulation values after the optimization functions of different class variables are substituted into the model. If the difference between the simulated

value and the actual value is smaller, and the difference between the simulated value and the original model is larger, it means that the policy lag has a greater impact on this type of variable. As a result, Table 11 shows that the policy lag influence of cross-border electricity infrastructure investment is the largest; the reason for this is that the infrastructure is usually a long construction cycle, and cross-border logistics development level and informatization are affected by the early stage of the construction investment. Yet the early stage of the construction investment is the manner of projects under construction during the construction period but not immediately for practical production activities. Therefore, its lag is more serious than other variables. The second is enterprise operation because tax policies and fiscal policies can reduce the cost of enterprises in the form of tax cuts and subsidies and promote the development of enterprises. However, tax policies and fiscal policies can only help enterprises according to the monthly or quarterly financial statements of enterprises; thus the enterprise operation is also affected by policy lag. In addition, government supervision is also affected by the policy lag; from the change of government supervision behavior to achieving results, a certain period of transition is needed, namely, the government can only gradually change the supervision mode and supervision intensity so as to optimize the market environment, not overnight. However, cross-border e-commerce talent cultivation is not affected by policy lag. Although the government promulgates talent policies to absorb and cultivate cross-border e-commerce talents, talent introduction and cultivation need a longer term to achieve. However, the policy implementation in the three quarters of 2020 cannot significantly increase the number of cross-border e-commerce talents; thus the talent cultivation of cross-border e-commerce talents is not affected by the policy lag. In addition, it can be seen from Table 11 that customs supervision is almost not affected by policy lag. The reason is that the current customs supervision is data-based and information-based management, and the change of its supervision mode and content is easy to realize. It can be seen from Table 12 that the relative error between the overall simulation result and the actual value is less than 5%, which is within the allowable error range. This shows that the revision of the model in this section is reasonable and effective.

5. Simulation Analysis

This section firstly analyzes the impact of a single policy on the development of cross-border e-commerce B2B exports; then it combines different policies to study their impact on the development of cross-border e-commerce B2B exports and conduct simulation discussions.

5.1. Impact of Single Policy

5.1.1. Impact of Tax Policy

The impact of tax policy on cross-border e-commerce B2B export companies is mainly reflected in the financial support and customs environment. Financial support affects the logistics investment coefficient, information infrastructure investment coefficient, and corporate costs. The customs environment mainly affects the customs clearance environment. In order to study the impact of government tax policies on the development of cross-border e-commerce B2B exports, the value of the tax policy variable is multiplied by 1.1 or 0.9 to indicate the increase or decrease in its policy intensity. The intensified tax policies' strength means that the government launches a series of tax policies that are conducive to the development of cross-border e-commerce B2B exports, such as simplifying the utility of preferential tax policies, providing income tax incentives for small, medium, and micro cross-border e-commerce companies, etc. The following compares different tax strengths with the original model, and the simulation results are shown in Figures 4–8.
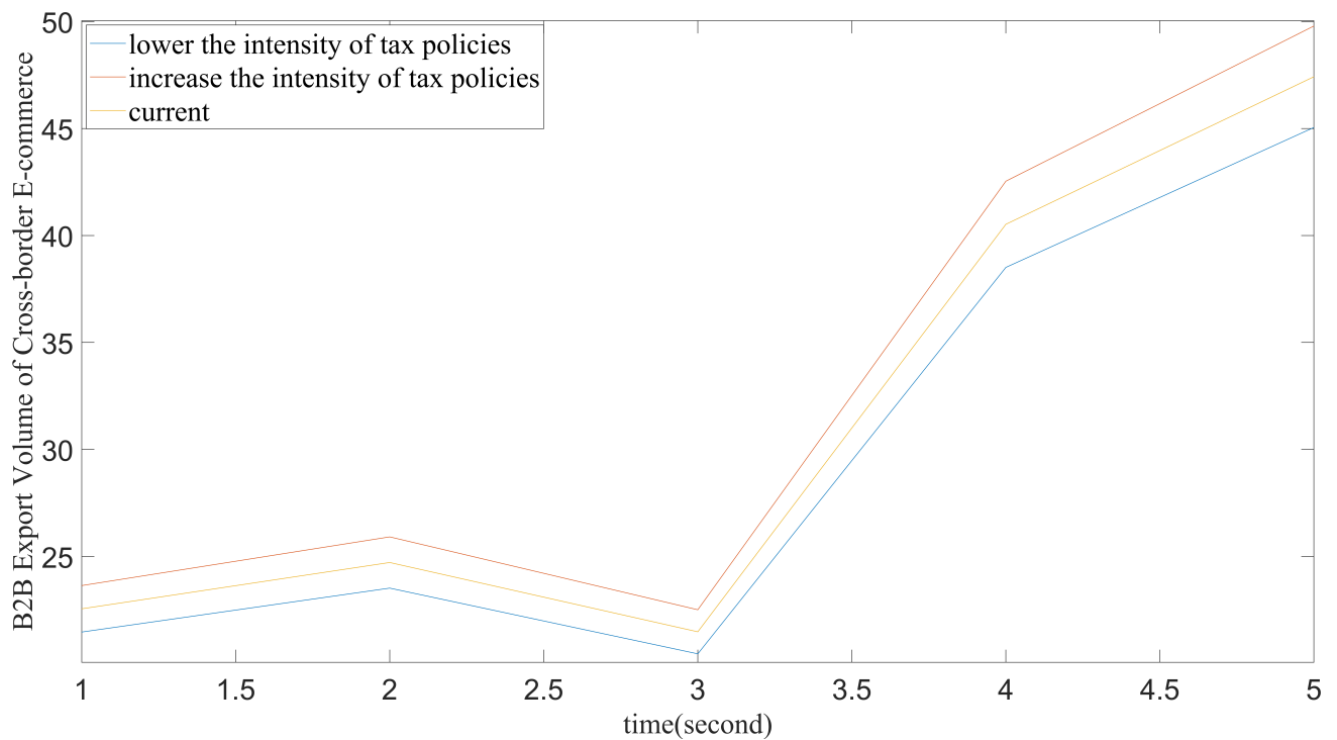
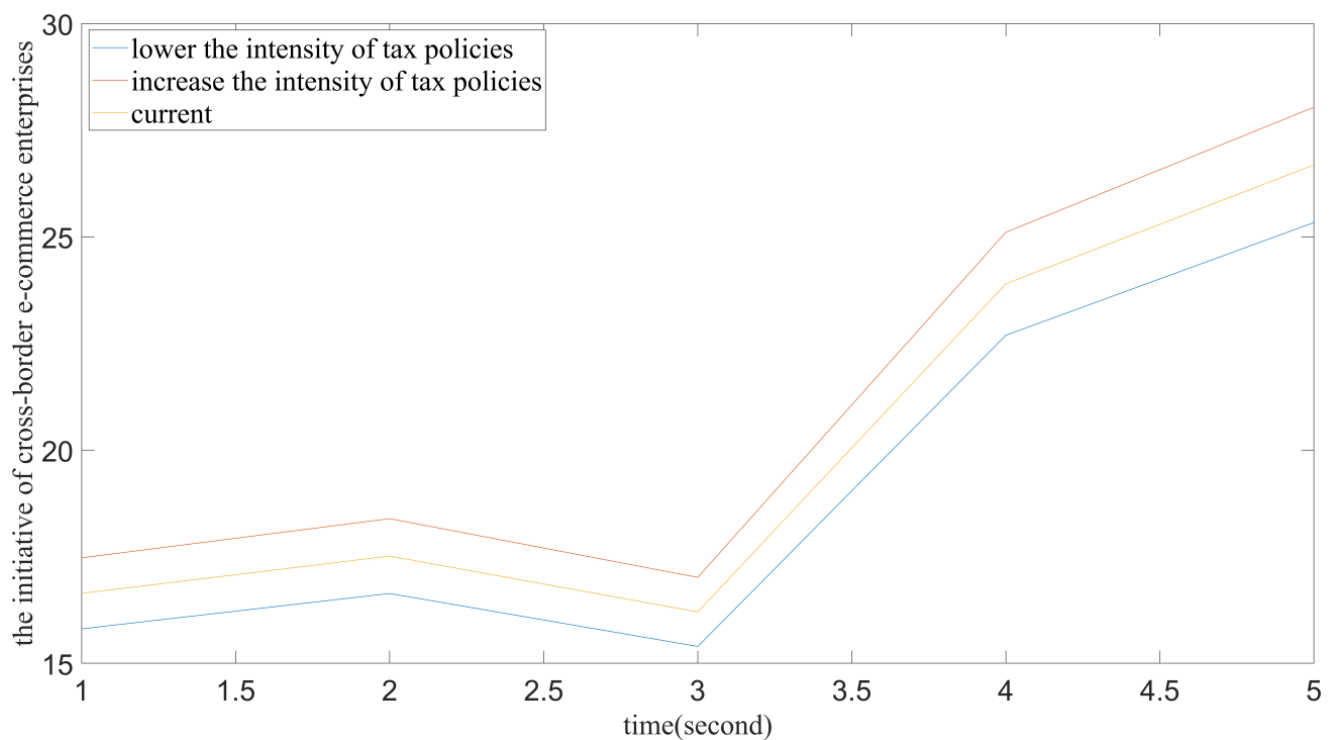**Figure 4.** Influence of tax policy intensity on B2B export of cross-border e-commerce.

Figure 5. Influence of tax policy intensity on cross-border e-commerce enterprises enthusiasm.
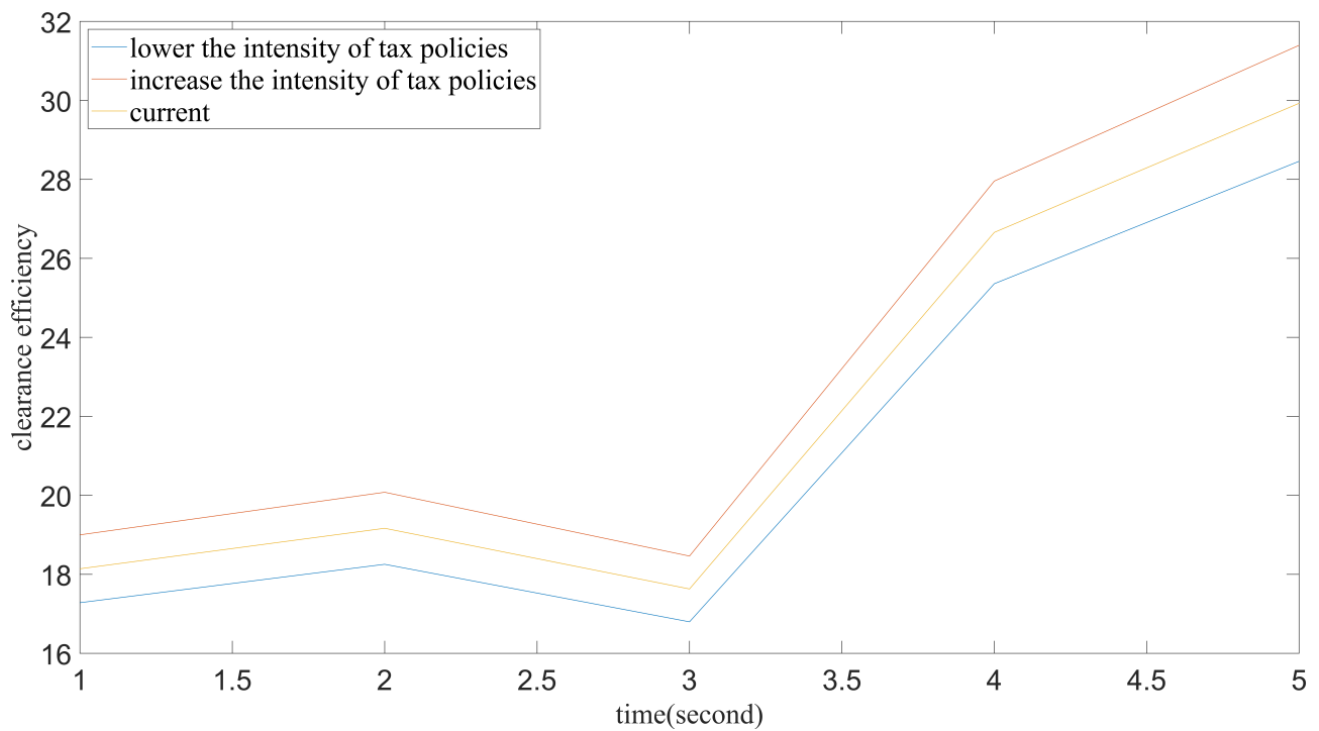
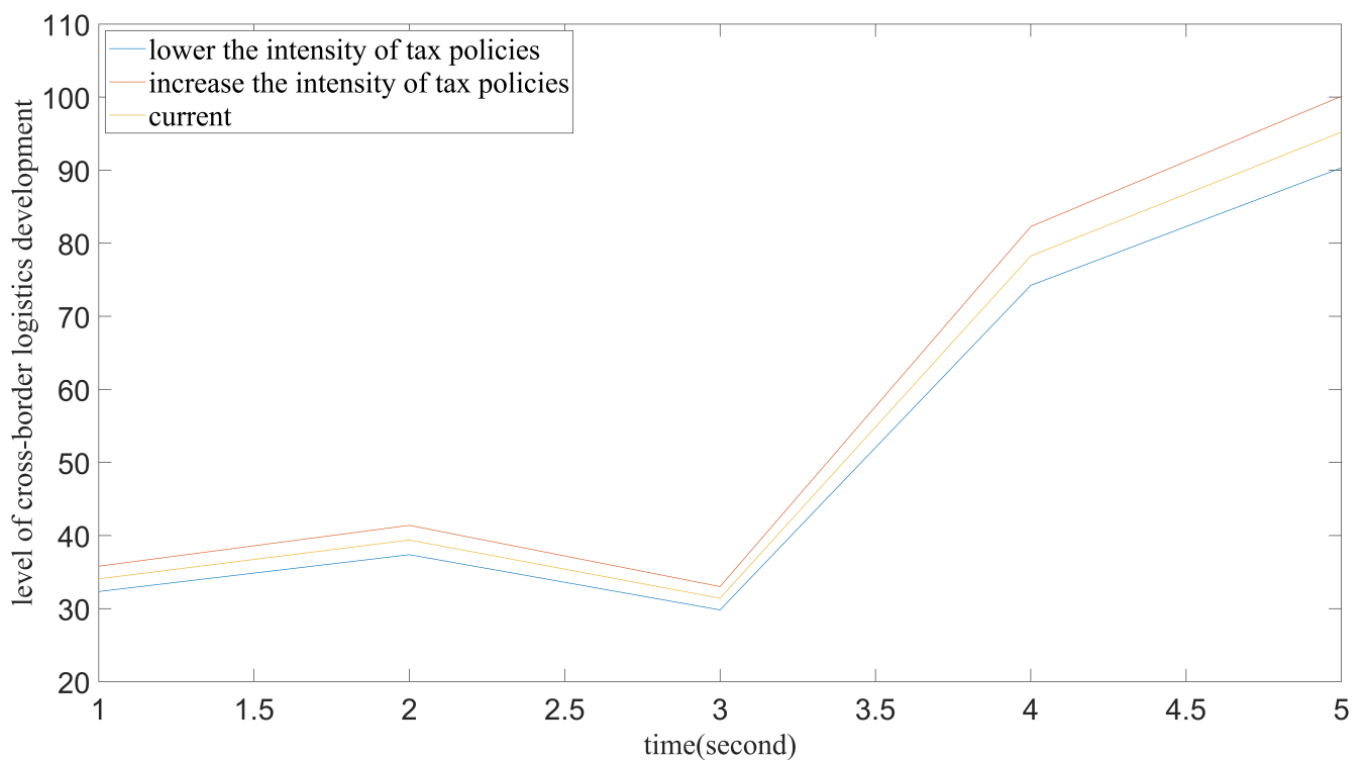**Figure 6.** The influence of tax policy intensity on customs clearance efficiency.

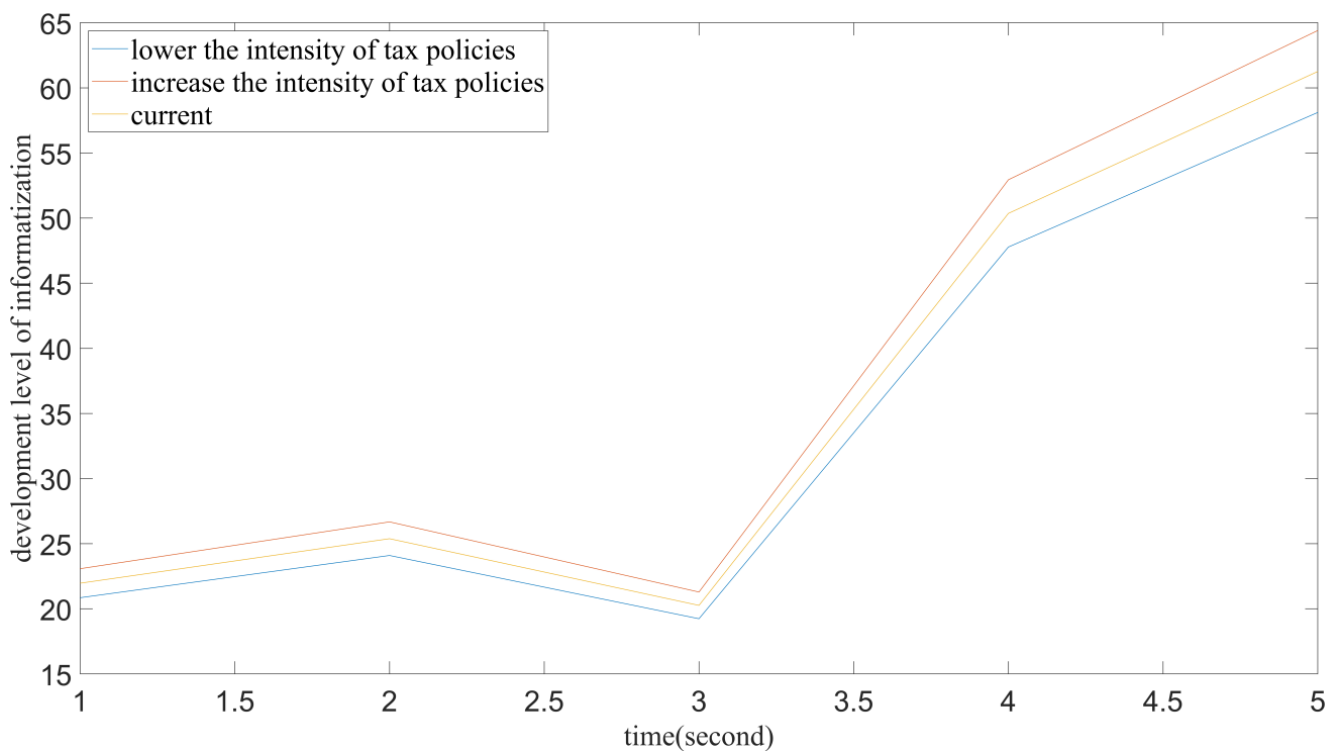**Figure 7.** Influence of tax policy on cross-border logistics development level.

Figure 8. Influence of tax policy intensity on informatization development level.

It can be seen from Figures 4–8 that when the government intensifies tax policies' strength, it can effectively improve the development level of cross-border e-commerce B2B exports, the enthusiasm of enterprises to participate in the cross-border e-commerce B2B export industry, the customs clearance efficiency of cross-border e-commerce products, and the level of international logistics and informatization development. The reason is that when the government intensifies its tax policy, it can create a low-tax working environment to attract companies to carry out cross-border e-commerce B2B export business and is conducive to strengthening the construction of cross-border e-commerce infrastructure. At the same time, it can improve the efficiency of customs clearance by improving tax rebate procedures. This will accelerate the export of cross-border e-commerce B2B goods and promote the development of cross-border e-commerce B2B exports.

5.1.2. Impact of Payment Policy

The payment policy mainly changes the market environment and platform reputation by adjusting the government's supervision of the cross-border e-commerce industry. Here, in order to study the impact of government payment policies on the development of cross-border e-commerce B2B exports, the payment policy variable is multiplied by 1.1 or 0.9 to indicate the increase or decrease in its strength. The increase in the payment policy strength means that the payment policy can effectively increase the payment system development, strengthen supervision of individuals, enterprises, third-party payment platforms, banks, and other individual cross-border payment security, simplify cross-border payment procedures, improve convenience, and ultimately promote the increase in the scale of cross-border online shopping. This paper compares the simulation model with the original model under different payment policies, and the simulation results are shown in Figures 9 and 10.
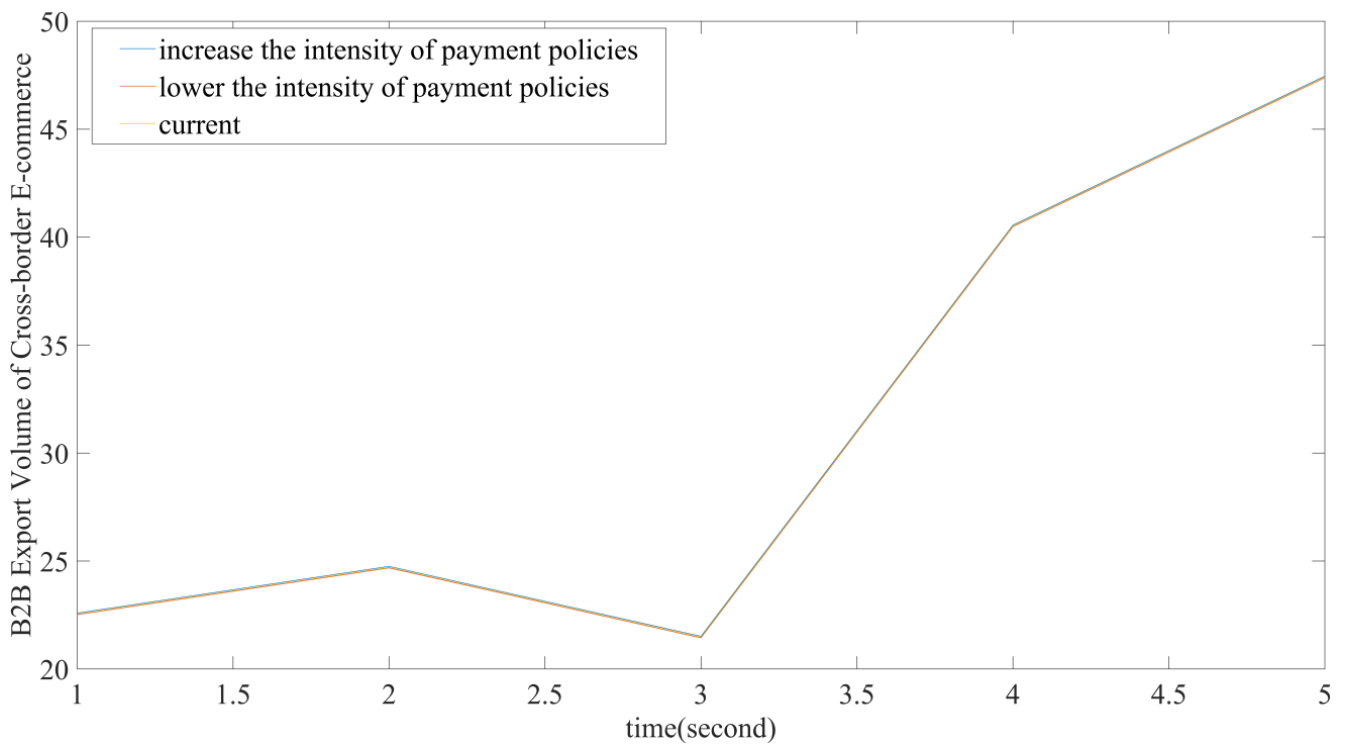
Figure 9. Influence of payment policy on B2B export of cross-border e-commerce.
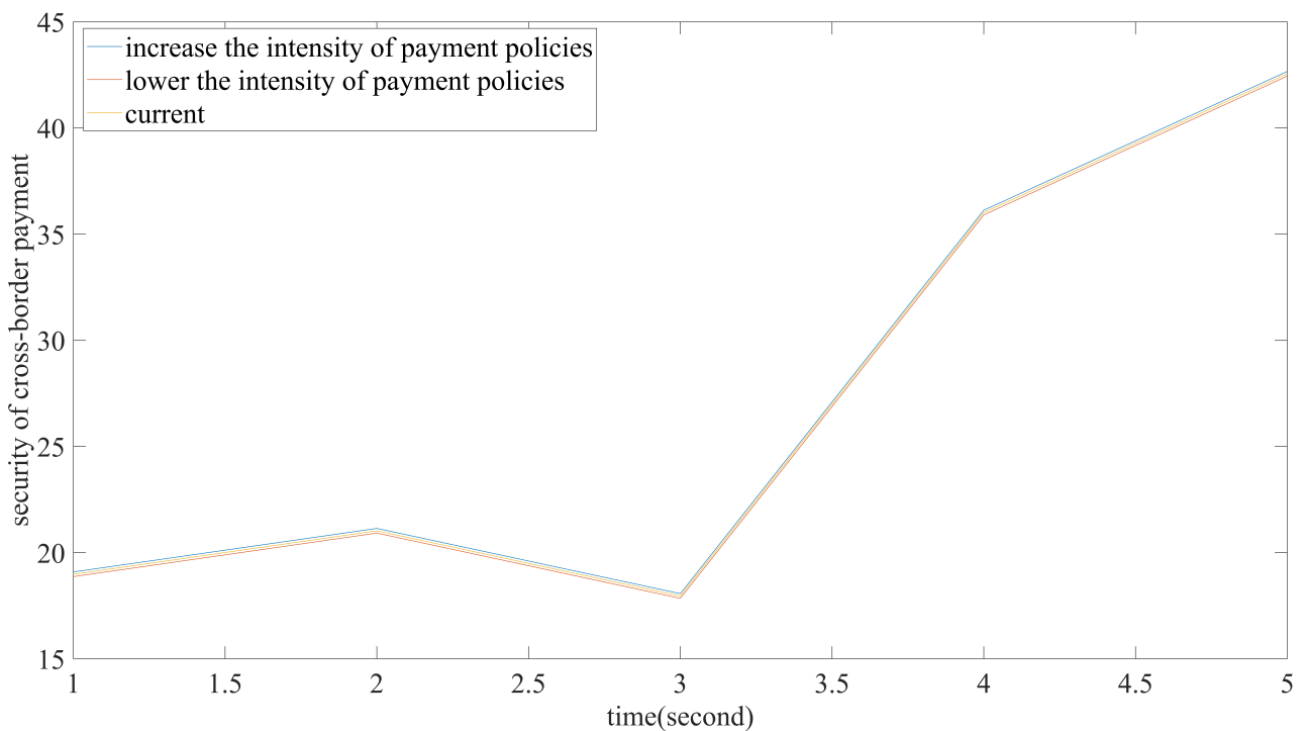
Figure 10. The impact of payment policy strength on cross-border payment security.

It can be seen from Figures 9 and 10 that the government can effectively improve the security of cross-border payments and promote the development of cross-border e-commerce B2B export trade by increasing the intensity of payment policies. This shows that the government can optimize the cross-border payment system and market environment by issuing payment policies, which will ultimately help cross-border payment security and

cross-border e-commerce B2B export trade development. However, compared with other policies, the payment policy has no significant impact on the development of cross-border e-commerce B2B export trade.

5.1.3. Impact of Customs Clearance Policy

Customs clearance policy mainly affects the customs environment and the efficiency of customs clearance, which determines the quality of cross-border logistics. As mentioned above, the customs clearance policy has an important impact on the development of cross-border e-commerce B2B export trade. A number of customs clearance policies and regulations can expand the business scope of cross-border e-commerce B2B enterprises, simplify the customs clearance process, and protect the efficiency and international competitiveness of related enterprises. In order to study the impact of government customs clearance policies on the development of cross-border e-commerce B2B export trade, the customs clearance policy variables are multiplied by 1.1 or 0.9 to indicate the increase or decrease in its strength. The increase in the customs clearance policy strength means that the government has issued a number of customs clearance policies to support the development of cross-border e-commerce B2B exports, such as expanding the scope of cross-border e-commerce export goods, shortening the time for customs clearance, and solving tax rebates. This paper compares the different customs clearance policy intensity models with the original model, and the simulation results are shown in Figures 11 and 12.
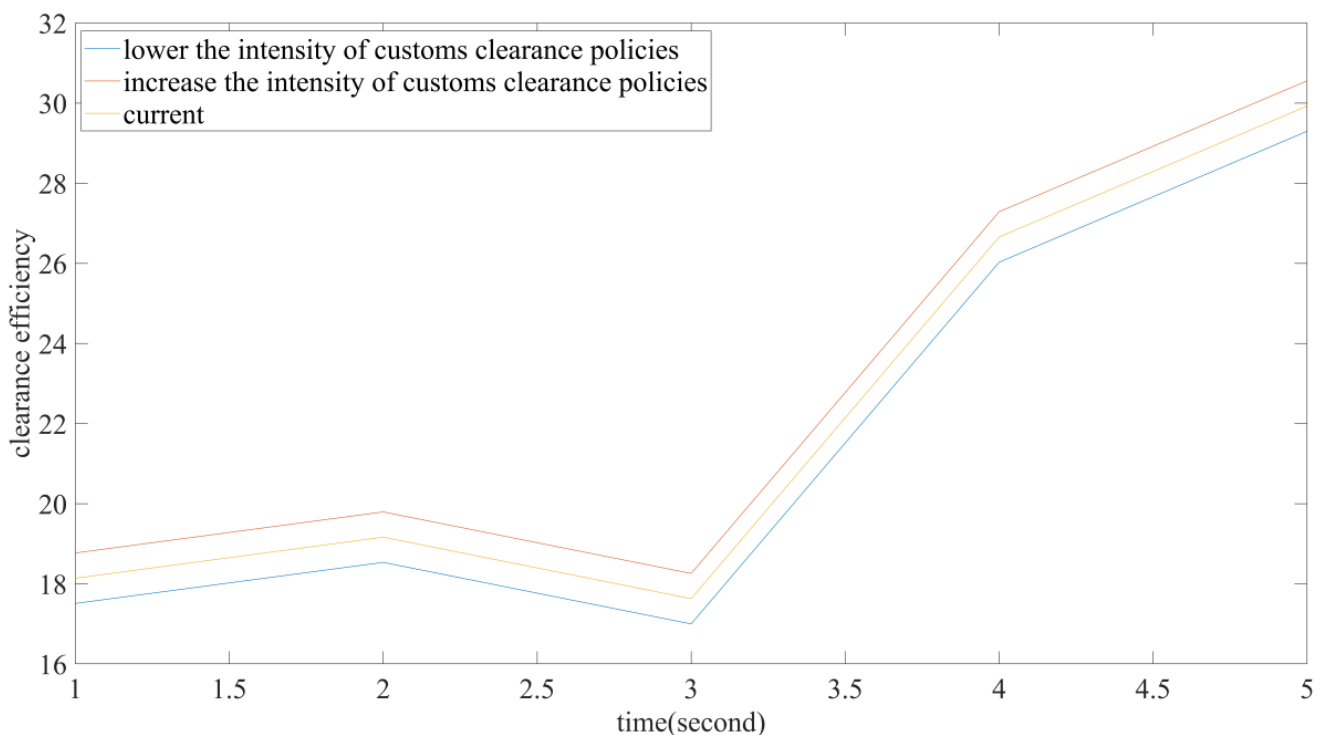
Figure 11. Influence of customs clearance policy intensity on customs clearance efficiency.

It can be seen from Figures 11 and 12 that the intensified customs clearance policies' strength can effectively improve the efficiency of customs clearance and positively impact on the development of cross-border e-commerce B2B export trade. The reason is that the government's publication of customs clearance policies can increase the optimization of cross-border e-commerce customs clearance, shorten the time of customs clearance, provide convenient customs clearance services, and provide assistance to the development of cross-border e-commerce B2B exports.
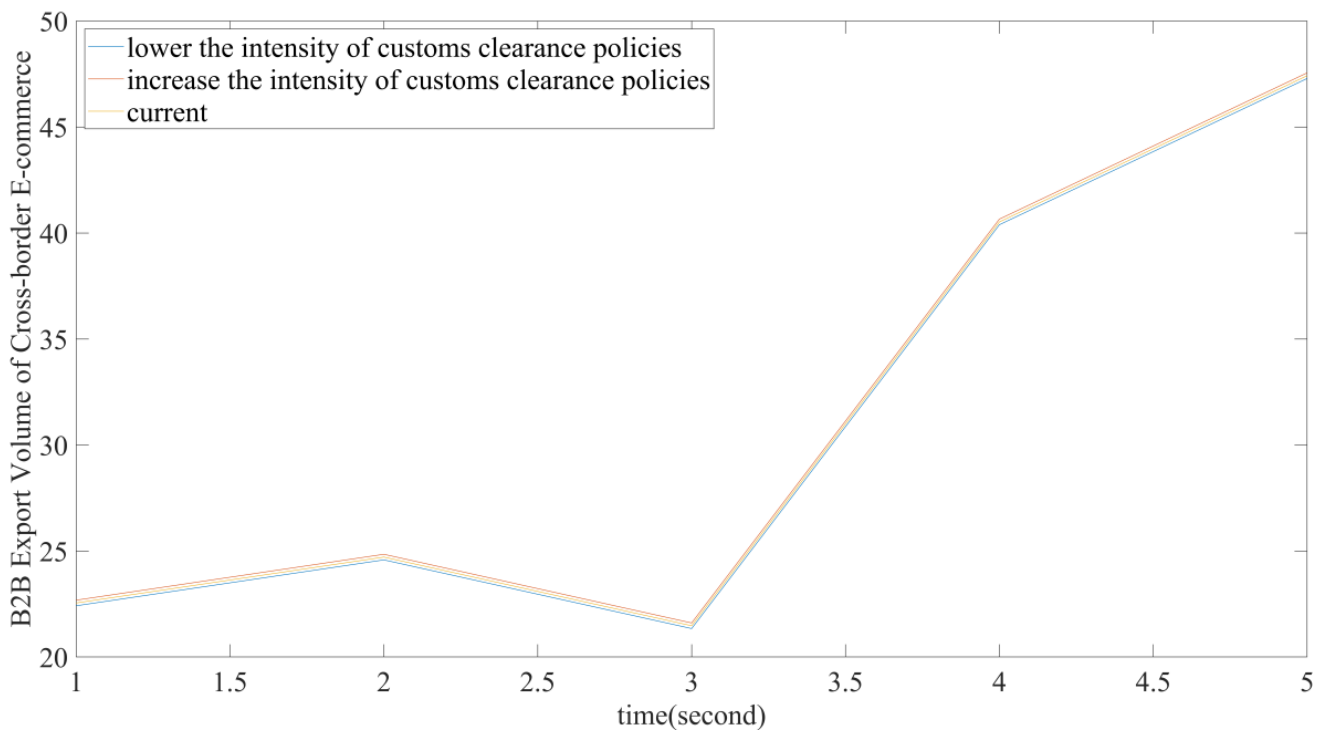
Figure 12. Impact of customs clearance policy on B2B export development of cross-border e-commerce.

5.1.4. Impact of Fiscal Policy

Fiscal policy affects the degree of government funding support, the regulatory environment (regulatory policies), and the growth coefficient of employees. When the country increases financial support for the cross-border e-commerce industry, it will promote the development of cross-border e-commerce infrastructure. At the same time, fiscal policies will also provide a good market environment for cross-border e-commerce B2B companies and increase their enthusiasm for business. In addition, fiscal policy support can effectively cultivate and absorb talents and increase the number of employees. In order to study the impact of government fiscal policy on the development of cross-border e-commerce B2B export trade, the fiscal policy variables are multiplied by 1.1 or 0.9 to indicate the increase or decrease in its intensity. The increase in fiscal policy means that the government has issued a number of fiscal policies to support the development of cross-border e-commerce B2B exports. For example, the government provides financial subsidies for cross-border logistics construction and overseas warehouse building. The following compares the models representing different fiscal policy strengths with the original model, and the simulation results are shown in Figures 13–15.

It can be seen from Figures 13–15 that the intensity of fiscal policies has a significant positive impact on the development of cross-border e-commerce B2B exports and accelerates the development of cross-border logistics and informatization. The reason is that the government can support cross-border e-commerce B2B export enterprises through fiscal policies and accelerate the development of supporting facilities. The development of cross-border e-commerce infrastructure construction can effectively improve the efficiency of cross-border commodity delivery and enhance cross-border e-commerce. The platform reputation reduces the costs of enterprises in related industries, further optimizes the market environment, and ultimately promotes the development of cross-border e-commerce B2B exports.
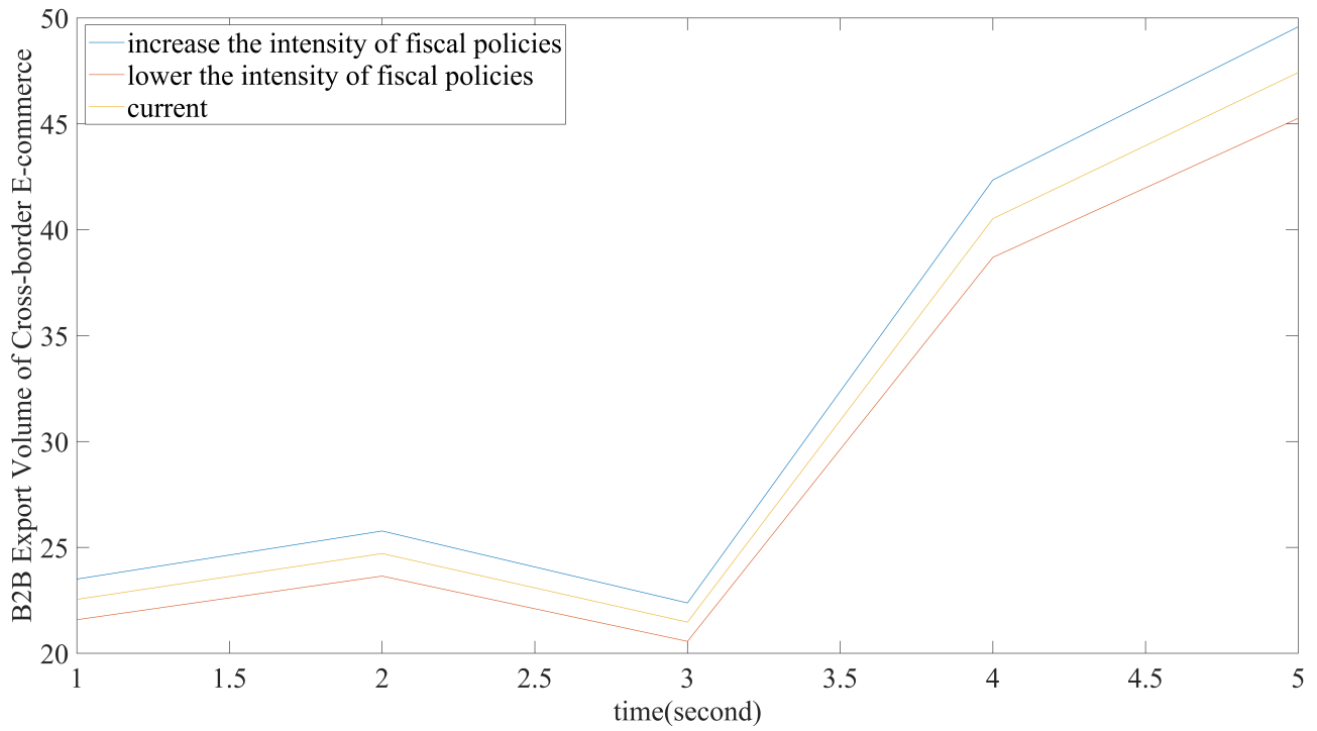
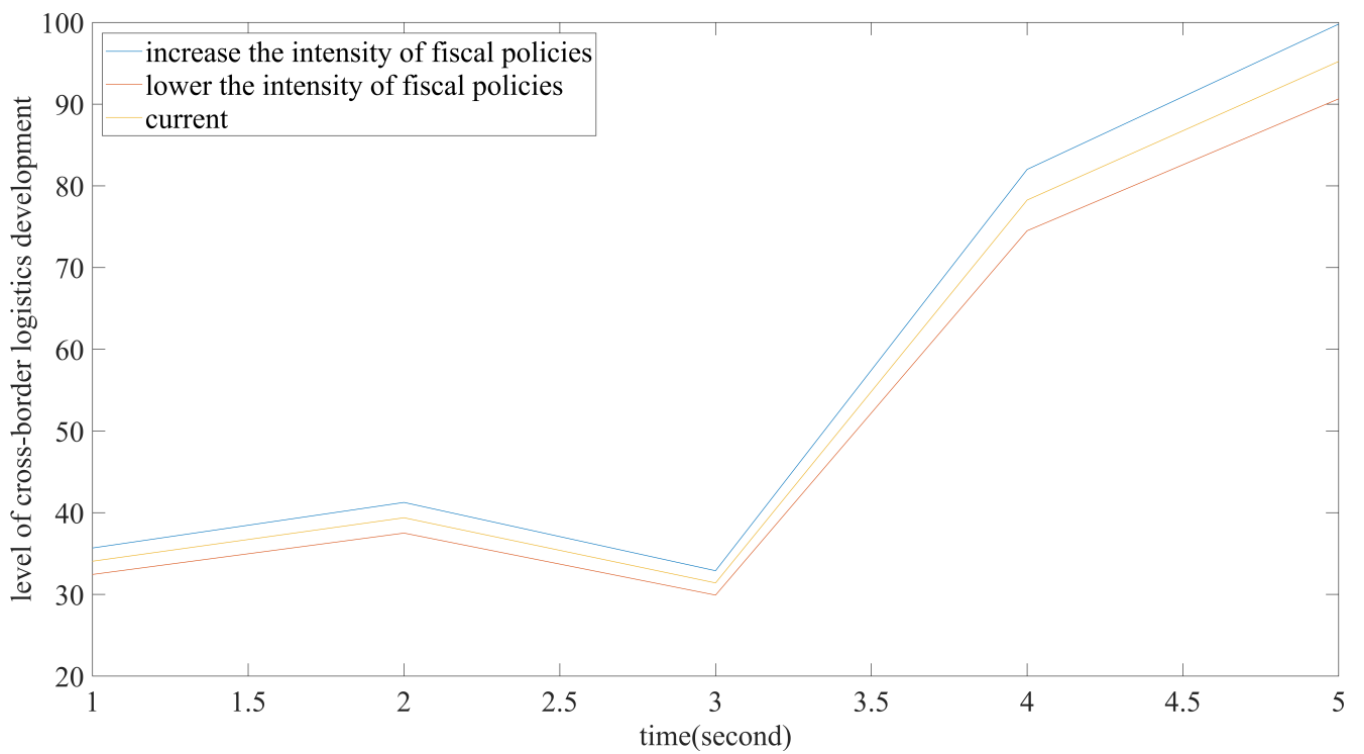**Figure 13.** The influence of fiscal policy intensity on cross-border e-commerce B2B export.

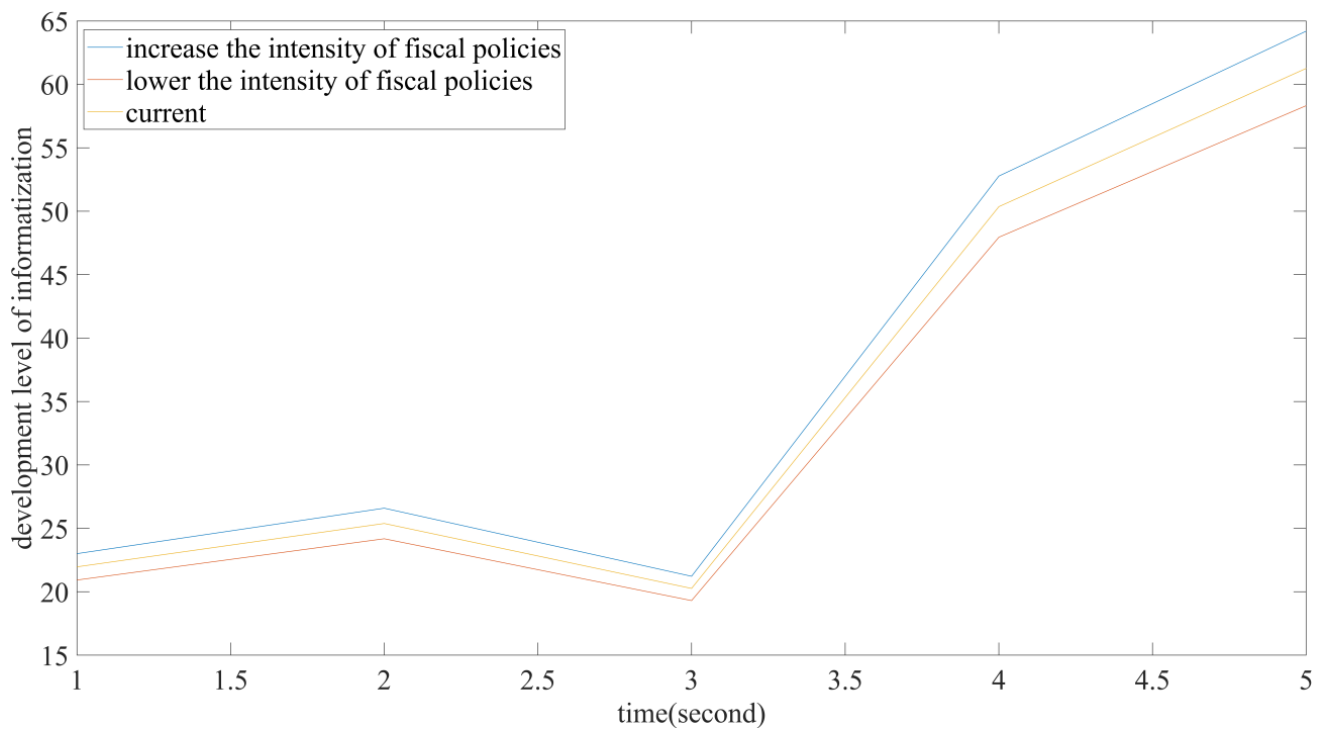**Figure 14.** Impact of fiscal policy on cross-border logistics development.

Figure 15. The influence of financial policy intensity on informatization development level.

5.1.5. Impact of Talent Policy

The talent policy only affects the increase in the number of employees and talents. The development of information technology and cross-border logistics is inseparable from the development of relevant talents. As mentioned above, the establishment of infrastructure is conducive to the development of cross-border e-commerce B2B export trade. At the same time, the development of cross-border e-commerce B2B export trade requires not only talents but also a large number of employees, and the talent policy can increase the number of employees. In order to study the impact of the government's talent policy on the development of cross-border e-commerce B2B export trade, the talent policy variable is multiplied by 1.1 or 0.9 to indicate the increase or decrease in its strength. The increase in the talent policy represents the government's proposed multiple talent policies. In order to promote the development of cross-border e-commerce B2B exports, for example, the government has made efforts to introduce and train industry leaders and professional technical personnel. The following compares the models of different talent strengths with the original model, and the simulation results are shown in Figures 16 and 17.

It can be seen from Figure 16 that increasing or reducing the intensity of the talent policy has no significant impact on the development of cross-border e-commerce B2B export trade. However, it can be seen from Figure 17 that the strength of the talent policy has a significant impact on the number of employees. Increasing the strength of the talent policy can increase the number of cross-border e-commerce employees. In addition, compared with the above-mentioned different policy simulation results, it is not difficult to find that the talent policy has little effect on the development of cross-border e-commerce B2B export trade, and it needs the support of tax policies, fiscal policies, and customs clearance policies.
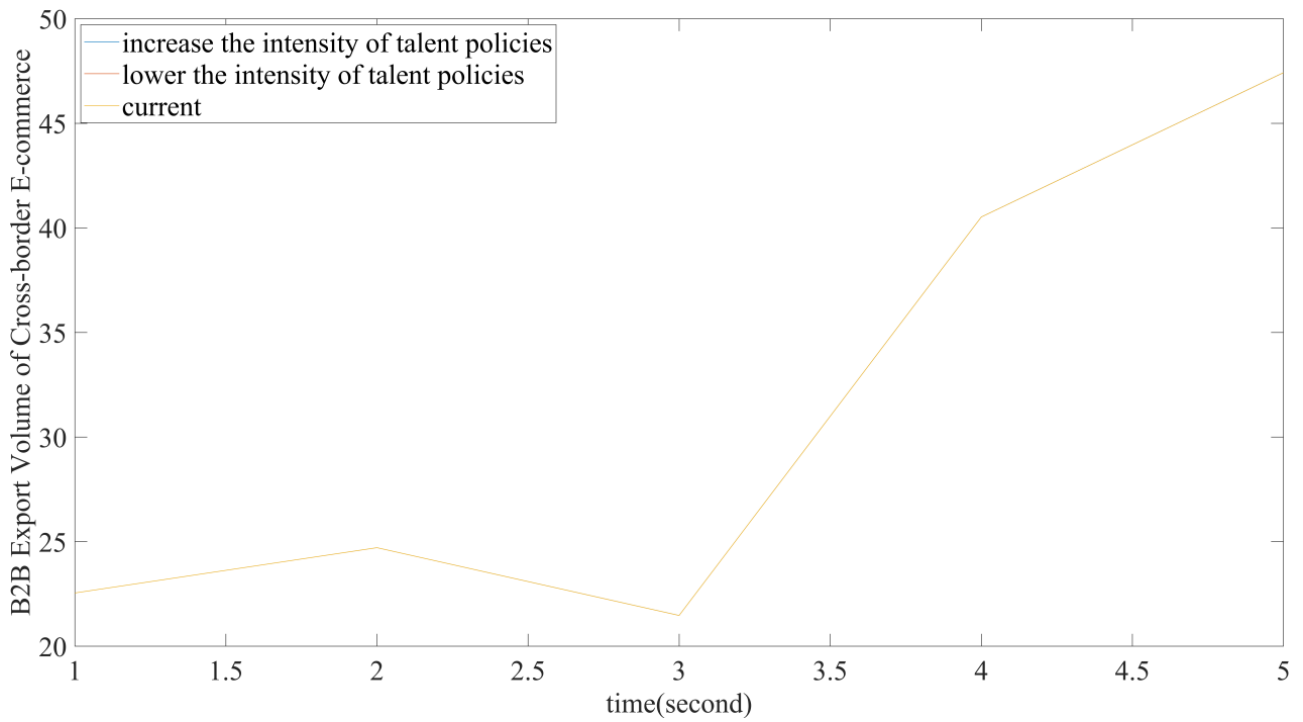
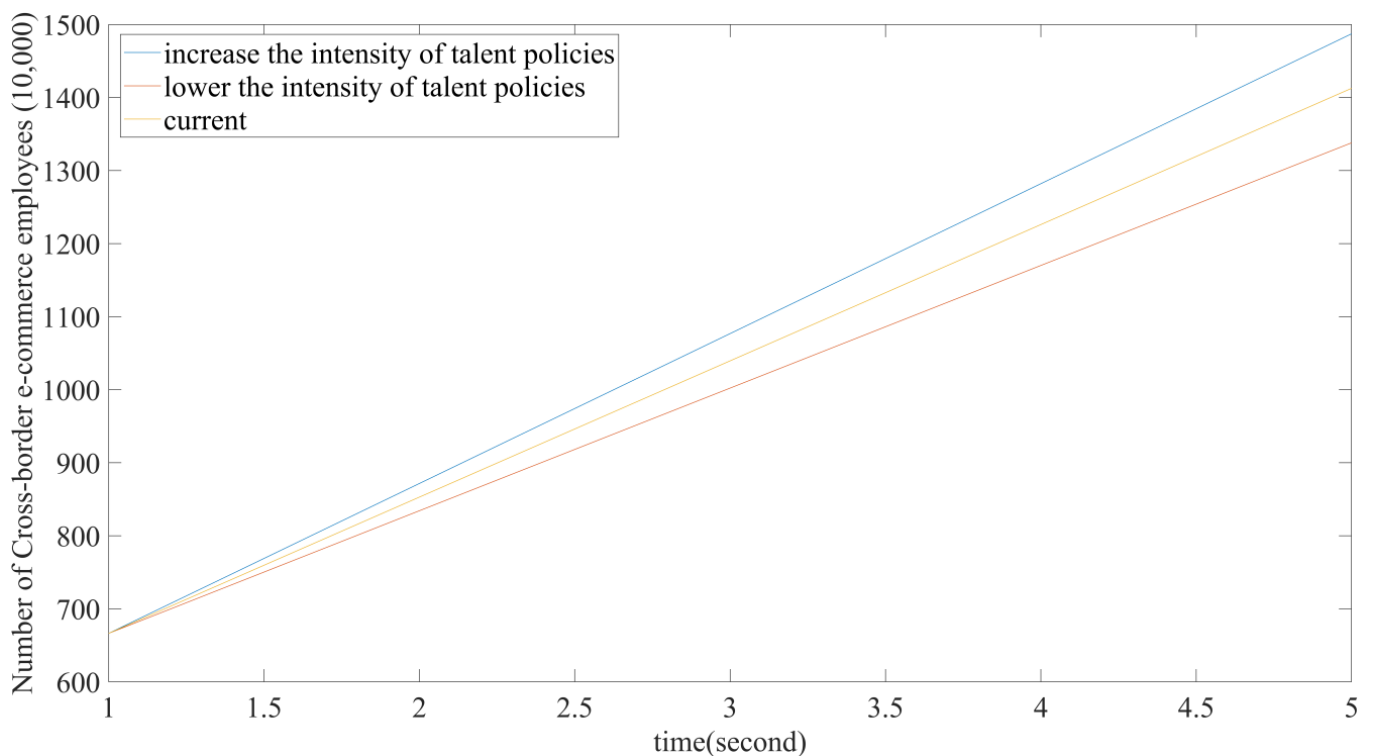**Figure 16.** Influence of talent policy on B2B export development of cross-border e-commerce.

Figure 17. Impact of talent policy on the number of cross-border e-commerce employees.

5.2. Impact of Combined Policies

The above simulation analyzes the impact of a single policy on the development of cross-border e-commerce B2B export trade. This section analyzes the impact of different combined policies on the development of cross-border e-commerce B2B export trade. The specific classification and combination of policies are shown in Table 13. The tax policy and

fiscal policy here can reduce the cost of enterprises and implement financial subsidies to enterprises; thus they are classified as financial support. Tax policies and customs clearance policies can affect the efficiency of customs clearance and customs. Therefore, it is attributed to the customs environment. The regulatory environment is the regulatory policy, including taxation policies, payment policies, customs clearance policies, and fiscal policies. The implementation of fiscal policies and talent policies can improve the income and treatment of cross-border e-commerce B2B exports practitioners and attract more people to engage in this industry; thus the combination of the two policies is considered to be the growth of practitioners. Here, the policy intensity of different policy combinations is increased by 10%, and its impact on the development of cross-border e-commerce B2B export trade is simulated. The results are shown in Figure 18.

Table 13. Policy combinations.

Policy Combination	Types of Policies Included
Financial support	Tax policy, fiscal policy
Customs	Tax policy, customs clearance policy
Regulation	Tax policy, payment policy, customs clearance policy, fiscal policy
Employment growth	Fiscal policy, talent policy
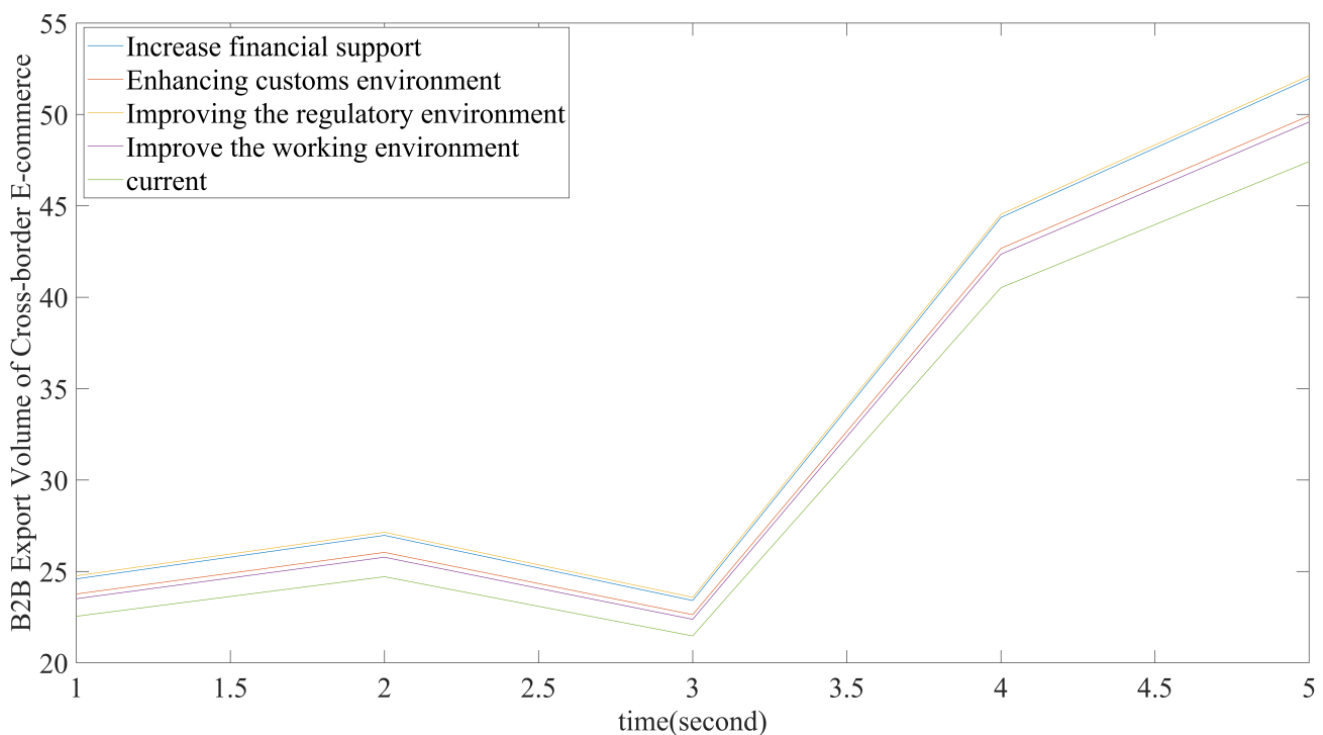
Figure 18. Policy combination simulation results.

It can be seen from Figure 18 that different types of policy combinations can significantly improve the development level of cross-border e-commerce B2B, and optimizing the regulatory environment is the most effective in promoting the development of cross-border e-commerce B2B, followed by rising financial support and optimizing the customs environment and employment environment. The regulatory environment mainly optimizes the cross-border e-commerce market environment and improves the security of cross-border payments. The optimization of the cross-border e-commerce market environment can combat counterfeit and inferior products and promote healthy competition between enterprises

and the enthusiasm of cross-border e-commerce practitioners. The main goal of raising financial support is to improve the construction of cross-border e-commerce infrastructure and reduce business operations cost so as to attract more traditional foreign trade companies to transform, thereby promoting the development of cross-border e-commerce B2B export trade. The improvement of the customs environment can effectively improve customs clearance efficiency, shorten the cross-border commodity turnover cycle, and help enhance cross-border e-commerce platform reputation and fasten the development of cross-border e-commerce B2B export trade. In addition, the increase in the working environment can provide the necessary labor for the rapid development of the industry, on the one hand, and on the other hand, it can strengthen the reserve of relevant scientific and technological talents and management talents and promote the development of science and technology and the improvement of management and operation concepts.

6. Analysis and Discussion

This section further discusses simulation results analysis, policy suggestions, and research limitations, as shown below:

6.1. The Simulation Results

Based on the above simulation experiments, the following conclusions can be drawn:

(1) Tax policies, customs clearance policies, and fiscal policies have the greatest impact on the development of the cross-border e-commerce B2B industry, followed by payment policies and talent policies.

(2) The government has adopted tax policies, customs clearance policies, and fiscal policies to provide financial support for cross-border e-commerce B2B enterprises, which can effectively reduce the cost of enterprises engaging in the cross-border e-commerce B2B industry, expand the construction of cross-border logistics infrastructure and information infrastructure, optimize the customs clearance environment, improve customs clearance efficiency, and promote cross-border electricity.

(3) For cross-border e-commerce B2B companies, payment policies can optimize cross-border payment procedures and improve payment security, thereby enhancing the reputation of cross-border e-commerce platforms, and ultimately benefiting cross-border e-commerce platforms.

(4) Through adjusting the intensity of talent policy, we can find that it has no obvious effect on the development of cross-border e-commerce B2B export trade. It can be seen that in the context of the dual circulation measure, the talent policy cannot effectively improve the development of cross-border e-commerce B2B export trade, and it may lag behind the development of the cross-border e-commerce B2B industry.

(5) The simulation results of the four policy combinations of financial support, customs environment, regulatory environment, and employment environment indicate that the regulatory environment has the greatest impact on cross-border e-commerce B2B export trade, followed by financial support, customs environment, and employment environment.

(6) The "dual circulation" measure has a lag effect on the B2B export development of cross-border e-commerce. Among the variables related to the development of cross-border e-commerce B2B export trade, infrastructure investment of cross-border e-commerce is most affected by policy lag, followed by enterprise operation, government supervision, customs supervision, and cross-border e-commerce training.

6.2. Policy Suggestions

Through analyzing the simulation results of single policy and policy combination, we give some policy suggestions to promote the development of cross-border e-commerce as follows:

(1) Strengthen the implementation of tax policies and fiscal policies

From the simulation results of a single policy, it can be seen that tax policies and fiscal policies have a great role in promoting the development of cross-border e-commerce B2B export trade. From the effect of policy combination, the combined tax and fiscal policies can significantly affect cross-border e-commerce B2B export trade. For example, the simulation results above show that payment policies and talent policies have no significant effects on the development of cross-border e-commerce B2B export trade. However, when there are tax policies or fiscal policies in the policy portfolio, the regulatory environment that includes payment policies or employment environment that includes talent policies can significantly promote the development of cross-border e-commerce B2B export trade. The main reason is that tax and fiscal policies can promote the development of cross-border e-commerce export trade by means of capital inflows. Therefore, strengthening the implementation of tax and fiscal policies is conducive to the development of cross-border e-commerce B2B export trade.

(2)   Appropriately increase funding support

For the development of cross-border e-commerce B2B export trade, financial support means the reduction of enterprise cost and the improvement of the enterprise development environment. At present, due to the complicated market environment faced by cross-border e-commerce B2B, the cost and risks faced by enterprises to participate in cross-border e-commerce B2B are relatively large, which are lower than the country's expectations for the development of the industry. When enterprises participate in cross-border e-commerce B2B export trade, the government can encourage enterprises to develop cross-border e-commerce B2B export business by providing financial support such as tax incentives and financial subsidies. The infrastructure construction supported by funds can provide a good foundation and environment for the development of cross-border e-commerce B2B export. However, the government needs to formulate corresponding rules and policies while supporting cross-border e-commerce B2B enterprises and beware of insurance fraud, tax evasion, etc.

(3)   Optimize the customs environment

The quality of the customs environment determines the level of development of cross-border e-commerce B2B export trade. Simulation results show that tax policies and customs clearance policies can positively affect the customs environment and customs clearance efficiency and ultimately positively affect the development of cross-border e-commerce B2B export trade. Based on this, the government can greatly promote the development of cross-border e-commerce B2B export trade by optimizing the customs environment and improving the level of customs management. Therefore, the government needs to improve the cross-border e-commerce tax system in terms of customs supervision, provide specific and unified management standards for the regulatory authorities, and manage cross-border e-commerce B2B export trade in a scientific and orderly manner. At the same time, the customs management should be innovated, such as shortening the time for customs clearance of goods, simplifying the procedures and forms of customs declaration for goods, and making full use of advanced information technology to improve management efficiency.

(4)   Optimize the regulatory environment

The government's optimization of the regulatory environment for the cross-border e-commerce B2B industry can effectively improve the cross-border e-commerce market environment. A good market environment will help increase the enthusiasm of cross-border e-commerce B2B companies and promote the development of cross-border e-commerce B2B export trade. Meanwhile, the regulatory environment also includes the supervision of commodities; that is, optimizing the regulatory environment means optimizing commodity supervision, which can improve the quality of China's cross-border e-commerce B2B product, protect consumers' rights and interests, and maintain China's foreign trade reputation. In addition, the government can improve the cross-border e-commerce inspection and

quarantine system, formulate corresponding accountability and punishment regulations, and crack down on illegal businesses such as illegal operations and selling counterfeit and shoddy products. In addition, the government can innovate the regulatory model of cross-border e-commerce, use advanced information technology to electronically monitor cross-border e-commerce products, file companies and products, and adopt different regulatory schemes for companies with different credit levels to achieve efficient supervision.

(5)   Strengthen the combination of talent policy and fiscal policy

The development of cross-border e-commerce B2B export trade is inseparable from the support of practitioners. The Chinese government also needs to strengthen the talent pool of cross-border e-commerce. From the simulation results of the single talent policy, the talent policy is not significant in promoting cross-border e-commerce B2B export trade. However, it can be seen from the simulation results of policy combination that the combination of fiscal policy and talent policy can effectively promote the development of cross-border e-commerce B2B export trade. Based on this, the implementation of a single talent policy has a relatively limited effect on the development of the industry. At this time, on the one hand, the government should strengthen and guide colleges and universities to open cross-border e-commerce majors, cultivate cross-border e-commerce talents, and meet the market's demand for cross-border e-commerce talents. In addition, it must publish more B2B programs that are beneficial to cross-border e-commerce. The fiscal policy for the development of export trade, by promoting its development to attract more talents to engage in the industry, can effectively promote the growth of the number of cross-border e-commerce practitioners and the increase in related talent reserves.

(6)   Reduce the policy lag time

The policy implemented by the government usually has a lag from enforcement to effectiveness. The proposal and implementation of the "dual cycle" measure need to consider how to reduce the lag time of the policy. To this end, the following suggestions are put forward: First of all, the government should strengthen the operability of policies. Secondly, local governments can reduce principled policy documents and issue operational policy documents according to the needs of B2B export enterprises of different local cross-border e-commerce enterprises to speed up policy implementation and clarify the details of policy acceptance departments, acceptance time, operation procedures, and implementation methods. Thirdly, the government needs to improve and perfect the policy implementation mode, streamline the project process, improve the efficiency of project implementation, adopt a more flexible way to deal with small projects, concentrate on major projects, and improve the efficiency of project implementation. For example, B2B infrastructure construction of cross-border e-commerce is very important for its export development, but it is greatly affected by the lag of policy implementation. As a result, local governments need to accelerate the implementation of cross-border e-commerce infrastructure construction to promote the development of local cross-border e-commerce B2B export.

6.3. Limitations

This paper studies the influence of the "dual circulation" measure on the development of cross-border e-commerce B2B export trade. Compared with other scholars' studies, although this paper quantifies the influence of the "double circulation" measure on the development of cross-border e-commerce B2B export trade, the paper still has the following shortcomings in the overall modeling process: (1) The data volume of the B2B export of cross-border e-commerce adopted in this paper is small; thus it cannot more accurately simulate the impact of the "dual circulation" measure on the B2B export development of cross-border e-commerce. (2) In the process of modeling, this paper does not arrange various types of policies according to the promulgation time and also does not consider the impact of policies promulgated at different time points on the B2B export of cross-border e-commerce in various periods. For example, some of the policies were promulgated in the third quarter of 2020, while some were promulgated in the fourth quarter of 2020. From

the perspective of the timeline, the policies promulgated in the later period cannot affect the development of the B2B export trade of cross-border e-commerce in the earlier period. Moreover, policies promulgated at different time points have different effects. Policies promulgated in the third quarter of 2020 can affect the development of the B2B export trade of cross-border e-commerce from the third quarter of 2020 to the third quarter of 2021. The policies issued in the fourth quarter of 2020 can only affect the development of cross-border e-commerce B2B export trade from the fourth quarter of 2020 to the third quarter of 2021. Therefore, if the promulgation time of multiple types of policies is arranged in the modeling process and their influence on the development of the B2B export trade of cross-border e-commerce is considered, the simulation results will be more accurate.

7. Conclusions

This paper first analyzes the "dual circulation" measure by qualitative analysis and divides it into five categories, namely: tax policy, fiscal policy, customs clearance policy, payment policy, and talent policy. These five types of policies significantly impact on cross-border logistics infrastructure, the level of cross-border informatization, the degree of cross-border payment security, the reputation of cross-border e-commerce platforms, the cost of cross-border e-commerce companies, the number of cross-border e-commerce talents, and the environment of the cross-border e-commerce market, customs clearance efficiency, and other aspects. Then, a system dynamics model for the development of cross-border e-commerce B2B export trade is constructed, and Vensim PLE is used for simulation analysis.

The modeling process and simulation results demonstrate that: (1) infrastructure investment of cross-border e-commerce is most affected by policy lag, followed by government supervision and enterprise operation, while talent training of cross-border e-commerce and customs supervision are almost not affected by policy lag; (2) tax policy, customs clearance policy, and fiscal policy have a greater effect on the promotion of cross-border e-commerce B2B exports, while the payment policy and talent policy have less impact on them; and (3) from the simulation results of policy combination, we can see that the regulatory environment (i.e., regulatory policies) is the most important to promote cross-border e-commerce B2B export trade, followed by financial support, customs environment, and business environment.

Compared with existing literature, this paper has the following innovations:

(1) When current scholars study the impact of the "dual circulation" measure on cross-border e-commerce, they do not quantify the impact of the policy on the cross-border e-commerce industry but adopt the method of panel data analysis to conduct qualitative research on the impact of the "dual circulation" measure on the cross-border e-commerce industry. In this paper, when studying the effect of the "dual circulation" measure on the development of the B2B export trade of cross-border e-commerce, it is classified, and the influence of "dual circulation" measure on the development of the B2B export trade of cross-border e-commerce is quantified by constructing a system dynamics model. Compared with other studies, this paper quantifies the impact of the "dual circulation" measure on the development of the B2B export trade of cross-border e-commerce, which can more intuitively analyze the implementation effect of the "dual circulation" measure. Its quantitative model has certain reference value for future research on the impact of the "dual circulation" measure on other industries; that is, it can specifically analyze the implementation process of the "dual circulation" measure and understand the development and change of the industry from many aspects and levels.

(2) In the modeling process, the lag of the implementation effect of the "dual circulation" measure was considered and introduced into the model to improve the effectiveness and rationality of the model. Usually, a lag exists in the policy implementation. When this paper takes quarterly as the time unit, the issue of lag in policy implementation cannot be ignored. Most studies on the impact of policy on the industry do not

consider the factor of policy lag or mainly study the lag of the impact of monetary policy on macroeconomic regulation. Therefore, this study can effectively analyze the impact of policy lag on the effect of policy implementation and put forward more practical suggestions for policy promulgation and implementation.

In future studies, to analyze the impact of policies on targeted industries, not only the influence mechanism should be considered, but also the impact of different policy promulgation times on the development of targeted industries in different periods should be explored [31], and the timeliness of policy implementation should be deeply explored [32].

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