

Trade Liberalization and Trade Protection Based on Game Theory

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Abstract. Under the background of economic globalization, economic and trade exchanges are increasingly close. While countries enjoy the dividends brought by the global economy, trade competition is also more intense. In order to protect their own economic and political interests, countries usually adopt the policies of trade liberalization or trade protection policy protectionism. The total economic volume of China and the United States is huge, so the trade frictions between the two countries will attract the attention of the world trade countries. The choice of trade policies between the two countries will also affect the economic level and economic and trade relations of both countries and even the development of the entire world economy. Therefore, from the perspective of game theory and international trade, this paper analyzes the choice of trade policy in world trade by calculating the Nash equilibrium in the choice of trade policy and the welfare changes caused by the implementation of tariffs. Through game theory analysis, the results show that trade protection and trade liberalization in world trade are both contradictory and coexist. In order to protect the development of their important industries, countries can adopt reasonable subsidy policies or protection policies to support them under the framework of WTO. However, countries should actively promote global economic governance and actively promote the development of multilateral trade and regional economy. It provides some ideas for the choice of trade policy in the context of trade war.

Keywords: Trade disputes; China; United States; Game theory; Trade.

1. Introduction

1.1 Research Background and Motivation

Since entering the 21st century, trade liberalization has become a basic trend, but the outbreak of the economic crisis has also made some countries pay more attention to trade protectionism. Excessive trade protectionism will affect the trade convenience of all countries in the world and hinder economic globalization. Trade competition among major countries is an important factor affecting the smooth operation of the world economy. Take China and the United States as an example. As the two largest economies in the world, the Trump government, which pursues "the United States first", has implemented trade protection measures against China. With the signing of a memorandum by Trump at the White House on March 22, 2018, the trade war between the two countries officially broke out. China subsequently took relevant measures to fight back. The Trade disputes between China and the United States has become a trade friction that has attracted the attention of the world. In fact, there are no absolute advantages and disadvantages of trade protection and trade liberalization in international trade. In the competitive environment of maximizing their own interests, trading countries often choose two trade policies according to their own interests. With the development of the economy, trade policies are also constantly adjusted. During the economic crisis, countries often adopt protectionist policies to support the recovery and development of their economies; With the recovery of the economy and the deepening development of economic globalization, trade liberalization has further expanded, and discriminatory and unfair trade protection measures that have an impact on international trade are also being eliminated, regulated and retained in agreements and agreements reached through multilateral trade negotiations [1]. At the same time, the changes in the welfare of all parties brought about by the trade protection policy also make the results of the implementation of the trade policy uncertain. Therefore, trade liberalization and trade protection are both antagonistic and coexisting. In the context of the deepening development of economic

globalization and the rise of trade protectionism in the world trade, how countries formulate international trade policies to balance the interests of all parties and achieve the maximization of interests has become a question that countries should consider in depth. Through the analysis of game theory and relevant models of international trade, it can be seen that the profit situation of all parties when adopting different policies, the policy choice of the two countries in the final equilibrium, and the welfare changes of their own countries and the world market when imposing tariffs as a trade participant that does not affect the world price, provide a certain theoretical reference for the country to formulate trade policies.

1.2 Literature Review

Trade liberalization and trade protection policies are constantly changing with the balance of interests in international trade. The income distribution effect in international trade makes the same policy have different welfare effects on consumers, producers and other different groups, resulting in the conflict and differentiation of policy propositions, resulting in the game switching between free trade and trade protection of trade policy, and shaping the complex symbiotic and alternating relationship between free trade and trade protection [2]. Taking the Trade disputes between China and the United States as an example, some scholars believe that the increase of trade links will make the trade frictions caused by the different systems and customs between the two countries naturally arise [3]. In Sino-US trade, the United States has a long-term trade deficit. At the same time, China's accelerated progress in the fields of scientific and technological innovation and intellectual property has also increased the pressure of the United States [4]. In the face of trade frictions, the two countries will attack and defend each other in the whole process of trade war game. Both sides will rationally choose to maximize their respective interests and finally solve the problem through trade negotiations. The two countries will achieve (trade war, trade war) Nash equilibrium to (cooperation, cooperation) Nash equilibrium in the trade war, and achieve a win-win situation of cooperation rather than a zero-sum game [5]. The above research mainly analyzes the reasons for the emergence of trade protection policies and the strategic choices of both sides in the trade war from the perspective of game theory. In fact, the formulation of trade policy is also a game of the interests of all parties involved in trade. The strategic choice in the Trade disputes between China and the United States can be extended to the policy choice in international trade.

1.3 Research Framework

Therefore, this article will first introduce a case, namely the Sino-US trade war, and then conduct a balanced analysis of the different trade policies implemented by the two countries based on game theory, and then give suggestions based on the results of the case analysis and the reasons behind it, and finally the conclusion.

2. Case Description

On August 14, 2017, President Trump of the United States announced that he would investigate unfair trade practices suspected of infringing US intellectual property rights and forcing US enterprises to transfer technology. This is a precursor to friction in Trade disputes between China and the United States. On March 22, 2018, the Principality of the United States imposed tariffs on Chinese products exported to the United States in accordance with the "301 Investigation" to punish Chinese related products; The next day, the Ministry of Commerce of China announced that it would take countermeasures against the United States. The Trade disputes between China and the United States war broke out in a comprehensive way. Immediately, the United States continued to impose tariffs on Chinese goods, and China also responded to the imposition of tariffs. After many rounds of competition, the trade war between the two sides has been escalating. On December 1, 2018, China and the United States reached a truce agreement on trade war at the G20 Summit, and the two heads of state agreed to reach a 90-day trade truce. However, on May 10, 2019, the trade negotiations broke

down, and the United States and China successively imposed another round of tariffs. On January 15, 2020, the two sides reached a consensus on tariff exemption, and the trade friction entered a stage of easing.

As for the Trade disputes between China and the United States war, some scholars believe that the essence of the Trade disputes between China and the United States war is the reflection of the global strategic competition between the United States as an old empire and the rapidly developing socialist China in the economic and trade field [6]. Some scholars also believe that the long-standing huge deficit in Trade disputes between China and the United States directly led to the trade war, and the statistical methods of the two countries for different import and export amounts also exaggerated the trade balance between the two countries. As of 2017, before the official start of the trade war, China ranked first in the world with a total import and export trade of 4105.2 billion dollars, and the United States was second with 3956.2 billion dollars, when the trade deficit between China and the United States reached 375.23 billion dollars. It can be seen from the figure below that the Trade disputes between China and the United States deficit has existed for a long time and is on the rise. In addition, Trump of the United States has held a mercantilist view for a long time, believing that a long-term trade deficit will cause huge losses to the United States, increase the unemployment rate of the United States, and seriously impact the domestic manufacturing industry. Therefore, the trade protectionism has planted seeds for the Trade disputes between China and the United States war [7]. At the same time, the "Manufacturing 2025" proposed by China will also improve the level of China's high-end manufacturing industry, achieve independent innovation in cutting-edge fields such as artificial intelligence, and challenge the advantages of the United States. In addition to the impact of the COVID-19 on the global economy, China and the United States are facing downward pressure on their economies and challenges to their trade, further aggravate the economic problems faced by the two countries.

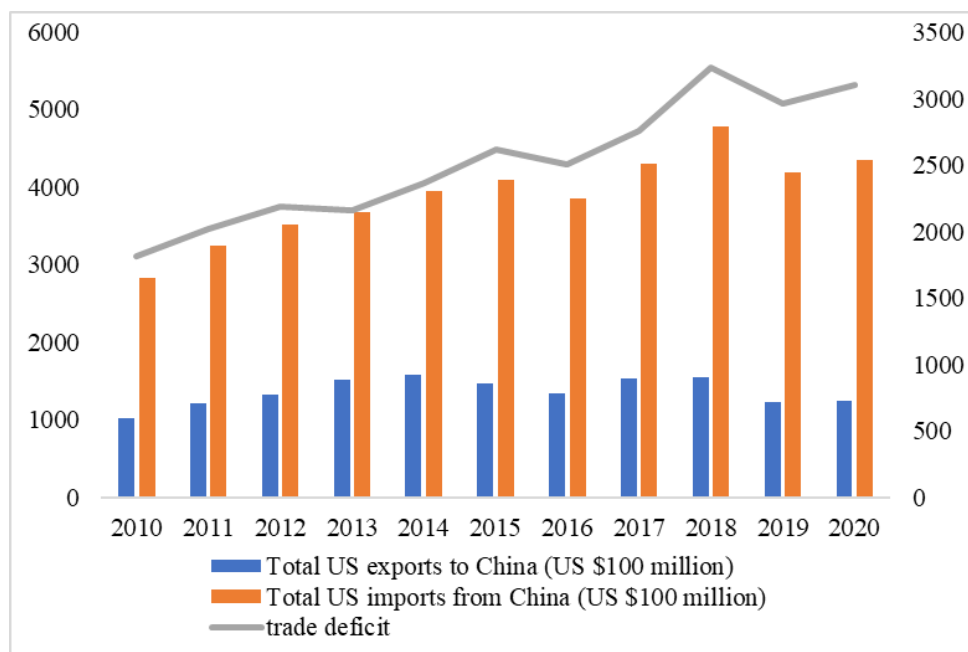


Figure 1. The situation of bilateral trade between China and US in 2010-2020

Data source: Ministry of Commerce of China

3. Analysis on the Problem

In the process of trade, the major trading countries usually choose trade protection or trade liberalization policies to maximize their own profits. Construct the Prisoner's Dilemma model to analyze the policy choices of both sides in international trade.

As shown in the Table 1, Country A and Country B can choose to implement trade barriers or free trade policies. Assuming that both countries choose the trade liberalization policy, both countries can realize the free flow of goods and services in the open market. While producing products with advantages, they can obtain products with lower prices than those produced by their own countries without comparative advantages through the international market. Therefore, both countries can benefit from free trade (100,100). If one side adopts trade barriers and the other side adopts trade liberalization policies, the party who adopts trade barriers will obtain more than 100 points of income from free trade and 150 points of income; However, the import and export trade of the party adopting trade liberalization is damaged, and the gains are less than 100 and 50 points less than those of the party adopting free trade. If both parties adopt trade barriers, the profits of both parties will be 100 points lower than that when both parties implement trade liberalization, and 50 points higher than that when only they implement trade liberalization.

Table 1. Trade policy choices based on prisoner's dilemma analysis

		Country B	
		liberalization of trade	trade barrier
Country A	liberalization of trade	(100,100)	(50,150)
	trade barrier	(150,50)	(80,80)

No matter what the other side chooses, it is a better choice to choose trade barriers, so both countries will reach the equilibrium state of (80, 80) when choosing trade barriers. But in fact, when both sides choose trade liberalization policies, both sides will gain higher benefits than when both sides choose trade barriers. Therefore, in reality, the two sides of trade often make a commitment to implement a more open trade policy by reaching cooperation and specifying mutually beneficial policies. In the game, both sides will observe each other's actions and adjust their own policies. At the same time, there is not only one game between the two countries on economic and trade issues. Any country will fear that it will be retaliated by the other country for its dishonesty. Therefore, neither country can expect the other country to keep its promise on the premise of its dishonesty, so as to achieve long-term cooperation [8]. Therefore, the existence of trade disputes or trade barriers is inevitable to some extent, but the trade of both countries has the trend of trade liberalization.

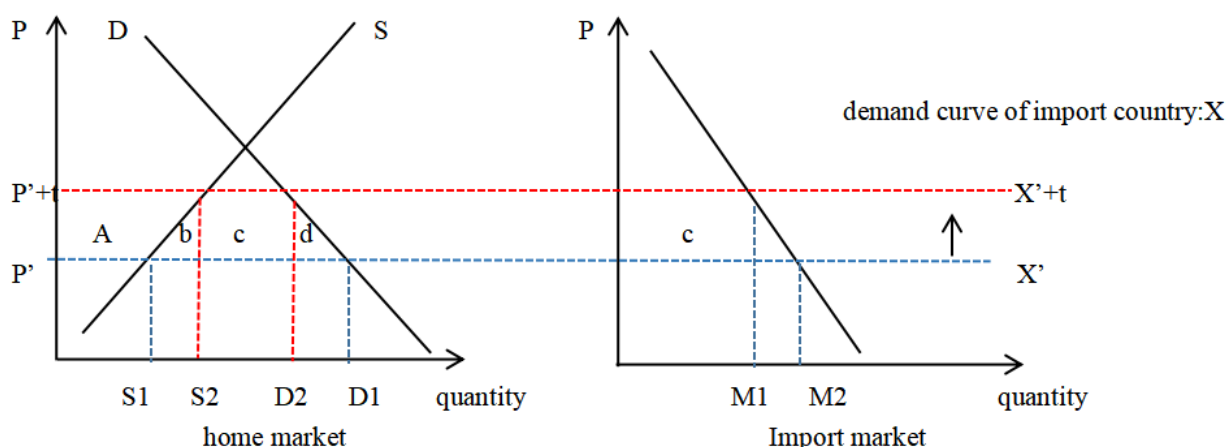


Figure 2. Schematic diagram of welfare changes resulting from the imposition of tariffs

From the perspective of international trade, take the United States as an example of imposing tariffs on imported goods. As shown in the figure above, if the United States imposes an import tax of t unit on imported goods, the consumer surplus in the United States will decrease ($a+b+c+d$), the producer surplus will increase by a , and the government revenue will increase by c . Finally, the net effect of the country decreases ($b+d$). Although the trade protection policy can protect the interests of the producers in the home country to a certain extent, the total effect of the country is actually

reduced compared with that in the free trade state, resulting in unnecessary losses. Therefore, the implementation of the policy of imposing tariffs on imported goods will, to some extent, reduce the competitiveness of Chinese products in the American market, protect the development of American domestic industries and the prices of American local goods, and provide certain jobs for the labor force. However, the implementation of the trade protection policy will reduce the trade volume between the two countries, and will actually damage the overall social welfare of the country.

4. Suggestions

Under the framework of WTO, trade liberalization and trade protection are contradictory but coexist. On the one hand, WTO promotes the principle of trade liberalization through its contents including non-discrimination and most favored nation treatment. On the other hand, WTO also allows the existence of appropriate trade protection through non-discrimination, most favored nation treatment and other contents [9]. In international trade, there is no absolute trade liberalization policy or absolute trade protection policy of a country. Participants in world trade should formulate foreign trade policies that conform to the laws of their own economic development and the trend of economic globalization according to their own trade situation and international trade operation.

First of all, in order to protect their own interests, while other countries implement trade protection policies such as imposing tariffs on their own products, they should counterattack at an appropriate time to prevent themselves from being at a disadvantage in the game. At the same time, the two sides should promote negotiations, reach cooperation consensus and strengthen economic and trade cooperation and exchanges between the two countries. Secondly, in order to protect the development of domestic leading industries or basic industries and other industries with strategic significance, the country can adopt reasonable subsidy policies or protection policies to support them under the WTO framework. Finally, in the context of economic globalization, countries participating in international trade should actively promote global economic governance, and actively promote the development of multilateral trade and regional economy. A truly free, mutually beneficial, cooperative and win-win multilateral trading system will be established within the alliance, and the circle of economic and trade friends outside the alliance will be gradually expanded to promote the continuous development of regional trade alliances and promote economic globalization in the new era [10]. Take China as an example. In recent years, China has actively promoted the construction of the "the Belt and Road". Through regional cooperation or multilateral trade, it has enhanced trade partnerships with other countries, expanded its trade scope, and driven the common economic development of countries along the Belt and Road. While realizing its own economic development, it has strengthened the ties between countries around the world and promoted the in-depth development of economic globalization.

5. Conclusion

In the context of economic globalization, this paper studies the choice of the strategies of the two countries in the Trade disputes between China and the United States from the perspective of game theory and the relevant knowledge of international trade, and analyzes the welfare impact of the trade protection policy taking the imposition of tariffs as an example on the importing countries themselves and the world market. The research results show that the two countries will reach Nash equilibrium at the beginning (trade barriers, trade barriers). However, in the long-term trade exchanges, the two sides will change their trade strategies to (trade liberalization, trade liberalization) by reaching cooperation and specifying mutually beneficial policies, so as to pursue greater interests. Trade liberalization and trade protection policies appear alternately with the continuous development of the economy. But in fact, a simple trade protection strategy will bring negative welfare increase to the importing country. Although tariff barriers protect the interests of domestic producers and increase tariff income to a certain extent, in fact, the rising domestic market price will cause consumer welfare

loss, and the loss will be greater than the sum of the added value of the producers and government welfare. Participating countries in international trade, especially those in trade wars, should pay attention to balancing the advantages and disadvantages of trade liberalization policies and trade protection policies, negotiate while maintaining their own interests, and promote regional and world economic cooperation. This study provides some theoretical analysis and suggestions for countries that may be in a trade war. Although this paper analyzes the equilibrium situation that will occur in the international trade between the two countries and the welfare changes that will occur when implementing trade barriers, it only gives relevant suggestions for the countries in the trade war. In the future, the research should be more universal and can provide suggestions for countries in general trade competition.

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