

Research Article

Behavioral Analysis in International Business Negotiations Based on the Bargaining Model of Game Theory

Bei Zhang 

School of Business Administration, Henan University of Animal Husbandry and Economy, Zhengzhou 450000, China

Correspondence should be addressed to Bei Zhang; 81321@hnuah.edu.cn

Received 22 October 2021; Accepted 18 November 2021; Published 6 December 2021

Academic Editor: Miaocho Chen

Copyright © 2021 Bei Zhang. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

In the process of global digital trade rules negotiation, game and cooperation coexist, and all parties are actively seeking cooperative relationship while negotiating game. Against this background, this paper provides a comprehensive overview of the negotiation process of global digital trade rules and analyzes the core issues of the negotiations and their implied political game. This paper firstly compares the core issues of global digital trade rules negotiations at multilateral and regional levels and quantitatively reflects the weighting relationship between core issues and keywords by means of a dynamic thematic model. In order to judge the potential partnership of each country, this paper constructs a theoretical model of partner selection for global digital trade rules negotiation from the perspective of political game and uses the data of 62 major digital trade countries for empirical testing. Compared with traditional trade agreements, the consensus reached in digital trade negotiations is less influenced by traditional economic geography factors and more influenced by the level of digital trade restrictions and political distance. When signing digital trade terms, a country tends to choose countries with similar levels of digital trade restrictions and high political similarity as partners. Financial restrictions and trade restrictions are the most important digital trade restriction factors that countries pay attention to when negotiating, and political stability is the most important political factor that countries pay attention to when negotiating. Compared with developed countries, developing countries pay more attention to market size, cultural differences, and digital infrastructure when negotiating. The formulation of global digital trade rules may follow a reconstructive path from bilateral to regional to multilateral, promoting regional digital trade rule systems at this stage and gradually expanding the scope of negotiations to the multilateral level.

1. Introduction

In the era of digital economy, trade is undergoing the transformation and upgrading of “digitalization,” and, as a primary form and an important part of global digital trade, cross-border e-commerce is driving the rapid transformation and vigorous development of international trade [1]. Cross-border e-commerce emerged at the turn of the century, with Amazon and eBay hitting the European market at the end of the 20th century, marking the official arrival of cross-border e-commerce on the world stage. With the improvement of digital infrastructure and the laying of global logistics networks, more and more traditional enterprises have joined the cross-border e-commerce field, playing an increasingly important role in global trade activities [2]. Under the epidemic, the New Crown Pneumonia

pandemic has affected normal international trade transactions, and the unique platform advantages of cross-border e-commerce are increasingly prominent, bucking the trend against the backdrop of a sluggish global economy and driving innovative growth in the global economy [3]. Under the influence of the new crown pneumonia epidemic, the e-commerce of global trade has become a prominent feature of international trade, and digital trade will still maintain high growth and usher in new development opportunities. Global digital trade has emerged under the trend of digitization, networking, and platform and is an advanced trade form for the development of cross-border e-commerce, injecting fresh blood and development vitality into the digital economy [4]. Regarding the definition and connotation of digital trade, the World Trade Organization, OECD, EU, and other international organizations have

made provisions, and, with the continuous development of digital trade, the definition and connotation of digital trade are constantly supplemented and expanded, becoming a dynamic concept [5].

Digital trade is a digital platform as a carrier, through the effective use of digital technologies such as artificial intelligence, big data, and cloud computing, to achieve the accurate exchange of physical goods, digital products and services, and digital knowledge and information and then promote the transformation of the consumer Internet to the industrial Internet and ultimately realize the intelligent manufacturing industry of new trade activities, is the expansion, extension, and iteration of traditional trade in the digital economy era [6]. Cross-border e-commerce and digital trade closely connect the economies of various countries and regions in the world, which is conducive to deepening the international division of labor, promoting the intelligent transformation and upgrading of industries, accelerating the process of trade liberalization, and bringing new growth points and important development opportunities for the global economy. While the global digital trade is booming, due to its virtualization, networking, and platform characteristics, the clear-cut boundaries between goods and services in the traditional trade era no longer exist [7]. In response to the trend of borderless goods and services, the existing international trade rules find it difficult to solve a series of basic problems of digital trade such as regulatory principles and classification system. Digital trade forms a powerful impact and serious challenge to the existing international trade rules system and regulatory enforcement [8]. The establishment of reasonable and standardized digital trade rules globally is the general trend, which is conducive to providing a strong foundation and key support for the efficient and smooth development of digital trade, promoting the cooperation and mutual benefit of trade among countries, and promoting the construction of a new pattern of international trade with digitalization, networking, and intelligence [9]. Therefore, the negotiation of global digital trade rules is on the agenda, and the formulation and reconstruction of global digital trade rules have become the focus of a new round of international trade negotiations and rule competition. Throughout the negotiations on global digital trade rules, since 1997, the issue of e-commerce has received extensive attention at the multilateral and regional levels and has been discussed at WTO ministerial meetings for many times, but no substantive progress has been made; APEC, OECD, G20, and other regional economic organizations have actively contributed their ideas; TPP, TTIP, TiSA, and other mega free trade agreements have also made provisions and clarifications [10]. Despite the extensive attention and important efforts made by all parties, a unified and standardized digital trade rules system has not yet been formed. On the one hand, due to the virtualization and platform characteristics of e-commerce, goods and services tend to be borderless, and the clear-cut boundary between goods and services in the traditional trade era no longer exists, and a series of fundamental issues such as whether e-commerce applies to GATT or GATS and whether e-commerce is provided across borders or consumed abroad

are still outstanding, making it difficult to form a standardized and regulated framework for global digital trade rules [11]. On the other hand, due to the different levels of development, differences in interests, and divergent positions of countries around the world, different countries and regions have taken measures to compete for the right to speak on digital trade rules and the terms that are favorable to them, and the digital divide has further hindered the orderly negotiation of global digital trade rules [12].

Based on the above research background, it is necessary to make a comprehensive review of global digital trade rules negotiation at multilateral, regional, and national levels. In the process of global digital trade rules negotiation, game and cooperation coexist, and all parties are actively seeking cooperative relationship while negotiating game. Therefore, this paper firstly compares the negotiation process of global digital trade rules, analyzes the core issues of the negotiations and their implied political games, then constructs a theoretical analysis model to judge the potential partnership and influencing factors of each country, and predicts the future pattern of global digital trade rules. In terms of the core issues of global digital trade rules negotiation, this paper focuses on the digital trade rules negotiation process of two major international organizations, WTO and APEC, introduces machine learning and text mining methods, uses dynamic topic modeling, performs multidimensional feature identification and information extraction, topic identification, and evolution analysis on digital trade texts, and composes the core issues and keywords of global digital trade rules negotiation.

This paper describes the change trend and evolution law of global digital trade rules keywords over time and summarizes the core issues and evolution trend of global digital trade rules negotiation.

On this basis, the interests and potential political games of major economies such as the US, EU, and China are analyzed in depth in terms of cross-border data flow, intellectual property protection, market access barriers, and digital trade regulation, as well as the possible cooperation relationships among countries on this basis.

2. Related Work

The rise of cross-border e-commerce and digital trade has posed certain impact and challenges to the existing international trade rules system and regulatory enforcement. As the basic basis and code of conduct on which digital trade activities are conducted, the negotiation of global digital trade rules is on the agenda, which is of great significance to the healthy and orderly development of global digital trade [13]. The existing literature on global digital trade rules can be categorized into three levels: multilateral, regional, and national, which together constitute the existing global digital trade rules literature system. In recent years, cross-border e-commerce has been developed in full swing, and the advantages of cross-border transactions are increasingly highlighted in the new crown pneumonia epidemic, pulling the global economic innovation growth. In the context of the severe situation of world foreign trade, cross-border

e-commerce still maintains a rapid growth trend and becomes a new engine of international trade growth. As an emerging product in the era of digital economy, cross-border e-commerce differs from traditional international trade in terms of trade costs, transaction patterns, and potential risks, and the traditional international trade regulatory principles present a certain degree of inapplicability [14]. The existing international trade rules have been impacted and challenged and are in urgent need of supplementary adjustment and improvement. In terms of trade costs, cross-border e-commerce can significantly reduce the trade costs brought about by geographical distance, which to a certain extent leads to the “death of distance” and also brings new trade costs such as express logistics, online payment, and language differences [15].

In terms of transaction mechanisms, cross-border e-commerce relies on a variety of online platform mechanisms and business models, such as paid search advertising, pricing mechanisms, feedback mechanisms, trust mechanisms, and consumer auction mechanisms [16]. The problem of seller reputation and information asymmetry is increasingly prominent. In terms of potential risks, the development of cross-border e-commerce is influenced by macro factors such as exchange rate changes and credit risks, while personal micro factors such as computer skills, education, nationality, and religion can also have an impact. International trade has entered the stage of “digital for trade,” and the important tasks at this stage are to accelerate the promotion of digital technology application, promote the construction of multilateral and regional digital trade rules, and speed up the construction of domestic rules for digital trade in three aspects. In order to ensure the healthy and sustainable development of cross-border e-commerce, governments and international organizations must make corresponding adjustments to solve the existing problems of international trade rules and regulatory systems, such as accelerating the creation of global digital customs, optimizing customs clearance, logistics and foreign exchange settlement, and other related service systems, and continuously strengthening the market supervision of cross-border e-commerce [17].

At the multilateral level, the negotiation of multilateral digital trade rules represented by the WTO is constrained by multiple factors and has not yet resulted in substantial progress. It is generally agreed that the e-commerce rules under the WTO framework lack progress and cannot meet the needs of the ever-changing digital trade development. Wójcik and Ciszewska-Mlinarič argue that international rule negotiations lack a global consensus to actively build cross-border e-commerce WTO rules [18]. Up to now, the WTO has not formed a comprehensive trade agreement on digital trade and only regulates the operation of digital trade through fragmented treaties. GATS, GATT, ITA, TRIPS, TBT, and other agreements under the WTO framework cover some aspects of digital trade, and many scholars have explored their applicability and analyzed them from the perspectives of cross-border data flow, regulatory measures, trade facilitation, and so forth. The reasons for the slow development of digital trade rules under the WTO

framework are, firstly, the difficulty in solving the fundamental problems of e-commerce characterization, classification, and model and, secondly, the sharp opposition of the interests and views of the members. The global digital trade rule-making faces the problems of data monopoly, data localization, data sovereignty, and security which need to be solved.

The two-layer game theory has gradually been accepted, and it has become another unique perspective for the study of international relations, and a number of scholars have further deepened and developed the theory on this basis one after another [19]. Although the theory has brought a new perspective to the study of international relations, it has still not been fully theorized, and its implications for international relations itself remain ambiguous. He therefore raises two central issues: What is the meaning of cooperation? And how should the possibility of cooperation be explained? By analyzing these two topics, the two-tier game is further conceptualized. The book argues that the decision-making power of the state is shared by different domestic actors, so the game between actors at the domestic level is based on three variables: differences in policy preferences of actors, domestic distribution of information, and the nature of the domestic political system, as well as the impact that both divided government and asymmetric information can have on cooperation [20]. On the other hand, some researchers have set out to examine the scope of two-tier game theory, whether it can be applied to games outside the economic sphere and whether it can be applied to non-Western democracies [21]. The book explores and demonstrates the breadth of application of two-layer game theory by collecting cases in different fields in different types of countries at different periods of time for study and comparison.

3. Two-Tier Game of International Negotiations

3.1. Static Negotiation Analysis Model of Bargaining Process.

The static analysis model of the two-layer game is based on Putnam’s two-layer game theory, which is a one-time game and is divided into two processes: domestic game and international game, in which the two processes occur and take place simultaneously. Specifically, the domestic game is played by domestic actors, such as the executive, legislature, and interest groups, who legitimize their policy preferences through formal or informal means based on their own interests and using their own domestic political system models. The international game process involves representatives from both sides of the negotiation table adopting certain negotiation strategies based on the policy preferences of domestic constituencies in order to bring about the intersection of the winning sets of both sides. The basic model framework of the static game can be found in Figure 1.

In a one-time static game, the opinion of voters at the domestic level can approve the decision to accept or reject negotiations at the international level, while national negotiators at the international level will have certain expectations about this opinion, test the voters’ ideas through some actions, and make efforts to reach an agreement that is

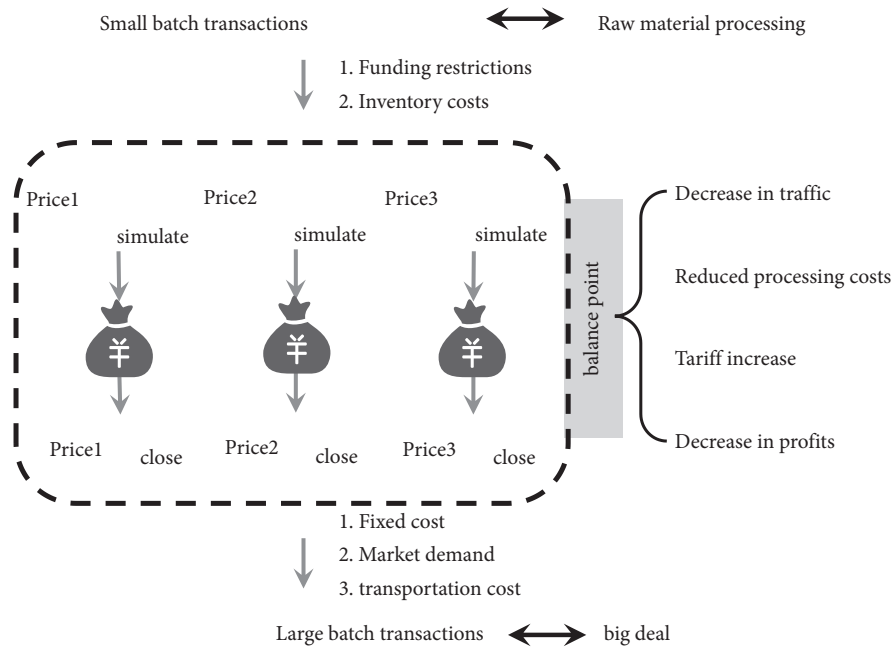


FIGURE 1: Static one-shot game model.

consistent with policy preferences. The winning set represents the minimum probability that countries can accept when formulating a given national coalition policy or negotiating an agreement. The size of the winning pool affects the likelihood of successful negotiations at the international level; the smaller the pool is, the less likely it will be to succeed, but the smaller the pool is, the more favorable the country can be in a position to distribute the benefits in the negotiations. The winning set is mainly subject to three factors: first, the power contrast and power distribution among the actors involved in the domestic level; second, the domestic political system of the negotiating country; and third, the negotiation strategy adopted by the international level negotiators to maximize the intersection of the winning set.

The ratification game is the core element of the domestic level game. Negotiations at the international level require the approval of actors at the domestic level, while at the domestic level, policies proposed by the executive need to be reviewed and approved by the legislature, and when decisions or agreements made by the executive at the international level are displeased by most domestic interest groups, the legislature realizes that this harms the interests of most voters or constituencies, and then the legislature will use a more stringent ratification system. Both the executive and foreign negotiators are aware in advance of the fact and the process that any international agreement reached requires domestic testing and approval within the other country and within their own country. Once an agreement is reached, domestic actors lose the opportunity to make changes to the agreement and can only amend the content of the agreement by reopening the negotiations. Negotiators in international-level games often use the following negotiation strategies to change the initial set of negotiating parties and increase the intersection of their winning sets: issue-linked strategies, i.e.,

using other issues associated with the negotiation to change the attitudes of domestic-level voters toward the agreement, thereby increasing the probability of successful negotiations; marginal payment strategies, i.e., paying more attention to the interests of marginal supporters in the negotiation process, thereby the complicity strategy, in which the negotiating parties compromise with each other to ensure that the agreement is ratified in order to achieve their mutual interests; the political level strategy, in which the political status of the negotiators is raised to facilitate the agreement, because high-status negotiators seem to be better able to promote the marginal payment strategy and increase domestic favorability of the agreement.

3.2. Dynamic Analysis Model. While the static analytical model in the previous section was more concerned with the interactions of individual actors between levels, the dynamic analytical model in this section explores and models the impact that repeated games between two levels can have on the size of the intersection of winning sets from the perspective of the impact between the international level and the domestic level. In the case of anarchy in the international community, the prisoner’s dilemma still exists for cooperation between countries even if both parties have complete information. What the prisoner’s dilemma describes can be mainly summarized in Figure 1, that is, the different payoffs that the two parties participating in the game receive when they make different decisions. Rational people, when faced with the prisoner’s dilemma, will choose the outcome of (confess, confess) as the overall strictly superior strategy because they are afraid that their interests will be damaged by the choice of others. For the participants, the payoff is not as high as (deny, deny), but the risk taken is minimal. This shows that, in a single game, both participants make rational decisions that can make their situation worse.

Therefore, this paper tries to use the dynamic repeated game model to solve the possible new prisoner's dilemma in international cooperation, in order to lay the theoretical framework and foundation for the subsequent case study. Putnam's two-layer game model is suitable for static, one-time games, and only for games with simultaneous decisions (where "simultaneous" does not mean simultaneous in physical time, but simultaneous in the sense of information), but such a situation is not in line with the reality of international cooperation negotiations, and the dynamic and repetitive game process is the characteristic of international cooperation negotiations. The dynamic and repetitive game process is a characteristic of political games in international negotiations, where the decision process may be preceded or followed. Therefore, before building the dynamic model in this paper, it is assumed that the occurrence of the game at the domestic level precedes the occurrence of the game at the international level. Unlike the matrix representation used in the static model, the dynamic game mainly uses a tree diagram to analyze the game process. The root and branch points are considered as decision nodes to indicate which participant's decision point, while the branches from the decision nodes are called "branches" (prongs) of the tree, which indicate the strategies chosen by the participants, and the ends of the branch tips indicate what each participant gets, as shown in Figure 2.

There are $2M = 8$ possibilities for the decisions made by both A and B, forming 8 pure strategy combinations. The rational person in each combination is non-Nash equilibrium if there is no motivation for the rational person in each combination to choose a separate deviation from the current strategy combination for higher interest; conversely, it is Nash equilibrium. The subgame refined Nash equilibrium, on the other hand, exists in the form of a small tree (i.e., subgame) in a large tree of pure strategies. In these small trees, there is necessarily no implausible threat and therefore no incentive to deviate individually. Thus, the subgame Nash equilibrium, as the best game choice, guarantees its optimal payoff and benefit at all times, and this plays an important role for future expectations in dynamic games, especially in repetitive games. A recurrent game means that participants play the same game repeatedly, and each time they play a game it is called a round. Repetitive games are influenced by the probability of paying discount (probability 0 to 1) and the probability of ending each round of the game (probability 0 to 1). The closer the probability is to 1, the more participants will look at the current short-term benefit, and therefore the process of the game will be more similar to Putnam's one game. Unlike one-off games, the payoff for participants in a recurrent game is the sum of the payoffs for each round.

As a result, they are more willing to consider the benefits of their current actions in the context of longer-term future benefits and are less likely to be stimulated by short-term interests that create a willingness to deviate and act. Based on their future expectations of the game, they make their choices by calculating and comparing the value of abandoning their preferred policy preferences with the voters who support them and the benefits of electing them. In the

case of repeated games between two countries, although participants value long-term gains more, there will be participants who choose to depart from the current agreement if the discount rate is high enough. Therefore, in order to reduce or even avoid breaches in international cooperation, participants take reciprocal measures that promote the durability of their cooperation based on expectations. The repetitive prisoner's dilemma is the best reproduction of such agreement-breaking behavior above, and solving the repetitive prisoner's dilemma helps identify ways to implement long-term cooperative relationships when incentives to deviate from the agreement are present. In the prisoners' dilemma, the Pareto dominant strategy is not a subgame refined Nash equilibrium; due to the existence of rationality, strict dominance is the strategy that will be chosen by the parties to the game, but this will lead to a worse situation for them. In the case of the U.S.-China trade relationship, for example, while maintaining low tariffs, both China and USA can gain the most from it, that is, the Pareto optimum; USA chooses to raise tariffs, which allows it to increase the price of the products it produces and thus exchange more goods from other countries and profit more from them. The existence of incentives such as this deviation from the agreement can drive the participants away from the Pareto optimum, ultimately putting both sides in a prisoner's dilemma.

Therefore, in order to maintain the cooperation of the game participants in the longer term, there are several interaction strategies to prevent or intimidate the participants from abandoning the deviation: First, the tit-for-tat strategy, in which both parties choose to cooperate in the first round, and if one participant chooses to deviate from the agreement in the second round, then the other participant will deviate from the agreement in the third round, so that both parties fall into strict dominance and reduce the gains of both parties. This type of punishment can inhibit to some extent the other party's tendency to be motivated to deviate from the action; second, the cold trigger strategy, compared to the tit-for-tat strategy; the cold trigger strategy is more absolute and has a longer punishment time; once one participant breaks the agreement, the other party will take eternal punishment measures, not just one round. Although these strategies have credibility problems, they demonstrate the possibility of international cooperation in repetitive games.

3.3. Strategic Adjustment of Bargaining Behavior. After the above analysis, it can be found that, unlike the static analytical model, in the dynamic analytical model of the two-layer game, participants can break the prisoner's dilemma that exists in the one-time static game, achieve collective rationality, and maintain long-term international cooperation in the process of repeated games, even in anarchy. The source of participants' gains in the process of repeated games is the sum of payments in each round, rather than the immediate discount of the current single game. In general, the expected benefit will be lower than the current benefit, but if the expected payment is extended and the value of the expected benefit is increased, it will make the discount rate of

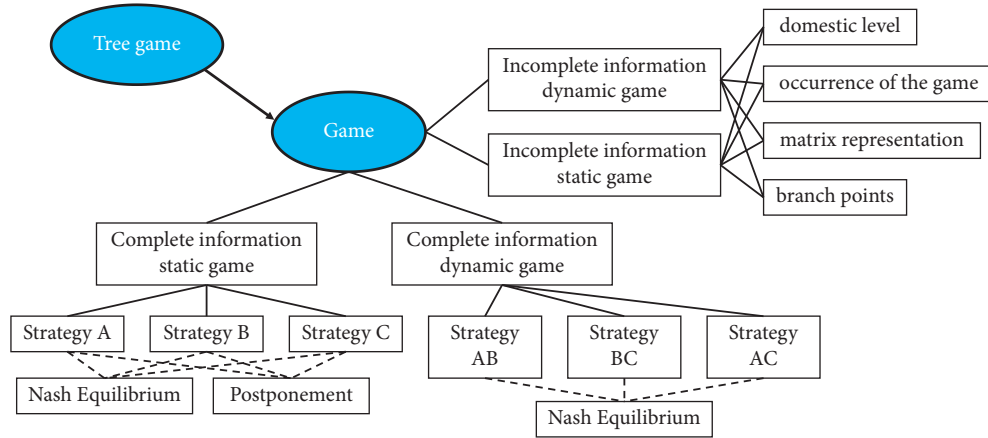


FIGURE 2: Tree game diagram.

the current benefit decrease when the value of the expected benefit increases to a large enough size, as shown in Figure 3. Therefore, the decision consideration of the participants in the repeated game on payments no longer focuses only on the current benefits but rather on the future expectations of the total benefits based on the repeated round process, making corresponding decision judgments and changes in negotiation strategies. The existence of repeated games does not mean that incentives or motivations to deviate from action do not exist in anarchy, where states will work in their own national interests. In order to implement long-term cooperation, participants use a combination of negotiation strategies to increase the intersection of their winning sets, as well as interactive punishment strategies, such as the cold trigger strategy and the tit-for-tat strategy, to suppress their possible future incentives to deviate and make cooperation sustainable in the long run.

The dummy variable Q is constructed as the explanatory variable and takes the value of 1 if the two countries sign the digital trade clause; otherwise it takes the value of 0. Based on the above theoretical analysis process, the indicators of economic geographic factors, cultural distance, digital trade constraints, digital infrastructure, and political ties between the two countries are selected as explanatory variables and the following basis is constructed. Regression equation is

$$Q = a + \sum_{i=0}^n a_i x^{i+1}, \quad (1)$$

$$a_n = \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{(q_i + q)^2}{n}, \quad (2)$$

where PTA denotes the dummy variable for whether the two countries have signed digital trade terms, $\ln \text{gdp} \text{ppc}$ denotes the market size of the two countries and consumption levels, $\ln \text{dist}$ denotes the geographical distance between the two countries, remote denotes the average geographical distance between the two countries and the rest of the world, culture denotes the cost due to cultural differences, DTRI denotes the digital trade constraints and their subindicators in both countries, mobile denotes the level and improvement of digital infrastructure in both countries, RI political denotes the political ties and friendly relations between the two

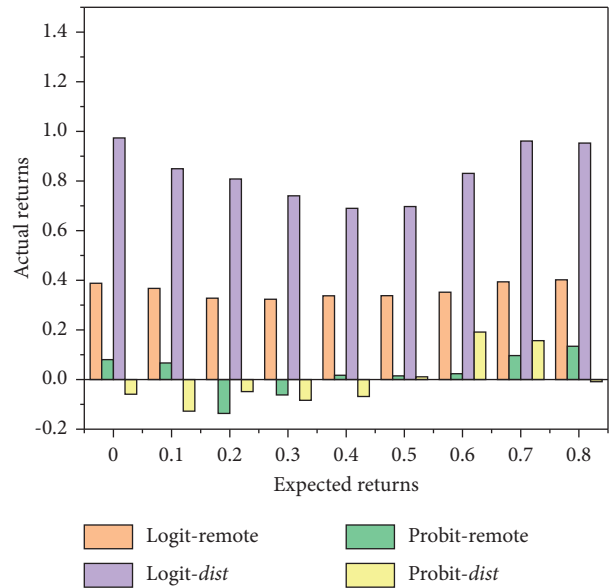


FIGURE 3: Expected versus actual returns.

countries and their subindicators, and ε denotes the error term. Based on this, the following regression equation is constructed considering the specific number of digital trade terms signed by the two countries and the impact of the number of digital trade terms signed by the two countries with other countries in the world on the two countries.

$$Q_n = \frac{a + \sum_{i=0}^n a_i x^{i+1}}{n}, \quad (3)$$

$$Q_n = \frac{(q_1 + q_n)^2}{n}, \quad (4)$$

where PTAnum denotes the number of digital trade terms that have been agreed between the two countries and totalnum denotes the number of digital trade terms signed by both countries with the rest of the world.

According to the theoretical hypothesis, the more distant the two countries are from the rest of the world, the more likely it is that a digital trade agreement will be reached between the two countries. Drawing on the treatment, the

geographical distance between the two countries and the rest of the world is calculated as follows:

$$r_{ij} = c_{ij} \ln \frac{(q_n + q_i)}{n}, \quad (5)$$

$$c_{ij} = \lim_{n \rightarrow \infty} \sum_{i,j=1}^n \frac{\text{dis}(c_i + c_j)}{n}, \quad (6)$$

where cont_{ij} denotes the binary dummy variable for whether country i and country j are on the same continent, taking the value of 1 if both countries are on the same continent and 0 otherwise. If both countries are on the same continent, then remote_{ij} denotes the average of the sum of the logarithms of the geographical distances between the two countries and the rest of the world; if the two countries are on different continents, then remote_{ij} takes the value of 0. The data are obtained from the French CEPII database.

The DTM model analysis process mainly includes three stages. One is the extraction of research themes based on the time sequence, by extracting the words with high weight, high frequency of occurrence and high text contribution, and grouping them together to determine the text themes. Under theme k , the generation probability of word ω is the Dirichlet prior parameter β_k , and the sum of the distribution probabilities of word ω in all time periods represents its contribution to the theme of k .

$$P_{i,j} = \lim_{n \rightarrow \infty} \sum_{i,j=1}^n \sqrt{p_i + q_j}, \quad (7)$$

$$\beta_i = p_i + q_i, \quad (8)$$

$$P_{i,j} = \sum_{i \neq j} \beta_{i,j}. \quad (9)$$

Q is equal to the sum of the distribution probabilities of all keywords under that topic; i.e.,

$$\beta_{i,j} = \lim_{n \rightarrow \infty} \sum_{n(w)} \left(\frac{\sqrt{\alpha_i + \alpha_j}}{n} \right)^2, \quad (10)$$

$$Q = \lim_{n \rightarrow \infty} \sum_{i,j=1}^n \frac{\text{dis}(q_i + q_j)}{n}, \quad (11)$$

where k denotes the number of subject terms under that topic. The evolution of topic heat can be compared by normalizing the topic heat so that the topic heat matrix is normalized in the $[0, 1]$ space, as shown in the following equation:

$$\kappa = \text{Max}\{k_i, \dots, k_j\}. \quad (12)$$

4. Empirical Analysis

This paper first uses Logit binary regression models to investigate the conditions and influencing factors for the adoption of digital trade terms and performs robustness tests using Probit binary regression models, least-squares regression models considering the number of digital trade terms, and non-EU country samples. Then, group

regressions are conducted for different countries to explore the similarities and differences in the influencing factors of reaching digital trade terms for North-North country pairs, South-North country pairs, and South-South country pairs, and subindicator regressions are conducted for political ties and digital trade restrictions indicators to explore the differences in the effects of the breakdown level. Finally, the propensity matching score method is used to predict the willingness of countries to cooperate in signing digital trade terms and to judge the future global digital trade rules pattern. This paper first constructs a Logit regression model to analyze the factors influencing the signing of digital trade terms between two countries, and the specific regression results are shown in Figure 4. Firstly, the traditional economic geography variables are added in column (1), and the regression results show that the coefficient of market size ($\ln \text{gdppc}$) is significantly positive, indicating that the larger the market size, the greater the consumption capacity for digital trade goods; and the stronger the market size is, the more likely it is to reach digital trade terms; the coefficient of geographical distance between two countries ($\ln \text{dist}$) is significantly negative, indicating that the closer the geographical distance between two countries is, the more likely it is to reach digital trade terms, and countries tend to sign digital trade terms with geographically adjacent countries; the geographical distance between two countries and other countries in the world (remote) has a significantly positive regression coefficient, indicating that the more distant the two countries are from the rest of the world, the more likely it is that digital trade terms will be agreed between them. To ensure that other participants do not act contrary to the agreement due to incentives and to ensure the existence of the long-run Pareto optimum, interactive strategies such as the tit-for-tat strategy and the cold trigger strategy become ways for participants to punish deviant actions, and it is based on the expectation of long-term benefits and future punishment that long-term cooperation is possible.

Subsequently, the cultural difference variable is added in column (2), cultural differences are also one of the hindering factors for digital trade transactions between the two countries, causing certain trade costs and affecting digital trade terms signing; cultural differences (culture) have a significantly negative regression coefficient, indicating that the greater the cultural differences, the less favorable the digital trade terms signing, and countries tend to choose countries with similar culture to their own to sign digital trade terms. Then, adding the level of digital trade restrictions (DTRI) and digital infrastructure (mobile) in column (3) variables, the regression coefficient of DTRI is significantly negative, indicating that when a country signs digital trade terms, it tends to choose countries with similar levels of digital trade restrictions and openness as its own. The regression coefficient of mobile is significantly positive, indicating that the better the digital infrastructure is, the more favorable it is for digital trade activities and the more likely it is to sign digital trade terms, as shown in Figure 5. It is worth noting that the regression coefficient of

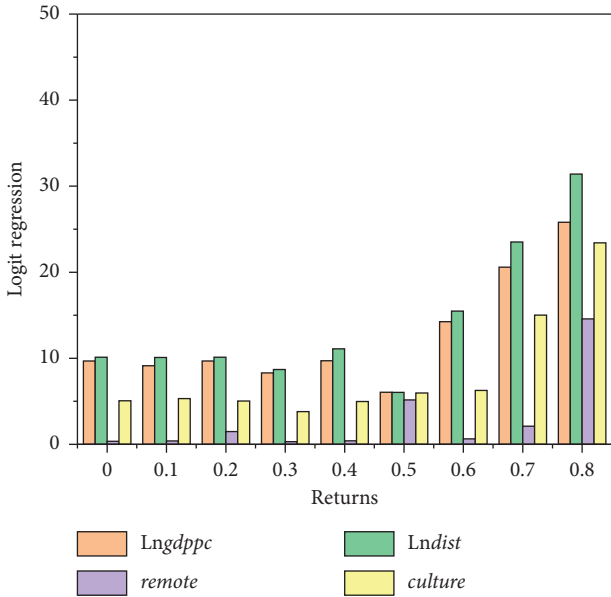


FIGURE 4: Logit baseline regression results.

geographical distance between the two countries is still negative at this point but is no longer significant, indicating that digital trade terms are less influenced by traditional geographical factors. Column (4) adds political distance (political), and the regression coefficient is significantly negative, indicating that the greater the political distance between the two countries is, the less favorable it is to sign digital trade terms, and countries tend to sign digital trade terms with the more politically similar countries tending to sign digital trade terms with countries with high political similarity. At this point, the effects of both geographical distance and cultural differences between two countries are no longer significant, indicating that digital trade can, to a certain extent, overcome the limitations of traditional geographical factors and cultural differences, reduce the distance costs of trade activities, and expand the scope of digital trade activities, and the regional character of digital trade terms is weakened. Overall, the baseline regression results are in good agreement with the theoretical derivation part, and the two corroborate and complement each other.

In this paper, the robustness of the regression models for the conditions of signing digital trade terms and the influencing factors are tested, and the results are shown in Figure 6. Column (5) is the result of Probit model, column (6) is the result of linear probability model (LPM), column (7) is the result of least-squares regression with the number of digital trade terms signed between two countries as the explanatory variable, and column (8) adds the number of digital trade terms signed between two countries and other countries as the explanatory variable on the basis of column (7). The robustness test results show that the overall robustness of the regression model is good, but the geographical distance between the two countries ($\ln dist$) and cultural differences (culture) are poorly robust. This also indicates that in the era of digital trade, the virtualization, platform, and pervasiveness features of digital trade make the economies of the world closely connected, as shown in Figure 6. To a certain extent, digital trade has led to the

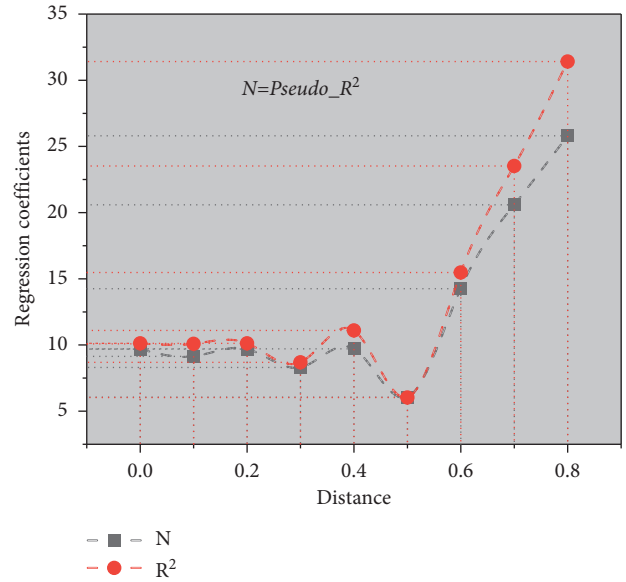


FIGURE 5: Variation of regression coefficients in negotiations.

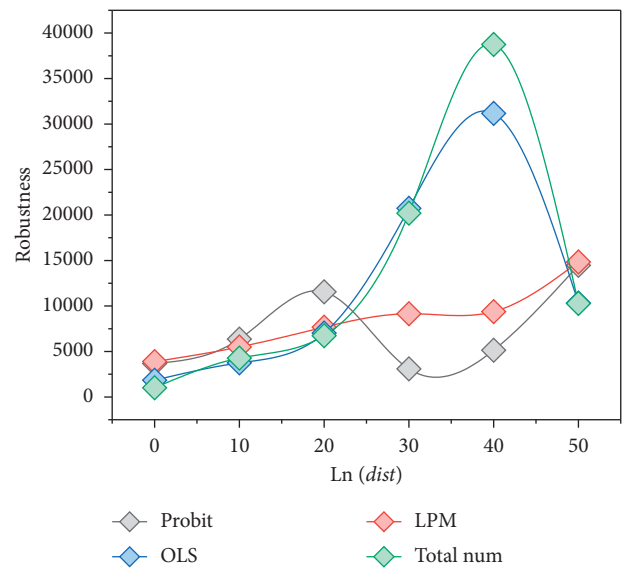


FIGURE 6: Overall robustness of the regression model.

“death” of geographical distance, and the regionalization of digital trade terms has diminished, and the traditional trade cost effects caused by geographical factors and cultural differences have been reduced and are no longer decisive factors in the conclusion of digital trade terms.

EU member states are geographically close to each other, have similar levels of economic development and digital trade openness and usually participate in digital trade negotiations as a whole, with consistency in their external digital trade terms signing behavior. In order to ensure the reliability of the regression results, this paper excludes the data of 27 EU member states and performs Logit, Probit, LPM, and least-squares estimation on the cross-sectional data of 35 non-EU countries, respectively. The specific analysis process is consistent with the above baseline regression and robustness test ideas, and the regression results

of non-EU countries are shown in Figure 7. It is worth noting that the regression coefficient of the geographical distance between the two countries ($\ln \text{dist}$) has regularity and stability and the cultural differences (culture) showed the same positive trend. This phenomenon suggests that digital trade in countries outside the EU member states is beneficial in strengthening economic ties and trade between countries that are far apart and culturally different. The trade of digital products and services between countries can be efficiently exchanged and benefits are exchanged through digital trade platforms, while cost factors due to geographical distance and cultural differences play a minimal role in digital trade exchanges and agreements signed. Digital trade provisions become a powerful tool to strengthen political and economic ties between countries and enhance global digital trade liberalization and economic integration.

Comparing the results, it can be found that, in the negotiation process of digital trade terms led by developed countries, the market size, geographical distance, cultural differences, and digital infrastructure level of the two countries do not have a significant influence and decisive role in the negotiation results, and developed countries pay more attention to the digital trade restrictions and liberalization level of the two countries and the political distance factor. When negotiating and signing digital trade terms between developing countries, they pay more attention to the market size, cultural differences, digital trade restrictions, and digital infrastructure level of both countries, while geographical distance and political distance have no significant influence. In conclusion, digital trade restrictions and liberalization level have a significant impact on the digital trade terms signed between developed and developing countries, and developed countries pay more attention to the political distance factor, while developing countries pay more attention to the market size, cultural differences, and digital infrastructure. In addition, the effect of geographical distance on digital trade terms signed by developed and developing countries is not significant. The regression coefficients of all six political difference subindicators are negative, and the discourse and accountability (political_VA), political stability (political_PV), and regulatory quality (political_RQ) show a strong significance, with the regression coefficient of political stability showing the largest absolute value, while government efficiency (political_GE), legal system (political_RL), and corruption control (political_CC) were not significant in the regression results. This indicates that, among the many political factors, the two countries are most concerned about the political stability of the two countries when considering signing digital trade terms, and political stability is a necessary condition for the smooth conduct of digital trade activities. In general, countries with similar domestic political situations are more inclined to sign digital trade terms. Discourse and accountability and regulatory quality are also important variables that significantly affect the signing of digital trade terms. Countries with similar political institutions and regulatory quality usually have closer political and economic ties, and it is easier to reach consensus on digital trade negotiations between countries.

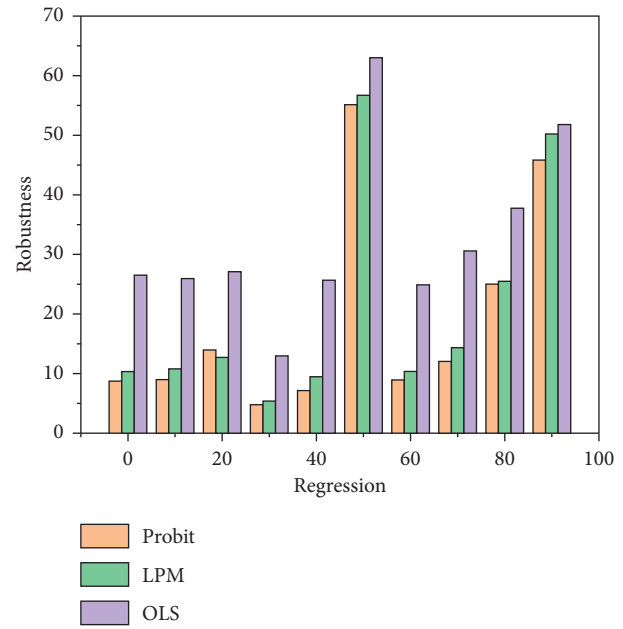


FIGURE 7: Baseline regression and robustness tests.

5. Conclusion

In the era of digital economy, the formulation and reconstruction of global digital trade rules have become the focus of a new round of international trade negotiations and rule competition. In the process of global digital trade rules negotiation, the game and cooperation coexist, and countries are playing fierce political games around the core issues in order to win their own interests, while actively seeking cooperation with countries with similar positions and mutual benefits. This paper analyzes the core issues and political games of global digital trade rules negotiations and examines the potential partnerships among countries. This paper analyzes the core issues of global digital trade rules negotiations at multilateral and regional levels. The core issues of concern and debate under the WTO framework are intellectual property protection, market access barriers, and digital trade rules, but, due to the differences in the interests of the parties, there are huge differences on many issues such as tariffs on digital trade, the characterization of digital products, and the way of service trade provision, and no consensus has been reached, and no formal rules have been formed at the multilateral level to effectively regulate global digital trade, which lags behind the actual needs of digital trade development. This lags behind the actual needs of digital trade development. Countries have turned to the regional level to seek solutions in their own interests, and regional economic organizations, represented by APEC, have issued a series of provisions related to e-commerce and digital trade, with core issues covering cross-border data privacy protection, paperless trade and trade facilitation, and digital APEC construction. The negotiation of digital trade rules at the regional level can not only provide decision-making suggestions and references for multilateral rule negotiations but also boost the confidence of multilateral

rule negotiations, which is of great significance for promoting the negotiation and construction of global digital trade rules. The formulation of global digital trade rules may follow a reconstructive path from bilateral to regional to multilateral, promoting regional digital trade rule systems at this stage and gradually expanding the scope of negotiations to the multilateral level.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] A. van Aaken, "Behavioral aspects of the international law of global public goods and common pool resources," *American Journal of International Law*, vol. 112, no. 1, pp. 67–79, 2018.
- [2] A. van Aaken and J. Kurtz, "Beyond rational choice: international trade law and the behavioral political economy of protectionism," *Journal of International Economic Law*, vol. 22, no. 4, pp. 601–628, 2019.
- [3] S. Cho, "A social critique of behavioral approaches to international law," *AJIL Unbound*, vol. 115, pp. 248–252, 2021.
- [4] J. Dekker, M. Amitami, A. H. Berman et al., "Definition and characteristics of behavioral medicine, and main tasks and goals of the international society of behavioral medicine—an international delphi study," *International Journal of Behavioral Medicine*, vol. 28, no. 3, pp. 268–276, 2021.
- [5] W. J. Johnston, S. Khalil, A. Nhat Hanh Le, and J. M.-S. Cheng, "Behavioral implications of international social media advertising: an investigation of intervening and contingency factors," *Journal of International Marketing*, vol. 26, no. 2, pp. 43–61, 2018.
- [6] C. Jung, W. Sim, and W. Sim, "The effect of storytelling of local foods perceived on perceived value, satisfaction, and behavioral intention by international students: focused on international students living in Jeonju city," *Journal of Tourism Management Research*, vol. 25, no. 2, pp. 581–609, 2021.
- [7] H. C. Kales, C. G. Lyketsos, E. M. Miller, and C. Ballard, "Management of behavioral and psychological symptoms in people with Alzheimer's disease: an international Delphi consensus," *International Psychogeriatrics*, vol. 31, no. 1, pp. 83–90, 2019.
- [8] Y. K. Kim, A. Maleku, C. M. Lemieux, X. Du, and Z. Chen, "Behavioral health risk and resilience among international students in the United States: a study of socio-demographic differences," *Journal of International Students*, vol. 9, no. 1, pp. 282–305, 2019.
- [9] M. C. Lambert, E. T. Sointu, and M. H. Epstein, "A comprehensive review of international research using the behavioral and emotional rating scale," *International Journal of School & Educational Psychology*, vol. 7, no. 3, pp. 215–226, 2019.
- [10] A. Laszlo, "Preface to the special edition of systems research and behavioral science on co-creating responsible futures in the digital age—exploring new paths toward economic, social and environmental sustainability: select essays from the 5th business systems labor," *Systems Research and Behavioral Science*, vol. 35, no. 4, pp. 351–356, 2018.
- [11] C.-M. Liu and C.-P. Lin, "Assessing the effects of responsible leadership and ethical conflict on behavioral intention," *Review of Managerial Science*, vol. 12, no. 4, pp. 1003–1024, 2018.
- [12] D. Mead and M. Sharpe, "Pornography and sexuality research papers at the 5th international conference on behavioral addictions," *Sexual Addiction & Compulsivity*, vol. 25, no. 4, pp. 248–268, 2018.
- [13] O. Odukoya, R. S. Fox, L. L. Hayman, and F. J. Penedo, "The international society for behavioral medicine (ISBM) and the society of behavioral medicine (SBM) advocate for the inclusion of behavioral scientists in the implementation of the global action plan for the prevention of non-communicable diseases (NCDs) in low- and middle-income countries," *Translational Behavioral Medicine*, vol. 11, no. 6, pp. 1286–1288, 2021.
- [14] C. L. Osborne, D. S. Kauvar, and S. B. Juengst, "Linking the behavioral assessment screening tool to the international classification of functioning, disability, and health as a novel indicator of content validity," *Disability & Rehabilitation*, vol. 42, no. 12, pp. 1775–1782, 2020.
- [15] C. Samango-Sprouse, E. Stapleton, S. Chea et al., "International investigation of neurocognitive and behavioral phenotype in 47,XXY (Klinefelter syndrome): predicting individual differences," *American Journal of Medical Genetics Part A*, vol. 176, no. 4, pp. 877–885, 2018.
- [16] E. Shijaku, M. Larraza-Kintana, and A. Urtasun-Alonso, "Network centrality and organizational aspirations: a behavioral interaction in the context of international strategic alliances," *Journal of International Business Studies*, vol. 51, no. 5, pp. 813–828, 2020.
- [17] I. Surdu, H. R. Greve, and G. R. G. Benito, "Back to basics: behavioral theory and internationalization," *Journal of International Business Studies*, vol. 52, no. 6, pp. 1–22, 2021.
- [18] P. Wójcik and M. Ciszewska-Mlinarič, "The impact of cognitive and behavioral factors on the export performance: a dynamic capabilities perspective," *European Business Review*, vol. 33, no. 3, pp. 427–449, 2020.
- [19] Y. Xiao, X. Ren, P. Zhang, and A. Kethloafsete, "The effect of service quality on foreign participants' satisfaction and behavioral intention with the 2016 Shanghai International Marathon," *International Journal of Sports Marketing & Sponsorship*, vol. 21, no. 1, pp. 91–105, 2019.
- [20] Q. Xie and D. F. K. Wong, "Evaluation of cognitive behavioral intervention for Chinese international students in Hong Kong," *Research on Social Work Practice*, vol. 30, no. 1, pp. 97–109, 2020.
- [21] E. van der Zee, V. Fikfak, and D. Peat, "Introduction to the symposium on limitations of the behavioral turn in international law," *AJIL Unbound*, vol. 115, pp. 237–241, 2021.