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RESEARCH ARTICLE

Zhiyun Liu

Assumptions of Gain Preference and Choice of Action by States in International Legislation: From the Perspective of International Relations

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Abstract Upon entry into the vision of scholars in international relations, game theory has quickly become an effective approach to analyzing international conflicts and cooperation, and has been broadly adopted by neo-realism and neo-liberalism, which are two dominating aspects in the current theories of international relations. The former argues that the states participating in the game always follow relative gains, hence achieving a pessimistic conclusion on international cooperation, while the latter argues that the states participating in the game always follow absolute gains and deduce an optimistic prospect for international cooperation, which provides a useful way to analyze the confrontation and cooperation of states in international legislative game. Of course, it is aware that gain preference and choice of action by states in international legislative game are also conditioned by other factors.

Keywords gain preference, game theory, international law, international organization

1 Introduction

Since the 1950s, due to the changes of international situations and progress of science and technology, the research on international relations had undergone a "revolution in methodology," namely revolution of behaviorism. The traditional research approach of classical realism was challenged and many scholars in international relations began to realize that the research on the subjects under their study had not been fully deployed, and those subjects actually might have

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Zhiyun Liu (✉)
School of Law, Xiamen University, Xiamen 361005, China
E-mail: liuzy420@xmu.edu.cn

been analyzed and predicted by more "scientific" approaches. To turn such potential or prospect into reality, various research methods employed in other disciplines that have already obtained obvious effects should be learned or adopted.[1] On the background, game theory, together with economics, social psychology, cybernetics, information theory and simulation were emphasized by scholars in international relations and broadly applied in the research on international conflicts and cooperation, hence making an important contribution to the analysis on international relations toward "science" and "precision." The ultimate goal of game theory is to expand the scope of the model of rational man: To lead the restricted classical realism to a more complicated world, where there is cooperation besides opposition.[2] Consequently, the employment of game theory by scholars in international relations, especially those advocating neo-realism and neo-liberalism as dominant schools at present, provides a useful analytical framework for discussion on the issues concerning negotiation and cooperation, as well as construction and compliance of international legislations.

As a very specific and vivid theory of rationalism, game theory is the matrix of choices of action by two or more rational players in a certain model in special situations when they have to make a choice from different solutions according to their preferences.[3] If the preferences of players change too frequently, the model will degenerate into a method to interpret such preferences after their occurrence when the actions can be used only to reflect the tendency of preferences. Therefore, a condition is required by the analytical method of game that players are assumed to have a relatively stable preference and must take a corresponding action when they have to make a choice. As to the categories of game, although there are multiple forms, the basic forms are nothing more than "zero-sum game" and "non-zero-sum game."[4] In international cooperative game, gain preference,

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[1] See Bull H., *The Theory of International Politics* (1919–1969), in Der Derian J. ed., *International Theory*: *Critical Investigations*, translated in Chinese by Qin Z. L., Zhejiang People's Publishing House (Hangzhou), at 197–228 (2003).

[2] See Snidal D., *The Game Theory of International Politics*, 38 World Politics 25–57 (1985).

[3] See Abbott K. W., *Modern International Relations Theory*: *A Prospectus for International Lawyers*, 14 Yale Journal of International Law 335–411 (1989).

[4] In view of game results, the basic game forms can be divided as "zero-sum game" and "non-zero-sum game" and each model has several variants. The zero-sum game means the loss of one player is exactly the gain of the other player, namely, (–1) + (+1) =0. The "chicken game" is a typical zero-sum game. Specifically, if Party A and Party B meet on the road with only one roadway and both refuse to make way for the other, they may cause an accident and die. However, if one party gives way, he may become "chicken." In reality, examples of the features of the zero-sum game are as follows: a campaign for a seat of the congress by two candidates; most military actions (as the military objective got by one party is lost by the other party) and international crisis (as one country wins reputation and the other loses face), etc. The other basic form of game—"non-zero-sum game," also called "prisoners' dilemma" or "variability game," means what one lost is not the gain of the other. In "non-zero-sum game,"

or rather the acceptable level of interest distribution for an individual state is the fundamental element that determines which form the game is and whether the game succeeds or not.[5] When demonstrating international conflicts and cooperation, neo-realists and neo-liberalists just assume different gain preferences of states and consequently deduce different choices of actions by states, and even results. Meanwhile, such analysis also plays a positive role in interpreting and predicting conflicts and cooperation in the international legislative game.

2 Assumptions of Gain Preference and Interpretations of International Legislation by Neo-Realists

Undoubtedly, the introduction and application of game theory by scientific behaviorists is not only a significant contribution to the studies on international relations, but also an innovation in methodology reference value to international law studies. Consequently, various models of game have become important approaches and modes for study on conflict and cooperation issues, especially in the analysis on international cooperation and international regimes followed by neo-realists and neo-liberalists. Especially, in terms of demonstration of the issues concerning international cooperation and international regime, the assumptions of gain preferences of states as well as the relevant discussions thereof by neo-realists provides a useful analytical path to interpret some phenomena in international legislation.

2.1 Assumptions of Gain Preference of States in International Cooperation by Neo-Realists and International Legislation

According to game theory, when a state is interested in relative gains, or calculating whether its gains are more than others, it is a "zero-sum game" or a "non-cooperative game," hence there is no room for cooperation. This is just the standpoint of realists, and in their view states that feel insecure in cooperation

gains may be different in the interest distribution of the parties, and hence there are conflicts and fight in those games. According to the results of the games, such games can be divided as "cooperative game" and "non-cooperative game." The former refers to the game where players may reach a binding agreement, just opposite to the latter. For details, see Ni S. X. et al, 当代西方国际关系理论 (Contemporary Western International Relations Theory), Fudan University Press (Shanghai), at 307–10 (2001); see also Aceves W. J., *Institutionalist Theory and International Legal Scholarship*, 12 Am. U. J. Int'l L. & Pol'y 238–56 (1997).

[5] See supra note 2, at 43.

always concern about how to distribute gains, where they do not care about whether every participating party may gain or not, but who gains more. If the distribution of gains is unequal, the state of fewer gains would try its best to weaken the others so as to change its disadvantaged position in such distribution, since states are always afraid that friends today may become enemies in a war in the future, and if they let their friends obtain advantages in common gains today, they may create a very dangerous potential enemy. Inevitably, such situation leads to the following result: A state shall pay a close attention to the gains of its partners.[6]

Consequently, just as Waltz stated, in a self-help system, competitors may hold that relative gains are more important than absolute gains, or when provided with an opportunity for cooperation for common gains, those states that feel insecure would certainly ask how to distribute the gains. What they care about would be "who will get more gains," rather than "whether all of us can obtain gains." Thus, if every party is afraid that the other party will take advantages to enhance its own strength, they will not cooperate even if both parties may obtain considerable absolute gains.[7] Moreover, Waltz held that the focus on relative gains is the first way that international political structure constrains the development of cooperation, while the second way that constrains cooperation shall not be ignored, where a state is also afraid the cooperation and exchange in goods and services may lead to its dependence on other states. Undoubtedly, the higher the professional level of a state, the more it will depend on other states for raw materials and goods it cannot produce, and the close interdependence between states means those states have to bear or are vulnerable to the impacts of common weakness resulted from a high level of interdependence. Therefore, a state shall reduce dependence and pursue self-support to the maximum.[8] In short, Waltz believed that in the anarchic international regime, the success rate of cooperation between states is low and states prefer to reduce cooperation and seek self-help to realize self-support to the maximum.

Since international legislation is a form of participation in international cooperation of states and a representation of institutionalization of international cooperative relations, just as Aceves said, both law of treaties and common law are the products of non-zero-sum game while promoting ongoing cooperation.[9]

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[6] See Grieco J. M., *Anarchy and the Limits of Cooperation*: *A Realist Critique of the Newest Liberal Institutionalism*, in Kegly C. W. Jr. ed., *Controversies in International Relations Theory*: *Realism and the Neoliberal Challenge*, St. Martin's Press (New York), at 151–71 (1995).

[7] See Waltz K. N., *Theory of International Politics*, translated in Chinese by Xin Q., Shanghai People's Publishing House (Shanghai), at 139 (2003).

[8] Id. at 140–41.

[9] See Aceves W. J., *Institutionalist Theory and International Legal Scholarship*, 12 Am. U. J. Int'l L. & Pol'y 227–59 (1997).

One of the significances of international legislation is closer interdependence of states and a kind of long-term arrangements aiming at keeping stability and durability of some interest distribution plan. Hence, if the assumptions of neo-realists on state concern in international cooperation are right that states prefer reduction of interdependence and focus on relative gains, such legislative cooperation is rather of the nature of "zero-sum game" or "non-cooperative game," and therefore, it would be difficult for the development of international legislation, since if both states were concerned about or unable to determine relative gains, each state would be willing to choose a less stable arrangement with the view that, in case the gap in gain distribution is to its disadvantage, it may be easier to withdraw from such arrangement.[10]

In fact, if some international legislation with unequal interest distribution is made in special conditions, once such special conditions change, the states believing they obtain fewer gains may abandon such cooperation and choose to breach or withdraw from such legal system. Similarly, even if the interest distribution is balanced in the original legislation, with time passing by, once such balance is upset, the authority and the stability of the original legal system will face challenges.

2.2 Assumptions of Relative Gain Preference and the Choice of Action by States in International Legislative Game

Generally, the assumptions of neo-realists that states concern relative gains in international cooperation negotiation fit the interpretation of the issues concerning international legislation in the area of military affairs and security as well as the operation of laws. Of course, it also fits the interpretation of the legislation in international economic areas in such special periods as the Cold War.

2.2.1 Assumptions of Relative Gain Preference and International Legislation in the Military or Security Area

Actually, in international military or security cooperation, participating states are mainly concerned about relative gains in most cases, since once other players obtain advantages through cooperation in this area, it will be a very critical issue for the state as its survival may be at stake. Undoubtedly, such concerns about

[10] See supra note 6, at 166.

relative gains may easily render international legislative cooperation in the military or security area in a "zero-sum game," which usually proves the conclusion of realists that a state must depend on self-help system in anarchy. Specifically, the assumptions of preference that a state focuses on relative gains may be used to interpret some situations concerning international negotiation and legislation in military affairs and security.

First, the failure of military or security cooperation is basically due to unbalanced distribution of interests, and the states of fewer gains always try to change their disadvantaged positions. Thus it would be difficult for the parties to make compromises on the distribution of interests, which will lead to failure of international negotiation. For instance, the importance of cooperation in arms control was realized after the brutal World War I. However, since the motive of every state in such issues as disarmament was to weaken the military power of others so as to gain its own advantaged position and safeguard of security, substantially no agreement was reached in most circumstances at disarmament meetings from the 1921 Conference of Washington to the outbreak of World War II, and even such agreements as the *Treaty for the Limitation of Naval Armament* reached occasionally had never exerted any substantial significance or effect. In fact, the big powers preaching disarmament and calling for disarmament meetings expanded their armament for war secretly and crazily, ultimately leading to World War II, much crueler than World War I.

Second, even in certain special conditions, such as in peace agreements between the victorious states and the defeated states, interest distribution is always unbalanced in international provisions on security, which aimed at constraining the military power and political status of the defeated states, and the defeated states had to accept such provisions temporarily. However, it is hard to establish a stable international legal system on such basis. Once the defeated states resume their powers, their top political and military objectives are to break such legal system and re-distribute interests. For instance, when defeated in World War I, Germany was forced to sign the *Peace Treaty of Versailles*, a humiliation to the state in the eyes of Germans, but when it restored its economy and after Hitler assumed rein of the government, the top diplomatic objective of Germany was to repeal the provisions in the *Peace Treaty of Versailles* on restrictions on German armament with "equal armament" as excuse. In October 1932, Germany announced its withdrawal from the League of Nations and unilaterally declared repeal of the provisions of the *Peace Treaty of Versailles* on military affairs soon after.[11]

Third, the instability of international legal system in military or security aspects is usually triggered by the break of the originally balanced interest

[11] See Wang S. Z. ed., 国际关系史：十七世纪中叶——一九四五年 (History of International Relations: 1650s–1945), 2nd ed., Law Press (Beijing), at 328–31, 423–26 (1986).

distribution system. For instance, according to the *Treaty on the Non-Proliferation of Nuclear Weapons*, the US, the USSR (Russia), the UK, France and China are nuclear weapon states, while others are non-nuclear weapon states. Undoubtedly, the reason why such arrangement was accepted then was the interest balance mechanism, whereby those nuclear weapon states could maintain their nuclear advantages by this arrangement and the non-nuclear weapon states could impose certain restrictions on nuclear weapon states by this arrangement without the capability for making nuclear weapons, which was of great importance for those states. Indeed, such balance of interest distribution was temporary, as once a non-nuclear weapon state become capable to make their own nuclear weapons, or the nuclear advantage of a nuclear weapon state is shaken, pursuit of a new balance in interest distribution is imperative. In fact, both the negotiations on Iranian and North Korean nuclear crisis in recent years and refusal of the US Congress to approve the *Comprehensive Nuclear Test Ban Treaty* in 1999 were the actions of the relevant states after the original balanced distribution of interest in the mechanism of non-proliferation of nuclear weapons has changed, hence, an unprecedented impact on such mechanism.

2.2.2 Assumptions of Relative Gain Preference and International Legislation in Economic Area

It is generally held that the assumptions of neo-realists that states focus on relative gains in international cooperation game are conducive to interpretation of the cooperation in the security or military area as well as phenomena concerning international law, but neo-realists are not satisfied with this and endeavor to apply their theory to international economic area. They argue that the assumptions that states focus on relative gains in international cooperation negotiation or legislation are applied to the military or security area as well as the economic area, or "the application of the assumptions of relative gains in the economic area are as general as that in the security area. This is because economic interests may finally be transformed into security interests; therefore, from a long term, security and economy are inseparable…. It indicates that pursuit of relative gains may intervene in economy, similar to the intervention in military cooperation."[12] Although neo-liberalists have made successful demonstrations for the issues concerning international cooperation in the economic area, and their assumptions are more potential in universality and interpretation in such area,

[12] See Snidal D., *Relative Gains and the Pattern of International Cooperation*, in Baldwin D. A. ed., *Neorealism and Neoliberalism*, translated in Chinese by Xiao H. R., Zhejiang People's Publishing House (Hangzhou), at 172–208 (2001).

hence the theoretical framework of neo-liberalism as a whole only fits the interpretation of the issues related to cooperation and legislation in so-called "low politics" field including international economy or environmental protection. Nevertheless, the emphasis of neo-realists on relative gain preference of states in international economic relations is not totally alienated from reality and consequently of no theoretical value. On the contrary, such viewpoint provides an excellent approach to interpret the phenomena of international economic legislation between eastern and western states, and between northern and southern states before the 1980s, especially the low success rate of legislation in this period.

Theoretically, the dominant thinking of western and eastern states, or northern and southern states on interest distribution in game relations before the 1980s was obviously tended to focus on relative gains. Due to the cold-war thinking and ideological controversy, the super powers of the US and the USSR and western and eastern states attached more importance to relative gains and were afraid that unbalanced interest distribution in cooperation would enhance the strength of others and consequently bring threat to them. Such thinking restricted economic exchange among those states, leading to the popularity of the theories and practice of "containment" and "two parallel markets," which sharply cut off the linkage between domestic markets, and economic restriction and sanction were also deemed as useful tools in ideological controversy. Meanwhile, in various dominant economic theories in developing countries in that period, either the Development Theory or the Attachment Theory, or the Unequal Exchange Theory, though the pursuit of relative gains was not written down in paper, the strongly hostile attitude of those theories to the international division of labor," "international trade system" and cross-national economic activities of multinational companies at that time indicated those theories focused more on relative gains, without emphasis on absolute gains obtained through international economic cooperation.

In practice, the emphasis of developed and developing countries as well as socialistic states on relative gains in international cooperation in that period brought serious adverse impacts on international economic cooperation and legislation. Northern and southern states of the same capitalist system moved little in international economic legislation, let alone eastern and western states, which had open confrontations through the Council for Mutual Economic Assistance and the Paris Coordinating Committee. Both capital input of multinational companies and trade negotiations held by the GATT were deemed by developing countries as new tools or methods of developed countries to continue their role as exploitation and enslaving in the colonial period. To get rid of the situation of being exploited and enslaved, change the original international economic order that was oriented by market allocation and establish a new

international economic order oriented by authority allocation have become the objectives of domestic and foreign policies of developing countries. Both domestic foreign-related economic legislation featured by enhancement of efforts on control of foreign direct investment and nationalization, and the struggle for establishment of a new international economic order at the UN conferences indicated that what was concerned by broad developing countries was the protection of the interests of developed countries by the existing international capitalistic economic system and international economic organizations, and even the whole capitalistic market order. Undoubtedly, such strategy of developing countries was adopted in a special historical period and the actions and struggles of those states were of historic significance at that time. Objectively, however, they were indeed suspected of ignoring the "absolute gains" by joining in the capitalistic market system.

Dominated by such thinking, most of the negotiations on international economic legislation between southern and northern states from the end of World War II to the 1980s fell into the dilemma of "zero-sum game" or "non-cooperative game." For instance, from 1960 to 1969, there were only two bilateral investment protection agreements concluded between southern and northern states, and from 1970 to 1979, the number increased to 12.[13] With regard to multilateral international investment legislations in such period, although the *ICSID Convention* was officially adopted under efforts of the World Bank, developing countries did not make any active response to join in. By the time of entry of the Netherlands in October 1966, the member states to this convention were only 20 and developing countries remained the minority.[14] Additionally, the GATT was deemed as the "rich country club" by developing countries for a long period. The seven rounds of negotiations before the Uruguay Round were basically confined to a few fields such as tariff concession, and developing countries did not proactively participate in those negotiations and few of them made any commitment.

3 Assumptions of Gain Preference by Neo-Liberalists and Rapid Development of International Economic Legislation in Globalization Context

As for the assumptions of neo-realists that states focus on relative gains in

[13] See UNCTAD, World Investment Report 1995, at 320.

[14] See ICSID, *List of Contracting States and Other Signatories of the Convention* (as of November 3, 2003), at http://www.worldbank.org/icsid/constate/c-states-en.htm (last visited May 30, 2004).

international cooperation, neo-liberalists hold that in such game, states emphasize absolute gains, i.e., they focus on whether they can obtain interests rather than whether others may obtain more interests than them or not in international cooperation, and in the process, the "non-cooperative game" can be changed to the "cooperative game." Such viewpoint provides some approaches to interpret the rapid development of international economic legislation in the globalization context of the recent years.

3.1 Assumptions of Concerns on Absolute Gains of States in International Economic Cooperation and Analysis on Construction of International Economic System by Neo-Liberalists

Different from neo-realists, when bringing forward the proposition of international cooperation, neo-liberalists have accepted the basic assumptions of commercial liberalism that individuals in global political economy focus on increase of absolute gains and fraud is the main restriction on cooperation.[15] First, they believe that relative gains are more outstanding in the issue of security, while the pursuit of absolute gains is more obvious in economic cooperation. Moreover, different from security issue, occurrence of a prompt and fatal fraud is rare in international economic area, because most economic activities are quite transparent. Second, players may supervise each other and have time to discuss any possible change, even adjust agreements if necessary. Therefore, although fraud may bring harms to others, it rarely causes any fatal consequence. Those favorable conditions will enhance trust and reduce the danger in cooperation.[16]

Since the sovereignty system has been improved and well observed after World War II, most cooperation in international economic area was then based on "reciprocity," and such cooperation has been made in the form of "non-zero-sum game" rather than "zero-sum game." In a non-zero-sum game, only by changing "non-cooperative game" to "cooperative game" can international economic legal system be formed. Thus, some neo-liberalists base their analysis on game techniques. They hold that in the negotiation on establishment of the international regime to avoid unilateral decision, the key to resolve the "prisoners' dilemma," namely the problem concerning fraud and information exchange, is the key to transform non-cooperative game to cooperative game. If the game is only played once, smooth information exchange would be difficult to achieve and occurrence of fraud would be common. The danger of fraud mainly

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[15] See supra note 6, at 159.

[16] See Lipson C., *International Cooperation in Economic and Security Affairs*, 37 World Politics 17 (1984).

originated from two additional factors: direct gains and long-term cost of fraud. In practice, when direct gains are considerable, the tendency of fraud becomes extremely obvious.[17] However, if the game repeats, such situation will change, since "though in the prisoners' dilemma of one-time game, non-cooperation is an ideal strategy, repetition of the game in the future increases the possibility of cooperation. This is because players hope others will follow the example of today's cooperation, and in the long run, cooperation will outdo the low-effective non-cooperation balance."[18] In such dynamic repetition of game, on the one hand, the focus on future may promote cooperation. If future rewards are expected to be more than current gains, the motive of betrayal will be lowered as betrayal may incur revenge. In international economic relations, players generally hope their cooperation may continue. In other words, the game is repeatable, generally, as in economic sphere no one may exclude another from the game or decisively change the nature of the game by a simple action. On the other hand, revenge for betrayal is possible in international economic area. Thus, when determining whether to adopt the betrayal strategy or not, a rational player has to consider the possibility of revenge and the results of such strategy.[19] At such time, "menace" will be used as an effective means to constrain betrayers by cooperators. A one-time game may give betrayers an impossible chance, but in a repeated game, players will give up their idea of taking chances.[20] Meanwhile, repetition changes not only the result of the game, but also the structure of the game. In a one-time "prisoners' dilemma," a player has its own betrayal strategy and the choice of action of others is irrelevant to it. However, in a repeated game, it is important to make adjustment according to the actions of other players.[21] Thus, states may not be "rational" in a one-time game, but they may become genuinely rational in a repeated game. The reason is that states would give up the short-term interest of betrayal for long-term benefits of cooperation.

Simply speaking, in a repeated game, since every state has the strategic chance of "tit for tat," states will finally find cooperation is their best long-term strategy in such interaction of mutual harm or mutual benefit. In other words, a repeated game offers an opportunity of gradual "learning" to players, and such "learning"

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[17] Id. at 14.

[18] See Snidal D., *Coordination vs. Prisoners' Dilemma*: *Implications for International Cooperation and Regimes*, 79 Am. Polit. Sci. Rev. 923–42 (1985).

[19] See Axelrod R. and Keohane R. O., *Achieving Cooperation under Anarchy*: *Strategies and Institutions*, 38 World Politics 226–54 (1985)

[20] See Hoekman B. M. and Kostecki M. M., *The Political Economy of the World Trading System*, translated in Chinese by Liu P., Hong X. D. and Xu M. D. et al, Law Press (Beijing), at 76 (1999).

[21] See supra note 2, at 49.

is just one of the basic factors for establishment of cooperation. Nevertheless, for either the reciprocal promise to opening-up or the possibility of "punishing" of fraud, if there is no binding commitment or legal provision, there would be only an uncertain temptation or "menace." To convince players of its practicality, a guarantee should be made by reaching formal treaties or mechanism. Consequently, international economic legal system is required. Here, though neo-liberalists, similar to realists, take the assumptions that states are rational as the basis of their theory, they have a broader viewpoint on rationality of states, i.e., a rational state does not only "directly seek for its interests," but contrarily may estimate its future interests and the cost of its action as well as the possibility of giving up current gains for more long-term benefits. It may take actions after considering the potential responses of other states.[22] Obviously, it is such "strategic rationality" that makes the effective choice of a state possible in the world of interdependence.[23]

Consequently, neo-liberalists arrive at the following conclusion: Cooperation would be difficult if a game is only played once. However, if the game is played repeatedly, players will get the opportunity to learn from the past and expect for the future, which makes cooperation possible. The system based on a stable reciprocal mechanism provides the possibility for duration of such cooperation.[24] The revelation to international economic legislation is as follows: The success and continuousness of most international cooperation shall be based on reciprocity, and the legalization of international economic cooperation is an effective way to reduce trade cost, prevent fraud and institutionalize the reciprocal principle. On the one hand, reciprocity is the precondition or basis for changing the "non-cooperative game" to the "cooperative game." The international regime is not to replace reciprocity; on the contrary, it is to enhance and institutionalize reciprocity. The regime contains the rules of reciprocity, whereby fraud will be deemed illegal and be punished more severely. On the other hand, a sustaining sense of reputation may be established more easily for reciprocity defined in relevant areas and the established reputation may become an important asset, as other players will be more willing to enter into cooperation agreements with the government of good reputation. Reputation implies that the commitment of a player is creditable,[25] and the credibility of commitments is necessary for members to overcome the dilemma of game and realize cooperation, as they need to obtain the "assurance" of others of no fraud.[26] As a

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[22] See supra note 3, at 352.
[23] See supra note 2, at 38–40.
[24] See supra note 9, at 238–56.
[25] See supra note 19, at 250.
[26] See Abbott K. W. and Snidal D., *Hard and Soft Law in International Governance*, 54 Int'l Org. 421–56 (2000).

result, reciprocity is the basis for cooperation and formation of systems, especially in international economic area. In fact, reciprocity provides a balancing point to players in international cooperation; by adopting the reciprocity strategy, players may adjust their interests, extend cooperation and reduce the cost of supervision and sanction. Keeping reciprocity valid continuously, namely establishing a reciprocity system, is the key to maintain international regimes. If a consensus on reciprocity institutionalization has been reached, the next issue is from which aspects such institutionalization shall be started. Neo-liberalists point out that effective reciprocity is based on three conditions: First, the betrayer can be identified by all players; second, cooperators are able to revenge themselves on the betrayer; and third, inducements are strong enough to carry out such revenge. When the number of players is a lot, those conditions are very difficult to satisfy. The situation may change as follows: Punishment of the betrayer may not be carried out though the betrayer is identified; or no cooperator is willing to play the role as policeman. Then, in the action that compels players to observe rules, every cooperator may intend to be a free rider.[27] Therefore, neo-liberalists further point out that as the key element satisfying the three conditions for effective reciprocity, a special organization for the effective reciprocity system shall be established and maintained in international regime so as to distribute the cost of institutional maintenance and punishment of betrayers.[28]

To conclude, we may find the theoretical logic of neo-liberalists is as follows: To focus on absolute gains is the basis of cooperation, and the repetition of game is an effective way to eliminate betrayal. Meanwhile, the principle of reciprocity shall become a main standpoint for game cooperation, especially for international economic cooperation, and even for the establishment of international legal system. Reciprocity institutionalization is one of the means for players to keep cooperation or maintain a system, as well as an important precondition for the success of cooperation and establishment of a system.

3.2 Assumptions of Gain Preference by Neo-Liberalists and Rapid Development of International Economic Legislation in Globalization Context

Undoubtedly, a theory or a viewpoint shall be of certain reasonableness to be persuasive. As for whether the assumptions of neo-liberalists that states emphasize absolute gains in international economic cooperation and their

[27] See supra note 19, at 235.
[28] Id. at 235–37.

analysis on game cooperation are feasible or not, we may make an analysis on the nature of human needs, the nature of international relations practice as a dynamic process and the significance of reciprocity in international economic law development.

On the one hand, Maslow has pointed out in his analysis on the hierarchy of needs that the lowest yet the most basic (or fundamental) needs of human being are physiological need and then safety need. Thus, to seek for absolute gains in economic cooperation from the most basic level of needs seems more reasonable, and as in the economic area, focus on relative gains may result in failure of economic cooperation, which may obviously be of impacts on survival. Though interest distribution in economic cooperation is usually unequal, the most basic needs of human being for survival can be guaranteed. Moreover, in modern constitutional states, as executors of the will of constituency, governments shall give top priority to livelihood issues and their policy objectives are usually to promote economic growth, ensure full employment and improve social welfare. Although the implementation of those objectives may be affected by other factors or deviated temporarily, governments will endeavor to promote economic cooperation and pay more attention to absolute gains in international economic cooperation in most time or in the long run. Indeed, relative gains may be emphasized in the security area, since stress on relative gains is more conducive to safeguarding security, and this is determined by the feature of the security area which is much different from those of the economic area. A state may have to yield the absolute gains from economic cooperation for safety reason sometimes, but it is only a temporary tactic, as the security as the second level of needs would not be assured if such tactic lasts. It has been proved by China's lessons. The Ming Dynasty and the Qing Dynasty adopted the "close-door" policy for national defense reasons, which led to the decline of the whole empire. Actually, it is true not only for China, but also for the rest of the world. For instance, in the arms race with the US, the USSR crazily engaged in arms expansion while ignoring the livelihood needs of its people, and finally, it collapsed. Thus, it is unreasonable and infeasible to adopt the achievement of relative gains in international economic cooperation as a long-term strategy. According to the theory of hierarchy of needs, the "close-door" practice and hostile actions in the Cold War are doomed to be a historical event for a short time.

On the other hand, the practice of international relations is dynamic in nature, i.e., interactions among states will continue. What the "dynamic" emphasizes in international relations and legislation is: the impacts of multiple decisions of states over time and adjustment of relations among states. Actually, whether new balance can be found in the process of a game and whether such balance is stable are critical issues, and those balances (rather than the forms of game) make

dynamic analysis different.[29] For example, the GATT/WTO negotiations are a process of repeated games, for which western scholars have pointed out: "The repeatability of (GATT) negotiations strengthens cooperation, since if the deal reached in any time in the past has not been implemented (or is pulled back), the other party may not only resort to dispute settlement procedures, but also make negotiations on the established agreement again. History plays an important role in a repeated game: The adopted actions or standpoints will be of impacts on the standpoints of trade partners in negotiations in the future. It would take some time for players to understand each other, whereby they would be encouraged to input resources to establish reputation or alliance."[30] Then, "menace" would be an effective method for the cooperators to constrain betrayers. Betrayers may bear a thought that they may avoid punishment by chance in a one-time game, but a repeated game would eliminate the thought.[31] The multilateral trade negotiation in 1982 ended without tremendous progress is partly due to no state took the US warning seriously, while the fact proved those states were wrong.[32] In fact, in the 1980s, the preferential trade agreements adopted by the US at least imposing certain pressure on the members of the GATT to start a new round of multilateral trade negotiations. The US also employed tools of unilateral trade policies including Section 301, Super Section 301 and Special Section 301 to retaliate against or threaten the states that took the so-called unequal or unreasonable actions in the field beyond governance of the GATT (e.g., service and intellectual property rights), forcing them to discuss those topics in multilateral trade negotiations. In GATT's Uruguay Round negotiations, in order to force developing countries or other states to make commitments on liberalization related to the subjects in its favor, the US took the means of "menace" such as withdrawal from negotiation several times. However, it is proved by the fact that such "menace" played a major role in the success of those negotiations.

In practice, if the gains from unilateral concession are fewer than those from joint actions and the cost of unilateral punishment on betrayers is unacceptable, conditional cooperation, namely, reciprocal cooperation will be more appealing. Ultimately, reciprocity institutionalization as the guarantee for establishment and stable operation of international legal system is the choice of history. Looking back on the development of international economic law, we may find both the UK from promulgation of the Peel's tariff regulations to 1860 and the US from

[29] See supra note 2, at 48.
[30] See supra note 20, at 74.
[31] Id. at 76.
[32] See supra note 16, at 9–10.

the end of World War II to 1971 when it had financial deficits had introduced the principle of reciprocity into bilateral trade negotiations after experiencing unilateral opening of their domestic markets.[33] For example, the investment protection agreements concluded between the US and other states in early days were not reciprocal, only aiming at solving issues concerning investment insurance of the US overseas investment insurance institutions in the territory of other contracting parties. Such non-reciprocal agreements were not adaptable to the development of international investment before long. Later, the principle of reciprocity was provided in the investment protection agreements of the US and Canada with other states, and provisions on application of reciprocity were added in the former US non-reciprocal investment protection agreements. Additionally, the non-reciprocal MFN treatment adopted in some treaties of commerce and navigation of the US in early days were later replaced by the reciprocal MFN treatment.[34] Similarly, multilateral free trade systems, typically, the GATT/WTO, benefit from reciprocity, and the principle of reciprocity is the fundamental factor for continuance and development of the GATT in the 1970s after the US economic status declined relatively. Art. XXVIII of the GATT explicitly stipulates: "… negotiations on a reciprocal and mutually advantageous basis, directed to the substantial reduction of the general level of tariffs and other charges on imports and exports … are of great importance to the expansion of international trade." The reciprocal basis here means a state lowers its protection level to exchange for the corresponding lowering of protection level by another. In negotiations prior to the addition of this provision, the principle of reciprocity and mutual benefit was reiterated. In the Kennedy Round and the Tokyo Round, this principle was emphasized once and again. Though the ministerial declaration of the Uruguay Round did not explicitly mention the principle of reciprocity, it proposed to adhere to the principles of the GATT "to assure reciprocal preference of all parties."[35] It is the institutionalized reciprocity that guarantees the stability, authority and development of the multilateral free trade system. Indeed, in both modern international economic law and international law as a whole, including co-existence law and cooperation law, most of the defined obligations of states

[33] See Tomita T., *Coordination and Opposition in the Multi-Polar World*, in 全球化：时代的标识——国外著名学者、政要论全球化 (Globalization: Mark of the Time—On Globalization by Well-Known Foreign Scholars and Political Leaders), translated in Chinese and edited by the Globalization Research Center of China Institutes of Contemporary International Relations, Shishi Publishing House (Beijing), at 28–59 (2003).

[34] See Zeng H. Q., 国际投资法学 (International Investment Law), Peking University Press (Beijing), at 367–68, 570–72 (1999).

[35] See Han L. Y., 论 WTO 规章及义务的性质 (On Nature of WTO Regulations and Obligations), in Chen A. ed., 12 国际经济法学刊 (Journal of International Economic Law) 30–31 (2006).

are reciprocal, though there are holistic obligations and reciprocal ones.[36]

Additionally, as far as the reality of international relations is concerned, the cases that fall into the form of zero-sum game are relatively few, only occurring in some specific and simple situations, such as territory or property disputes in international relations. Moreover, factors involved in real international relations, especially in international economic relations, are complicated. If other factors are taken into consideration, "zero-sum game" is easy to transform to "non-zero-sum game," and then cooperation will be realized. For instance, before the 1980s, compensation for nationalization was the focused discussion between northern and southern states. For players, the standards and methods of compensation were closely related to the distribution of interest. In fact, for nationalization issues, simply taking the position of southern or northern states would lead to consequences no one would expect, such as political confrontation between the home state and the host state and damages to investment environment. For foreign investors, though they might seek for diplomatic protection from their home state, such protection was usually not a "panacea" and always puts investors in embarrassment as what they lost overweighed what they gained. Meanwhile, neither the home state nor the host state intends to start a diplomatic war for such issues thus bring harms to their relations. As a result, the best solution was concession, namely, the ICSID Convention of 1965 for settlement of disputes between investors and host states including nationalization issues.[37] After the 1990s, this Convention was even approved by many Latin American states, the originators of Calvo Doctrine.

In summary, we may find either the nature of human needs, or the practice in international relations, or even the significance of reciprocity in the progress of international economic law has proved the reasonableness of the assumptions of neo-liberalists that states focus on absolute gains in international economic cooperation and games can be successfully played. Just based on such reasonableness, the viewpoint of neo-liberalists that stress on absolute gains becomes an effective interpretation on the shift of focus on relative gains to absolute gains in international economic legislation cooperation. Virtually, since the 1980s, states have gradually returned to the focus on absolute gains in international economic cooperation. Though such return was only a judgment on the general tendency, while, states inevitably had different emphases or values choices on specific issues, international economic legislation had revived and

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[36] See Pauwelyn J., *Conflict of Norms in Public Law—How WTO Law Relates to Other Rules of International Law*), translated in Chinese by Zhou Z. H. et al., Law Press (Beijing), at 64–103 (2005).

[37] For detailed causes for conclusion of the ICSID Convention, see supra note 34, at 570–72.

experienced tremendous progress. For instance, with respect to foreign-related economic legislation, "control relaxation" becomes the general tendency in the world, especially in developing countries and states in transition. As a result, direct investment of multinational companies is welcomed by all states, and "win-win" becomes a popular slogan today. At international level, numerous bilateral, regional and multilateral treaties in international trade, investment and financial areas have been concluded and abided, which primarily form an international market system with liberalism as the core.[38]

4 Other Factors with Impacts on the Choice of Action by a State in International Legislative Game besides Gain Preference

Undoubtedly, it seems that the assumptions of relative gain preference of neo-realists and the assumptions of absolute gain preference of neo-liberalists can be applied to certain areas respectively, whereby the former is more persuasive in the safety area, while the latter is more useful in the economic area. Of course, there are exceptions. For example, the assumptions of neo-realists are more persuasive for the practice in international economic cooperation and legislation among groups of states from the end of World War II to the 1980s. However, the change of the "hostile" attitude of different groups of states in such special period to the "cooperative" attitude after the mid-1980s proved the reasonableness of the assumptions and inference of neo-liberalists. It shall be noted that the assumptions and inferences of those theories are based on simplification of international relations, where there are only the players who directly participated in the game and most of other factors that may impact the game are excluded. Such simplification is not consistent with reality, since other

[38] According to statistics as of 2006, 2,573 bilateral investment treaties were concluded and in 2006 there were 73 new bilateral investment treaties. Among those treaties, 680 were concluded between developing countries, accounting for 26.43% of the total. Correspondingly, as of 2006, 2,651 agreements for the avoidance of double taxation were concluded, and in 2006 there were 83 new agreements of this kind. Meanwhile, regional economic integration is full of vitality, especially the NAFTA, the EU and the ASEAN. Additionally, by July 2008, as global largest international economic organization, the WTO had 153 members, and intensive negotiations on entry of many other countries or regions are under way. The situation is similar for other international economic organizations or international economic treaties. For instance, by entry of the Netherlands in Oct. 1966, the members to the ICSID Convention were only 20, but as of July 2008, the number increased to 155. See UNCTAD, *World Investment Report 2007*, at 15–17, at http://www.unctad.org/en/docs/ wir2007_en.pdf (last visited Aug. 24, 2008); see WTO, *Members and Observers*, at http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm (last visited July 28, 2008); see also ICSID, *Member States*, at http://icsid.worldbank.org/ICSID/FrontServlet?requestType=CasesRH&actionVal=howHome&pageName=MemberStates_Home (last visited July 25, 2008).

factors that may influence the result of a game always exist in practice, and those factors, together with gain preference, determine the choice of actions of a state in international cooperation negotiations and legislative game.

4.1 Environment for International Cooperation in Practice Does Not Adopt the Simplified Form in Theory

According to the logic of realism, since there is no international government or effective international law system that may safeguard national rights and interests in the international regime, in other words, in an anarchic world, states will concern relative gains rather than absolute gains. As the result of anarchy, states have to maintain their power and positions, and they may refuse any cooperation beneficial to both parties if they find others obtain more gains than themselves. For instance, in the arms race between the superpowers in the Cold War, both the US and the USSR focused on relative gains, rather than the level of arms as such.[39] Therefore, in the security area, states tend to prefer relative gains, which may lead to low success rate of cooperation, and even if the results of cooperation have been achieved (e.g., conclusion of international agreements), such cooperation may not last long. Undoubtedly, in a game where there are two states or groups of states with strong hostility to each other, when there is no other external constraining factor, such gaming inference is basically tenable. However, in every game of security, there are certain external constraining factors, which may be of impact on the result of the game.

For example, the development of nuclear weapons of a state is constrained not only by its technology, economic strength and resources but also by enormous pressure from international community as well as other possible responses of international community. Generally, when there is a strong feeling of insecurity or necessity of development of nuclear weapons to obtain or safeguard its important interests, a state will be strongly motivated to develop nuclear weapons. Once external constraints are relaxed to some extent, it may take steps in such aspect. In the confrontations between the US and the USSR and between India and Pakistan, the development of nuclear weapons caused a domino effect. The fact that one party owned nuclear weapons became a strong incentive inducing other parties to engage in nuclear development. However, it does not mean there is no possibility for cooperation in this area between those states. In reality, the examples of absolute "zero-sum game" are rare. In *The Strategy of Conflict*

[39] See Keohane R. O., *International Institutions*: *Can Interdependence Work?* 110 Foreign Pol'y 82–96 (1998).

published in 1960, Thomas C. Schelling has shifted his attention from zero-sum game where both parties are in direct opposite positions concerning interests and begun to emphasize the following fact: Almost all decisions are combination of conflicting interests and some collective interests. Schelling indicated that bargaining enables players to seek for the most favorable solution to conflicting interests, as for any player, reaching certain consensus is better than nothing, and every player has to balance between the pursuit for a large piece of cake and the conflict of cooperation.[40] For example, even in the "chicken game," if one party or both parties become rational and choose concession, a tragedy can be avoided. Then, "zero-sum game" would be transformed into "non-zero-sum game."

As manifested by many events in the Cold War period, in most cases, when conflicts between the US and the USSR reached certain intensity, both parties chose to make compromises so as to avoid direct military conflict and finally settle the crisis. The typical case was the Cuban missile crisis. Facing the US menace of starting a war, considering the gap of strength, the USSR finally chose to concede. Moreover, even in the most serious confrontation, the US and the USSR entered into or joined in such treaties including the *Outer Space Treaty* (1967) and the *Nuclear Non-Proliferation Treaty* (NPT) (1968). In December 1987, heads of the US and the USSR signed the *Intermediate-Range Nuclear Forces Treaty*, which was the first treaty between the two states on reduction of nuclear arms—nuclear weapons at all levels—in a real sense since nuclear weapons came into existence. Such action greatly facilitated international disarmament. Thus, just as Keohane pointed out, the proposition concerning "relative gains" should be restructured, i.e., what shall be concerned is "in what conditions a state would give up cooperation for mutual benefits to maintain its relative power and position," rather than "its relative gains or absolute gains that a state seeks for." Undoubtedly, when there are only two major players and the gains of one player will decisively change the balance of power, relative gains will be expanded intangibly. The typical cases are arms race and monopolistic competition. However, cooperation potentials exist in most topics. In multilateral negotiations on those topics, relative gains are difficult to estimate and the danger of shift of decisive power is small. Thus, the arguments on relative gains only emphasize the difficulty of cooperation in fierce bilateral competition, but by no means impair the prospect of general cooperation as a whole.[41]

Similarly, it is harder to adopt neo-liberalists' assumptions of absolute gain

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[40] See NOBELPRIZE, *Robert Auman's and Thomas Schelling's Contributions to Game Theory*: *Analyses of Conflicts and Cooperation*, at http://nobelprize.org/nobelprizes/economics/ laureates/ 2005/ecoadv05.pdf (last visited January 27, 2007).

[41] See supra note 39, at 88.

preference as well as their inferences on the results of game to interpret the behaviors of states in the so-called "high politics" areas including political and security issues. Theoretically, their assumptions of preference and inferences fit more for interpreting the cooperation issues in the so-called "low politics" area such as economic and environmental issues. Nevertheless, we shall note that even in the economic area, the assumptions on which the inferences of the neo-liberalism theory are based is not changeless. For instance, according to this theory, if the states participating in international economy and cooperation concern on absolute gains, cooperation will be realized. In the context of economic globalization, though states usually rely on absolute gains in international economic legislation, which leads to rapid development of liberalization in international economic laws in recent years, such situation is not absolute. As in some circumstances or on some specific issues, the states participating in legislative negotiation may shift to emphasize relative gains, which may bring difficulty to cooperation or lead to the failure of cooperation. For instance, in the new round trade negotiation of the WTO—the Doha Round, both northern and southern states seemed to concern relative gains, which made the negotiation hard to achieve any progress. In 2001, US President Bush declared that the US would not approve the *Kyoto Protocol* for two reasons: First, this Protocol had brought serious harms to the US economy; and second, developing countries had not assumed any obligation of emission reduction. Obviously, this is another case to illustrate concern on relative gains in international cooperation on environmental protection. For another example, in some areas or on some issues, when a state is not sure whether to choose absolute gains or relative gains, or if it finds the benefits from both betrayal and cooperation are substantial, the prospect of cooperation will be unclear. Moreover, even in the WTO system which is "oriented by rules," the role of big powers cannot be neglected and there is still certain room for the work of the "doctrine of hegemonic cooperation" advocated by neo-realists.

In addition, "zero-sum game" also exists in some economic fields, such as the fierce competition between the US and Europe on large passenger aircrafts (i.e., the US Boeing and European Airbus).[42]

4.2 Combination of National Interests and Collective Interests May Influence the Choice of Gain Preference—Example of the Protection System for Global Public Domain

In many games among states, when national interests and collective interests are

[42] Id.

closely combined, an individual state will shift its focus on relative gains to absolute gains, and hence contradiction between individual action and collective action can still be overcome. This has been demonstrated by the success of cooperation on multilateral legislation with regard to the issues concerning global public domain, which includes high seas, outer space, the Antarctica and atmosphere, since the second half of last century.

In international legislation for protection of the common heritages of human being, protection of global public domain is highlighted. The so-called global public domain refers to the places on the earth where natural resources deposit, such as abyssal seabed, high seas and fisheries in high seas, outer space, the Antarctic, atmosphere, carbon dioxide emissions and broadcasting electro-magnetic frequency bands. Motivated by private interests, an individual state may bring damages to existing public domain by excessive exploitation or due to negligence only. Moreover, some states or groups of states may declare some areas of their exclusive territory. The claims for the territories where public domain overlaps or there are conflicting interests may even give rise to outbreak of international conflicts.[43] From Waltz's perspective of neo-realism, this issue will be discussed purely with the mode of anarchy, where self-interest and relative gains will be stressed, and consequently it is impossible for states to make cooperation on the establishment of an international management system for promoting lenience on the issues concerning public domain. However, if every state only focuses on their self-interests or relative gains, there will be a disaster or damage to those public resources, and finally, no state can obtain absolute gains. In such circumstances, the issues concerning protection of public domain have been settled. The development of multilateral legislation on the protection of global public domain after World War II manifests that a feasible solution to prevent possible damage to global public domain, from the Antarctica to outer space and abyssal seabed, has been found. For instance, with regard to the protection of the Antarctica, the conclusion of the *Antarctic Treaty* of 1959 signified that people overcame individual selfishness with rationality and collective interests won over the greed for relative gains. In the framework of the said treaty, international community entered into a series of treaties or protocols on the protection of the Antarctic Continent in the following 30 years, which formed a complete system of Antarctic treaties.[44]

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[43] See Hsiung J. C., *Anarchy & Order*, translated in Chinese by Yu X. D. and Zhang T. J., Zhejiang People's Publishing House (Hangzhou), at 188 (2001).

[44] Besides the Antarctic Treaty as the framework, this system also includes *Agreed Measures for the Conservation of Antarctic Fauna and Flora* (1964), *Convention for the Conservation of Antarctic Seals* (1972), *Convention for the Conservation of Antarctic Marine Living Resources* (1980), *Convention for the Regulation of Antarctic Mineral Resource Activities* (1988) and *Protocol on Environmental Protection to the Antarctic Treaty* (1991).

Meanwhile, a great progress has been achieved in international cooperation on other aspects including outer space, high seas and atmosphere, and by now, a relatively sound international legal protection system has been established basically. With respect to protection and utilization of outer space, for example, the UN General Assembly adopted the resolution of *International Cooperation in the Peaceful Uses of Outer Space* in 1961, aiming at making outer space and celestial bodies free for exploration and peaceful use by all states. Those concepts were manifested in the documents of UN General Assembly later on. The consensus on "common heritages of mankind" also promotes the conclusion of series of agreements concerning outer space system, including *Treaty on Principles Governing the Activities of States in Exploration and Use of Outer Space*, *Including the Moon and Other Celestial Bodies* (1967), *Treaty Banning Nuclear Weapon Tests in the Atmosphere*, *in Outer Space and under Water* (1963), *Agreement on the Rescue of Astronauts*, *the Return of Astronauts, and the Return of Objects Launched into Outer Space* (1968), *Convention on International Liability for Damage Caused by Space Objects* (1971), and *Agreement Governing Activities of States on the Moon and Other Celestial Bodies* (1970).

In addition, the Bush government that withdrew from the *Kyoto Protoco*l as the result of their concern on relative gains supported the passing of the *Bali Road Map* in December 2007, which was a breakthrough of historic significance in international cooperation on environment and would bring a profound impact on the countermeasures of mankind for climate change in many aspects. The *Bali Road Map* not only requires developed countries to assume the obligations for slowing down climate change, which should be reported to and subject to the measurement and inspection of international community, but also requires developing countries to take steps for slow-down of climate change within the framework of sustainable development, which should also be reported to and subject to the measurement and inspection of international community. Meanwhile, developed countries shall support the developing countries in this regard with the construction of finance, technology, and such supports should also be reported to and subject to the measurement and check of international community.[45] By a simple method for calculation of interests, obviously, the gains of developed countries including the US would be less than those of developing countries, but the reason why such road map can be reached is that developed countries understand the close relationship between collective interests and their self-interests in protection of global environment, and the

[45] See Gao F., 巴厘路线图 (The Road Ahead from Bali), at http://www.chinadialogue.net/ article/show/ single/ cn/1640 (last visited January 12, 2008).

realization of their interests is based on acquisition of collective interests. It is on the basis of the common interests of nations, or collective interests that the principles of joint responsibilities and concerted actions can be established in the *Bali Road Map*.

4.3 International Mechanism or Role of International Organizations May Impact the Results of Game—Example of Disarmament and Non-Proliferation Mechanism Dominated by the UN after World War II

Although international community is in anarchy, it does not mean it is out of order. In fact, numerous international organizations and mechanisms constitute the network international community. When the influence of international organizations and mechanisms is weak, the gain preference of states may determine the results of games. However, when such influence is powerful enough, the results of games may change, i.e., the results of games are not determined purely by gain preference of states. In other words, the expectation of gains of a state would be adjusted according to international regimes. The procedures and rules of international regimes would enable the state to understand whether its behavior is legitimate and which rules can be adopted as the principles for reducing conflicts and enhancing cooperation. As a result, the international regime creates the expectations of states to some extent, and to realize such expectations, the focus is gradually shifted from relative gains to absolute gains. The typical case concerned is the shift of the attitudes of states to disarmament and nuclear non-proliferation mechanism by efforts of the UN after World War II.

If it was the weakness of the League of Nations and the disarmament mechanism after the World War I that led to the failure of disarmament in that period as determined by the relative gain preference of states, it was the relatively powerful UN as well as the disarmament mechanism established and maintained by the UN after World War II that changed the destiny of failure of disarmament negotiations merely determined by the relative gain preference of states. Since the 1960s, the efforts of the UN have been directed from disarmament to non-proliferation of nuclear weapons, termination of nuclear tests and prohibition of development of biological and chemical weapons. Through efforts of the UN, the *Partial Test Ban Treaty* was adopted in 1963 and over 50 UN members concluded the NPT in 1968. In 1978, the holding of the UN 1st session on disarmament signified the establishment of the dominant position of the UN in disarmament and the commencement of deliberations and negotiations on multilateral disarmament. Particularly, after the end of the Cold War, when the situation of hostile confrontation between the US and the USSR

and their control of negotiations on disarmament changed, multilateral disarmament activities within the framework of the UN were active. At that time, disarmament negotiations dominated by the UN was accelerated, and the UN Geneva disarmament negotiation conference made further review of issues concerning prohibition of biological and chemical weapons, nuclear disarmament, prevention of nuclear proliferation, prevention of arms race in space and prohibition of radiological weapons. In November 1993, the *Chemical Weapons Convention* was officially adopted, which came into force in April 1997. This Convention initiated to include the inspection mechanism into the multilateral disarmament convention, creating the precedent of thorough elimination of a full set of modern actual combating weapon systems. On September 10, 1996, the 50th Session of the UN General Assembly officially adopted the *Comprehensive Nuclear Test Ban Treaty*. In April 1995, under the auspice of the UN, the NPT was indefinitely extended by consensus. Later, the UN General Assembly passed three decisions on *Principles and Objectives for Nuclear Non-Proliferation and Disarmament*, *Strengthening the Review Process for the Treaty*, and *Establishment of a Nuclear-Weapon-Free Zone in the Region of the Middle East*, so as to enhance control and supervision over nuclear non-proliferation and disarmament. The three objectives of those decisions—prevention of nuclear proliferation, promotion of nuclear disarmament and promotion of peaceful use of nuclear energy—laid a sound foundation for nuclear disarmament and arms control in the 21st century. Meanwhile, the five permanent members of the UN Security Council adopted the *Arms Export Rules* aiming at restricting sale of weapons, and the UN General Assembly adopted the resolution of *Register of Conventional Arms*.[46] Additionally, significant achievement has been made with respect to the establishment of a nuclear-weapon-free zone. After establishment of the nuclear-weapon-free zone in the south Pacific region in 1985, 10 Asian states and 42 African states concluded the Southeast Asian Nuclear-Weapon-Free Zone Treaty and the African Nuclear-Weapon-Free Zone Treaty in December 1995 and April 1996 respectively. The appeals for establishing nuclear-weapon-free zones in the Middle East, the South Asia and even the Northeast Asia are increasingly higher.[47] All those measures are of critical significance for consolidation and enhancement of the nuclear non-proliferation mechanism.

Among the aforesaid achievements, the most outstanding result is the indefinite extension of the force of the NPT of 1995. According to art. VIII, 3

[46] See Li S. J., 国际政治学概论 (Outline of International Politics), 2nd ed., Shanghai People's Publishing House (Shanghai), at 501–11 (2005).

[47] See Wang J. ed., 国际机制论 (On International Mechanisms), Xinhua Publishing House (Beijing), at 289 (2001).

and X, 2 of the said Treaty, the NPT review and extension conference held in New York from April 17 to May 12 in 1995 passed the resolution on "extending the *Treaty on the Non-Proliferation of Nuclear Weapons*" by consensus: "The Treaty shall continue in force indefinitely." In the conference, some other decisions were made: First, the decision of "strengthening the review process for the Treaty," which declared that the review conference for implementation of the Treaty and further progress should be held every five years; and second, the decision of "principles and objectives for nuclear non-proliferation and disarmament," which reaffirmed and iterated the principles and objectives of the Treaty and stated major issues concerning the general applicability of the Treaty, non-proliferation, nuclear disarmament, nuclear-weapon-free zones, security assurances, safeguards and peaceful uses of nuclear energy.[48] On April 25, 2000, the review conference 2000 was held in New York. The major topics of this conference were as follows: the general applicability of the Treaty, nuclear non-proliferation, nuclear disarmament and nuclear-weapon-free zones. Up to January 2003, the number of the contracting states to this Treaty reached 186.[49]

4.4 Interactions among International Legal Systems May Influence or Change the Original Gain Preference and Choice of Action by States

With dramatic development of globalization in recent years, the number of international legal systems and international organizations are on rapid increase. Topics in different domains overlap and calls for improving "global governance" are increasingly dominant. In some domains such as international environmental governance, there is even such phenomenon of "treaty congestion" as described by scholars.[50] Thus, it is infeasible to discuss an international legal system or an international organization without consideration of other systems or organizations. Practically, though every international legal system is established mainly to solve or try to solve cooperation issues in specific areas, those systems are of mutual influence in terms of establishment, maintenance and validity. Therefore, the gain preference of a state in construction of certain system may be influenced by other relevant systems in which the state participates, and such influence or change in turn may lead to different choice of actions by a state.

On the one hand, in such interaction, the rules or procedures of one international legal system of a state may change the cost and gains of an action subject to jurisdiction of another system, hence changing the gain preference of the state

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[48] Id. at 288–89.

[49] See UN, *The Treaty on the Non-Proliferation of Nuclear Weapons,* at http://baike.baidu.com/view/10554439.htm (last visited September 17, 2008).

[50] See Weiss B., *International Environmental Issues and the Emergence of a New World Order*, 81 Georgetown Law Journal 675–93 (1995).

related to the construction and even observance of the latter as well as its choice of action. For instance, in their nuclear cooperation framework, Norway and Russia set up mutual funds to make it possible to improve the utility of low-concentration radioactive wastes treatment equipment in Murmansk. This program also cleared the obstacles for Russia to implement the relevant provisions on prohibition of nuclear dumping as provided in the *London Convention* of 1996, and as a result, Russia shifted its insistence on relative gains to absolute gains.[51] For another example, when the Democratic People's Republic of Korea attempted to destroy the nuclear non-proliferation mechanism established by the NPT in recent years, the "six-party talks" and the results achieved thereof, including destruction of the nuclear cooling tower in Yongbyon by the Democratic People's Republic of Korea on June 27, 2008, and on the day before the official submission of its nuclear program declaration to China, chair of the six-party talks, dispelled the worry of international community that whether the Democratic People's Republic of Korea would destroy the nuclear non-proliferation mechanism. The "six-party talks" mechanism and the achievements thereof influence the gain preference and choice of actions of the Democratic People's Republic of Korea with respect to the nuclear non-proliferation mechanism, causing it to shift its focus on relative gains in the said mechanism to absolute gains.[52]

On the other hand, in interactions of international legal systems, states undergo a process of learning of others and then may change their "concepts," which may influence their gain preference and choice of actions. For instance, the risk prevention principle illustrated in the Vienna Convention in 1985 was of unique significance for protection of the ozone layer, thus making the entire world to attach great importance to the principle. Later, this principle was included in the *Rio Declaration* of 1992 and then applied to many environmental mechanisms including the systems for management of marine biological resources. It shall be notified that due to the difference between "concepts" and "power" and "interests" (while "materials" play a subordinate role here), even "weak" rules can influence the gain preference and choice of action by states with regard to

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[51] See Stokke O. S., *Sub-Regional Cooperation and Protection of the Arctic Marine Environment*: *The Barents Sea*, in Stokke O. S. and Vidas D. ed., *Governing the Antarctic*: *The Effectiveness and Legitimacy of the Antarctic Treaty System*, Cambridge University Press (Cambridge), at 13–31 (2000).

[52] The Democratic People's Republic of Korea nuclear crisis reoccurred in the first half of 2009. Facing the sanction decision of the UN Security Council, officials of the Democratic People's Republic of Korea irrationally declared the country would pull out of the six-party talks for good. This event showed the weakness and repetitiveness of such interactive effects. Refer to: *The Democratic People's Republic of Korea Declares the Six-Party Talks Ends for Good, China's Response*, at http://news.163.com/09/0716/20/5ECD8TLS000120GU.html (last visited July 16, 2009).

"strong" rules, as long as the "concepts" advocated by them are of enough attractiveness. For instance, the "Internet treaties" adopted in 1996 by the WIPO, namely, the *WIPO Performances and Phonograms Treaty* and the *WIPO Copyright Treaty*, definitely state the interest balance principle in their preambles, and such principle embodying human-oriented concepts is also of influence on the attitude of states towards the "strong" rules—the TRIPs, dispelling the previous doubt of member states whether the interest balance principle would be written in the TRIPs and urging them to shift their preference of relative gains to that of absolute gains. On December 6, 2005, WTO members adopted a decision, adding the transitional waiver mechanism in the *Decision on Implementing Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health* in 2003 as art. 31.2 of the TRIPS Agreement and as a permanent amendment to art. 31 (f) of the TRIPS Agreement. Furthermore, it stands a good chance that the interest balance principle would become one of the guiding principles for further reforms of the TRIPS Agreement.[53]

Additionally, during the interactive process of international legal systems, a system may strengthen or contradict relative rules of another system, hence affecting the actual effect of the latter. As a result, the gain preference and choice of actions of a state with regard to the latter may be influenced or changed. Generally speaking, if such interaction can enhance the resolution of key members, or is consistent with other rules that are respected by international community, or can strengthen the understanding of the state that the relevant systems are operating in a proper or appropriate way, such interaction will increase the compulsory power of rules. In other words, states would change their gain preference concerning systems, for instance, shift of their focus on relative gains to absolute gains, or enhance their belief in focus on absolute gains, and simultaneously take proactive actions instead of making negative response.

5 Conclusion

Since scientific behaviorists introduced game theory into the studies on international relations, there is an effective approach to make "precise" and "scientific" analysis and prediction of international phenomena, which not only brings great impulses on the traditional research approaches of international relations, but also provides vitality to the development of international relations theories. As a general theoretical approach to international relations, game theory illustrates the strategy of actions by states when there is no central government,

[53] See Yi S. L., 人权国际保护视角下的《TRIPs 协定》之变革 (Reform of the TRIPs from Perspective of International Protection of Human Rights), in Chen A. et al eds., 15 国际经济法学刊 (Journal of International Economic Law) 264–66 (2008).

authoritative system and preset objective, not only paying close attention to the point at issue in international community under anarchy, i.e, conflicts and cooperation, but also interpreting the implications of national interests of different types and political environment in the circumstances of international conflicts and cooperation. Game cooperation is a process where the policies of states gradually coordinate and a common mechanism is established, which consists of the steps of mutual enlightenment (learning), strengthened attitudes towards each other (menace), and mutual adjustment (adaptation) and mutual concession (construction). Interdependence makes the relations of states tighter and states understand that abandonment of hostile attitudes and participation in cooperation is a wise choice. Then, the issue that governments confront is not how to avoid cooperation, but "how to form and maintain the reciprocal cooperation mode in competition for controlling international cooperation system to serve for their own interests."[54] Though the game theory tends to simplify cases in interpretation, its reasonableness is still favored by scholars in international relations. Meanwhile, the employment of the game approach in analysis of cooperation between states also provides a reference to analysis on the issues concerning legislation and observance of international law. The traditional research on international law is confined to qualitative analysis, while the introduction of game theory provides an approach of quantitative analysis.

However, every theory has its limitations, and the same is to game theory. When analyzing game theory, especially the gain preference and choice of actions by states in international legislative game, we shall not neglect such limitations. On the one hand, the ontology of game theory stresses materiality and is based on the epistemology of rationalism. The limitations of the ontology and the epistemology determine the limitations of game theory in interpreting the origin, choice and even observance of international regimes. Indeed, the greatest challenge for game theory to become a universally applicable theory is the research of cognitive psychologists, who have doubted the expected benefit mode in game theory that is used to analyze decision-making, and also listed assertive empirical evidences to rebut the assumptions that a player must be the pursuer of maximal benefits.[55] Facing such challenge, Keohane, who is skillful

[54] See Keohane R. O. and Nye J. S., *Power and Interdependence* (3rd ed.), translated in Chinese by Men H. H., Peking University Press (Beijing), at 323 (2002).

[55] See Munck G. L., *Game Theory and Comparative Politics*: *New Perspectives and Old Concerns*, 53 World Politics 173–204 (2001); see Morton R. B., *Methods and Models*: *A Guide to the Empirical Analysis of Formal Models in Political Science*, Cambridge University Press (Cambridge) 84–93 (1999); see also Stein A. A., *The Limits of Strategic Choice*: *Constrained Rationality and Incomplete Explanation*, in Lake D. A. and Powell R. eds., *Strategic Choice and International Relations*, Princeton University Press (Princeton), at 210–17 (1999).

in using the analytical approach of game theory, has to acknowledge the defects of the theory by stating that the thinking of the rationalism can be used neither to interpret why international mechanisms exist in some areas but not in other areas, nor to systematically state the creation and elimination of those mechanisms; the assumptions of functional maximization can neither tell us the origin of mechanisms, nor enable us to deeply understand the differences in design of mechanisms in different cultural and political systems;[56] and in words of the constructivism, game theory cannot tell us the relation between materials and culture. For instance, why US dollar can be used to exchange for goods and services of usage value?[57] Similarly, the limitations of the ontology and the epistemology of game theory are inevitably of impact on the interpretation of international law by this theory. For example, though the assumptions of the realism on the gain preference of states can interpret the difficulty and instability of international legislative cooperation in military or economic areas, it can neither interpret why international legal system exists in some military or security areas but not in other areas, nor systematically describe the creation and elimination of international law systems in specific domains. This is also true for the assumptions of the liberalists on the absolute gain preference of states, which can interpret the general prosperity of international economic legislation, but has difficulty interpreting the legislation in some economic fields. Moreover, such assumptions cannot tell us the origin of international legal system or enable us to deeply understand the differences in design of mechanisms in different cultural and political systems. In addition, the change of concepts may make states have different understandings of interests, thereby taking different actions. The typical case is that the negative attitude of Bush government once focusing on relative gains towards international climate change caused many difficulties in international cooperation in this respect and seriously impaired the soft strength and moral image of the US. Soon after Obama took office, the US government not only put forward new energy policies, but also adjusted diplomatic policies on international climate cooperation. The fundamental adjustment is the change of guiding thoughts. Obama government has taken a comprehensive consideration of the US economic, climate and energy safety in the future, a sharp contrast to the practice of Bush government in putting economy and climate change in totally opposite positions. The change of the guiding thoughts or "concepts" leads to the change in foreign policies. President Obama has sent positive signals of "action" and "cooperation" to international community several

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[56] See Keohane R. O., *International Institutions*: *Two Approaches*, in Beck R. J., Arend A. C. and Vander Lugt R. D. ed., *International Rules*: *Approaches from International Law and International Relations*, Oxford University Press (New York), at 196–99 (1996).

[57] See Keohane R. O., *Rational Choice Theory and International Law*: *Insights and Limitations*, 31 The Journal of Legal Studies 307–19 (2002).

times and tried to abandon the former US unilateral and isolated practices with regard to climate change issues, which is obviously a great progress in terms of policy objectives and actions.[58]

On the other hand, after assuming the focus by states on the game of absolute gains, neo-liberalists emphasize that cooperation originate from betrayal and information asymmetry in their relevant analysis. However, many interactive actions in international relations are not resulted from "market failure" caused by fraud and insufficient information, but still attributed to distribution of power.[59] Indeed, except for persuasive games, the assumptions for most types of games weaken the factor of power. Once the factor of power is considered, the scenario of the game may change:[60] First, since the players in international regimes, rules of game and balance of game may be determined by power, the more powerful states may completely deprive less powerful states of the opportunity to participate, or set up barriers to the participation by the latter in any kind of game. For instance, some states are excluded intentionally from such systems as the WTO and the IMF. Second, power plays a distinct role in determination of game rules. The principal organ of the UN in the security area is the Security Council, and the veto system by big powers in the Security Council is a typical manifestation of power. Moreover, the situation is common where power determines results. Certainly, we shall be clear that neo-liberalists have considered the factor of power in their inference of games, though such factor has not been fully considered. In game analysis on international legislative cooperation at all levels, if the role of power is emphasized, the process of the game and even the results would have been changed. Meanwhile, it should not be ignored that game theory which weaken the role of the power has not taken the moral factor into account, and the game analysis which creates rules while concealing power also secretly conceals moral claims. Hence, the international legal system established upon such game cooperation may be a system lack of the value basis of fairness and justness, the legitimacy of which would be widely questioned.

Additionally, the interpretation of the game preference to international

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[58] Zhao X. S., 美国在气候变化问题上的政策调整与延续 (The US Adjustment and Extension of Policies for Climate Change), at http://ias.cass.cn/show/showproject_ls.asp?id=1005 (last visited May 15, 2009).

[59] See Qin Y. Q., 国际制度与国际合作——反思新自由主义 (International System and International Cooperation: Retrospection of Neo-Liberalism). In Qin Y. Q. ed., 权力·制度·文化——国际关系理论与方法研究文集 (Power, System, Culture: Collected Works on International Relations Theories and Research Approaches), Peking University Press (Beijing), at 109 (2005).

[60] Id.

legislative cooperation is based on reciprocity, which determines that such interpretation cannot be universally applied. Although current international law, including co-existence law and cooperation law, is basically based on reciprocity, there are exceptions. For instance, with respect to such international laws as international human rights law and international environmental law, which are formulated for the purpose of protecting the "common interests of mankind" or the "common interests of the world," the effect of interpretation of these instruments provided by the game analysis based on reciprocity is very limited. In fact, some international human right laws have become international *jus cogens*. For instance, the "crimes against humanity" and "prohibition of slave trade" represent the collective interests of international community, rather than the private interests of any state, and reciprocity has lost its functional significance in this regard. Even with respect to other human right laws or environmental laws that have not become *jus cogens*, considering their purposes and implementation, they seem to aim at administering domestic affairs such as respect of human rights, which seems to be an issue between the authority and nationals of a state; but from the perspective of the values which they protect and the impacts which they try to avoid, what they protect are international and collective interests. For instance, the major reason why "the respect of human rights" becomes an international issue is that it embodies the "justice of mankind" or "global justice." For another example, since environmental pollution has no national boundary, environmental protection becomes an "international" action. To protect environment effectively, a state has to cooperate with others. Now, we may find that either the breach of the obligations in environment or human rights would go against international interests of a collective nature. Although the obligations in human rights and environment are of national nature in terms of performance, the purpose pursued is collective interests.[61] Consequently, what is followed in multilateral legislative cooperation in human rights and environment is not the principle of reciprocity, but the principle of collective interests. Inevitably, the interpretation of this cooperation by the current game theory is unsatisfactory. Meanwhile, the fact that factors including reciprocity, reputation and trust conducive to cooperation are incorporated in the assumption of actions is partly because such games are featured by easy realization of cooperation. Therefore, the introduction of those factors may be deemed as wise after the event.[62]

Actually, game theory based on reciprocity ignores the fact that international community where states stay is not of a purely material structure, but a social

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[61] See supra note 36, at 86–87.

[62] See Brams S. J., *Game Theory*: *Pitfalls and Opportunities in Applying It to International Relation*, 1 Int'l Studies Persp. 221–32 (2000).

form where there are common moral consciousness, values and interests to certain extent as well as mutual language exchange and cultural tradition. In such social form, the claim for justice shall be satisfied other than order, which may not require for reciprocity necessarily, but shall meet with collective interests, or the minimum moral rules. After all, the issue of justice and the concept of fairness may play an important role in formation of the preference of a state and determination of its actions. Though the result of a successful dealing may not necessarily be the reach of a plan on equal distribution of interests, it is a result that meets certain standards of justice and fairness.[63] Thus, the consideration of morality, fairness and obligation is usually a crucial reason for a state to clear obstacles to cooperation. However, combined with those factors, reciprocity will become a concept hard to define and evaluate. Additionally, the more abstract or diverse the concept of reciprocity is, the closer the meanings of reciprocity and fairness become,[64] which conflicts with the assumptions on which game theory is based that the player is a "rational man" or "economic man." Thus, the viewpoint of game theory to separate justice from order does not hold water, and the corresponding international cooperation and the establishment and operation of the relevant international law cannot be fully and clearly interpreted by game theory based on reciprocity.

However, despite all the above-mentioned defects of game theory, we cannot deny its significance in providing a brief and effective analytical path to research on international relations and international law. In fact, despite the defects, game theory is the "engine of thinking" in research on international relations and diplomatic decision-making, as advocates said, which is conducive to making choice of the best solution by a state and understanding the nature, drive and results of international conflicts. As it is of certain impacts on international relations and practice in foreign policies, game theory is a research approach to the countermeasures with practical values.[65] The research achievements on game theory also indicated that this theory is not only a tool for description, but also a tool for analysis; it can not only explain the past, but also predict the future. At the research level, the game analysis on international relations has upgraded from the use of such simple approaches as previous "metaphor" and "analogy" to the use and exploration of "model" and "theory," and even from focusing on pure

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[63] See Hurrell A., *International Society and the Study of Regimes*: *A Reflective Approach*, in in Beck R. J., Arend A. C. and Vander Lugt R. D. ed., *Regime Theory and International Relations*, Oxford University Press (New York), at 52–79 (1995).

[64] Id.

[65] See Ni S. X. et al, 当代西方国际关系理论 (Contemporary Western International Relations Theory), Fudan University Press (Shanghai), at 317 (2001).

descriptive models in empirical analysis to the skillful use of deductive models.[66] Thus, we hold that just as the game analysis of law is a hot topic in the legal circle in recent years, the functions of game theory concerning international relations in analyzing or interpreting international law shall be paid due attention. However, we shall be clear that though game theory, especially the assumptions of the gain preference of state in games works well in analyzing international conflicts and cooperation and even in interpreting international legislative game, it is by no means perfect or omnipotent, of course, there is no perfect or omnipotent theory forever. Since international cooperation games in different fields, including international legislative game, are a complicated process, to fully understand them, we shall effectively combine various theories from various perspectives so as to avoid the result that one factor is emphasized while other important ones are neglected.

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Author

Zhiyun Liu, Ph.D in law (Xiamen University), is a professor at School of Law, Xiamen University. He specializes in the crossing areas of international relation theory and international law, as well as the public international law, international economic law, financial law and investment law. Since 1999, over 110 articles of his, in English and/or Chinese, have been published in the periodicals of China and foreign countries. Meanwhile, his published monographs include 国际经济法律自由化原理研究 (Research on the Theory of Liberalization of International Economic Law, 2005), 现代国际关系理论视野下的国际法 (International Law from the Perspective of Modern International theory, 2006), 当代国际法的发展：一种从国际关系理论视角的分析 (The Development of Contemporary International Law: An Analysis from the Perspective of International Relations Theory, 2010).

[66] See supra note 2, at 25–27.