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Global Environmental Problem from the Perspective of International Political Economics

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Abstract: The formation of global environmental problem is regarded as the result of negative externalities of accumulation and enlargement and excess of environmental self-purification when egoistic man (nation, manufacturer, family) pursuing self-benefit of maximization. Global environment is international public goods. It can not be produced and provided by the way of “Club Goods” but only depends on establishment of a set of binding international joint production system to redesign operation rules of modern commerce and industry.

Key Words: international political economics global environmental problem
international public goods

Since 1970s in the western society and sweeping across global environment activities gradually later, with the advancement of economics, society and science technology, people would have deep understanding to the environmental problems related to them continuously and its science and foresight would also be strengthen gradually. Especially in the late 1980, people in growing number realized more deeply that, the degeneration of ecological environment is a common problem that the whole mankind must face on the ground that it has no differences in terms of different national boundary, social system and ideology. The environmental problem in a country or an area is likely to exert an influence on ecological environment in the whole area or even in the world. For protecting the earth that contemporary people and their descendants depend on for live, international community has no choice but to surmount the restriction of national boundary, nationalities, religion and culture. In order to human common benefits and to own benefits in various countries, they should share in trouble and cooperate in protecting the environment together.

1. International mechanism of environmental problem

Since the mankind enters civilization period, there were a series of environmental problems such as air pollution, water pollution. With the development of social productivities, people’s ability to transform the environment would increasingly strengthen and the environment lived by human is also being improved constantly, but thereupon the environmental pollution and the self-destruction environment have happened in some areas.

Before industrial revolution, there appears some uncoordinated phenomenon between human's economic activities and natural environment. Since the last half of a century after industrial revolution, with the rapid development of social industrialization and the expansion of scale that human transform nature unprecedentedly, people obtained increasing quantities of resource from the nature and discharged more and more those of wastes. Thus, environmental problems would develop from a single environmental pollution to the compound problems that outstanding environmental destruction and environmental pollution coexist.

1.1 The environmental problem under the model of two traditional departments

In the traditional systematic model of economy, suppose there are only two departments, that is, families and manufactures, which joined by product market and factor market. On one hand, the manufactures produce the products and services and sell to the families through product market, and the families need to pay money to the manufactures; On the other hand, the families sell factors of production to the manufactures in the factor market, and the manufactures also pay money to the families. In this way, the whole economy becomes the system of connection of opposite flow between material flow and value flow. As shown in Figure 1.1, indeed, two traditional departments of economic system implies a supposition, that is, the environment is exogenous variables of this model, and therefore we may suppose that the environment has nothing to do with the economic system, and there is no so-called environmental problem.

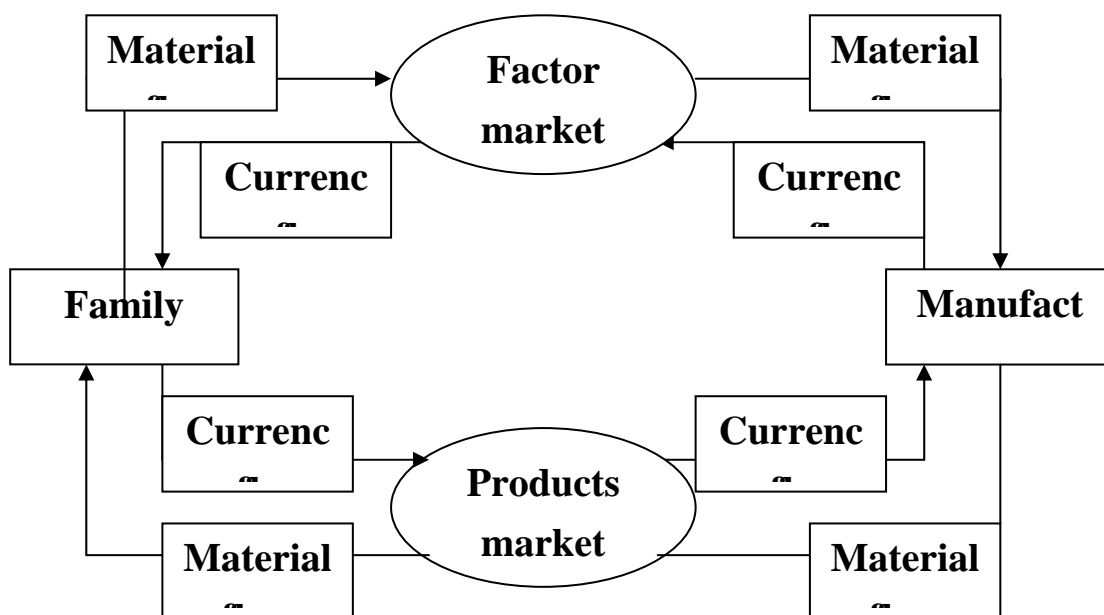


Figure 1. Environment of traditional two department ----Economic Model

1.2 The expansion of the model of two department and its environmental problem

On the basis of two traditional department's model, we will introduce the environmental system as endogenous variables of the economic system to construct economy-environment system model. In this way, we are able to reveal the environmental function and the formation of environmental problem clearly, as shown in Figure 2.

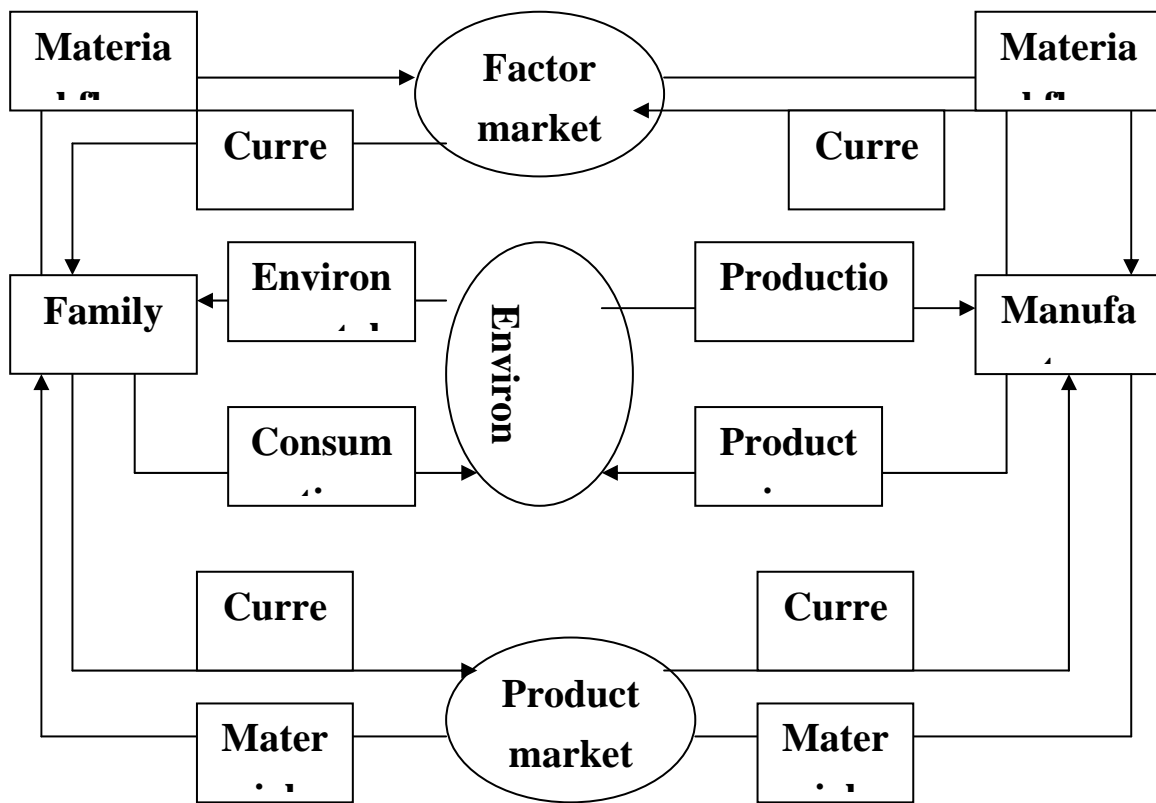


Figure 2. Environment of expanded two department ----Economic Model

Environmental system has three functions——Economic production function, service production function and the function of decomposing and absorbing wastes. For one thing, environmental system provides the manufactures with various resources (materials) required by production, and also supplies environmental service (graceful nature, clean air) to families. At the same time, the manufactures and families drain production surplus and consumption surplus to the environmental system. Suppose S stands for self-purification of environmental system, C for consumption surplus, P for production surplus, δ for the absolute difference between systematic self-purification of environment and the sum of consumption surplus and production surplus. Meanwhile, it is necessary for us to presume that environmental problem is result of human activities. Then the environmental problem can be expressed with the following formulae:

$$\delta = S - (P + C)$$

When $\delta = 0$, the production surplus and consumption surplus produced by manufactures and families are just equal to the self-purification of environmental system, namely, the production surplus and consumption surplus are absorbed and composed by environmental system completely, and there is no any environmental problem at this moment.

When $\delta < 0$, the production surplus and consumption surplus produced by manufactures and families are less than the self-purification of environmental system, and it also can not produce any environmental problem at this moment.

When $\delta > 0$, the production surplus and consumption surplus produced by manufactures and families are more than the self-purification of environmental system, and then it will produce the environmental problem.

Therefore we can draw the conclusion; so-called environmental problem is the result of accumulation and expansion of the sum of consumption surplus and production surplus and excess of environmental self-purification. In other words, the environmental problem is the result of accumulation and enlargement of external negative effect. As long as we know the mechanism of accumulation and expansion of external negative effect, we would find out the measures to solve the environmental problem.

1.3 The model of three departments, four departments and their environmental problem

On the basis of expansion of the model of two departments, we will introduce government department and foreign department to construct the model of three department and four department, for the purpose of understanding the source and mechanism of environmental problem produced, as shown in Figure 3.

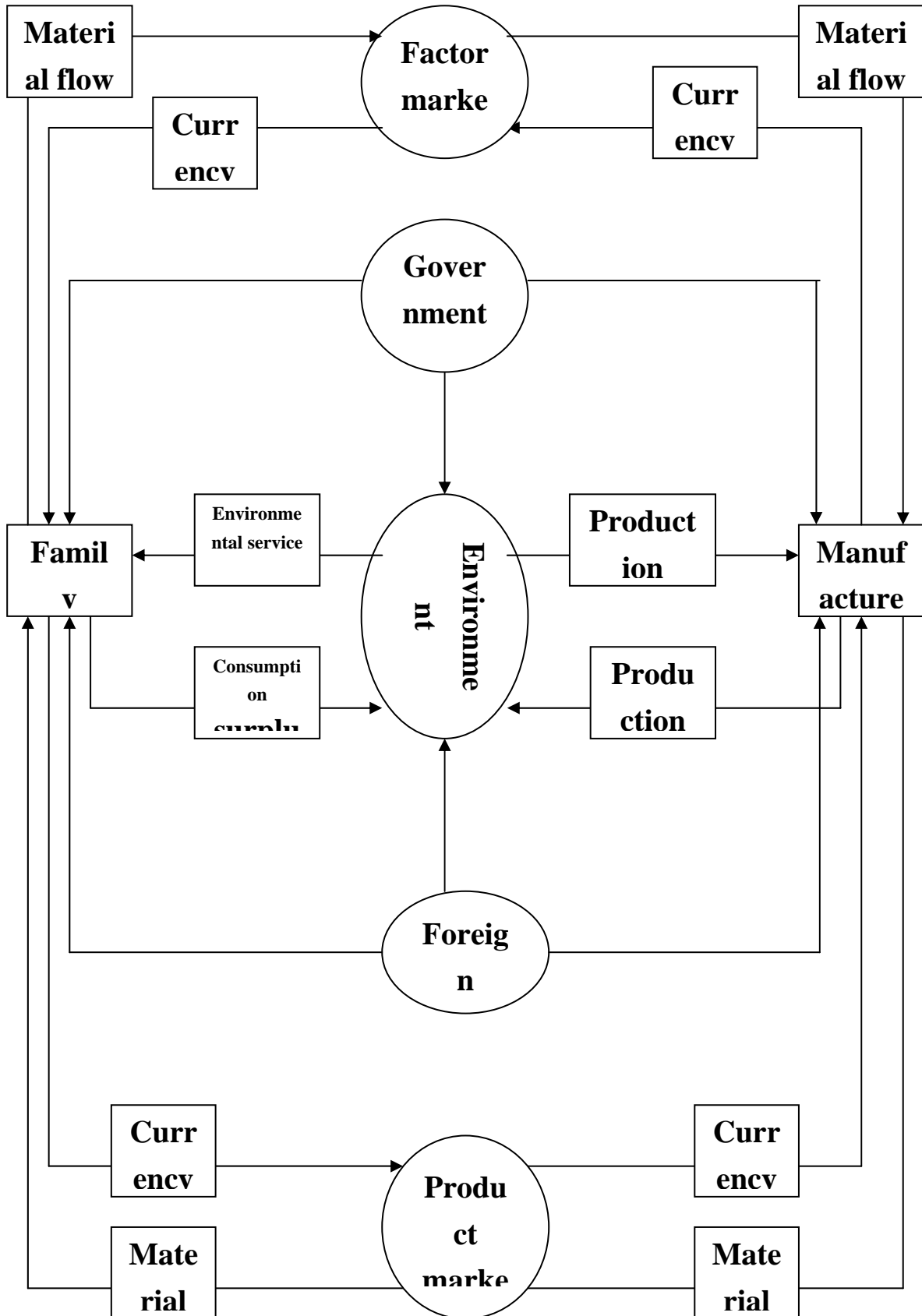


Figure 3. Environment of three department or four department ----Economic Model

In Figure 3, in case of not considering the foreign department, it is a model of three department. In this model, there appear some new changes between the relations between the environment and manufactures as well as families and the relations between the environment and manufactures as well as families in the expansion of the model of two department. The government's goal of economic social development during a certain period of time and a series of economic policy implemented under this goal will change the behavior of manufactures and families. What kind of economic policy the government adopts depends on the judgment or choice to major filed and priority field of social economic development in mid-term or short-term as well as expectancy of social economic development in long-term. The effect of the government department to the formation of environmental problem will be presented as follows; Firstly, the government conveys information to manufactures and families by the value orientation. For example, the government advocates either the mode of "pollute first, manage later" or unification between economic development and environmental protection, the results of which are different completely. Secondly, the government can affect the behavior of manufactures and families by the goal of economic development. The goal of economic development is direct expression of government's value orientation, and there are differences at all between pursuing single economic development and unifying economic development with such goal as social development, resource economizing, environmental quality improvement and harmony between human and nature. Thirdly, the government enables to influence the behavior of manufactures and families through economic policy, including industrial policy, revenue policy, consumption policy and environmental policy. Through analyzing above-mentioned three respects, we may know that the government plays either a stimulating and accelerating role or an inhibiting role to the accumulation and expansion mechanism of environmental problems (δ). In the model of four department, we will introduce foreign department into environment constructed for analyzing this model—the model of economic system, and this foreign department has an effect on the environmental problems in a area or country mainly by trade and investment. The trade comprises these forms such as goods trade, service trade, technologic trade and rubbish trade. The goods trade leads to the goods separating the production ground from the consumption ground because of goods displacement and it regards consumption surplus as medium to act on the environmental problems δ , that is, some environmental problems are produced only by

the pollution that goods produced in the process of consumption but these goods have not produced any pollution in the process of production. Generally speaking, the service trade does not lead to any environmental problems. Regarding the manufactures as medium and the industry as carrier, the technologic trade has influence on the environmental system in a country or area, representing either benefits or harmful to the environmental system. The rubbish trade transfers the environmental cost directly to other countries in order to destroy the environment in other countries, and thus it is considered as an immoral conduct of lacking of international responsibility and selfish extremely. The rubbish export as the behavior of trade object is on the rise in the trade between the developed countries and the developing countries. The pollutants transferred from one country to another country have become an important issue that the international political economics and international trade pay attention to. International direct investment will lead to industry transfer, which affects the environment in a country. Indeed, the economy from close to open in the developing countries is always a process of the developed countries transferring backward industry in that pursuing the internal impulse of economic growth and external pressure by the developing countries or regions happens to coincide with such goal of the developed countries as transferring backward industries outward, upgrading domestic industries, protecting the national environment, improving the environmental quality and harmonizing the relations between human and nature. In this way, the developing countries or regions become the destination that the developed countries transfer backward industries and environmental problems, further enlarging the effect of accumulation mechanism of negative externalities. Only by the trade and investment, regional environmental problems have become international problems. Certainly, internationalization of environmental problems is also related to natural attribute of environment. For example, the tropical rainforest is considered as “the lung of the earth”. Though chopping the tropical rainforest is a regional problem, its result becomes an international problem. This paper dose not discuss about it.

2. Global environmental problems from the perspective of international public goods theory

A vast majority of environmental factors belong to public goods and have basic character of the public goods. When the environmental problems develop from regional problems to the global environmental problems, it seems to possess the properties of international public goods and thus we can bring it into the frame of international public goods theory to analyze.

2.1 The meanings of international public goods theory

International public goods theory refers to the application of public goods theory to solve global problems in the international political economic relations in economics. American economist C.P. Kindleberger is the first person who leads the public goods theory into international relations study and is a founder of “hegemonic stability theory” too. He emphasizes that the international public goods play an important role in stabilizing international order. According to the view of Kindleberger and Allison, the international public goods include: (1) trade system with open freedom, the steady international financial monetary system, the coordinating mechanism of international macro-economic policy; (2) international security system; (3) international economic assistance system. Steegerliz would divide international public goods into five categories in an article named *International Public Goods Theory and Framework of International Organization*, that is, stability of international economy, international security (political stability), international environment, international humanism assistance and knowledge sharing in the world (Steegerliz, 1995). The international public goods and the general public goods have such some common characters as impartibility, non-rivalrousness and non-exclusiveness, and therefore there appear “hitchhike” phenomena unavoidably. However, compared the international public goods with the general public goods, we may find an evident character, that is, the international public goods does not make clear the main part of production and supply of the international public goods, thus resulting in them to be in insufficient supply. In a country or an area, the government is always producer and supplier of the international public goods and it may compel manufactures, families and some foreign departments among the national territory not to produce public harmful substances by policies and decrees, which is to produce public beneficial substances, namely, supply of the public goods, while in the world, owing to lack of a global international government approved by various countries or elected by votes, there are no the producer of international public goods and the “hitchhike” phenomena can not be eliminated either. Just as Kindleberger has put it, “the phenomenon about an insufficient supply of the international public goods caused by the “hitchhike” phenomena becomes more serious under no international governmental world political system.” Of course, some scholars don’t approve of the formulation of intentional public goods. They thought that the international public goods are a fictitious form, and these goods are considered as only some private products needed by the hegemonic countries for safeguarding their hegemony and as some none public tools twiddled by those countries for pursuing their own interests. In fact, it does not make all countries that are supposed to helped benefit from the international assistance in that the international assistance from the industrialized countries to the developing countries may exert influence on the politics and economy of the developing countries in order to control these countries (Duncan Snidal, Bruce Russett, 1985). Although it seems that this criticism

has some rational aspects, we are not able to deny the concept and theory of the international public goods.

2.2 The mode of production of the international public goods

The speciality of production and supply of the international public goods is determined by its own speciality. There are four modes of production, which is presented as follows: (1) Voluntary production. In essence, it is to solve the global common problems. Nevertheless, because of lack of common world government, it can not compel a country to what to do or what not to do and even not impose international tax on a country forcedly, making full use of their financial resources to produce the international public goods. Whether a country would like to produce and offer the international public goods of their own free will depends on identification, needing intensity, partiality and consistency of national financial resources and its needing intensity of a certain international public goods. (2) Participating production. The production and supply of the international public goods are not offered by hegemonic country unilaterally as what the advocators of “hegemony stability theory” claim but produced by some person who are correlated with interests by the way of participation. Meanwhile, the voluntary production may decide the range, quality and participating intensity of the participating production. Due to disparity in standard and quality of the social economic development in various countries, the people who are correlated with interests have different major and priority development field when at the different developing stages. In the other words, the order of solving contradictions is also different when facing various contradictions at one time, and therefore there is great disparity in participating intensity of person who is correlated with interests. Although the participating production is the optimum choice in the process of production of international public goods, an inevitable “hitchhike” phenomenon may reduce actual effect of the participating production objectively. (3) Relational contracting production. The relational contract refers to an uncertain long-term contract to the future or an incomplete contract. And the content of contract will be revised and supplemented constantly with the change of time. Just because the formation of global problem is a long-term process, it is a long-term process or even a permanent process to solve this global problem. The mode of participating production has determined that the mode of production of international public goods must be the relational contracting production. And this relational contract stipulates the mode of participation and content, responsibility and obligation of the participation, that is, it stipulates the right and obligation of each participant in the form of various international conventions and agreements. Because there are not any power properties but more social properties in contracting production, the core of contract is to set up an incentive mechanism of the global cooperation, and is that person who are correlated with interests would correlate their own interests with their expectation and requirement to the world closely on their own initiative for the purpose of decreasing the shortage of supply of

the international public goods seriously caused by the “hitchhike” phenomenon. (4) Negotiating production. Now that the production and supply of international public goods need to sign on relational contract, it must rely on a kind of effective negotiating mechanism. Being lacking in arrangement to verticality, centralization of state power and system, it is not applicable to command and control in the course of producing the international public goods.

3. The management of global environmental problems

Since the 1970s, with the economic development, there have not only occurred the regional environmental contamination and large scale ecological damage, but also appeared extensive and intensive global environmental crisis such as the atmospheric deviation, ozone damage and depletion, biological diversity decrease, acid rain contamination, desertification, deforestation, especially the decrease of tropical rain forest, water resource crisis, oceanic contamination, hazardous wastes produced by the investment as the loader and the trans-boundary pollution transfer, which have endanger the survival and development of human beings. The solutions to these problems have become the major concerns for every country. Though many environmental conventions, treaties and protocols have been concluded by the international community, after the Environment and Development Conference in Brazil in 1992, countries around the world have introduced the idea of sustainable development into their economic and social development strategies, the environmental awareness of the people around the world has been increased, and international organizations have joined the cooperation in environmental protection and gained achievements therein, these vigorous phenomena can not yet change this increasingly severe environmental problems. Therefore, it is of realistic significance in keeping the world’s peace and stability as well as the people’s survival and development to solve the contradiction between the global environmental problems and the survival and development of human beings and to coordinate the rights and obligations of every country in the respect of global environment.

3.1 Establishment international joint production system to manage the global environmental problems

The global environmental problem is totally international public goods, which concerns human long-term happiness. It may neither produce according to the way of “Club Goods” nor produce and offer by the hegemonic countries according to the proposition of “hegemonic stability theory”, but it can be only offered by such modes as voluntary production, participating production, relational contracting production and negotiating production. That the establishment of this production system could be implemented in the

world effectively, thus bringing into the good results, depends on the cooperation among the governments all over the world as well as the broad participation of NGO, enterprises and individual.

From the global viewpoint, we may suppose every country is a producer that is regarded as “economic man” which pursues self-benefit of maximization and that meets all conditions of “supposition of economic man”. In this way, the formation of global environmental problems can be interpreted as negative externalities of accumulation and enlargement when egoistic man pursuing self-benefit of maximization, that is to say, the interests of single producer (cost) are deviated from global interests (cost). Consequently, we would draw the conclusion based on the general public goods theory in the following: first, the international public goods offered by market; second, the international public goods offered by government. Nevertheless, as to global environmental problems of the international public goods, offering by neither establishment of high-efficiency international market nor establishment of international government that is over sovereignty through international vote, we can place hope on setting up a joint production system to produce and offer the international public goods as the only choice. The difficulties of joint production system lie in: (1) global environmental standard approved by the world, namely, the standard of international public goods. Due to a great disparity in politics, economy, culture, religion, developmental goal and developmental strategy in various countries, it is impossible to set up unified the standard of international public goods (environmental standard) in the world. (2) It is unable to overcome the “hitchhike” problem. In the international political-economic system, it is severe “hitchhike” problem that is unable to be eliminated, resulting in the pace of improvement of the global environmental problem not to catch up with that of its deterioration forever. Because both the government and ordinary consumer have a motive to conceal the consumption partiality in order to avoid bearing the cost, there are always some countries obtaining profits free from the efforts of other countries under the establishment of joint production system to improve the global environmental quality in the field of international environment. And the “hitchhike” behavior of sovereignty is more serious than other types of this behavior. If the “hitchhike” behavior of sovereignty becomes common phenomenon in the world, it not only can not solve the international environmental problem but also will destroy limited or efficient international cooperation mechanism. (3) The influence of the international system and mechanism design on the establishment of joint production system. The politicians in various countries will give the priority to the national interests no matter in their perspectives or decision makings, so that currently, there is still no clear strategy to help create a system or mechanism design, which combines the national and international objectives. So far, many governments around the world have just realized an importance of global policy and coordinating decision-making mechanism in dealing with global environmental problems in the world. (4) Problem exists in the motive mechanism of joint

production system. Current international cooperation is very extensive both in time and space. The external effect produced between the countries affects not only the interests of our generation but also those of our offspring. Overflow effects between borders, including refugee, jobs and public security, are beyond the control of a country. Because of the lack of governmental mechanisms between countries, the “hitchhike” problem is conspicuous here. It should still be pointed out that there exist certain differences between countries either in their demand on or their capability of providing international public goods, which makes it difficult for governments around the world to reach a consensus in deciding the service level of some international public goods. (5) The conditions of joint production system is unstable. The core of the joint production system is cooperation. Only when all the countries realize the cooperative productions best meet the interest of their countries, do they have the willing to join the cooperation so that the concept of solving worldwide environmental problem can turn into action. The conditions to stabilize the joint production system include: ① the profit of the joint production system is prospective; ② the hitchhiker will get no profit and even negative profit (suffer a certain punishment); ③ there exists the mechanism to strengthen the willing and scale of cooperation; ④the sharing mechanism of the joint production cost is reasonable and feasible. (6) The collective action runs counter to the individual action logically. It is a collective action process to solve the global environmental problem, and needs unified action logic. But in the diversity of international political economic system, there exist collective preferences for inconsistency, which can be fully explained by Arrow’s Impossibility Theorem, which holds that unified orders of the collective preference can not be deduced from the orders of individual preference.

3.2 Attaching importance to the specific role of NGO playing in dealing with global environmental issue

The role of NGO (Non-Governmental Organization) in global environmental issue should be given important attention to and given the full play. Not representing the will of any government but dealing with the problem only, NGO saves a lot of cost which would have been produced between the governmental competitions, and earns the recognition and support of the public and the governments around the world.

3.3 Designing sustainable global commercial rules and the system of commerce and industry

“Both the US and other western industrialized countries, knowing nothing about what on earth the enterprise is, do not understand how the enterprise will develop therefore.”

Anyone who has a little economic discernment maybe considers the saying ridiculous, but the correctness of Hogan's words has been proved by those practices after the Industrial Revolution. The commercial rules and industrial production systems after the Industrial Revolution, especially those in the past century, have tremendously shaken the foundation of human's survival and development, produced the dominant commercial culture, and made the world fall into the trap of consumption society, as well as creating unprecedented material civilization at the same time. Taking to earn money as their tenets, enterprises consider the substantial increase of material wealth can save all the souls having worldly suffers, and "all the issues concerning resources unfair distribution and social imbalance can be solved by exploiting, inventing, financing and increasing (forever increasing)." However, the truth attests that it does not work to save the world by commerce/ business. Modern commercial regulations and industry system are destroying the livings on the earth. So for a sustainable future, cooperation between governments, enterprises and academic departments around the world is needed so as to reevaluate the traditional commercial orders and commercial and industrial system, design an epoch making revolutionary commercial regulation and industrial system, solve the worldwide environmental problem, find a way for the sustainable development of commerce and industry, and construct a brand new commercial civilization with sustainability.

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