



# Analysis on the Relationship between Overlapping Free Trade Area and Multilateral Trade Agreement

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*This paper gets foundation from National Social Science Foundation Program: the studies on theory and empirical of Overlapping Free Trade agreement. The number of program: 07CGJ010.*

## Abstract

The overlapping free trade area (FTA), as one prominent phenomenon in the development of FTA after the 1990s, has influenced the multilateral trade system (MTS) greatly. This article has proved that the special advantages of spoke countries can bring about cohesive effect on the industries through adopting the analytical method of infinitely repeated game, and the spoke countries will face a discriminatory treatment, resulting in decentralization effect. The overlapping free trade agreement has the feature of self-execution, and compared with the traditional FTA, it is more likely to meet the conditions of incentive compatibility constraint with MTS.

**Keywords:** Overlapping Free Trade Agreement, Rules of Origin, Incentive Compatibility, Sustainability

## 1. Introduction

Along with the trend of economic globalization, the economic communication among the countries has been deepened increasingly; at the same time when all the countries are benefiting from the economic globalization, they have to face serious uncertain risks. For not only getting the effect of trade creation brought by regional preferential arrangement but also reducing the risks because of opening, choosing regional economic organization becomes a suboptimal strategic choice of each country. At present, such organizations are mainly shown as FTA, Customs Union, the Common Market, and Economic and Monetary Union, most of which are at the phase of Customs Union or FTA. The FTA has been the primary choice of many countries thanks to its features like finiteness of the sovereignty release, directness of benefiting as well as easy access to agreement. Thus, numerous overlapping FTAs appeared in the late 1990s. As this phenomenon develops rapidly, the overlapping free trade agreement will influence the running of regional economic organizations and MTS significantly. This issue has been analyzed by many scholars from different angles. Some analyze whether the development of FTA plays a promoting or obstructing role in MTS; some analyze the incentive compatibility between the Customs Union and MTS by means of static game; some analyze the self-execution of interregional trade agreement with the method of dynamic game; and some also analyze the distribution of market power and profit of member countries by FTA and Customs Union. All of the analysis is the study centering on simple relationship between FTA or Customs Union and MTS, but researches on the relationship between the overlapping free trade agreement as a special phenomenon after the 1990s as well as regional organization specially arranged and MTS are relatively few. Nevertheless, this article makes up for the flaw to some extent by analyzing sustainability of the overlapping free trade agreement and its incentive compatibility with MTS with a kind of trade model provided.

In order to analyze the issue deeply, the article adopts the imperfect competition model of four countries and four commodities, among which three countries constitute two FTAs respectively with one being the hub and two being the spoke, the fourth country isn't included this area. Additionally, each of the four countries produces a kind of imperfect competition commodity. For simplicity of the model, it is assumed that scales of the member countries are symmetrical, and consumers in all countries have the same preference. And in the first-order game, both each individual FTA and the multilateral trade agreement meet the conditions of incentive compatibility constraint. Based on this assumption, the article analyzes the optimal tariffs of the hub and spoke countries firstly; then the self-executing mechanism of overlapping FTA, as well as the incentive compatibility with the multilateral trade agreement, is analyzed, so is the political and economical effects of the overlapping free trade agreement finally.

The article is divided into five parts, namely, introduction, development status of the overlapping FTA, model, political and economical effects of the overlapping free trade agreement and conclusion.

## 2. Development Status of the Overlapping FTA

In the more than a decade recently, the global regional economic cooperation organizations have developed rapidly. According to the report of World Bank, by the end of 2007, the number of regional trade agreements notified to WTO had increased from 50 in the 1990s to 380. In addition, 60 regional agreements were at different negotiation stages, and there also were considerable ones not notified to WTO for various reasons. Development of the regional trade changed the original pattern of trade in the world to a relatively large extent. And volume of trades between interregional countries took up about 40% in the global trade volume at the end of 2004. Another attractive phenomenon is that almost all countries have joined in one regional economic organization at least, and some are even in the mode of a group. As a result, a large number of overlapping free trade agreements spring up.

The overlapping free trade agreement refers to the phenomenon that one county (area) concludes free trade agreements respectively with many countries (areas). This concept indicated the “star” system put forward by Park in the beginning, which was gradually replaced by the “hub-and-spoke” system later [E]. When one county (area) concludes free trade agreements respectively with many countries (areas), it will act as a hub while others are just like the spokes, between which there are no free trade agreement. If one spoke country signs agreements with many countries, this condition is called multi-level overlapping free trade agreement, which is not discussed in the article. Currently, many overlapping free trade agreement are springing up, so some countries become the hub countries as well as the spoke ones. Among the member countries of WTO, 97% participate in the free trade agreements, and most of them participate in not only one]. Counties of EU have signed at least 19 agreements with countries in EFTA, and Columbia, Venezuela, Chile and some countries in Central America have signed 8-18 such agreements. The U.S. has signed the CUSFTA with Canada and North American Free Trade Agreement (NAFTA) with Mexico. At present, its negotiation with Chile has been finished, and it is boosting the construction of FTAA. Furthermore, the three countries in NAFTA are also member countries of APEC (the developed countries in APEC will complete the establishment of FTA in 2010 while the developing countries in 2020.). This leads to that some countries become hub countries, such as the U.S., Mexico, Chile, Singapore, etc. With respect to Mexico, it has concluded 10 free trade agreements, including the U.S., Canada, Chile, Bolivia, Columbia- Venezuela, Nicaragua, Costa Rica, EU, EFTA, Israel and Guatemala-El Salvador-Honduras. Countries and regions concluding the free trade agreements with Chile include Ecuador, Venezuela, Bolivia, Peru, South American Common Market, EU, Canada, Mexico and the U.S. Singapore in Asia also signs agreements with Japan, New Zealand-Australia and the U.S. EU carries out expansion towards the east, signing agreements with 10 counties of ASEAN, Euro-Med Agreement with Mediterranean countries and agreements with South Africa and Mexico, and is negotiating with the South American Common Market and Chile. If the condition goes like this, EU will become a large hub area, and other countries will become spoke ones. In such complex overlapping free trade agreement, some countries become the hub countries while some become spoke ones. Many economic and political issues are resulted from different executing time of agreements, discrepancies between covered commodities and different provisions in the rules of origin. Absolutely, the overlapping free trade agreement is not as simple as it seems.

## 3. Trade Model

An international trade model of four countries and four commodities is established in the article, assuming that consumers of all countries share the same preference and constant elasticity of substitution (CES). In the model, there are two FTAs with one country being the hub, two being the spokes and the fourth being a country outside the area. Infinitely repeated game is performed between countries belonging to or not belonging to the area in the established trade model. The assumption that economic structures of intraregional countries are symmetrical avoids the negotiation between intraregional countries. The article mainly analyzes the internal self-executing mechanism of overlapping free trade agreement, and the incentive compatibility between the area and MTS.

### 3.1 Setting of the model

The four countries in the trade model are represented by 1, 2, 3 and 4, among which 1 and 2 make up a FTA, 2 and 3 make up another FTA and 4 is a country not belonging to the area. Due to such setting, 2 become a hub country, and 1 and 3 become the spoke ones. Each of the countries produces a kind of commodity. Member countries of a FTA have the right to set external tariffs independently, so tariffs of 1, 2 and 3 are  $t_1$ ,  $t_2$  and  $t_3$  respectively, and that of 4 is  $t_4$  or  $t^*$ . Tariff in the area is zero. Utility functions of member countries in the area are  $u_1(t_1, t_2, t_4)$ ,  $u_2(t_1, t_2, t_3, t_4)$  and  $u_3(t_2, t_3, t_4)$  respectively, where there is a implicit assumption, that is, 1 and 3 in the two areas only trade with 2 respectively, and there is no direct economic contact between 1 and 3. Additionally, along with external tariff increase of each country, the utility will increase ( $\frac{\partial u}{\partial t_1} \geq 0$ ,  $\frac{\partial u}{\partial t_2} \geq 0$ ,  $\frac{\partial u^*}{\partial t_4} \geq 0$ ); this assumption maintains the trade mode of “prisoners' dilemma”, that is, every country won't reduce its tariff unilaterally for the sake of maximized benefits. Meanwhile, along with the occurrence of overlapping free trade agreement, levels of welfare in the intraregional countries will increase, while that

of the country outside the area will decrease reversely. ( $\frac{\partial u}{\partial t} \geq 0, \frac{\partial u^*}{\partial t} \leq 0$ )

Based on the assumption above, utility level of each country is:

$u^i = \left[ \sum_{j=1}^N (C_j^i)^\delta \right]^{\frac{1}{\delta}}$ , where N means the quantity of traded commodities, and  $u^i$  means the utility level of country i;

$C_j^i$  shows consumption of commodity j in country i, and  $p_j^i$  refers to price of commodity j in country i. Condition for realizing utility maximization for consumption is:

$$\frac{c_j^i}{c_k^i} = \left( \frac{p_j^i}{p_k^i} \right)^{-\delta} \tag{1}$$

Where,  $\delta = \frac{1}{(1-\rho)}$  is the elasticity of substitution of consumption.

In order to indicate the trade model correctly, three parameters are added,  $\alpha, \beta, \delta$ , among which  $\alpha$  is the quantity of traded commodities, reflecting relative advantage of the commodity,  $\beta$  is the area scale, and  $\delta$  is the elasticity of substitution of consumption.

Because 2 is the hub country, trading with 1 and 3, it is equivalent to a FTA constituted by three countries; 1 and 3 are spoke countries, equivalent to that each pure FTA trades with the country outside the area. So utility function and budget constraint of each intraregional country are:

Utility function of 1:

$$u^1 = \left[ \frac{\beta}{3}(c_1^1)^\delta + \frac{\beta}{3}(c_2^1)^\delta + \beta^*(c_4^1)^\delta \right]^{\frac{1}{\delta}} \tag{2}$$

Budget constraint: the consumption value of one country at the world price equals to the income value.

Budget constraint of 1:

$$\sum_{j=1}^3 \beta_j q_j c_j^1 = \alpha q_1 + \sum_{j=1}^3 \beta_j q_j \tag{3}$$

Utility function of 2:

$$u^2 = \left[ \frac{\beta}{3}(c_1^2)^\delta + \frac{\beta}{3}(c_2^2)^\delta + \frac{\beta}{3}(c_3^2)^\delta + \beta^*(c_4^2)^\delta \right]^{\frac{1}{\delta}} \tag{4}$$

Budget constraint of 2:

$$\sum_{j=1}^4 \beta_j q_j c_j^2 = \alpha q_2 + \sum_{j=1}^4 \beta_j q_j \tag{5}$$

Utility function of 3:

$$u^3 = \left[ \frac{\beta}{3}(c_3^3)^\delta + \frac{\beta}{3}(c_2^3)^\delta + \beta^*(c_4^3)^\delta \right]^{\frac{1}{\delta}} \tag{6}$$

Budget constraint of 3:

$$\sum_{j=1}^3 \beta_j q_j c_j^3 = \alpha q_3 + \sum_{j=1}^3 \beta_j q_j \quad (7)$$

Substituting the budget constraint and consumption condition of each country into corresponding utility function

**Proposition 1:** Supposing external tariff level of each country is the same, in the overlapping free trade agreement, utility level of hub countries is higher than that of the spoke countries. That is,  $u^2 > u^3$  or  $u^2 > u^1$ .

In the first place, there are rules of origin in each free trade agreement, and which are of certain differences mutually. As described by Bhagwati, overlapping free trade agreement is just like pot and bowl, bringing about multiple duplicate to the rules of origin, and it is applied to almost any place and any product as a large number of non-tariff barriers. If a country concludes different free trade agreements with a number of countries, commodities between the hub country and other spoke countries could flow freely, while trade between the spoke countries must face tariff barriers. Products of spoke countries must enter the hub country first, and then enter other spoke countries. In order to comply with the rules of origin, spoke countries will purchase more intermediate input goods from the hub country to make them into final products, and then export to other spoke countries through the hub country; or invest to set up factories in the hub country. It is obvious that producers in the hub country obtain special returns in the overlapping free trade agreement, while these in spoke countries are in the face of relatively discriminatory treatment.

In the second place, the overlapping free trade agreement brings about a re-allocation effect on industries inside the area. In the FTA, there is no tariff barrier among member countries, and commodities in the area could flow freely; a country's trade structure will change along with it and has re-allocation effect on its industries eventually. Effects of FTA on industrial re-allocation are embodied in two aspects: one is the structural readjustment of industries outside the area and inside the area; the other is the structural readjustment of industries between the member countries in the area. For structural readjustment of industries between countries outside the area and inside the area, as countries outside the area face a variety of tariff barriers, they will enter the FTA by means of direct investment, which, obviously will lead to the cohesive effect of industry in the area. For industry allocation among member countries in the area, simple FTA will result in the flow of resources to the area of high returns, getting industrial structure in the area optimized. However, as for the overlapping free trade agreement, industries in the area will show an obvious specialization effect of cohesion and decentralization due to the emergence of Hub-and-Spoke. Taking the FTA in the model for example

Assuming that there is no chain relationship of input and output between companies in the area, and each country could produce products of relatively great elasticity of substitution, in respect that products manufactured in country 2 could have access to the 1 and 3. Therefore, products of country 2 will face a market of great demand, while the similar products manufactured by 1 or 3 could only enter country 2 to be in the face of a relatively small market demand. Products manufactured by country 2 have the effect of increasing returns to scale; along with the increase in demand, its production scale will expand and the costs of products will be reduced, becoming more competitive than similar products manufactured by 1 and 3; more and more production of such products will be carried out in country 2, and that in 1 and 3 will decline gradually, and there will be cohesive effect of industry. This is the "Hub Effect" brought up by Krugman. Assuming that there is the relationship of input and output between companies, products manufactured by 1 or 3 will be in an unfavorable condition initially due to the decline in market demand, however, in respect that there is link mechanism of input and output between companies, country 2 will mainly engage in the production of final products, while 1 and 3 will process intermediate input goods respectively in accordance with its own resources, so as to enter country 2 with duty-free treatment, which reduces the overall production costs and improves the international competitiveness, and enables such products to be exported to countries outside the area. As a result, in the area, there will appear cohesive effect of industry in the hub country and specialization effect of decentralization in spoke countries. The strength of this effect depends on the degree of trade barriers between spoke countries; the higher the trade barriers, the stronger the sensitivity of industrial allocation to the cost (as shown in the diagram below).

Insert Figure 1 Here

Note:  $T_1T_3$  refers to trade barriers between 1 and 3;  $I_2$  represents the degree of industry cohesion in country 2. A represents industrial equilibrium state in the state of global free trade.

When the trade barrier between 1 and 3 is higher than 1.68, cohesive effect of industry will appear suddenly in country 2.

### 3.2 Preference to tariff rate

Among analyses on tariff between countries inside and that outside the area, the well-known argument is Kemp-Aan's tariff adjustment condition,  $\tau_1$  at is, external tariff of the Customs Union shall be reduced to such a degree that countries

outside the area are not sensitive to its internal tariff. If the external tariff level of Customs Union comes up to this standard, benefit level of member countries in the area will be raised for being a component of the Customs Union, and that of countries outside the area will not be decreased either. In the overlapping free trade agreement, it is assumed that each FTA keeps in touch with countries outside separately, therefore the spoke country 1 and 3 are of the same optimized external tariff level, and it is in line with the conditions in the first order. That is,  $\frac{\partial u^1}{\partial t_1} = 0, \frac{\partial u^3}{\partial t_3} = 0$ , while

the hub country attaches more emphasis on economic interests in the area in respect that it is at a particular position. Therefore, the scale of external tariff level is not important. According to previous assumptions, member countries in the area tend to have high tariff, and the hub country will choose a higher external tariff consequently. In order to make up for the discriminatory status in the area, spoke countries will balance the level of tariffs, choose appropriately lower external tariffs, and attract resources of countries outside the area.

### 3.3 Self-execution mechanism of the overlapping free trade agreement

First of all, we assume that there is a simple FTA, to ensure that this FTA remains sustainable in an unlimited number of repeated games, the following conditions must be met:

$$u(t^i, 0, t^*) + \sum_{\tau=1}^{\infty} u(t^i, t^j, t^*) \delta^\tau \leq \sum_{\tau=0}^{\infty} w(0, 0, t) \delta^\tau \quad (8)$$

The first part on the left is the utility level when member countries in the area adopt the optimum tariff in first-order game, and  $\tau$  is the period of time; the second part is the discounting of profits obtained by member countries in the area when they are punished for deviating from the cooperation; what on the right refers to the utility level during the cooperation of member countries in the area.

To make the overlapping free trade agreement sustainable, it only requires that utility levels of spoke countries meet requirement of (8).

Utility levels of spoke countries shall meet the following requirement:

$$u(t^2, 0, 0, t^*) + \sum_{\tau=1}^{\infty} u(t^1, t^2, t^3, t^*) \delta^\tau \leq \sum_{\tau=0}^{\infty} w(t^2, 0, 0, t^*) \delta^\tau$$

Generally, utility level of hub country is higher than that in the spoke countries due to its particular status, and the hub country will not deviate from cooperation in the area, on the contrary, it will take the initiative to strengthen regional cooperation; however, if we consider the impact of interest groups, it will be difficult to determine.

**Proposition 2** When the initial state of 1, 2, 3 is symmetrical, that is, when  $t_1=t_2=t_3$ , if 2 is hub country, while 1 and 3 are spoke countries, country 4 will not steer the gear of trade from 1 and 3 to country 2 because country 2 is the hub country when the tariffs of  $t_1$  and  $t_3$  are reduced to such a level, then overlapping free trade agreement is of sustainability and nature of self-execution.

If the external tariffs of  $t_1, t_3$  are higher, countries outside the area are sure to steer the gear of trade from 1 and 3 to country 2, so as to be in line with the rules of origin and gain the maximum economic benefit; on the contrary, if external tariffs of  $t_1, t_3$  are reduced to a degree low enough, and country 2 is of preference to high tariff, country 4 will not change its direction of trade; benefit levels of 1 and 3 will not reduce for being spoke countries and deviate from the agreement of regional cooperation. Only in this way could the overlapping free trade agreement have sustainability.

$$\frac{\partial u}{\partial t_1} \geq 0$$

$$\frac{\partial u}{\partial t_3} \geq 0$$

### 3.4 Incentive compatibility of the overlapping free trade agreement and multilateral agreement

On the relationship between FTA and MTS, Ai Ze is of the opinion that the MTS promotes the development of open regional organizations; Kruger points out those regional organizations will arouse the objection of interest group to MTS. With the appearance of a large number of overlapping free trade agreements, we need to reexamine the relationship between free trade agreement and MTS.

If FTA and multilateral free trade agreement could satisfy the incentive compatibility constraints, the development of FTA will not be an obstacle to the MTS. Incentive compatibility constraints shall meet the following requirements: as the formation of FTA, benefit levels of member countries in the area shall be raised, and that in countries outside the area shall not be reduced at the same time, in this way, between the FTA and MTS, the requirements of incentive

compatibility constraints are met.

**Proposition 3** When  $t_1=t_2=t_3$ , that is, the three countries are symmetrical, and FTA constituted by 1, 2 and 2, 3 are independent mutually, external tariff will decline; when the Kemp-Ann condition is met, benefit level in the area will be improved, and that in countries outside the area will not be decreased.

$$\frac{\partial u^*(.)}{\partial t^*} \geq 0$$

$$\frac{\partial u^*(.)}{\partial t} \leq 0$$

$$\frac{d\tau}{1+\tau} \Big/ \frac{d\phi}{\phi} = 0 = \left[ \frac{1}{1+(1+t)^{\phi}} \right] \frac{dt}{1+t} \quad (\text{Kemp-Wan tariff adjustment})$$

**Proposition 4** When  $t_1=t_2=t_3$ , that is, the three countries are symmetrical, in the overlapping free trade agreement constituted by 1, 2 and 3, 2 is the hub country, while 1 and 3 are spoke countries; when the external tariff levels of 1 and 3 are lowered to the degree at which regional benefit level and that outside the area will not be reduced, between the FTA and MTS, the requirements of incentive compatibility constraints are met.

Comparing with simple free trade agreement, it is easier for overlapping free trade agreement to meet the requirement of incentive compatibility conditions in the relationship with MTS due to the following reasons. First, production categories covered by modern regional trade agreement are greatly increased, and agreement parties almost transfer all the trade rights. This reduces transaction cost between enterprises. It is a key question whether regional trade agreement include “all substantive” trade merchandises. Some scholars say, “All substantive” not only refers to trade merchandises that actually exist, but also includes content of six-digit tariff lines in the coordinate system. Until recently, extensive product categories are covered by modern trade agreement, most of which includes bank, insurance, transportation, investment, intellectual property, technical barriers, etc. In 1998, WTO examined the free trade agreements established after 1990, and found that there were 43 agreements that include 100% industrial products and some optional agricultural products. Economists Scove Moris and Alan Venter hold the opinion that after 10 years’ operation, a regional trade agreement shall cover 95% trade merchandises; after 15 years’ operation, the coverage rate shall be increased to 98% . According to this assumption, some sensitive merchandise will be listed into regional trade agreement gradually. If WTO Doha Talks can finally conclude some substantive agreements on agricultural product, regional trade agreement in the future will also include trade of agricultural product. The appearance of overlapping free trade agreement enables the spoke countries to establish potential economic connections with other spoke countries through the hub country in wide area, and finally promote spoke countries to establish FTA and become a more open system. Next, range of policies covered by modern regional trade agreement is not only limited to the field of trade policies, participants also reach agreement on some policies related to trade. In traditional regional trade agreement, member countries mainly sign agreement in aspects of lowering tariff and eliminating quotas. However, in modern regional trade agreement, policies covered by agreement have already involved the ones related to trade. For example, all free trade agreements in North American FTA and the ones with the participation of European Union involve trade & competition policy, trade & investment policy, trade & environment policy, trade & labor policy, etc. These policies are also new issues for discussion in WTO Doha Talks. Besides, there is also an important development in the aspect of policies covered; many regional trade agreements such as European Union and European Free Trade Agreements, Australia–New Zealand Free Trade Agreement, Canada–Chile Free Trade Agreement, etc. have already began to use special protective program to replace antidumping policy between partner countries. Higher degree of openness and freedom in the area enables the overlapping FTA to further economic communication more easily, increasing dependency among Hub-and-Spoke-other Spokes, increasing the amalgamation, as well as promoting escalation of regional economic organizations, thus it is favorable to the development of MTS. Therefore, extensiveness of modern free trade agreement coverage and increase of utilized tools will promote the development of overlapping FTA toward multilateral FTA.

Overlapping free trade agreement makes all the member countries hope to be the hub country, leading to “Domino Effect” and the appearance of more overlapping free trade agreements. Examples are: establishment of FTR in the Americas, European Agreement 2004, establishment of FTA in APEC by developed countries in 2010, and establishment of FTA by developing countries in APEC in 2020. Establishment of these large FTAs involve lots of overlapping free agreements; great countries in the area represent, in multilateral trade negotiations, the interest and will of a great number of spoke countries, and participants in such negotiations are comparatively reduced, but the phenomenon of conspiracy is serious, thus agreement can not be easily reached . Therefore, to make a mutually complementary relationship between free trade agreement and multilateral, consistence of regional free trade agreement with multilateral trade agreement shall achieved as much as possible, and threat of benefit groups toward MTS in the

area shall be eliminated by means of gradually eliminating rules of origin.

#### 4. Conclusion

This thesis takes the special phenomenon--overlapping free trade agreement in the development of FTA emerged after the 1990s as object of study, adopting the analyzing method of repeated games to study the tariff preference and self-execution of overlapping free trade agreement, as well as problems such as its incentive compatibility toward MTS. It is pointed out in the thesis that in the overlapping FTA, hub country has preference to high tariff for countries outside the area due to its special position; in order to make up for their inferior positions, spoke countries need to bring external tariff down. Due to the complexity of rules of origin in overlapping FTA, protection of the area toward the outside is relatively high, thus losses suffered for violation to cooperation agreement will be relatively heavy, and therefore overlapping free trade agreement possesses the nature of self-execution. In Kemp-Ann tariff adjustment conditions, compatibility relationship of Customs Union and MTS is pointed out; overlapping free trade will affect kemp-Ann conditions due to the scale of trade, discrepancy in comparative advantage and special arrangement of hub country and spoke countries, provided that member countries are symmetrical and their external tariffs are consistent. However, one thing is sure: in overlapping free trade agreement, external tariff levels of spoke countries shall be brought down properly until countries outside the area will not change their trade directions because of the position difference between hub countries and spoke countries, and then the optimal external tariff levels of spoke countries can be reached. Only in this way could the compatibility between overlapping free trade agreement and multilateral trade agreement be guaranteed.

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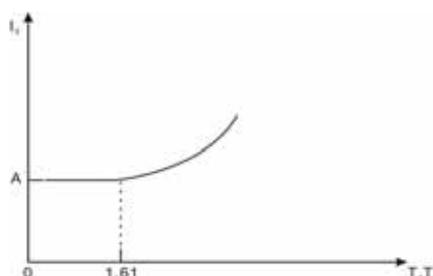


Figure 1. Analysis of cohesive effect of industry