ISSN: 2710-0170

Game Analysis on Line Self-Reliance Pricing in Foreign Trade

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Abstract

At present, a prominent phenomenon in China's economic life is the coexistence of price war and line self-reliance pricing. The price cartel formed by the homogeneous enterprises participating in export from China shows that the result of the behavior of pursuing profit maximization of export enterprises is bound to fall into the "prisoner's dilemma" . In the absence of external coercion enterprises can depend on each other still can not get out of the dilemma; If the promised action of the penalty clause can be trusted then there will be a cooperative equilibrium; Advantageous firms can also promote the emergence of cooperative equilibrium.

Keywords

Foreign trade; Price cartel; Game analysis; Line self-Reliance pricing.

1. Introduction

With many foreign companies unable to compete with cheap Chinese goods in foreign markets, trade barriers are piling up, fueled by protectionism. Many of China's exports of goods have a price advantage, so in the export of such industries often occur some anti-dumping trade friction worthy of attention, such as the Sino-European leather shoes trade friction in early 2006, the Sino-US, Sino-European textile trade friction in 2005, the Sino-US household appliances trade war and textile trade friction in 2004, The Sino-US steel trade friction in 2003, the Sino-European citrus canned trade friction in 2002, and the Sino-Japanese trade war caused by the trade of agricultural products in 2001 were all caused by the suspicion of dumping of Chinese goods.

In the context of global integration, various forms of government price subsidies will be subject to the constraints of the World Trade Organization. The main body of trade should be the enterprise. The author believes that the export price strategy of similar Chinese enterprises will play a key role in coping with external anti-dumping. For China's export trade enterprises should take what kind of price strategy to deal with the more and more frequent trade barriers and special safeguard measures in foreign markets, the industry has different views, summed up, mainly "limited production insurance price" and "production insurance price" between the differences.

2. Theoretical Analysis

In traditional microeconomics, the profit maximization decision of an enterprise is made by price through the market mechanism, and its optimal decision does not depend on others, but only depends on its own choice. The decision of an enterprise does not consider the impact on other enterprises, nor does it consider the impact of other enterprises' decisions on itself.

However, in the real economic life, the profit maximization decision of enterprises not only depends on their own choice, but also closely related to the choice of other enterprises, and there is a strong interdependence between enterprises (especially in the market of imperfect competition). Under such a condition of external effect, how to make decisions and how to avoid getting into trouble is one of the leading areas of game theory research. It is obvious that we

ISSN: 2710-0170

can study from the perspective of game theory how Chinese companies can band together to cope with sanctions or restrictions in foreign markets. In addition, due to the openness of the order meeting, the information about the market demand is known to all participating enterprises, so it can be assumed that the game meets the complete information requirements. The following analysis will expand from this assumption.

2.1. Complete Information Static Game

To make the analysis simple, construct the simplest cartel model: Suppose that there are only two enterprises A and B in a certain market with comparable market power. If they compete with each other, they both gain 15 million yuan; if they cooperate and conspired to form a cartel, they both gain 25 million yuan; if one party abides by the cartel and the other party defaults, the nonconforming party gains 0 yuan and the defaulting party gains 30 million yuan. Two players in this game, A and B, each have two strategies to choose from: keeping the contract and breaking the contract; When selecting its own optimal policy, assume that the other party's policy is established: assuming that A keeps its agreement, B's default is the optimal policy (3000>2500); Similarly, if B keeps the agreement, A will get a bigger profit for breaching the agreement (3000 > 2500). Therefore, both sides chose to default and attempted to obtain 30 million yuan in revenue, but did not consider that their choice would bring negative benefits to the other side. Therefore, in this default competition, both parties can actually only get 1500 (<2500 < 3000), which is far less than the income under collective rationality (2500), and the enterprise falls into the predicament of causation, and the individual rationality conflicts with collective rationality.

It is clear that this cartel agreement is not a Nash equilibrium, and although it represents collective rationality, it cannot be enforced. Because in this game, the optimal strategy of A is default (3000 > 2500), and the optimal strategy of B is still default (1500 > 0) when A defaults, so default is the optimal strategy for every player. As long as the player is rational, he will have no incentive to abide by the agreement and thus break the Nash equilibrium (default, default). Therefore, in order to make the cartel agreement effective, the agreement itself must constitute a Nash equilibrium, cartel members will consciously abide by the agreement, the agreement can be automatically executed. For an agreement to be binding, the Nash equilibrium must somehow be reached through collective rational cooperation. In the above model, the reason why enterprises will get more benefits from cooperation (2500 > 1500), because the cartel's maintenance of high prices will restrict or divide production. In a typical cartel agreement, the reason why the price is set to divide the market is to ensure that the members' cooperation benefits are greater than the competition benefits, because meeting the individual rational payment is a prerequisite for cooperation, that is, only when the benefits of each member's separation from the cooperation are at least not less than the cooperation, the enterprise may have the desire to cooperate.

2.2. Complete Information Dynamic Game

The above game only considers its own optimal strategy choice when the other party's strategy is given, and the firm's choices are independent of each other. In reality, the firm's actions have precedence and precedence, and the space of strategy choice of the latter actor depends on the choice of the former actor, and it is impossible for the former actor to choose without considering the impact of his choice on the latter. Therefore, the above game is dynamically expanded: A acts first, and there are two strategies: ① keep an agreement ② break a contract; If B acts later, its strategy depends on the choice of A and acts later, then B has four strategies: ① Whether A keeps the contract or breaks the contract, B keeps the contract, expressed as (keep the contract, keep the contract); ② A keeps his contract, and A breaches his contract, which is expressed as (breach of contract, breach of contract); ③ A in breach of contract, it keeps its contract is expressed as (breach of contract); ④ Whether A keeps the contract or

ISSN: 2710-0170

breaches the contract, he will breach the contract, expressed as (breach, breach). The only Nash equilibrium in this game is (default, {default, default}), the equilibrium result is still (default, default), the equilibrium text pays 1500, and the firm still cannot get out of the dilemma. Therefore, even if the enterprise action has the first and the second, the strategic choice stores each other, the camera action, the game result still can not get rid of the similar dilemma.

2.3. Credible Commitment to Action

Clearly, in a complete cartel agreement, mutual agreement on penalties is an act of commitment. Suppose the penalty clause stipulates that: if either party is found to be in breach of the contract, the penalty is 20 million yuan, and there are three Nash equilibria in this game: (breaching the contract {breaching the contract , breaching the contract}), (breaching the contract {breaching the contract , breaching the contract}), (breaching the contract {breaching the contract , breaching the contract}), which of these three Nash equilibria will eventually appear as a result? It is necessary to introduce the concept of equilibrium in dynamic games with complete information: subgame perfect Nash equilibrium. A subgame perfect Nash equilibrium is a combination of strategies that is the Nash equilibrium of the original game, and it gives the Nash equilibrium in each subgame, that is, a strategy is a reasonably credible strategy only if the action rules specified by the strategy are optimal in all possible cases. A subgame refined Nash equilibrium requires the elimination of rules of action that are reasonable only in certain situations but not in others, so that the equilibrium will be the only reasonable outcome that can eventually occur.

Under the condition of penalty commitment, the dynamic game will have a unique sub-game perfect Nash equilibrium: (keep the contract {keep the contract , keep the contract}, the equilibrium result: (keep the contract, keep the contract), each player has no enthusiasm to deviate from it, and achieves the unity of collective rationality and individual rationality. Therefore, in order to make the equilibrium result consistent with the collective rationality, Katel should take some measures to change the payment function of the game and thus change the game result, which is called commitment action. But when the promise of punishment is implausible, that doesn't change the equilibrium outcome either. When the price cartel does not have the ability to carry out the punishment promised actions, the result is that the maximum punishment for the defaulting enterprises is competitive price reduction, and the retention payment of the defaulting enterprises is still not less than that

Competition when the Nash pay, resulting in the return of low competition, the enterprise still can not get out of the dilemma. Here, again, it is up to the government to help the cartels, to make the promises of action credible, the penalties in place, and cooperation possible.

2.4. Incredible Punishment Strategy

In the above game, the reason why the firm defaults repeatedly is that the default payment is still no less than the competitive Nash payment. Would implementing a strategy to minimize default payments force companies to forgo default options? Consider the following punishment strategies: When A keeps the contract, B must keep the contract, otherwise A and B will die together as punishment; If A defaults, B defaults without penalty. In this case, two Nash equilibria appear: (default {default , breach}) and (default {default , breach}). Since B's optimal policy is default (2500>0) when A keeps the contract, and B's optimal policy is default (1500>0) when A breaks the contract, B's optimal policy is II2: {Keep the contract, break the contract}, and II4: {contravention contravention} is unreasonable, and B will not implement it. Therefore, only (contravention {contravention , contravention}) is the only sub game perfect Nash equilibrium, whose equilibrium result is (contravention, contravention), which also achieves the unity of collective rationality and individual rationality, and the enterprise gets out of the prisoner's dilemma.

ISSN: 2710-0170

To achieve this collective rational equilibrium, the premise is that A's threat of punishment must be credible. In the model assumption, A and B have the same market power, which means that the cost of A implementing this strategy may exceed that of B or even gain a negative return, while B at most chooses not to produce, and the return is 0. Therefore, B has no reason to believe that A has the power to punish himself, so the threat of A is questionable. However, if this assumption is relaxed, the situation will change. Assuming that A and B have different market forces, A accounts for 80% of the market share, and B accounts for 20%, A will have a lower cost function than B. Since cost is difficult to change in the short term, taking cost as a promise can be believed, then the above penalty strategy becomes feasible: If A finds that B has defaulted, it will reduce the price until B's cost is below, and A can not lose money, forcing B to be unable to produce and have to cooperate. (default {default, default}) is the only Nash equilibrium. (default {default , default}) is the only subgame perfect Nash equilibrium. Therefore, our conclusion is that if there are dominant firms in an industry, then the dominant firms can play a similar role to the government in the cartel organization through the implementation of punishment strategies, and assume the responsibility of maintaining the effectiveness of the cartel.

3. Conclusion

Through the above analysis, the main conclusions are as follows: (1) The result of the export enterprises' pursuit of profit maximization is bound to fall into the "prisoner's dilemma", which is manifested as price war; (2) In the absence of external coercive force, although firms can be interdependent, they still cannot get out of the dilemma, because the cooperation agreement does not constitute a Nash equilibrium; (3) If the committed action of the penalty clause can be believed, then a cooperative equilibrium occurs; (4) Advantageous enterprises can also promote the emergence of cooperative equilibrium. In the non-cooperative game model, when the Nash equilibrium obtained in the non-repeated game is less than the Pareto optimal result in all equilibria, individuals are involved in the collective action game problem, that is, how team members can take collective action to achieve "collective rationality" and avoid the "dilemma" of "prisoners". The "Prisoner's Dilemma" game model shows that enterprises should shift from competition to competition-cooperation.

There must be some preconditions for the formation and effective operation of a price cartel: first, an effective cartel agreement must constitute a Nash equilibrium. Secondly, the existence of dominant firms among cartel members helps to reach Nash equilibrium under cartel agreement. Price cartels need to partially satisfy the "smart pig game" in game theory, that is, there needs to be one or several strong manufacturers in the market, and no matter what strategy other manufacturers adopt, it has nothing to do with the overall pain and does not affect the implementation of cartel prices by manufacturers in a strong position. Third, the customer market should be a relatively divisible market, that is to say, the market demand of the price cartel is weak. There is a potential for car breaking force, that is, it must face a price elasticity is not very large demand curve, otherwise it has only a small room to raise prices. Fourth, the implementation of the price cartel should have an effective supervision and punishment mechanism, that is, to have a severe and effective punishment mechanism for those who violate the agreement. Otherwise, due to the difficulty of the punishment for violations, the agreement often becomes dead letter.

How difficult it is to maintain a cartel because of proprietary information. Before and after the formation of self-regulated price, there are all kinds of information fraud in the cartel. Prior to the establishment of a cartel, members had an incentive and behavior to underreport production. After cartels are established, the incentive to cheat is even greater. In a typical cartel, the action of one member to reduce production and thereby help the market raise prices

ISSN: 2710-0170

objectively benefits all members. The benefits of high prices are non-exclusive (Z.K. Wang, 2017), each member hopes that others will reduce the output, while he hopes to increase the output. The result was the disintegration of the entire cartel.

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