

HOW DOES THE PRISONER'S DILEMMA HELP IN REGULATING AND CONTROLLING THE COMPETITION?

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INTRODUCTION

Jurisprudence: It has been derived from the Latin word 'Jurisprudencia' which means Knowledge of Law or Skill in Law. According to Gray and Dr. Jenks, Jurisprudence is a formal science because it is concerned with the form, conditions, social life, human relations that have grown up in the society and to which society attaches legal significance. Jurisprudence is not related to law only, but to all the forms of social science and their application in analyzing the need to regulate and control the various aspects of society as well as conducts of human beings.

The world in its present form is concerned with liberalization, globalization, consumer behavior, competition and economic development. The world has become a global village which needs to be regulated and controlled. This requires the study and application of economics and to understand its concept and use in studying the human behavior and the market strategies.

Economics: The word "economics" is derived from a Greek word "okionomia", which means "household management" or "management of house affairs" -i.e., how people earn income and resources and how they spend them on their necessities, comforts and luxuries. It is understand of action and reactions of individuals. (Robert Ahdieh) It is a social science that studies man's efforts in satisfying his wants and producing and distributing wealth. Both Jurisprudence and Economics are sciences and both aim to regulate lives of the people. Both of them try to develop the society and improve life of an individual. Karl Marx was a pioneer in this regard. When we take into consideration the growth and development of the society, we cannot ignore the economic aspects which cover the standard of living, per capita income, employment, demand

and supply, and competition.

This project focuses on one aspect only i.e. competition. The term “competition” has originated from the Latin word “competere” which was first used in 1579. The competition is the effort of two or more parties acting independently to secure the business of a third party by offering the most favorable terms. It is the rivalry between the two or more parties which are dealing in the same kind of products or services. Many a time, in order to make and maximize profits, companies resort to illegal means leading to an unhealthy competition. They can enter into an agreement and decide on prices, strategies, etc. and form cartels or exercise such practices which can restrict the entry of a new player in the same field.

In general, the relation of economics to laws is too vague to be understood for practical use and application. It is to be remembered that economic laws are tendencies, not actual descriptions of any given conditions in this or that place. When we try to understand the jurisprudence and economics together, we just end up tracing the analytical and historical relation of economics to existing laws, and the division into political economy and natural or social economy; the former treating of the finances and property of the state and indeed all of the fiscal or the trade relations of the state with persons or with other states, including taxation, coinage, currency, tariffs and the expenses of administering government; and the latter as treating of the production, exchange and distribution of wealth by those persons so engaged. It is particularly noticeable that the right to hold property, to make contracts or to engage in trade is not attempted to be conferred by law, but recognized as conditions existing prior to the law. (W. H. Timlin) Jurisprudence accurately relates to social economy rather than political economy, as former is more concerned with the utility and maximum satisfaction (of the consumer in terms of needs as well as of the businessman in terms of profit maximisation).

There are various laws, mechanisms and theories have been evolved to deal with such problems in the economy, Game Theory being one of them. It is the mathematical theory of games was invented by John von Neumann and Oskar Morgenstern in 1944.

Game theory: It is the formal study of decision-making where several players must make choices that potentially affect the interests of the other players. This theory is purely connected with the economic analysis of law. (Richard A. Posner) In case of competition and its regulation,

we can take into consideration the concept of Nash equilibrium and the application of the prisoner's dilemma.

Competition in product characteristics

Suppose there are two firms. If the products are different, then either firm increases its market share by making its product more similar to that of its rival. Thus in every possible equilibrium the products are the same. But if $x_1 = x_2 = m$ (m stands for total market share of that product) then each firm's market share is 50%, while if it changes its product to be closer to m then its market share rises above 50%. Thus the only possible equilibrium is $(x_1, x_2) = (m, m)$ here m denotes equal market share of both the companies with respect to that product. This pair of positions is equilibrium since each firm's market share is 50%, and if either firm changes its product its market share falls below 50%.

Now suppose there are three firms. If all firms' products are the same, each obtains one-third of the market. If $x_1 = x_2 = x_3 = m$ then any firm, by changing its product a little, can obtain close to one-half of the market. If $x_1 = x_2 = x_3 = m$ then any firm, by changing its product a little, can obtain more than one-half of the market. If the firms' products are not all the same, then at least one of the extreme products is different from the other two products, and the firm that produces it can increase its market share by making it more similar to the other products. Thus when there are three firms there is no *Nash equilibrium*¹. Similarly, prisoner's dilemma also deals with two players. (Martin J. Osborne)

Prisoners' dilemma: It is a theory which is a two-person game, but many of the applications of the idea are really many-person interactions. It is assumed that there is no communication between the two prisoners. If they could communicate and commit themselves to coordinated strategies, we would expect a quite different outcome. The two prisoners interact only once. Repetition of the interactions might lead to quite different results.

Consider X and Y, two prisoners who have each been offered a deal to turn state's witness (defect) against the other. They can't communicate. They had originally agreed to remain in solidarity, i.e. not testify against each other, but since the agreement cannot be enforced, each

¹ Nash equilibrium, also called strategic equilibrium, is a list of strategies, one for each player, which has the property that no player can unilaterally change his strategy and get a better payoff or outcome.

must choose whether to honor it. If both remain in solidarity, then they will each only be convicted of a minor charge. If only one defects, then the state will throw the book at the other and let the defector go. If they both defect, each will get convicted of a serious charge.

In this game, the strategy of defection is weakly dominant for each player, meaning that whatever the other player does, defecting yields an outcome at least as good and possibly as better than remaining in solidarity would. Note that if the bottom right cell payoffs were (2,2) instead of (1,1), then defecting would be strictly dominant for each player. Either way, Defection-Defection is dominant strategy equilibrium. However, it is not Pareto optimal. Both players could be made better off if neither defected against the other.

This is an example of a social dilemma: a situation in which each agent's autonomous maximization of self-utility leads to an inefficient outcome. Such a situation can occur for any number of people, not just two. An agreement by two people to trade with each other (involving goods, services, and/or money) sets up a prisoners' dilemma-type game whenever the agreement cannot be enforced. Similar can be situation in case of two rival firms, trying to acquire a higher rate of profit and larger market share with respect to the same line of products. They can either form cartel, or one of them may acquire dominant market position, affecting the trade of other market players. Though laws are there to be enforced and to evaluate the economics functionally but these cannot actually understand the approaches and trends, due to which there is no complete regulation and control of such unhealthy competitions.

Regulate, Command and Control: Regulate, as ordinarily used, means to subject to rules or restrictions, to adjust by rule or method, to govern, whereas Command and Control applies to endeavors undertaken by collections of individuals and organizations of vastly different characteristics and sizes for many different purposes. Command and Control determine the bounds within which behavior(s) are to take place, not the specific behaviors themselves. The degrees of freedom associated with these bounds can vary greatly, thus, establishing the conditions under which sense-making and execution take place. It is separate from sense-making and its operational implementations. It is important to always keep in mind that there are many different approaches to accomplishing these functions. No specific approach or set of approaches defines what Command and Control mean. (David S. Alberts and Richard E. Hayes)

Command and Control can be applied to all subsets of an enterprise; to the functions performed; to the levels of the organizations; to the focus of the activity, whether strategic or tactical. So, when we talk about regulation and control of the competition in the economy, we try to take a behavioral approach towards the analysis of the market trends, human desire, human welfare and economic conditions. One such approach is prisoner's dilemma which is considered by lawyers, economists and authorities concerned to critically examines the rivalry between two firms, and to reach the most favorable outcome without ignoring other economic influences like demand and supply of the product, price of the product, market shares, economic regulations, shares of the firms, growth affected by companies after adopting illegal measures, competition policies, penalties etc.

COMPETITION AFFECTING THE ECONOMY AND MARKET INTEREST

“People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.”

- Adam Smith, The Wealth of Nations, 1776

The Oxford English Dictionary defines Competition as “Rivalry in the market, striving for custom between those who have the same commodities to dispose of.” “Striving for custom” implies the practice of competing. The competition is usually treated as a process by which economy can function effectively and efficiently.

Development of the competition law

The view that competition law should aim to promote some form of economic welfare is intrinsically linked to the influence of economics and in particular welfare economics, consumer theory and related fields in competition law analysis. This influence may be explained by the more economics-oriented approach that has been gradually introduced in EU competition law with the implementation of the EU merger regulation in the 1990s, the reform of the law on vertical restraints and cooperation agreements in the late 1990s and early 2000s, and most recently the discussion over a more effects-based economic approach in the implementation of the abuse of dominance provisions of EU competition law, basically provided under Articles 81

and 82 of the EC Treaty. In the context of Article 81, the Commission holds that “the objective of Article 81 is to protect competition on the market as a means of enhancing consumer welfare and of ensuring an efficient allocation of resources.” The reference to “efficient allocation of resources” could be interpreted in terms of total welfare. However, given that Article 81(3) explicitly refers to “consumer benefit,” it appears that the Commission is to focus on consumer welfare. European Courts have also focused on the protection of consumer interests. There have been instances where the firms restrict the supply of goods and this leads to an increase in price. A reduction of competitive rivalry, following the exclusion of a competitor or an agreement between two competitors to cooperate with each other, will not be found unlawful, if they do not also lead to a likely consumer harm or consumer detriment. Moreover, in merger control, the emphasis is now firmly on consumer welfare. The recently adopted Merger Guidelines indicate that “effective competition brings benefits to consumers, such as low prices, high quality products, a wide selection of goods and services, and innovation. Through its control of mergers, the Commission prevents mergers that would be likely to deprive customers of these benefits by significantly increasing the market power of firms.”

On the other hand, US anti-trust laws have evolved to prevent the practices relating to monopoly. The Sherman Act was enacted in 1890, at a time when economists’ understanding of monopoly and competition was limited and communication between economists and lawyers even more so. The early judicial decisions interpreting the Sherman (and later the Clayton) Act demonstrated channels of insight amidst clouds of confusion. (Richard A. Posner) The very goal of antitrust policy was obscure and contested—was it to promote economic efficiency or to reduce the power of big business? It is hard to do both. By the 1940s, however, the courts had devised a reasonably successful anti-cartel policy—the famous “per se” rule of illegality; but they remained deeply confused about mergers, monopolies, and “vertical” restrictions (for example, resale price maintenance and other restrictions on dealers and other distributors). The Warren Court, populist in antitrust matters, deepened the confusion, yet at times displayed receptivity to economic analysis of antitrust issues. Beginning around 1970, increased consensus and sophistication in the economic analysis of antitrust encouraged a more sophisticated judicial approach to antitrust law and, beginning in the 1980s, coincided with a more positive public attitude toward capitalism. The “big business” illusion was largely forgotten. Efficiency became the only generally accepted goal of antitrust. More judges and lawyers learned the rudiments of

antitrust economics, and antitrust economists became more effective as consultants and expert witnesses. It is fair to say that at the beginning of its second century antitrust law has become a branch of applied economics, has achieved a high degree of rationality and predictability, and is a success story of which all branches of the law and allied disciplines can be proud.

In India, the competition developed after the implementation of policy of liberalization, globalization and privatization in 1991. India decided to replace its then existing competition law - the Monopolies and Restrictive Trade Practices Act 1969, which was primarily designed to restrict the growth of monopolies in the market - with a modern competition law in sync with established competition law principles. As the first step towards this transformation, the Competition Act, 2002 was enacted and received presidential assent on January 13 2003. (M. M Sharma) In India, the Competition Act, 2002 seeks to achieve the following objectives:

- to prevent anti-competitive practices;
- to promote and sustain competition in the markets;
- prohibits vertical and horizontal agreements;
- to regulate mergers and acquisitions;
- to protect the interests of consumers; and
- to ensure freedom of trade carried on by other participants in markets in India.

Competition can be a motivating factor, boosting the productive efforts, planning beneficial market strategies, reducing cost of production with help of advanced technology, motivating employees to reach the target, analyzing the consumer demand, their behaviour as well as their willingness to pay, keeping the records of other competitors in the industry etc. competition also provides for better bargaining power and market discipline to help firms in making a better production decision.

Anti-competitive practices affect the economy

“The detection, prohibition and punishment of cartels is one of the highest priorities of the Commission in the field of competition policy. The greatest challenge in the fight against hard-

core cartels is to penetrate their cloak of secrecy and counter the increasingly sophisticated means at the companies' disposal to conceal collusive behavior".²

Sometimes, these firms resort to illegal means for their profit maximization, acquiring a larger market share, to enhance growth of the firm and to prevent the entry of new firms. In other words, competition and cooperation among firms these days is usually not a matter of "price taking" — accepting the price that a perfectly competitive market determines by the interplay of supply and demand — but of "price making," a situation that demands strategy. This is where game theory, the mathematical analysis of strategic thinking, comes in. (Michael Chwe, 2013). Firms collude and maintain the trust that they have in each other and communicate this with each other when necessary. (N. Honing, T. Kozelek and M.C. Schut)

In the classic price fixing cartel, concert of action of the requisite sort is clear: The cartel is nothing more than an agreement among competitors to fix prices and restrict output. These practices are prohibited by the law. (Edward B. Rock)

Regulation and Control of Competition with the help of Prisoner's Dilemma

For the purpose of regulation and control, Prisoner's dilemma can be understood in two ways:

1. It helps the firms in taking advantage out of information it has of other firms, or by cheating other firms by betraying the cartel
 2. Other approach is how it helps in regulating and controlling the competition either by providing incentive or by minimizing the risk of paying a huge amount of fines
1. Consider a current store that is the monopolist in the relevant geographic market because it is the only store in the market. Suppose its monopoly rents are 200, and suppose that if a new store were to enter the market, the duopoly rents would be 100, which the two stores would split evenly if the incumbent declined to engage in a price war. If the incumbent engaged in a price war, prices would fall to the competitive level, and, therefore, monopoly rents would be zero. But competing prices down to marginal cost would not deter entry because marginal cost³ includes return to capital invested (or the marginal cost of not investing in the next best activity). So to deter entry, the incumbent would have to price below cost, forcing both itself and the entrant to incur losses of 10. (Phillip C. Zane)

² Press Release, "Commission adopts new leniency policy for companies which give information on cartels", IP/02/247, 13 February 2002.

³ The cost added by producing one extra item of a product.

Application of prisoner's dilemma in analyzing the competition and the approaches of the firms to make profits and take control over a larger market share in the same industry is related to the price war, new players in the industry, cartelization and abuse of dominance and such related agreements. Suppose we are strict Benthamite utilitarians, i.e., we believe that the most desirable outcomes are those that maximize total utility, regardless of how that utility is distributed. Then the observation that universal cooperation is efficient with respect to pure strategies or mixed strategies, would not be enough to ensure that it is a most desirable outcome. (Steven T. Kuhn and Serge Moresi)

Another example can be Airline industry all over the world which has been considered as an oligopolistic market i.e. market dominated by a few firms which are large enough to influence the market size, due to their capital intensive nature and policy restrictions. In oligopolistic market there is a natural tendency to collude between enterprises. Since, it is a form of industry (market) structure characterised by a few firms where products may be homogenous or differentiated. The behaviour of any one firm in an oligopoly depends to a great extent on the behaviour of others. So, with collusion, oligopolistic firms can avoid behaviour that is detrimental to their general interest e.g. price war. Therefore, there is a high tendency of oligopolists forming a cartel. The main purpose of forming cartels is to coordinate the policies of member firms to increase the profit. If we consider that the individual firm owners simply decide to work together in an effort to limit competition and increase joint i.e. they decide to collude, then also the outcome would be exactly the same as the outcome of a monopoly in the industry. However, they do have one advantage over the prisoner's dilemma scenario — they usually know what the other firms did in the past, so they can decide on quantity and pricing based on the assumption that they will act in the same way in the future. But if the firm is wrong in its anticipation, then they can make corrections in its production schedule.

Cartels are universally recognized as the most harmful type of anticompetitive behaviour. As they offer no legitimate economic or social benefits that would justify the losses that they generate to the society and consumers. (Baxter) In Game Theory terms, a cartel arrangement may have prisoner's dilemma. All the members of the cartel will be better off if they stick to the agreed prices and production quantities. But for each individual member, it is advantageous to

cheat by increasing production or reducing price and thereby selling more products. When the firms form a cartel and cooperate by restricting the supply for higher prices, they end up making the profits same as monopolists. But, suppose, a firm betrays and supplies the goods, the market price would decline, and it will be able to make much more profits, whereas others will face the loss.

As far as perfect competitive market is concerned, the sellers do not engage with the concerns of other firms in the industry, the reason being that there are many sellers and a change in price can affect their own business because buyers have many alternatives available. Here, the illegal mode to affect competition can be public revelation of private information of other firms. In such markets, Nash equilibrium cannot be applied. As there are many players, it is quite difficult to earn more by taking advantage by making the practical use of prisoner's dilemma theory. If a firm increases price, it will lose its customers and if it decreases the price, it will run into loss. Moreover, highlighting the wrong practices of other firms is not of significant use as there are many other options available to the consumers and buyers.

Game theorists focus on the nature of uncertainty, like what the outcome can be, or how the decision-making strategy engaging various firms can affect the market shares and prices, what can be the valuation in case of bidding, or bargaining etc. This theory can have application when the firms are working on estimates. What if the firms form cartel, or there is an abuse of dominance? Can prisoner's dilemma help in regulating and controlling such wrongful practices? Though prisoner's dilemma can be a pre-emptive measure but when the policies and penal provisions are so stringent, the firms which are accused of involving into anti-competitive practices would fail to put forward their justifications. In order to control and regulate the competitions, we need to know the actions taken by the firms and the root cause of such illegal practices which can further help in coming up with new legal measures and in conceptualizing the theories as the globalized era demands for. There are two broad traditions with respect to the economic theories of regulation. The first tradition assumes that regulators have sufficient information and enforcement powers to effectively promote the public interest. This tradition also assumes that regulators are benevolent and aim to pursue the public interest. Economic theories that proceed from these assumptions are therefore often called 'public interest theories of regulation'. Another tradition in the economic studies of regulation proceeds from different

assumptions. Regulators do not have sufficient information with respect to cost, demand, quality and other dimensions of firm behavior. They can therefore only imperfectly, if at all, promote the public interest when controlling firms or societal activities. (Johan den Hertog) In case of prisoners' dilemma, the regulators do not have sufficient information and they rely on the information given by the prisoners (here firms). The idea behind prisoner's dilemma is with respect to either cooperation or defection. Cooperation can help in lowering down the risk of loss as far as imposition of fine is concerned, whereas the defector can easily get away (as an incentive), making the other party suffer by betraying. (W. Zaluski)

2. Prisoner's dilemma has its application both in criminal cases and in civil cases. Taking a pragmatic approach, cartelization in US, which is a capitalist economy, is a criminal offence whereas in India, a mixed economy, cartel formation is a civil/ economic offence. But, in general, prisoner's dilemma is a theory which does not determine the nature of offence but tries to analyze the consequence as well as the penalty after the two parties are found guilty. Suppose, Firm A and Firm B are said to have entered into an anti-competitive agreement. But, there is no evidence supporting this offence and so inquiry is conducted. If both the firms do not support investigation and remain silent, both will be heavily fined. If either of them confess, the other of them confess, the other one will be heavily fined, and if both confess, both will be fined but amount would be very less in this case. At the same time, the US has taken the leniency approach so as to let at least one party to confess and support the administration. (Kush Makkar, CCI) These programs can only be successful if they have overwhelming incentives to offer to cartel members so that they could betray the cartel. If the incentives are discretionary, and especially when they are confined to threat of pecuniary fines, it is highly unlikely that these programs could prove to be effective. (Neyrinck Norman)

Taking a Formalist View:

Legal formalism, also known as conceptualism, treats law like a math or science. The game theory is based on the study of calculations and inductions, where the outcome is based on assumptions with respect to confessions and actions taken by the prisoners.

Formalists believe that in the same way a mathematician or scientist identifies the relevant axioms, applies those on given data, and systematically reaches a demonstrable theorem, a judge identifies the relevant legal principles, applies them to the facts of a case, and logically deduces a

rule that will govern the outcome of a dispute. Judges derive relevant legal principles from various sources of legal authority, including state and federal constitutions, statutes, regulations, and case law. Similarly, authorities concerned try to experiment by providing a chance to each of them, either to confess or to remain silent. The logic behind such action is that to maximize their chance to escape the penalty, the chance of betraying the other party becomes more. May be we can take the utilitarian approach to understand this, because one would always think for the self-satisfaction. If a firm is charged for being involved into an anti-competitive practice, it means their motive is to make huge profits and by cooperating with its rival firms, it can secure its market position. So, when this happens, the whole burden of paying the price and help these firms to grow incessantly shifts on the consumers. So, formalists can calculate the possibility of knowing the root-cause of a problem and that will certainly help them in eradicating those issues. It would also help them in deciding the punishment and calculating the probability of their success in setting up some examples for those who are into these mal practices.

Formalists also rely on inductive reasoning to settle legal disputes. For e.g., there are five firms which are sued for forming a cartel. There is another firm which is a suspect as it is following the same practices like same prices, holding goods at the same time etc. it can be deduced that this sixth firm is also guilty. Now, there have been such instances before i.e. cartelization. On the basis of such past experiences, one can apply the theory of prisoner's dilemma and find new ways for the control of such activities through induction. Like it is known that firms are profit-motive and they are unwilling to pay huge amount as fines, so what else can be done to make them confess and help in preserving a healthy competition. Whereas deductive reasoning involves the application of general principles that will yield a specific rule when applied to the facts of a case, inductive reasoning starts with a number of specific rules and infers from them a broader legal principle that may be applied to comparable legal disputes in the future.

We can apply the concept of realism to the theory of prisoner's dilemma to regulate and control the competition. But that is only possible if such situations have occurred before as the realists rely on experiences rather than science. Prisoner's dilemma is a scientific method where players are different, market conditions are different, consumers and prospective buyers are not the same and so on, as far as economic-related aspects are considered. So, the realism has a very limited scope in this case.

Formalists like Professor Ronald M. Dworkin maintains that that law is best explained as a rational and organized system of principles that judges must apply with integrity. The principle of integrity requires that judges provide equal treatment to all litigants presenting legal claims that cannot honestly be distinguished. When we apply the prisoner’s dilemma, we should be fair enough to give equal opportunities to every player to confess or to remain silent, whatever they prefer to and apply the legal principles to this problem without ignoring the public interest or without ignoring the participation of the firms (player) so that in future, one can apply this theory and get the cooperation from those who have been charged or sued, and help the legal system in formulating various legal principles to combat such issues of corrupt and anti-competitive practices.

CONCLUSION

After the implementation of economic reforms in 1991, the Indian market has opened a gateway to the foreign investors. Due to this competition and business rivalry among the firms in the domestic market has increased as they have to secure their existence and a huge share in the market. There have been increase in the number of complains to Competition Commission of India regarding cartelization, abuse of dominance, combinations etc. and laws have been developed and implemented but have proved insufficient to combat and eradicate this issue.

Prisoner’s dilemma is a theory which tries to deal with the situation where two players are charged for a crime or an illegal activity. It helps us understand what governs the balance between cooperation and competition in business and economics, in politics and in social situations. When there are two firms selling the same kind of product, they will try to come together and fix price. If both cooperate, the profit margin would be same. If one cheats, it would make a higher profit and the other would suffer a huge loss. In case, the both cheat, they would suffer more as compared to cooperating. There is no reason why rational players in a prisoner's dilemma need restrict themselves to either certain cooperation or certain defection

FIRM A

| | | |
|-----------|------------------|----------------|
| | cooperate | betray |
| cooperate | (profit, profit) | (loss, profit) |
| betray | (profit, loss) | (loss, loss) |

FIRM B

When two firms are found guilty, they will be imposed fine. One can either, confess and betray the other to escape the penalty or may cooperate and remain silent thinking of securing and maintaining the market share in the future and not involve oneself in business rivalry. There are incentives given to the player and through leniency program, one can try to reach to the roots of the problem and hence, combat such issues and eradicate these anti-competitive practices. By understanding prisoner's dilemma, one can help in regulating the competition through formalism if the firms are engaged into anti-competitive practices. On the basis of matrix, it is tried to make out that what are the probability of a player confessing or not confessing, and how on the basis of such reactions, penalty can be imposed or a legal doctrine can be evolved.

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