

13 Contract, Law, and Enforcement in Static Settings

This chapter presents the notion of contract. Much emphasis is placed on how contracts help to align beliefs and behavior in static settings. It carefully explains how players can use a contract to induce a game whose outcome differs from that of the game given by the technology of the relationship. Further, the relationship between those things considered verifiable and the outcomes that can be implemented is carefully explained. The exposition begins with a setting of full verifiability and complete contracting. The discussion then shifts to settings of limited liability and default damage remedies.

Lecture Notes

You may find the following outline useful in planning a lecture.

- Definition of *contract*. Self-enforced and externally enforced components.
- Discuss why players might want to contract (and why society might want laws). Explain why contracts are fundamental to economic relationships.
- Practical discussion of the technology of the relationship, implementation, and how the court enforces a contract.
- Definition of the *induced game*.
- Verifiability. Note the implications of limited verifiability.
- Complete contracting. Default damage rules: expectation, reliance, restitution.
- Liquidated damage clauses and contracts specifying transfers.
- Efficient breach.
- Comments on the design of legal institutions.

Examples and Experiments

1. *Contract game*. A contract game of the type analyzed in this chapter can be played as a classroom experiment. Two students can be selected to first negotiate a contract and then play the underlying game. You play the role of the external enforcer. It may be useful to do this once with full verifiability and once with limited verifiability. This may also be used immediately before presenting the material in Chapter 13 and/or as a lead-in to Chapter 18.

2. *Case study: Chicago Coliseum Club v. Dempsey* (Source: 265 Ill. App. 542; 1932 Ill. App.). This or a different case can be used to illustrate the various kinds of default damage remedies and to show how the material of the chapter applies to practical matters.² First, give the background of the case and then present a stylized example that is based on the case.

Facts of the Case:

Chicago Coliseum Club, a corporation, as “plaintiff,” brought its action against “defendant” William Harrison Dempsey, known as Jack Dempsey, to recover damages for breach of a written contract executed March 13, 1926, but bearing date of March 6 of that year.

Plaintiff was incorporated as an Illinois corporation for the promotion of general pleasure and athletic purposes and to conduct boxing, sparring and wrestling matches and exhibitions for prizes or purses. Dempsey was well known in the pugilist world and, at the time of the making and execution of the contract in question, held the title of world’s Champion Heavy Weight Boxer.

Dempsey was to engage in a boxing match with Harry Wills, another well-known boxer. At the signing of the contract, he was paid \$10. Dempsey was to be paid \$800,000 plus 50 percent of “the net profits over and above the sum of \$2,000,000 in the event the gate receipts should exceed that amount.” Further, he was to receive 50 percent of “the net revenue derived from moving picture concessions or royalties received by the plaintiff.” Dempsey was not to engage in any boxing match after the date of the agreement and before the date of the contest. He was also “to have his life and health insured in favor of the plaintiff in a manner and at a place to be designated by the plaintiff.” The Chicago Coliseum Club was to promote the event. The contract between the Chicago Coliseum Club and Wills was entered into on March 6, 1926. It stated that Wills was to be paid \$50,000. However, he was never paid.

The Chicago Coliseum Club hired a promoter. When it contacted Dempsey concerning the life insurance, Dempsey repudiated the contract with the following telegram message.

BM Colorado Springs Colo July 10th 1926

B. E. Clements

President Chicago Coliseum Club Chgo Entirely too busy training for my coming Tunney match to waste time on insurance representatives stop as you have no contract suggest you stop kidding yourself and me also Jack Dempsey.

²For a more detailed discussion of this case, see Barnett, R., *Contracts: Cases and Doctrine*, 2d Ed. (Aspen 1999), p.125.

The court identified the following issues as being relevant in establishing damages:

First: Loss of profits which would have been derived by the plaintiff in the event of the holding of the contest in question;

Second: Expenses incurred by the plaintiff prior to the signing of the agreement between the plaintiff and Dempsey;

Third: Expenses incurred in attempting to restrain the defendant from engaging in other contests and to force him into a compliance with the terms of his agreement with the plaintiff; and

Fourth: Expenses incurred after the signing of the agreement and before the breach of July 10, 1926.

The Chicago Coliseum Club claimed that it would have had gross receipts of \$3,000,000 and expenses of \$1,400,000, which would have left a net profit of \$1,600,000. However, the court was not convinced of this as there were too many undetermined factors. (Unless shown otherwise, the court will generally assume that the venture would have at least broken even. This could be compared to the case where substantial evidence did exist as to the expected profits of Chicago Coliseum.) The expenses incurred before the contract was signed with Dempsey could not be recovered as damages. Further, expenses incurred in relation to 3 above could only be recovered as damages if they occurred before the repudiation. The expense of 4 above could be recovered.

Stylized Example

The following technology of the relationship shows a possible interpretation when proof of the expected revenues is available.

		D	
		T	O
C	P	1600, 800	-10, 1200
	N	100, 800	0, 0

This assumes that promotion by Chicago Coliseum Club benefits Dempsey’s reputation and allows him to gain by taking the other boxing match. The strategies for Chicago Coliseum are “promote” and “don’t promote.” The strategies for Dempsey are “take this match” and “take other match.” This example can be used to illustrate a contract that would induce Dempsey to keep his agreement with Chicago Coliseum. Further, when it is assumed that the expected profit is zero, expectations and reliance damages result in the same transfer.

14 Details of the Extensive Form

This chapter elaborates on Chapter 2's presentation of the extensive form representation. The chapter defines some technical terms and states five rules that must be obeyed when designing game trees. The concepts of perfect recall and perfect information are registered.

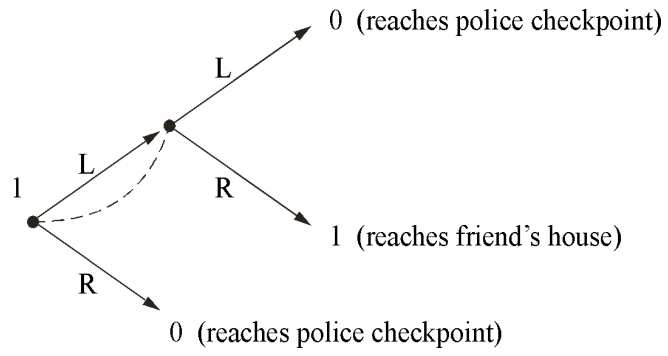
Lecture Notes

This material can be covered very quickly in class, as a transition from normal form analysis to extensive form analysis. The key, simply, is to bring the extensive form back to the front of the students' minds, and in a more technically complete manner than was needed for Part I of the book. Here is an outline for a lecture.

- Review of the components of the extensive form: nodes, branches, labels, information sets, and payoffs; initial, decision, and terminal nodes.
- Terms describing the relation between nodes: successor, predecessor, immediate successor, and immediate predecessor.
- Tree rules, with examples of violations.
- Perfect versus imperfect recall.
- Perfect versus imperfect information.
- How to describe an infinite action space.

Examples and Experiments

1. Abstract examples can be developed on the fly to illustrate the terms and concepts.
2. *Forgetful driver*. This one-player game demonstrates imperfect recall. The player is driving on country roads to a friend's house at night. The player reaches an intersection, where he must turn left or right. If he turns right, he will find a police checkpoint, where he will be delayed for the entire evening. If he turns left, he will eventually reach another intersection requiring another right/left decision. At this one, a right turn will bring him to his friend's house, while a left turn will take him to the police checkpoint. When he has to make a decision, the player does not recall how many intersections he passed through or what decisions he made previously. The extensive form representation is pictured on the next page.



15 Backward Induction and Subgame Perfection

This chapter begins with an example to show that not all Nash equilibria of a game may be consistent with rationality in real time. The notion of sequential rationality is presented, followed by backward induction (a version of conditional dominance) and then a demonstration of backward induction in an example. Next comes the result that finite games of perfect information have pure strategy Nash equilibria (this result is used in Chapter 17 for the analysis of parlor games). The chapter then defines subgame perfect Nash equilibrium as a concept for applying sequential rationality in general games. An algorithm for computing subgame perfect equilibria in finite games is demonstrated with an example.

Lecture Notes

An outline for a lecture follows.

- Example of a game featuring a Nash equilibrium with an incredible threat.
- The definition of *Sequential rationality*.
- Backward induction: informal definition and abstract example. Note that the strategy profile identified is a Nash equilibrium.
- Result: every finite game with perfect information has a (pure strategy) Nash equilibrium.
- Note that backward induction is difficult to extend to games with imperfect information.
- *Subgame* definition and illustrative example. Note that the entire game is itself a subgame. Definition of *proper subgame*.
- Definition of *subgame perfect Nash equilibrium*.
- Example and algorithm for computing subgame perfect equilibria: (a) draw the normal form of the entire game, (b) draw the normal forms of all other (proper) subgames, (c) find the Nash equilibria of the entire game and the Nash equilibria of the proper subgames, and (d) locate the Nash equilibria of the entire game that specify Nash outcomes in all subgames.

Examples and Experiments

1. *Incredible threats example*. It might be useful to discuss, for example, the credibility of the Chicago Bulls of the 1990s threatening to fire Michael Jordan.

2. *Grab game.* This is a good game to run as a classroom experiment immediately after lecturing on the topic of subgame perfection. There is a very good chance that the two students who play the game will not behave according to backward induction theory. You can discuss why they behave differently. In this game, two students take turns on the move. When on the move, a student can either grab all of the money in your hand or pass. At the beginning of the game, you place one dollar in your hand and offer it to player 1. If player 1 grabs the dollar, then the game ends (player 1 gets the dollar and player 2 gets nothing). If player 1 passes, then you add another dollar to your hand and offer the two dollars to player 2. If she grabs the money, then the game ends (she gets \$2 and player 1 gets nothing). If player 2 passes, then you add another dollar and return to player 1. This process continues until either one of the players grabs the money or player 2 passes when the pot is \$21 (in which case the game ends with both players obtaining nothing).

16 Topics in Industrial Organization

This chapter presents several models to explore various strategic elements of market interaction. The chapter begins with a model of advertising and firm competition, followed by a model of limit capacity. In both of these models, firms make a technological choice before competing with each other in a Cournot-style (quantity selection) arena. The chapter then develops a simple two-period model of dynamic monopoly, where a firm discriminates between customers by its choice of price over time. The chapter ends with a variation of the dynamic monopoly model in which the firm can effectively commit to a pricing scheme by offering a price guarantee. The models in this chapter demonstrate a useful method of calculating subgame perfect equilibria in games with infinite strategy spaces. When it is known that each of a class of subgames has a unique Nash equilibrium, one can identify the equilibrium and, treating it as the outcome induced by the subgame, work backward to analyze the game tree.

Lecture Notes

Any or all of the models in this chapter can be discussed in class, depending on time constraints and the students' background and interest. Other equilibrium models, such as the von Stackelberg model, can also be presented or substituted for any in the chapter. With regard to the advertising and limit capacity models (as well as with others, such as the von Stackelberg game), the lecture can proceed as follows.

- Description of the real setting.
- Explanation of how some key strategic elements can be distilled in a game theory model.
- Description of the game.
- Observe that there are an infinite number of proper subgames.
- Note that the proper subgames at the end of the game tree have unique Nash equilibria. Calculate the equilibrium of a subgame and write its payoff as a function of the variables selected by the players earlier in the game (the advertising level, the entry and production facility decisions).
- Analyze information sets toward the beginning of the tree, conditional on the payoff specifications just calculated.

The dynamic monopoly game can be analyzed similarly, except it pays to stress intuition, rather than mathematical expressions, with this game.

Examples and Experiments

Students would benefit from a discussion of real strategic situations, especially with an eye toward understanding how the strategic tensions are manifested. Also, any of the applications can be used for classroom experiments.