

THE ROLE OF PRICING STRATEGY IN MARKET DEFENSE

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THE ROLE OF PRICING STRATEGY IN MARKET DEFENSE

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SUMMARY

The price variable is among the most powerful instruments in the arsenal of the executives to achieve entry deterrence objectives. There are two main pricing strategies that firms may use to defend against a competitive market entry. The first of these options, limit pricing (or entry deterring price), may be utilized prior to competitive entry. The second option, aggressive (predatory) pricing, may be executed post-entry. The effectiveness of both of these options is still controversial. For example, the Chicago School proponents argue that these strategies are anecdotal in nature. On the other hand, the rationality of such conduct has been reliably simulated by Post-Chicagoans in game theoretic settings. The potential contributions of the marketing discipline have been recognized and called upon to help resolve the conflict.

With this dissertation, I attempt to shed light on the role that price plays in preemptive and post-entry market defense of firms. As such, the questions tackled include but are not limited to: how effective is price as an entry-deterrence tool; in conjunction with firm and market specific barriers to entry; and as a post-entry retaliation mechanism? What are the facilitating conditions for limit, aggressive (predatory), competitive and supra-competitive pricing? What are the (long-term) consequences of these strategies? Following a multi-disciplinary literature review, I present a dynamic process model and test my hypotheses in a key network industry – the airline industry. Building upon the advantages of multiple methods a la triangulation, I find that both limit pricing and predatory pricing can serve as effective strategies for the incumbents' market defense. Predatory use of pricing in network industries may diminish consumer welfare.

Results also suggest that firm specific barriers have a more significant role in market defense than market specific barriers. Insights and frameworks based on the marketing philosophy are also presented with the hope of advancing the ongoing debate between the Chicago and Post-Chicago Schools of thought.

CHAPTER 1

INTRODUCTION

The contemporary competitive process resembles military campaigns. Firms need to advance and protect their strategic positions often at great cost. Conflict with too many competitors quickly diminishes the scarce resources and depresses the viability of firms. Resource advantages need to be fortified, exploited, and enhanced before competition can emulate (cf. Barney 1992). Therefore, the attention to market defense mechanisms has been increasing (Kuester et al. 1999), and managers consider market entry deterrence to be a major strategic issue (Smiley 1988). Scholars from economics, industrial organization, and marketing have acknowledged the important managerial and public policy implications of market defense and provided guidance for this problem (e.g., Bain 1956; Gatignon et al. 1989; Gruca et al. 1992; Han et al. 2001; Kuester et al. 1999; Milgrom and Roberts 1982a; Ramaswamy et al. 1994; Sullivan 1977).

A firm may retaliate to competitive market entry with several options such as increased promotional spending (to consumers or trade members), new product launch and price reductions, simultaneously or otherwise. There is evidence that as the number of the marketing mix instruments used (breadth of reaction) increases, market defense becomes less successful (Gatignon et al. 1997). The most common reaction pattern is reaction by a single variable (Robinson et al. 1988). The price variable is among the most powerful weapons in the arsenal of the executives to achieve entry deterrence objectives. It is inherently flexible, can be modified quickly, and is directly associated with profitability. In one survey, pricing was deemed to be “extremely important” by seventy-

eight per cent of the respondents and ranked third among fifteen key marketing issues (cf. Srinivasan et al. 2000). Chen and McMillan (1992) reported that the likelihood of competitive response is higher, the response delay is shorter, and the likelihood of a matching response is higher for price cuts than they are for other competitive actions. Incumbent firms often reduce price when they encounter new market entry (Calantone and di Benedetto 1990).

There are two main pricing strategies that firms may use to defend against a competitive market entry (LeBlanc 1992). The first of these options, limit pricing (or entry deterring price (Porter 1980)), may be utilized prior to competitive entry. The second option, predatory (aggressive) pricing, may be executed post-entry. The effectiveness of both of these options is still controversial. The Chicago School proponents argue that they are “more anecdotal than actual” (Gilbert 1989, p.125) or an outright myth (DiLorenzo 1992; Koller 1971; Lott 1999). This has been the basis that Federal courts have used for not attributing much credit to unfair pricing claims for the past three decades. On the other hand, the Post-Chicagoans approach the same facts with different assumptions (e.g., information asymmetry) and deem the same set of options rational, alive and well (Jung et al. 1994).¹ Lively debates between Chicago and Post-Chicago scholars continue (e.g., Edlin 2002; Edwards 2002; Elhauge 2003; ten Kate and Niels 2002).

¹ Price competition is the core element of free markets. Even though it has become much more complicated during the past two decades, it still remains the variable that is the least under the control of the firm under (perfectly) competitive market conditions. However, when the marketplace is not competitive the reverse becomes true and one or few firms may enjoy the benefits of controlling the going price in a market through the use of their market power. Ironically, drastic price cuts and price wars that are ingredients for healthy competition are also associated with unfair competitive conduct (Gundlach and Guiltinan 1998). The abuse of market power in terms of price manipulation is considered illegal and is subject to antitrust sanctions.

The disciplines of economics, law, public policy, and more recently strategic management have been heavily involved in this stalemate debate between Chicago and Post-Chicago proponents as to how intense (if any) should the antitrust sanctions be. The potential contributions of the marketing discipline have been recognized and been called upon to help resolve the conflict (e.g., Bloom and Gundlach 2001b; Grewal and Compeau 1999; Guiltinan and Gundlach 1996b; Gundlach 1995; Helgeson and Gorger 2003; Ursic and Helgeson 1994). Foer (2002, p.227) suggested that marketing and strategic management could serve as “the third leg that gives the antitrust stool stability.”

With this dissertation, I attempt to shed light on the role that price plays in pre-entry and post-entry market defense of firms. As such, the questions I tackle include but are not limited to: 1. how effective is sole price as an entry-detering tool; in conjunction with other barriers to entry; and as a post-entry retaliation mechanism? 2. What are the facilitating conditions for limit and predatory (aggressive) pricing? 3. What are the long term consequences of these strategies? After a thorough multi-disciplinary literature review, I develop a process model and test my hypotheses using multiple methods. Logit analysis enables me to examine different pricing strategies, market entry and exit as dependent variables. Event-history analysis enables me to consider the conditions that lead to or delay market exits. Finally, multi-level mixed coefficients modeling (hierarchical linear modeling) allows me to go beyond the framework, take the nested nature of the data into account, and illuminate the role that different types of barriers play for entry deterrence. Building upon the advantages of these methods a la triangulation, I attempt to contribute to the debate between Chicago and Post-Chicago Schools of thought, and provide empirical ammunition towards this objective.

The remainder of this dissertation is as follows: In Chapter 2, I undertake a literature review of the relevant theoretical base and develop a conceptual understanding. In Chapter 3, I review and synthesize the literature on predatory pricing from a multi-disciplinary perspective. The in-depth discussion of predatory pricing here leads to the development of a network price competition framework i.e., Chapter 4 where I introduce network industries and develop and present my hypotheses. In Chapter 5, I discuss the context for my network data --the airline industry, in detail. Chapter 6 presents a review of the methods and measures I intend to use. In Chapter 7, I analyze the data, present, and discuss the results. In Chapter 8, I conclude with limitations and future research avenues. The dissertation also includes ten Appendices in support of the eight chapters.

CHAPTER 2

THEORETICAL BASES AND CONCEPTUAL UNDERSTANDING

The relevance of competitive signaling, resource advantage theory, game theory, and marketing/strategy literature for building a market defense framework is reviewed in this chapter.

2.1 Competitive Signaling

Signaling theory serves as an important foundation to understand limit and predatory pricing because both represent (potentially) costly signals to potential and actual entrants. Limit pricing may signal that the cost structure of the incumbent is low and/or is willing to protect the market through sacrifice, whereas predatory pricing may indicate both a low cost structure for the incumbent and/or that the incumbent has deep pockets and is willing to fend off an entrant at all costs (LeBlanc 1992). Similarly, all price modifications can convey competitive signals, depending on the amount, timing, and the context. Distinguishing among temporary, evolving and structural changes in prices is important because they are likely to produce different results (Srinivasan et al. 2000). Facing a price cut, an incumbent firm may choose to accommodate, to defend market share or to counter-attack with deeper discounts. The assumption on the degree of (imperfect) information is key in distinguishing Post-Chicago from the Chicago School of thought (Lande 1993).

A market signal is an action that conveys indications of intentions, motives, goals or abilities (Porter 1980). Signals can be directed at customers, channel members,

competitors or other stakeholders (Prabhu and Stewart 2000). Firms usually infer meaning from the signals and decide on their competitive responses. The same signal can gain different meanings depending on the interpretation of the message. Characteristics of the signal (i.e., clarity, consistency, and aggressiveness) are considered by the receivers (Heil and Robertson 1991). For example, a price increase can be interpreted as a response to market demand or a weakness on the sender's side (Heil and Walters 1993; Prabhu and Stewart 2000). Moore (1992) found that managers' beliefs about the nature of the signal affected the nature of their responses. If the particular signal was perceived to be cooperative, the managers were more likely to cooperate and not to retaliate.

Signaling can render predation rational when there is imperfect information (Hilke and Nelson 1987; Kreps and Wilson 1982; Milgrom and Roberts 1982a; Milgrom and Roberts 1982b). In many markets, the incumbent is more informed about the characteristics and conditions (e.g., demand, technology, production) of the market than the new entrant. The utilization of the asymmetry of information can be predatory if the incumbent influences the belief and expectations of a rival in a way to alter its decision regarding entry, exit, price and output levels. This may especially be the case, if the prey is more efficient than the predator but still decides not to enter a market as a result of signaling, signal jamming, or reputation (Gundlach 1995). It was also suggested that when competitive intelligence is not reliable, managers have incentives to overreact when they face competitive actions (Leeftang and Wittink 1996).

Signal Jamming: Signal jamming refers to the unobservability of a sender's actions regarding key variables such as cost. A dominant firm might send signals to current and

prospective rivals that its costs are low and the chances for profitable entry are dim (Milgrom and Roberts 1990). For example, a competitor may alternate its marketing variables (e.g., sales promotions) to steal the short term demand for a potential entrant's product when they are conducting market tests (Gundlach 1995). The potential entrant may not realize the ploy and decide not to launch the product. False/pre-mature product announcements (i.e., vaporware) can mislead competitors, potential entrants, and buyers in their decisions (Bayus et al. 2001; Eliashberg and Robertson 1988; Robertson et al. 1995). Thus, signal jamming may result in an exit, a decision to not enter, or have other anti-competitive effects (Fudenberg and Tirole 1986; Grout 2000).

Reputation: As will be detailed in a later section, repeated interaction between firms facilitates the formation of perceptions and beliefs of competitors. A hostile reputation can be an asset for the firm in the long run (Weigelt and Camerer 1988). A reputation for predation can deter entrants as well as potential investors of competitors. Burns (1986) showed that alleged predation depressed the acquisition cost of the victims and others through reputation.

Case in point: The Department of Justice (DOJ) filed a suit against the Airline Tariff Publishing Company (ATP) in 1992. DOJ argued that the carriers were able to negotiate and agree on prices by signaling them through the ATP computer reservation system for a future date. Another charge was that carriers were able to negotiate the elimination of discounted tickets via signaling within the system. The case was settled in 1994 after the airlines agreed to restrictions in using the system (1994b).

2.2 Resource Advantage (R-A) Theory

Nonetheless, as an evolutionary, process view of competition, R-A theory provides a viable starting point from which to debate antitrust issues. It also provides public policy researchers with many potentially fruitful avenues for empirical investigation (Hunt and Arnett 2001 p. 23-24)

R-A theory is a dynamic, process theory of competition developed by Shelby D. Hunt and Robert M. Morgan. It has been developed through more than a dozen articles over time (e.g., Hunt and Morgan 1995; Hunt and Morgan 1996) and is detailed in two books (Hunt 2000; Hunt 2002). It draws from evolutionary economics, Austrian economics, heterogeneous demand theory, differential advantage theory, historical tradition, industrial-organization economics, resource-based tradition, competence based tradition, institutional economics, transaction cost economics, and economic sociology (Hunt 2000). Table 2.1 provides a summary of characteristics that R-A synthesis shares with other theory.

Table 2.1: The Pedigree of Resource Advantage Theory

Research Tradition	Representative Works	Affinities with R-A Theory
Evolutionary Economics	(Marshall 1890) (Schumpeter 1934; 1950) (Alchian 1950) (Nelson and Winter 1982) (Langlois 1986) (Dosi et al. 1988) (Witt 1992) (Foss 1993) (Hodgson 1993)	Competition is an evolutionary, disequilibrating process. Firms have heterogeneous competences. Path Dependencies can occur.
Austrian Economics	(Mises 1920; 1949) (Hayek 1935; 1948) (Rothbard 1962) (Kirzner 1979; 1982) (Lachmann 1986)	Competition is a knowledge-discovery process. Markets are in disequilibrium. Entrepreneurship is important. Value is subjective. Intangibles can be resources.
Heterogeneous Demand Theory	(Chamberlin 1933) (Smith 1956) (Alderson 1957; 1965) (McCarthy 1960) (Myers 1996)	Intra-industry demand is substantially heterogeneous. Heterogeneous supply is natural. "Product" should be defined broadly.
Differential Advantage Theory	(Clark 1954; 1961) (Alderson 1957; 1965)	Competition (a) is dynamic, (b) is both initiatory and defensive, and

Table 2.1 (continued)

		(c) involves a struggle for advantages. General equilibrium is an inappropriate welfare ideal.
Historical Tradition	(North 1981; 1990) (Chandler 1990) (Landes 1998)	History “counts.” Firms are entities that are historically situated in space and time. Institutions influence economic performance.
Industrial-organization Economies	(Mason 1939) (Bain 1954; 1956) (Porter 1980; 1985)	Firm’s objective is superior financial performance. Market place positions determine relative performance. Competitors, suppliers, and customers influence performance.
Resource-based Tradition	(Penrose 1959) (Lippman and Rumelt 1982) (Rumelt 1984) (Wernerfelt 1984a) (Dierickx and Cool 1989) (Barney 1986; 1992) (Conner 1991) (Grant 1991) (Pfeffer and Salancik 1978)	Resources may be tangible or intangible. Firms are historically situated combiners of heterogeneous, imperfectly mobile resources. Firms are constrained by a network of resource inter-dependencies with other entities.
Competence-based Tradition	(Selznick 1957) (Andrews 1971) (Hofer and Schendel 1978) (Hamel and Prahalad 1989; 1994a; 1994b) (Prahalad and Hamel 1990; 1993) (Teece and Pisano 1994) (Day and Nedungadi 1994) (Aaker 1995) (Sanchez et al. 1996) (Heene and Sanchez 1996) (Sanchez and Heene 1997) (Christensen 1997; Christensen and Bower 1996)	Competition is disequilibrating. Competences are resources. Renewal competences prompt proactive innovation. Firms learn from competing. Firms are embedded.
Institutional Economics	(Veblen 1899; 1904) (Commons 1924; 1934) (Hamilton 1932) (Kapp 1976) (Neale 1987) (Mayhew 1987) (DeGregori 1987) (Ranson 1987) (Hodgson 1994)	Competition is disequilibrating. “Capital” is more than just physical resources. Resources have “capabilities.”
Transaction Cost Economies	(Coase 1937) (Williamson 1975; 1985; 1996)	Opportunism occurs. Many resources are firm specific. Firm-specific resources are important.
Economic Sociology	(Parsons and Smelser 1956) (Granovetter 1985; 1994) (Etzioni 1988) (Coleman 1990) (Zukin and DiMaggio 1990) (Powell and Smith-Doerr 1994) (Smelster and Richard 1994) (Scott 1995) (Uzzi 1996) (Fligstein 1996)	Institutions can be independent variables. Social relations may be resources. Economic systems are embedded.

Drawing from the above theory, Hunt and Morgan (1997) present the foundational premises of R-A Theory as follows:

1. Demand is heterogeneous across industries, heterogeneous within industries and dynamic.
2. Consumer information is imperfect and costly.
3. Human motivation is constrained self-interest seeking.
4. The firm's objective is superior financial performance.
5. The firm's information is imperfect and costly.
6. The firm's resources are financial, physical, legal, human, organizational, informational, and relational.
7. Resource characteristics are heterogeneous and imperfectly mobile.
8. The role of management is to recognize, understand, create, select, implement, and modify strategies.
9. Competitive dynamics are disequilibrium provoking; innovation is endogenous.

Of particular interest for my purposes, Hunt and Arnett (2001) argue that R-A is the remedy for the current antitrust stagnation. For example, they argue that a market based advantage that stems from a contractual agreement that exclusively ties a distributor is anticompetitive if the distributor is coerced into the agreement through the bundling of a complementary product. In this case, the market advantage does not necessarily come from a relational resource but through market power. They argue that the focus on neo-classical theory and equilibrium economics has limited the exposure to outside ideas in antitrust. The focus of Chicago School of antitrust has been solely economic efficiency (as opposed to social welfare), which cannot be sustained through the analysis of the static supply and demand curves which actually do not exist, and thus cannot be calculated (Hunt and Arnett 2001).

R-A is a dynamic theory that also focuses on market segments, comparative and competitive advantage/disadvantages and enables useful insight for framework

development (Hunt and Arnett 2001). It encompasses a wide body of theories (e.g., resource-based view (Barney 1986; Barney 1992)) and extant research (e.g., the role of disruptive technologies (Christensen 1997; Christensen 2001)). Finally, it stresses and avoids many of the unrealistic assumptions of the neo-classical price theory, which is also a goal of the current research.

2.3 Game Theory

Isaac and Smith (1985) were among the first to study predation possibilities through game-theoretic experiments involving decision making under competitive contexts. They run different versions of a single market design experiment in search of predatory pricing (including one with sunk costs), yet they did not detect any. However, Jung et al. (1994) commonly observed predatory pricing in their experiment with repetitions of a simple signaling game. This game was set up so that the potential entrant would choose whether to enter or not, and the monopolist would choose whether to fight or accommodate. Prospective entrants were permitted to observe monopolist's decisions. The entrants were better-off if they remained out of the market, unless the monopolist chose to accommodate. Moreover, Harrison (1988) modified and implemented Isaac and Smith's (1985) work to a multiple market setting and found evidence for predatory pricing. Harrison's settings were further replicated with modifications and consistent patterns of predatory pricing were detected in most of the markets. It was shown that predatory pricing can be reliably simulated "both in stylized signaling games and in rich market settings"(Gomez et al. 1999) and that it is "alive and well" (Jung et al. 1994, p.73).

Kreps and Wilson (1982) analyzed the incentives of an incumbent to fight an entrant in order to influence the beliefs of future entrants in a case of multi-market predation. This work led to the classic work of (Milgrom and Roberts 1982b). According to the Milgrom and Roberts model, an incumbent firm manipulates its price in order to signal to a potential entrant, hence exerts influence on the entry decision (Milgrom and Roberts 1982a; 1982b). In a dynamic signaling game with two-sided uncertainty, it was shown that when the incumbent expected the entrant to be weak, predatory pricing was chosen, and when the incumbent expected the rival to be strong, limit pricing was chosen (LeBlanc 1992). “Predatory pricing is a rational strategy on game-theoretic models of oligopoly, based on informational asymmetries, that take into account signaling, signal jamming, and reputation effects” (Burns 1989, p.327). Thus, the entry deterring effects of a reputation for predation have also been established with game theoretical experiments.

Guiltingan and Gundlach (1996a) suggested that the courts would benefit from the competitive interaction and strategic decision-making insights. The advancement of game theory has enabled the study of these complex issues. In that context, acting strategically meant to consider the expected move of the opponent to come up with the best possible move. This can be staged as a multistage game in which players intend to make preemptive moves. Purpose and intent are also considered, and the information needed for decision making of existing and potential players are described in strategic game theoretic models. A simple game-theoretic framework is presented in Figure 2.1.

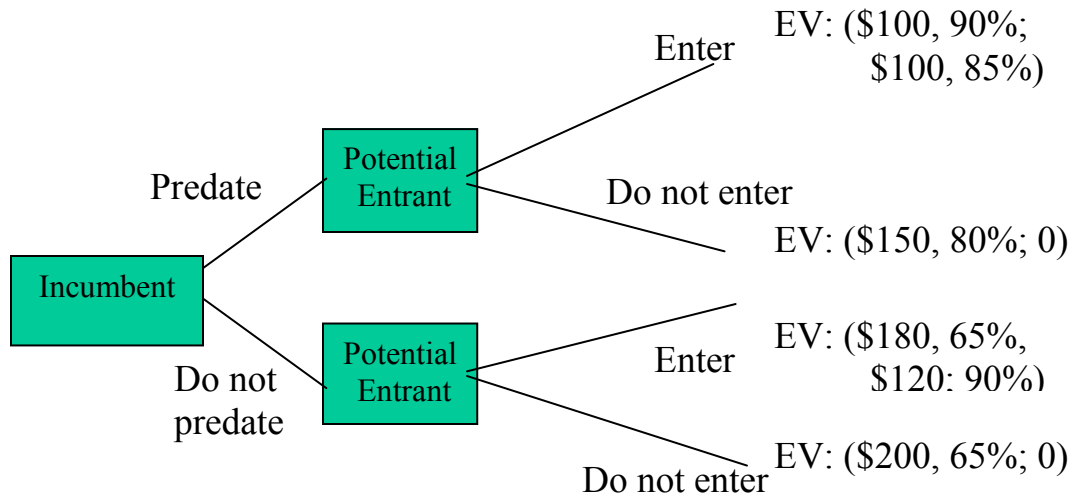


Figure 2.1: A Simple Game-Theoretic Construct in the Airline Context

Note: The expected values represent the *average fare and the load factors of the incumbent and the entrant* respectively.

2.4 Marketing Strategy

Marketing strategy research (e.g., research focusing on marketing-strategy content, formulation process, and implementation related issues) and strategy research in marketing (research focusing on the role of marketing in the formulation of corporate and business level strategy and knowledge management) are two broad research streams that are getting intertwined (Bharadwaj and Varadarajan 2004). The determinants of business performance that the academics have considered to be predominant have evolved over time. The current paradigm appears to be the resource-based view of the firm also adopted the by general R-A Theory. Bharadwaj and Varadarajan (2004, pp.222-23) provide an overview of the evolution of thinking on this topic over time and complement R-A theory.

After reviewing these major theories, I focus on two relevant conceptualizations from marketing strategy. The first of these works is by Gruca and Sudharshan (1995) which focused mainly on pre-entry conditions. Their generic entry deterrence strategy framework consisted of feedback loops that started and evolved around the competitive environment (cost conditions, demand conditions, history, and legal climate). The loop consisted of alternative entry deterrence strategies (at functional, business unit, and corporate levels) leading to the anticipated entry decision, leading to anticipated consequences for incumbent, leading to choice of entry deterrence strategy, leading to entry decision, leading to realized consequences for the incumbent. Much of the attention was devoted to the competitive environment which formed the core of their model. The current research is focused on a single element (i.e., price) of the functional level entry deterrence strategies that Gruca and Sudharshan (1995) describe. Therefore, the overall marketing mix strategy (integrated product differentiation), building switching costs, brand proliferation, and pre-announcements of new products are beyond the scope of this research.

The second effort focused on post-entry competitive response options as opposed to pre-entry deterrence. Kuester et al. (1999) examined and summarized the empirical contributions to competitive market entry reactions to date and reported five dimensions for it.

Instrumental: refers to the elements of the marketing mix used for reaction. If retaliation occurs using the same instrument (e.g., counter product introduction or counter price cut) reciprocal retaliation is said to occur.

Intensity: the weight of reaction (i.e., the funds allocated for counter promotional activities.)

Breadth: the number (variety) of marketing instruments used,

Time: the speed (or time lag) of reaction.

Domain: refers to the choice of market for counterattack.

It should be noted that Kuester et al. (1999) focused on price and product retaliation and ignored domain retaliation in the empirical examination.

The understanding of competitive responses was furthered by the “Defender” model (Hauser and Shugan 1983). Using a zero-sum approach, empirical results have supported that the optimal response to entry is to reduce price, advertising, and distribution spending for non-dominant brands; to reduce price but increase marketing budget for dominant brands (Gruca et al. 1992). This suggests that price reduction is the de facto optimal response against competitive entries. Relative power theory suggested that strong incumbents (i.e., those with market power) are expected to retaliate more intensively and more often than weak incumbents (Kumar et al. 1998). The focus in recent competitive interaction literature has been on competitive reactions at the retail level and especially on sales (price) promotions, advertising expenditures, and store brand sales due to the availability of scanner data. Most advertising and price promotions do not attract retaliation by incumbents (Nijs et al. 2001). However, when there is retaliation, it tends to focus on a single variable and often uses the same instrument of aggression (Steenkamp et al. 2005). Despite the observation that relative levels of price among competitors explain significant variance in retail strategy (Shankar and Bolton 2004), the clash of the relative prices in inter-type competition (rather than short-term price reductions) remains a gap in literature.

2.4.1 Reputation effects from a marketing perspective

A CEO is ultimately responsible for the growth of a company as evidenced by its financial performance, its capacity for self-renewal, and its character. The only way you can measure character is by reputation.
Roberto Goizueta (Goizueta 1995).

If the firm can convince its rivals that it is committed to a strategic move it is making or plans to make, it increases the chances that rivals will resign themselves to the new position and not to expend the resources to retaliate or try to cause the firm to back down. Thus, commitment can deter retaliation (Porter 1980, p.101).

A vastly unexplored area of research is how to measure the reputation of a firm and its effects on different constituents in the marketplace. A favorable reputation has been linked to survival in crisis (Yoon et al. 1993), positive customer attitudes toward the company's products and salespeople (Brown 1995), enhanced buying intentions (Yoon et al. 1993), and choice (cf. Traynor 1983; cf. Weiss et al. 1999).

Corporate Reputation has been defined as the "overall estimation in which a company is held by its constituents. A corporate reputation represents the "net" affective or emotional reaction –good or bad, weak or strong– of customers, investors, employees, and the general public to the company's name" (Fombrun 1996).

In the marketing domain, *Reputation Management* has been increasingly attached to the public relations function. A good reputation may be considered the most important asset of a company in the long run and can help it survive and even thrive during the tough times. Reputation is relied on for many aspects of organizational decision-making at different levels (e.g., choosing a supplier/distributor, promoting an employee).

Similarly, many organizational decisions impact the reputation of the firm, thus attention

to this largely ignored topic is necessary. The corporate need for a Chief Reputation Officer (CRO) position has been proposed to manage the *Reputational Capital* of firms (Young 1996). “Reputation is becoming central in the language of strategy and competition, rather than in the old language of public relations” (cf. Garone 1998). Very few empirical studies that study reputation effects exist (Landon and Smith 1997; Landon and Smith 1998).

Often used interchangeably in the marketing domain, both corporate reputation and corporate image reflect perceptions of an entity. However, they are conceptually distinct in two main ways. Image summarizes a brand or firm’s identity (Park et al. 1986) whereas “reputation reflects an overall judgment regarding the extent to which a firm is held in high esteem or regard. Thus, whereas image reflects what a firm stands for, reputation reflects how well it has done in the eyes of the marketplace. Image and reputation are distinct concepts as each can vary independent of the other. A firm can change its image through positioning, though its reputation remains intact” (Weiss et al. 1999). Moreover, the attractiveness of images is segment specific (e.g., Rolex for luxury), but a favorable reputation is desirable by all customer segments (Weiss et al. 1999). For example, Virgin Group’s businesses range from book publishing, radio and television broadcasting, hotel management to entertainment retail, trading investment, and airlines. “Virgin is considered the consummate specialist in all things for youth fashion and fashionability” (Garone 1998) despite the bad publicity about the poor quality and services of their railroad services (Bower 2000).

Sheth (in personal communication 2004) suggested two typologies to illustrate the dynamics of reputation. First, he argued that a reputation can be represented in two

dimensions: strong/weak and good/bad. Therefore, similar to conjoint analysis (Malhotra 1999), the strength of the attribute (weight of attribute utility) can be multiplied with

reputation score to observe overall reputation (i.e., $U(x) = \sum_{i=1}^m \sum_{j=1}^{k_i} \alpha_{ij} x_{ij}$ (Jain et al. 1979)).

The same typology can be applied to the concept of image as well. Sheth (2004) also suggested a 2X2 matrix in which firm image and firm reputation form the two dimensions. This typology is represented on the sample spatial map below (Figure 2.2):

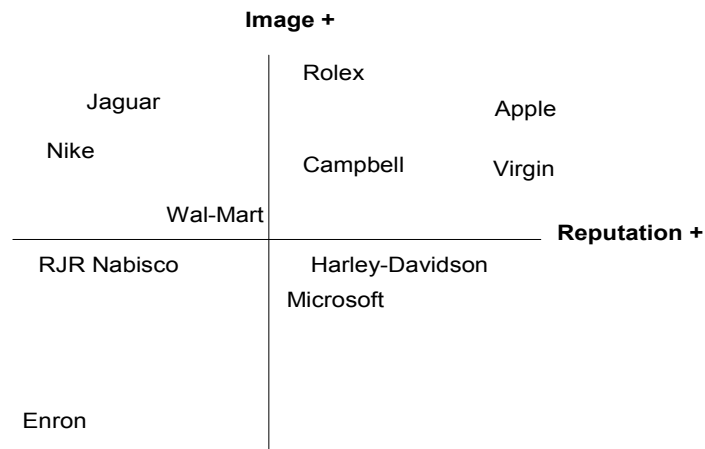


Figure 2.2: A Typology of Reputation and Image

It should be noted that reputation has a somewhat different meaning when studied from an economics perspective. In this context, reputation has to do with the consistency to keep promises and sticking to a particular strategy (e.g., a government with a reputation for committing to a path for money supply) (Rogoff 1989). Expected actions

are anticipated through reputation (Evans and Thomas 1997). The rationality of reputation building and its effects on decision making, bargaining and technology adoption has been shown in game theoretical agency settings (DeJong et al. 1985; Dobson 1993; Evans and Thomas 1997; Hendricks 1992; Park 1999). The significantly positive reputation effects for not expropriating minority shareholders on stock prices and IPOs have been shown in Finance (Gomes 2000).

Finally, reputation is important to examine from an antitrust perspective where it gains a different interpretation. Limited work on reputation so far has focused on the customer's perspective. The classic definitions of reputation have not considered competitors as direct constituents of reputation. However, it may be possible for a monopolist to charge supra-competitive prices due to high barriers to entry, reputation for predation and other signaling effects. In this context, a reputation for predation is established by constant signaling of future intention to predate in the face of new entry. This is best demonstrated by actions in a market. Potentially more efficient competitors in (other) markets observe the reactions of the incumbent to entry, and often the quick demise of the previous entrant. As a result, they may decide not to commit the high level of resources needed to compete against the incumbent. *Ceteris paribus*, they would rather enter a market where the incumbent does not have a reputation for predation. Thus, a valid purpose of predation may be to develop a reputation as a tough competitor (Comanor and Frech 1993; Kreps and Wilson 1982). Reputation for predation is neither the only, nor the most effective factor affecting potential entry. However, a reputation for predation implies strong and constant signaling to all potential competitors for all the markets a company operates in, thus may be quite influential overall. Similarly, Weiss et

al. (1999) concluded that corporate reputation has a strategic influence beyond traditional approaches. The DOJ stated that the existence of a reputation for predation could be examined by means of industry surveys and that such a study had not been undertaken (1999e, p.134).

Repeated interaction between firms facilitates the formation of perceptions and beliefs of competitors. A hostile reputation can be an asset for the firm in the long run (Weigelt and Camerer 1988). A reputation for predation can deter entrants as well as potential investors of competitors. Burns (1986) showed that alleged predation depressed the acquisition cost of the victims and others through reputation. Areeda and Turner (1975) admitted that “a demonstrated willingness to indulge in predatory pricing might itself deter some smaller potential entrants...” The reputation can develop from previous experience with the incumbent in the market in question for potential entry or in other markets. Similarly, the reputation may be derived from observing other firms’ competitive interactions with the incumbent in the market in question for potential entry or in other markets. The anticipated retaliation for specific markets may differ because the incumbent may have revealed its intent to protect a specific market(s) (e.g., fortress hubs (Allvine 1996b)) at all costs and not react so sharply to other market entries. I develop this notion into a framework in Figure 2.3 below:

Framework for Assessing the Incumbent's Reputation for Predation and its Impact on Market Entry

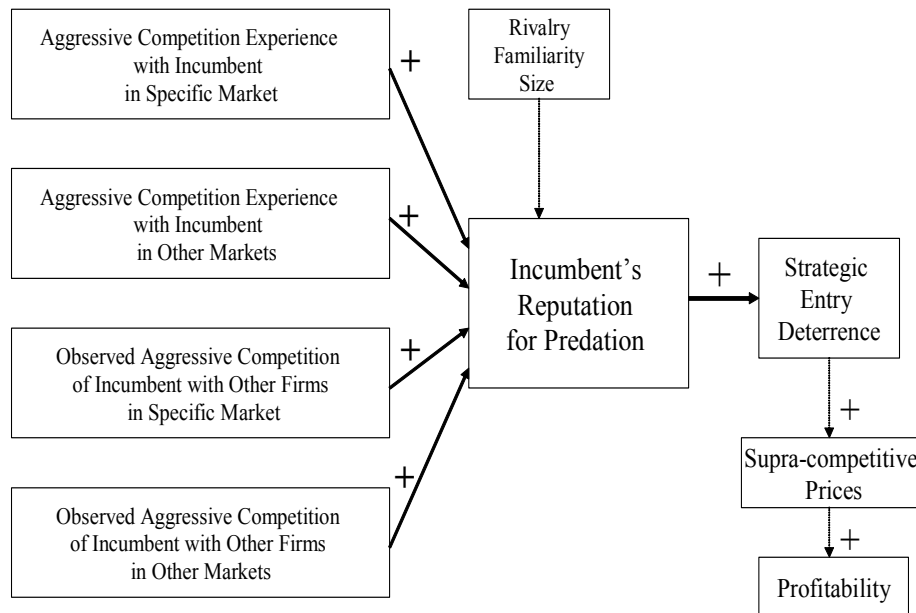


Figure 2.3: Framework for Assessing the Incumbent's Reputation for Predation and its Impact on Market Entry

For example, in the airline context, a carrier “defending its turf” against encroachment by a start-up carrier in a few markets can create a “reputation for predation” that deters start-up carriers from entering its many other hub markets; this can significantly alter the “cost-benefit” predation calculation for a hub carrier in a way uncharacteristic of most other industries” (Nannes 1999). Frederick Reid, a former Pan Am and American employee, who recruited to be the President and Chief Operating Officer for Lufthansa admitted to this phenomenon: “Pan Am was effectively destroyed by it and American was a winner. American has this reputation as a tough customer...” (McCormick and Field 1997). “If the prey believes that the threat or promise will be

carried out, there is no need for actual predation. Thus, like collusion, the most successful use of predatory threats or promises is difficult for outsiders to observe”(Comanor and Frech 1993). Reputations are impressions of actual behavior by the constituents. Yet, the courts continue to treat reputation effects as “industry folklore” because of a lack of empirical evidence. The bottom-line implication of the reputation effects literature is that it is important to consider the reputation effects as a barrier to entry when studying pre- and post-entry market defense.

2.4.2 Inter- vs. intra- type competition:

Intra-type competition takes place between businesses of similar cost/organization/service structure (e.g., Goldman Sachs/Merrill Lynch). By contrast, inter-type competition is defined as competition between businesses with different structure (e.g., Merrill Lynch/Charles Schwab) (Allvine 1996b). Examples in business-to-business settings are commonplace as well: In IT outsourcing, IBM, EDS, and Accenture are intra-type competitors whereas Infosys, TCS, and Wipro (i.e., Indian offshore providers) would be considered their inter-type competitors. The competition between large distributors (e.g., IKON for copier and printers) and the local dealers can be characterized as inter-type. It is typical for intra-type competition to focus on non-price factors (e.g., facilities, sales assistance, and extended warranties) and for inter-type competition to focus on discounts. Such structural differences between inter- and intra-type competition have long been observed (Allvine 1996; Miller, Reardon, and McCorkle 1999). Similarly, competition between Delta and American Airlines is considered intra-type, while competition between Vanguard and American Airlines would be considered inter-type competition. It is typical for intra-type airlines to focus on non-price factors

(e.g., promotion, frequent flier miles) and for inter-type airlines to compete on price.

Table 2.2 contrasts the two types of competition.

Table 2.2: Characteristics of Intra-type *versus* Inter type Competition

	Intra-type	Inter-type
Occurrence	Continuous	Discontinuous/random
Change	Small	Large
Risks	Low	High
Established Methods	High	Low
Innovations	Minor	Major
Changes in efficiency	Low	High
Demand Effect	Secondary	Primary
Leadership Style	Managerial	Entrepreneurial
Outcome	Reduction of Uncertainty	Novelty

Source: Dixit (2000)

A major take-away from the retailing literature is that inter-type businesses (e.g., general merchandiser (Sears), broad-line specialist (Home Depot), limited-line specialist (Ace Hardware)) can co-exist and prosper (i.e., number of larger stores are positively related to the size and number of smaller stores (Miller et al. 1999)). Similar formations in many business-to-business contexts exist: in machine tools there are industry giants such as Illinois Tool Works that supply a wide variety of equipment, but there are also operations that focus on segments of the market (e.g., CNC tool rooms), and finally smaller shops that only custom-build. In heavy construction equipment, Caterpillar and Komatsu are the market leaders, but Linkbelt's specialization in cranes pays-off.

At the absence of inter-type competition price competition typically suffers. For example, Table 2.3 illustrates the lack of price competition between intra-type competitors in the airline industry.

Table 2.3: Non-competitive Pricing among Intra-type Competitors in the Airline Industry

Minneapolis to Miami												Travel Date: June 16, 1999	
Northwest		American		Continental		Delta		TWA		United		US Airways	
Fare	Code	Fare	Code	Fare	Code	Fare	Code	Fare	Code	Fare	Code	Fare	Code
\$ 345	*	\$ 226	ME014N	\$ 345	*	\$ 345	*	\$ 345	*	\$ 345	*	\$ 345	*
\$ 444	ME121NR	\$ 444	ME218NR	\$ 444	HE21UP	\$ 444	KES21NN	\$ 444	VES21N	\$ 444	HOE21NQ	\$ 444	ME121NN
\$ 483	ME21NR	\$ 483	ME21NR	\$ 483	HE21UP	\$ 483	QE21NN	\$ 483	VE21N	\$ 483	HE21NQ	\$ 483	ME21NN
		\$ 526	KOE14FN										
\$ 634	HE114NR	\$ 634	OE148NR	\$ 634	KSE14UP	\$ 634	HES14NN	\$ 634	KES14N	\$ 634	MOE14NO	\$ 634	ME114NN
		\$ 669	OE7NR			\$ 689	HE7NR						
\$ 692	HE14NR	\$ 692	OE14NR	\$ 692	KE14UP	\$ 692	HE14NN	\$ 692	KE14N	\$ 692	ME14NO	\$ 692	BE14NN
		\$ 785	HE21NR			\$ 785	ME21NR						
\$ 973	YE7NR	\$ 973	HE7NR	\$ 973	HE7UP	\$ 973	ME7NR	\$ 973	KE7N	\$ 973	ME7NPQ	\$ 973	BE7NR
						\$ 1,350	YD5						
\$ 1,430	YU18NX	\$ 1,430	Y26	\$ 1,430	*			\$ 1,430	*	\$ 1,430	BUA	\$ 1,430	*
\$ 1,432	B26												
		\$ 2,064	C26			\$ 2,064	*			\$ 1,708	Y1UA	\$ 1,734	FB
\$ 2,144	F26	\$ 2,144	F26	\$ 2,144	08	\$ 2,142	*	\$ 2,144	F26	\$ 2,144	BUA		
\$ 2,206	Y			\$ 2,206	Y			\$ 2,206	Y	\$ 2,206	Y		
		\$ 2,516	P26			\$ 2,570	C						
\$ 3,340	F			\$ 3,340	F	\$ 3,124	F	\$ 3,340	F	\$ 3,218	F		

* -- multiple codes with the same fare
Source: Easy Sabre, April 2, 1999.

(Oster and Strong 2001, p.31)

The notion of inter-type versus intra-type competition is also supported by the notion of mutual forbearance.

2.4.2.1 Mutual forbearance

Mutual forbearance theory implies that the higher the multi-market contact between the same firms, the lesser the intensity of competition due to increased familiarity between firms and their ability for deterrence (Jayachandran et al. 1999). Therefore, gaining competitive intelligence becomes advantageous. Korn and Baum (1999) observed that empirical evidence has robustly demonstrated that multimarket contact leads to mutual forbearance.

Mutual forbearance moderates the effect of rivalry through tacit collusion and leads to improved performance for firms. Increased deterrence (Porter 1980) and increased familiarity among firms (Baum and Korn 1999) were observed as potential reasons for this effect (Jayachandran et al. 1999). While direct collusion is illegal and has

antitrust consequences, tacit collusion is observed when firms understand the motives and strategies of each party and implicitly coordinate so that intense competition is avoided (Jayachandran et al. 1999). Since most discounters that provide inter-type competition are smaller than their major counterparts they would have less market contact than intra-type competitors. Therefore, mutual forbearance would not only explain the general intensity aspect of inter-type competition but also help explain the exception for large inter-type competitors (e.g., intra-type major competitors do not retaliate against large inter-type discounters such as Wal-Mart and Southwest Airlines because of the high multi-market contact with them).

Korn and Baum (1999) found out that firms (in the airline industry) did not actively increase multi-market contact to achieve mutual forbearance. Perhaps the potential for increased market contact is limited by resource constraints or regulation. Moreover, previous studies have generally not differentiated market contacts between inter- and intra-type competing firms. Jayachandran et al. (1999) argued that the positive relationship between multimarket contact and the intensity of competition was moderated by the organizational structure of competing firms, seller concentration, spheres of influence (i.e., focal market distribution), and resource similarity (i.e., parity). Mutual forbearance may have antitrust implications through collusion, and multimarket reactions may have antitrust implications through predation (Jayachandran et al. 1999). As previously discussed, an incumbent's competitive reputation can also deter market entry in the context of multimarket competition. Clark and Montgomery (1998) have experimentally shown that an incumbent's reputation for aggressiveness, but not intelligence, makes a market less attractive and more risky to a potential entrant. They

found that reputation has a stronger effect when the degree of multimarket contact is high.

The theoretical basis for the use of pricing strategies as a defense mechanism in competitive interaction was inquired in this Chapter. The theories are linked to support of specific hypotheses in Chapter 4 (also see Figure 4.4). In the next Chapter, an inquiry of the actual use and evolution of aggressive pricing is undertaken from a multi-disciplinary perspective and the contemporary thinking is synthesized with insights from marketing.

CHAPTER 3

AN INQUIRY OF THE USE OF PREDATORY PRICING IN MARKET DEFENSE: EVOLUTION, REVIEW, AND MARKETING SYNTHESIS

3.1 Introduction to the Review

The monopolists, by keeping the market constantly understocked, by never fully supplying the effectual demand, sell their commodities much above the natural price, and raise their emoluments, whether they consist in wages or profit, greatly above their natural rate.

Adam Smith, *The Wealth of Nations* (1776)

Aggressive competitive conduct by a monopolist, which is beneficial to consumers, and aggressive exclusionary conduct by a monopolist, which is deleterious to consumers, look alike.

(Blair and Esquibel 1995)

Pricing has become an increasingly complex and sophisticated marketing activity over the last few decades. Interestingly, among all marketing mix elements, it is the one that is the least under the control of the business under perfectly competitive market conditions. However, when a market is not competitive, the reverse becomes true and one or few businesses may enjoy the benefits of controlling the going price through the use of their market power. The abuse of market power in terms of price manipulation is considered illegal. This chapter focuses on a widely recognized and debated form of price manipulation –predatory pricing, and describes how the marketing discipline can contribute to its assessment.

The current stage of the evolution predatory pricing is quite important. The very mechanism, drastic price cuts, that is associated with predatory pricing also happens to be at the heart of healthy competition (1993b). The primary objective of public policy

making regarding competitive interaction is to distinguish anti-competitive conduct from those that are pro-competitive (Scherer 1976). Despite the growing economic literature on predatory pricing, the case law in Europe and the U.S. remains limited (Grout 2000).

This chapter reviews the extensive literature on the history of predatory pricing and presents insights to a serious debate on whether or not a new set of ground rules for evaluating predatory pricing antitrust cases should be adopted. The notion that the Supreme Court's Brooke decision has established an imperfect standard against the plaintiffs/new entrants is also examined. The main goals of this chapter are to provide a historical perspective on the topic, to summarize the new evaluation alternatives available to the courts, and to present a synthesis that also integrates marketing insights.

Courts generally do not find predatory pricing to be rational and assume that predatory pricing practices are rare. This emphasis comes from the concern for antitrust litigation to not disturb the beneficial, competitive price-cutting behavior. At the absence of absolute market power, the courts simply view the cases as competitive (Sheffett and Petty 1994). The concept of predatory pricing represents a double-edged sword for the policy makers in that if not prevented, the price competition that enhances consumer welfare in the short-run can turn out to be disadvantageous for the consumers with return of the supra-competitive prices in the long run (Gundlach 1995).

The positive impact of lower prices on consumer welfare is generally accepted. However, predatory pricing is detrimental to consumer welfare in the long run because once the competitors exit the market, the predator raises prices with the intention of collecting supra-normal profits. Moreover, the problem with predatory pricing is not limited to harm to consumers through the increase of prices back to monopoly levels.

Predatory pricing, successful or not, can potentially reduce incentives for investment and innovation, and prevent new entry or expansion by more efficient firms. There are special implications for network industries such as telecommunications and software where the value of the product/service increases along with the number of users. Innovation can be stifled when predatory prices induce consumers to continue to use an old technology as opposed to a superior alternative offered by a new entrant (Guiltinan and Gundlach 1996).

Price competition is the core element of free markets. Lower prices and competition increase the welfare of the consumers and the society in general (Grewal and Compeau 1999). Yet, if consumers feel that the price they have to pay is unfair, then social harm may occur (Guiltinan and Gundlach 1996). The line between competition and anti-competitive conduct needs to be carefully drawn.

It appears that there is an increasing gap between the insights from the modern economic theory and the enforcement of current judicial policy. Government enforcement concern is high as evidenced by the DOJ lawsuits. The new economy requires new rules for the assessment of predation because of the growing importance of intellectual property (e.g., Microsoft litigation). Increasing market concentration in many industries and number of mergers, are also of concern (Bolton et al. 2000). There is an ongoing debate between two camps on how enforcement on predatory pricing should be exercised.

The Chicago School of thought, with its more established neo-classical theory economists and free enterprise institutes is supported by corporations and practiced by the Supreme Court. Since 1993, the Supreme Court requires proof of below-cost pricing and

of recoupment of losses suffered during predation to concur a predation case, and no predatory pricing plaintiff has been able to prevail in the courts (Bolton et al. 2000). The Chicago School concurs that Predatory Pricing cannot be a logical business practice for a company. They claim that it is not rational if they price below (short-run) AVC, and perfectly legal if they are above AVC, and thus predatory pricing claims should be ignored (DiLorenzo 1992).

Many companies are suffering and trying to get attention to what Post-Chicago School of academics call blatant use of predatory pricing and harm to the competitive process. The following scenario is observed in many monopolistic markets: The incumbent signals the intention to predate once a new player announces entry. If the entrant is bold enough to actually enter the market, the predator matches the entrant's (lower) price in the market and usually increases output. The predator declares an all-front war against the much smaller (but usually more innovative and efficient) entrant and does not budge until it is driven out of the market or out of business. As soon as the entrant has been forced out, the monopolist ignores the newly stimulated demand, reduces the capacity and increases its prices to levels (sometimes higher than) before the entry. This pattern has been observed for many cases in the airline industry (1996a; Allvine 1996b). There are many independent experts and academics, who concur that predatory pricing can indeed be a viable business strategy for the major player in a monopolistic market. This view validates the need for attention to this important antitrust topic. The Post-Chicago view of predation has been on the rise in the nineties during the Clinton Administration as demonstrated by the U.S. *versus* Microsoft, and U.S. *versus* American Airlines cases. However, it would not be surprising if most pending cases were

settled during the administration of President George W. Bush, who stated during his election campaign that he would only pursue price fixing antitrust cases (Financial Times, 2000c).

Grewal and Compeau (1999) suggested that marketing researchers have not engaged in public policy implications of pricing until recently and that a focus on this issue is long overdue. They argued that developments such as the Internet, global markets, mega-corporations, and cooperative marketing arrangements created the necessity of taking a closer look at the pricing and public policy interaction with consumer welfare in mind. After all, courts consider economic harm to consumers as the best way of assessing harm to society (Baer 1996).

Guiltinan and Gundlach (1996) argued that marketing was in a unique position to help form public policy guidelines with comprehensive measurement and modeling procedures, and that predation and predatory pricing have not been addressed by marketers until recently. Gundlach (1995) suggested that the marketing discipline had the potential to further the understanding needed for the development of a more suitable antitrust policy.

The literature on predatory pricing is overwhelming and dominated by the disciplines of law and economics. This chapter represents a literature review of the existing knowledge on this topic. It is an effort to thoroughly understand, summarize, and then synthesize and present a big picture of the subject from the perspective of cases and law, and the assumptions and development of the thinking in economics.

3.2 Pricing

Price can assume many meanings depending on the specific context. It can mean rent, tuition, fee, fare, rate, interest, toll, premium, honorarium, dues, assessment, retainer, salary, commission, wage, even bribe and income taxes (Schwartz 1981). Merriam-Webster Dictionary defines price as “the amount of money given or set as consideration for the sale of a specified thing.” It is also defined as the quantity of one thing that is exchanged or demanded in barter or sale for another or the cost at which something is obtained. More elaborate definitions have involved the concepts of value and worth. Price can mean a fair return or equivalent in goods, services, or money for something exchanged, or the monetary worth or value of something (Mish 1995). Simply, it is the amount of money the customers have to pay for a product or service (Grewal et al. 1998).

The marketing mix is defined as the set of controllable marketing variables that marketers employ to obtain the desired responses from their target markets (Kotler and Armstrong 1991). Price is one of the key components of the classic “four Ps: product, price, place, and promotion” grouping of the marketing mix (McCarthy 1960). It has been cited as the most important component of the mix by marketing executives (1983). Price has special importance for the marketers due to its inherent flexibility and close association to profitability. General pricing approaches include cost-based pricing (cost-plus (mark-up), break-even, and target profit), buyer based pricing (perceived value), and competition based pricing (going rate, sealed bid, competitive response) (Allvine 1999; Kotler and Armstrong 1991).

The pricing strategy is dependent on the nature of the product in question (e.g., innovative versus imitative), and the product mix of the firm. For example, market skimming and market-penetration are two strategies that can be employed for an innovative product or service. Products have to be positioned in the marketplace to be profitable and the following are some of the options that can be employed: product-line pricing, optional-product pricing, captive-product pricing, by-product pricing, and product-bundle pricing (Kotler and Armstrong 1991, p.351).

Prices can also be adjusted through the use of discount pricing (quantity, functional, seasonal discounts, payment terms) and allowances (trade-in, promotional); discriminatory pricing (customer-segment, product-form, location, time); psychological pricing; promotional pricing (loss leaders, special-event pricing, cash rebates, low-interest financing, longer warranties, free maintenance, discounts); and geographical pricing (FOB-Origin, uniform delivered, zone, basing point, freight absorption). However, both buyers' and competitors' reactions need to be considered before changing prices (Allvine 1999; Assael 1990).

Price theory in economics defines how the firms should set prices under certain assumptions to maximize their profits (Pass and Lowes 1994). However, the static nature of the price theory and its rigid assumptions for cost, price and quantity (product) make it inapplicable to marketing practitioners. When these assumptions are violated, it becomes hard to measure the nature of the demand (demand curve) and a profit-maximizing price cannot be determined. Assumptions that marketers cannot afford to have include, an unchanging environment, single product firms, and all customers paying the same price (Allvine 1999).

Due to the absence of a single profit maximizing guideline in practice, the marketers determine their strategy for the product or service before they set the price for it. There are internal (e.g., marketing objectives, marketing mix strategy, costs, organization for pricing) and external factors (e.g., nature of the market and demand, competition, economy, resellers, government) that impact pricing decisions. Marketing objectives of the firm can include survival, current profit maximization, market-share leadership, product-quality leadership among others. The marketing mix for a particular product is closely tied to the marketing mix strategy of the related items that the firm offers. As most of the dot-com start-ups have painfully discovered, prices must start to exceed their costs (as effected by their economies of scale and learning curve) at some point if a company is to survive in the long run. The procedures for pricing and the flexibility for changing the price also have impact on the pricing decision as an internal factor (Kotler and Armstrong 1991). It should be noted that the nature of the market and demand characteristics can be industry specific (e.g., seasonal). Economists have identified four general types of markets (pure competition, monopolistic competition, oligopolistic competition, and pure monopoly). The price elasticity of demand is also of concern. The state of the economy impacts the purchasing power of consumers and has to be considered. The bargaining power of middlemen and retailers can become important in making pricing decisions. Finally, laws regarding pricing are also important and marketers need to make sure that their pricing policies do not violate them. These issues include price fixing, resale price maintenance, price discrimination, minimum (predatory) pricing, price increases (ceilings), and deceptive pricing (Kotler and Armstrong 1991).

Price fixing refers to price collusion among competitors. It is considered illegal except when supervised by a government agency (e.g., local milk industry agreements, fruit and vegetable cooperatives). Resale Price Maintenance problem implies that manufacturers cannot require that their dealers sell at pre-specified prices. They can only propose suggested retail prices. They cannot refuse to sell to a dealer or punish the dealer otherwise because of pricing issues. Regulated price increases refer to certain industries (i.e., utilities) in a free market economy. Government may also use its influence to discourage major industry price spikes during shortages or in times of inflation.

Deceptive pricing problem means that the price reduction should not be advertised unless it is a saving from the usual retail price, not advertise inaccurate factory or wholesale prices, and not advertise comparable prices for different goods. FTC Guidelines against deceptive pricing were issued in 1958 (United States 1958). Price discrimination problem implies that sellers must offer the same price terms for a given type of transaction.

Robinson-Patman Act forbids price discrimination unless the seller can prove that its costs are different in selling to a particular customer than others (1936). This can usually be the case when order quantities vary in size. However, the seller needs to prove that these differences are proportional to the differences of quantities. It can also be justified if the seller can prove that it is trying to meet competitor's prices in good faith. Even then, price discrimination should be temporary, localized, and defensive rather than offensive (Dalrymple and Parsons 1990). For effective discriminatory pricing, segments in the market should indicate varying levels of demand. Discrimination does not work if the low price segment customers can resell the product to the higher price segments. Similarly, competitors who sell to the higher price segments at lower prices can be very

disturbing. This may lead some firms to illegally employ predatory pricing practices to drive the competition out of the market (Kotler and Armstrong 1991). Thus, last but certainly not least, minimum (predatory) pricing is an important issue that marketers need to be aware of.

3.2.1 Predatory Pricing

The best known form of predation is predatory pricing, yet it has currently no statutory definition (Guiltinan and Gundlach 1996). Areeda and Turner (1975) argued that predatory pricing occurs when a firm lowers its prices in order to eliminate a current competitor in the relevant market or to prevent new firms from entering the market:

[P]redation...cannot exist unless there is a temporary sacrifice of net revenues in the expectation of greater future gains....Thus, predatory pricing would make little economic sense to a potential predator unless he had (1) greater financial staying power than his rivals, and (2) a very substantial prospect that the losses he incurs in the predatory campaign will be exceeded by the profits to be earned after his rivals have been destroyed.

Others such as Professor (then Judge) Posner simply defined predatory pricing as pricing at a level calculated to exclude from the market an equally or more efficient competitor (Posner 1976). Viscusi et al. (1995) later commented that, pricing at a level to exclude a *less efficient* competitor is naturally what competition is supposed to do. Some researchers focus on the exclusionary conduct (Grout 2000), and some focus on losses imposed on others (Sullivan 1977) in their definitions. Professor Baumol's 1996 article refined the Areeda-Turner definition:

Indeed, one can, perhaps, define a price to be predatory if and only if it meets all three of the following conditions. First, the choice of that price

must have no legitimate business purpose. Second, that price must threaten the existence or the entry of rivals that are at least as efficient as the firm (call it firm F) that has adopted the price at issue (price P). Third, there must be a reasonable prospect of recoupment of at least whatever initial costs to firm F were entailed in the company's adoption of the price in question, that recoupment taking the form of monopoly profits made possible by reduction (as a result of price P) in the number of competitors facing F. (Baumol 1996, p.52)

Hence, Professor Baumol would define a business act as legitimate if the expected (long-run) net return is positive, and if that return does not depend on the exit of any of equally or more efficient competitors or the prevention of entry of such firms.

Gregory T. Gundlach, who has published numerous articles on the topic of predation (e.g., Gultinan and Gundlach 1996a; Gundlach 1990; Gundlach 1995; Gundlach and Gultinan 1998) perceives predatory pricing as a reduction of prices (usually below cost) with the intention of punishing a competitor or gaining higher profits in the long run by driving competition out of business (Gundlach 1990). Predatory pricing can improve a firm's bottom-line through exclusionary conduct or other anti-competitive effects in the market. Specific cases of pricing below cost, unlawful price discrimination and price warring are considered predatory pricing (Grewal and Compeau 1999). The same actions regarding pricing can be interpreted differently, depending on what the intent of the case is. Pricing below cost with the intent of dumping excess inventory can be considered legal (Grewal and Compeau 1999).

When the cost concept is built into the descriptions above, a definition which would generally be accepted by the courts in the U.S. is obtained (i.e., pricing below an appropriate measure of unit cost (e.g., total or variable) with the intent of driving out rivals (presumably with shallow pockets), and later raising price above unit cost to recoup

losses through supra-competitive pricing. The court definition was shaped through cases such as *Matsushita Electric Industrial Co. v. Zenith Radio Corp.*; *Cargill Inc. v. Monfort of Colorado Inc.*; and finally in *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.* However, the measure of cost that would distinguish predatory from non-predatory pricing has not yet been prescribed (McCareins 1996). Figure 3.1 summarizes the current perception of predatory pricing enforcement in the courts:

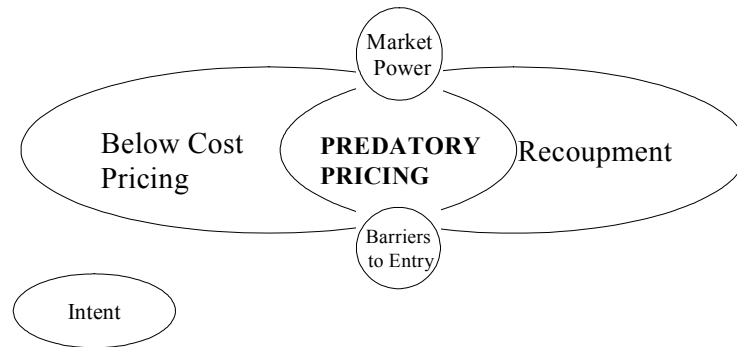


Figure 3.1: Perception of Predatory Pricing under Current Law

Whether a particular conduct is predatory may depend on the jurisdiction in which a firm does business or whether the suit is brought under state or federal law (McCareins 1996). State and Federal courts use different standards to detect predatory pricing. State courts are usually more receptive to predation cases and tend to protect the preys (i.e., smaller firms) more. On the other hand, the Federal courts have stated that predatory pricing is “inherently uncertain” (1986b, pp.588-89) and that it is generally implausible

(1993b, p.226). Today, intent is at best a secondary concern for the courts in the United States. Predatory pricing is found only when below-cost pricing exists along with (a dangerous possibility of) recoupment (1993b). This puts a heavy burden of proof on the plaintiffs.

Perhaps in one of the most widely quoted statements in predatory pricing history, the Supreme Court in the Matsushita Case stated that predatory pricing is “rarely tried, and even more rarely successful” (1986b, p.590). The reason for this sharp conclusion is discussed later in this chapter under the evolution of predatory pricing section. Similarly, it will be discussed later that there may be exclusionary and anti-competitive effects of predatory pricing that are not as obvious as the *elimination* of a *direct* competitor. The following definition however, successfully captures the essence of the diverse nature of the topic, and hence has been adopted for the purposes of my dissertation:

Predatory Pricing is a price reduction that is profitable only because of the added market power the predator gains from eliminating, disciplining or otherwise inhibiting the competitive conduct of a rival or potential rival (Bolton et al. 2000, p.3).

3.2.2 Predatory Pricing versus Predation

Even though predatory pricing is the most widely recognized form, it is only a part of the larger conduct of predation. Ordover and Willig (1981) defined predation as actions that are unprofitable but for their possible contribution to a rival’s exit. There is a rather wide list of activities that can be considered to be predatory depending on their impact on societal welfare.

Misleading advertising about a competitor’s product, specifically designing interfaces for complementary products that are incompatible for a rival, initiating

excessive regulatory hearings and/or lawsuits have been noted as predation (Bork 1993). Cutting supply of an essential output or refusal to provide access to essential resources for competition (e.g., slots at airports) is also predatory according to the “essential facility” doctrine (Gundlach and Bloom 1993). Prentice (1996) discussed the predation liability for fraudulent product announcements that a manufacturer knows will not ever be launched. In addition, raising rival’s costs through acquisition and sleeping on of patents, product pre-announcements, useless product modifications, exclusionary market channel arrangements, market share agreements, bundled discounts, discounts designed to reduce rivals’ ability to obtain display space (Gundlach 1990), refusals to deal, mandatory tying arrangements, and other uses of the power in one market to increase the cost to competitors in other related markets (Meeks 1998) have been reported. Non-price predation (e.g., reputation, raising rival’s costs) may be used to depress the acquisition cost of rivals.

Predation is like warfare in that it can only be rational when less expensive measures fail (Scherer 1980). Indeed, it has been argued that that non-price predation is more effective than predatory pricing because it is less costly, less risky and more often successful (Bork 1978). Snyder and Kauper (1991) summarized literature on raising rivals’ costs, a category of predation. Salop and Scheffman (1987) showed that non-price predation strategies that increase rival’s costs are more advantageous than predatory pricing. Not every non-price predation is pre-branded illegal, non-price predation does not have to force exit to be successful and it does not have market power as a prerequisite. It may be more cost-efficient for large firms to employ contractual provisions and other strategies to increase barriers to entry to maintain market power. In

the broadest sense, sixteen non-price predation strategies have been reported which included outright sabotage such as burning down a rival's plant but also vertical integration, innovation, and product promotion (1991). The next section discusses the evolution of the theory and practice of predatory pricing but also reports on non-price predation where necessary.

3.3. Evolution of the Theory and Practice of Predatory Pricing

3.3.1 A Historical Perspective

Predatory pricing cases have a major role among the anti-competitive practice and antitrust violation cases (Gundlach 1995). Since the turn of the last century, the courts' approach to evaluate predatory pricing cases has swung back and forth between being in favor of the plaintiffs and the defendants. Economic theory and scholarly articles seem to have played an important role, for better or worse, in shaping the federal court policies. Especially, the articles by McGee (1958), Koller (1971), and Areeda and Turner (1975) seem to have influenced the courts to an extent that their impact is still observed today in their reflection from the 1993 Brooke decision. The early influence of academics ended the "populist era" of predation enforcement, where plaintiffs won most of the cases. The adoption of Areeda-Turner rule by the courts as a standard shifted the balance in favor of the defendants. Predatory Pricing was defined by the courts as irrational business (1986b), and the neo-classical price theory school continuously presented it as a myth (DiLorenzo 1992; Koller 1971). Moreover, the 1993 Brooke decision has made it even harder for the plaintiffs to survive in courts. In this decision, the Supreme Court required not only evidence of below cost pricing but also of recoupment. In none of predatory

pricing cases since the Brooke decision (at least 38 of them), did the plaintiffs prevail (Carney and Zellner 2000). However, modern view holders such as Guiltinan (1996), (Bolton et al. 2000), as well as distinguished economists such as Alfred Kahn (1998) have pointed out that certain assumptions of price theory do not hold in the real world. Currently, there seems to be a consensus among those who hold the modern Post-Chicago view of predation that predatory pricing can be a viable and profitable business strategy especially under monopolistic market conditions (Bolton et al. 2000). This indicates that a reassessment of the standards that the courts use today may be well justified and overdue. Milestones of the evolution of predatory pricing and an approximation of plaintiffs' success rate in the courts are presented next (Table 3.1; Figure 3.2), followed by a discussion of the evolution.

Table 3.1: A Summary of the Evolution of Predatory Pricing in the U.S.

Timeline		Description
1890	Sherman Act	Prohibited contracts or conspiracies that restrain trade including price fixing, and monopolization.
1910	Clayton Act	Defined unlawful uncompetitive behavior and practices other than monopolization.
1911	<i>Standard Oil Co. v. United States</i>	Standard Oil found guilty in this classic case of monopolization. A major component of the case involved the allegations that Standard Oil had employed predatory pricing to drive its competitors either out of business or to force them to sell it to Standard Oil at distressed prices. Standard Oil was broken up into 33 geographically distinct companies (Gibb and Knowlton 1965).
1914	Federal Trade Commission (FTC) Act	Extended Sherman Act in terms of restraints for trade. FTC authorized to interpret antitrust statutes.
1936	Robinson-Patman Act	Price discrimination that lessens competition or promotes monopoly declared illegal. Protected small business from price-cutting by large sellers.
1938	Wheeler-Lea Amendment	FTC authorized to protect consumers as well as competitors.
1940's	Strong FTC enforcement	Cases are infrequent until 1940's. More cases observed with strong FTC enforcement (Bolton et al. 2000).
1936-70's	The Populist Era	Roughly 77% of predatory pricing plaintiffs win their case (Koller 1971).
1967		In this classical example of the populist era, three producers in California were accused of charging less for their pies in

Table 3.1 (continued)

	<i>Utah Pie Co. v. Continental Baking Co.</i>	Utah than in markets closer to their plants after Utah Pie's entry to the market. Court decided in favor of Utah Pie. The Supreme Court reinstated the jury verdict though this decision was widely criticized. Justice Stewart argued that the consumers benefited from lower prices and increased competition in Utah.
1975	Areeda-Turner AVC Rule	From the seminal article proposing a per se AVC standard for detecting predatory pricing.
1975-80	A Defendant's Paradise	Dramatic change in enforcement –no plaintiff prevailed during the five years following Areeda-Turner (Bolton et al. 2000).
1982-92	Augmented AVC Era	Intent and market structure also considered. Equilibrium was claimed to be reached at 17% plaintiff success rate (Bolton et al. 2000).
1986	<i>Matsushita Electric Industrial Company v. Zenith Radio Corporation</i>	American television manufacturers sued twenty-one Japanese corporations that sold televisions in the United States. Plaintiffs' argument was that the defendants conspired to drive them out of the U.S. market with predatory pricing. The court's assessment became one of the most quoted in the following cases to come: "consensus... that predatory pricing schemes are rarely tried, and even more rarely successful. . ." (1986b, p.590) Thus, the court did not find an economic motive for the defendants to predate. Earlier verdict of the Court of Appeals was reversed and remanded.
1989	<i>A.A. Poultry Farms, Inc. v. Rose Acre Farms, Inc.</i>	The defendant's prices were less than its average variable costs for a period during (and below ATC throughout) the price war. Predatory intent of defendant's executives was also documented: "We are going to run you out of... business. Your days are numbered"(1989, p.1398). The court focused on recoupment and concluded that intent by itself did not help determine the probability of recoupment, and in the absence of recoupment, even the most vicious intent was considered harmless to the system.
1993	<i>Brooke Group v. Brown & Williamson Tobacco</i>	<i>Brooke Group</i> (formerly known as Liggett) alleged that <i>Brown & Williamson Tobacco Corporation</i> introduced its own line of generic cigarettes (that the plaintiff had pioneered with great success) and used predatory pricing to stifle price competition in the economy segment of the national cigarette market. <i>Brooke</i> argued that the defendant used below cost pricing and offered discriminatory volume rebates to wholesalers. <i>Brown</i> not only matched the plaintiff's retail price but also consistently undercut its wholesale price. A harsh price and rebate promotion war took place at the wholesale level that lasted eighteen months. Ultimately, <i>Brooke</i> gave in and increased its prices. Generic brand prices increased by 71% and branded cigarettes prices increased by 39% whereas the costs were roughly constant (Bolton et al. 2000). Even though below cost pricing and predatory intent was documented, and the defendant was found guilty by a jury, the Supreme Court required proof of below cost pricing, <u>and</u> of recoupment, and subsequently decided in favor of the defendant.

Table 3.1 (continued)

	Defendants' Ultimate Paradise Era Commences	<i>Brooke</i> decision led to excessive summary dismissal by lower courts. Augmented AVC Era equilibrium destroyed. Plaintiffs have not prevailed in a case since <i>Brooke</i> . Summary dismissal is the norm. (Bolton et al. 2000)
1998	DOT Proposed Guidelines	Department of Transportation (DOT) realized the strategic problem and would allow proof of recoupment based on reputation effects (and would not require proof of below
1999	<i>United States v. Microsoft</i>	Microsoft is accused of predatory pricing against Netscape for bundling its Internet Explorer with its operating system free of charge, and later settles the case.
	<i>United States v. AMR Corp.</i>	Department of Justice (DOJ) filed complaint against American Airlines based on strategic and reputation effects in parallel with DOT guidelines.
2000	Presidential Elections	George W. Bush stated during his election campaign that he would only pursue price fixing antitrust cases (2000d).
2001	DOT switches to case by case approach	After evaluating thousands of responses from different parties, DOT dropped proposed guidelines and decided to take a case by case approach (January).
	<i>American</i> Case Dismissed	Judge Morton dismissed the case basing on "time honored rules" (April); DOJ decides to appeal the decision (July).
2002 -	Evolution continues...	DOJ appeals the dismissal of <i>American</i> case but does not pursue the objective aggressively in the aftermath of September 11 events (the summary dismissal is later verified by a panel of three judges in July 2003). American Antitrust Institute observed that this marked "the death of predatory pricing as a critical antitrust tool in this political climate" (cf. Foer 2003, p.14). The low cost carriers start to make headway into bleeding major carriers' territories. Another wave of predation against the discounters may be in order after the major carriers get their act together, however the discounters (e.g., Southwest, JetBlue, AirTran) now have deeper pockets. As a preliminary step, the majors launch a new wave of low-cost versions of themselves (e.g., Song for Delta, and Ted for United Airlines)...

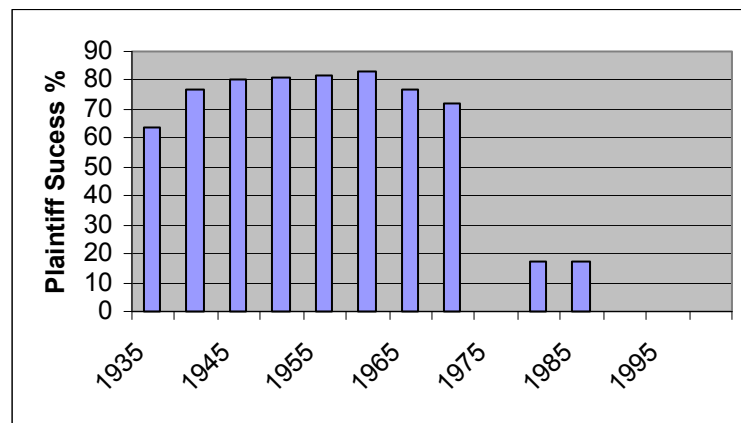


Figure 3.2: Approximated Predatory Pricing Plaintiff Court Success over Time

3.3.2 Regulatory Acts Regarding Predatory Pricing

Predatory pricing is a violation that is monitored by antitrust regulation bodies. Antitrust regulation is constructed to prevent substandard industry performance (efficiency) and promote competitive performance and equitable distribution of market power. The typical targets of antitrust regulation are those industries with oligopolistic structures with high entry barriers where market power stifles innovation. The following are renowned Acts that were designed to regulate such behavior:

Sherman Act – 1890: Section 1 of this Act basically prohibited contracts or conspiracies that restrain trade. The behavior considered illegal (e.g., price fixing, allocating territories among competitors, tying purchases of one product to another) was defined by courts. Section 1 makes concerted action illegal regardless of their market impact. If the conspiracy is proven, the plaintiff does not have to prove actual or potential monopolization (Hawker and Petty 1996). “*Rule of Reason*” doctrine, which suggested analyzing the context of behavior to see if the case displays unreasonable restraint of trade or legitimate business practice, was used for cases of ambiguous nature (Sullivan 1991). Section 2 declared monopolization and conspiracy to monopolize, as a felony. Intent was defined further with subsequent legislation (Kovaleff 1994).

Clayton Act – 1914: Defined unlawful anticompetitive behavior and practices other than monopolization (e.g., price discrimination (Section 2), exclusive dealing and tying contracts, mergers (Section 7), and inter-locking directorates.) Section 7 was an important

antitrust statute in terms of its impact on litigation and structure. Cellar-Kefauver (1950) made mergers and acquisitions that decrease competition or promote monopoly unlawful (with respect to Section 7 of Clayton). This Act was intended to prevent unfavorable market structures. However, labor unions and agricultural organizations (cooperatives) were exempt (Martin 1959; States 1984).

Federal Trade Commission (FTC) Act – 1914: Extended and overlapped with the Sherman Act in terms of restraints for trade. It defined certain conduct modes businesses must compete in (e.g., Unfair Methods of Competition (Section 5)). The FTC was authorized to interpret antitrust statutes. With the extension of Wheeler-Lea Act of 1938, FTC was authorized to protect consumers as well as competitors (American Bar Association. FTC Act Editorial Committee. 1981).

Robinson-Patman Act –1936: Amended Section 2 so that price discrimination that lessens competition or promotes monopoly was considered illegal. The original Clayton Act had exempted price discrimination in the form of quantity or volume discounts (1936).

Two main types of price discrimination were recognized. Primary discrimination included injury to competing sellers, whereas secondary discrimination included injury to competing buyers. A key case for primary discrimination was the Utah Pie Case (1967). Pie producers in California, were accused of charging less for their pies in Utah than in markets closer to their California plants, after Utah pie's entry to the market. Court decided in favor of Utah Pie, though Justice Stewart argued that the consumers benefited from lower prices and increased competition in Utah (Van Cise and McCord 1969). A

key case for secondary discrimination was Morton Salt Case (1948). Morton gave volume discounts to selected buyers. Large chain grocery stores were given the lowest wholesale prices. Court found against Morton based on Robinson-Patman Act (1948).

It appears as if the Robinson-Patman Act was designed to protect small businesses against the “chain-store revolution.” Secondary type of price discrimination was enforced in the courts more, typically in the form of “mom and pop” grocery stores versus the major food chain. However, today Robinson-Patman Act is interpreted rather strictly, and is not considered a major factor in food retailing anymore (Dickinson 2003). The standard for primary-line Robinson-Patman violations has become basically the same as it is for ordinary predatory pricing under Section 2 of the Sherman Act (Kintner 1979). Most predatory pricing cases fall under either an attempt or actual monopolization charge under Section 2 of the Sherman Act or Section 2(a) of the Robinson-Patman Act (McCareins 1996).

Antitrust legislation is enforced by the Antitrust Division of the Department of Justice, and by FTC with some overlap. However, most lawsuits are filed by private parties rather than the government agencies. The cases can be criminal or civil. Most forms of price discrimination are not illegal themselves, though the market power exercised to employ price discrimination may be illegal under Section 1 of the Sherman Act. The Robinson-Patman Act extended antitrust for price discrimination to credit terms, delivery times, quality, and volume discounts. It was designed to protect small competitors rather than the competitive process. Robinson-Patman Act is easier to pursue in courts as it requires proof of a reasonable possibility of substantial injury, whereas Sherman requires a dangerous probability of actual monopolization. Still,

Robinson-Patman Act is not favored by the FTC and Department of Justice (DOJ) which do not currently enforce the Robinson-Patman Act (Dickinson 2003; MacAvoy 2000).

There was also one Act that specifically regulated marketing behavior within a particular industry --Agricultural Marketing Agreement Act –1937 (United States 1937).

3.3.3 Early Years and the Populist Era (1890 - 1975)

Very few cases were observed before the 1940's. This inactive period continued until the 1936 Robinson-Patman Act. Plaintiffs gained substantial power after Robinson-Patman which protected smaller firms from price cutting by large ones. FTC initiated a strong enforcement effort in the early 1940s. More lawsuits started to emerge. Oral and written statements were used as evidence of intent. It was relatively easy to establish predatory intent (Koller 1978). Koller (1971) reported that the Federal courts had identified that predation had occurred in 95 out of the 123 cases. This equals to a 77 per cent litigated case success rate for plaintiffs. This high rate may be due to the fact that plaintiffs have won some cases “they probably should have lost. It seems no exaggeration to call this the populist era of predatory pricing enforcement” (Bolton et al. 2000, p.14). It was in this context when Justice Sullivan proposed that predatory behavior can be identified by two non-cost criteria – whether it looks “jarring or unnatural”, and whether it is aimed toward a particular target rather than an abstraction such as market share (Sullivan 1977, p.112). Alan Greenspan commented that, “the entire structure of antitrust statutes in this country is a jumble of economic irrationality and ignorance” (Greenspan 1962).

Despite the cases in which firms were found to employ predatory pricing, there

was a lack of economic theory supporting the presence and rationale of it. On the other hand, Koller's dissertation titled "*The Myth of Predatory Pricing*" (1971), and the literature stemming from this work, was relied upon by the Chicago School and cited by the courts and influential academics such as Areeda and Turner (1975).

3.3.4 Areeda-Turner Era (1975- 1982)

A new era started to emerge in the 1970's, in which law's condemnation of many forms of predation was criticized. This notion gained significant support among the Federal judiciary and antitrust scholars (Bernstein 2001), and the legal environment that favored the plaintiffs came to a halt with the publication of the seminal 1975 Areeda-Turner article. The Areeda-Turner rule basically stated that a firm should be found guilty of predatory pricing whenever it sets price less than its marginal cost (i.e., the cost of material and labor in making the last unit, excluding the startup/fixed costs). It followed that any price set equal to or above the firm's marginal cost is non-predatory. According to Areeda-Turner, competition in an industry would naturally drive prices toward the marginal costs. Pricing below marginal cost, meant operating at a loss, and was considered irrational, except for the intention to drive out competitors, which was considered predatory. After competitors were driven out of business, a predatory monopolist could potentially recoup its losses by charging supra-competitive prices, which hurt the welfare of the consumers. Areeda and Turner also recognized that marginal cost data (i.e., how costs vary with each additional unit of output) were not easy to compute. In practice, marginal cost was more of a conceptual tool for economists. Thus, Areeda and Turner suggested the use of a per se standard of Average Variable Cost

(AVC) as a substitute for marginal cost. AVC is calculated by identifying those costs that vary with output, adding them up, and dividing the result by the total number of units produced (Pass and Lowes 1994). Even though there are differences between MC and AVC, a firm with prices below AVC is not even covering the variable costs, not to mention its fixed costs. Deductive reasoning follows that, in the absence of a justification, a firm with below AVC pricing must be conducting predatory pricing since the only profits (rationale) would come from rewards through the outcome of predation.

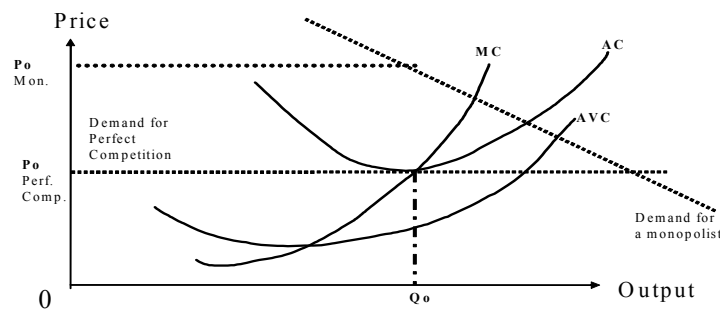


Figure 3.3: Cost Relationships

With the lack of a major alternative theoretical model of predatory pricing to consider, the courts embraced Areeda-Turner AVC rule and replaced the uncertain factors adopted previously. As a result, the legal trend was totally reversed against the plaintiffs. Plaintiffs' success rate immediately fell down to only eight per cent as opposed to seventy-seven per cent during the populist era (Hurwitz and Kovacic 1982). Areeda and Turner also spread the view that predatory pricing is a rare event in practice (Brodley

and Hay 1981).

3.3.4.1 Counter Cost and Non-cost Proposals

Despite its increasing popularity in the courts, Areeda-Turner rule was criticized by economists because it did not capture the strategic factors and long run welfare effects. Sharp price reductions can also be viewed as market signaling that communicate threats and sanctions. Alternative cost and non-cost standards were proposed to overcome the practical drawbacks of Areeda-Turner rule, but none of them could replace the precedent in court practice (Bolton et al. 2000, p.15):

Alternative Non-cost Standards: Some economists argued that predatory pricing is a matter of intent, not costs. The price could even be set higher than ATC for a case to be considered predatory (Shepherd 1986).

Williamson Output Increase Rule. Williamson (1977) suggested that predatory pricing be evaluated as a long-run strategy, particularly from the perspective of the incumbent firm's response to entry. Temporary price cuts have negligible benefits and long-term welfare problems occur when the predator raises prices after competitors exit. Williamson concluded that his rule would have superior welfare consequences to the Areeda-Turner cost rule where strategic responses were not taken into consideration. Williamson output increase rule basically stated that it would be considered predatory conduct if a firm raised its output significantly within the twelve to eighteen months following a rival's entry.

Baumol Price Reversal Rule. Baumol (1979) proposed that it is predatory conduct if the incumbent first decreases the price sharply, but then increases it again after the competitor exits, and this is not accounted for by a rise in cost or demand.

Alternative Cost Standards: In order to replace Areeda-Turner, other counter cost rules have also been proposed.

Joskow and Klevorick (Two-stage rule). Under the Areeda-Turner rule, a firm covering its AVC is considered lawful yet the fixed costs remain unaccounted for in the equation. Average Total Cost (ATC) includes both fixed and variable costs and it was argued that pricing below ATC for a considerable period could also be predatory. Thus, even though the firm may be pricing above AVC, it is still informative to compare the price to ATC. In one of the more comprehensive alternative proposals to Areeda-Turner, Joskow and Klevorick (1979) basically argued that a price below AVC is always predatory, and a price greater than AVC but less than ATC is predatory unless the defendant shows that it has or had a reasonable justification for the price:

Therefore, the adoption of a strategy of pricing below average variable cost by a dominant firm confronted with entry is sufficient to demonstrate predation. A price below average variable cost, and for that matter, a price below average total cost, could not possibly be sustained in the long run since, to survive, firms must cover total costs in the long run. A firm with market power-the ability to control price-would only have an incentive to impose losses on itself when faced with an entrant if the promise of future monopoly gains made such a tactic profitable from a long-run perspective (Joskow and Klevorick 1979, p.252).

In their two-stage test Joskow and Klevorick (1979) would first focus on the market structure to determine if predation is likely to be successful. This meant a careful examination of the entry and exit costs. They argued that screening out markets where

predatory pricing was unlikely would ensure not discouraging truly competitive price competition. The assumption was that only firms with market power would have incentives to exclude rivals through predation. On the second stage, they proposed to test if price was below cost. They would also determine if Baumol price reversal happened (price cut, exit of competitor, price rise), and see if corporate predatory intent was documented.

Average Total Incremental Cost. Incremental costs are defined as the costs that will be incurred as the result of a decision (e.g., capacity increase). In other words, it is the difference between the firm's total cost at the two output levels divided by the change in output. Average Incremental Cost (AIC) (also known as Average Avoidable Cost (AAC)), is the unit cost of the added output, or in other words, the cost that would have been avoided had the additional amount of output not been produced (Baumol and Sidak 1994). As the time frame of the cost measure gets longer, more costs become avoidable, because there is a greater opportunity for redeploying assets that are fixed in the short run. Therefore, average long run incremental cost (LAIC) is the incremental cost when all costs are considered variable, and serves as a natural upper threshold.

Baumol (1996) argued that combinations of the firm's products had to be considered for a proper Areeda-Turner test. Accordingly, the price of each product by itself had to equal or exceed that item's average avoidable cost. Moreover, any combination of the firm's products had to be priced so that the incremental revenue had to exceed the avoidable cost incurred by that combination of products.

Still, there are a number of instances in which the odor of predation is strong, as when an entrant airline with its six-plane fleet, operating on

almost as many routes, proposes to fly a route coveted by a large incumbent airline, whereon the latter announces that it will open for business (for the first time) along each of the most promising of the entrant's routes. Analogous examples in which predatory pricing is the issue are also easily imagined. There is reason to provide the entrant in such a scenario effective recourse against overaggressive acts by the large incumbent. Accordingly, the rules for proper execution of an average variable cost test that are described in this article are designed not to offer undue protection to the firm suspected of predatory pricing (Baumol 1996, p.52).

Other proposals included that of Posner (1976) (required AVC test, high market concentration and proof of intent), Scherer (1976) (full rule of reason inquiry with focus on intent and market structure), and Ordover and Willig (1981) (predatory conduct if benefits depend on added market power through forced exit).

The following statement summarizes the position of most courts regarding cost before the decisive *Brooke* Case (1992b):

If the defendant's prices were below average total cost but above average variable cost, the plaintiff bears the burden of showing defendant's pricing was predatory. If, however, the plaintiff proves that the defendant's prices were below average variable cost, the plaintiff has established a prima facie case of predatory pricing and the burden shifts to the defendant to prove that the prices were justified without regard to any anticipated destructive effect they might have on competitor.

As summarized in the above statement, AVC and ATC were commonly used as lower and upper thresholds for proving predatory pricing by the courts. However, some researchers observed that this standard was not appropriate for certain industries (e.g., telecommunications) (Grout 2000). Joskow and Klevorick (1979) were the first to recommend the use of long run average incremental cost as an upper threshold. Grout (2000) evaluated alternative thresholds and concurred with Joskow and Klevorick in that LAIC was the most appropriate upper threshold for high fixed cost industries with

multiple product catalogs.

3.3.5 Augmented AVC rule era (1982 – 1992)

The lower courts faced with difficulties when they tried to implement the AVC standard as proposed by Areeda-Turner. Cost was very hard to determine, and there were many criticisms toward the use of a per se short term cost test. The fact that no single plaintiff won a case during the five years following Areeda-Turner made the courts “a defendant’s paradise” (cf. Bolton et al. 2000, p.18).

In the absence of a binding Supreme Court example, lower courts adopted what was called an augmented AVC rule, which also took intent and market structure into consideration. High concentration in markets and barriers to entry were recognized as enablers of recoupment. During the ten year augmented AVC rule period until the Brooke Decision (1983-1993), the plaintiff success rate increased to seventeen per cent and probably would have been much higher if out of court settlements were included in that figure. Bolton et al. (2000) suggested that “a more or less satisfactory equilibrium” was reached during the augmented AVC era. Dismissal of cases by summary judgment was common, and cases remained tough to win, yet the occasional excessive jury awards may have prevented many cases of predatory pricing from taking place.

3.3.6 The Recoupment requirement Era (1993 -)

Recoupment element started to gain importance in the courts during late eighties as evidenced by three cases leading to the Brooke Decision --Matsushita (1986), Cargill (1986a), and Rose Acre (1989). The reasoning used in the Matsushita Case required that

plaintiffs prove not only below cost pricing, but also that the alleged predator either recouped its losses or at least had a very high probability of recoupment. Recoupment would be through succeeding in driving competitors out of the market, restricting output, and raising prices (Sheffett and Petty 1994). During the same year, the verdict of the Cargill Case, in which the plaintiff had alleged that a proposed merger had antitrust implications by enabling the defendants to implement a price-cost squeeze strategy against the plaintiff, was reversed. The Supreme Court held that the proposed merger did not constitute antitrust harm and that the Court of Appeals had erred (1986a). In the Rose Acre Case, the court decided to analyze the possibility of recoupment before analyzing below cost pricing. The rationale was that the determination of likelihood of recoupment was easier than undertaking the cost analyses. It would not be necessary to analyze below cost pricing if recoupment was not considered to be possible (Calvani 1999). The recoupment element evolved into today's final and strict form with the critical Brooke case verdict.

The Brooke decision established a framework in which the plaintiffs were required not only to prove below-cost pricing, but also recoupment of losses suffered during predation. No plaintiff has been able prevail in the courts since the Brooke Decision (Bolton et al. 2000). However, if a company can ever prove that an incumbent used below-cost pricing and also intended to recoup its losses later through supra-pricing, then the courts will rule that this was illegal conduct because the incumbent has harmed the welfare of the society by diminishing the efficiency of the allocation of resources across the society (Gultinan 1996). Yet, the Supreme Court did not define what an appropriate measure of cost is, or elaborate on the issue of recoupment sufficiency.

3.3.6.1 Brooke Case

A brief summary of *Brooke* is provided here and the case is discussed in a later section. The market in the Brooke Case consisted of six main players with little price competition, resulting in high profitability. The plaintiff was the first to introduce a generic and less expensive product. As a result of the introduction of this new brand category, smokers of both the plaintiff's and the competition's brand switched to the less expensive product, increasing the "generic" sales. The defendant (third largest player with 12% market share) introduced counter generic cigarettes with wholesale prices even lower than that of the plaintiff's. A price war took place during which the plaintiff claimed that the defendant sold its generic product at a loss. It was claimed that the defendant was trying to force the plaintiff to increase its generic product prices in an effort to minimize the cannibalization of the defendant's premium brand and maintain its profitability. The jury found the defendant guilty, however that verdict was overruled, reasoning that recoupment was not probable (1993).

First a plaintiff ... must prove that the prices complained of are below an appropriate measure of its rival's costs ... second ... is a demonstration that the competitor has a reasonable prospect [under Section 2a of the Robinson-Patman Act], or under Section 2 of the Sherman Act, a dangerous probability, of recouping its investment in below-cost prices (1993, pp.4702-703).

Starting with *Brooke*, recoupment was perceived to be the ultimate objective of predatory pricing. Unless recoupment was probable, the general view held that price wars (and predatory pricing attempts that failed) were beneficial for the consumers. The court admitted that below-cost tests might not always be effective in determining whether predatory pricing was employed. Nevertheless, it chose to dismiss the

possibility in its administration, arguing that it would be beyond the practical ability of any jurisdiction to control:

As a general rule, the exclusionary effect of prices above a relevant measure of cost either reflects the lower cost structure of the alleged predator, and so represents competition on the merits, or is beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price-cutting. (1993 p. 223)

With Brooke, the Supreme Court also welcomed the idea of dismissals by summary judgment in the absence of proof of below-cost pricing and recoupment. The lower courts embraced the invitation and have dismissed a vast majority of the predatory pricing cases since Brooke.

3.3.7 The Emerging School of Thought

It has been noted that Brooke decision was the most important predatory pricing decision of the modern times. It set a milestone in jurisdiction, and was particularly crucial, as it seemed to destroy the satisfactory equilibrium that was achieved with the augmented AVC rule. It is important to note that almost all predatory pricing cases have been dismissed by summary judgment and that no plaintiff has prevailed in the courts since Brooke. The reason may be that the Supreme Court encouraged lower courts to dismiss predatory pricing cases by summary means (at the lack of market concentration, entry barriers, and capacity to absorb additional market share). Another explanation could be the Supreme Court's skepticism that predation can be a rational business strategy and its disregard of modern theories of predatory pricing. Today, the survival chances of a predatory pricing case beyond the summary judgment phase are slim (Bolton et al. 2000). However, the fact that reputation effects were considered plausible in at least one case

(1995) was a positive development. The courts may start to integrate the thinking from modern theories into the jurisdiction in the near future. DOJ's civil complaint against American Airlines was also based partially on reputation effects.

The proof requirement for recoupment of losses as well as below-cost pricing put a heavy burden on plaintiffs to prove their case. The Supreme Court "sent a chilling message to predatory pricing plaintiffs" with the Brooke decision (Denger and Herfort 1994). Following Brooke, it became very difficult to successfully prove a predatory pricing case in most markets either with below-cost or recoupment elements (Meeks 1998). Proof of recoupment was a legal element additionally required by the Brooke Case.

The critical Brooke Decision was not without its critics. Bolton et al. (2000) argued that the notion that predatory pricing was "rare and implausible" stems from early and old economic theory and that the new approaches have to be used to assess predatory pricing cases. They argued that the Supreme Court failed to take a strategic approach to develop an understanding of the case. The defendant successfully deterred aggressive pricing for an extended period in the future. Aggressive pricing was also effectively prevented in other markets (e.g., branded cigarettes).

The limits of the existing enforcement stemming from earlier decisions including that of the Brooke Case were increasingly criticized. For example, Guiltinan and Gundlach (1996b, p.88) explained that predatory pricing litigation relied on the narrow assumptions of neoclassical price theory. They questioned the underlying assumptions of the theory, which are exclusive motivation for profit maximization, possession of perfect information, and calculated rationality in decision making. They also questioned whether

or not the welfare of the consumers should be judged solely on the basis of allocative efficiency. Ordover and Willig (1981) suggested that opportunity cost of capacity decisions should also be considered. The lack of strategic theory approach and lack of consideration of game theoretic models were also criticized (Bolton et al. 2000).

Predatory conduct in many industries and the inability of neo-classical theory to detect and deal with it became increasingly apparent. Growing literature on the inability of the courts to deal with the problem (Bolton et al. 2000), and the observation of anti-competitive affects of predation on the airline industry (Oster and Strong 2001), led DOT to draft and propose guidelines for governing the airline industry.

DOT Guidelines: The traditional assumption of the Chicago School does not hold well in industries where there is a high fixed cost structure. That was the reason why DOT felt the need to propose a set of guidelines to govern anti-competitive conduct in the airline industry in 1998. Interestingly, DOT guidelines allowed for reputation effects (expected gains from deterring future entry by competition) as evidence for predatory pricing, and did not require proof of below-cost pricing (1998d). In essence, DOT was trying to update the rules that defined anticompetitive conduct for the airline industry. These guidelines are detailed in Chapter 6.

DOJ Efforts: DOJ Antitrust Division Section Chief Roger Fones announced that they would not be using Areeda-Turner (AVC) test, but would be focusing on a measure of costs that the alleged predator “could have avoided had it not embarked upon the pricing/capacity strategy under review” (Fones 1997). It was stressed that the division

would not look into the very short-term average avoidable cost, but would have a short to medium run perspective. He made many remarks regarding the airline industry including “a popular misconception that predation cannot occur in the airline industry because the avoidable cost of filling an empty seat is low” (Fones 1997). Around the same time as this announcement, DOJ also took a proactive stance in detecting and preventing antitrust violations by suppliers. They communicated with general counsels of corporations offering to make presentations on bid rigging, price fixing, and market allocation, and distributed a booklet named "What You Should Know About Detecting and Preventing Antitrust Violations, Antitrust Primer for Procurement Officials" (1997b).

DOJ filed a civil complaint against American Airlines based on reputation effects in parallel with the DOT guidelines in 1999. American Airlines case was the first DOJ brought in more than 20 years. It was seen as a tough case because of the very high standards of proof imposed on the plaintiffs since the Brooke Decision (Carney and Zellner 2000). The case is detailed in Chapter 6.

3.3.8 Differing Practices among States:

The Federal courts generally embrace the notion arising from the early work of McGee (1958), Koller (1971) and Areeda and Turner (1975) that predatory pricing is irrational. Since the Brooke (1993) decision, the Federal courts have required proof of not only below-cost pricing but also recoupment of losses suffered through such pricing (1993).

State courts have generally been generally less demanding and more hospitable to predatory pricing plaintiffs than the federal courts (Sheffett and Petty 1994). For example,

Wal-Mart was found guilty in an Arkansas district court even after the Brooke decision, in a verdict that was later reversed by higher courts (Hawker and Petty 1996). Many states have laws to treat predatory pricing in form of sales below cost statutes or minimum mark-up laws (Haynes 1988). These laws can be generic in nature or may address concerns for competition in specific markets such as gasoline sales. Some states require proof of below cost sales, and some others still adopt a focus from the populist era such as of harm to competitors, rather than harm to competition (Calvani 1999). Cost criterion used by the states is usually Average Total Cost (ATC) or a form of AVC or ATC. State courts infer intent of predatory pricing action either from the below-cost behavior or from other means. The concern for bankruptcy of small competitors is higher at the state level than that at the federal level (Guiltinan and Gundlach 1996). Some states use a sliding scale requiring differing levels of proof depending on how much the price was below ATC (Bruckmann et al. 1995). Appendix A includes an unexhaustive survey of the states regarding their antitrust laws with respect to predatory pricing.

3.3.9 Insights from European Union Regulation:

Even though the outcomes of the U.S. litigation affect the rest of the world and the U.S. appears seemingly unaffected from other country influences, it is still worthwhile to take a brief look to how a continent with a long industrial history is dealing with the predatory pricing issue.

Europe appears to be more aggressive in its antitrust enforcement. Whether above AVC pricing can be predatory is debated. The European Commission comfortably employed AIC cost but one with a longer frame in order to not set the floor too low for

predatory claims. Proof of recoupment is not required, hence a defendant may be found guilty even when it had no reasonable prospect of recouping losses made through predatory pricing (1994c).

The European Commission also recognizes the uniqueness of network industries due to the high overhead involved. For example, there is a general understanding that the average variable cost rule does not normally apply to the telecommunications industry since “the variable costs of providing access to an already existing network are almost zero” (1998b). Similarly, the 1998 Competition Act acknowledges that AVC tests may not be relevant for regulated industries since their variable costs may be close to zero. There is a general agreement among the policy-makers that alternative approaches may be necessary for such industries. Long run incremental cost (LRIC) is considered to be an acceptable test for such industries as it includes both capital and operating costs of the increments. As long as the price is above LRIC, the decision will be profitable, hence rational and non-predatory. In particular, LRIC is the accepted test for the telecommunications industry in particular. As for the time frame, neither the very short, nor the very long time frame is considered appropriate. However, the Commission has admitted that it may have to examine AIC of longer than a year (1998b).

Moreover, the Commission has employed and is supporting the use of combinatorial cost tests for the telecommunications sector. Combinatorial tests can be defined as a sequence of tests where the revenue earned from each service or combination of services must cover the total incremental cost of adding that collection of services to the remaining services (2000a). Unfortunately, combinatorial tests can be very hard to calculate since it requires all combinations to be considered (2000a).

3.4 Critical Cases for the Evolution of Case Law

The evolution of predatory pricing can probably be best observed through a study of important cases through history. The following cases were selected since they represent a summary of the evolution of jurisdiction over time.

3.4.1 Standard Oil Co. v. United States, 221 U.S. (1911)

Standard Oil of the Rockefellers was found guilty in this classic case of monopolization. A major component of the case involved the allegations that Standard Oil had employed predatory pricing to drive its competitors either out of business or to force them to sell it to Standard Oil at distressed prices (1911). It had aggressively purchased 223 independent companies prior to 1907 (McGee 1958). As a result of the case, it was broken up into thirty-three geographically distinct companies (Gibb and Knowlton 1965).

Standard Oil was accused of engaging in predatory pricing (pricing below ATC) to drive competitors out of business and then raising price above ATC to recoup losses. Standard was also accused of buying key input suppliers (i.e., pipeline companies) to control the market, of using its market power position for negotiating discriminatory rail freight rates, and of engaging in business espionage. Even though McGee (1958) later disputed the verdict of the case and argued that no predation actually took place, other researchers have shown that subtle predatory tactics were employed: United Rail charged cartel prices to the whole oil industry except for Standard Oil which got rebates. Standard Oil and the railroads shared the cartel freight profits. By effectively raising the cost of its

rivals, Standard Oil was then able acquire them at distressed prices (Granitz and Klein 1996). Predatory pricing coupled with acquisition is more viable because the period during which the predator incurs losses is shortened and market power is further enhanced. Celler-Kefauver Amendment (1950) to the Clayton Act section 7 prohibited the creation of monopoly through horizontal merger.

3.4.2 Utah Pie Co. v. Continental Baking Co, 386 U.S. (1967)

In this classical example of the populist era, Utah Pie, the leading vendor of frozen pies in its market, brought a suit under Section 2(a) of the Robinson-Patman Act, against three national bakeries alleging that they had engaged in a geographically focused predatory pricing campaign to increase their local market share. The court concluded that the defendants' charged less for their pies in Utah than elsewhere. The plaintiff's market share had diminished from 66.5% to 45% during the forty-four month price war. The Supreme Court reinstated the jury verdict for the plaintiff (1967; Calvani 1999).

Interestingly, the sales volume of the plaintiff had increased and the firm had remained profitable throughout the price war. The court suggested that ATC could be considered an appropriate standard for below-cost. It also "left open the possibility that prices above cost may be predatory if coupled with evidence of anticompetitive intent and a deteriorating price structure. The Court did not comment on whether the evidence in that case would support a predatory pricing claim under the Sherman Act" (McCareins 1996).

The Utah Pie decision was widely criticized. Nevertheless, it marked the high time of early era predation litigation. The winning predation cases of the time were

characterized by the large predators, geographic price discrimination, sales below average total costs, and predatory intent. Dissenting Justice Stewart then observed about the Utah Pie Case that “if we assume that the price discrimination proven against the respondents had any effect on competition, that effect must have been beneficent. The Court has fallen into the error of reading the [statute] as protecting competitors, instead of competition” (cf. Calvani 1999, p.5).

3.4.3 Matsushita Electric Industrial Company v. Zenith Radio Corporation 475 U.S (1986)

In 1986, American television manufacturers sued twenty-one Japanese corporations that sell televisions in the United States. Plaintiffs’ argument was that the defendants conspired to drive them out of the U.S. market with predatory pricing. The court’s logic, and assessment of the Matsushita case became one of the most quoted in the following cases to come:

Any agreement to price below the competitive level requires the conspirators to forgo profits that free competition would offer them. The forgone profits may be considered an investment in the future. For the investment to be rational, the conspirators must have a reasonable expectation of recovering, in the form of later monopoly profits, more than the losses suffered. . . . [T]he success of such schemes is inherently uncertain: the short-run loss is definite, but the long-run gain depends on successfully neutralizing the competition. Moreover, it is not simply to achieve monopoly power, as monopoly pricing may breed quick entry by new competitors eager to share in the excess profits. The success of any predatory scheme depends on maintaining monopoly power for long enough both to recoup the predator's losses and to harvest some additional gain. Absent some assurance that the hoped-for monopoly will materialize, and that it can be sustained for a significant period of time, "[t]he predator must make a substantial investment with no assurance that it will pay off." . . . For this reason, there is a consensus among commentators that predatory pricing schemes are rarely tried, and even more rarely successful. . . . (underline added) These observations apply

even to predatory pricing by a single firm seeking monopoly power (1986b).

Following the above argument, the Supreme Court concluded that the defendants did not have a significant chance to achieve monopoly power and subsequently raise prices in the U.S. market. The court also did not find that the industry had high barriers to entry. Since the court did not find an economic motive for the defendants to predate, it demanded the plaintiffs to provide more persuasive evidence. Earlier verdict of the Court of Appeals was reversed and remanded. An appropriate measure of cost was not defined (McCareins 1996).

3.4.4 A.A. Poultry Farms, Inc. v. Rose Acre Farms, Inc. 881 F.2d (1989)

The case was regarding a price war among egg producers. It was testified by the plaintiff's expert that the defendant's prices were below its average total costs during the war. The defendant's prices had also been less than its average variable costs for a period during the price war. Predatory intent of defendant's executives was also documented: "We are going to run you out of...business. Your days are numbered." (1989, p.1398).

The court stated that it was much easier to conclude from the structure of the market that recoupment was not probable, than it is to determine the appropriate measure of cost and measure cost. Thus, the court decided to first analyze the probability of recoupment before applying a cost test. If recoupment was not possible then it could be inferred that the low price was not predatory even if it were below cost:

Predatory prices are an investment in a future monopoly, a sacrifice of today's profits for tomorrow's. The investment must be recouped. If a monopoly price later is impossible, then the sequence is unprofitable and we may infer that the low price now is not predatory. More importantly, if there can be no "later" in which recoupment could occur, then the consumer is an unambiguous beneficiary even if the current price is less

than the cost of production. Price less than cost today, followed by the competitive price tomorrow, bestows a gift on consumers. Because antitrust laws are designed for the benefit of consumers, not competitors..., a gift of this kind is not actionable. (1989, p.1401)

The court also concluded that intent by itself did not help determine the probability of recoupment, and in the absence of recoupment, even the most vicious intent was harmless to the system: “Entrepreneurs who work hardest to cut their prices will do the most damage to their rivals....If courts use the vigorous, nasty pursuit of sales as evidence of a forbidden “intent”, they run the risk of penalizing the motive forces of competition” (Calvani 1999, p.8). Not surprisingly, the plaintiffs did not prevail in this case.

3.4.5 Brooke Group v. Brown & Williamson Tobacco 509 U.S. (1993)

The Supreme Court decision regarding the Brooke case has been considered to be “the most important predatory pricing decision in modern times.” No single plaintiff has won a case of predatory pricing in the Federal courts since the Brooke Decision was made (Bolton et al. 2000). The Supreme Court developed a two-stage proof framework for analyzing predatory pricing claims during the Brooke Case that no plaintiff has been able to survive since (Bolton et al. 2000).

Brooke Group (formerly known as Liggett) alleged that Brown & Williamson Tobacco Corporation introduced its own line of cigarettes in the generic segment, which Brooke Group had pioneered, and used predatory pricing to stifle price competition in the economy segment of the national cigarette market. Liggett argued that the defendant used below cost pricing and offered discriminatory volume rebates to wholesalers. The

allegation was that the defendant conspired to force Liggett to raise its own generic cigarette prices so that it could introduce oligopoly pricing in the economy segment.

R.J. Reynolds had 28 per cent and Philip Morris 40 per cent market share at the time of the trial. The defendant was a distant third with about 12 per cent. The plaintiff's share (once 20 per cent at its peak) was just around two per cent in 1980 and around five per cent in 1984. On the verge of bankruptcy, the plaintiff introduced low-cost generic (black and white) cigarettes in 1980. This new category of cigarettes was around 30 per cent less expensive and it was an immediate success.

As the success of the generics became apparent, larger firms responded. The defendant was the manufacturer that was hit the hardest. Even though they sold around 11% of the branded cigarettes, their customers were the most price-sensitive and 20% of them had switched to plaintiff's generic cigarettes. The defendant introduced its own generic cigarettes in 1984. The defendant was not the first to respond to Brooke's generic cigarettes, indeed R.J. Reynolds had already repositioned one of its existing brands as generic by 1984 (1993).

However, the defendant not only matched the plaintiff's price at the retail level but also consistently undercut it at the wholesale level. A harsh price and rebate promotion war took place at the wholesale level. After the war, the plaintiff gave in and increased its prices. Generic brand prices increased by 71% and branded cigarettes prices increased by 39% (Bolton et al. 2000).

The Supreme Court held that Section 2 of the Sherman Act is not violated unless plaintiff proves not only that defendant's prices were 'below an appropriate measure of ... costs, but also that defendant had a dangerous probability, of recouping its investment in

below-cost prices” (1993). Unable to meet the burden of the increased level of proof, the plaintiff lost the case despite strong evidence of predation. The defendant had cut its prices below costs, had predatory intent, had decreased its output and increased prices following the period of price war even though its costs were pretty much constant. The parties in Brooke had both agreed that AVC was the appropriate standard therefore the Court did not discuss the issue further (Watson 1998).

The Brooke case brought clarity to a couple of issues to the disadvantage of the plaintiffs: below cost pricing would be a prerequisite to predatory pricing (it followed that a firm can not be held liable of predatory pricing if its prices are above its costs), and proof of recoupment (in form of a reasonable prospect or a dangerous probability) would be required. Condemning above-cost price cuts would be “beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price-cutting” (1993). Unfortunately, this message enables the incumbents in network industries (which have very low AVC structure) to employ predatory pricing legitimately with above (variable) cost prices.

The logic for the recoupment aspect was as follows: the predator needs to recoup its losses of predation to be profitable in the long run (i.e., rational), if predatory pricing does not result in elimination of the rival, then recoupment cannot occur. If there is no recoupment and the competitor is not eliminated, there is no harm to competition and consumers have simply benefited from the low prices. If recoupment is not possible then summary dismissal of a case should be appropriate. This view also shared by the Chicago School of thought, has its flaws, discussed in the Post-Chicago School of thought section of this chapter.

3.4.6 United States v. AMR Corp. et al. (American Airlines) (1999) --dismissed (2001)

The 1999 DOJ suit against American Airlines was the first predatory pricing suit brought forward in more than twenty years (Carney and Zellner 2000). Following the DOT guidelines in spirit, the prosecutors wanted to set an example for the industry. DOJ basically alleged that American Airlines used a temporary capacity expansion and fare reductions to drive new entrants out of its Dallas/Ft. Worth (DFW) hub (1999c). DOJ also had evidence of intent:

“If you are not going to get them [LCCs] out then no point to diminish profit.” Don Carty, Chairman and CEO of American Airlines, 1996

DOJ’s complaint alleged that American Airlines dominated many of the routes from its Dallas hub and charged monopoly prices. American controlled seventy percent of the flight capacity from DFW. Low-cost carriers (LCCs) were proven to have positive impact on consumer welfare through lower prices. DOJ complained that American Airlines cut its prices to a level that would not make business sense except if it could drive LCCs out of DFW before they could get a foothold in the market. Vanguard, Sun Jet, and Western Pacific were victims of the alleged predatory strategy (1999c). All of them were successfully driven out of the DFW hub and subsequently out of business. The DOJ built its case incorporating elements of game theory and strategic economic theory. These allegations, if proven, should have met the burden of predation (Piraino 2000).

The case was to go on trial in Wichita, Kansas on May 22, 2001. However, the Federal court dismissed the case by summary judgment before the trial date. The reasoning was derived from the Brooke Decision. The government had failed to show

that American's pricing was below cost and that recoupment was highly probable. DOJ's modern approach to the case was perceived as an attempt to change antitrust law (Priest 2001), and time-honored rules (case memorandum and order 2001). With the new administration in place, it is not likely that DOJ will be aggressive to bring a new case forward. However, the decision to simply apply the Brooke philosophy to a network industry case basically made parts of the new economy (e.g., airlines, software, semiconductors, bio-technology) exempt from antitrust law (Carney 2001). Even so, Judge Morten concluded:

The government's claims in the present case fail because American did not price below an appropriate measure of cost, because it at most matched the prices of its competitors, and because there is no dangerous probability (even assuming below-cost pricing) of recoupment of American's supposed profits by means of supra-competitive pricing. With respect to costs, the evidence shows that American priced its fares consistently above its average variable costs. Alternative, creative measures of costs proposed by the government are inconsistent with existing law, and inconsistent with an antitrust regime which seeks to nurture rather than throttle vigorous price competition. With respect to the question of recoupment, the government's claims suffer from a pervasive failure of proof...Actual or likely recoupment by supra-competitive pricing finds no basis in the evidence...The government's theory of liability by reputation is not the law, and should not be. A fundamental principle of antitrust law is that it be capable of effective and accurate administration, and not chill the competition it seeks to foster. The government's reputational liability approach would violate this principle, permitting claims of predation based solely upon the subjective and unverifiable complaints of a defendant's competitors. The low fare carriers in question entered the core markets seeking to play a new sort of ball game. The government's theory — that an established competitor should not, and indeed, cannot deviate from its existing market strategy in the face of aggressive price cutting by a new entrant — represents a whole new mid-game spin on time-honored rules. Here American played by the traditional rules. It competed with the low fare carriers on their own terms. It did not price its fares below cost; it did not undercut the other carriers' fares... Summary judgment is appropriate (U.S. v. AMR Corp et al., Summary Judgment, 2001, pp.136-37).

3.5 Legal Elements of Proof

A look into the legal elements to prove for winning a case is insightful for an understanding of the mechanics of the case trials. This section is based on McCareins (1996).

Appropriate Measure of Cost: The courts have not agreed on a definition of an appropriate measure for the cost tests. Appendix A: State Law Survey demonstrates that the states employ many different standards. Similarly, Federal circuits do not have a general standard. AVC and ATC are generally used as thresholds for burdens of proof. The reason for the lack of a generally accepted measure is due to the understandable hesitation of the Supreme Court to define it (McCareins 1996). However, twelve Federal Appellate Courts have typically interpreted the appropriate measure as selling below average variable cost.

Aggregation of Products: Whether cost calculations should be done with respect to a single product, a product line, or a particular outlet or production facility has not been defined. Some circuits have favored an assessment of predatory pricing based on the costs and revenues associated with a full product line, as long as the competition was not limited to a narrower scope (McCareins 1996).

Classification of Costs. There involve heavily debated issues such as determining what is an appropriate measure of cost (average variable cost, average total cost, average avoidable/incremental cost etc.), and classification of the incurred costs as variable, fixed or avoidable depending on the definition of relevant market(s) and choice of time horizon. Accounting and inventory systems vary; the distinction between costs and investments is not clear cut, and it is hard to attribute costs to a specific product line or a

product in the often encountered case of multiple product lines. More recently, the complexity of these issues has been further elevated where whether and how above-cost pricing can be predatory is being examined (e.g., Edlin 2002; Meeks 1998).

Feasibility of Recoupment: This element refers to the proof that the predator will actually profit from predation. This would require that once the rival is eliminated, the predator would be able charge monopoly prices. The predator should be able to exert the monopoly prices for a sufficient period of time so that he can recover his losses during predation and also make a fair return on its investment in predation. Evidence of recoupment was not a required element of predatory pricing in all courts before the Brooke decision, which announced that the predator must be able to recoup losses through supra-competitive prices for the case to be found predatory in nature. It was also inferred that recoupment would not be possible if the markets are competitive, barriers to entry are low, and the alleged predator either does not have the capacity or lacks the resources to create capacity to capture the market share of an eliminated rival (Watson 1998).

There are two general ways that a plaintiff can attempt to prove recoupment. The first path is to show that recoupment occurred through actual market data (supra-competitive pricing for sufficient time to recoup). The second path would be trying to prove that the predatory behavior was likely to bring tacit coordination and oligopoly pricing. Tacit coordination would depend on similarities between the goals of the competing firms, product variety and differentiation in the industry, and likelihood of firms successfully signaling each other about price and output (1993).

Role of Defendant's Subjective Intent: Whether or not the intent of the defendant will play a role in the case depends on the circuit. Predatory intent may be admissible to reverse the assumption that above AVC is legal. Some courts have argued that proof of intent leads to illegal scrutiny through corporate documents and hence is counterproductive. Some have argued that intent is not important as long as the rival could not be eliminated through predation. Intent to monopolize may also be derived from attempts to create artificial barriers to entry, by entry deterring pricing, restrictive marketing practices, acquisition of key inputs, or aggressive expansion of capacity (McCareins 1996).

Role of Barriers to Entry: The Supreme Court view holds that high barriers to entry enable the firm to recoup profits over a longer term. However, with low barriers, predatory pricing may have limited effect on competition since as soon as the incumbent increases prices new rivals will see the opportunity and enter.

Relevant Market: Last but not least, the relevant market refers to the product, service or geographical areas that are involved in the case. Monopoly power of the predator applies to the relevant market through its exclusion of rivals in the market and the subsequent supra-competitive pricing. A product/service market should have its own elasticity of demand, whereas geographic markets can be local, state, national, and even international. “Evaluation of actual, probable, or presumed anticompetitive effects can be done only in the context of a relevant market. Therefore, one of the first steps in an antitrust analysis is determining the boundaries of the relevant market(s)…” (Enders 1986, p.24).

The determination of the relevant markets becomes harder when the multi-product nature of the markets is taken into account. Most businesses have at least one product

line, and most large companies have multiple product lines. A static analysis of predatory pricing may have indicated that it is irrational in a single market, however it can be rational in a multiple market environment where a reputation effect of predation can deter potential entrants in related markets (Trujillo 1994). From a legal standpoint, the relevant market refers to the product, service, or geographical areas that are involved in the case.

Market Power: Monopoly power has been defined as “the power to control prices or exclude competition” (1956, p.391; 1979, p.272). The existence of market power can be simply inferred when a defendant has pre-dominant market share (1966, p.571).

The structure of a market may be derived from the study of the number and size of firms, their cost and demand conditions, product differentiation, the nature of any entry barriers, and degree of regulation. Industry Concentration Ratio (percentage of total sales of the n (usually four) largest firms in an industry) and the Herfindahl-Hirschmann Index ((HHI) –sum of the squared market shares of all firms) are two commonly used market structure indicators. However, the calculations for both measures need to be based on the relevant market figures to be meaningful.

Application of performance based market power tests include practical or conceptual difficulties, hence most studies use market structure tests. Previous studies have generally shown a positive correlation between market concentration and profitability (Shepherd 1970) (though the actual relationship may be more complex due to omitted third variables (Bharadwaj and Varadarajan 2004)).

The U.S. Department of Justice's merger guidelines suggest that an HHI over 1,000 may raise antitrust concerns (1997a). According to the 1992 DOJ/FTC Horizontal Merger Guidelines, markets with an HHI greater than 1800 are considered "highly

concentrated," and the DOJ/FTC will not approve mergers and acquisitions in highly concentrated markets if there is even a slight increase in the HHI (1997a). Courts will not predation credible unless the incumbent has market power.

3.6 The State of the Debate on Predatory Pricing

The purpose of the Antitrust Act and its application in the courts is a continuously debated topic. As mentioned previously, there are two main schools of thought. The Chicago School of thought based on the neo-classical theories argues that predatory pricing is “rarely tried and even more rarely successful” (1986b). On the other side, the emerging Post-Chicago School of thought argues that there is plenty of evidence that new approaches such as strategic theory and game theoretic models provide that predatory pricing can be rational and profitable for the predator (Bolton et al. 2000). The two schools are compared next:

3.6.1 The Chicago School

In an early work that continues to influence the courts today, McGee (1958) studied the 1911 Standard Oil Case, which was considered to be the classic case of predation. He found no evidence in the case trial records that Standard Oil had indeed had cut its prices below cost to drive out smaller competition and later intended to increase prices. He argued that predatory pricing by Standard Oil would have been irrational because of the relatively larger losses it would have had to suffer due to its higher market share. He also argued that the prey would not be inclined to leave the market since it knows that the predator cannot afford such large losses infinitely. Funding for the prey

would not be a problem either since capital markets would effectively step in as long as it is an efficient producer. He claimed that the predator would not have gained anything even if it could drive competition out of the marketplace because the prey, a purchaser of prey's assets or new competition could enter the market as soon as the predator increases its prices.

With the lack of a rival theory, McGee's (1958) analysis was considered to be the only coherent economic theory of predatory pricing (Bolton et al. 2000). Other scholars such as Koller (1971; 1978); Areeda and Turner (1975; 1996), Harold Demsetz (1973), Demsetz and Weiss (1975); George Stigler (1987); and Wesley Liebeler (1986) expanded upon this work and built the foundation of the Chicago School of thought. During the nineties however, despite the late effort by John Lott (1999; 1996) the Chicago School seems to have lost its dominance in academic journals.²

Free enterprise institutes carry on the mission of the Chicago School. Institutes such as the American Enterprise Institute, Heritage Foundation, and Cato Institute (www.cato.org) promote free markets and limited government. They sponsor Chicago School stream of research through their funding which comes from foundations, corporations, and individuals. They maintain numerous web sites and publish journals, magazines, and newsletters to keep the Chicago torch burning. Foer and Lande (1999) reported that each of the above institutions spends around up to \$30 million and argued that their lobbying has resulted in considerable decline in Federal antitrust funding over time.

The courts continue to empathize with the Chicago School and have been

² I am joined by Bolton et al. (2000), and Sappington and Sidak (2000) in my critical view against the validity of Lott's findings.

exercising it as though there are no opposing theories. Judges who have openly sided with the Chicago School include judges Bork (1978) and Easterbrook (1984; 1981). There seems to be a prejudice that most cases are brought forward by the small companies to create heavy litigation costs for large corporations. For example, Judge Easterbrook estimated the average cost of a predation case for a major corporation to be around \$30M and even went as far to argue that the antitrust offense of predation should be forgotten (Easterbrook 1981, p.337).

The general argument of the Chicago School has been summarized here based on the work of DiLorenzo (1992). The counter argument of the emerging school of thought is presented in the next section.

7.1.2 Chicago School Claim: Predatory pricing is irrational and very rarely (if ever) occurs because:

1. Predatory practices are more costly for the large firm due to its larger market share (it has to incur losses on a larger number of units) (McGee 1980).
2. It is not possible to continuously charge supra-competitive prices. Potential entrants will be lured one after another. The incumbent cannot recoup losses (Gomez et al. 1999).
3. Price wars are inherently uncertain, thus recoupment possibility cannot be calculated accurately. A price war could also spread to surrounding markets, making predation even more risky. McGee (1980) argued that even though predatory pricing is usually irrational, it is generally rational for the victim to hold on because predatory pricing strategies represent temporary cuts in prices. Furthermore, Easterbrook (1981) argued that the victim has the same incentive as

the predator to outlast its rival and possibly collect eventual monopoly rents. In expectation of supra-normal price levels and profits that will follow the price war, capital markets can step in and help the prey. Thus, deep pockets argument will not hold (Gattuso and Boudreaux 1999).

4. The prey firm can shut down and wait for supra-normal prices. In the meantime, if they go out of business, someone else can take over.
5. There are opportunity costs associated with the funds allegedly used for predation by the large firm.
6. Consumers could potentially stock up during predation; limiting quantity per consumer also would not work as competition would step in and supply the unserved demand.
7. Victims can arrange for long term contracts above predation prices with customers if they also realize that monopoly prices will follow. Since the customers will benefit from the prey's continued existence as a supplier, they may agree to such long term agreements to buy at a truly competitive price.
8. Anticipated monopoly profits have to be discounted to present value, diminishing any value predation may have had. Indeed, the future recoupments must be discounted by the probability that monopoly power will not be achieved, and then discounted again to present value (Easterbrook 1981, p.272). Acquisition is a much more profitable way of eliminating a competitor (Gomez et al. 1999).

According to the Chicago School, economic efficiency of the market should be the goal of antitrust (Bork 1978). This interpretation evolves around maximizing

productive and allocative efficiency. The productive efficiency is simply defined as the ratio of the outputs in relation to the inputs the companies employed. Allocative efficiency refers to the general efficiency of the markets and involves how the limited societal resources should be allocated across industries. Allocative efficiency in general is referred to as the consumer welfare (Gundlach 1995).

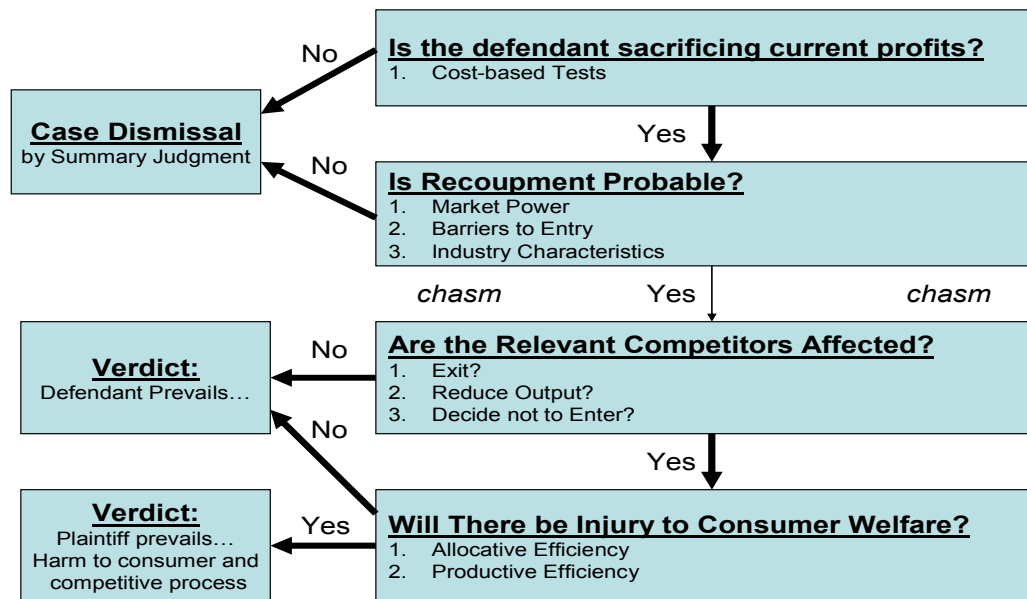
The stance regarding merger and acquisitions is also a very important antitrust issue. It is also related to predation since mergers and acquisitions typically lead to dominant market power for the firms involved, the prerequisite for predatory pricing. The Chicago School view of mergers can be summarized as follows: as long as benefits (productive efficiency benefits to merging firms, and allocative efficiency benefits to consumers) of a proposed merger is not lower than the potential loss to the competitors, it would not be seen as a violation of antitrust. Similarly, the Chicago School claims that in an industry with two levels where the production is monopolized and distribution is competitive (i.e., gasoline), the monopolist cannot increase its profits by acquiring the distributors. Increasing the retail markup will mean decreasing the producer markup by the same amount. The monopolist cannot maximize its profits beyond the monopoly profits (Posner 1976).

The intent and drastic price cuts that the populist era emphasized are not important for Chicago School: “intent plays no useful role... Firms “intend” to do all the business they can, to crush the rivals if they can...[A] desire to extinguish one’s rival’s is entirely consistent with, [and] often is the motive behind, competition...[P]rice reductions are carried out in a pursuit of sales, at others’ expense. Entrepreneurs who work hardest to cut their prices will do the most damage to their rivals...” (1989,

pp.1401-1402). It follows that the intention to compete is not different than the intention to exclude a rival.

Some Chicago School extremists take the position even further by claiming that below cost pricing should also be legal. It has been argued that meeting price cuts, discounting for introducing new products and excess capacity of perishable products are already acceptable reasons for below cost pricing (Boudreaux and Kleit 1996). It was proposed that all government monopolies including the postal service and public schools be deregulated (Boudreaux and Kleit 1996b) and that all direct competitor suits be prohibited (Boudreaux and Kleit 1996a).

The Federal Courts attempt to detect cases of predatory pricing through the assumptions and the logic of Chicago School which is derived from the neo-classical price theory view (Guiltinan and Gundlach 1996). Figure 3.4 illustrates the decision-making criteria that the Federal courts use today.



Adopted from Guiltinan and Gundlach (1996, p.89)

Figure 3.4: Decision-Making Framework in the U.S. Federal Courts

3.6.2 Post-Chicago School of Thought

Even though Koller (1971), Areeda and Turner (1975) and other earlier literature provided seemingly counter evidence for a rationale of the existence of predatory pricing, the claim for a myth of predatory pricing remained unjustified (Bolton et al. 2000). Koller had reported that out of 23 cases he studied, actual predation was attempted in seven (30%) and achieved in four cases (17%). Zerbe and Mumford (1996) studied the same cases since 1940 and updated them until 1982. They detected predatory pricing in 27 out of 40 (68%) of the cases.

Both of these studies probably under-reported the cases of predation because they did not include settlements, predatory disciplining where no suit is filed, forced acquisitions, and cases that were not filed because supporting theory was not yet

discovered or known (Bolton et al. 2000). Granitz and Klein (1996) conducted a re-assessment of the Standard Oil case, and on contrary to McGee's (1958) work found evidence that predation had occurred. Perhaps, actual predatory pricing cases are not as rare as the courts have concluded (Adams and Brock 1996). "Exclusionary strategies are frequent, not exceptional business practices"(Brodley and Hay 1981, p.1045). Bolton et al. (2000) argued that there is now a consensus in modern economics that predatory pricing can be a rational and successful business practice. They indeed made the claim that no major article has had a counter statement during the last three decades. Many weaknesses of the Areeda-Turner rule and the Chicago School arguments have been reported (McCall 1987).

Many of the early critics of Areeda-Turner focused on its short run focus. For example, Joskow and Klevorick (1979) argued that "...to dismiss entirely an assessment of long-run effects, as for example Areeda and Turner seem to do, is to dismiss the essence of the predatory pricing problem." Williamson (1977) argued that temporary price cuts have negligible benefits and resulted in long-term social welfare problems.

The solely cost based approach of Areeda-Turner was also criticized for being impractical. Accounting and inventory systems vary; the distinction between costs and investments is not clear cut; and it is hard to attribute costs to a specific product line or product in the often seen case of multiple product lines. Areeda-Turner cost-based tests are difficult to apply due to the multi-product nature of most businesses (Gomez et al. 1999). The emerging view's counter arguments of the Chicago School are summarized below, and additional points follow.

7.2.2 Post-Chicago School Response: Predatory pricing can be rational and may frequently occur because:

1. Predatory practices are not necessarily costly for the large firm due to its larger market share because predation does not occur in every segment of the market. It is usually geographically or otherwise localized to a segment. Instead, the predator may subsidize its local losses by its profits in other segments and wage war much longer.
2. It may be possible to charge supra-competitive prices due to high barriers to entry, reputation and other signaling effects. Potentially more efficient entrants see what happened to the previous entrant, and may decide not to commit the high level of resources needed to fight the incumbent. A valid purpose of predation may be to develop a reputation as a tough competitor (Comanor and Frech 1993), (Kreps and Wilson 1982). Bad lock-ins in network industries may result in loss of welfare.
3. Price wars often result in the destruction of the small competitors due to the deeper pockets of the predators. Capital markets will not necessarily step in and help the prey because of reputation effects. “Each time a start-up is driven out of a market, the difficulty of obtaining funding ratches up a notch.” The fact that there is no readily available financing for a start-up that has faced predatory practices is a direct contradiction of Chicago theory. Lenders normally require substantial security, a demonstrated ability to repay. If the loan is perceived to be risky, higher interest rates will result. It is not likely for prudent lenders to give credit at all to a small prey facing predation by a large and experienced firm (Atwood 1998).

4. It is not realistic to argue that the prey firm can shut down and wait for supra-normal prices. Brand equity is hard to build up and customers value continuity of products and services.
5. There are opportunity costs associated with the funds allegedly used for predation by the large firm, however there are opportunity costs associated to the capital of potentially more effective entrants as well. They will not enter the market if they have other options where they are not likely to meet with predation. Moreover, the opportunity cost argument presents a rationale for predatory pricing. Foregone profits, that would have been earned if the monopolist had employed its assets in alternative options rather than using them to predate in the subject market, also represent costs (Ordover and Willig 1981). Comanor and Frech (1993) argued that the predator incurs losses from an economic sense, but not necessarily from an accounting sense. The loss is the lower profits than otherwise could have been earned.
6. The argument that consumers could potentially stock up during predation, simply does not hold for network industries (e.g., transportation, software, telecommunications) and services and is not practical for many other industries. Customers would not engage in long-term contracts above predation prices unless they realize the full implications of the ongoing predatory pricing. They normally would try to maximize their short run returns as long as they believe they have alternate suppliers. Moreover, long term contract argument does not hold for consumer markets (e.g., airlines).

7. Anticipated monopoly profits may have to be discounted, however the strategic long-term gains also need to be built into the equation. What would the incumbent's losses be if it had remained inactive? How many potential entries were discouraged by the predatory behavior? These are hard to estimate but the long term impact on business is not. Recouping the investment may be much easier than thought. Case studies have suggested that predators have occasionally succeeded in recouping their losses (Adams and Brock 1996).
8. Contrary to what Easterbrook (1981) argued, litigation can be much more costly for smaller companies which throughout the case have to incur legal fees they cannot afford. Typically, large firms departmentalize the case as they have the personnel and the resources to do so; however, the prey's management can easily get drawn into this side effort and drown in the increasing details of the case.

The arguments above and the emerging Post-Chicago School of thought could be observed in the works of Klevorick (1993), Ordover and Saloner (1989), Craswell and Ratrik (1985). The Post-Chicago School raised numerous issues that the Chicago School theory had not captured before (1998a). Gultinan and Gundlach (1996) criticized the old school of thought because it relies on the assumptions of neo-classical theory such as singular motivation of managers for profit maximization, and firms' possession of complete information.

Sole Profit Maximization: There may be practical objectives other than sole profit maximization. Managers may settle for satisfactory rather than optimal levels (Baumol 1967; Simon 1979). Predatory pricing generally leads to a drastic increase in market

share, which if aligned to performance evaluations, may be a motivational factor for managers. Maximization of career opportunities has also been offered as an alternative for sole profit maximization (Stelzer 1987). Urbany and Peter (1994) have shown empirical evidence for a preference for volume rather than profit orientation. Their experiment indicated that manufacturing firms held a long-term perspective for customer acquisition and in estimating their worth.

Rational Decision Making: Decision making under uncertainty is not rational. Guitinan (1996) argued that managers do not estimate probabilities accurately when they are dealing with risky situations. Simon's (1957) highly regarded concept of bounded rationality implies that: a) buyers/managers are not aware of their comprehensive set of alternatives, b) they do not know the outcome of taking a specific alternative with certainty, and c) they do not have the mental capacity to rationally process all perceived alternatives. Individuals tend to develop noncompensatory preferences (e.g., elimination by aspects) when faced with complex decision scenarios (Bettman et al. 1998).

Kahneman and Tversky (1979) have long demonstrated that individuals do not necessarily maximize their economic utility in the way predicted and assumed by neo-classical economics. Their Nobel prize winning prospect theory essentially claims that individuals have differing risk preferences and display risk-averse characteristics for gains and risk seeking characteristics for losses (i.e., a sure \$50 bonus would be preferred over a coin toss for \$100 or nothing, whereas a coin flip for a \$40 parking ticket or nothing would be preferred over a sure \$20 parking ticket). That is, the utility curve for gains is concave whereas the utility curve for losses is convex and also with a steeper slope. Thus, managers are risk-averse for gains but risk-affinitive for losses.

Post-Chicago Proposals:

Meeks (1998) criticized the static nature of the traditional analysis and argued that it may lead to unsatisfactory results if cost is used as the main criterion. He argued that for anti-competitive conduct to occur, the price need not even be below cost, as long as it was low enough to deter entry, and supra-competitive prices would occur once the potential competition is eliminated. He proposed a non-cost based approach for detecting predatory pricing in transition markets (e.g., telecommunications). It was important to consider if the market was recently deregulated or associated with one that is regulated. He suggested that if the lower price was offered to a large segment of the market, it was probably not a static move aimed at preventing new competition. The predating firm had to possess market power (at least 50%). Strategic harm to potential competition had to be the most likely explanation for the predatory action and the barriers to entry had to be high (Meeks 1998).

Bolton et al. (2000) in their award winning effort argued that modern economics principles should be employed to submit proof of predatory pricing. In particular, they suggested that the pro-competitive dynamic gains such as reputation effects should be considered, and short and long run incremental costs should be employed for proof of below-cost pricing. Essentially, their proposal required the following elements to be incorporated:

1. *Facilitating market structure*: “Short-run pricing power” had to be present in the market. This would be typically observed by the existence of one or more dominant firms and high entry and re-entry barriers.

2. *Scheme of predation and supporting evidence*: A persuasive evidence of recoupment would have to be presented at the absence of a plausible scheme of predatory pricing.
3. *Probable recoupment*: Probable recoupment as opposed to actual should be sufficient. Moreover, intangible benefits from injury to competition and exclusionary effects would be acceptable.
4. *Price below cost*: They proposed that AVC should be substituted with Average Avoidable Cost³, and ATC should be substituted with long run average incremental cost (LRAIC).
5. *Absence of an efficiencies or business defense*: A plausible efficiencies gain, no less restrictive alternative, and efficiency-enhancing recoupment would have to be demonstrated.

This proposal was a novel attempt to incorporate the dynamic strategic perspective into the current antitrust policy. Guiltinan and Gundlach (1996) argued that a dynamic strategic approach underlines the insufficiency of the current law to cope with aggressive and predatory pricing.

In summary, the Post-Chicago School contends that it may be rational and plausible for firms to employ predatory pricing (Hazlett 1995). It examines the relevant markets with a strategic perspective, considers impact of opportunity costs, and imperfect information (Bolton Brodley, and Riordan 2000; Brodley and Hay 1981; see Bloom and

³ Average Avoidable cost: Average per unit cost that predator would have avoided during the period of below cost pricing had it not produced the predatory increment of sales.

Gundlach (2001a) for a discussion of differences between Chicago and Post-Chicago Schools of thought). Simply put, the Post-Chicago view is that markets are generally not perfect, and they are not necessarily self-correcting (Gundlach et al. 2002). Some of the prominent names that have supported this stream include Lawrence Sullivan, Paul Joskow, Alvin Klevorick, Janusz Ordover, Robert Willig and Joseph Stiglitz (Elhauge 2003).

Marketing perspective is well aligned with the Post-Chicago School of thought in its basic position. Additional assumptions of marketing to that of the Post-Chicago School are alternatives for assessing consumer welfare (e.g., variety, innovation, satisfaction), and the possibility of irrational decision making and non-profit maximizing goals (Gundlach 2001). Marketing could well assume a complementary role due to its cross-disciplinary nature which has not yet been realized (Gundlach et al. 2002).

3.7 Synthesis and a Marketing Perspective

3.7.1 The Need for a Marketing Perspective:

The unique position of marketing to offer public policy insights has been observed by several scholars working on the subject (Grewal and Compeau 1999; Guiltinan and Gundlach 1996b). It was suggested that a marketing focus on predatory pricing is overdue (Grewal and Compeau 1999). The many aspects of consumer welfare, which is of key concern to public policy, can be captured with the comprehensive marketing measurement and modeling tools that enable the study of the benefits of quality, service, variety, and innovation to consumers (Guiltinan and Gundlach 1996). The marketing discipline has the potential to further the understanding needed for the

development of a more suitable antitrust policy (Gundlach 1995). This potential has not been utilized by the courts so far. A review of the marketing mix variables could reveal a better understanding of predation than a focus on pricing alone.

The issue facing legislators of predation is indeed similar to one researchers face when designing a scientific study. Defendant's conduct can be presumed legal (i.e., non-predatory) for the null hypothesis (stemming from the notion of being innocent until proven guilty). Alternate hypothesis would be that the defendant's conduct is illegal (predatory). The risk that an incorrect conclusion may be reached always exists. A balance needs to be sought through the manipulation of Type I (rejecting the null hypothesis when it is true), and Type II (failing to reject when null hypothesis is false) errors, and the respective power (probability of successfully rejecting the null hypothesis when it should be rejected) of the test. Legislators set the evaluation criteria (e.g., Areeda–Turner AVC rule), imposing rigid parameters that apply to everyone in the name of being just. The set criteria, hence the parameters can drastically shift over time as differing success rates of plaintiffs for similar cases show. In some cases, however, the judges may have set unfortunate examples when they interpreted these criteria too strictly. The influence of these (Supreme Court) decisions may have resulted in the self-fulfilling prophecy that predatory pricing is a “myth.” Yet, the courts seem to be content with this situation due to their comforting assumption that predatory pricing “rarely” succeeds and that consumers benefit from failed predation attempts. A minimal standard (i.e., higher alpha level) would have been costly for the competition, because a number of wrong inferences (i.e., rejections through Type I error) would have a negative impact on desirable price cutting behavior (1993, p.226).

3.7.2 A Focus on Deregulated Markets:

It was argued that price discrimination has to accompany strategic predatory pricing since predation is usually targeted by geography or other segmentation (Meeks 1998). Dempsey (1989) discussed how deregulation of an industry facilitates discrimination. Brennan (1995) studied deregulation in the telecommunications industry and detected potential for predatory pricing. The same hazard was detected for electric power, natural gas (Meeks 1998) and airline industries (Kahn 1987). Meeks (1998) argued that recently deregulated industries are much more likely to have examples of predation than those that are not. This interesting notion is reflected in the following framework (Figure 3.5).

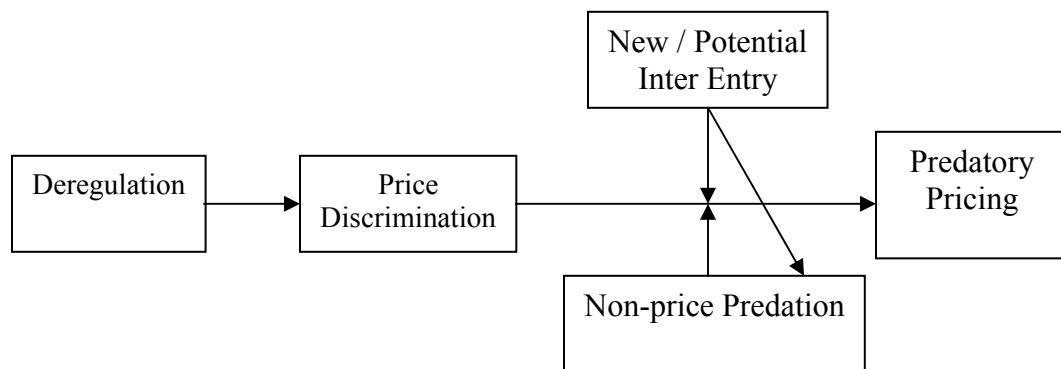


Figure 3.5: Framework for Deregulation and Predatory Pricing Relationship

Naturally, industry characteristics influence all factors in this framework including deregulation. The number and size distribution of firms, cost and demand conditions, and barriers to entry impact firm strategies. However, it is also true that deregulation often transforms a monopolistic industry to an oligopoly with a number of

firms with high market power. Since no precedent has been set, it can be easy to employ price discrimination. It is particularly easy to discriminate in previously regulated service industries because there are few arbitrage opportunities for the consumers (e.g., leisure traveler cannot transfer plane pre-purchased plane tickets to businessmen on the run). Robinson-Patman Act limits price discrimination for commodities and does not generally apply to service or lease industries (1936). This enables such industries to set supra-competitive prices. Kotler and Armstrong (1991, p.343-44) described an airline industry that has taken full advantage from the possibilities of price discrimination:

The passengers on a plane bound from Raleigh to Los Angeles may pay as many as ten different round-trip fares for the same flight—first class; first class-night; first class-night, child; first class-youth; coach; coach-night; coach-night, child; Super-Saver, nonrefundable fare; Super-Saver, 25 percent cancellation penalty; and military personnel. These fares vary from \$238 to \$1512!

The existence of discrimination could provide rationale for predation because discounters with their low cost structure can be very damaging to the incumbent's established price discrimination strategy based on market segmentation. For example, revenue management is essential to the success of the hospitality and airline industries, and is closely related to marketing through price. Major carriers' predatory behavior against the low cost carriers has been observed in the airline industry (1998c; 1999b; 1999c; 1999d). Incumbent firms may also employ non-predatory tactics to prevent new entry to their bases of market power.

3.7.3 Epilogue

By all accounts, the 1975 Harvard Law Review article “*Predatory Pricing and Related Practices under Section 2 of the Sherman Act*” by Phillip Areeda and Donald F. Turner was the seminal article in predatory pricing. All U.S. courts have been influenced by this article in one way or another. It has been noted that the widespread acceptance of Areeda-Turner and the conservatism in the U.S. courts, especially since the eighties, may be explained by judiciary appointments by conservative Presidents, the intellectual influence of the Chicago School and the extensive public relations campaigns to communicate its aspects to the judges, and the contrasting lack of an organized antitrust effort (Foer and Lande 1999). Following Areeda and Turner (1975), that predatory pricing is rare and AVC is the measure to test the claims of predatory pricing have been generally presumed by the courts with some exceptions mostly on the State level.

However, Areeda and Turner and the Chicago School have had their share of criticisms:

Scherer has demonstrated that the Areeda-Turner rule would not promote long-run economic welfare, would not ensure an efficient allocation of resources, and would encourage firms to maintain excess capacity. Greer has shown that the Areeda-Turner rule relying on either an average variable or marginal cost floor would be overly lenient in that it would allow the destruction of equally (or more) efficient rivals. Dirlam has also rejected cost-based rules, noting that they are too rigid and would require difficult and ambiguous short-run cost measurements. Finally, Beckenstein and Gabel have argued that succinct per se rules are unable to deal with some anticompetitive practices and other subtle forms of business behavior like predatory investment, economies of scope, vertical integration, and experience curve learning (McCall 1987).

The criticisms of the Post-Chicago School are summarized in Table 3.2.

Table 3.2: Criticisms regarding the Areeda-Turner rule and the Chicago School

Theoretical	<ul style="list-style-type: none"> • Uses unrealistic assumptions of neo-classical price theory (e.g., Lande 1993; Gultinan and Gundlach 1996) • Describes the manufacturing era of the past <i>versus</i> the current knowledge/network society (e.g., Bolton, Brodley, and Riordan 2000) • Previous empirical findings were flawed (e.g., Granitz and Klein 1996; Zerbe and Mumford 1996). • Predatory pricing <u>can be</u> rational (e.g., Adams and Brock 1996; Sullivan and Grimes (2000) • Lacks a strategic perspective (e.g., Williamson 1977; Joskow and Klevorick 1979) • Ignores reputation, signaling effects and information asymmetries (e.g., Comanor and Frech 1993; Jung, Kagel, and Levin 1994; Milgrom and Roberts 1982) • Ignores the nature of network/service industries (e.g., European Commission 1998) • Ignores opportunity costs of actions (e.g., Ordover and Willig 1981) • May exclude (more) efficient rivals (e.g., Greer 1979) • Promotes inefficient allocation of resources and excess capacity (e.g., Sherer 1976)
Legal	<ul style="list-style-type: none"> • Cost rules are hard to calculate, impractical (e.g., Sievers and Albery 1991) • Short-run cost focus is irrelevant (e.g., Dirlam 1981; Meeks 1998) • Per se rule is inapplicable to all cases (e.g., Beckenstein and Gabel 1986) • Litigation can be costly for the prey (e.g., Atwood 1998)
Managerial	<ul style="list-style-type: none"> • Promotes selective and geographic predation (e.g., Allvine 1996) • Narrow view of market power (e.g., Trujillo 1994) • Ignores deep pockets of predators (e.g., Atwood 1998)
Buyer	<ul style="list-style-type: none"> • Does not promote long run economic welfare (e.g., Scherer 1976)

Despite these criticisms, the Chicago School has keenly used Areeda-Turner as the basis for their static, neo-classical price theory arguments for more than two decades. However, not only the contexts of predation and the nature of the problem have changed over the years, but also the opposing Post-Chicago views have been growing stronger (1998b). Hence, it is worthwhile to revisit the Areeda and Turner (1975) article and comment on its key limitations in today's economy.

The context in which Areeda and Turner published their article was radically different than that of today. In the Areeda and Turner world, the economy was still driven by production of oil, steel, and commodities. Sheer output was what mattered most. In the manufacturing era, it was presumed that the bigger was better, higher capacity would lead to better economies of scale and a better cost structure. Being large enabled them to gain

dominant market share and hence market power. Areeda and Turner projected of a dominantly manufacturing world where there is either perfect competition (i.e., many firms take going price) or monopoly (i.e., one firm sets the price). “The view that predatory pricing is rare or even fanciful is based on theoretical constructs that ignore the realities of markets in which oligopolistic structure, incomplete information and strategic behavior are commonplace” (Sullivan and Grimes 2000, p. 145).

The “real world” is almost always somewhere in between a monopoly and perfect competition, with differentiated products of oligopolies instead of commodity outputs and identical firms. In the real world, the firms do not compete only on quantity and price. It is a service-based economy that is pre-dominant in the U.S. society today. The small firm can be more efficient and welfare enhancing than the corporate giant. Small service companies from catering to transportation, and entertainment to management consulting can be as or more efficient than the big players. Southwest in the airline industry is one clear example of an efficient firm. The nature of the airline industry enables clear illustrations of the new issues facing the policy makers.

Areeda and Turner perceive two pre-requisites for predatory pricing: a greater financial staying power by the predator and a very substantial prospect of recoupment. The use of Chicago School doctrine, made it really easy for Judge Marten to decide that American had indeed not violated the law and to dismiss the case by summary judgment. American had not priced below AVC, and the recoupment of losses incurred during the alleged predation was not probable anyway (memorandum and order) (1999c). Yet, looking at the same facts, DOJ and the Post-Chicago School concur otherwise. Modern thinking in antitrust, dubbed here as the Post-Chicago School deals with reputation

effects, game theory, conspiracies to raise rival's costs or reduce rival's revenues and even scanner data input analyses where applicable. The Post Chicago School studies the relevant markets with a strategic perspective and considers the firm's opportunity costs of its actions.

The current antitrust enforcement does not consider the differences in competitive reaction to entry by intra- and inter-type companies. This purposeful ignorance extends from the Pre-Areeda-Turner enforcement era heavily criticized by the Chicago School. The Robinson Patman Act (1936) was passed with the general intent of protecting the mom-and-pop stores from the chain-store revolution. Many small stores won cases of predatory pricing against the large (and generally more efficient) chains until Areeda-Turner set the tone for the rest of the century, and the objective of antitrust became guarding the competitive process and not the (small) competitors. For example, entrant Wall-Mart grew as a discounter by undercutting the high-service/high cost department stores and established itself as one of the largest retailers in the world. The incumbent local mom-and-pop stores did not have much other than their older but loyal clientele to defend themselves against the chains. The stores that were less efficient simply faded away.

Areeda and Turner (1975) utilized a number of purely theoretical examples to illustrate their points, and they readily admitted that some of these scenarios posed threat to long-term competition. Areeda and Turner did not believe that a long-term dynamic test of predation could be practically developed. They reasoned that their short-term static cost focus would be practical. However, the very notion of recoupment represents a strategic assessment of a long-term return (supra-normal profits) on a short-term

investment (predatory pricing). Thus, the nature of the problem imposes the need to use a strategic-dynamic test (rather than a short-run static rule) to assess predatory pricing.

Today, technology enables market segmentation at the micro-level. Companies offer product/service lines with different levels of utility at varying prices (e.g., premium, standard, discount). Specialization and focusing on different market segments or niches is also common. Customer Relationship Management and other sophisticated marketing tools permit customizing the product/service offer even to the individual consumer's needs. However, this targeting capability becomes destructive if predatory pricing is pinpointed at a local rival. For example, American Airlines did not cut prices on all or even most of its routes on its DFW hub when it faced entry by discounters. It cut its prices only on those routes in that it competed head to head with them. This geographic segmentation enabled them to subsidize losses incurred during the time of predation on targeted markets. The revenue and losses at stake were insignificant for American but vital for the survival of Vanguard (and SunJet and Western Pacific which are now out of business). As the American Airlines case justified "devices other than a general price-cut may, however, be the subject of suits for predation" (Areeda and Turner 1975). Such selective or geographic price cuts provide the major airline next to infinite staying power through cross-subsidization.

Moreover, American increased capacity on these routes by shifting its aircraft from more profitable routes. Any business expanding capacity entails opportunity costs. "[A]ny cost calculation that totally ignores the opportunity cost component is likely to be illegitimate...it is essential to include all opportunity costs of ownership inputs..." (Baumol 1996). Foregone profits that would have been earned if the monopolist had

employed its assets in alternative options rather than using them for predation represent costs (Ordover and Willig 1981). Ironically, Areeda and Turner rule does not take the opportunity costs into account. Predatory pricing analyses appear to be plagued by cost issues.

Areeda and Turner have advocated the per se AVC rule, however, in their seminal work they also asserted that “virtually all costs are variable when a firm, operating at capacity, plans to double its output by constructing new plants and purchasing new equipment” (1975, p.701). Deep discounts coupled with drastic volume increase can indeed be the typical response to market entry depending on industry characteristics (e.g., air and truck transportation). Thus, the use of an ATC test (i.e., a less rigorous test than that of AVC), may be practically justified under special circumstances.

Price discrimination today is a typical practice in service industries and is not regulated by the Robinson-Patman Act. It has been shown that economies of scale can motivate a price-discriminating monopolist to engage in unprofitable conduct and sell even when the average cost is higher than the price. The incurred losses can be effectively subsidized with profits from other markets. This can have harmful effects on social welfare (Park 2000).

Areeda and Turner (1975) argue that “a demonstrated willingness to indulge in predatory pricing might itself deter some smaller potential entrants... Repeated predation in the same market, moreover, is not only costly but is likely to be easily detectable and thus the occasion for severe antitrust sanctions.” Indeed, this argument is the essence of the theory of reputation effects. Areeda-Turner is practically the standard rule in courts today. Yet, it does not equip us to detect predatory pricing in many cases in a service-

based economy and makes it almost impossible to detect it in network industries (Carney 2001). Even the most deliberate cases of repeated predation may not be detected today because of over-reliance on the Areeda-Turner rule.

According to the Federal courts, (predatory) intent is at best a secondary criterion to consider (*A.A. Poultry Farms, Inc. v. Rose Acre Farms* 1989). This may have to do with the fact that both the Chicago School and the Post-Chicago School agree that the firm's objective is profit maximization. Interestingly, a decision-making perspective adopted by marketing, and one that goes beyond both schools is an understanding that alternative and multiple managerial objectives such as survival, satisficing (e.g., simply meeting the Wall Street numbers), and enhancing sales, personal welfare (i.e., self-compensation, career advancement), reputation effects, and social welfare do exist (Gundlach 2001). Sales management researchers have long studied the optimal employee compensation mix for different business objectives such as building, holding, harvesting, or divesting market share (Strahle and Spiro 1986). Similarly, top executive compensation seems to correlate positively with sales but not necessarily with shareholder return (McKnight and Tomkins 2004). The use of a sales/market share growth objective typically enhances not only personal welfare but also corporate reputation effects (i.e., warranted aggressive/predatory response by incumbent). Therefore, the courts should recognize that alternative objectives can be legitimate goals. For example, maximizing social welfare can be prevalent in the case of non-profit organizations. Often an overlooked research dimension, the nature of competition between organizations with contrasting objectives presents challenging issues for policy makers. Manufacturers may aggressively cut prices (i.e., market share growth objective)

to secure contracts in their main business market (e.g., copiers/high speed printers) to make premiums on complementary products (e.g., ink cartridges/services). Not-for-profit hospitals have been accused of abusing market power in concentrated markets (Simpson and Shin 1998). Competitive bidding/pricing by public universities for government contracts may also be considered as unfair competition by the private industry members/universities. This interesting phenomenon underlines the necessity of undertaking a broader examination of the consumer welfare construct which is discussed at a later section.

Moreover, the strategic marketing orientation of the aggressor business should be examined in the courts. The orientation of the business can directly impact its profitability and selection of performance objectives (Gatignon and Xuereb 1997). For example, competitor-oriented businesses would likely retaliate more aggressively than customer-oriented businesses in the face of competitive entry (Narver and Slater 1990). Predatory sacrifice perceived by managers in competitor-oriented businesses is likely to be much smaller than that perceived by their customer-oriented counterparts. The notion of perception of sacrifice requires a discussion of rationality and risk tolerance as well.

The state of marketing and consumer research has progressed beyond the basic risk-averse/prone notion and explored the role of multiple and conflicting personas and non-financial (e.g., social) risks and moderating roles of risk perceptions on attitude formation and decision making (Campbell and Goodstein 2001). Choices can also be heavily influenced by the framing/perception of the proposition: a teenager might drive through town to save \$5 on a single DVD that would have cost \$20 but would not do the same to save \$5 on a pair of athletic shoes that cost \$150 (Thaler 1985). Similarly, a

purchasing agent/jobber may fly across the world to resolve a \$50K dispute on an office-supply deal worth \$1 million, but may be reluctant to do so to save \$50K in a \$15 million worth of automation equipment. Admittedly, the reluctance of the agent/jobber in the latter example can also be explained by other factors (e.g., complexity of the deal, purchase category etc.) but the point is that there are implications not only for consumer and small business contexts but also for million dollar decisions. Organizational buying committees consist of individuals with different backgrounds, departments, levels of expertise, interest, motivations, power, and so on. The study of the consistencies in irrational buyer behavior is currently a hot topic for behavioral economists, psychologists, and marketers. It would be fruitful to bring new decision-making insights to the courts (Korobkin and Ulen 2000). It was shown that decision-makers may “over-compete” on price to maximize the profit difference and perform significantly inferior than rational price models that maximize the profits (Griffith and Rust 1997). Irrational competitive responses such as incumbents’ herding to new markets have also been observed (Debruyne and Reibstein 2005). Effects such as information availability (also information primacy and recency), biases in representativeness, categorization, and optimistic overconfidence can change inferences drastically (Tor 2002). As such, temporal, internal and external strategic reference points (historical precedents/cognitive constructs) complement prospect theory to explain managerial decision-making and predict competitive reactions (Shoham and Fiegenbaum 1999). Accordingly, managers of underperforming businesses would be expected to be more risk-prone (increasing likelihood of predatory conduct) under pressure than those of businesses that are doing

well. Therefore, predatory pricing (e.g., dumping by distressed steel producers in Russia and Brazil) may be attributed to high debt and deteriorating performance.

3.7.4 A Reaction Framework for Competitive Price Reductions

In Figure 3.6, I integrate the learning from the literature review and present a reaction framework for competitive price reductions from a cost-based perspective. The framework illustrates how the current law might be interpreted by executives, and has implications for business marketers, managers, and policy makers.

Resource base obviously plays a role but I do not want to convey the message that the business with the deeper pockets has the final word in predatory pricing engagements. Many small suppliers/manufacturers are able to defend their markets effectively. An important reason is that marketers typically develop ongoing relationships with their customers. Obviously, developments in the CRM arena have enhanced the effectiveness of this key phenomenon. The stronger the relationship, the lower is the price elasticity for the product, hence the lower the threat from predatory pricing. A very strong form of pre-emptive market defense against predatory pricing occurs when these relationships are converted into binding commitments in the form of legal contracts (i.e., business cannot lose the buyer for a pre-specified time period regardless of predator's pricing).

Moreover, many bids are not granted to the lowest cost provider but to the value package solution provider. Therefore, bundling becomes a strategic tool and is especially effective when the business has differentiated itself. However, careful consideration is advised to marketers when employing strategic bundling since the same tool can be used for aggression. For example, 3M recently got in trouble for bundling rebates for its office

supplies anti-competitively (2003b).

In essence, the Post-Chicago School does not yearn for a return to the Pre-Areeda-Turner era, it rather incorporates the learning from deregulation, modern strategic thinking, advanced technology, the new economy and globalization. It concludes that Areeda –Turner is inadequate to cope with today’s dynamic and complex environment.

It is my contention that the nature of the network industries is such that, when considered in an integrated paradigm, the use of pricing strategies for pre- and post-entry defense is not only feasible but also rational. I discuss the nature of the network industries, develop a price competition framework for network industries, and present my hypotheses next.

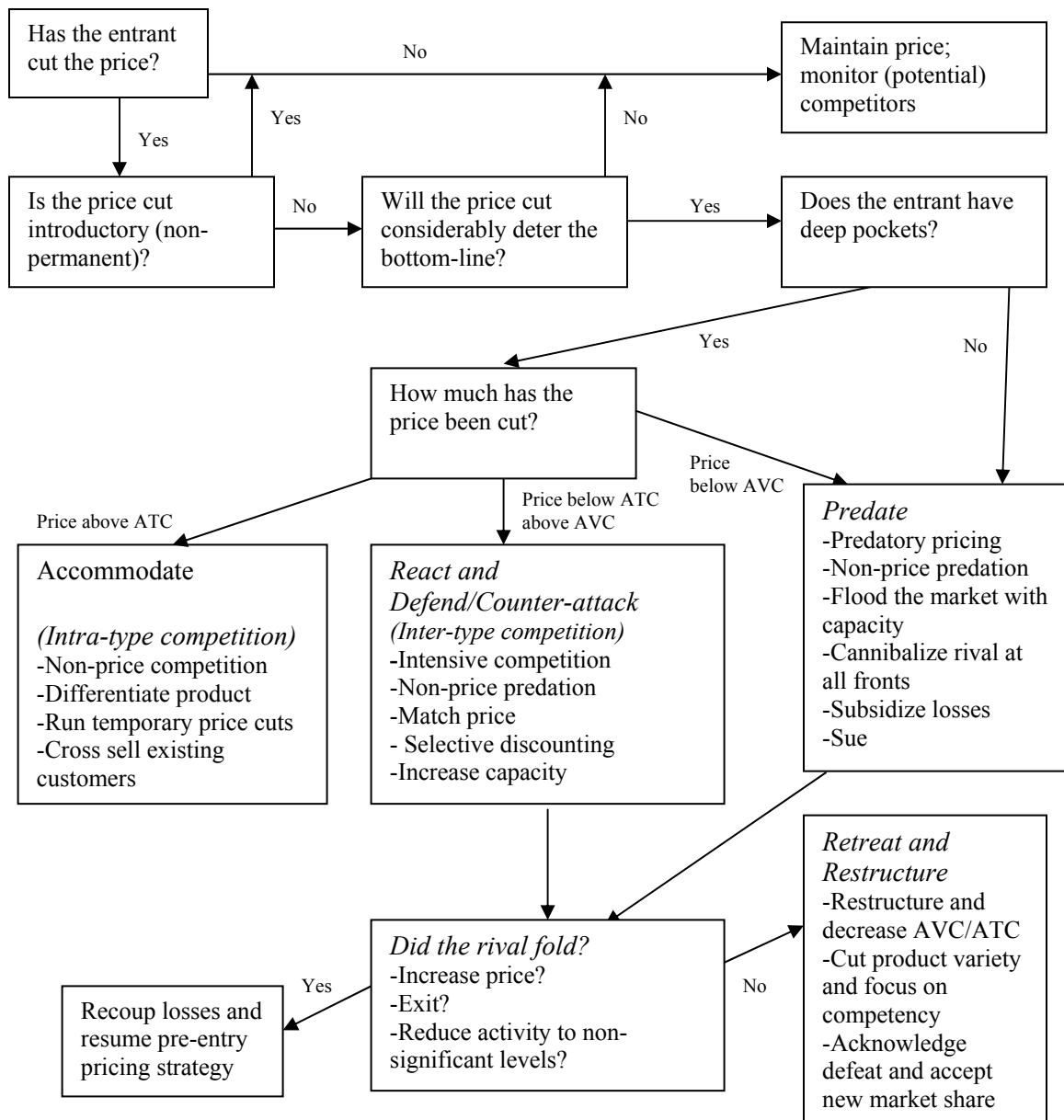


Figure 3.6: Incumbent's Reaction Framework for Competitive Price Reductions

Read:

The Case of Accommodation: The incumbent businesses tend not to compete on price when challenged by a company of the same type. Rather, they tend to emphasize quality, design and differentiate their products/services. Alternative reactions include temporary price cuts to distract buyer attention on competitor or try to cross-sell existing customers.

The Cases of React and Defend and Predation: These scenarios typically take place between a major company and a discounter. Discounter cuts the price to a level that is disturbing for the incumbent. If the incumbent chooses to accommodate, the discounter can establish a foothold of the market which it can use to drive the prices further down. The incumbents typically choose the other route of aggressive competition.

CHAPTER 4

NETWORK PRICE COMPETITION FRAMEWORK

The Network Pricing Strategy framework presented is in Figure 4.1. The framework has three features that should be noted. First, it represents a dynamic process a la Resource Advantage Theory. That is, two-way knowledge flows (competitive signals) and competitive responses are embedded in the framework although not explicitly drawn. It follows the logic from empirical industrial organization literature and the PIMS paradigm in that the structure of the market, the competitive position, and competitive strategies determine a business unit's performance (Bharadwaj and Varadarajan 2004). Incumbents perceive market entry to strategic markets with discounts as acts of aggression and will consider retaliation. Similarly, the entrant choice for market entry depends on the choice of pricing strategy of the incumbent and strategic assessment of the market. The state equilibrium of the model relies on the incumbent's and the potential entrant's behavior. For example, the optimal pricing strategy for the incumbent may change even without new entry, it is only necessary to increase the incremental potential likelihood of entry (i.e., aggregate strategic assessment) sufficiently. Equilibrium points of dynamic models have been shown to be more realistic than those of static models that assume perfect information (Coughlan and Mantrala 1992).

Second, the framework is focused on a special but important type of market entry, inter-type entry (see section 2.4.2 for a discussion of inter-type competition). Inter-type competition is based on price, whereas firms with similar cost structures compete on non-price factors such as promotion and service (Allvine 1999; Palamountain 1955). The

Department of Transportation and independent based analyses have observed this phenomenon (Oster and Strong 2001; DOT reports 1997-2000). “Entry by major carrier on a point-to-point basis into another carrier’s hub has become very much the exception” (Nannes 1999, p.4). The rules of competitive conduct between major (i.e., intra-type) firms has been the focus of research in marketing strategy literature. It has been laid out that conduct in these markets can be explained by leader-follower pricing system (Roy et al. 1994).

The framework is domain specific and focuses on price competition among firms with inter-type cost structures. In particular, it is assumed that the incumbents are major firms with deep pockets and the new entrants are discounters (that are more efficient than and have cost advantages over the incumbents but have shallow pockets). Therefore, intra-type competitors and inter-type competitors form two strategic groups of competition (Hunt 1972). There are “mobility barriers” that prevent changing group membership as suggested by the Strategic Groups literature (Bharadwaj and Varadarajan 2004).

Third, the model is designed for network industries (or industries with network characteristics –discussed next) which are typically characterized by high barriers to entry. Generic (industrial organization school) and sustainable capabilities (R-A theory) are also incorporated in the form of market and firm specific barriers. I posit that developing a framework by integrating these theories reveal a scenario in which predatory strategies can be rational.

Three main factors, market power of the incumbent, barriers to entry and strategic assessment of the incumbent, act as antecedents for choice of the pricing strategy of the

incumbent. This is consistent with the classical industrial organization literature. It is also suggested that firm specific factors should be more influential than market and industry specific factors, which is consistent with the Resource Advantage theory.

The price levels in markets and strategic assessment of the incumbents lead to the decision on whether or not to enter any given market. This is consistent with classical economics and signaling theory literature.

Incumbents are expected to react sharply in markets that they consider to be strategic with the intention to drive entrants out of their markets. This is consistent with findings from industrial organization and strategy literature. If the inter-entrant is driven out of the market as a result of retaliation and or lower strategic prospects, it is expected that consumer welfare will be negatively affected. This is consistent with views from marketing and Post-Chicago school of thought (see Figure 4.1).

Next, I discuss the network industries and then develop my hypotheses following the five phases in the model: pre-emptive defense, entry decision, post-entry defense, exit decision, and policy consequences.

NETWORK PRICE COMPETITION FRAMEWORK

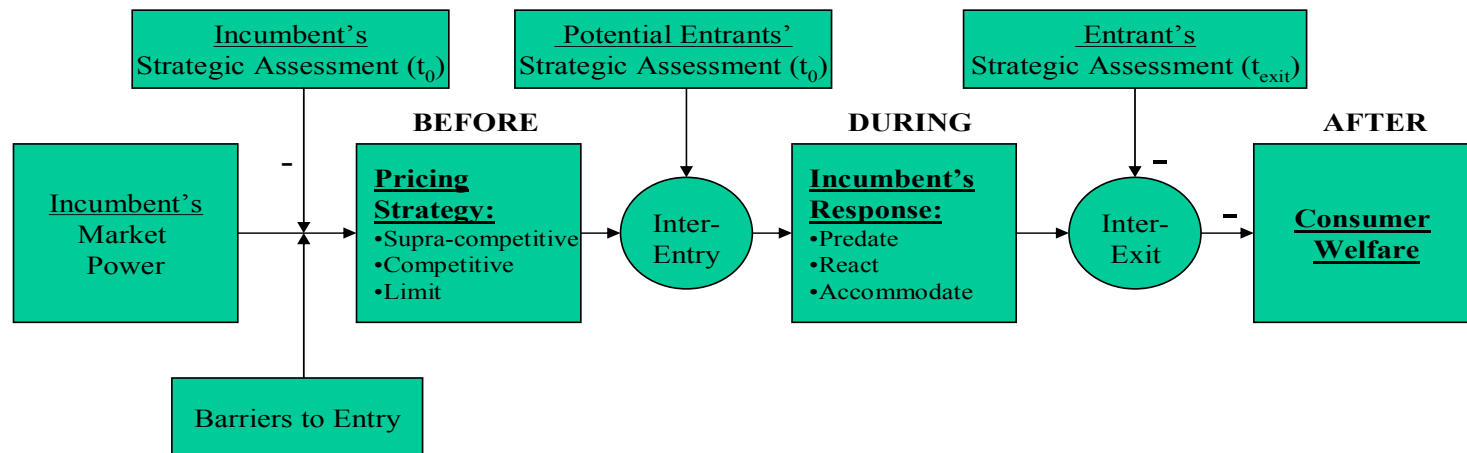


Figure 4.1: Pre-entry and Post Entry Network Price Competition Framework

4.1 Network Industries

Network industries have a unique and dynamic nature of competition. There are four main characteristics that differentiate network industries from others: complementarity, compatibility, and standards; consumption externalities; switching costs and lock-in; and significant economies of scale in production (Shy 2001). Complementary products (e.g., PC and mouse) require compatibility for industry-wide appeal and this leads to the development and adoption of standards. This notion is especially emphasized by firms in information markets. Consumers' perceived value of a network increases as others use or adopt complementary or compatible products or services which leads to positive consumption externalities (Katz and Shapiro 1985; Lemley and McGowan 1998). High switching costs in three categories (e.g., procedural (economic risk, evaluation costs, learning costs, and set-up costs), financial (benefit loss costs, monetary loss costs), and relational (personal relationship loss costs, brand relationship loss costs)) cause many consumers to continue with their existing providers (Burnham et al. 2003). Network industries are also characterized by high start-up (fixed) costs, and low unit production (marginal) costs (Watson 1998). Heil and Robertson (1991) argued that incumbents' reaction propensity increases with high fixed costs and economies of scale. Network learning dynamics (within firm, between firm and end-user based dynamics), surveillance, and shared resources also enhance the capabilities of network firms (Dickson et al. 2001). Users in network markets may derive benefits from the user network (e.g., e-mail), the complements network (i.e., Windows-based software), and the producer network (level of competition) (Frels et al. 2003).

Industries such as airlines, telecommunications, and software have been at the core of the growth of this society. Network industries are often associated with capital-intensive industries serving mass markets. Historically, these industries have been heavily regulated due to the neo-classical economics argument that the social welfare is better-off when these industries are preserved as natural monopolies. However, the positive consumer experience after deregulation of several of them (e.g., telecommunications) has demonstrated otherwise. Other industries that possess network industry characteristics include: broadcasting, cable television, electricity, water, pipelines, sewage systems, oil pipelines, natural gas pipelines, road and highway systems, bus transport, truck transport, inland water transport, ocean shipping, postal service, package delivery systems, refuse pickup systems, airline computer reservation systems, bank automated teller machine systems, bank and non-bank credit card systems, bank debit card systems, bank check and payment clearance systems, local real estate broker multiple listing services, and the Internet (White 1999).

An important feature of network externalities is the *Positive Feedback Cycle* (or Snowball effect) –the greater the potential for growth, the higher the number of future participants. Watson (1998) argued that as in a natural monopoly, a network industry would usually converge towards a single product (e.g., Windows computer operating system). A lock-in happens when the costs of switching from a network become higher than gains due to externalities. A bad lock-in occurs if inferior products win over others. Positive feedback cycles can cause bad lock-ins. That is why the Microsoft Case has been paid high attention and linked to the future of antitrust (2000b).

Positive feedback cycles can enable a firm to achieve monopolization very

quickly. Once achieved it may be even harder to resolve the monopolization due to network effects (Rajiv 1998). Indeed winner-take-all (or most) competition is commonly observed in network industries with snowballing --the more the customers, the more valuable the product/service, the more the attractiveness of the product/service to even more customers (Valente 1995). Customer switching costs become higher over time. Also, due to the high-fixed costs of network firms, increasing sales decrease average costs substantially. These factors can easily motivate an Internet company to give its products for free (e.g., Adobe Acrobat Reader) to penetrate the market and set the standard (Evans and Schmalensee 2001). The antitrust standards become irrelevant because of the unique dynamic competition in the network industries to capture the dominant position in the markets.

Network industries are very visible and include some that are key to the welfare of the society such as utilities, software, telecommunications, cable services, credit cards, and transportation (e.g., airlines). Thus, they are of uppermost concern for antitrust enforcement bodies. The current antitrust approach is characterized by heavy use of cost analysis and is not appropriate for all cases in dynamic markets, especially where high level of fixed costs (e.g., networks) are involved (Sievers and Albery 1991).

Evans and Schmalensee (2001) argued that there is no cost-based test to distinguish predatory innovation from non-predatory innovation in a winner-take-all setting. The marginal cost of a network firm (with excess capacity) is often negligible. Average Variable Cost (AVC) test provides a safe harbor for network firms enabling them great flexibility to drop prices for predatory reasons. Network effects can enhance the effects of market power particularly in dynamic industries. Stifled innovation may

cause bad lock-ins to obsolete technologies, resulting in additional loss of welfare. At the same time, it is common for such companies to price their products/services below AVC for non-predatory reasons (e.g., introductory low prices to penetrate the market). The interconnections in network markets and the high tendency of market power in one market to spill-over to other connected markets make the defense of strategic markets even more critical.

4.2 Hypotheses

4.2.1.1 Market Power

Typically, the existence of market power has been simply inferred when an incumbent has pre-dominant market share (1966, p.571). Firm(s) may use a monopolistic market structure or conduct to achieve market power, which it then uses to achieve better performance at the expense of its competitors and the competitive process. I define market power as the ability to influence (pricing) conduct in the marketplace for the purposes of the current research.

Structure-conduct-performance paradigm implies that higher the concentration in a marketplace the further it is from the case of perfect competition, the higher the prices, and the lower the societal welfare (Lopez 2001). Previous studies have generally shown a positive correlation between market concentration and industry profitability (Shepherd 1970) among other factors.

Establishing the relationship between market power and pricing strategy is also important from a public policy perspective because, in order to win a case, one of the elements that the plaintiff must show is that the incumbent had market power to act upon. It must establish that the incumbent used or pursued market power by anti-competitive

means.

Demonstration of market power is typically sought through high market share. The structure of a market may be derived from the study of the number and size of firms, their cost and demand conditions, product differentiation, the nature of any entry barriers, and degree of regulation. Industry Concentration Ratio (percentage of total sales of the n (usually four) largest firms in an industry) and the Herfindahl-Hirschmann Index ((HHI) –sum of the squared market shares of all firms) are two commonly used market structure indicators.

Pre-entry:

The incumbent's pricing strategy for a specific market is heavily influenced by its market power for the market in question. Market price premiums are conceptualized at the three levels of strategic pricing options: supra-competitive, competitive, and limit pricing, which is intuitive and consistent with the microeconomics view of market performance.

1. Supra-competitive pricing: This refers to pricing at levels that yield premium margins for the incumbent. This type of pricing is typical of a monopolist. The incumbent is able to reap profits at levels that would not otherwise be possible because of a lack of competition in the market place. Neo-classical economic theory suggests that supra-competitive prices cannot exist in the long run because of the threat of potential entrants (a.k.a. theory of market contestability). However, industry observations have shown that firms can and do differentiate themselves and as a result, they are able exert consistent

price premiums in the marketplace especially when barriers to entry are high (Baker and Pratt 1989).

2. *Competitive Pricing*: This refers to the going price levels in the marketplace in which the incumbent makes reasonable profits (i.e., industry average for comparable markets). Neo-classical theory would predict that competitive profits would converge towards zero in the case of perfect competition. However, since markets are not perfectly competitive, we observe modest levels of profits in competitively priced markets.

3. *Limit Pricing*: As discussed in the introduction, this strategy is also called entry deterring pricing (Porter 1980, p.14). With limit pricing, the incumbent prices its services low so as to prevent competition. Thus, the price is intentionally set low so that entry is discouraged and (lower) profits are secured for a longer time. The apparent signal is low current and future profits (Bain 1956). It should be noted that an entry-deterring price does not necessarily have to be below (variable) cost to be anticompetitive. It could negatively influence the entry decision of a more efficient firm at above cost levels. Potential small scale entrants may assume that the incumbent enjoys economies of scale, and potential large scale entrants may assume that the total demand is inelastic (i.e., increased supply will lead to even lower prices) (Gruca and Sudharshan 1995).

Limit pricing can also be justified by interests in protecting market leadership or to prevent competitor growth in strategic territory. In doing so, the incumbent may utilize signal-jamming to influence potential entrants' to believe that their costs are lower than they actually are. The result would be little or no profits in markets where limit pricing is employed. Similar to predatory pricing, the evidence so far is that the use of limit pricing is rare (Smiley 1988). Low prices do not deter entry (especially against

innovative entrants, e.g., the cases of disruptive technologies or leaps in production efficiencies (Christensen 1997; Han et al. 2001)), but they do diminish the chances of the entrant's survival in a given market (Lieberman 1989). Furthermore, limit pricing has been documented to be a rational strategy in game-theoretic experiments (LeBlanc 1992; Milgrom and Roberts 1982a). Thus, network industries may prove to be the ideal setting to show that there may be more limit pricing in practice than meets the eye. If limit pricing can stimulate and absorb the demand it stimulates, the residual demand upon new entry may be too low to justify the entry effort (Eliashberg and Jeuland 1986).

Furthermore, both industrial organization literature and PIMS based studies suggest that it pays off to be the dominant firm in an industry (Buzzel and Gale 1987; Sudharshan and Kumar 1988). "The superior financial performance of businesses with large market shares is attributable to their ability to obtain inputs at lower costs, extract concessions from channel members, and set prices rather than be price takers" (cf. Bharadwaj and Varadarajan 2004, p.223). Aggregate market concentration and performance relationship has been found to be positive and significant in two meta-analyses (Capon et al. 1990; Dutta and Narayan 1989). There is a well established link between market power and price levels in economics and strategy literature (Abunassar 1994; Borenstein 1989) and it is expected that this will hold true for the network industries as well.⁴ Therefore,

H1: Market power of the incumbent and the market price premium will be positively associated.

⁴ It should be noted that some scholars have argued that the market share-performance relationship does not exist and may be attributed to third factors (e.g., Symnanski et al. 1993).

4.2.1.2 Barriers to Entry

“Entry conditions are central to antitrust analysis”

John M. Nannes, Deputy Assistant Attorney General, Antitrust Division (1999).

Barriers to entry can be defined as factors that prevent an entrant from competing on an equal footing with the incumbent(s) (Dolan 1986, p.602). For a particular industry, if the barriers to entry are high and retaliation from the incumbents is expected, potential entrants are not likely to be enthusiastic about entry (Mintzberg and Quinn 1996).

Karakaya and Stahl (1989) used a broad categorization of the concept and identified nineteen barriers to entry. Their list included cost advantage of incumbents, product differentiation of incumbents, capital requirements, customer switching costs, access to distribution channels, government policy, advertising, number of competitors, research and development, price, technology and technological change, market concentration, seller concentration, divisionalization, brand name or trademark, sunk cost, selling expenses, incumbent's expected reaction to entry, and possession of strategic raw materials (essential facility). They later advanced this list to 25 items for consumer goods markets (Karakaya and Stahl 1992).

Porter (1980) identified six major categories for barriers to entry. These six barriers were cost advantages of incumbents, product advantages of incumbents, capital requirements, customer switching costs, access to distribution channels, and government policy. Barriers to entry may potentially enable the firm to recoup profits over a longer term and make predatory pricing rational. Multiple industry data also indicate that firms use entry deterrence less frequently when other barriers exist (Bunch and Smiley 1992).

The model posits that the market power of the firm is a primary determinant of its

pricing strategy. However, this link should hold true and probably be even stronger with the inclusion of the comprehensive barrier to entry measures that include firm specific (i.e., brand equity) and those determined by outside forces (e.g., regulation --tobacco settlement that requires new entrants to pay additional State taxes along with the industry giants that originally caused the case (Forbes 2005)). The industrial organization literature argues for the positive effect of barriers to entry whereas the efficiency school suggests that barriers are not necessary for superior performance (Bharadwaj and Varadarajan 2004). This leads to the following hypothesis:

H2: The positive relationship between the market power of the incumbent and the market price premiums will be positively moderated by barriers to entry.

It is also possible that barriers to entry could have a direct effect on the pricing strategy of the incumbent, thus forming a quasi-moderation effect. This should be investigated as an alternate specification. Therefore,

H3: Barriers to entry and the market price premium will be positively associated.

Of particular interest here are the firm specific barriers that can be enhanced as opposed to market specific barriers (e.g., regulation) that are generally beyond the control of the incumbent. Neoclassical price theory traditionally emphasized the choice for the industry as the strategic decision whereas the Resource Advantage theory predicts that firm specific barriers would be more important than market specific barriers (Viscusi et al. 1995). Varadarajan and Jayachandran (1999) observed that the earlier focus in industrial organization literature (Bain 1956) on “why some firms are more profitable” later shifted to “why some firms are more profitable” (Demsetz 1973), and ultimately, the resource-based view of the firm (Barney 1992) where profitability is determined by

competitive advantage. Hunt (2002, p.287) observed the state of the theoretical debate on the firm specific versus industry (i.e., market) specific factors:

By the time of McGahan and Porter (1997), the entire nature of the debate over firm performance had changed dramatically. Originally, advocates of industry-based strategy (e.g., Montgomery and Porter 1991) were citing Schmalensee (1985) to justify their focusing on “choosing industry” as the key strategic decision. After Rumelt’s (1991) replication and extension of Schmalensee found firm factors to account for almost six times the variance of industry factors (46 percent vs. 8 percent), the debate shifted toward whether industry choice at all. Thus, McGahan and Porter’s (1997) study, which finds that firm effects dominate industry effects by only 36 percent to 19 percent, is interpreted by its authors as confronting the challenge from Rumelt and others that industry, far from being key, doesn’t seem to matter at all. The point to be emphasized here is that no one now claims empirical support for the neoclassical position. That is, after Rumelt’s (1991) and other studies, no one argues seriously the neoclassical position that either industry is everything or industry effects dominate firm effects.

McGahan and Porter (2002) found even lower influence of industry factors on performance than their earlier findings (48 percent business-unit factors and 10 percent industry factors). Still, market-specific barriers (e.g., institutional environment) can be important from a public policy perspective since all types of barriers can be antecedents to monopoly conditions in a market (Yip 1982). Karakaya (2002) reported four major underlying dimensions of barriers (i.e., firm specific, product differentiation, cost of market entry (financial requirements), and profit expectation of entering firms) with firm specific barriers being the most important. His study was in an industrial setting. I inquire if this finding will hold true in network industry setting as well. The relative effectiveness of these two categories is also interesting to verify good, and potentially bad and ugly effects that barriers to entry may have (Han et al. 2001). Therefore,

H4: The positive moderating effect of firm specific barriers on the incumbent’s pricing strategy will be higher than that of market specific barriers.

Firm specific barrier influence would also be expected as direct effects. Therefore,

H5: The positive effect of firm specific barriers on the incumbent's pricing strategy will be higher than that of market specific barriers.

These hypotheses, if supported would also have managerial implications since building firm specific barriers is a prerogative that managers typically do not have with market specific barriers.

4.2.1.3 Strategic Assessment

The model also alludes to the role of potential entrants' strategic assessment for entry for the market in question. Game theoretical analyses have indicated that competitors' moves are calculated by investigating its resources and entry patterns (e.g., Milgrom and Roberts 1982b). The resource-advantage theory advanced by Hunt (2000) suggests that resources play a critical role in the long term prosperity of the firm. Firm growth is constrained by internal management resources (Penrose 1959). Available resources (e.g., human resources, capital) constrain the choice of markets for entry (Wernerfelt 1984b). For example, employees (relations), type and capabilities of the aircraft, and management leadership that potential entrants have can also be potential resources in the airline industry context. The fit of the market with potential entrants' existing portfolio would also be important. It is not likely that an existing airline would start flying a route that is not connected to its existing routes on either end (Dixit 2000). The attractiveness of the market is also an important part of the strategic assessment (Baldwin 1995) as growing markets are more likely to be under the threat of new entrants

both in the form of existing or start-up competitors (Gatignon et al. 1989). The successful analysis and perception of these issues have been linked to higher performance (Clark and Montgomery 1996). The incumbent is less likely to employ supra-competitive pricing and make the market more attractive for entry if it deems that the potential for entry for a given market by inter-competition is high after strategic assessment. Therefore,

H6: The positive relationship between the market power of the incumbent and the market price premiums will be negatively moderated by the incumbent's strategic assessment (i.e., resources, strategic fit, market growth) of the potential entrants.

H7: Incumbent's strategic assessment and the market price premium will be negatively associated.

4.2.2 Entry Decision

The questions that an incumbent should normally answer before reacting to a competitor's price cut are: "is the price cut likely to have significant impact on our sales?" and "is it likely to be a permanent price cut?" If the answer to any of these two is negative, then there actually is no need to react to a price cut (Kotler and Armstrong 1991) (also see Figure 3.8). However, in practice (i.e., with information asymmetry), it is not very easy to answer these questions accurately, especially with a strategic perspective and that encompasses uncertainty. A price cut insignificant today could reshape the industry landscape tomorrow (e.g., the case of Dell Computers). Similarly, price levels that are below cost and non-sustainable today could become sustainable with economies of scale tomorrow (e.g., eBay.com, Amazon.com). Incumbent firms in network industries, especially when challenged by low-cost start-ups with drastically lower cost structures, tend to fear the worst (e.g., Microsoft *versus* Linux; American *versus*

Southwest Airlines). In high-tech industries, this fear is partially transformed into defensive acquisitions by leading firms (e.g., acquisitions by Ticketmaster; Microsoft; Cisco). However, in recently deregulated industries where merger and acquisitions have to be approved after a detailed antitrust scrutiny, it can be quite rational to employ non-price and predatory pricing schemes. Thus, managers in these firms may answer affirmatively when they strategically analyze the two important questions. Recoupment may not be feasible in the short run and not even in the foreseeable future. But perhaps these firms are sacrificing gains and incurring losses in exchange for lower future losses or even survival.

The entrant can fairly accurately observe the pricing strategy of the incumbent. Upon analysis of its resources, strategic fit, the market growth, and the current pricing strategy of the incumbent, the entrant decides whether or not to pursue entry to the market. The framework suggests that the response of the incumbent will be heavily influenced by its pricing strategy for that market. If the incumbent were using supra-competitive pricing, it is anticipated that it will predate (sharp price and capacity reactions) to protect its market power, if the incumbent were using competitive pricing, it is anticipated that it will react competitively (reasonable price and/or capacity reactions), and finally if the incumbent was using limit pricing, it is anticipated it will accommodate (insignificant price and/or capacity reactions). This structure has not been previously empirically tested, however, content analyses of reports from the popular press support these assertions. In the predation case, the odds are against the entrant to establish itself and succeed in the marketplace (exceptions such as Southwest Airlines can occur depending on the strategy, efficiency and the funds available). In the competitive reaction

and accommodation cases the entrant is increasingly more likely to survive given that it is more efficient than the incumbent and managed well.

The following set of hypotheses are also supported by the signaling literature which suggests that price levels are indicators of market potential and the cost structure of the incumbent (Heil and Walters 1993, Prabhu and Stewart 2000). Heil and Robertson (1991) argued that the major benefits from signaling are preemption and development of competitive norms of conduct, and proposed that market power and antitrust action due to price signaling would be positively related. This verifies the before-during-after price modifications pattern previously mentioned.

Adam Smith (hence, the classical industrial organization literature) would also predict that capital flows into markets with above average returns on investment. This capital flow could be in the form of new market entries. Still, this relationship should not be taken for granted. Dixit (2000) hypothesized that the higher prices would lead to higher probability of entry to markets (in the airline industry) but was perplexed by a negative relationship. Therefore,

H8: Incumbents' pre-entry market price premiums for markets with inter-category entry will be higher than those of markets without inter-category entry.

The rationale for the consideration of strategic assessment for Hypothesis 7, and the Resource Advantage theory also applies to the entry decision phase. Therefore,

H9: Potential inter-category entrants' strategic assessment of the markets will be higher for the markets that they enter.

Pre-entry defense summary: The model posits that the main positive effect of market power on pricing strategy is moderated by the incumbent's strategic assessment of potential entrants' and the barriers to entry. The moderating effect of barriers to entry is positive. However, the moderating effect of strategic assessment is expected to be negative. Direct linkages from both factors to pricing strategy are also plausible. *Ceteris paribus*, the trade-off between these countervailing forces determines the pricing strategy of the firm. If the positive effects are dominant, the firm is likely to employ a supra-competitive pricing strategy resulting in large fare premiums (and loss of consumer welfare). If there is a balance between these effects, the firm is likely to employ competitive pricing. Finally, if the negative effects are dominant, then the firm is likely to engage in limit (entry-deterring) pricing which results in lower prices in the short run but has negative welfare effects in the long run due to lessened competition (and decreased efficiency due to stifled competition and potential innovation).

Potential entrants' own strategic assessment and the pricing strategy of the incumbent lead to entry analysis. The framework flow is interrupted, and equilibrium is reached if there is no entry. However, if the challenger decides to enter the market, a response by the incumbent is triggered as measured by a price change. This response may be categorized at three levels, which are discussed next. The incumbent may choose to predate, to react or to accommodate depending on its pre-entry strategy. If the entrant is able to endure the retaliatory response of the incumbent, a new market equilibrium will be observed.

4.2.3 Post-entry Defense

Trend analysis indicates that the firms react sharply when an entry by a discounter (i.e., inter-type entry) occurs in their markets (Oster and Strong 2001). Previous work on competitive interaction also suggests that retaliatory actions to entry depend on the perception of threats (Kuester et al. 1999). Namely, it is expected that the incumbent would react most sharply in cases where its supra-competitive profits are threatened. As discussed in Chapter 3, the current tests of predatory pricing are based on average variable cost, the courts are not effective in distinguishing predatory action from vigorous competition in network industries. Therefore, the extent of paired price and capacity reaction could easily reach the scale of predation without being detected by the courts. The evidence for that would be consistent with observations of market exits by the inter-category entrants (presumably more efficient than the incumbents) which were likely to survive had predatory tactics not been utilized. Supra-competitively priced markets improve the profit margins and are more valuable and strategic from the perspective of the incumbents. Hence, the expected incumbent retaliation in the case of inter-entry to supra-competitively priced markets is predation. The reaction of the incumbent will likely not be as drastic in the case of entry to competitively priced markets. Finally, the incumbent is expected to react little or not at all in the case of entry to markets where limit pricing was employed (i.e., accommodation).

The logic of accommodation is supported by the widely established Defender model (Hauser and Shugan 1983) which predicts that an opposite reaction such as cutting back on advertising or increasing price can be the optimal strategy against market entry. Moreover, there are several PIMS based studies that reported that no or limited reaction

to market entry is the norm (Biggadike 1979; Robinson 1988; Yip 1982). Retaliation was associated simply with high-growth markets.

On the other hand, price reduction was found to be the optimal response against competitive entries (Gruca et al. 1992). It is well documented that hostile acts trigger stronger competitive actions (Heil and Walters 1993). Due to the interconnected nature of the networks, the number of markets that are considered strategic could be even higher. MacMillan and colleagues (1985) have reported that such strategic challenges accelerated competitive response. Swift and more aggressive responses are expected if the focal market of entry is viewed important by the incumbent (Chen and MacMillan 1992; Chen et al. 1991). Assuming that firms derive their market power from strategic emphasis to a given market, and that market power and price are positively correlated, it is only natural that the entries to markets that are supra-competitively priced would attract more intensive retaliation to entry than others. Bowman and Gatignon (1995) also concur that the retaliation is delayed when the incumbent has low market share. An incumbent that does not react to entry to markets where its profits lie may send signals of weakness to potential competitors and invite further entry. “If the strategy fails and entry occurs, consequences for the incumbent firm can vary depending on which strategy was chosen [prior to entry]. Certain strategies may leave the incumbent in a worse competitive position, whereas others may lead to a stronger posture after entry ” (Gruca and Sudharshan 1995, p.44). For example, “the airline industry has certain characteristics that make a predatory theory more than plausible” (Nannes 1999). To match a move is a strong signal by itself, indicating unwillingness to give up a position without escalating the war to mutually destructive levels (Chen and MacMillan 1992). Robinson (1988)

observed that the current strategy may influence future as well as the competitive conduct. Therefore,

H10: The magnitude of the incumbent's response to inter-entry will be positively associated with its pre-entry pricing strategy.

4.2.4 Exit Decision

As detailed in previous sections, the inter-type entrants are typically subject to aggressive price cuts when they enter strategic markets. The incumbents generally target their responses so that the inter-entrants are driven out of their key markets before they can establish their structure and inflict considerable damage to the incumbents. However, since the inter-entrants are presumably more efficient than the incumbents due to their operation and cost structures, their exit patterns would also be affected by their financial resources and the price elasticity of the market. When discounters enter markets, the passenger volume typically increases significantly more than the percentage decrease in average price. Therefore, the decision to exit the market will be effected by the incumbent's response and the post-entry strategic assessment of the entrant.

Incumbent's choice for reaction strategy sends a signal to the entrant as to how determined the incumbent is to deter entry (Heil and Walters 1993). A price matching move is a strong signal in its own right (Shelling 1960), however this move becomes even more powerful given the context that the entrant is a discounter with less a comprehensive value proposition. Accurately perceiving the intent of competitive reactions enhances firm performance (Clark and Montgomery 1996; Day and Nedungadi 1994). This has further implications than just sheer financial impact of price reductions. A sharp price cut may cause the entrant to leave the markets upon strategic assessment

even though it might have made more economic sense to fight back due to a more efficient structure of the entrant (Gundlach 1995). Successful retaliation has been associated with holding a competitive advantage (e.g., brand equity), low scale of new entry, and low to medium access to resources by the new entrants (Robertson and Gatignon 1991), and all these conditions are met in the inter-type competition framework. In essence, the entrant weighs the strategic benefits against the threats posed by the incumbent's retaliation and makes the decision to exit or stay. Therefore,

H11: *The likelihood of inter-category exit from a given market and the magnitude of the incumbent's competitive response will be positively associated.*

H12: *The likelihood of inter-category exit from a given market and the entrant's strategic assessment will be negatively associated.*

4.2.5 Policy Consequences

Increased *long-term* social welfare is the ultimate goal of antitrust. Lower prices and competition increase the welfare of the consumers and the society in general (Grewal and Compeau 1999, p.3). However, if the consumers feel that the price they have to pay is unfair, then social harm may occur (Guiltinan and Gundlach 1996a). The courts consider economic harm to consumers as the best way of assessing harm to society (Baer 1996). However, a long-term assessment of social welfare should not be simplified to allocative efficiency (Guiltinan and Gundlach 1996a). For example, Bloom and Gundlach (2001a) identified thirteen paths through which marketing affects consumer welfare.

Figure 4.2: Marketing Extension for Consumer Welfare Assessment

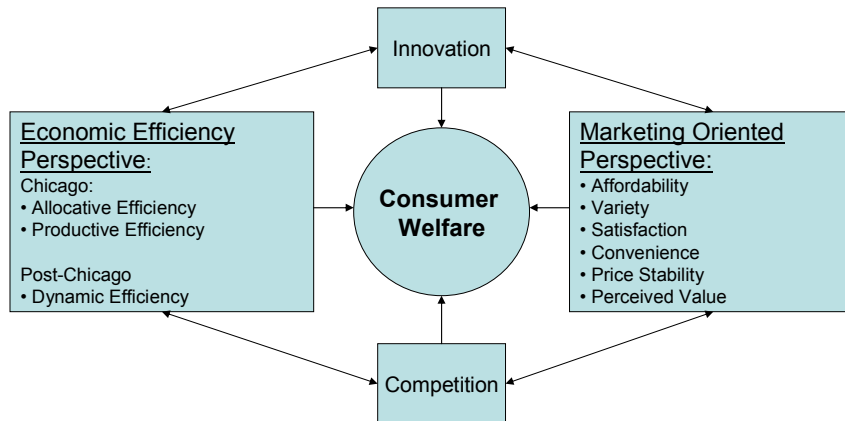


Figure 4.2: Marketing Extension for consumer Welfare Assessment

The long-term consequences of predatory pricing (or any anti-competitive action for that matter) on consumer welfare are central to antitrust analysis. Marketing insights for a more informed consumer welfare analysis are presented in Figure 4.2 and Table 4.1. The shortcomings of just focusing on allocative efficiency for assessing consumer welfare, and marketing's potential contributions for its operationalization and conception have been observed by many scholars in marketing and elsewhere (cf. Gundlach et al. 2002).

Table 4.1: Dimensions of Consumer Welfare and Marketing Insights

Dimensions of Consumer Welfare	Marketing Insights	Public Policy Implications
Efficiency	Local inefficiencies may disrupt the general efficiency of the markets	An antitrust analysis that goes beyond economic efficiency
Affordability	Focus on net income is too narrow	Affordability is a better measure of welfare than income
Satisfaction	Established scales such as SERVQUAL exist	Track satisfaction from market as well as market concentration
Variety	Broader definition of variety	Discount for seemingly variant offerings. Let the consumer define variety.
Price Stability	Fluctuating prices are a great nuisance to consumers. Price confusion is detrimental to social welfare	Active public communication/advertising and legislation to prevent price confusion
Convenience	Non-cost based tests may be relevant; the level of convenience can serve as such a measure	Monitor the level of convenience before/after predatory action as well as price levels. (side note: investigate unjustified convenience charges)
Innovation	Product Life Cycle concept and impact of line/brand extensions versus radical innovations	Emphasis to prevent bad-lock-ins to obsolete technology. Support superior technology by adoption/promotion
Competition	Track market share and sales but also signaling, reputation effects, and strategic decision making	Fund and utilize research that quantifies the impact of signaling, reputation, and strategic decision making

4.2.5.1 Consumer Welfare

Affordability. There is more to measuring social welfare than efficiency. Purchasing power is a classic variable considered by the Chicago School/courts in terms of price levels. From a marketing perspective, purchasing power goes beyond the notion of the basic price itself, but also encompasses the notion of affordability which includes credits terms, payment options, etc.

Variety. Variety (choice) is a variable that is of paramount importance for consumer welfare (Guiltinan 2002; Lande 2001). A high number of players in an industry does not necessarily imply variety in commoditized markets. Therefore, perceived (buyer defined/unobservable) variety mix is more important to capture than simply supply variety. Marketing implications for a choice-centered antitrust policy have been identified from both demand and supply perspectives (see Guiltinan 2002).

Satisfaction. Buyer satisfaction is a key construct in marketing, yet considered to be too difficult to deal with and ignored in welfare analyses by economists. Marketing has a significant history of research with the satisfaction construct for both products and services and has established scales to measure it. Historical data can be used to estimate the impact of a predatory strategy on buyer satisfaction in the long run.

Convenience. Overall convenience associated with the use of a product or consumption of service can also be an important dimension of satisfaction and welfare. Related dimensions include decision-making, access, transaction, benefit and post-benefit convenience (Berry et al. 2002). Levels of convenience provided to the buyers before the alleged predatory action should be compared to those of the period following it.

Price stability. Predatory pricing typically results in drastic price fluctuations especially

in network industries. For example, in one DOJ alleged case of predatory pricing, American Airlines cut its prices by 26 per cent, but then raised it by 84 per cent after driving out the competition (Carney and Zellner 2000). Fluctuating demand and prices can prove fatal especially for small manufacturers that do not hedge their risks effectively. Similarly, unstable prices can be a source of great inconvenience and confusion for the consumers. Buyers may feel the price they paid is unfair (Smith and Nagle 1995; Zeithaml 1988) or they may even feel betrayed. At the same time, it is common for price-discriminating businesses to fuel price confusion among buyers in order to avoid competing on price (Grewal and Compaeau 1999). Since each of these options diminishes consumer welfare, the social implication is to communicate/advertise and sometimes even intervene to prevent price confusion and unnecessary price fluctuations.

The positive impact of lower prices on consumer welfare is generally accepted. However, predatory pricing is detrimental to consumer welfare in the long run because once the competitors exit the market, the predator raises prices with the intention of collecting supra-normal profits and recouping its predatory investment. Moreover, the problem with predatory pricing is not limited to harm to consumers through the increase of prices back to monopoly levels. Predatory pricing, successful or not, can potentially reduce incentives for investment and innovation, and prevent new entry or expansion by more efficient firms. There are special implications for network industries such as telecommunication and software where the value of the product/service increases along with the number of users. Innovation can be stifled when predatory prices induce

consumers to continue to use an old technology as opposed to a superior alternative offered by a new entrant (Guiltinan and Gundlach 1996a).

Grewal and Compeau (1999) suggested that marketing researchers have not engaged in public policy implications of pricing until recently and that a focus on this issue is long overdue. They argued that developments such as the internet, global markets, mega-corporations, and cooperative marketing arrangements created the necessity of taking a closer look at the pricing and public policy interaction with consumer welfare in mind. After all, courts consider economic harm to consumers as the best way of assessing harm to society (Baer 1996). Guiltinan and Gundlach (1996a) argued that marketing was in a unique position to help form public policy guidelines with comprehensive measurement and modeling procedures, and that predation and predatory pricing have not been addressed by marketers until recently. Gundlach (1995) suggested that the marketing discipline had the potential to further the understanding needed for the development of a more suitable antitrust policy.

In all cases of exit by inter-entrant there will be a loss to consumer welfare stemming from the assumption that the inter-entrant was presumably more efficient. The loss to consumer welfare (mainly in terms of purchasing power and price stability) occurs because the incumbents are typically able to increase the prices to pre-entry levels and sometimes even higher to recoup losses incurred during predation. The long run effect of predation is higher prices for the consumers.

It appears that there is an increasing gap between the insights from the modern economic theory and the enforcement of current judicial policy. Government enforcement concern has never been higher in many years. The new economy requires

new rules for the assessment of predation because of the growing importance of intellectual property (e.g., Microsoft Case). Increasing market concentration in many industries and number of mergers, are also of concern (Bolton et al. 2000). Obviously, measuring social welfare with comprehensive measures itself constitutes a dissertation topic and is well beyond the scope of this dissertation. However, the market power of the incumbent can be practically used as a proxy of long term social welfare and the following hypotheses can be tested. Therefore,

H13: The inter-entrant's exit will result in loss to consumer welfare (as measured by the increase in the incumbent's post-exit market power).

If supported, the above hypothesis would undoubtedly generate public policy implications. The overall premises of the proposed framework are summarized in Table 4.2.

Table 4.2: Summary of the Framework Premises

	Context	Theoretical Base
H1-H7	<u>Antecedents of Pricing Strategy:</u> <ul style="list-style-type: none"> • Market power leads to higher price premiums • Incumbents consider threat of potential entrants when deciding strategy • High barriers to entry prevent market contestability • Firm specific barriers more influential than market specific barriers 	Industrial Organization, Strategy, Resource Advantage, Market Segmentation
H8-H9, H12	<u>Antecedents of Market Entry:</u> <ul style="list-style-type: none"> • Entrants will consider price levels as indicators of efficiency and potential • Entrants will conduct strategic analyses before entry and exit 	Industrial Organization, Signaling, Game Theory, Entry Detering Prices, Reputation Effects, Multi-market competition
H10	<u>Consequences of Entry:</u> <ul style="list-style-type: none"> • Incumbents will respond differently depending on the market of entry 	Competitive Interaction, Inter-Intra-type Competition, Multi-market competition, Game Theory
H11	<u>Determinants of Market Exit:</u> <ul style="list-style-type: none"> • Entrant is likely to exit in the face of drastic response by the incumbent 	Competitive Interaction, Signaling, Resource Advantage, Game Theory
H13	<u>Consequences of Market Exit:</u> <ul style="list-style-type: none"> • Exit by will have negative consequences on long and short-term consumer welfare. 	Post-Chicago Economics, Public Policy and Marketing Interface

CHAPTER 5

CONTEXT: AN INQUIRY OF THE DYNAMICS OF COMPETITION IN THE U.S. AIRLINE INDUSTRY

It was a love of the air and sky and flying, the lure of adventure, the appreciation of beauty. It lay beyond the descriptive words of men –where immortality is touched through danger, where life meets death on an equal plane; where man is more than man.

Charles Lindbergh, The Spirit of St. Louis. 1953

This is a nasty, rotten business.

Robert Crandall, American Airlines, 1994 (Petzinger 1995).

The airline industry has certain characteristics that make a predatory theory more than plausible (Nannes 1999).

An inquiry of price competition in a key network industry –airlines, provides a unique perspective into the dynamics of competition. The main contributions of this chapter are two-fold: it introduces the deregulated passenger airlines as an ideal context for empirical research, and describes the history and competitive landscape of the industry.

Several unexpected consequences were observed as a result of the airline deregulation in 1978. These included increased range of services at the expense of overall service quality, the dominance of hub-and-spoke systems, and the subsequent fare structure that penalized passengers flying out of major hubs in the form of hub premiums. Contrary to popular belief, the effect of deregulation on decreasing fares was not robust. In comparison to pre-deregulation era, tickets today cost less on longer haul routes

regardless of the nature of competition, but not on shorter routes where low cost carrier (LCC –such as Southwest or Air-Tran) competition is absent. Waves of LCC entrants were driven out because of cut-throat competition and/or predatory practices of the major carriers. The existence of such practices is suggested by the observations and actions of the DOT and DOJ.

The eighties saw the emergence of yield management systems, frequent flier programs and the widespread use of computer reservation systems. The primary distribution and sales channel was the travel agencies, which lost much of their power after the explosion of the Internet, and the subsequent movement to cut their commissions throughout the industry.

After September 11, the LCCs have performed better than the major carriers, which could not respond to increased pressure to cut costs. Anticipated near future trends in the airline industry include consolidation attempts among the major carriers, subsequent antitrust action, revision of the hub-and-spoke system and re-organization, restructuring of corporate travel policies, and increased market access by LCCs aided either by federal or local governments.

5.1 Historical Perspective⁵

As the phrase “America on wheels” indicates, cars are often referred to as the foundation of American culture. However, by the 1990’s the number of adult individuals who owned cars were less than those who had flown (Petzinger 1995, p.113). Convenient access to air service is one of the key considerations for choosing business locations. This

⁵ The historic facts in sections 5.1.1, 5.1.2 and intro of 5.1.3 have been adopted from the Air Transport Association web site (www.air-transport.org) except where cited.

chapter will present the rich history of the U.S. Commercial Aviation with its ups and downs and bring the reader to date. An overview is provided in Table 5.1.

Table 5.1: The U.S. Airline Industry Timetable

	The Early Years
1903	First flight by Wright Brothers at Kitty Hawk, NC.
1914	The first scheduled air service starts between St. Petersburg and Tampa, FL.
1918	First Airmail delivery
1925-26	The Contract Air Mail Act and The Air Commerce Act of 1926 passes
1933	The first modern passenger airliner the Boeing 247 can carry 10 passengers
1934	<i>Air Mail Act of 1934</i> is enacted due to scandal regarding the mail bidding process
1938	The <i>Civil Aeronautics Act</i> of 1938 is passed. CA Board commences
1940	The first plane with pressurized cabin, the Stratoliner is introduced by Boeing
1943	The U.S. builds its first jet plane Bell P-59
	The Jet Age
1958	Boeing remodels and introduces its KC-135 jet tanker as the first U.S. passenger jet, the 707 (capacity 181 passengers) The <i>Federal Aviation Act</i> is passed to monitor the growing airline industry
1963	Sabre Computer Reservation System introduced by American
1967	Department of Transportation (DOT) is created
1969	Boeing launched its first widebody jet the 747 in 1969. It could carry 450 passengers. The first supersonic plane the Concorde is introduced
1978	The Airline Deregulation Act is passed. A new era begins... New Entrant Low Cost Carriers (LCCs) start to compete for markets
1981	American offers the first frequent flier program: AAdvantage
1982	Braniff goes bankrupt, the first case for a major airline since 1938
1984	Deregulation is considered to be successfully completed, and the CAB is abolished Most remaining functions are transferred to the DOT Accusations of predatory pricing occur Antitrust ruling enforces equal listing on Computer Reservation Systems
1986	People Express goes bankrupt mainly as a result of American's revenue management system
1986-89	Mega-Mergers era: Concentration increases and fortress hubs are formed
1992	American ignites a price war with its "value pricing" campaign and causes many bankruptcies and the worst performance in the industry
1993	The peak year for Travel Agency share in bookings
1995	Explosion of the internet

Table 5.1: (continued)

	ValueJet Crash causes misfortune for discounters Majors employ aggressive/predatory pricing to contain/destroy LCCs
1997-98	Competition stagnation: No new entrants in any markets
1998	DOT proposes guidelines to prevent anticompetitive practices in the industry
1999	DOJ reviews complaints and files a lawsuit against American
May 2001	American case dismissed by summary judgment. DOT appeals
September 2001	Terrorist attacks cause turmoil in the industry that was already sending alarming signals
2002-	Majors carriers drop commissions to travel agents LCCs gain market share and force majors to become more efficient

5.1.1 The Propeller (Early) Era

The first flight was accomplished by Orville and Wilbur Wright on December 17, 1903 at Kitty Hawk, North Carolina. All lasted 12 seconds for 120 feet distance but it was the first flight with the exception of balloons and gliders. The first U.S. passenger flew with Orville Wright five years later in 1908 and the transportation industry would never be the same.

The first scheduled air service started in 1914 between St. Petersburg and Tampa, Florida. The seaplane had a capacity of one passenger and made two flights a day, and the service cost \$5 one-way. The company ceased operations after only four months. Early flights were always great publicity but commercial aviation did not become widespread until much later.

World War I necessitated more powerful engines and resulted in planes that could fly at 130 mph. Increased power also enabled larger aircraft. However, the end of war left a huge surplus of planes (i.e., no demand for new planes) and many aircraft builders went out of business. The railroad was still the primary means of transportation for Americans.

The U.S. government decided to put the surplus planes to use. In 1917, The Congress approved \$100,000 for an experimental service and the first airmail was delivered from New York to President Wilson in Washington on May 14, 1918. By 1920, the Post Office was able to save almost a day on transcontinental deliveries through airmail.

The fleet, able to fly at night by mid-1920s, flew an average of 2.5 million miles and delivered 14 million letters annually. However, the Post Office typically contracted private companies for mail transportation, and had no intention of staying in the airmail business. *The Contract Air Mail Act* (also referred to as the Kelly Act after its main supporter, Rep. Clyde Kelly of Pennsylvania) was passed in 1925.

The Air Commerce Act of 1926 gave the Secretary of Commerce the authority to designate air routes, and license pilots and aircraft. National Air Transport (owned by the Curtiss Aeroplane Co.), Varney Air Lines, Western Air Express, Colonial Air Transport and Robertson Aircraft Corporation were the initial contract winners. They would form the core of the U.S. private airlines: “National and Varney would eventually become important parts of United Airlines. Western would merge with Transcontinental Air Transport (TAT), another Curtiss subsidiary, to form Transcontinental and Western Air (TWA). Robertson would become part of the Universal Aviation Corporation, which in turn would merge with Colonial, Southern Air Transport and others, to form American Airways, predecessor of American Airlines. Juan Trippe, one of the original partners in Colonial, later pioneered international air travel with Pan Am - a carrier he founded in 1927 to transport mail between Key West, Florida, and Havana, Cuba. Pitcairn Aviation, yet another Curtiss subsidiary that got its start transporting mail, would become Eastern Air Transport, predecessor of Eastern Air Lines.”

Henry Ford was also among the early contact winners. He carried mail from Detroit to Chicago on the same planes that transported spare parts for auto manufacturing. In 1927, Ford introduced the Trimotor (also referred to as the Tin Goose). The “Tin Goose” was the first plane designed specifically to carry people and had a capacity of 12 passengers. The Ford brand was assuring for the public but it took Charles Lindbergh’s historic flight across the Atlantic to bring flying to unprecedented public attention. Lindbergh became an instant hero when he completed his non-stop trip from New York to Paris on May 21, 1927. The Air Age had commenced.

The 1930 *Watres Act* (after one of its main supporters, Rep. Laurance H. Watres of Pennsylvania) authorized the Post Office to sign long-term airmail contracts based on space or volume as opposed to weight, and to consolidate airmail routes where necessary. The idea was to promote larger, hence stronger airlines enabling more frequent and faster mail delivery. The Post Office held a number of meetings attended by select larger airline executives (thus, these meetings were later referred to as the Spoils Conference). The idea was to have one company operating on each of three transcontinental mail routes as opposed to mail changing hands between several smaller airlines until it reached its destination.

Following the victory of the Democrats in 1932, smaller airlines complained that there had been unfair practices in the bidding process. In one case, it was discovered that a big airline was favored over a smaller airline even though its bid was three times higher. Congressional hearings followed, and by 1934 the scandal had reached such proportions that President Roosevelt cancelled all mail contracts and gave the job to the Army. Unfortunately, the Army pilots were not familiar with the routes and the

corresponding weather conditions. A number of accidents took place during practice runs and President Roosevelt had to retreat from his plan just one month later. The result was the *Air Mail Act of 1934*. The airmail services would be run by the private sector but the former contractors were not allowed to bid, and the bidding process was re-structured to be more competitive. The resulting lower margins mandated that the airlines pay more attention to the passenger business. The government also put a halt to vertical integration in the industry and manufacturers and operators were separated (e.g., Boeing, Pratt & Whitney, and United Airlines) resulting in a more focused and re-organized industry.

Arguably, the 1930s were the most innovative period in aviation history. Safer, larger, and faster planes were necessary to have a feasible airline business. Air-cooled engines, better cockpit instruments (e.g., improved altimeters, airspeed indicators, rate-of-climb indicators, compasses) and the introduction of artificial horizon were among the innovations of the period. Naturally, the wide spread use of radio was also of prime importance. Eighty-three radio beacons across the country were fully operational in 1932. The first air traffic control tower was established at Newark, New Jersey in 1935.

Launched in 1933, the first modern passenger airliner is considered to be Boeing 247. The 247 had a capacity of 10 passengers and could fly 155 miles per hour. United Air Lines purchased sixty 247s. TWA wanted to outdo United and the search for a better alternative led them to the Douglas Aircraft Company. Douglas' prototype DC-1 incorporated and improved upon many of Boeing's innovations. The longer version the DC-2 could accommodate 14 passengers and was a big hit. However, DC-3, later called the plane to change the world, had a capacity of 21 passengers, and was considered cost-efficient, safer, more comfortable, with more powerful engines. It could complete a coast-

to-coast trip in 16 hours. Following the marketing concept of product development, Douglas got American Airlines heavily involved in the design process of DC-3. The result was the first plane that enabled airlines to make money from passenger business. DC-3 became very popular and introduced many new travelers to the joys of flying. Despite the success of DC-3, a technical difficulty remained: The airlines wanted to fly higher so that they could avoid air turbulence and storms at lower altitudes. Motion sickness was also a problem for many passengers. However, they could not fly higher than 10,000 feet because the lack of oxygen made passengers dizzy or even unconscious. In 1940 the solution was called Stratoliner by Boeing, the first plane with pressurized cabin. First embraced by TWA, the Stratoliner had a capacity of 33 passengers, could fly at 20,000 feet at 200 miles per hour.

There were also political problems resulting in economic problems for the airlines. Before *the Civil Aeronautics Act* of 1938, many government agencies were involved with the airlines resulting in bureaucracy and no long-term policy for the industry. All the airlines were losing money due to the reduced mail revenues since the 1934 Airmail reform. The wish of the airlines for a rational government regulation through an independent agency was granted through the Civil Aeronautics Act (Rhyne 1939):

Sec. 2. In the exercise and performance of its powers and duties under this act, the Authority shall consider the following, among other things, as being in the public interest, and in accordance with the public convenience and necessity:

- a. The encouragement and development of an air transportation system properly adapted to the present and future needs of the foreign and domestic commerce of the United States, of the Postal Service and of the national defense;
- b. The regulation of air transportation in such manner as to recognize and

preserve the inherent advantages of, assure the highest degree of safety in and foster sound economic conditions in, such transportation and improve the relations between, and coordinate transportation by air carriers;

c. The promotion of adequate, economical and efficient service by air carriers at reasonable charges, without unjust discrimination, undue preferences or advantages, or unfair or destructive competitive practices;

d. Competition to the extent necessary to assure the sound development of an air transportation system properly adapted to the needs of foreign and domestic commerce of the United States, of the Postal Service, and of national defense;

e. The regulation of air commerce in such manner as the best promote its development and safety; and

f. The encouragement and development of civil aeronautics.

The *Civil Aeronautics Authority* (CAA) was founded with the Civil Aeronautics Act.

CAA was empowered to regulate fares, mail rates, inter-line agreements, mergers, and routes. CAA had a mission with a double edge. It needed to hold rates at reasonable levels for the public but also strengthen the financially weak airline business to help develop the commercial air transportation business. First, *Air Safety Board* was created to investigate accidents. However, that function was also transferred to CAA in 1940. CAA was then renamed Civil Aeronautics Board (CAB). The CAB was modeled after the Interstate Commerce Commission so that public utility type of regulation could be imposed and the airline industry would not be harmed because of “cut-throat”, wasteful, destructive, excessive, unrestrained competition (Dempsey 1989, p.18).

There was one remaining factor before the commercial aviation could take off, the World War II. Interestingly, just as aircraft helped efforts of war, warfare helped the aircraft industry. In 1939, there were less than 300 air transport planes in the U.S., but by

1945, 50,000 planes were produced annually. While the U.S. focused on mass production, the breakthrough innovations –radar and jet engines- took place in Europe.

5.1.2 The Jet (Post-war) Era

The first jet engine was designed by a British pilot in 1930; but the first to build and test a jet plane were the Germans in 1939. However, it would take five more years for them to perfect the design –too late to change the outcome of the war. Nevertheless, the jet age had arrived. The U.S. built its first jet plane, the Bell P-59 in 1943. The breakthroughs in military aircraft were eventually applied to commercial aircraft. For example, Boeing remodeled and introduced its KC-135 jet tanker as the first U.S. passenger jet, the 707 in 1958. The 707 had a capacity of 181 passengers and could fly 550 miles per hour. It burned kerosene, which cost half as much as the gasoline the traditional planes were using at the time. Pan Am was the first customer of the legendary Boeing 707. The same year *the Federal Aviation Act* was passed to monitor the growing airline industry. With this Act, *Federal Aviation Agency* was founded to establish and run the air traffic control system, and to monitor the safety of the overall flights (its name was later changed to Federal Aviation Administration when the Department of Transportation (DOT) was created in 1967). CAB still had authority over economic issues such as routes and fares.

Boeing launched its first widebody jet the 747 in 1969. The 747 had a capacity of 450 passengers. Pan Am was the first customer. Douglas and Lockheed jumped on the widebody jet bandwagon with the DC-10 and L1011 respectively. However, these planes

were smaller in size, seating about 250 passengers. The supersonic plane, the Concorde flew the same year.

5.1.3 Deregulation Era

Deregulation will be the greatest thing to happen to the airlines since the jet engine.

Richard Ferris, President, United Airlines (Peterson and Glab 1994, p.49)

Before deregulation the U.S. airline industry was run much like a public utility. Civil Aeronautics Board (CAB) was in charge determining who would fly which routes and how much they would charge for the service. The CAB would not permit most new companies to fly. For example, it delayed its decision on a proposal to fly coast-to-coast for less than half the going rate for eight years and then dismissed it (Peterson and Glab 1994). As a matter of fact, some of the practices in the regulated airline industry would be considered illegal in other industries. For example, the CAB approved a war chest fund in which the airlines agreed to support any airline that was suffering from a union strike. By mid-70s the mutual aid had amounted to \$350 million (Peterson and Glab 1994). In 1970, American, TWA, and United jointly decided to cut the capacity on their coast-coast services so that they could achieve higher load rates. There were no other competition on coast-to-coast routes and this would constitute a deliberate antitrust case for any other industry except the airlines. Instead, the CAB approved it and granted antitrust immunity for one year (Peterson and Glab 1994, p.30). Similar agreements followed. Regulatory structure enabled airlines to fly at half capacity to capture market share. Since carriers

could not compete on price, they were competing on non-price terms such as “sandwich wars.” For example, Delta was alleging that Northeast airlines did not have their steaks “cooked to order” as their advertisements stated (Peterson and Glab 1994, p.30). This dispute continued until Delta’s acquisition of Northeast (Kuttner 1996). This kind of subtle competition did not create winners but an industry with low profitability.

The notion of deregulation was becoming stronger as studies showed that unregulated interstate fares in Texas and California were significantly lower than intrastate flights after controlling for distance (Levine 1987). For example, Southwest was able to avoid Federal regulations by servicing the Dallas-San Antonio-Houston triangle, which enabled it to offer fares much cheaper than that of the incumbent airlines. It was asserted that regulation gave consumers excessive service, but a lack of price competition, and inflated fares (Dempsey 1989). Moreover, the increased use of the widebody jets coincided with the OPEC oil embargo in 1973. The fuel prices and inflation increased drastically. The result was increased capacity and cost but falling airline traffic. In order to assure a reasonable rate of return for the airlines, the CAB allowed airlines to increase fares. It also decided to not approve any new service on any route for four years and limited the overall capacity on major routes. However, the poor performance of the airline industry continued despite the fact that it cost more for the public to fly. The industry became a target for the Ford Administration, which was after regulatory reforms. Hearings of the Senate Subcommittee on Administrative Practice and Procedure, chaired by Senator Edward Kennedy, concluded that airline prices would fall automatically at the absence of government-imposed limits (1977). The major airlines had not taken the hearings seriously and had sent their junior executives. On the other

hand, Kennedy had enlisted elite academics (e.g., Alfred Kahn of Cornell) and discounter heroes such as Freddie Laker (of U.K.'s Laker Airways) (Peterson and Glab 1994). Kennedy recognized the political importance of bringing the airfares down and it economically seemed to make sense. Alfred Kahn had written two volumes entitled the *Economics of Regulation* and had concluded that even imperfect competition was preferable to inherently imperfect regulation (Kahn 1970). Deregulation would allow for new and innovative services, increased productivity and efficiency resulting in higher consumer welfare. The CAB admitted to similar conclusions (1975). The airline industry "was naturally competitive, not monopolistic" therefore entry and price constraints could no longer be justified. Led by John E. Robson, the CAB started to loosen its grip on its own. Cornell University Economics Professor Alfred E. Kahn became the chairman of the CAB in 1977. Kahn was not happy with the existing CAB regulation. He argued that the system inflated fares, and caused misallocation of resources, carrier inefficiency, excess capacity, and acute range of services and prices (Dempsey 1989, p.20).

Kahn actively participated in an effort for reform by effectively using the preliminary results of flexible regulation under his leadership for convincing political figures and media. Behind the scenes, United Airlines⁶, and Federal Express were also supporting the idea of deregulation. Each trusted that the size of their fleet would give them an edge over competition in an unregulated industry (Petzinger 1995).

The theory of contestable markets in which potential market entry would prevent monopolies was going to be tested with deregulation. Kahn was confident that the results

⁶ Worldwide, only Aeroflot had a larger fleet than United Airlines at that time.

would benefit all constituents including consumers, all communities, and the airlines --its employees, stockholders, and creditors (1978, p.8).

Kahn would be dubbed the father of the U.S. airline deregulation a year later in 1978. Deregulation first commenced on the cargo side of the business. The express package delivery service experienced tremendous growth since deregulation. Fed-Ex, UPS, DHL are all considered owners of major airlines today.

The Airline Deregulation Act:

The Airline Deregulation Act, a milestone for the airline industry, was approved by Congress on October 24, 1978 and signed soon after by President Jimmy Carter. Government Controls on domestic routes and schedules were discarded and the free market economics took over. Congress had scheduled that route and rate regulations to be phased out in four years. However, CAB moved very liberally with Kahn on board, and all restrictions on routes were practically abolished within one year.

There was also much deregulation in the international arena. The U.S. had signed 45 “Open Skies” agreements by mid-2000. “Open Skies” agreements abolish limitations on routes including those on capacity, frequency, and provide flexibility for pricing, charters, cooperative marketing agreements, and other joint operations. The DOT continues to monitor the remaining regulated international routes.

After deregulation was successfully completed, the CAB was abolished at the end of 1984 and most of its remaining functions were transferred to the DOT. Among the most important of these inherited functions was to review and grant antitrust immunity to merger and acquisition activities. However, the role of the government on safety has not

been abandoned, and the FAA continues to regulate safety issues. Deregulation sparked a wave of change in many aspects of the airline business including many that were not forecasted. For example, the rise and fortification of the hub-and-spoke networks, more complex fare structures, and the survival of major firms at the expense of entrants were all unforeseen (2001g). These changes are discussed next.

5.1.4 Consequences

Transportation was the first industry in the nation to be regulated, and the first to enjoy significant deregulation (Dempsey 1989). While the evaluation regarding the success of deregulation has been mixed, the evidence has been encouraging. Yet the experience was far from perfect, and there were criticisms:

Of the six intellectual assumptions behind the airline deregulation, four have been proven completely false. Deregulators believed that airline size was not critical to efficient operations. The marketplace, to the contrary, has ruled that bigger is better. Deregulators believed that barriers to entry are low in the airline business. Experience has demonstrated that they are very high. Deregulators believed that increased competition would produce low unrestricted fares. In fact, it has produced a bewildering array of discriminatory prices. Deregulators believed that travel agencies were obsolete as well as potentially misleading channels of information and distribution. But travel agencies became more powerful than ever. A fifth assumption, that antitrust laws would restrain competitive abuses, has been negated by the policy default of two administrations... (Kuttner 1996).

Despite the above criticisms “Deregulation has been one of the most successful regulatory and economic policy reforms in the late 20th century” (Kasper 1998). Kahn himself admitted that he had surprises in the deregulation process including the turbulence and painfulness of the process, the reconcentration of the industry, the intensification of price discrimination and the deterioration in quality of airline service

(Kahn 1988). He asserted that deregulation resulted in lower fares, increased range of price-quality options and improvements in efficiency but that the competition was unevenly distributed across markets and that congestion and delays were causing problems (Kahn 1988). Several consequences of deregulation are investigated next.

5.1.4.1 Service and Quality

Serious concern about the decreasing level of safety and service quality and increasing concentration levels after deregulation has been voiced (Dempsey 1989):

The industry rapidly became an oligopoly, with an unprecedented wave of mergers consolidations, and bankruptcies. Today, the top 8 airlines dominate more than 94% of the domestic passenger market... [F]unneling of aircraft into “hub-and-choke” bottlenecks... have significantly narrowed the margin of safety and sent the number of near misses skyrocketing. Airline service has gone to hell in the 1980s. We are headed aboard aerial slums, served cardboard food, overbooked, bumped, and misconnected. Our luggage is routed through the Twilight Zone, never to be seen during our natural lives... We can either spend an arm and a leg or sleep in a strange city on a Saturday night.

The number of departures have increased by 50% for small community, 57% for medium, and 68% for large community airports since deregulation (1996a). The DOT indicated that the number of domestic passengers tripled since deregulation and that more than 80% of domestic passengers enjoy two or more carriers alternatives (2001g). However, Dempsey (2000a) points out that 61% of the non-hub communities suffered from decreases in service. 28% of them lost all the service they had and only 6% enjoyed new services (Dempsey 2000a). Meanwhile customer satisfaction was also deteriorating (Dempsey 1989). The following were reported to be the top customer complaints ranked in order:

Flight Problems: Cancellations, delays or other deviations,

Baggage handling: Claims for lost, damaged, or delayed baggage; charges for excess baggage; carry-on problems; difficulties with claim procedures,

Refunds: Problems in obtaining refunds for unused or lost tickets or fare adjustments,

Customer Service: Rude or unhelpful employees, unpleasant meals or cabin service, and treatment of delayed passengers

Reservations, ticketing and boarding: Airline or travel agent mistakes in reservations and ticketing; problems in making reservations and obtaining tickets due to busy phone lines or waiting in line; delays in mailing tickets; and problems boarding the aircraft,

Oversales: Bumping problems, whether or not the airline complied with DOT oversale regulations,

Other: Cargo problems, security, airport facilities, claims for bodily injury, and other miscellaneous problems,

Fares: Incorrect or incomplete information about fares, discount fare conditions and availability, overcharges, fare increases, and the level of fares in general,

Smoking: Inadequate segregation of smokers, failure of the airline to enforce no-smoking rules,

Advertising: Ads that are unfair, misleading, or offensive.

Source: (Coleman 1987) in (Dempsey 1989)

One of the major concerns about deregulation was that smaller communities would lose air service after deregulation. Despite the ongoing program, (Dempsey 1989) notes that many smaller communities have either lost all air services or the services were downgraded to commuter carriers and suffered from a sharp decrease in quality. Forty percent of small communities have suffered from decreasing service and increasing prices after deregulation (Moore 1986).

As a potential remedy, the DOT administers the *Essential Air Service* Program, which was launched with deregulation. Essential Air Service Program was designed to provide subsidies to carriers to fly to certain smaller communities to which service would be not feasible otherwise. Section 419 of the Federal Aviation Act ensures that smaller communities remain linked to the national aviation system. This program was initially approved by the Congress for a period of ten years (expiring in 1988) but was later extended for another ten years (until 1998). Seventy-eight communities were still being subsidized under this program as of May 1998 (1998d). In 1998, the end date for the program was also abolished and its annual budget was increased and set to \$50 million with Rural Air Service Survival Act. The program continues to this day. Some 113 communities were being subsidized as of October 2001 (2001b; 2001j). The carriers under the Essential Air Service program are usually assigned for a period of two years. The following is expected from the basic essential air service:

- (a) service to a hub airport, defined as an FAA-designated medium- or large-hub airport,
- (b) service with no more than one intermediate stop to the hub,
- (c) service with aircraft having at least 15 passenger seats at communities that averaged more than 11 passenger enplanements a day in any calendar year from 1976-1986,
- (d) under certain circumstances, service with pressurized aircraft, and
- (e) flights at reasonable times taking into account the needs of passengers with connecting flights (1998d).

Currently, communities are eligible to be a part of this program if they are further than 70 driving miles of an FAA-designated Large or Medium Hub airport, unless the subsidy per passenger exceeds \$200 (with certain exception for communities that are further than 210 highway miles from the nearest Medium or Large Hub) (2001f).

In conclusion, it can be said that while service in hub markets increased in frequency, some community markets suffered from a loss of service as a result of deregulation. While the range of the quality of services (e.g., first class, business, coach) increased, it can be argued that the average service level also decreased. However, this issue should be taken into consideration along with the fare levels, which generally were reduced due to heavy competition following deregulation.

5.1.4.2 Fare Levels

Numerous low cost carriers (LCCs) challenged the major carriers following deregulation. Major carriers⁷ responded by price cuts, and airfares (adjusted for inflation) fell by 33% from 1976 (the dawn of deregulation) to 1993 (Morrison and Winston 1995). Thus, benefits of new entrants included lower fares and increased frequency. Dropping fares ignited demand: “For example, when AirTran entered the Atlanta-Buffalo market, average fares declined by 36%, from \$185 to \$119, and the number of the passengers in the market increased by 65%, from 23,000 per month to 38,000 per month. Similarly, when Vanguard re-entered the Kansas City-Minneapolis market in late 1996, average fares declined by 59%, from \$246 to \$101, and the traffic more than doubled, increasing from about 12,000 passengers per month to 25,000 per month” (2001g, p.6). The DOT estimated that consumers saved \$6.3 billion per year due to low fare carriers (1996c). “Most upstarts have average seat mile costs in the 7 cent range, compared to the 10 cent

⁷ A major airline is defined by the DOT as airlines with annual operating revenues of over \$ 1,000,000,000. (Oster and Strong 2001) There were 12 major U.S. passenger airlines in 2000: Alaska, America West, American, American Eagle, American Trans Air, Continental, Delta, Northwest, Southwest, Trans World, United and US Airways. In addition, three all-cargo airlines were classified as majors: DHL Airways, FedEx and United Parcel Service.

range of traditional carriers. Upstarts maintain their low costs by a number of strategies, including lower labor costs, direct marketing and “no frills” service” (Fones 1997). Thus, discount airlines have approximately 30% cost advantage over network carriers.

However, the increase of concentration in hub markets limited the extent of benefits that discount carriers could offer. The average number of carriers per route was 2.2 (most routes are served by major carriers only) and those routes that Southwest flies were 47.2% cheaper than comparable routes (Kuttner 2000). DOT reported that passengers paid \$54 less, on average, if a low cost carrier served the same market (Dempsey 2000a). On the other hand, while the public has been getting better deals, it was reported that unrestricted fares (i.e., fares that mainly business class passengers pay) have increased by 73% after deregulation (Dempsey 2000a, p.485).

Average Fares Measured Against SIFL
Top 1,000+ U.S. Domestic Markets
Second Quarter 1998

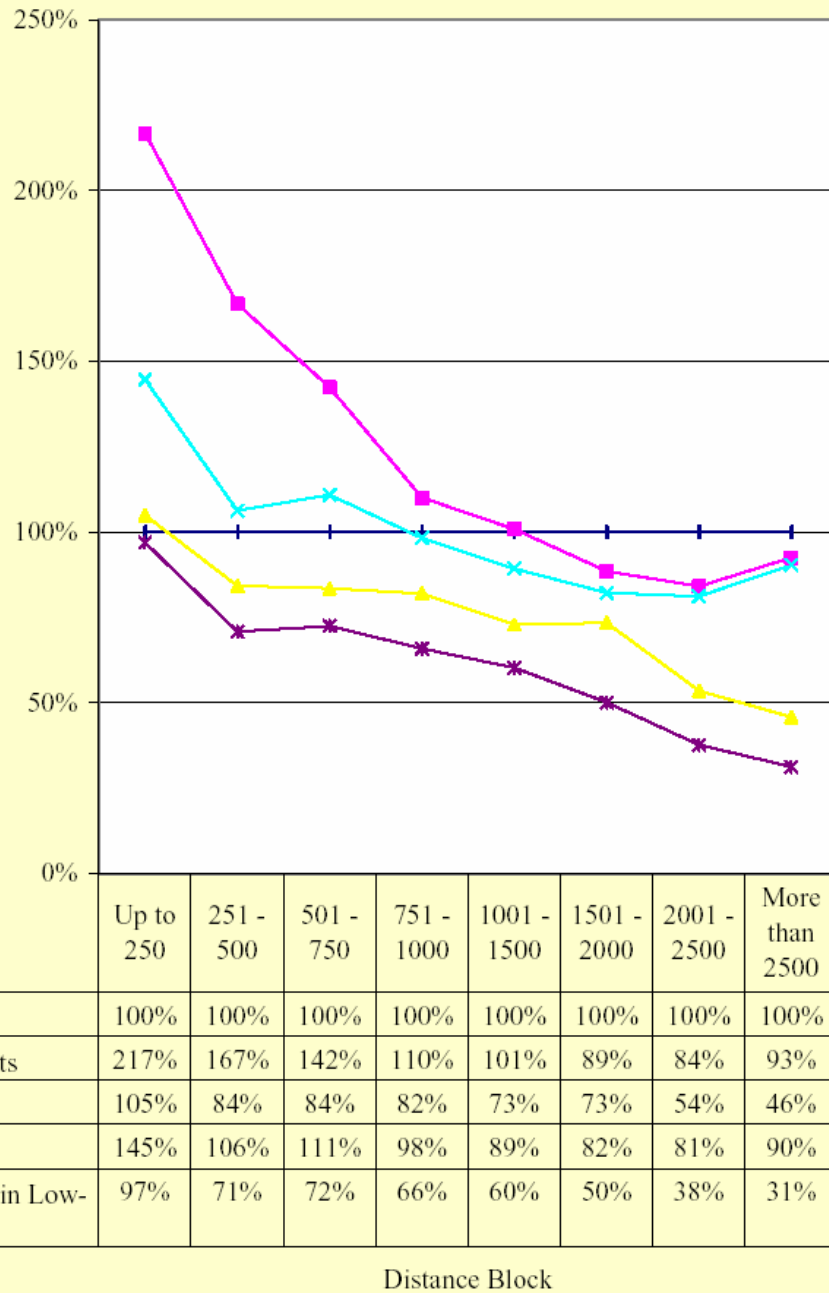


Figure 5.1: Demonstration of fare level differences 1998Q2

Note: SIFL stands for Standard Industry Fare Level. It is the pre-deregulation fare level (adjusted for inflation). Source: Domestic Airline Fares Consumer Report 1998 Q2 (1998a)

Figure 5.1 powerfully demonstrates the impact of low fares carriers and deregulation has had on fare levels. The 100% base line represents the prices in 1978 (pre-deregulation) adjusted for inflation.

The implication is that the overall fare levels are indeed lower than they would have been under regulated pricing for distance blocks longer than 750 miles. The prices are lower than the regulation era for low-fare carrier markets for all distance blocks. Finally, the major carriers' fares are lower than regulation era only for distance blocks longer than 1500 miles. The figure applies to the second quarter of 1998 but the implications can be generalized to other time frames. For example, Figure 5.2 presents the same notion for the third quarter of 2001.

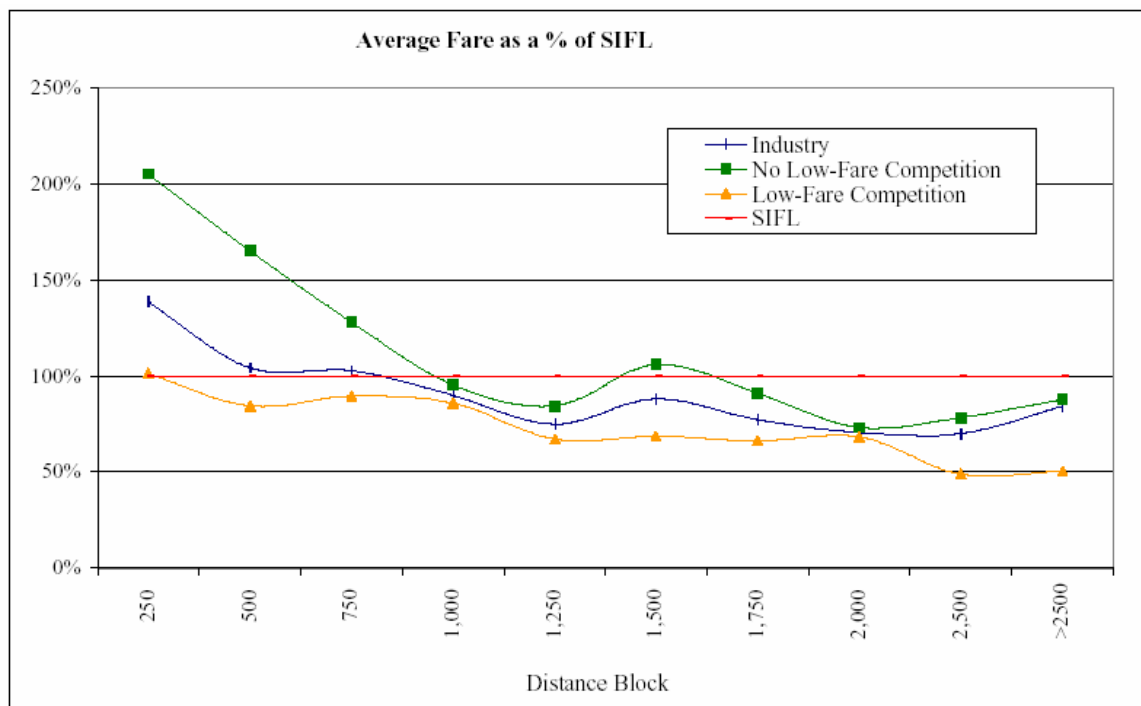


Figure 5.2: Demonstration of fare level differences: Top 1000 markets, 2001 Q3

Note: SIFL stands Standard Industry Fare Level. It is the pre-deregulation fare level (adjusted for inflation). Source: Domestic Airline Fares Consumer Report 2001 Q3 (2001d)

5.1.4.3 Market Concentration and Power

Despite the early success, ten years into deregulation, the increasing levels of concentration were causing concern. The DOT observed that the number of carriers had increased from 39 to 131 from 1978 to 1987 (1987a). However, this observation was misleading since “nearly two-thirds of city-pairs were airline monopolies and another 20% were duopolies” (Dempsey 1989, p.87). “The 11 major airlines have shrunk to eight; the eight local former local service carriers are now two and they are trying to merge; the eight original low-cost charter airlines have been reduced to one, through bankruptcy and abandonment; 14 former regional airlines have shrunk to only four; over 100 new upstart airlines were certified by the CAB and about 32 got off the ground and most of these crashed, leaving only a handful still operating; of the 50 top commuters in existence in 1978, 29 have disappeared... Today, the top 50 carriers who constitute 90 percent of that industry are captives of the major airlines and relegated to serving the big airlines at their hubs” (1987b, p.61-62).

A major reason for increased market concentration was the DOT’s relaxed merger evaluations in the 80’s. Particularly in the second half of the 80s, the DOT approved a number of mergers based on the notion that there were no barriers to entry even though the mergers resulted in dominant market shares. The analysis overlooked the issue of whether or not those potential entries would be economically feasible (Nannes 1999). Despite the warnings in the Airline Deregulation Act of 1978 against “unreasonable industry concentration, excessive market domination”, the DOT “never met a merger it didn’t like” (Dempsey 1989, p.87):

DOT approved them all. It approved Texas Air’s (i.e. Continental and New York Air) acquisition of both People Express (which included

Frontier) and Eastern Airlines (which included Braniff's Latin American routes); United acquisition of Pan Am's transpacific routes; American's acquisition of AirCal; Delta's acquisition of Western; Northwest's acquisition of Republic; TWA's acquisition of Ozark; and US Air's acquisition of PSA and Piedmont, to mention only a few. This has sharply increased national levels of concentration to the point that the eight largest carriers control over 94% of the domestic passenger market... Under deregulation, [charter flights] virtually vanished (Dempsey 1989, p.88)

A critical review can indeed establish that the mergers in the Reagan era started an irreversible process and were an important reason of the increase in market concentration in the airline industry. Table 5.2 demonstrates that twelve mergers took place in a matter of two years:

Table 5.2: Airline Mergers in the 1985-87 Period

Acquiring Airline	Passengers (thousands)	Acquired Airline	Passengers (thousands)	Final Bid
Southwest	10698	Muse	1980	March 11, 1985
Piedmont	14274	Empire	1084	October 3, 1985
People	9100	Frontier	7068	October 9, 1985
Northwest	14539	Republic	17465	January 24, 1986
Texas	19640	Eastern	41662	February 24, 1986
TWA	20876	Ozark	5541	February 28, 1986
Alaska	3132	Jet America	774	September 8, 1986
Delta	39804	Western	9062	September 10, 1986
Texas	19640	People	11907	September 16, 1986
American	41165	Air Cal	4451	November 18, 1986
Alaska	3132	Horizon	942	November 20, 1986
US Air	19278	Pacific Southwest	9049	December 9, 1986
Us Air	21725	Piedmont	22800	March, 1987
Braniff	2557	Florida Express	1415	December 15, 1987

Source: DOT Air Carrier Traffic Statistics (Oster and Strong 2001, p.7).

Other major mergers since deregulation have included (1993a, p.459):

American: TWA, Air Cal, Eastern (Latin America), Reno

United: Pan Am (transpacific), Pan Am (Latin America), Pan Am (Heathrow)

Delta: Pan Am (Europe)

Continental: Texas International, Frontier, New York Air, Rocky Mountain, Britt, PBA

Pan Am: Pan American World, National, Ransome

Eastern: Braniff (Latin America)

Republic: North Central, Southern, Hughes Airwest

US Airways: US Air (Allegheny), PSA, Empire, Henson

Southwest: Morris Air

TWA: TWA, Ozark

Former CAB chairman Alfred Kahn heavily criticized DOT for their hasty approval of the mergers: “It is absurd to blame deregulation for this abysmal dereliction.”(Kahn 1988). Empirical research has also indicated that the airline consolidation has led to market power (Kim and Singal 1993). The ten largest airlines accumulated 88% of the revenue passenger miles flown; that figure had risen to 94% by 1990 (Sheehan 1993). General Accounting Office reported that consumers flying from small to major airports had to pay 34% more if the major airport was concentrated and 42% more if both airports were concentrated (Dempsey 2000a, p.485). However, mergers were probably not the primary reason for the increased concentration in the 80’s. Market concentration and the resulting power was a consequence of the rise of the hub-and-spoke system.

5.1.4.4 Hub-and-Spoke Networks

I never heard a word spoken about hub and spoke in the entire debate leading up to deregulation.

Congressman James Oberstar, Ranking Minority Member, U.S. House of Representatives Aviation Subcommittee (Dempsey 2000a)

One of the unforeseen results of airline deregulation was the emergence of the hub-and-spoke networks. The hub and spoke concept lies at the heart of any network

carrier. Securing hubs enables the dominant carrier to charge “hub premiums” (Hecker 2001). The following statistics should clarify their importance: U.S. General Accounting Office (GAO) compared prices at concentrated hub airports and relatively unconcentrated airports, and found that prices were 27% higher in the concentrated hubs (Dempsey 2000b). Adjusting for the average trip distance and the size of the markets, the concentrated hub fares were on average 18.7% higher than for similar markets in other airports. In the absence of LCC competition, the major carrier was able to charge fares that exceeded its fares in non-hub markets of comparable distance and density by upwards of 40% (Dempsey 2000b).

The incumbent hub carrier has an advantage over their competitors because they are able offer a wider range of flights and services. In effect, they are able to attract a larger portion of business travelers and obtain a higher yield than their rivals (2001g). There is also higher brand recognition and the advertising costs are spread across more markets than that of the rivals (Levine 1987). Robert Crandall, CEO of American airlines summarized the benefits of the system as follows:

While a hub and-spoke system is admittedly more expensive to operate than a comparably sized system of point-to-point routes, the system's incremental costs are more than offset by its enormous revenue benefits. For example, we estimate that there are fewer than 500 city pair markets in the United States big enough to adequately support point-to-point jet service. However, our hub-and-spoke system makes it possible for American to effectively serve over 10,000 markets –and realize a large revenue per available seat mile premium relative to point-to-point carriers. (1993a, p.3)

However, the efficiency of using hub and spoke networks for short-haul flights is questionable. For example, Southwest has an average of 20.4 minutes ground time as

opposed to American's 50.3 minutes (Dempsey 2000a). The result is a 22% better utilization of aircraft for Southwest plus additional gains from personnel productivity (Dempsey 2000a). The hub-and-spoke system also led to the use of smaller aircraft, which meant relatively poor seat-mile cost efficiency. The same pattern of increasing concentration of fortress hubs has been observed over and over again (Dempsey 1990; 1997). Table 5.3 demonstrates the increase of market share by hub carriers particularly during the decade following deregulation. These figures continued to be alarmingly high in the 90's.

Table 5.3: Single Carrier Market Shares at Major Airports Pre and Post Deregulation

Airport	1977	1987	1997*
Baltimore/Washington	24.5% US Air	60.0% US Air	33.7% US Air
Cincinnati	35.0% Delta	67.6% Delta	79.4% Delta
Detroit Metropolitan	21.2% Delta	64.9% Northwest	63.4% NW
Houston Intercontinental	20.4% Continental	71.5% Continental	39.1% CO
Memphis	40.2% Delta	86.7% Northwest	52.2% NW
Minneapolis/St. Paul	45.9% Northwest	81.6% Northwest	69.7% NW
Nashville Metropolitan	28.2% American	60.2% American	29.3% SW
Pittsburgh	43.7% US Air	82.8% US Air	73.3% US
St. Louis – Lambert	39.1% TWA	82.3% TWA	48.7% TWA
Salt Lake City	39.6% Western	74.5% Delta	55.5% Delta
Average	33.8%	73.2%	54.4%

Source: Extended from Consumer Reports (June 1988), at 362-367 (Dempsey 1989, p.89)

* 1997 figures were retrieved from the DBP database and may not be fully compatible with earlier figures. The loss of market share at the hubs were typically due to Southwest competition.

Hubs enable the incumbent to have more frequent service on the spokes than would otherwise be economically feasible (Levine 1987). Therefore, they are generally beneficial for the public, however, their disadvantages include increased barriers to entry (2001g; Anderson 1997). The resulting market power may also lead to supra-competitive

pricing (i.e., higher prices than would be considered normal for the market) and decrease the welfare of consumers especially for those living in hub markets (Brown 1991). A major concern regarding competition was that the major carriers stifled competition in their hub airports. The incumbents carry the majority passengers in and out of their hub markets (2001g). “The hub carrier dominates city pairs it serves directly from its hub, except to other cities that are also hubs for other carriers, in which case the two carriers providing hub service dominate. Entry by a major carrier on a point-to-point basis into another carrier’s hub has become very much the exception” (Nannes 1999, p. 4). One 2001 DOT report concluded that remaining passengers pay 41% more than those flying in hubs with low-cost carrier presence (2001e). The situation in short-haul hub markets was even worse, with its 54% price premium over comparable routes with low fare competition.

5.1.4.5 Hub Premiums

Federal Aviation Administration categorizes airports into four categories: large hubs, medium hubs, small hubs and non-hubs (Morrison and Winston 1997):

Categorization	Total U.S. Traffic Accounted by Hub
Large Hubs	1% or more
Medium Hubs	0.25% to 0.99%
Small Hubs	0.05% to 0.24%
Non-hubs	less than 0.05%

When the fare levels are compared to non-hubs, fare premium effects are robust and present. A hub premium is the increased fares that the consumers have to pay for flying from a certain hub and is defined in percentages. Premiums have been observed to

be 62% for Charlotte, 51% for Cincinnati and Pittsburgh and 41% for Minneapolis/St. Paul (Oster and Strong 1996). These premium effects were “persistent” over time (2001g).

Interestingly, hub premiums are either mild or non-existing for hubs that are served by Southwest (hence, the phrase “Southwest effect”) (2001g). For example, one year after Southwest began serving Providence, RI markets, fares fell by almost 50% and traffic more than tripled (Slater 2001). In summary, hub-and spoke networks enable the use of market power and act as barriers to entry (Leigh 1990). Table 5.4 demonstrates the consistent increase of hub premiums for the leading hub airports in the nation on an airline basis. For example, it shows that consumers in Atlanta have had to pay 20-40% higher fares for the privilege of flying out of Hartsfield airport in comparison to the rest of the nation for the same distances.

Table 5.4: Changes in Hub Premiums over Time

	Carrier	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Atlanta	Delta	0.35	0.39	0.39	0.26	0.33	0.33	0.40	0.34	0.32	0.33	0.28	0.41	0.21	0.21
Baltimore	US Airways	0.04	0.01	-0.02	0.02	0.08	0.12	0.15	0.14	0.21	0.11	-0.07	0.04	0.05	-0.01
Charlotte	US Airways	0.26	0.07	0.13	0.14	0.20	0.26	0.24	0.28	0.36	0.36	0.25	0.59	0.69	0.62
Chicago O'Hare	American	0.22	0.22	0.29	0.29	0.23	0.21	0.17	0.09	0.11	0.23	0.15	0.15	0.19	0.20
Chicago O'Hare	United	0.25	0.20	0.24	0.24	0.18	0.15	0.18	0.11	0.15	0.18	0.12	0.14	0.22	0.25
Cincinnati	Delta	0.24	0.19	0.25	0.33	0.30	0.28	0.37	0.28	0.30	0.37	0.42	0.64	0.60	0.51
Dallas-Ft. Worth	American	0.13	0.23	0.16	0.19	0.27	0.29	0.30	0.22	0.16	0.29	0.38	0.31	0.35	0.35
Denver	United	-0.09	-0.12	-0.19	0.02	0.05	0.07	0.13	0.09	0.08	0.09	0.07	0.12	0.19	0.07
Detroit	Northwest	0.08	0.14	0.15	0.10	0.05	0.05	0.09	0.10	0.18	0.22	0.34	0.25	0.29	0.22
Houston (IAH)	Continental	-0.12	-0.13	-0.10	0.01	0.14	0.19	0.19	0.16	0.15	0.15	0.13	0.13	0.21	0.18
Memphis	Northwest	0.37	0.35	0.39	0.32	0.26	0.18	0.27	0.24	0.23	0.26	0.38	0.29	0.39	0.39
Minneapolis	Northwest	0.10	0.11	0.10	0.17	0.13	0.13	0.33	0.26	0.25	0.21	0.42	0.34	0.44	0.41
Philadelphia	US Airways	0.20	0.20	0.20	0.10	0.10	0.08	0.07	0.21	0.32	0.33	0.27	0.26	0.30	0.29
Pittsburgh	US Airways	0.28	0.29	0.22	0.08	0.06	0.16	0.20	0.27	0.40	0.39	0.45	0.45	0.49	0.51
Salt Lake City	Delta	0.14	0.09	0.09	0.14	0.24	0.15	0.21	0.21	0.19	-0.06	-0.04	-0.02	-0.19	-0.15
St. Louis	TWA	0.12	0.12	0.10	0.18	0.10	0.06	0.06	0.03	-0.04	-0.04	0.01	-0.02	0.14	0.09
Washington (IAD)	United	0.01	0.17	0.17	0.17	0.12	0.11	0.15	0.16	0.16	0.17	0.21	0.2	0.32	0.37

Data taken from table 2 of Severin Borenstein's January 21, 1999 presentation to the TRB Study Committee on Airline Competition

Source: (Oster and Strong 2001, p.33)

The trends in Tables 5.4 and 5.5 indicate that the hub premium effect is persistent over time. It should be noted that the occasional negative premiums may be either due to presence of discounters or due to low entry barriers and limit pricing (e.g., St. Louis, Baltimore).

Examining the HHI index at the national level can be misleading. A more accurate assessment would be possible through an examination at the hub airport level. It was found that the concentration for the airline industry had increased to an alarming 3877 (above 1800 is considered highly concentrated by the DOJ) and thirty-three airports were assessed to be highly concentrated (1997a). It should be noted that only La Guardia and Los Angeles International airports are below the 1800 threshold for high concentration. There has been a general trend for more concentration fueled by the mergers as explained previously.

Table 5.5: Sample HHI Index for the 10 largest US Airports 1985-1996

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Chicago O'Hare	2449	2836	3263	3491	3526	3591	3617	3427	3557	3474	3505	3445
Atlanta	4190	4468	4569	4619	5420	5489	7586	7604	7058	6223	5585	6233
Dallas/Fort Worth	4143	4500	4519	4759	4906	4927	4833	5008	4541	4451	4581	4684
Detroit	2189	2151	3903	3793	4655	5124	5557	5973	6188	5949	6240	6465
Los Angeles	852	911	1025	1066	1131	1156	1297	1376	1393	1379	1528	1524
Denver	2356	3015	3767	3674	3504	3562	3587	3661	3787	4307	4980	4892
Phoenix	1601	2000	2395	2459	2507	2700	2849	2679	2645	2556	2544	2451
San Francisco	1437	1723	1847	1715	1903	2134	2552	2685	3073	3448	3760	3831
Newark	2821	2395	2154	2400	2815	2933	3092	3143	3222	3287	2929	3060
New York LaGuardia	1368	1384	1320	1175	990	1102	1293	1662	1763	1733	1688	1777

Source: DOT Form 11 Data (1997a)

Professor Allvine observed that the major airlines widely employ predatory pricing in the name of defending their “fortress hubs”:

Government study after study shows that airline industry is not perfectly competitive... These studies show that the major airlines employ many monopolistic practices that contribute to the market power to raise and maintain prices above the competitive level. In imperfect competitive markets, it makes perfectly good sense for large firms to use predatory pricing to destroy competition that threatens the monopoly prices charged (cf. Dempsey 2000a, p.474).

5.1.5 Marketing

Deregulation has resulted in stiff competition for the airlines and marketing efforts became key as airlines scrambled to differentiate themselves from competition. The airlines spent in excess of \$10 billion for domestic sales and promotion activities in 2000 which was almost twice their operating profits (2001c). The following section investigates the impact deregulation had on important elements of airline marketing.

5.1.5.1 Yield Management

“It was a typical flight in the era of deregulation: United Airlines flight 815 from Chicago to Los Angeles, with 204 tickets sold at almost as many prices.”

(the range of prices on that flight was from \$87.21 to \$1258.51)

NY Times Reporter Matthew Wald (Wald 1998)

Bob Crandall of American Airlines allegedly is the innovator of the airline yield (a.k.a. revenue) management. Based on the concept that the cost of additional seats on scheduled flight was negligible, he ordered his staff to study the demand and price elasticity patterns from its computer reservations system “Sabre”. The result came in the form of 35% “Super-Saver” discounts in 1977 all around the nation. Unable to compete without a price advantage many charter services were soon bankrupt (Petzinger 1995).

American training manual stated the new objective “to sell the highest priced product that the customer is willing to buy” (Peterson and Glab 1994, p.59). The minds behind regulation and economists had anticipated that deregulation would lead to a simpler fare structure (2001g). However, the yield management systems led the industry in the opposite direction.

Yield management essentially uses the power of price to communicate with the customer and to lure them from one service (own or competitors’) to another. The demand for different products/services is monitored continuously and price and promotional adjustments are made to maximize revenues, thus the profits of a company through segmentation of the market. Many companies in other industries have also realized the benefits of revenue management. Examples include the hotel industry, railroads, telecommunications, and broadcasting. Certain conditions need to be satisfied for revenue management to be useful (Daudel and Vialle 1994). The product should be perishable, it should be possible to price target different customers. It should be possible to sell the product in advance. The variable costs should be low. The demand should be cyclical or it should vary so that it can be smoothed by revenue management. Typically, segmentation by time is key. Needless to say, the airline industry is ideal for the application of revenue management. Today, virtually every successful airline is using yield management in some form.

5.1.5.2 Frequent Flyer Programs

Among the innovations that deregulation inspired, a most important marketing tool became the frequent flier programs. In its purest form, the frequent flier programs

attempt to create brand loyalty by inducing a passenger to fly on only the owner of the program or one of its affiliates (through code-sharing). As with yield management, the Frequent Flier Miles concept was also innovated by American Airlines (Peterson and Glab 1994, p.60) in May 1, 1981. Five days later United Airlines responded by introducing Mileage Plus (Woodyard 2001). All major airlines developed their own programs shortly thereafter.

Table 5.6 demonstrates the scope of the frequent flier programs in the U.S.. For example, American's AAdvantage program has induced some 35 million members resulting in 2.3 million travel awards redeemed during 1998.

Table 5.6: A Comparison of Major Frequent Flier Programs

Airline	Members (million)	Number of Awards Accumulated	Number of travel awards redeemed in 1998
American Aadvantage	35	NA	2.3 million
US Airways Dividend Miles	20	4.4 million	900K
Continental OnePass	16	NA	1 million
Northwest WorldPerks	18.5	6.1 million	1.2 million
United MileagePlus	27	6.1 million	2.1 million
America West FlightFund	2.9	NA	NA
Alaska Mileage Plan	3	812K	191K
TWA Aviators	12	1.1 million	NA
Delta Skymiles	24	9.6 million	1.9 million
Southwest Rapid Rewards	1.2	NA	927K

Source: InsideFlyer (Stoller 1999)

Frequent flier programs have advanced into more sophisticated forms and consumers can earn mileage points through several means including credit card purchases or long-distance phone calls. As perfectly acceptable as they are as a marketing tool, a potential anticompetitive problem with the frequent flier programs is that they can be effectively used to target new entrants. Additional bonus miles on certain routes can

effectively bring down the fare without being detected and then be revoked (Oster and Strong 2001). It has been argued that having a reward program tied in with an excellent customer service will help take the customer's eye off the price (Mohs 1999).

A current snapshot of the frequent flier campaigns is presented below⁸:

- There are more than 120 million members worldwide, 74 million members of whom are from the U.S.
- 27-28% of the members are active.
- AAdvantage of American Airlines remains as the largest frequent flier program with more than 45 million members. On average, more than 11 thousand new members enrolled in AAdvantage per day in 2001.
- The programs grew by 11% on average with the fastest growing segment being "mileage consumers."
- Approximately 40% of the miles earned are not from flying and credit cards are the most popular form of earning such miles.
- An award is estimated to cost airlines \$13.93 on average.
- 14 million free tickets were awarded in 2001.
- 82-87% of members have web access.

5.1.5.3 Distribution: The Rise (and Fall) of Travel Agents

There is no doubt that the travel agencies grew in importance after deregulation. As the choice of flights available to the public increased in number, the influence that the agents had in the decision making also increased. The airlines tried to get the leading agents on their side by use of commissions. Two main conflicting forces are at work when the motives of travel agents are considered. On one side is the issue of the override commission and the percentage baseline commission, which motivates the agent to influence the customer to buy the most expensive ticket from the airline that offers the

⁸ Source: http://www.webflyer.com/company/press_room/facts_and_stats/frequent_flyer_facts.php

best override commission, on the other hand is the need to keep their customers satisfied and happy to succeed in the long run. Travel Agent Commission Overrides (TACOs) are special bonus commissions paid to travel agents by a specific airline for meeting a targeted proportion or number of passengers booked (Oster and Strong 2001). It appears that this scenario was more beneficial to major airlines who offered better commission rates than low-cost carriers. Another public policy concern is that travel commission overrides were typically designed to be in favor of the carrier with the largest market share (1996a).

The inability of the new entrants to cope with commission overrides (TACOs) was a main reason why they exited certain markets. Southwest airlines' decision to pull out of Indianapolis – Detroit (one of the rare exit events for Southwest) and Midwest Express' exit from Milwaukee-Detroit and other markets have been linked to commission overrides (Oster and Strong 2001). The largest travel agencies also admitted that overrides had an important effect on the booking patterns (1996a). The sophistication in the computer reservation systems also fueled the need for agents.

However, the growth of discounting and the explosion of the internet as a viable distribution medium drastically changed the equilibrium as the major airlines were being forced to cut their commissions due to increasing cost pressures. Namely, Delta, American and Continental decided to drop the commissions altogether and others followed suit (Brannigan and Stringer 2002). Some major airlines have announced that they will start for charging extra for paper tickets. Major airlines also realize that selling a ticket through their own web site costs them 25% of what it cost through a travel agent,

therefore the travel agencies who typically sold 80% of the tickets face a gloomy future (Fonti 1999). This trend can be readily observed in Figure 5.3.

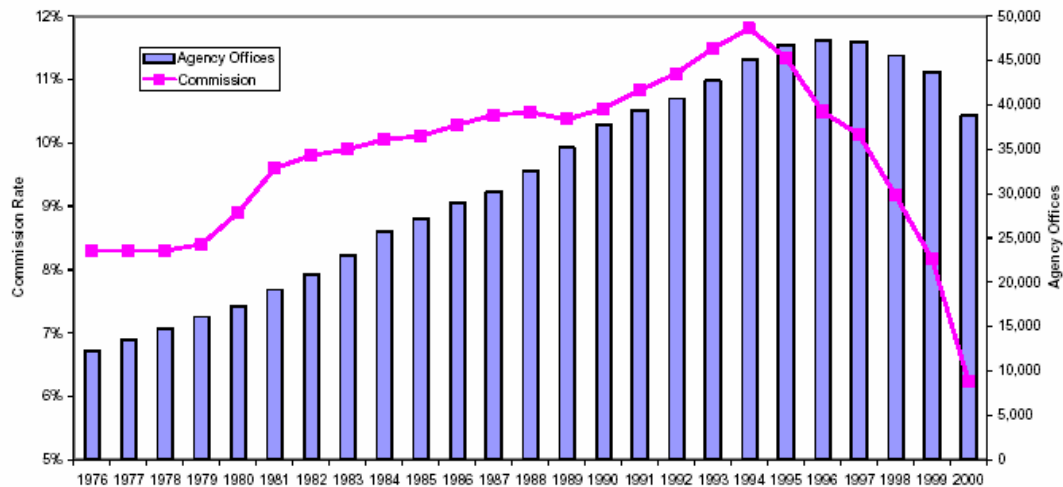


Figure 5.3: US Travel Agency Overall Airline Commission Rates and the Number of Agency Offices, 1976-2000

Source: Harris / Travel Weekly, 2000 Travel Agent Survey

5.1.5.3.1 Computer Reservation Systems (CRS)

The CRS systems had tremendous impact on the development of complex pricing strategies and revenue management systems. These systems enabled the travel agents to track fare and capacity changes instantaneously. Although several competing systems were initially introduced (American's Sabre vs. United's Apollo), many of these systems (as well as the largest travel agencies) later merged. Some airlines chose to join existing systems and pay fees for listings rather than develop their own systems. Table 5.7 presents the travel agents' market share of competing systems:

Table 5.7: 1999 Market Share for CRS

CRS	Market Share
Sabre	34%
WorldSpan	24%
Apollo	24%
System One	20%

Note: Some travel agents use more than one system

Source: Harris / Travel Weekly 2000 Travel Agent Survey

The DOJ actually sued the airlines and owners of the systems because of signaling and price fixing (1994b). That the systems were designed to give their owners certain (anti-)competitive advantages was a concern:

An airline whose CRS is used by travel agents has access to a very accurate picture of both its own and its rivals' business patterns. Through the CRS an airline can track the effect of price changes, see roughly how much of a rival's seat inventory is assigned to a given discount fare classification, measure how much full-fare business it attracts compared to rivals, and track changes in city-pair flows... It can even see how loyal its own frequent flyers are. A CRS owner can then use this information to distort market signals to its rivals, leading them to make incorrect decisions. When a CRS owner sees travel agents making bookings on a rival airline's flights, it can intervene through targeted incentive programs in an attempt to switch business. By responding selectively, it can temporarily distort signals the market sends to competitors, in order to persuade the rivals to abandon fares, schedules, or even routes where, absent these secret interventions, its offerings would be preferred by customers (Kuttner 1996, p.261).

Computer Reservation Systems (CRS) provide much of the information needed for a competitive response. Competitors, prices, capacity and availability can be observed through these systems. The incumbents can even gather the scope of new entry because the schedule and fares are filed before they are put in effect (Oster and Strong 2001). Therefore, the incumbent has much of the knowledge it needs for a competitive response

decision. It can target its direct (e.g., price, capacity on route) and indirect predatory weapons (e.g., frequent flier miles, commission overrides) discussed earlier to coordinate a successful campaign against the entrant (Oster and Strong 2001). Since these efforts can be highly targeted, they do not signal hostility to provoke retaliatory response from other major carriers.

5.1.5.4 Discounting and Competition

“Today, one of every seven domestic passengers is flying because of the increased competitiveness resulting from low fare service.” (1996c)

In April 1996, the DOT released a report full of hope for the airline industry. Its title read “The Low Cost Airline Service Revolution.”(1996c). One conclusion of the report was that the consumers heavily benefited from the efficiency and competition that the low cost carriers (LCCs) were bringing in the airline industry. It was also suggested that there was evidence that network (major) carriers and low cost carriers could co-exist. The fundamental cost advantages that low cost carriers have over network carriers were emphasized and the global implications were discussed. Other positive implications included those on industry labor force (e.g., union relations) and economic growth and benefits to consumers, communities, travel related industries and the aerospace industry in general. The report also included a warning that the premiums at network hubs where there was no low-cost competition were high and increasing.

It can be argued that the discounter LCCs entered the market in two waves. The first wave emerged right after deregulation in 1978 and continued roughly until 1982. Even though these discounters helped reshape the industry and brought many benefits to

consumers, the pre-deregulation incumbents did not let the LCCs steal away their customers. They responded with price discrimination utilizing sophisticated revenue management techniques. Some of their deep-discount fares were coded “FU” and the signal to the new entrants could not get clearer than that! (Kuttner 1996). As a result many LCCs went out of business before they got a fair chance to compete.

The classic example of a discounter during the first wave was undoubtedly *People Express*. People Express was founded in April 1981. Don Burr’s strategy was simple: very low operating costs and offering flight experience to the masses (Peterson and Glab 1994). The service might not be extensive but it would be warm (Petzinger 1996). Every employee was required to have a second job and many employees (e.g., the CFO) served as a flight attendant in their second jobs. Don Burr was a charismatic leader and the employees embraced his style of his leadership. He announced the precepts –the code of behavior for every employee of People Express:

- One: Service –Commitment to the growth and development of our people.
- Two: To be the best provider of air transportation.
- Three: The provide the highest quality of leadership.
- Four: To serve as a role model for others.
- Five: Simplicity.
- Six: Maximization of profits. (Petzinger 1996, p.134)

As the most successful airline launch ever, the company grew from 3 to 17 planes and was flying to 17 destinations out of Newark by the end of the same year. In five years, it had 217 planes operating in domestic and international routes (Pearson 1996). Their target market was the middle-class, working class, and students. “At one point it was cheaper to fly to Florida than to take a bus or drive” (1994a, p.35; Pearson 1996). The prices were fixed and you bought tickets as you boarded the plane, on a first come,

first serve basis. However, unable to respond to fierce price competition and revenue management by American, it was already bankrupt in 1986. In fact, the same fate was typical of the LCC of the era, among the 58 start-ups launched between 1978 and 1990, only America West and Midwest Express have survived (McBride 1999).

The second wave of LCC entries happened after the industry once again became profitable in 1993 and continued until the ValueJet crash in 1996. Ironically, the typical example of a second wave entry would be ValuJet which started its operations in Atlanta in 1993 and had grown from 5 to 30 cities until the crash. Second wave entries were also effectively stopped by the major players because they were already fortified in their hubs and were not about to give up the premiums. The typical competition pattern, also called the “homicidal cycle” (Dempsey 2000a; Dempsey 2000b) was observed in the airline industry in these five steps:

1. *Incumbent (major carrier) monopolizes a hub and raises prices to supra-competitive levels.*
2. *Low Cost Carrier (discounter) enters the market with low fares.*
3. *Incumbent responds by matching fares regardless of its cost structure, and often couples the response with increased capacity and/or frequency. Incumbent also uses TACOs (commission overrides) and other tactics to drive the entrant out before it can establish a foothold in the market.*
4. *LCC, not having the deep pockets as the incumbent is forced to withdraw.*
5. *Incumbent increases price to previous or higher levels and decreases capacity.*

As the same pattern was observed over and over again, the reputation effects become more than a theory and new entry to markets were stifled. New market entries diminished in the nineties (Dresner et al. 2001) and there were no new entry applications to DOT during 1997 and 1998 (see Figures 5.4 and 5.5 below). However, the tremendous effect discounting has had on fares levels is probably most apparent from reviewing actual figures.

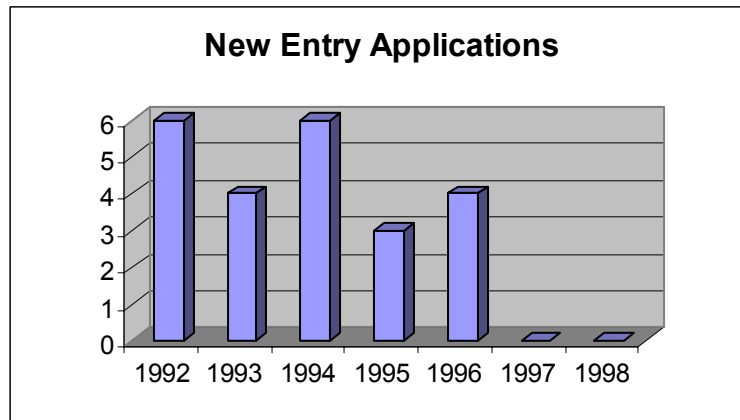


Figure 5.4: New Entry Applications
Data Source: (1999b)

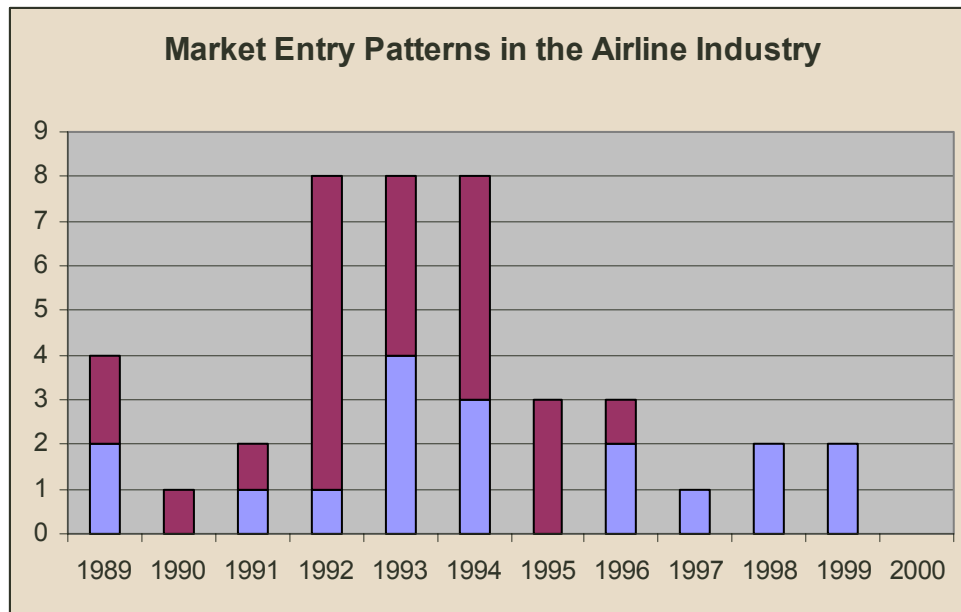


Figure 5.5: Entry/Exit Patterns in the Airline Industry

Note: The bottom (blue) stack represents new entering and remaining airlines for the year, the top (red) stack represents the entry and exits in the same year.

Table 5.8: Average Fares in Markets With and Without Low-Fare Competition

Market Type	1994	1995	1996	1997
Without Low-Fare Competition	\$168	\$183	\$177	\$180
With Low-Fare Competition	\$86	\$95	\$91	\$100
% Difference	97%	92%	93%	80%

Source: Domestic Airline Fares Consumer Report 1997 (Q4)

Low-fare carriers usually do not fly longer distances so it may be argued that a comparison between long haul and short haul market fares may not be justified. However, a deeper look in any given year indicates that the benefits of low-fare competition exist over the range of flights:

Table 5.9: Average Fares Sorted by Distance

Market Type	Mileage Block						
	0-250	251-500	501-750	751-1000	1001-1500	1501-2000	Over 2000
Without Low-Fare Competition	\$142	\$165	\$171	\$167	\$179	\$198	\$223
With Low-Fare Competition	\$67	\$75	\$101	\$121	\$133	\$163	\$176
% Difference	111%	121%	70%	38%	35%	22%	27%

Source: Domestic Airline Fares Consumer Report 1997 (Q4) (1997c)

The above Tables 5.8 and 5.9 demonstrate that discounting has a robust negative impact on the prices. Focus on specific markets is also telling in that it reveals the competitive impact on prices and passenger levels.

Case in point: Air-Tran Entry and Exits

Table 5.10: Atlanta Markets with AirTran Entry

Atlanta to:	Passengers per day		Change in Passengers	Average Fare		Change in Average Fare
	97 Q3	98Q3		97 Q3	98 Q3	
Buffalo, NY	269	443	65%	\$169	\$119	-30%
Dayton, OH	261	521	100%	\$178	\$116	-35%
Greensboro, NC	310	575	85%	\$229	\$113	-51%
Hartford, CT	514	885	72%	\$242	\$124	-49%
Houston, TX	974	1409	45%	\$211	\$130	-38%
Richmond, VA	426	700	64%	\$223	\$118	-47%
Group Average	459	756	65%	\$213	\$122	-43%

Table 5.11: Atlanta Markets with AirTran Exit

Atlanta to:	Passengers per day		Change in Passengers	Average Fare		Change in Average Fare
	97 Q3	98Q3		97 Q3	98 Q3	
Charlotte, NC	875	623	-29%	\$110	\$181	65%
Columbus, OH	728	546	-25%	\$114	\$182	60%
Louisville, KY	589	391	-34%	\$101	\$188	86%
Group Average	730	520	-29%	\$108	\$184	70%

Source: Domestic Airline Fares Consumer Report 1998 (Fourth Quarter); (2001e)

LCCs grew rapidly over time in spite of anti-competitive practices in the industry.

Their market share grew to almost 15% in 1999 from 8.8% in 1986 (2001a). This growth is also evident in Table 5.12 below:

Table 5.12: Airports with Most U.S. Destinations Served by Low Fare Airlines

Low Fare Services	1992	2002
Phoenix	48	84
Las Vegas	33	59
Chicago Midway	9	54
Orlando	5	40
Atlanta	2	39
Baltimore	3	38
Kansas City, Mo.	6	35
Denver	2	33
Tampa	2	32
Nashville	4	28
Houston	14	25
Los Angeles	6	25
Fort Lauderdale	1	23
Albuquerque	11	22
Oakland	7	22
St. Louis	13	20
New Orleans	3	19
New York JFK	3	19
Austin	7	17
Columbus, Ohio	11	17
Seattle/Tacoma	3	17
Indianapolis	6	16
Salt Lake City	2	15
San Diego	6	15
Detroit	2	14
Portland, Oregon	3	14
Dallas Love Field	13	13
El Paso	12	13
San Antonio	6	13
Birmingham	2	12
Dallas/Fort Worth	2	12
San Jose	1	12

Source: (Adams 2002)

5.1.5.5 Price Wars

“I knew the industry would be ruggedly competitive, but I did not expect its leaders to engage in extended kamikaze behavior.”

Warren Buffet regretting his investment in USAir in 1989 to his shareholders (Labich 1993).

The competition between the major airlines seems to have stagnated during the last ten years or so. However, this was not always the case, and irrational price wars have also taken place in the colorful history of the airlines. Dempsey (2000b) describes one such war between American and Northwest. In April 1992, American Airlines launched its “value pricing” campaign. They had concluded that the price structures had become too complex for the consumer to comprehend. Their new value pricing had only four levels (first class, regular coach, 14-day advance purchase, 21-day advance purchase). The unrestricted coach fares went down by almost 40% on average. *The Economist* argued that American was pricing below operating costs and could cause more chapter 11 files in the industry (1992a). American anticipated that the newly stimulated demand would more than offset the reduction in prices. However in May 1992, Northwest announced its “Grown-Ups Fly Free” campaign (i.e., an adult flying with a fare paying child would fly for free) to steal the thunder from American. American responded by cutting its lowest fares by 50%. As a result, the prices went down and the industry experienced the worst times in its history. Northwest and Continental sued American airlines with claims of predatory pricing, but as it has been the case in almost any predatory pricing case since Areeda-Turner, they could not get a verdict against the

defendant. However, American had to spend in excess of \$20 million to cover legal costs (Clouatre 1995). Eventually, complex fare structures resurfaced. Accusing American Airlines with predatory pricing, Northwest CEO John Dasburg then stated:

In the long run, predatory pricing will reduce the number of airlines, ultimately cutting the number of flights and choices available, particularly in smaller markets. This will leave the few surviving airlines free to price just as high as they want for just as long as they want.
(Dempsey 2000b, p.3).

A Relatively Recent Incident:

American seems to take the lead in most price changes but sometimes with differing results. In March 2002, American eliminated a three-day advance fare (Woodyard and DeLollis 2002). The impact of this would be to force the customers who used to buy this class of tickets (i.e., mostly business travelers) into buying a higher class fare (i.e., 10% fare increase). However, other major carriers, which usually readily went along with price increases, did not think that the increase was justified this time. They already had low load factors, and with the exception of Continental, they did not comply with American's price increase. Surprisingly, rather than taking the increase back to its previous level, American "retaliated" to the refusal to follow suit by dropping its three-day-advance fares by as much as \$99 on routes where it competed with the rebel carriers and required no Saturday-night stay (Woodyard and DeLollis 2002). It offered these discounted fares in ten markets that it competed with United, Delta, and US Airways each (McCartney 2002), but not with Continental. Normally, this type of big brother punishment would be expected if a member breaks the rules of a cartel such as OPEC. This was a case of blatant signaling and retaliation in the face of refusal to comply. This

incident demonstrates the unhealthy nature of competition in the airline industry.

However, this time the end result was beneficial to consumers. Northwest would not take any of American's swashbuckling and reacted by offering round trips for \$198 in 10 American markets, and when American did not give in, it offered the same discounts in 20 markets. American insisted on its discounts so Northwest finally offered \$189 round trips in some 160 American markets (Woodyard and DeLollis 2002) while American's comparable prices were averaging \$1650 (McCartney 2002). Southwest, always in search of an opportunity, joined the battle by re-offering its "friends fly for free" campaign after five years (Woodyard and DeLollis 2002).

Southwest Effect: Southwest undoubtedly proved to be the most successful LCC after deregulation. It actually had begun its operation as an intra-state carrier before deregulation but quickly extended its operations to more states. Southwest does not use major hubs and relies on secondary airport for its operations. It also typically does not serve long distance markets and focuses on short and medium haul instead. Most entries by Southwest are to markets with connecting service by incumbents. Southwest enters these markets with non-stop service and lower prices. The result is an overall decrease in the fare levels in the market, also called the "Southwest effect." (1998a). When the price wars got tough in mid 90's because of competing discount services such as Calite (Continental), Shuttle (United), and Reno Air, Southwest's Pilots Union accepted no increases for five years in return for options, which in effect enabled the airline to cut its costs by hundreds of millions of dollars (Banks 1995). At the height of the battle, United Shuttle even purchased 1-800-Southwest and used it as its reservations number.

The major carriers were not successful in their campaigns against Southwest because Southwest had both lower costs and deep pockets. “In the 1998 calendar year, the total domestic operating cost in cents per available seat-mile for the network airlines, adjusted for distance, ranged from 7.737 cents for America West and 9.123 cents for Delta to 11.582 cents for US Airways. The comparable costs for the low-fare airlines ranged from 6.083 cents for Southwest to 8.626 cents for Frontier. Thus every low-fare airline had adjusted costs per available seat-mile that were significantly below the costs of any network airline except America West.” (2001g). Therefore, the major carriers admitted failure against Southwest’s strategy and attempted to contain it rather than defeat it. “When major network airlines were subject to entry by either Southwest or by another major network airline, the response was typically either a very slight fare reduction with no significant increase in capacity or a fare increase. We did not find cases where the response was as aggressive as when a new-entrant low fare carrier entered a market.” (Oster and Strong 2001, p.15).

A Word on a Market Niche: It should be noted that not every new entrant in the airline industry has attempted to be a discounter. Despite the tough competition with the incumbents, several start-ups have attempted to carve themselves a niche in the first class business travelers’ market. For example, Midwest Express has secured itself a niche in the tough industry. Its formula is offering superior service at slightly higher fares. The seats are leather, and there is no center row. As a result, there are 30% fewer seats on its DC-9s than expected (Oliver 1995). Meals come in china with silverware and “crystal salt and pepper shakers” (though how this was impacted after September 11 remains a

question) (Oliver 1995). Midwest spends twice as much on its meals than other airlines (Oliver 1995). Midwest had been owned by Kimberly-Clark Corporation but went public in September 1995 (Oliver 1995). Recently, JetBlue, National, and Legend were among the other names who attempted to capture the same niche in different markets. So far, JetBlue seems to be successful, and Legend is already out of business due to aggressive responses by American.

5.2 Competitive Outlook

“Capacity is how we compete in this business”
Bob Crandall CEO, American (Labich 1993)

The revenue of the U.S. airline industry was around \$97 billion in 2001. The profit margins have not been impressive. Revenue management is used to subsidize discounted tickets with the gains from first and business class fares. When the demand falls for cyclical or other reasons, the industry experiences red ink. The following section exposes the industry with some factual information.

5.2.1 Industry Snapshot

On the day the Wright Brothers flew at Kitty Hawk if there had been a capitalist down there, the guy should have shot down Wilbur.
Warren Buffet. (Smith 1995)

Due to increased competition from LCCs and price wars, the profitability of the airline industry has displayed a highly cyclical pattern over the years. Table 5.13 illustrates this point. It should be noted that the price wars in 1982 and 1992 happened while the industry was already in a recession as the airlines tried to increase their load

factors.

Table 5.13: The Cyclical Nature of the U.S. Airline Industry

Cycle	Years	Duration	Airlines
Boom	1960-68	9 years	Expansion
Bust	1969-74	6 years	Recession
Boom	1975-79	5 years	Expansion
Bust	1980-82	3 years	Recession
Boom	1983-89	7 years	Expansion
Bust	1990-94	5 years	Recession
Boom	1995-2000	6 years	Expansion
Bust	2001-2005	5 years	Recession

Note: 1995-2000 expansion was a forecast which eventually proved to be accurate. 2000-2005 recession was predicted by AirTran CEO Joe Leonard at his speech at Georgia Pacific Headquarters on Aug 19, 2002.

Source: Aviation Week and Space Technology, 13 March 1995

One recent trend has been international growth through global alliances. For example, American Airlines and British Airways; United Airlines and Lufthansa; Delta Air Lines, Air France and Aero Mexico all joined forces for international expansion. The industry appears to be leading to a new wave of consolidation. However, the merger between United and U.S. Airways was blocked by the DOJ. Alternative expansion strategy for the majors has been controlling some or all of regional start-ups. For example, Delta owns Delta Express, Atlantic Southeast, Comair and has launched Song.

Another interesting response by major airlines to low cost carriers was in the form of founding their own low-cost versions. United Airlines was the first airline to try this strategy in October 1994, and the service was called “The Shuttle” by United (Oster and Strong 2001).⁹ Delta started Delta Express and US Airways started Metrojet in October

⁹ Continental had had an earlier effort with Continental Lite but the initiative lacked a consistent strategy

1996 and June 1998 respectively (2001g; Oster and Strong 2001). These efforts were generally defensive in nature but also allowed the majors to use the low-cost model of the entrants through their flexible labor agreements. Pilot unions ultimately restrained the expansion of most of these initiatives by imposing limits on total hours that could be flown as a proportion of total flights.

Table 5.14 illustrates the aggregate income statement of the industry over time. The expansion and recession periods of the industry can be tracked within this Table as well.

and eventually failed (Oster and Strong 2001).

Table 5.14: Aggregate Industry Snapshot Over time

1991–2001 SUMMARY

U.S. Scheduled Airlines (In millions, except as noted)

	1991	1992	1993 ¹	1994	1995	1996	1997	1998	1999	2000	2001 ²
Traffic and Operations—Scheduled Service											
Revenue Passengers Enplaned	452.3	475.1	488.5	528.8	547.8	581.2	594.7	612.9	636.0	666.2	622.1
Revenue Passenger Miles	447,955	478,554	489,684	519,382	540,656	578,663	603,419	618,087	652,047	692,757	651,663
Available Seat Miles	715,199	752,772	771,641	784,331	807,078	835,071	857,232	874,089	918,419	956,950	930,486
Passenger Load Factor (%)	62.6	63.6	63.5	66.2	67.0	69.3	70.4	70.7	71.0	72.4	70.0
Average Trip Segment (Miles)	990	1,007	1,002	982	987	996	1,015	1,008	1,025	1,040	1,047
Cargo Ton Miles	12,130	13,199	14,120	16,062	16,921	17,754	20,513	20,496	21,613	23,888	21,997
Freight and Express	10,225	11,130	11,944	13,792	14,578	15,301	17,959	18,131	19,317	21,443	20,109
Mail	1,905	2,069	2,176	2,270	2,343	2,454	2,555	2,365	2,296	2,445	1,888
Revenue Aircraft Miles	4,416	4,661	4,846	5,033	5,293	5,501	5,659	5,838	6,168	6,574	6,514
Aircraft Departures (Thousands)	6,783	7,051	7,245	7,531	8,062	8,230	8,127	8,292	8,627	9,035	8,789
Average Stage Length (Miles)	651	661	669	668	657	668	696	704	715	728	741
Financial Results											
Passenger Revenue	\$57,092	\$59,844	\$64,288	\$65,690	\$69,835	\$75,515	\$79,540	\$81,052	\$84,383	\$93,622	\$80,936
Freight and Express Revenue	5,509	5,916	6,662	7,284	8,616	9,679	10,477	10,697	11,415	12,486	11,892
Mail Revenue	957	1,184	1,212	1,183	1,266	1,279	1,362	1,708	1,739	1,970	1,058
Charter Revenue	3,777	2,989	3,386	3,859	3,742	3,675	3,748	4,059	4,284	4,913	4,459
Other Revenue	7,900	8,424	9,750	11,020	11,658	12,296	14,790	16,294	17,634	17,848	17,081
Total Operating Revenues	75,234	78,357	85,298	89,037	95,117	102,444	109,917	113,810	119,455	130,839	115,425
Total Operating Expenses	77,021	80,803	83,884	86,299	89,266	96,300	101,375	104,528	111,119	123,840	125,489
Operating Profit (Loss)	(1,787)	(2,446)	1,415	2,738	5,852	6,143	8,542	9,283	8,337	6,999	(10,064)
Interest Income (Expense)	(1,778)	(1,743)	(2,052)	(2,352)	(2,426)	(1,989)	(1,738)	(1,753)	(1,833)	(2,193)	(2,485)
Other Income (Expense)	1,624	(598)	(1,541)	(727)	(1,143)	(1,427)	(1,686)	(2,682)	(1,226)	(2,320)	4,838
Net Profit (Loss)	(\$1,941)	(\$4,787)	(\$2,178)	(\$341)	\$2,283	\$2,727	\$5,119	\$4,847	\$5,277	\$2,486	(\$7,710)
Passenger Yield (\$ per Passenger Mile)	12.74	12.51	13.13	12.65	12.92	13.05	13.18	13.11	12.94	13.51	12.42
Passenger Unit Revenue (\$ per Seat Mile)	7.98	7.95	8.33	8.38	8.65	9.04	9.28	9.27	9.19	9.78	8.70
Freight and Express Yield (\$ per Ton Mile)	53.87	53.15	55.78	52.81	59.11	63.26	58.34	59.00	59.09	58.23	59.14
Mail Yield (\$ per Ton Mile)	50.25	57.24	55.68	52.14	54.00	52.13	53.32	72.23	75.76	80.60	56.00
Cargo Yield (\$ per Ton Mile)	53.30	53.79	55.77	52.72	58.40	61.72	57.71	60.53	60.86	60.52	58.87
Operating Profit Margin (%)	(2.4)	(3.1)	1.7	3.1	6.2	6.0	7.8	8.2	7.0	5.3	(8.7)
Net Profit Margin (%)	(2.6)	(6.1)	(2.6)	(0.4)	2.4	2.7	4.7	4.3	4.4	1.9	(6.7)
Rate of Return on Investment (%)	(0.7)	(9.0)	(0.4)	5.2	11.9	11.5	14.7	12.0	11.1	6.4	(6.9)
Employment (Full-Time Equivalents)	533,565	540,413	537,111	539,759	546,987	564,425	586,509	621,058	646,410	679,967	670,730

¹ Financial results exclude fresh-start accounting extraordinary gains of Continental and Trans World.² Financial results include cash compensation remitted to air carriers under the Air Transportation Safety and System Stabilization Act (PL 107-42).

Source: Air Transport Association Annual Report (2001c)

The table illustrates that the profit margins of the industry have not been impressive even in good years. Airlines have earned a net profit between one and two percent on average, compared to an average of five percent or more for other industries. Only 15 have survived among the 43 pre-deregulation airlines, and two thirds of 226 post-deregulation airlines have not been able to succeed (Dempsey 2000a). On the positive side, the airlines were highly profitable in the late 90's and their net profits totaled \$23 billion from 1995 through 2000 Q3. The Average passenger load was around 72% percent for the same year while the break-even load for most carriers was around 65% (2001g).

More than 130 airlines have gone bankrupt since deregulation, and currently there is little incentive for new entrants (Wysocki Jr 2001). Airlines already schedule more flights than the eight most crowded airports in the nation can handle, which only adds to the congestion problems at the hubs (Wald 2001). The recent activities (e.g., reports, DOT proposed guidelines, complaints and finally the DOJ lawsuit) in the airline industry strongly suggest that anticompetitive practices (e.g., predatory pricing) may indeed be an issue.

The unique nature of the airline industry enables the network carriers to engage in predation in a variety of ways. Observed tactics have included: "dropping prices sharply; eliminating advance purchase and Saturday night stay-over restrictions; expanding the inventory of low-fare seats offered; increasing the number of flights and/or the size of aircraft; scheduling departures in close proximity to the new entrant's flights, sometimes boxing them in; offering passengers bonus frequent flyer miles; paying travel agent commission overrides to steer traffic toward the incumbent in the new entrant's markets;

paying higher upfront commission rates on routes where it competes with a new entrant; biasing its computer reservations systems against non-affiliated interline connections; refusing to enter into ticketing-and-baggage, joint-fare, and code-sharing relationships with the new entrant; refusing to lease gates, provide services, or sell parts to the new entrant; restricting airport operators with majority-in-interest clauses to prohibit the construction of gates and other infrastructure for new entrants; and prohibiting affiliated regional feeder airlines from entering into marketing agreements with the new entrant” (Cooper 1999; Dempsey 2000b, p. 24). Half of the informal complaints received by DOT between 1993-1999 were regarding unfair pricing and capacity increases, where as more than 30% were regarding restrained access to gates and other facilities or services (1999d).

Increasing complaints and actual observations of unfair conduct motivated the DOT to propose a set of guidelines to protect competition in the airline industry in 1998. The guidelines essentially proposed that predation would be inferred if:

(1) the major carrier adds capacity and sells such a large number of seats at very low fares that the ensuing self-diversion of revenue results in lower local revenue than would a reasonable alternative response,

(2) the number of local passengers that the major carrier carries at the new entrant’s low fares (or at similar fares that are substantially below the major carrier’s previous fares) exceeds the new entrant’s total seat capacity, resulting, through self-diversion, in lower local revenue than would a reasonable alternative response, or

(3) the number of local passengers that the major carrier carries at the new entrant’s low fares (or at similar fares that are substantially below the major carrier’s previous fares) exceeds the number of low-fare passengers carried by the new entrant, resulting, through self-diversion, in lower local revenue than would a reasonable alternative response (1998c).

The responses for the above guidelines were mixed, and generally the parties who would be distracted by the application of it opposed to it while those who suffered from/disturbed by anticompetitive practices supported it. Therefore, the major airlines, their trade association, certain academics, and unions opposed the guidelines (Gattuso and Boudreaux 1999), whereas the low-fare airlines, GAO, and Alfred Kahn (1998) supported them.

An interesting counter-proposal to the DOT guidelines came from Foer (1999). He argued that the DOT guidelines would not be effective since the courts take too long to resolve the cases (if ever) and that the low-cost carriers go out of business long before then. He emphasized the need for greater predictability and proposed a “Safe Harbor” option. A major carrier (defined as 50% or more market share from a hub) could take the Safe Harbor option when challenged by a new entrant. A major carrier that chose to comply with the Safe Harbor option would not be subject to any predation lawsuits. That option would require them to make a public statement that they will commit to their response level (low) fares and increased level of capacity for at least two years. They would have to file a public notice to the DOT. And with certain exceptions, they would not be able to increase their prices or decrease their capacity for a period of two years. He suggested that the majors would not alter their price and capacity unless they were willing to live with it and suffer the losses for two years. The pattern where the major goes back to the high (monopoly) levels of pricing and capacity would be effectively constrained with the Safe Harbor (Foer 1999). Naturally, ongoing antitrust law would have to be modified before Safe Harbor could become successful. Otherwise, no major carrier would opt for it when they have the option to predate and not be found guilty

under existing laws.

Canada, facing similar predatory problems in their airline industry passed *Regulations Respecting Anti-competitive Acts of Persons Operating a Domestic Service*, S.O.R./00-324 in year 2000. Predation by incumbent would be detected based on two rules with respect to AAC:

- (a) operating capacity on a route or routes at fares that do not cover the avoidable cost of providing the service; and
- (b) increasing capacity on a route or routes at fares that do not cover the avoidable cost of providing the service (cf. West 2000).

Even though an average avoidable cost test has its own complexities such as determining which costs were avoidable and the appropriate time frame, it has been successfully employed in at least one case in Canada (West 2000).

An impartial body, the Transportation Research Board of the National Research Council encouraged DOT to continue their investigations. They observed that “a cursory review revealed some actions that were difficult to reconcile with fair and efficient competition. Particularly difficult to reconcile were cases in which incumbent carriers added nonstop service in low- to moderate-density markets they had not previously served directly, coincident with a new entry. In some of these cases, the incumbent bypassed its own hub to initiate the service, a strategy seldom employed outside of high-density markets. The logical inference is that such responses are probably temporary—possibly calculated to protect the incumbent’s hub traffic and to dissuade similar challenges elsewhere—and would seem to warrant additional scrutiny” (1999d, p.33).

Inspired by DOT's guideline proposal, DOJ decided to file a lawsuit against American Airlines in 1999. This was the first DOJ predatory pricing lawsuit in the airline industry since deregulation (Nannes 1999). DOJ alleged that American had used predatory tactics in order to drive Vanguard, Western Pacific, and Sunjet out of its markets (1999e, para 23-28):

American has monopoly power in most of its DFW city pairs and faces little current competition and little prospect of entry on those routes. Its monopoly power allows it to charge supracompetitive fares. American's fares on DFW city pairs are substantially higher than its fares on otherwise comparable routes where it faces competition....[W]hen a [low cost carrier] entered a DFW route and it appeared the [low cost carrier] would be economically viable if American simply followed a profit-maximizing business strategy, American would instead saturate the route with enough additional capacity at low fares to keep the entrant from operating profitably. American would also take further steps, such as matching the [low cost carrier's] connecting fares with its own nonstop fares, to keep traffic away from the [low cost carrier]. To evaluate the success of its strategy and determine whether to intensify its response, American would investigate the financial resources of [low cost carriers], determine their break-even factors, and conduct head counts at the departure gate to monitor their passenger loads.

As a result of these practices all three entrants had to leave the markets they entered, and all were bankrupt before September 11, 2001.

Table 5.15: American Airlines' Actions Relevant for the DOJ Lawsuit

American From Dallas To	Before		During		After	
	Flights	Price	Flights	Price	Flights	Price
Kansas City	8	\$108	14	\$80	11	\$147
Long Beach	0	---	3	\$86	0	---
Colorado Springs	5	\$150	7	\$81	6	\$137

Source: (Carney and Zellner 2000).

Vanguard markets: American operating at 65% load factor charged \$108 before Vanguard's entry on DFW to Kansas route. They reduced their rates to \$80 following the entry matching the fares. American also added 6 more round trips to the route, driving Vanguard out of the market in the process. After Vanguard pulled out, American decreased the daily round-trips to 11 from 14 and increased the prices by 80%. It was also documented that the route went from the worst performing to the best performing American route after the exit of Vanguard.

SunJet markets: American responded to the entry announcement of SunJet to the DFW – Oakland route. They matched SunJet's fares and also entered the DFW-Long Beach route in which it also matched Sun Jet. SunJet was forced to move out of all DFW routes. American increased prices by over 30% in the two months following Sun Jet's exit.

Western Pacific markets: American increased its capacity significantly to put pressure on Western Pacific. The frequency was increased from 5 to 7 flights per day. As a result of this response, Western pulled out of the routes and declared bankruptcy. American's fares were in the range of \$81-105 when Western was in the market. After they pulled out American went back to its original frequency of 6 and increased the prices to \$137 on average.

As it was discussed previously, cases of predatory pricing are very hard to prove in the airline industry, and the judge of DOJ's American lawsuit dismissed it by summary judgment in May, 2001. DOJ appealed the decision but could not overturn the ruling.

The DOT issued a series of reports in January 2001 re-stating their concern about the anti-competitive practices in the airline industry (2001e; 2001g; Oster and Strong 2001). They concluded that “incumbent airlines at times have responded to new competition with fare cuts, capacity increases, and other practices that are apparently designed to eliminate or reduce competition” (2001g). The DOT reminded that they were authorized by the Congress to prevent unfair practices in the airline industry and warned that they had the right and the obligation to prevent such practices even if they do not violate antitrust laws. After studying thousands of responses their proposed guidelines generated, the DOT concluded that they would examine each case independently due to the complexities and differentials in the marketplace, and one governing guideline would be too simple of an approach. Instead, the DOT expressed a wish to develop a “body of caselaw based on a more thorough examination of cases of apparent predatory-type behavior” (2001g, p.11).

The second report was entitled *Predatory Practices in the U.S. Airline Industry* by Professors Oster and Strong (2001). It described the patterns of entry and competition, and included an analysis of predatory conduct and predatory pricing with examples from the airline industry. This report examines the potential for predatory practices, or unfair methods of competition, in the U.S. domestic airline industry. One of their two main conclusions was that “predatory practices may have occurred in the past and are a recurring possibility in the U.S. domestic airline industry.” They detected high use of market power in the airline industry, hub premiums and recoupment of losses suffered during predation against new entrants. Their second conclusion was that the antitrust laws, as they have been applied in other industries, may not be sufficient to identify some

types of predatory practices in the airline industry. Their work is highly relevant to understand the competitive context of the airline industry, and several of their figures have been cited and reproduced in this chapter.

The third report issued by the DOT in January 2001 was entitled *Dominated Hub Fares* (2001e). This report summarized, updated, and provided new support for the existence and demonstration of hub fares and the effects of LCC service on fare levels. It argued that quality service and reasonable fares can co-exist just like major carriers and LCCs can. Atlanta and Salt Lake City were provided as examples for co-existence. The report concluded that “the key to eliminating market power and fare premiums is to encourage entry into as many uncontested markets as possible.”

The DOT received 32 informal complaints from 1992 until 1999. Half of these were allegations of unfair pricing and capacity responses –the dumping of low-fare capacity in the city-pair market and, in some cases, added flights. Others were about unfair marketing, airport handling relationships (higher travel agent commissions) (Oster and Strong 2001, p.10). The administration concluded that “apparent unfair practices have occurred in the airlines industry”(2001g, p.114). “Free markets do not exist in a state of nature. Free markets are things that have to be defined by custom and law” (Dempsey 2000a, p.487).

5.2.2 The Role of Barriers to Entry

It has been shown that the theory of market contestability did not apply to the airline industry because of high barriers to entry (Baker and Pratt 1989; Hurdle et al. 1989). The threat of potential entry may not force the airlines to cut their prices since

they can readily and effectively react to any entry with price cuts and capacity increases (Levine 1987). Instead, the incumbents may attempt to raise the barriers to entry and develop a reputation for predation by competitive and aggressive reactions to entry to their hub markets. Therefore, these barriers gains special importance when conducting research in this industry. Among the six generic barriers identified by Porter (1980), several either do not apply or take on a proxy form in the airline context. For example, cost advantage of incumbents' would not necessarily apply since the LCC entrants are presumably more efficient within this framework. However, barriers such as product advantages of incumbents are captured by hub formation and code-share agreements. Both hubs and code-share agreements have been associated with higher fares (2001e; Hassin and Shy 2000). Figure 5.6 presents proposed proxies for Porter's barriers to entry for the airline context.

Porter's six generic barriers to entry:	Barriers as reflected in the Airline Industry:
Cost advantages of incumbents	The LCC entrants have cost advantages
Product advantages of incumbents	Hub Formation
Capital requirements	Airport Congestion, Reputation Effects
Customer switching costs	Code-Share agreements, Frequent Flier Miles
Access to distribution channels	Gate, Slot and Noise Controls and Availability
Government policy	Gate, Slot, and Noise Controls

Figure 5.6: A Comparison of Generic and Industry Specific Barriers to Entry

As discussed in a prior section, Karakaya and Stahl (1989) have proposed an extended list of generic barriers to entry. Several of the items among their extended list are of interest and captured either in different components of the proposed framework (e.g., market concentration, price) or under the current proxies of barriers to entry (e.g., gate and slot controls and availability is a proxy for limited access to essential facilities).

Another barrier to entry suggested by Karakaya and Stahl (1989) is incumbent's expected reaction to entry and this has been included in the framework in the form of reputation effects of incumbent's predation. It might also be interesting to consider advertising, product differentiation of incumbents and brand name or trademark as potential barriers to entry from a marketing perspective. However, these involve further complications in terms of measurement.

Slot and Gate controls: Certain airports are considered high-density airports. This indicates that in these airports, an airline must have slots to schedule a flight (take-off or landing) between 6 a.m. and midnight. For example, FAA's high density rule permits 48 slots at LaGuardia from 6 am to midnight every day, resulting in (48x18) 864 slots per day (1995b). Slot controls have been imposed in four major airports (Chicago O'Hare, New York La Guardia, New York Kennedy, and Washington National) since late 1960s. It has been estimated that the fares in slot-controlled airports have been 11-15% higher than non-controlled comparable airports with the exception of New York Kennedy (Morrison and Winston 1997). Congestion pricing (charging aircraft for their take-offs and landings according to the delays it imposes) has been offered as an alternative to slot-controls (Morrison and Winston 1997).

Joe Leonard, CEO of AirTran, has noted that they are able to serve Atlanta with cheap fares because Eastern Airlines went bankrupt and freed up 22 gates for AirTran (2001h). Similarly, JetBlue is serving New Yorkers because they were awarded 75 slots at JFK airport by the FAA (2001h). Landing slots in most major airports are not available. The incumbent is rarely, if ever, willing to lease extra slots to a new entrant.

Even in the rare case of lease, monopoly rents may be collected. The FAA “Buy-Sell” slot rule lets deeper pockets ensure market share by getting the slots and enjoy monopolistic pricing (Dempsey 1989). Slot control regulation needs to be significantly revised so that LCC access to markets is possible and not left to coincidence or awards by officials. Before the DOT permitted the landing slots to be resold, the largest eight airlines controlled about 70% of the slots at Chicago O’Hare, New York La Guardia, Kennedy, Washington National. In a couple of years the figure increased to 96% (Dempsey 2000a, p.450).

Table 5.16: Percentage of Domestic Air Carrier Slots Held by Selected Groups

Airport	Holding Entity	1986	1991	1996
O’Hare	American and United	66	83	87
	Other Established airlines	28	13	9
	Financial Institutions	0	3	2
	Post-deregulation airlines	6	1	1
Kennedy	Shawmut Bank, American, and Delta	43	60	75
	Other Established airlines	49	18	13
	Other Financial Institutions	0	19	6
	Post-deregulation airlines	9	3	7
LaGuardia	American, Delta and US Airways	27	43	59
	Other Established airlines	58	39	14
	Financial Institutions	0	7	20
	Post-deregulation airlines	15	12	2
National	American, Delta and US Airways	25	43	59
	Other Established airlines	58	42	20
	Financial Institutions	0	7	19
	Post-deregulation airlines	17	8	3

Note: Some Financial institutions have taken control of slots when incumbent carriers went bankrupt.

Source: Anderson (1997)

Similarly gate controls are an issue, and the dominance of major carriers in controlling the gates is illustrated in Appendix D (1999a). Low Fare carriers who cannot

secure access to gates are left to the mercy of the major carriers and have to pay hundred per cent to two hundred per cent premiums to use the gates (Woellert 1998). Spirit Airlines was reported to face such a fate since it had been outbid by the majors in Detroit continuously for almost a decade (Ingersoll 1999). Thus, slot and gate controls can also effectively serve as barriers to entry and lead to increased fares (Hurdle et al. 1989; Morrison and Winston 1990).

5.2.3 After September 11, 2001

The general belief about the airline industry is that it is not really a profitable industry and that it should be left alone. Although examples of apparently unfair practices seem to be common, this general belief has provided the industry some relief with respect to antitrust investigations. Such empathy regarding the industry is higher than ever after September 11. The industry has received around \$15 billion worth in direct aid and guaranteed loans. The total direct aid payments by October 2002 have exceeded \$4,299,852,435.3 to some 382 airlines. Table 5.17 illustrates the direct aid that the larger carriers have been provided by the federal government as of July 25, 2002.

Table 5.17: Direct Aids to Major Airlines by the Federal Government

UNITED AIR LINES, INC.	\$724,485,485.8
AMERICAN AIRLINES, INC.	\$656,032,849.3
DELTA AIR LINES, INC.	\$594,894,536.4
NORTHWEST AIRLINES, INC.	\$405,525,526.3
CONTINENTAL AIRLINES, INC.	\$343,398,895.9
US AIRWAYS, INC.	\$287,219,674.0
SOUTHWEST AIRLINES CO.	\$264,642,089.9
AIRTRAN AIRWAYS, INC.	\$27,690,969.2

Source: <http://www.dot.gov/affairs/carrierpayments.htm>

The airlines also laid-off employees and cut back on services in response to falling demand and increasing security costs. However, the future of the major airlines still looks gloomy. The consumers save \$6.3 billion annually due to low-fare airline competition (1996). On June 18 2002, *The Wall Street Journal* reported that ‘Wal-Mart’ airlines were crunching the biggest carriers. The number of passengers carried by the five major airlines was 10% lower in May 2002 than it was in 2001. One would consider this a result of September 11, and the turmoil it created, but the traffic of the five biggest low-cost carriers increased by 11% in the meantime.

The future of the surviving LCCs looks brighter than it did before September 11. Obviously, the same conclusion cannot be drawn for the major carriers who have yet to re-structure their costs. Union relations play a big role in restructuring and labor expenses represent up to 40% of the revenue of a major airline but only 25% of the revenues of low-cost carriers (Trottman and McCartney 2002). Another advantage of low-cost carriers is their higher aircraft utilization due to their point-to-point and secondary airport operations. The transparency of (low) prices and distribution of tickets (e-tickets) have also helped the low cost carriers. More than 40% of Southwest tickets are booked online whereas the same figure is around 5% for majors (Trottman and McCartney 2002).

The fare difference between flying business class on a major carrier and discounter has become so wide that some employers allow their employees to purchase two discounter seats so that they can get some extra space to stretch out (and still spend less money than it would cost on a major carrier) (Trottman and McCartney 2002). While the passenger traffic in April 2002 was down by 10.5% from two years earlier, the major

carriers had increased the average cost of a 1000 mile coach ticket had by 14.7% (Trottman and McCartney 2002).

5.2.3.1 Anticipating Trends

Our major competition over the last fifteen years was other people doing the same things we do. That's not the case anymore.

Don Carty, CEO, American Airlines (2002)

In July 2002, Delta announced that the competitive threat is not from the big players such as American but from the discounters (Fonti 2002). It devised low-fare competition strategy with McKinsey and Co. (Fonti 2002). In the meantime, Southwest announced an aggressive expansion plan “connecting the dots” between city pairs common for business travel (e.g., Baltimore to LA, the highest Southwest round-trip fare was \$598 as opposed to \$1127 of United) (Trottman 2002).

In August 2002, Delta, Northwest and Continental announced a marketing agreement which links flight schedules, frequent flier programs, and access to airport clubs. A similar deal was earlier announced by United and US Airways (Woodyard 2002). In the meantime, the share of revenues from premium passengers (i.e., business and first class), average industry yield and revenues have been decreasing (Hazel 2003).

Deriving from the above sections, I anticipate that the following trends could be observed in the industry in the near future.

1. *Industry Consolidation Attempts:* As the competition and pressure for profitability increases, the majors will attempt to consolidate. US Airways is not in a position to compete with either majors or LCCs. It is likely that it will

either shrink to its roots as a regional carrier or be taken over by a major carrier (Sheth and Sisodia 2001). If the second option is realized, other mergers would follow. The CEO of America West Airlines recently predicted that United, Delta and Northwest would remain as major network carriers, and AirTran, Southwest, and Jet Blue would remain as discount carriers following anticipated mergers (Sunnucks 2005).

2. *Antitrust Action:* In relation to the above scenario, the DOJ will have to revise its criteria for evaluating mergers. DOT reports have shown the effect of the presence of LCCs on fare levels, and their current measure (HHI) does not take this into consideration. A new set of criteria could enable consolidation action as long as there is sufficient LCC presence in the markets.
3. *Revision of the Hub-and-Spoke System:* The efficiency and cost of managing a large scale hub-and-spoke system is being questioned. Major carriers may be better off concentrating on medium and long haul markets and leaving the short-haul spoke (feeding) operations to regional operators that they own or control. Regional carriers have better cost structures that can effectively compete with other LCCs.
4. *Restructuring of Corporate Travel Policies:* As audio and video conferencing becomes widespread, corporations will revise what constitutes a need for travel for whom and at what cost. More and more companies are already booking flights on LCCs (Woodyard 1999). LCCs will want to get a larger share of the corporate pie, and they will arrange umbrella deals with them. For example, ProAir offered unlimited business trips for a flat rate, and Vanguard

offered 10-15% discounts for businesses that buy 10 or more trips (Woodyard 1999).

5. *Increased Market Access and Growth for LCCs*: Permission of the mergers with special access conditions for LCCs could serve to increase their presence in key markets. The Federal government has already asked the airports to reveal their plans for increased competition. More than a dozen hub airports with high concentration were requested to file “competition plans” in order to secure federal expansion funding or increase facility charges (Pinkston 2000). These plans would include new gate plans, ticket counters, and strategy to attract new (i.e., LCC) airlines. Slot controls are also likely to be revised and relaxed for the benefit of LCCs. However, the presence of LCCs in bringing lower fares and stimulating economic growth in communities is well understood. If the Federal government acts slowly in opening up the markets to LCCs, the communities are likely to take the matter in their own hands. The following section demonstrates such a case. This is a very important phenomenon as it demonstrates the insufficiency of public policy at the federal level.

Case in point: Communities want LCC Service. Sam Williams, the President of Metro Atlanta Chamber of Commerce, commissioned a study to examine the fare levels with benchmark cities and stated “We want more airlines brought in here” (Saporta 1998). More and more communities are becoming aware of the substantial effect that the discounters have on prices. Since the public policy makers have been slow to open up markets to LCCs, some communities have decided to be proactive and have taken the

matter in their own hands. For example, the business community in Wichita, Kansas have raised \$4.7 million so that they could attract AirTran (Fonti 2002). The money would be solely committed for ticket purchases on AirTran for the next two years (Fonti 2002). Air-Tran would also be able to draw funds if ticket sales fall below expectations. Finally, the community would spend \$600K for marketing AirTran flights in Wichita (Fonti 2002). Wichita was previously served by three majors: Delta, American, and United, and the community's multimillion dollar investment would bring much lower fares in return. Similar deals with AirTran have already been successfully employed in six other markets: Gulfport/Biloxi-Mississippi, Pensacola-Florida, Tallahassee-Florida, Grand Bahama, Newport News, Va., and Rochester-New York (Fonti 2002). Admitting the failure of current policy, the DOT itself stated that communities that have little or no service by LCCs should actively seek their presence. The communities would have to market themselves to LCCs, and it was advised that they seek advice from aviation consultants (1996c).

5.2.4 European Landscape

European policy makers have observed the deregulation process in the US closely. Unrestricted cross-border flights have been allowed since 1993 (McCormick and Field 1997). The new start-ups in Europe have adopted Southwest's business model and tried to emulate its success. Successful European low cost carriers include Ryanair, EasyJet, Virgin Express, and Debon Air:¹⁰

¹⁰ This section draws heavily from (McCormick 1997) March 31 3B.

Ryanair: RyanAir is the oldest of the LCCs in Europe. It took advantage of early deregulation and started its operation in 1985 flying between Britain and Ireland. It is the leading carrier on the Dublin-London route. Continental Airlines chairman David Bonderman owns 20% of Ryanair. Like Southwest, Ryanair intentionally ignores the major airports due to their congestion and aircraft turnaround times. No frequent flyer miles, no free snacks. However, this structure enables Ryanair to be able to break even at 50% utilization (and its load factors are around 75%) (Michaels 2000). Ryanair uses only one type of aircraft (the Boeing 737) and is based in Dublin.

EasyJet: It appears that Easyjet is trying to emulate a combination of People Express and Southwest. It offers a no-frills service: seats are not assigned (first come first serve), no free meals, and casually dressed flight attendants. EasyJet also does not use travel agents or a CRS system for ticket sales. The result is 25% cost savings per ticket and also fewer employees per aircraft. Its base is London-Luton airport.

Virgin Express: Virgin Express was created when Richard Bronson (Founder and Chairman of Virgin Group including Virgin Atlantic Airways) purchased European Business Airlines. The initial problem Virgin Express faced was the high tax and cost structure in its base, Brussels, Belgium. They also faced the problem of not getting the slots they needed for efficient operations to their destinations. However, Richard Bronson is reputed as a tough competitor, and Virgin Express is a strong brand throughout the European Union. Its current base is Brussels-Zaventem airport.

Debonair: Debonair attempts to use a hybrid strategy: quality service at an affordable price. They do offer quality snacks on board but no meals. Debonair has in-flight entertainment at every seat and plans to introduce video-on-demand and in-flight gaming. Like EasyJet, Debonair's base is London-Luton airport.

As a result of increasing pressure from the emerging LCCs, some large players who could not adopt to the new competitive field are facing trouble (e.g., Iberia, Alitalia, Olympic). On the other hand, British Airways has aggressively made acquisitions in Germany and France to increase its presence. Concentration and prices are expected to decrease in the coming years in Europe as the benefits of deregulation are greeted by more consumers.

CHAPTER 6

DATA AND METHODOLOGY

6.1 Data Set

The Airline Origin and Destination Survey (DB1B) is a 10% sample of airline tickets from reporting carriers collected by the Office of Airline Information of the Bureau of Transportation Statistics. This database is used to determine air traffic patterns, air carrier market shares and passenger flows. The data includes origin and destination, distances, passengers per day, average one way and round trip fares for all carriers, fared passengers, market shares per city-pair and airport, average yields, market ranks, and revenues. The data can be aggregated for airport, for markets within an airport or at city-pair detail. The Database Products Inc. makes the data commercially available in the form of several CD-ROMs. Access was gained to these databases through industry contacts. This available data of 28 quarters (from 1st quarter of 1993 to fourth quarter of 1999) allows for analysis of aggregate and individual markets. From this analysis, one could understand and identify market defense behavior in light of the principles discussed in this dissertation. The content of the databases has been summarized as follows in Table 6.1 (Dixit 2000):

Table 6.1: Contents of O&D databases

Variables/Database	O&D Plus Market	O&D Plus Carrier	Onboard
Passengers	yes	yes	yes
Market Share	yes	yes	yes
Distance	yes	yes	yes
Revenues	yes	yes	no
Yield (cents per passenger mile)	yes	yes	no
Onboard Passengers	no	no	yes
Seats available	no	no	yes
Market Rank	Yes	yes	yes
Fared passengers	yes	yes	no
Fare	yes	yes	no
Enplaned Passengers	yes	yes	yes

Other data for code-share agreements among carriers, gate and slot controls and usage agreements, carrier financial resources, employees etc. come from various DOT reports (see section on measures) and have been manually and built into the database extracted through a cumbersome process.

6.2 Methodologies

Most empirical work to date seems to have utilized standard approaches such as regression analysis as their methodology (e.g., Abunassar 1994). One exception is Dixit (2000) who used neural networks and binary logit analysis. I have considered a wide array of methodologies to ensure robust and unbiased results and to strengthen the validity of the findings a la triangulation. Sophisticated methods such as binary and ordered logit analysis, multi-level modeling with mixed coefficients (HLM), and event-history analysis were determined to be feasible. Logit models enabled the analysis of limited dependent variables; HLM enabled to account for the hierarchical structure in the

data; and even-history analysis overcomes the issues with right-censoring (i.e., exits unobserved in the database). Split sample and double-cross validation have been employed for validation purposes where applicable.

6.2.1 Logit models

The applicability of logit models to the airline industry context has been shown by Dixit (2000). The model is quite robust, and its use is familiar in marketing.

The ordinal categorical/binary nature of the dependent variables in the model (e.g., supra-competitive, competitive, entry/no entry; exit/no exit) facilitates the use of ordered/binary logit models. Ordered logit implies that the dependent variable can be ranked but the distance between the categories is not known (Aldrich and Nelson 1984; Menard 2002). Binary logit implies a dependent variable with two known states.

The assumptions of the limited dependent variable models, similar to multiple regression models, are as follows (Long 1997):

- a. The x 's and ε are not correlated $E(\varepsilon \mid x) = 0$
- b. Error terms have constant variance
- c. Error terms are normally (or logistically) distributed with a mean of zero.

An ordered regression model such as logit (or probit) can be derived when an infinite range for y is mapped to an observable variable and cut-off points (thresholds) are established (Long 1997). For example, an ordered logit model with three levels for the dependent variable would be specified as follows (Borooah 2002):

$$Y_i = 1, \text{ if } F_i \leq \delta_1$$

$$Y_i = 2, \text{ if } \delta_1 \leq F_i \leq \delta_2$$

$$Y_i = 3, \text{ if } F_i \geq \delta_2$$

where $\delta_1, \delta_2 \geq 0$; $\delta_1 < \delta_2$, and represent unknown parameters. The classification for pricing strategy depends on whether the observed fares surpass the respective thresholds. The probabilities for Y_i for each pricing strategy are:

$$\Pr(Y_i=1) = \Pr(Z_i + \varepsilon_i \leq \delta_1) = \Pr(\varepsilon_i \leq \delta_1 - Z_i)$$

$$\Pr(Y_i=2) = \Pr(\delta_1 \leq Z_i + \varepsilon_i \leq \delta_2) = \Pr(\delta_1 - Z_i < \varepsilon_i \leq \delta_2 - Z_i)$$

$$\Pr(Y_i=3) = \Pr(Z_i + \varepsilon_i \geq \delta_2) = \Pr(\varepsilon_i \geq \delta_2 - Z_i)$$

The ordered logit model assumes that the error term (ε_i) is logistically distributed (on the hand, an ordered probit model would assume the error term to be normally distributed. Greene (2000) suggests that while it is hard to specify this distribution based on theory, the results are equivalent in most applications). Therefore, the cumulative distribution function of the random variable X is:

$$\Pr(X \leq x) = \Lambda(x) = \frac{\exp(x)}{1 + \exp(x)} = \frac{1}{1 + \exp(-x)}$$

and the logit model becomes:

$$\Pr(Y_i = 1) = \Lambda(\delta_1 - Z_i) = \frac{1}{1 + \exp(Z_i - \delta_1)}$$

$$\Pr(Y_i = 2) = \Lambda(\delta_2 - Z_i) - \Lambda(\delta_1 - Z_i) = \frac{1}{1 + \exp(Z_i - \delta_2)} - \frac{1}{1 + \exp(Z_i - \delta_1)}$$

$$\Pr(Y_i = 3) = 1 - \Lambda(\delta_2 - Z_i) = 1 - \frac{1}{1 + \exp(Z_i - \delta_2)}$$

The estimates for $\beta_k, \delta_1, \delta_2$ are estimated through the maximum likelihood function. When the intercept is explicitly included, the following general notation is revealed:

$$F_i = \beta_0 + \sum_{k=1}^K \beta_k X_{ik} + \varepsilon_i = \beta_0 + Z_i + \varepsilon_i$$

The binary model is simpler in that only one threshold point has to be defined for the dependent variable.

6.2.2 Multi-level mixed coefficient models (Hierarchical linear modeling)

Multilevel analysis focuses on the analysis of data with complex patterns of variability, with a focus on its nested sources (Luke 2004; Snijders and Bosker 1999). Much of the phenomena in social and behavioral sciences consist of nested layers (Kreft and Leeuw 2002). Variables may relate to individuals, groups, teams, departments, organizations, countries, trading blocks and so forth. Multilevel models have been developed to deal with hierarchically structured data. These models are referred to as mixed-effect and random effect models in biometric applications, random coefficient regression models in econometrics, and covariance component models in statistics literature (Raudenbush and Bryk 2002). It is also referred to as Hierarchical linear modeling in the social sciences because of popular software package with the same name. A random coefficients multi-level model is said to exist when there are at least two levels, and the coefficients at the lowest (micro) level are treated as random variables at the second level. In contrast, mixed effect models assume that some of the coefficients are fixed and some are random (Snijders and Bosker 1999).

Adding new level(s) to the model renders it more general and often more useful (Kreft and Leeuw 2002). Analysis from data aggregated at different levels may produce different results when a hierarchy exists. This can be determined by intra-class correlations. If intra-class correlation is practically zero, then group differences do not exist and can be ignored in the analysis. However, by assuming and modeling this correlation, the implicit nested structure of the data is accounted for. On the other hand, if this correlation is substantial and is ignored, the reliability of the results become questionable (Kreft and Leeuw 2002). Therefore, the choice for the level of aggregation used to analyze the data becomes important. If we aggregate the data, we may potentially discard meaningful data and also introduce an aggregation bias. On the other hand, if we conduct our analysis at the individual (i.e., micro) level, we violate the independence assumption.

Overall, multi-level models help the researcher in three main ways (Raudenbush and Bryk 2002, p.7):

1. Improved estimation of effects within individual units (e.g., developing an improved estimate of a regression model for an individual school by borrowing strength from the fact that similar estimates exist for other schools)
2. The formulation and testing of hypotheses about cross-level effects (e.g., how varying school size might effect the relationship between social class and academic achievement within schools)
3. Partitioning of variance and covariance components among levels (e.g., decomposing the covariation among set of student-level variables into within- and between-school components).

These features enable researchers to construct more realistic models and test hypotheses across levels with greater accuracy and reliability. The use of multilevel models has been recommended unless there is reason to believe that hierarchical structure in the data is not an issue. The method is emerging and more and more researchers in marketing have been utilizing it (e.g., Malhouse et al. 2004; Van den Bulte 2000).

Luke (2004, p.13-14) categorized multilevel models in three main classes:

1. Unconstrained

$$Level1: Y_{ij} = \beta_{oj} + r_{ij}$$

$$Level2: \beta_{oj} = \gamma_{00} + u_{0j}$$

Mixed-Effects model becomes $Y_{ij} = \gamma_{00} + u_{0j} + r_{ij}$

This model is used as a null model to estimate between group effects.

2. Random intercepts:

$$Level1: Y_{ij} = \beta_{oj} + r_{ij}$$

$$Level2: \beta_{oj} = \gamma_{00} + \gamma_{01}W_j + u_{0j}$$

or with explanatory variable

$$Level1: Y_{ij} = \beta_{oj} + \beta_{1j}X_{ij} + r_{ij}$$

$$Level2: \beta_{oj} = \gamma_{00} + u_{0j}; \beta_{1j} = \gamma_{10}$$

Mixed-Effects Models are $Y_{ij} = \gamma_{00} + \gamma_{01}W_j + u_{0j} + r_{ij}$ and $Y_{ij} = \gamma_{00} + \gamma_{01}X_{ij} + u_{0j} + r_{ij}$

respectively.

3. Random intercepts and slopes

$$Level1: Y_{ij} = \beta_{0j} + \beta_{1j}X_j + r_{ij}$$

$$Level2: \beta_{0j} = \gamma_{00} + u_{0j}; \beta_{1j} = \gamma_{10} + u_{1j}$$

with cross-level interaction terms (W_j represents the interaction term):

$$\text{Level1: } Y_{ij} = \beta_{0j} + \beta_{1j}X_j + r_{ij}$$

$$\text{Level2: } \beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j}; \quad \beta_{1j} = \gamma_{10} + \gamma_{11}W_j + u_{1j}$$

The mixed effects models are $Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + u_{0j} + u_{1j}X_{ij} + r_{ij}$ and

$$Y_{ij} = \gamma_{00} + \gamma_{01}W_j + \gamma_{10}X_{ij} + \gamma_{11}W_jX_{ij} + u_{0j} + u_{1j}X_{ij} + r_{ij} \text{ respectively.}$$

6.2.3 Event-History analysis ¹¹

An event is described as a qualitative change that occurs at a specific point in time. Therefore, while a price change no matter how drastic, does not necessarily constitute an event, market entry and exit are considered events. It has been suggested that the best way to examine the causes and consequences of such events is through event-history analysis. If standard methods are applied to event-history data, the results can be severely biased due to censoring and time-varying explanatory variables. The event-history analysis has found many applications including but not limited to unemployment studies, consumer behavior studies (i.e., brand choice over time), medical studies on the course of illness, learning experiments in psychology and instruction research, insurance and accident studies, studies of migration, analysis of family formation and fertility, criminology studies and legal research, organization and management research (cf. Blossfeld et al. 1989). There are several dimensions that need to be considered before one can apply event-history analysis. I consider these in view of my model and data set.

¹¹ This section is based on Allison (1984) except where cited otherwise.

Distributional versus regression methods. Most of the early research that used event-history analysis has focused on the distributional issues such as the time until an event or the time between events. More recently, the focus has shifted to regression models in which the event is the dependent variable where its occurrence depends on explanatory variables. Similarly, the factors that lead to market entry/exit rather than the time that passes until a market entry is of interest for the current research.

Repeated versus nonrepeated events. Events can be repeated (i.e., marriage) or non-repeated (i.e., death). Not surprisingly, repeatable events are more complex to model but can be handled with event-history analysis. There can be more than one entry/exit in a given market in a longitudinal study or one can simply assume that it is a one-time event for a market.

Single versus multiple kinds of events. Events can be treated as identical or distinguished from one another (i.e., voluntary versus involuntary job termination). As such, market entry and exit in my models can be treated as identical or categorized as inter-entry and intra-entry.

Parametric versus nonparametric methods. Non-parametric methods make few or no assumptions about the distribution of the data. Alternatively, the researcher can assume a specific distribution (e.g., Weibull). Hybrid approaches have also been developed in which the regression model has a specific functional form but the distribution of the event times is not specified (resembles the linear models where no distribution is assumed for the error term).

Discrete versus continuous time. If the researcher is able to measure the “exact” event time or assume a continuous scale, then continuous models can be used. Otherwise,

discrete units (e.g., quarterly data) can also be handled by the event-history method.

Discrete time models are also easier to implement.

In simple form event-history analysis is conducted in the form of life-tables. This essentially implies that the survival time data is grouped.

If we define time intervals as I_j where $j=1, \dots, J$: $I_j : [t_j, t_{j+1})$, where

D_j : the number of failures observed in interval I_j

M_j : the number of censored spell endings observed in interval I_j

N_j : the number at risk of failure at start of interval

S_j, F_j : survival and failure functions for interval j respectively

If we assume that the transitions are evenly spread, then the notation is (Jenkins 2004):

$$n_j = N_j - \frac{d_j}{2} \text{ and } \hat{S}(j) = \prod_{k=1}^j (1 - \frac{d_k}{n_k})$$

$$\text{since } S(t)=1-F(t): \hat{f}(j) = \frac{\hat{F}(j+1) - \hat{F}(j)}{t_{j+1} - t_j} = \frac{\hat{S}(j) - \hat{S}(j+1)}{t_{j+1} - t_j}$$

hazard rate is estimate for mid-point of the interval becomes

$$\hat{\theta}(j) = \frac{[\hat{f}(j)]}{\tilde{S}(j)} \text{ where } \tilde{S}(k) = \frac{\hat{S}(k) + \hat{S}(k+1)}{2}$$

While the notation becomes more complex when we introduce explanatory variables to the model, a Cox proportional hazards model with two time-constant variables can be simply generalized as:

$$\text{Log } h(t) = a(t) + b_1 X_1 + b_2 X_2 ;$$

where $a(t)$ can be any function of time (Allison 1984).

The main methods that are utilized are contrasted with each other and other alternatives in Table 6.2 in order to demonstrate their relative advantages.

Table 6.2: Comparison of Alternative Methodologies

Methodologies	Pros	Cons
Multiple Linear Regression	<ul style="list-style-type: none"> • Easy to interpret and communicate • Interaction and dummy variable coding 	<ul style="list-style-type: none"> • Not suitable for binary dependent variables
Logit Models	<ul style="list-style-type: none"> • Can effectively deal with binary/ordered/ multinomial dependent variables 	<ul style="list-style-type: none"> • Arbitrary choice for dependent variable • Cannot deal with censored observations
Hierarchical Linear Modeling	<ul style="list-style-type: none"> • Considers the nested structure of the data and cross-level correlations 	<ul style="list-style-type: none"> • Time-consuming to prepare data
Event-History Analysis	<ul style="list-style-type: none"> • Can effectively deal with censored observations • Utilizes full information for the dependent variable • No assumptions on the nature and shape of the hazard function (Cox) • Can deal with time-varying explanatory variables 	<ul style="list-style-type: none"> • Data hard to get and time consuming to prepare • Feasible only for qualitative changes with known times
Structural Equation Modeling	<ul style="list-style-type: none"> • Tests the full model rather than a stepwise approach 	<ul style="list-style-type: none"> • Not feasible when the variables have single indicators or formed of formative (not reflective) scales
Time-Series Models	<ul style="list-style-type: none"> • Considers autocorrelation in the data and can establish cause and effect relationships 	<ul style="list-style-type: none"> • Data hard to get and very time consuming to prepare
Game-Theoretic experiments	<ul style="list-style-type: none"> • Enables precise modeling of timing and information levels 	<ul style="list-style-type: none"> • Difficulty with complex models prohibits construction of a generalizable model • Hard to find executive subjects

6.3 Measures

The operationalization of the variables for data analysis are described in this section.

Relevant markets: An inquiry of market defense immediately raises the question as to what constitutes a relevant market in the airline industry. One possible approach would be to assess the whole nation as the market. It may be argued that even though no carrier serves every city, there are no such restrictions prohibiting from doing so. However, with this definition of the relevant market --six major carriers, three of which are about equal size, and dozens of smaller carriers-- one would be misled to conclude that the industry is indeed not concentrated. For all practical purposes, considering regional markets as the relevant market level does not clarify the customer's dilemma either. Let us consider the case of the Southeast region: For a passenger who wants to fly from Atlanta to Savannah, the competitive service that Air-Tran offers on its Atlanta-Orlando flights provide little relief. A product/service market should have its own elasticity of demand as derived from consumer preferences. Therefore, from a marketing perspective, the relevant market for the consumers is the substitutable airport/city pairs. It should be noted that several DOT reports and recent literature have also taken this view regarding the definition of the relevant market in the airline industry (e.g., 2001d; Dempsey 2000b; Dixit 2000; Nannes 1999; e.g., Oster and Strong 2001). "We have consistently found that relevant airline markets are generally no larger than city-pair routes" (1996b, p.5).¹²

Pricing Strategy: This was the average yield (Average price / distance) for the incumbent for the market in question for a given quarter.

Distance: is the physical distance in miles between the two cities that make the market

¹² The relevant airline markets may be narrower than city pairs (1996b, p.6). A relevant market investigation at the segment level (e.g. business class city-pair market, coach class city-pair market) would be fully justified. Unfortunately, such an inquiry was not possible with the available data.

Market Size: Number of total passengers in the market for a given time frame (i.e., quarter).

Market Power: The market power of the incumbent was measured by the Herfindahl-Hirschman (HHI) index. The index is essentially the sum of the squared market shares of all firms in a market (i.e., revealing 10000 maximum for a pure monopoly). The primary advantage of the HHI is that it is more sensitive to the size distribution of firms than a four firm concentration ratio. HHI performed better than simple market share during preliminary analysis. An alternative measure to the HHI index was developed but did not perform better (see Appendix B).

Barriers to Entry: Barriers to entry were formed as a composite variable. The factors that were considered in the formation of the variable were as follows:

Market-specific barriers: Whether any of the cities that form the market is a hub; is subject to slot and noise controls; whether the gates are utilized at capacity; whether the gates are predominantly leased for exclusive use by one carrier (1999a; 1999d; Dresner et al. 2001).

Firm-specific barriers: Content analysis was undertaken in trade press to identify carriers with a reputation for predation for a period of ten years (1989-1999, i.e., pre-dating DOJ's American Airlines case). Keyword searches were conducted for "predatory", "aggressive", "anticompetitive", and "antitrust." The results consistently revealed the same pattern of frequency associations. American Airlines had its own a cluster with the highest frequency count (3), Continental, Northwest and United were grouped together next (2), Delta, TWA, and U.S. Airways (1) were grouped third.

Code-share agreements that were in effect for the major carriers were identified from the DOT reports. Code-share agreement barriers were coded to exist if the incumbent and one of its code-share partners operated in the same market.

Strategic Assessment: Strategic assessment was the sum of the composite variables for entrant resources, strategic fits, and market growth.

Resources: This was the sum of the full-time employees of the low cost carriers that operated at either end of the market (i.e., either city pair). It was transformed into a composite variable. Alternative financial measures such as resource slack (working capital over total assets) were employed as well but did not produce satisfactory results. For example, the working capital for Southwest airlines was consistently negative, whereas some smaller airlines' were positive. Therefore, I have opted for employees as a measure of potential entrant resources.

Strategic fit: This was the sum of the aggregate market shares of the low cost carriers that operated at either end of the market. This was transformed into a composite variable.

Market growth: For quarter n , this was measured as the percentage of growth in the number of total quantity of passengers flying in the market: $\frac{QP_{n-1} - QP_{n-5}}{QP_{n-5}}$. This was

transformed into a composite variable.

Entry event: Entries by the following carriers, JetBlue Airways, Frontier Airlines, Tower Air, AirTran Airways, ValueJet Airlines, Kiwi International, Carnival Airlines, Nations Air Express, National Airlines, Vanguard Airlines, Spirit Airlines, Pro Air, Reno Air, Sun Country Airlines, American Trans Air, Western Pacific Airlines, Air South, and Casino

Express (list acquired from the DOT officials, identical with that in the DOT special feature study (2003a)) with more than twenty passengers per day (2000c). Pioneer entries into markets that did not exist before were excluded. Entries by Southwest airlines were excluded because of the previously discussed “Southwest effect.” Competitors do not retaliate against Southwest and Southwest very rarely exits from markets it enters. Southwest’s market capitalization is more than double the rest of the industry combined (Hazel 2003, p.13).

Incumbent’s response: This was calculated as the percentage difference between the average incumbent yield before entry (Q_{n-1}), and the average of the incumbent yield at entry and four quarters following entry (Average Q_n to Q_{n+4}). The signs were reversed so that they measure retaliation rather than change, which makes it easier to interpret.

Incumbent’s retaliation response for exit hypothesis was the percentage difference between the average yield of the incumbent in the quarter before exit (or the quarter of last observation) and the average incumbent yield before entry. Use of average responses (i.e., average of yields after entry) would not necessarily support hypothesized relationships for the retaliation–exit linkage because an incumbent may keep prices high for a few quarters and then decrease it sharply (in multiple markets) to drive the entrant out (which was an observed pattern in the data). Such predatory actions would not be captured by an average response measure.

Other variables:

Hubs: Major and regional airline Hubs for the purposes of this research are listed in Appendix C.

HubPower: Weighed average HHI of all markets linked to the hub.

HubPremium: Weighed average yield for the hub

HubSpecificBarriers: These are market specific barriers excluding hub formation.

CHAPTER 7

DATA ANALYSIS AND RESULTS

- H1: *Market power of the incumbent and the market price premium will be positively associated.*
- H2: *The positive relationship between the market power of the incumbent and the market price premiums will be positively moderated by barriers to entry.*
- H3: *Barriers to entry and the market price premium will be positively associated.*
- H4: *The positive moderating effect of firm specific barriers on the incumbent's pricing strategy will be higher than that of market specific barriers.*
- H5: *The positive effect of firm specific barriers on the incumbent's pricing strategy will be higher than that of market specific barriers.*
- H6: *The positive relationship between the market power of the incumbent and the market price premiums will be negatively moderated by the incumbent's strategic assessment (i.e., resources, strategic fit, market growth) of the potential entrants.*
- H7: *Incumbent's strategic assessment and the market price premium will be negatively associated.*

These hypothesis were tested using multiple linear regression, logit and HLM models. Top 4000 markets in the U.S. by passenger volume for the 4th quarter of 1999 (the most recent quarterly data available) were chosen for the analyses.¹³ This was also the quarter by which extensive code-share agreements had come in effect. The general MLR model for hypothesis testing with moderating variables (Sharma 1981) was:

$$Y_i = \beta_0 + \sum_{j=1}^6 \beta_j X_{ij} + \sum_{k=4}^6 \beta_k X_{i3} X_{ik} + \varepsilon_i$$

Where Y_i is the average yield for the incumbent for market i
 X_{i1} is the distance between city pairs that form market i (control variable)

¹³ This represented a comprehensive approach as the top 2500 markets approximately account for 90% of passenger traffic.

X_{i2} is market size for market i (control variable)
 X_{i3} is market power of the incumbent for market i
 X_{i4} is strategic assessment of the incumbent for market i
 X_{i5} is firm specific barriers to entry for market i
 X_{i6} is market specific barriers to entry for market i

After cases with missing data and outliers were excluded, the final sample consisted of 3948 markets. A quick preliminary run showed that the main effects existed in the expected directions. All entered variables were significant ($p < 0.01$). However, transformations were undertaken to ensure that the data satisfies the assumptions of the method (this procedure is detailed in Appendix E). Due to non-normal distribution of market power, 374 cases where the market power was extremely high (above 9000) were excluded in order to achieve a normal distribution.¹⁴ The data was then split into two subsets of identical size ($n_1 = n_2 = 1787$) using the random split procedure to inquire if the results are robust.

The model was highly significant ($p < 0.01$) and the variables were able to explain 69 percent of the variance in incumbent's yield ($\text{adj}R^2 = 0.688$). Variance inflation factor (VIF) is between one and two for all variables so multicollinearity was not anticipated to present a problem (VIF values higher than 10 should be taken as a sign of multicollinearity (Neter et al. 1996, p.387)). Control variables were significant with negative coefficients consistent with a priori expectations (e.g., both increasing distance between cities and market size are expected to be negatively correlated with an incumbent's yield in a given market). Market Power of the incumbent was highly significant ($p < 0.01$) with a positive coefficient as expected. Therefore, Hypothesis 1 was supported.

¹⁴ The runs without this exclusion revealed identical results for significance.

The coefficient for firm specific barriers to entry and market specific barriers to entry were highly significant and positive ($p < 0.01$) thus indicating a main effect on incumbent's yield. Therefore, Hypothesis 3 was supported. In both models, the coefficient for firm specific barriers is higher than that of market specific barriers. Neter et al. (1996, p. 273) describe the formal test as one where

$$H_0 : \beta_{\text{firm specific barriers}} \leq \beta_{\text{market specific barriers}}$$

$$H_a : \beta_{\text{firm specific barriers}} > \beta_{\text{market specific barriers}}$$

$$\text{The full model } Y_i = \beta_0 + \sum_{j=1}^6 \beta_j X_{ij} + \varepsilon_i$$

$$\text{is compared with the reduced model } Y_i = \beta_0 + \sum_{j=1}^4 \beta_j X_{ij} + \beta_c X_{ic} + \varepsilon_i \text{ where } X_{ic}$$

stands for total barriers to entry (i.e., $X_{i5} + X_{i6}$). F* statistic of 314.77 was highly significant ($p < 0.01$) (see Appendix E for details). Therefore, Hypothesis 5 was supported.

The coefficient for Strategic Assessment was highly significant and negative as anticipated ($p < 0.01$). Therefore, Hypothesis 7 was supported. On the other hand, none of the moderating effects were significant ($p < 0.05$) with presence of main effects in the model. Therefore, moderation related hypotheses 2, 4, and 6 were not supported.

The MLR results for both split samples are presented in Table 7.1. The results were robust for the two samples. Double cross-sample validation revealed little shrinkage among the samples and further reinforced the findings.

Table 7.1: Multiple Linear Regression Results

MLR results	Split Sample 1			Split Sample 2		
	Beta	Significance	VIF	Beta	Significance	VIF
Constant	-.145			-.140		
Distance	-.720	p<0.01	1.298	-.745	p<0.01	1.346
MarketSize	-.039	p<0.05	1.394	-.027	p<0.10	1.350
MarketPower(MP)	.127	p<0.01	1.372	.106	p<0.01	1.402
FirmBarriers(FB)	.173	p<0.01	1.444	.141	p<0.01	1.371
MarketBarriers(MB)	.130	p<0.01	1.446	.119	p<0.01	1.405
Str.Assessment(SA)	-.222	p<0.01	1.395	-.221	p<0.01	1.333
FBXMP	-.018	n.s.	1.293	.01	n.s.	1.252
MBXMP	-.007	n.s.	1.287	-.016	n.s.	1.233
SAXMP	.021	n.s.	1.187	.026	n.s.	1.163

Note: The entries for the two constants are unstandardized coefficients.

Logit models:

It is very hard to justify arbitrary cut off points to determine different types of pricing strategy (i.e., supra-competitive, competitive, and limit) and any choice would be criticized. Therefore, rather than trying to justify the two arbitrarily chosen cut-offs, I would like to argue that the results of logit models should be similar to those of the MLR models as long as the cut-offs chosen for average yield (i.e., dependent variable) reveal a near-normal distribution (highest mode in the middle for competitive pricing) as opposed to a bi-modal distribution (i.e., two high modes on the tails). The reality should be near-normal anyway: in all likelihood, the highest mode in all deregulated consumer network industries is competitive pricing.¹⁵ Indeed, if we cannot make the assumption that most products/services are competitively priced in any unregulated industry, it would mean that public policy has grossly failed. To illustrate this point, several logit runs were

¹⁵ In a perfectly competitive market, *all* prices would be expected to be competitive whereas in a regulated monopoly, all prices would be expected to be supra-competitive.

undertaken with different cut-off points for the three categories of pricing strategy and the results were compared:

First, the following ordered logit model was run in the full data set:

$$\log it(Y_i) = \beta_0 + \sum_{j=1}^6 \beta_{ij} X_{ij} + \sum_{j=4}^6 \beta_0 X_{i3} X_{ij} + \varepsilon_i$$

where,

$$y_i = \begin{cases} 0 \Rightarrow \text{Limit Pricing if } \tau_0 = -\infty \leq y_i^* < \tau_1 \\ 1 \Rightarrow \text{Competitive if } \tau_1 \leq y_i^* < \tau_2 \\ 2 \Rightarrow \text{SupraCompetitive if } \tau_2 \leq y_i^* < \tau_3 = \infty \end{cases}$$

The cut off point for supra-competitive pricing was determined to be 25 cents per mile and the cut-off for limit pricing was set at 10 cents per mile. Pseudo-R-square was 45%; Log likelihood was -2127.9159; LR chi-square (9)=3534 was highly significant (p<0.001). Full results for the model are presented in Table 7.2.

Table 7.2: Main Logit Model Results

Variables	Coefficient	Std. Err.	Z	P> z	95% Conf. Interval
Distance	-.3534	.01063	-33.24	.000	-.3743 ; -.3326
Market size	-.0000	.00002	-1.44	.0149	-.0001 ; 8.67e-06
Market Power(MP)	.0001	.00002	4.68	.000	.0001 ; .0002
Firm Barriers	.4131	.03795	10.89	.000	.3387 ; .4875
Market barriers	.2872	.03647	7.87	.000	.2157 ; .3587
StrategicAssessment	-.2645	.01638	-16.14	.000	-.2966 ; -.2324
FirmBarriersXMP	-.0000	.00002	-1.48	.139	-.0001 ; 7.57e-06
MarketBarriersXMP	-.0000	.00001	-1.75	.08	-.0001 ; 3.38e-06
StrategicAssessmentXMP	-0.0000	.00001	-1.15	.248	-.0000 ; 5.35e-06

Next, the model was run with different cut-off points. The results are presented in Table 7.3:

Table 7.3: Logit Model Results for Alternative Cut-off Points

Cut-off 1 Cut-off 2	9; 27.5	11; 22.5	8; 20	12; 30	10; 30	9; 30
Pseudo-R ²	.4901	.4462	.4940	.4529	.4552	.4906
Distance	-.3724	-.3695	-.3814	-.3767	-.3408	-.3637
MarketSize	n.s.	-.000044	n.s.	-.00007	-.00004 [†]	n.s.
MarketPower	.0002	.0001	.0001	.0001	.0002	.0002
Firm Barriers	.4220	.4137	.5104	.4332	.3918	.4285
MarketBarriers	.2495	.3079	.2254	.3173	.2770	.2406
StrategicAssessment	-.3013	-.2746	-.2978	-.2312	-.2475	-.2938

Note: All models were significant $p < 0.001$. All coefficients significant at $p < 0.01$ except where noted [†] for $p < 0.05$ or n.s.

It should be noted that even though both cut-offs are modified by as much as twenty percent in both directions, the results were very robust. The significance of the results was also identical to those of MLR. All coefficients were highly significant and were in the expected directions with the exception of market size which was often non-significant. Therefore, main effect Hypotheses 1, 3, 5, and 7 were supported as in MLR analysis. This would indicate that the findings can be interpreted for the three categories of pricing strategy as conceptualized in the model. Furthermore, firm specific barriers appeared to be the most influential variable in all models, further supporting Hypothesis 5. The only surprise result was the positive and significant but much smaller coefficient for market power. This raised the possibility that the market power of the incumbent may not influence the choice of a discrete pricing strategy as much as it influences the average yields.

Multi-level mixed coefficient model:

The evidence on competitive interaction suggests that the overall market share of the incumbent for the city (hub) that the route connects should also be an important indicator of market power. Many smaller routes (i.e., spokes) that feed the hub system have been observed to have higher price levels than those that can feed higher levels of traffic. Major carriers typically set up their hubs at cities where the market size is large. The price levels should come down due to economies of scale as market size increases. However, hub systems are costly to operate and they have been shown to have a positive effect on prices in form of hub premiums (1999b; Allvine 1996b).

Although typically not stated explicitly, the airline industry possesses a hierarchical structure: the airlines compete with each other in individual markets (city-pairs), and these markets reside in hubs (collection of markets). The framework is developed from an incumbent defender's perspective (i.e., one defender per market, the dependent variable is the incumbent's yield for the market). The markets that connect hubs to each other (e.g., Atlanta-Dallas) were removed from the database to achieve a single incumbent. The new full data set consisted of 2024 markets nested in 36 hubs (please see appendix C for a list of the hubs included in the analyses; Appendix F for further tables with respect to HLM analyses.). The end result is a pioneer application of multi-level mixed coefficient modeling in the airline context. The base model with a cross-level interaction term is presented below:

Level I Airline (Market (city-pair))

$$Y_{ijk} = \beta_{0jk} + \beta_{1jk}(\text{Distance}) + \beta_{2jk}(\text{MarketSize}) + \beta_{3jk}(\text{MarketGrowth}) + \beta_{4jk}(\text{MarketPower}) + \beta_{5jk}(\text{FirmBarriers}) + \beta_{6jk}(\text{FirmBarriersXMP}) + R_{ijk}$$

Level II (Hub)

$$\beta_{0jk} = \delta_{00k} + \delta_{01k}(\text{Hub Premium}) + \delta_{02k}\text{Hub Resource} + \delta_{03k}\text{HubBarriers} + U_{0jk}$$

$$\beta_{1jk} = \delta_{10k} + U_{1jk}$$

$$\beta_{2jk} = \delta_{20k} + U_{2jk}$$

$$\beta_{3jk} = \delta_{30k} + U_{3jk}$$

$$\beta_{4jk} = \delta_{40k} + \delta_{41k}(\text{Hub Premium}) + U_{4jk}$$

$$\beta_{5jk} = \delta_{50k} + U_{5jk}$$

$$\beta_{6jk} = \delta_{60k} + U_{6jk}$$

The empty model was significant and suggested that the total variability that can be attributed to the group level variables is 24% (i.e., intra-class-correlation coefficient (ICC)) (Snijders and Bosker 1999). This justified the nested structure of the data (Appendix F). The sample was randomly split into two groups for split-sample validation. Group-centering was employed for level one variables and grand-mean centering was employed for level 2 variables (Snijders and Bosker 1999). Similar to previous tests, the moderating effects were mostly non-existent. However, the HLM models should not be compared with the earlier results per se. For example, the measure for hub barriers (i.e., market specific barriers for HLM) does not include hub formation since all level two variables are at hubs. Thus, hub barriers were not significant potentially due to issues with its weaker measure. Similarly, Hub resources and hub growth became proxies for strategic assessment. After several runs, the cross level interaction of market power that was found to be significant was with Hub Premium. It should be noted that firm specific barriers again have the highest positive coefficient in the model. Therefore, similar to

MLR results, the HLM model supports Hypotheses 1, 3, 5 and partially supports Hypothesis 7.

The results from the two split samples are presented below.

Table 7.4: Main HLM Results

Variables/Coefficients	Split Sample 1	Significance	Split Sample 2	Significance
σ^2	0.1296		0.11861	
$\tau(\text{intercept})$	0.0325		0.02279	
Reliability	0.828		0.788	
Intercept	2.9529	0.000	2.8944	0.000
Hub Premium	0.0567	0.000	0.0676	0.000
Hub Resource	-0.000010	.004	-0.000004	0.097
Hub Barriers	0.016253	n.s.	0.007218	n.s.
Distance	-0.0543	0.000	-0.0559	0.000
Market Size	-0.000038	0.003	-0.000052	0.000
Market Growth	-0.062	0.020	-0.1031	0.002
Market Power	0.000071	0.000	0.000074	0.000
MP X Hub Premium	0.000007	0.001	0.000007	0.006
Firm Barriers	0.1002	0.000	0.126	0.000
Firm BarriersXMP	-0.000002	n.s.	-0.000013	n.s.

H8: *Incumbents' pre-entry market price premiums for markets with inter-category entry will be higher than those of markets without inter-category entry.*

H9: *Potential inter-category entrants' strategic assessment of the markets will be higher for the markets that they enter.*

Markets with inter-entries in a given quarter are not expected to exceed a small fraction of the population (less than 5 percent). The need to examine this small end-tail of the distribution causes estimation problems (Dixit 2000). A binary logit model for the overall data set did not reveal satisfactory results (the null and full models consistently predicted no entry for all markets and achieved 98%+ prediction accuracy). Therefore, a subset of the data had to be specifically developed to test the hypotheses. Markets that an

inter-entry occurred within the calendar year 1995 (randomly chosen) were sought. Seventy-seven inter-entries were identified.¹⁶ Using the exact distribution of the entries among quarters, a comparable subset of markets where entry did not occur during the same period was generated. The two subsets were then combined, revealing a binary dependent variable (no-entry=0/entry=1) for 154 cases. The even distribution between market entry/no entry rates enabled the development of a binary logit model with sufficient power. Dummy variables were used to denote quarters to capture seasonal variation (Shaffer et al. 2000) but none were significant (Appendix G). Therefore, the entries in 1995 were pooled together. The model was significant with a Nagelkerke R-square of 60%. The results are presented in Table 7.5.

Table 7.5: Logit Model Results for Hypotheses 8 and 9

DV: Entry	Beta	Std. Error	Wald	Significance	Exp (Beta)
Distance	-1.377	.541	6.475	.011	.252
Market Size	1.050	.212	24.424	.000	2.858
Str. Asses.	.298	.142	4.434	.035	1.347
PricingStrategy	1.865	.142	8.251	.004	6.455
Constant	-4.314	4.806	.806	n.s.	.013

All variables in the equation were significant ($p < 0.05$). The negative coefficient for distance indicates that inter-entries occur in markets with shorter hauls. The positive coefficient for market size indicates that LCC entrants prefer larger markets for entry. The coefficient for Strategic Assessment is significant and positive. Therefore, Hypothesis 9 is supported. The coefficient for Pricing Strategy is also positive and highly significant. Therefore, Hypotheses 8 is supported. It should be noted that Pricing Strategy

¹⁶ Entries to entirely new markets (i.e., pioneer entries) were not included. Market entry and exit analyses with fewer than a hundred cases are common due to the manual labor involved in constructing the databases. See Dixit (2000) for an example with sixty-nine cases of entry, Dresner et al. (2001) for a study with fifty-eight entries, and Fournier and Zuehlke (2001) for a study with forty-three entries.

has the highest beta coefficient against entry likelihood. Therefore, limit pricing may be an effective strategy to deter entry in markets. The model predicts 81% of market entries correctly as opposed to 50% a priori (see Table 7.6).

Table 7.6: Logit Model Classification Table

Classification Table^a

Observed			Predicted		
			ENTRY		Percentage Correct
			.00	1.00	
Step 1	ENTRY	.00	62	14	81.6
		1.00	15	62	80.5
Overall Percentage					81.0

a. The cut value is .500

H10: The magnitude of the incumbent's response to inter-entry will be positively associated with its pre-entry pricing strategy.

The same data set as above was used to test Hypothesis 10. Dependent variable was the price response of the incumbent in proportion to its pre-entry yield. The independent variables were the pre-entry yield of the incumbent (Pricing Strat.), Market Size, Distance, and entrant's yield at entry (Entry Yield). The model was significant and the adjusted R-square suggested that roughly one third of variance in price responses to entry could explained by these variables alone.

The coefficient of Distance was positive and significant, suggesting that the incumbents retaliate to entries in longer haul markets more intensively. The negative and significant coefficient for market size suggested that the incumbent's average price response becomes less intense as market size increases. This could be related to the business passenger traffic that creates a significant share of the incumbent's revenues in

large markets. The coefficient for the entrant's yield is negative but not significant with incumbent's yield in the equation. Finally, Pricing Strategy has the highest and significant coefficient in the model. Therefore, it appears that the single most important variable in predicting the price response of the incumbent facing entry is its own pre-entry prices. Thus, Hypothesis 10 is supported. Alternative models that included entrant's yield and entrant's price cut percentage as independent variables were run but their coefficients were not significant, further supporting Hypothesis 10.

Table 7.7: MLR Results for Hypothesis 10

DV: Incumbent Response	Beta	Std. Error	Significance
Constant		.444	.183
Distance	.502	.063	.012
Market size	-.400	.012	.000
Entry Yield	-.010	.007	.939
Pricing Strat.	.759	.059	.000

H11: *The likelihood of inter-category exit from a given market and the magnitude of the incumbent's competitive response will be positively associated.*

H12: *The likelihood of inter-category exit from a given market and the entrant's strategic assessment will be negatively associated.*

In order to conduct these tests, binary logit analysis in similar fashion to the test of Hypotheses 8 and 9 were undertaken. This time the binary dependent variable was the Exit event within three years of entry (exit=1/no-exit=0). A new set of strategic assessment variables were created for the entrants in market (i.e., while the previous strategic assessment variable was aggregate for all potential entrants, this assessment is specific for the actual entrant in the market) (Appendix G). The model was significant with a Nagelkerke R-square of 83%. The coefficient for the control variable Market Size

was negative and significant indicating that the entrants are less likely to exit from larger markets. Strategic Assessment was also significant and negative. Higher strategic assessment by the entrant decreases likelihood of exit. Therefore, H12 is supported. Finally, the retaliation variable is positive and significant, and its coefficient has the highest absolute value in the equation. 10% increase in retaliation (i.e., 10% price cut with respect to pre-entry yield) increases the likelihood of exit by more than 10 times. Therefore, Hypotheses 11 is supported. The data suggests that predatory retaliation can be effective. Note that the Distance variable was omitted from the model as it was neither significant nor correlated with any of the variables in the model, and there was no theoretical reason that it would impact the exit decision. The contingency table predicted 91.3% of the exits correctly (as opposed to 71.7% for exits a priori).

Table 7.8: Logit Analysis Results for Hypotheses 11 and 12

	Beta	Std. Error	Wald	Significance	Exp (Beta)
Market Size	-3.646	1.628	5.012	.025	.026
Str. Asses.	-2.419	1.228	3.880	.049	.089
Retaliation	4.636	2.287	4.110	.043	103.083
Constant	44.969	20.473	4.824	.028	3.4E+19

Event-History Analysis:

Rather than pre-specifying an exit event and creating a binary variable for exit, one can also look at the time to exit from a market and its relationship with the incumbent's response. This objective can be achieved with life-table analysis which can also handle right-censored data (i.e., cases where the entrant did not yet exit by the time of the last observation). In order to avoid misspecification of cut-off points, two categories of the incumbent's response (high and low) were compared against one

another (i.e., medium levels were excluded). This was done to ensure that cases of accommodation and predation were specified correctly.

The event-history model was significant ($p < 0.01$) which suggested that the time to exit for cases of accommodation and predation were different. Figure 7.1 also clearly indicates that the two strategies lead to different exit patterns. Therefore, the analysis provides support for Hypotheses 11.

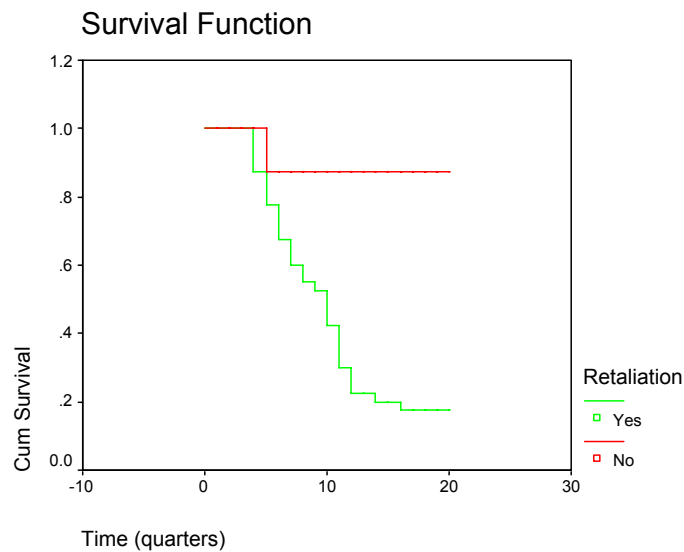


Figure 7.1: Graph for Survival Function

Similar analysis can also be conducted without creating a binary variable for the incumbent's response. In the following analysis, incumbent's response (Retaliation) and Strategic Assessment are included as continuous variables. Strategic Assessment and (the incumbent's) Retaliation are both significant in the expected directions with respect to the hazard rate for market exit. Distance and market size were not significant and were

excluded from the model (Appendix H includes the model with these variables).

Therefore, Hypotheses 11 and 12 are supported.

Table 7.9: Bivariate Correlations for Hypotheses 11 and 12

	Time in market	Retaliation	Str. Assessment
Time in market	1		
Retaliation	-.523	1	
Str. Assessment	.659	-.308	1

Table 7.10: Cox regression Results for Hypothesis 11 and 12

DV: Hazard	Beta	Std. Error	Wald	Sign.	Exp (Beta)
Retaliation	2.771	1.25	4.797	.029	15.979
Str. Asses.	-.440	.139	9.942	.002	.644

H13: *The inter-entrant's exit will result in loss to consumer welfare as measured by the increase in the incumbent's post-exit market power.*

Hypothesis 13 can be tested by comparing the post-exit market power of the incumbent to the levels of market power during inter-type competition. However, critics could argue that the increase is a given because the market power is measured by the HHI index (e.g., any exit from the market will increase post-exit market power). While I would counter-argue that the increase in the post exit market power from inter-type competition would be higher than intra-type competition, an alternative comparison of *post-exit market power to the pre-entry* levels was sought here. Exit cases in 1996, 1997, and 1998 in the previous sample were examined for this analysis. Average post-exit market power was calculated for the last year in the database, 1999 for all cases. Pre-entry market power was calculated and averaged for four quarters preceding entry. Paired sample t-test was employed to see if there is any increase between pre-entry and post-exit

market power of the incumbent. The results indicated that the pre-entry mean for market power (HHI) is 5414.6 while the mean for post-exit is 5751.5 (i.e., 337 HHI point increase). The paired t-test was significant ($p < 0.05$). Therefore, Hypotheses 13 is supported. This suggests that the incumbents enhance their market power to higher levels than even before inter-type entry occurs. This result is disturbing and has public policy implications.

To check that this is not a spurious effect, I tested the alternative hypothesis that the market power of incumbents in all markets have increased between 1994 and 1999. The same test was run for the randomly created no-entry sample for entry hypothesis (H_8). The paired t-test was not significant for this no-entry control sample ($p < 0.05$). Therefore, the increase in the incumbent's power could be attributed to the exit of the inter-type competitor.

These findings concluded the main part of the data analysis. A summary of the results is presented in Table 7.11.

Table 7.11: Summary of Results

Hypotheses	Main Methods	Results
<i>H1: Market power of the incumbent and the market price premium will be positively associated.</i>	MLR, Ordered Logit, HLM	Supported
<i>H2: The positive relationship between the market power of the incumbent and the market price premiums will be positively moderated by barriers to entry.</i>	MLR, Ordered Logit, HLM	Not supported
<i>H3: Barriers to entry and the market price premium will be positively associated.</i>	MLR, Ordered Logit, HLM	Supported
<i>H4: The positive moderating effect of firm specific barriers on the incumbent's pricing strategy will be higher than that of market specific barriers.</i>	MLR, Ordered Logit, HLM	Not supported
<i>H5: The positive effect of firm specific</i>	MLR, Ordered	Supported

Table 7.11 (continued)

<i>barriers on the incumbent's pricing strategy will be higher than that of market specific barriers.</i>	Logit, HLM, F-test	
<i>H6: The positive relationship between the market power of the incumbent and the market price premiums will be negatively moderated by the incumbent's strategic assessment (i.e., resources, strategic fit, market growth) of the potential entrants.</i>	MLR, Ordered Logit, HLM	Not supported
<i>H7: Incumbent's strategic assessment and the market price premium will be negatively associated.</i>	MLR, Ordered Logit, HLM	Supported
<i>H8: Incumbents' pre-entry market price premiums for markets with inter-category entry will be higher than those of markets without inter-category entry.</i>	Binary logit	Supported
<i>H9: Potential inter-category entrants' strategic assessment of the markets will be higher for the markets that they enter.</i>	Binary logit	Supported
<i>H10: The magnitude of the incumbent's response to inter-entry will be positively associated with its pre-entry pricing strategy.</i>	MLR	Supported
<i>H11: The likelihood of inter-category exit from a given market and the magnitude of the incumbent's competitive response will be positively associated.</i>	Binary logit, Event-History analysis	Supported
<i>H12: The likelihood of inter-category exit from a given market and the entrant's strategic assessment will be negatively associated.</i>	Binary logit, Event-History Analysis	Supported
<i>H13: The inter-entrant's exit will result in loss to consumer welfare as measured by the increase in the incumbent's post-exit market power.</i>	Paired t-tests	Supported
Overall Assessment: The framework was generally supported except for the hypothesized moderating effects were significant as main effects. Modified Framework is presented in Figure 7.2		

NETWORK PRICE COMPETITION FRAMEWORK

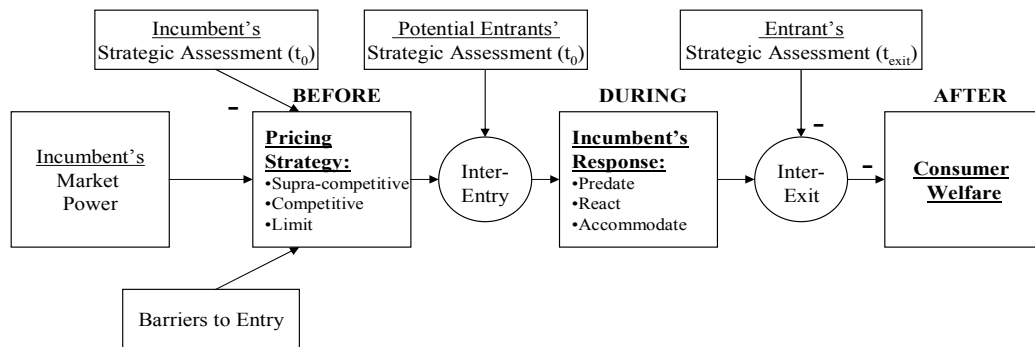


Figure 7.2: Modified Network Price Competition Framework

CHAPTER 8

CONTRIBUTIONS

The dissertation represents a theoretical and empirical advancement of the debate on the effectiveness of pricing strategy in market defense. I have developed a reputation for predation framework (Figure 2.3), a reaction to competitive price reduction framework (Figure 3.6), and a network price competition framework (Figure 7.2) among others, examined several key research questions and found empirical support for most of the hypotheses. Several methodologies such as multiple linear regression, binary and ordered logit models, multi-level mixed coefficient models, event-history analysis, ANOVA, and chi-square and t-tests were simultaneously utilized in the process. In accordance with the notion that marketers' job is to create differentiation (and decrease the correlation between cost and price), the notion of cost was de-emphasized during framework development. Thus, the dissertation represents contribution with a marketing perspective to an area which is pre-dominated by law and economics.

In Chapter 3, I discussed how marketing contributes to the analyses of the four stages of the current regulatory framework for evaluating predatory pricing. Next, I will summarize marketing's overall contributions through its research designs, data analysis methods, data sources, and key concepts.

The business and consumer-oriented research output of social sciences in general, and marketing in particular, should find its way into the courts' agendas in antitrust cases as they have done so on consumer protection issues. "Soft" research methods such as personal interviews, focus groups, questionnaires, and historical analyses are often overlooked by economists, yet promise great potential in understanding the strategic

paradigms that executives use in decision-making. For example, historical analyses can also be useful to assess the recoupment aspect (i.e., track stock/market share performance in cases with similar structure/barriers to entry), and to detect trends in managerial and jurisdiction practice. The marketing discipline is able in both positive and interpretative research via designing and conducting field experiments, quasi-experimental designs, focus groups, depth interviews, historical analyses, observation, scanner data analyses, and last but not certainly not least, descriptive surveys. Substantial and insightful differences between the models developed by economists and marketing researchers in estimating demand functions from scanner data have been noted (Scheffman 2002; Sullivan 2002).

Marketing also uses sophisticated data analysis methods such as structural equation modeling, multidimensional scaling, and is the home discipline of conjoint analysis. “In addition to the potential of expanded empirical methodologies, antitrust’s reliance on price data would benefit from marketing, because the source of these data is marketing. An understanding of price data from the perspective of those who generate and use them would yield further understanding of their nature and utility in antitrust” (Gundlach and Phillips 2002, p.252). The use of marketing research findings is now well accepted in both regulatory and legal proceedings. Potential applications of data collection and analysis methods and data sources typically utilized in marketing are provided in Table 8.1 along with the overall theoretical contributions that may be derived from key marketing concepts. The decision-making procedure in the courts today is used as a road-map. The dissertation also has managerial and public policy implications, which are discussed next.

Table 8.1: Overall contributions through Key Marketing Concepts, Methods, and Data Sources

	Market Segmentation	Price Competition	Buyer/ Managerial Decision-Making	Perceived Value/ Business Brand Equity	Relevant Marketing Research, Methods, and Data Sources
1. Is the defendant sacrificing current profits?	<ul style="list-style-type: none"> Segment level analysis can detect cross-subsidization and segment-based sacrifice 	<ul style="list-style-type: none"> Prices are signals that the incumbent can bluff with/manipulate due to information asymmetry Sacrifice cannot be calculated without considering the competitive response it attracts 	<ul style="list-style-type: none"> Managers often have multiple objectives other than profit maximization Managers are bounded in their rationality when faced with complex decision-making scenarios Strategic reference points determine “perceived” sacrifice involved 	<ul style="list-style-type: none"> Real sacrifice can be established through examining price minus customer perceived value of product/service 	<ul style="list-style-type: none"> Research designs/methods typically used by marketers would be helpful (e.g., consumer surveys/field experiments for relevant markets; expert surveys for strategic objective/orientation/signaling; interpretive research/quasi-experimental designs for rationality/risk tolerance)
2. Is recoupment probable?	<ul style="list-style-type: none"> Relevant markets are often based on multiple buyer defined segments (e.g., benefits sought, consumption patterns) Predation can be profitable even without immediate recoupment if it reinforces/establishes segment dominance 	<ul style="list-style-type: none"> Expected prices would change along with the stages of the product life cycle. This changes the recoupment calculations Distinguishing between temporary, evolving, and structural price changes lead to different recoupment calculations 	<ul style="list-style-type: none"> Probabilities (of recoupment) for gains are often exaggerated in decision-making 	<ul style="list-style-type: none"> The relative brand equity of the competitors should be considered for assessing market power 	<ul style="list-style-type: none"> Survey and historical research can delineate entry-deterrence (e.g., reputation effects) due to predatory reputation Variety of databases (e.g., PIMS) may be used to assess potential and actual recoupment

Table 8.1 (continued)

3. Are the business's relevant competitors affected?	<ul style="list-style-type: none"> Forced exit/reduced output issue needs to be examined at the market segment/ buyer perceived product line level 	<ul style="list-style-type: none"> Disciplining through predatory pricing can also force an entrant to raise prices 	<ul style="list-style-type: none"> Impact to competitors can also be perceptual 	<ul style="list-style-type: none"> If buyers do not perceive harm to competitive process, then assessing harm to rivals not relevant 	<ul style="list-style-type: none"> Sophisticated market models are available to assess impact
4. Will there be injury to business buyer and consumer welfare?	<ul style="list-style-type: none"> Continued service to all identified segments/niches should be a consideration in the courts 	<ul style="list-style-type: none"> Contracts can protect businesses from predatory pricing Consumers benefit from increased inter-type competition "Co-opetition" among businesses can also enhance consumer welfare 	<ul style="list-style-type: none"> Competitor oriented decision-making (e.g., me-tooism, and cost-cutting) can ultimately diminish welfare through decreasing customer orientation, customer satisfaction, innovation, and convenience 	<ul style="list-style-type: none"> Buyers' perception of welfare is a complex phenomenon. We need to go beyond efficiency and incorporate affordability, variety, customer satisfaction, convenience, price stability, innovation, and competition 	<ul style="list-style-type: none"> A variety of designs may be used to identify the levels of welfare on each of the sub-dimensions: (e.g., survey research for satisfaction, field experiments for variety, quasi-experimental designs for perceived value etc.) A variety of methods may be used to analyze the data (e.g., conjoint analysis for variety and innovation, structural equation modeling for satisfaction etc.) Scanner data is available to examine price predation in many retail contexts

8.1 Managerial Implications

The dissertation has implications from both the incumbent and the entrant's point of view:

1. The framework emphasizes the importance and uses of market power as a competitive advantage in network industries. The positive relationship between the rate of entry and fare premiums indicate that even though most discounters may enter those markets with the highest premiums, they might have the lowest chance of survival in the very same markets. A significant paradigm shift is implied for the entrants to consider competitively and limit priced markets as alternative potential entry targets. It was suggested that managers think of past and future competitive interactions, but they do not attempt to predict future actions of competitors (Montgomery et al. 2005). If managers of inter-type entrants start to undertake these predictions (keeping current antitrust enforcement in perspective), it is expected that they might opt to enter markets that are not supra-competitively priced more frequently in the future. After all, the seriousness of the threat to entry depends on the reaction from existing competitors that the entrant can expect; the prediction is "sharp retaliation from entrenched competitors" (Porter 1979, p.289). It is very important to anticipate how the actions of competitors will differ with differing conditions.
2. An important implication for the incumbents (and caveat for the policy-makers) is that predatory pricing can be a viable strategy to pursue under current legislation. Reputation effects and a strategy of predation may effectively deter new and potential entrants from entering strategic (supra-competitively priced) markets.

3. The findings reinforce the importance of firm specific barriers to entry as opposed to market specific barriers (i.e., capital requirements, regulation etc).¹⁷ Therefore, managers should exert effort to understand and build barriers to entry that will be specific for their firms. The list of barriers to entry in this category is quite extensive (i.e., alliances, product differentiation, brand equity, R&D spending, switching costs etc. (Karakaya 1989)). Managers will need guidance from academics in these endeavors.

Two Practical Implications for Marketing Managers:

1. Firms without market power need not worry when cutting price: The courts consider market power as a pre-requisite for predation. Demonstration of market power is sought through high market share. It was suggested that sixty percent or more represents conventional wisdom (1999c). Thus firms without market power may engage in excess capacity discounting or otherwise aggressive below cost pricing under current legislation. A company without market power does not meet the standards for proof of recoupment in a predatory pricing case. However, tying arrangements for sales can still be considered predatory regardless of market power (1992).

2. A Price can mean more than a number: Pricing can gain important implications through signaling. For example, a rival's altered belief about the cost structure may deter entry (Gundlach 1995). Therefore, marketers should consider potential implications when setting the price. There may be multiple objectives involved such as market penetration. Introductory low prices can be set to create excitement for a new product without

¹⁷ I do not mean to suggest that firm specific barriers are more important than market specific barriers under all circumstances. Market specific barriers would be expected to dominate entry conditions in heavily regulated industries (e.g., utilities, airlines in the 70's).

anticompetitive consequences. However, low prices can also be predatory if they are entry deterring. The aim in a price change may be simply to match competitors to stabilize prices in a market or appeal to retailers. Reduced prices can also increase the sales of complementary products. In such cases, suppliers may price below cost but still not be predatory if they intend to make money from complementary products (e.g., printer prices to compensated from ink cartridge sales) (Gundlach 1995). Thus, marketing managers need to consider their reaction to a competitor's price change carefully.

8.2 Public Policy Implications

Peteraf (1993) has observed differences between reactions to newly certified entrants and formerly regulated ones. Oster and Strong (2001) have also suggested that the responses of incumbents to low-cost entrants are different than their responses to major players. The responses in case of entry by a discounter were observed to be much stronger and vigorous. Many DOT reports also suggest that the lack of price competition (i.e., inter-type competition) is the root cause of hub premiums (as opposed to passenger mix, operational cost, and quality of service) (2001e).

Agglomeration theory and empirical observations in retailing suggests that intra-type and inter-type competitors should co-exist and prosper in the same markets (Ghosh 1986; cf. Miller et al. 1999). Inter-type agglomeration decreases the time and transportation costs for the buyers, enabling more expenditure (Ghosh 1986). Inter-type competition greatly influences the quality, price, and selection of products available to buyers. The theory of cluster development also posits benefits to businesses of all types when they are located in geographic proximity due to resulting productivity, innovation

and growth (Porter 2000). Thus, suppliers as well as buyers benefit from inter-category agglomeration (Ghosh 1986).

The following public policy implication stands out among others: policy-makers should pay particular attention to the options available to increase the number of inter-type competitors in network industries, and then to ensure that the competitive process is fair in these markets. New legislation should be undertaken if necessary. Increased inter-type competition also has the very desirable effect of diminishing the chances of strategic recoupment, and therefore minimizing predatory practices altogether (i.e., if inter-type competition already exists in the market, it is unlikely for the incumbent to predate against new inter-type entry). High market concentration has been associated with lower costs for firms in the industry (Dickson 1994). On the other hand, the analysis clearly indicates that market concentration leads to higher prices. This is an important dilemma that policy makers can resolve by ensuring the presence of discounters in key markets.

Network industries are more prone to limit and predatory pricing due to the interconnected and the winner take-all nature of the markets. It is important that network markets are under close monitoring by policy-makers.

The lower rate of long-term survival in supra-competitively priced markets fuels the suspicion that the current legislation is unable to detect acts of predatory pricing in network industries. The current Areeda-Turner (1975) AVC test is not applicable in network industries because marginal costs tend to be very low. The application of AVC criterion for detecting predation results in entry deterrence through reputation of predation and actual predation.

Entry deterrence results in diminished competition and lower consumer welfare in the long run. Public policy officials need to seriously look into this issue to protect the competitive process. Consumer welfare is a phenomenon that needs to be monitored by more than a short-run efficiency perspective.

In a global business economy with diminishing tariffs, industries become integrated across borders. It is important that the U.S. policy-makers monitor and learn from international developments to enhance domestic welfare, because all else being equal the more aggressive antitrust shall prevail in international law. Currently, the European Union is clearly the more aggressive party in its antitrust enforcement, Canada has already taken regulatory action in this direction (2000e), and more recently Australia is debating to do the same (e.g., Edwards 2002). Average variable cost tests have already been considered inadequate for certain industries such as telecommunications, and average avoidable cost tests are being used (1998b). European courts may consider above-cost price cuts abusive if coupled with substantial market power (*Compagnie Maritime Belge Transps. SA v. Commission* 1996; *Irish Sugar PLC v. Commission* 1999). Moreover, proof of recoupment is not required, hence a defendant may be found guilty even when it did not have a reasonable prospect of recouping losses incurred through predatory pricing (1994c). Arguably, these interpretations are bound to surface in the U.S. enforcement as well.

Marketing discipline can provide additional insights to perspectives offered by economists, lawyers and strategic management communities and help resolve the stagnant Chicago-Post-Chicago debate in antitrust.¹⁸

¹⁸ Typical witnesses in a senate subcommittee hearing on aviation include Professor Michael E. Levine (law), Professor Emeritus Alfred E. Kahn (political economy) and airline executives

8.3 Limitations and Future Research

As with all studies, the current research suffers from several drawbacks. The available data did not permit analysis at fine detail: the dependent variable was available on a quarterly basis and price data was the average yield. If possible, it would be useful to examine these issues with monthly data and especially at the business fare versus coach fare level. It should be noted that however, as a result of the data structure, the tests tended to be very conservative overall. If an incumbent predated against the entrant at the coach level and subsidized its losses with increases in business class fares, the data would not show this effect. The structural changes in the distribution of market segments (e.g., business vs. coach) should be investigated as this has important implications on revenue management and pricing policy. Different pricing strategies in different segments of the auto market (i.e., aggressive pricing for subcompact, cooperative pricing in the mid-size segment) have been identified (Sudhir 2001). Examination of the price elasticity of the different segments in the market would be helpful.

The data was dated from 1993 through 1999. It has been argued that when the environment is turbulent an approximate analysis of today's conditions is more useful

(2001i). It is our contention that the marketing discipline contains experts that would present highly relevant opinions and findings in senate and court hearings. In this respect, the Spring 2002 Research Workshop and Conference on Marketing, Competitive Conduct, and Antitrust Policy held by the *University of Notre Dame* was certainly a step in the right direction. This event was attended by "interested members of marketing's academic community, top antitrust scholars, and respected public policy officials and practitioners. A broad spectrum of research interests were represented, including those who study marketing strategy, competitive response/decision making, interfirm and marketing channel relationships, retailing, consumer behavior, and other topics related to competition. Various research methodologies were also represented, including mathematical modeling, survey research, experimentation, and interpretivist methods" (Gundlach 2002, p.224).

than an exact analysis of conditions a decade ago (Evans and Schmalensee 2001). While one could argue that the main premises of competition do not change, it is also true that the airline industry has experienced very turbulent times especially after September 11, 2001. It would be useful to examine these issues with recent data.

The competitive interaction in network industries resembles card games with imperfect information. Incumbents with high market power may have incentives to act like a table bully with deep pockets. Signaling commitment for future raises is often sufficient for winning with inferior hands (so long as the competitors do not really have a strong hand i.e., a radical innovation). Therefore, while this research was able to demonstrate the existence and effectiveness of the basic defense strategies and provide empirical support for the Post-Chicago School of thought, from another perspective it has just scratched the surface. Game theory can be used to extract more advanced recommendations for the decision-makers in future work. It was recently shown that dynamic game-theoretic models may be used to predict specific actions, and that they may outperform reaction functions and static models (Ailawadi et al. 2005).

Similarly, strategic entry deterrence is an important phenomenon that should be examined in future research. “The idea behind “strategic entry deterrence” is that a monopolist who pursues predatory pricing with sufficient zeal and frequency will earn a reputation formidable enough to scare off all potential entrants indefinitely. The firm can then charge monopolistic prices long enough to recoup its investment in predation” (1995a, p.1202).

The current research consciously omitted issues related to cost in the empirical side of the investigation but fell short of developing a new non-cost based predation test.

Future research should consider alternative cost tests, non-cost based tests or combinatory tests not only for predatory pricing but also for the overall predation construct. “A determination that an airline’s competitive response is or is not an unfair method of competition should not necessarily depend on a cost standard”(2001g, p.60).

Predation is not limited to price. The role of other variables in the marketing mix in predation should also be inquired in future studies (Robertson and Gatignon 1991). It would also be useful to inquire the domain dimension (retaliation in other markets) (Kuester et al. 1999) as this aspect of competition remains understudied and it appears that this dimension is often employed against entrants with shallow purses.

The framework was tested in one network industry --the airlines, therefore the generalizability of the results to other networks is questionable. However, as mentioned previously, the statistical tests were rather conservative. For example, the ability of airlines to alter their price within minutes and capacity within days could undermine the role of price as a credible signal for market potential. Yet, the results indicated that limit pricing leads to lower entries than supra-competitive pricing. I would expect these results to hold even more in industries where it is not easy to respond to competitive actions so readily. Still, it would be useful to test the model in other industries. For example, competitive local exchange carriers (CLECs) in the telecommunications industry, major drug manufacturers with expiring patents in the pharmaceutical industry, and electric utility firms can form interesting extension contexts for future inquiry.

Due to the labor required in setting up databases, the sample sizes were smaller for the entry and subsequently exit analysis. Pending funding, it would be useful to undertake these analyses within a research program and achieve larger sample sizes.

One reason for the lack of marketing research on the role of pricing strategy in market defense may be the interest in being practical. Burns (1986) had emphasized the need for empirical research on predatory pricing. After almost two decades, data remains hard to find and empirical work on the topic from any discipline is still not numerous. Historical data analysis from outside the grocery chain (scanner data) paradigm would advance our understanding of the price variable (Malhotra et al. 1999). Emerging methods for process model testing (e.g., Burton 2002) may have promising applications in competitive interaction contexts. The identified research issues/perspectives are presented in Table 8.2. There are a number of methodology issues to consider and a need for an empirical research perspective on the topic. These represent fertile areas for future research.

Table 8.2: Issues/Research Perspectives on the Use of Pricing Strategy in Market Defense

	Conceptual	Methodological/Empirical
Managerial	<ul style="list-style-type: none"> • What is the best pathway of conduct for effective aggressive/predatory pricing? • How can a business without deep pockets best defend itself against predatory pricing? <p>Can we develop extensive Reaction Frameworks for:</p> <ul style="list-style-type: none"> • Signaling? • Non-price predation? • Overall marketing mix? 	<p><u>Need cases and empirical demonstration on how to:</u></p> <ul style="list-style-type: none"> • Identify managerial objectives • Thwart predation with business brand equity • Employ non-price predation • Deter entry by managing reputation • Deter entry by price • Prevent/minimize lawsuits and legal losses • Examine the role of contractual agreements/CRM as a defense against predatory pricing • Evaluate behavioral aspects of predatory decision-making
Public Policy/ Societal Marketing	<ul style="list-style-type: none"> • (How) can we develop (a relatively) objective and reliable non-cost based test? • What is “below-cost”? • (When) will the strategic perspective take over? How can the process be accelerated? • How can we best distinguish between protecting the competition <i>versus</i> the competitive process? • How do we identify and prioritize industries that need specific legislation? • Should predatory pricing be treated as a global or domestic issue? • What is the interplay between ethics and predation? • What is the most effective means to increase consumer awareness of the long-term impact of predation? • What is the role of non-profit organizations in predatory pricing? 	<ul style="list-style-type: none"> • (How) can we develop a practical and comprehensive measure of consumer welfare? • How can we best measure reputation effects, varying perceptions of signaling, strategic recoupment, multi-product environment, opportunity costs, relevant markets, barriers to entry, and psychology of predation? • What are the consumer attitude/perceptions regarding predatory pricing and related constructs? • How does yield management enhance/deter welfare? • What is net effect of price instability on welfare?
Legal	<ul style="list-style-type: none"> • How can the current law be made enforceable in network industries? international cases? • (How) should we incorporate international cases/legislation? • How can the inconsistencies between the Federal and State level can be resolved? • Do historical cycles/swings in enforcement help us predict the next wave? 	<ul style="list-style-type: none"> • What are some applications of simulations, event-history analysis, focus group interviews, neural networks/genetic algorithms, game theory, and behavioral studies relevant for predatory pricing? • How can Post-Chicago antitrust be best lobbied among litigators/law circles/clients?

8.4 Conclusion

Empirical research on pre-entry and post-entry market defense has been lacking. The evidence on the use of limit pricing and predatory pricing has been inconclusive despite the theoretical basis for these actions. Both actions have direct implications for entry and defense conduct. Furthermore, our knowledge on the strength of firm specific versus market specific barriers was also a debate item.

This research presented empirical evidence that both limit pricing and predatory pricing are effective, and do take place in network markets. The role that price plays in pre-entry and post-entry market defense was examined in detail from a theoretical basis and empirically demonstrated.

There is an increasing gap from the insights from modern economic policy (i.e., Post-Chicago) and the enforcement of current judicial policy (i.e., Chicago). There is a need to go beyond the Chicago School of thought, adopt a strategic framework espoused by the Post-Chicago School, and update the current enforcement policy to adapt to the realities of the new economy. Marketing syntheses would provide a fresh perspective, which may eventually reveal an alternative policy that overcomes the drawbacks of the current enforcement.

Marketing researchers have not engaged in public policy implications of pricing until recently, and a focus on this issue is long overdue (Grewal and Compeau 1999). Guiltinan and Gundlach (1996) noted that marketing is uniquely positioned to help form public policy guidelines with sophisticated measurement and modeling procedures. Marketing can provide insights for realistic and practical derivation of the relevant

markets, opportunity costs, non-cost based tests, and analysis of strategic/competitive interactions, and impact of predation on consumer welfare.

How long it will take for the Post-Chicago foundation (that is generally aligned with those from marketing) to reshape the legal superstructure is as yet unknown.

Undoubtedly, marketing insights can speed up the process. It is my hope that the results, insights and the frameworks stemming from this work will attract the thinking of scholars and policy-makers towards this purpose.

APPENDIX A

Survey of State Law regarding Predatory Pricing

Table A1: Predatory Pricing Survey

<i>State</i>	<i>Predatory Pricing Statute</i>
Alabama	Gasoline Specific Below-cost Law.
Arkansas	Sustained Below ATC is prohibited. <i>Wal-Mart Stores, Inc. v. American Drugs, Inc.</i> [1995-1] Trade Cas. (CCH) ¶ 70,853 (Ark. S. Ct.)
California	Below ATC is presumptive evidence of intent. <i>Pan Asia Venture Capital Corp. v. Hearst Corp.</i> , 88 Cal. Rptr. 2d 118, 123-24 (1 st Dist. 1999).
Colorado	Below ATC with intent is prohibited. Gasoline Specific Below-cost Law.
Connecticut	General monopolization statute. Below AVC is prohibited. <i>Westport Taxi Serv., Inc. v. Westport Transit Dist.</i> , 664 A.2d 719, 729-30 (Conn. 1995).
Florida	Gasoline Specific Below-cost Law.
Georgia	Below Cost Act. Messy language --No definition of manufacturer's cost. Emphasis on Federal courts and Robinson-Patman Act
Hawaii	Based on California Unfair Practices Act. <i>Island Tobacco Co. v. R.J. Reynolds Tobacco Co.</i> , 627 P.2d 260 (Haw. 1981), overturned on other grounds, <i>Robert's Hawaii Sch. Bus, Inc. v. Laupahoehoe Transp. Co., Inc.</i> , 982 P.2d 853 (Haw. 1999).
Idaho	Yes.
Kentucky	Below ATC is illegal with intent. <i>Remote Services, Inc. V. FDR Corp.</i> , 764 S.W.2d 80 (Ky 1989).
Louisiana	Prohibits below cost sales.
Maine	The Unfair Sales Act. Below cost with intent is prohibited. Cost is not defined.
Maryland	Maryland Sales Below Cost Act. Prohibits intent to destroy competition. Below cost is not defined.
Massachusetts	Prohibits intent to destroy competition. Below cost is not defined. Gasoline Specific Below-cost Law.
Minnesota	Similar to Massachusetts statute, except that there is a Minnesota Attorney General's opinion that the Act does not apply to manufacturers.
Missouri	Gasoline Specific Below-cost Law.
Montana	Prohibits below cost sales at retail and wholesale.
Nebraska	Yes.
New Jersey	Gasoline Specific Below-cost Law.
North Carolina	Yes. Also Gasoline Specific Below-cost Law.
North Dakota	Prohibits below cost sales at retail and wholesale.
Oklahoma	Almost identical to the Massachusetts statute
Pennsylvania	Very similar to the Massachusetts Act.
Rhode Island	Below cost prohibited

Table A1 (continued)

South Carolina	Below cost with intent is prohibited. Cost not defined.
Tennessee	Almost identical to the Massachusetts statute. Also Gasoline Specific Below-cost Law.
Texas	Prices below AVC, or below short run profit maximizing price <i>and</i> ATC if entry barriers are high, are illegal. <i>Caller-Times Publishing Co., Inc. v. Triad Communications, Inc.</i> , 826 S.W.2d 576 (Tex. 1992).
Utah	Yes. Also Gasoline Specific Below-cost Law.
Washington	Consumer Protection Act was defined as consistent with the Robinson-Patman Act. <i>Seattle Rendering Works, Inc. v. Darling-Delaware Co., Inc.</i> , 701 P.2d 502, 505-06 (Wash. 1985) Specifically, the court held that prices below AVC violate the Act.
West Virginia	Below cost sales are prohibited.
Wisconsin	Yes.
Wyoming	Yes.

Note: 1. The data are gathered from Calvani (1999), and McCareins (1996) for illustration purposes. An independent survey was not undertaken.

2. Most State statutes include exceptions for matching price.

APPENDIX B

Comparison of HHI and Proposed MP Index

It has been suggested that simple market share and concentration ratios is not sufficient to draw valid conclusions regarding market power (Alpert 1984). It was argued that misleading calculations would result in many industries (e.g., soft drink, beer, airlines) when solely concentration ratios are used for analysis (Alpert 1984), yet many contemporary studies continue to use market share or market concentration for this task. Market characteristics (e.g., segmentation, product and price differentiation, growth strategy) and barriers to entry would ideally need to be considered for viable results which can be an overwhelming task. The unique relationship between incumbent's market share and overall market concentration is such that while both market share and market concentration are positively correlated with market power and each other; for any given market share, the lower the market concentration the higher would be the market power. That is, an incumbent with 50% market share will have relatively more market power in a market where all other competitors have 10% share than if the market was more concentrated (say with two more firms with 25% share each). This phenomenon is inquired further in here.

The HHI index is more comprehensive than market share per se but it is still an incomplete measure. It does not consider the fact that market power is firm specific and is relative to the other competitors in a given market (in accordance with relative power theory (Kumar et al. 1998)). The alternative measure under investigation is:

$$MarketPower_i = \frac{(MarketShare)_i^2}{\sum_{k=1}^n (MarketShare)_k^2}$$

where i represents the airline in question, and n represents the number of airlines in a given market. The denominator is simply the HHI for the market in question. This new index is better grounded in theory than HHI (see theoretical discussion on market power) and serves as a more appropriate measure of market power. For example, when there are two firms in a market with 50% market share, the market is heavily concentrated with an HHI index of 5000. However, it is misleading to use the HHI as a proxy for the firm's market power. If the same market had three firms (incumbent 50%, two competitors each 25%) then the HHI index would go down considerably to 3750 whereas in reality the relative market power of the incumbent would go up significantly (67% versus 50% according to the proposed index). Several figures that present a comparison between the simple HHI and this new augmented index are provided below. Unfortunately, this new measure proved inferior to the HHI index when regressed against yield. Therefore, HHI index was used the measure of market power in tradition with prior research.

When the MP index did not reveal better results than market share or HHI despite theoretical expectations (HHI performed better), the following inquiry was performed: All markets from Minneapolis for the fourth quarter of 1999 were examined. Northwest Airlines was the presumed incumbent for these markets. There were a total 381 markets. Six markets that did not have yield measures (due to insignificant volume) were excluded. Market power measures were correlated with the average yield in the markets. Initial results showed that (*ceteris paribus*) market share had the highest bivariate

correlation (.42), MP index performed second (.34), and HHI correlated worst (.29) against average yield (AVyield).

Also please note that market share and Market Power performed much better against the Average Yield of the incumbent, Northwest Airlines (NWY). However, HHI was not significant due to several markets where NW does not serve (NWY would be zero for all these markets) or may not be the incumbent.

Table B1: Bivariate Correlations with Full Sample

		Correlations				
		AVYIELD	NWY	MP	HHI	MS
AVYIELD	Pearson Correlation	1	.836**	.340**	.293**	.415**
	Sig. (2-tailed)	.	.000	.000	.000	.000
	N	375	375	375	375	375
NWY	Pearson Correlation	.836**	1	.669**	.001	.727**
	Sig. (2-tailed)	.000	.	.000	.980	.000
	N	375	375	375	375	375
MP	Pearson Correlation	.340**	.669**	1	-.137**	.977**
	Sig. (2-tailed)	.000	.000	.	.007	.000
	N	375	375	381	381	381
HHI	Pearson Correlation	.293**	.001	-.137**	1	-.040
	Sig. (2-tailed)	.000	.980	.007	.	.440
	N	375	375	381	381	381
MS	Pearson Correlation	.415**	.727**	.977**	-.040	1
	Sig. (2-tailed)	.000	.000	.000	.440	.
	N	375	375	381	381	381

** . Correlation is significant at the 0.01 level (2-tailed).

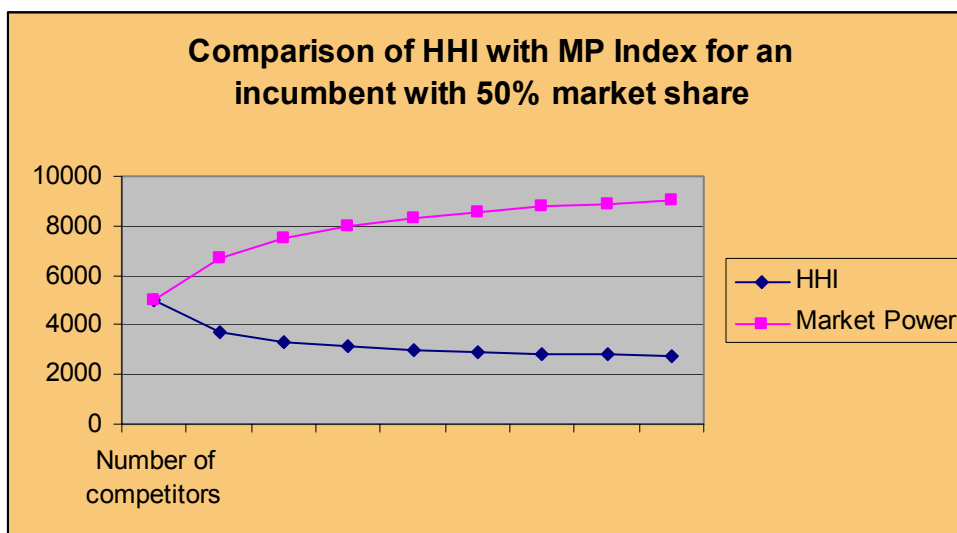
To resolve this problem, the markets where Northwest was not the incumbent (e.g., from Minneapolis to other hubs) or did not serve were removed. Therefore, the remaining markets were those that Northwest had the highest market share. This would be the better way of examining this relationship.

Table B2: Bivariate Correlations with Final Sample

		Correlations				
		AVYIELD	NWY	MP	HHI	MS
AVYIELD	Pearson Correlation	1	.994**	.326**	.518**	.486**
	Sig. (2-tailed)	.	.000	.000	.000	.000
	N	187	187	187	187	187
NWY	Pearson Correlation	.994**	1	.328**	.497**	.477**
	Sig. (2-tailed)	.000	.	.000	.000	.000
	N	187	187	187	187	187
MP	Pearson Correlation	.326**	.328**	1	.681**	.890**
	Sig. (2-tailed)	.000	.000	.	.000	.000
	N	187	187	190	190	190
HHI	Pearson Correlation	.518**	.497**	.681**	1	.920**
	Sig. (2-tailed)	.000	.000	.000	.	.000
	N	187	187	190	190	190
MS	Pearson Correlation	.486**	.477**	.890**	.920**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.
	N	187	187	190	190	190

** . Correlation is significant at the 0.01 level (2-tailed).

This time HHI correlates higher than both market share (second) and market power (third) against both AvYield and NWY. Therefore, HHI was used throughout the analyses to measure the market power construct. The relationship between the proposed (but not used) market power index and the HHI index is illustrated below.

**Figure B1: Comparison Graph 1**

Assumptions: Incumbent's market share is fixed at 50%. All other competitors have equal market share.

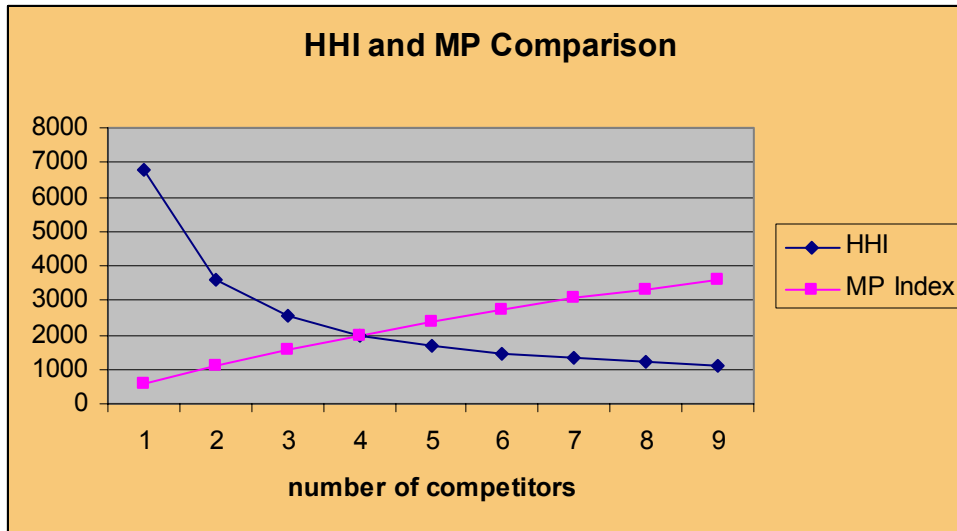


Figure B2: Comparison Graph 2

Assumptions for comparison basis: Incumbent's market share is fixed at 20%. All other competitors have equal market share (except when only one remaining, 80%).

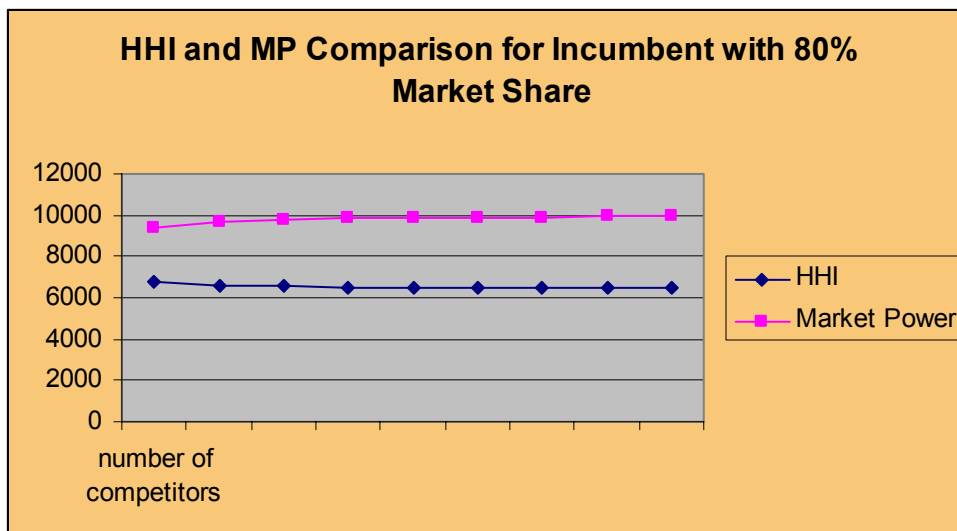


Figure B3: Comparison Graph 3

Assumptions for comparison basis: Incumbent's market share is fixed at 80%. All competitors have equal market share (except when only one remaining, 20%).

APPENDIX C

U.S. Regional and Major Airline Hubs

Hub	Dominant Carrier
Anchorage	Alaska Airlines
Atlanta	Delta
Boston	Delta
Baltimore	U.S. Air
Charlotte	U.S. Air
Chicago	American, United
Cincinnati	Delta
Cleveland	Continental
Columbus	America West
Dallas/Fort Worth	American
Denver	United
Detroit	Northwest
Fort Lauderdale	Delta
Honolulu	Hawaiian
Houston	Continental
Indianapolis	U.S. Air
Las Vegas	America West
Los Angeles	Delta
Memphis	Northwest
Miami	American
Minneapolis/St. Paul	Northwest
New York	Continental, TWA (merged with American)
Orlando	Delta
Philadelphia	U.S. Air
Phoenix	America West
Pittsburgh	U.S. Air
Portland	Alaska Airlines
Raleigh/Durham	American
St. Louis	Delta
Salt Lake City	Delta
San Diego	Southwest
San Francisco	United
San Jose	American
Seattle	Alaska Airlines
Tampa	Delta
Washington D.C.	United

Sources: Smith and Golden (2002); DOT reports (1999a; 1999d; 2001d; 2001e; 2001g); (Hecker 2001)

APPENDIX D

Gate Usage at Large Hubs 1998 Gate Usage Practices of Individual Large Hub¹ Airports²

<u>Airport</u>	<u>Rank³</u>	<u>1998 Exclusive- use gates</u>	<u>1998 Shared- use gates</u>	<u>1998 Airport- controlled gates</u>	<u>1998 total gates</u>	<u>Summary characterization</u>
ATL Atlanta	1	125	0	46	171	Mixed
BOS Boston	17	26	49	18	93	Mixed
BWI Baltimore- Washington	28	0	66	9	75	Mixed
CVG Covington, KY/ Cincinnati, OH	25	67	53	0	120	Mixed
DCA Washington, DC Reagan National	26	0	44	0	44	All shared-use
DFW Dallas-Fort Worth	4	112	0	8	120	Mixed
DTW Detroit	9	56	26	6	88	Mixed
EWB Newark	8	79	15	0	94	Mixed
IAH Houston	15	75	0	14	89	Mixed
JFK New York	10	99	14	0	113	Mixed
LAS Las Vegas	12	16	38	39	93	Mixed
LAX Los Angeles	3	12	96	38	146	Mixed
LGA New York LaGuardia	21	60	5	7	72	Mixed
MCO Orlando	16	57	16	6	79	Mixed
MIA Miami	7	0	0	121	121	All apt-controlled
ORD Chicago O'Hare	2	149	26	0	175	Mixed
PHX Phoenix	11	0	0	84	84	All apt-controlled
PIT Pittsburgh	23	89	1	10	100	Mixed
SAN San Diego	27	42	3	0	45	Mixed
SEA Seattle	18	0	49	27	76	Mixed
SFO San Francisco	5	72	0	3	75	Mixed
SLC Salt Lake City	24	49	20	3	72	Mixed
STL St. Louis	14	12	72	0	84	Mixed
TPA Tampa	29	18	23	19	60	Mixed
Large hub totals ⁴		787	453	172	1,412	
Percentages		55.7%	32.1%	12.2%	100.0%	

¹ The hub status of all airports in these tables is determined according to criteria applicable to 1998.

² Source: 1998 ACI-NA survey, except as noted.

³ Source: FAA Report VP, "Primary Airport Enplanement Activity Summary for CY1997".

⁴ These subtotals have been computed without the data for the nine large hub airports -- DFW, DTW, JFK, LAX, MIA, PHX, PIT, SAN, and TPA -- that did not respond uniformly to the ACI survey question about distribution of gates by lease type for 1992, 1998, and 2004 (planned).

Source: (1999a)

APPENDIX E

Transformations and Other Analyses

Raw data descriptive Statistics

	N	Mean	Std. Deviation	Skewness	Kurtosis
Inc.Yield	3971	21.5896	18.1793	2.933	11.158
MarketSize	3971	1173.0098	2613.337	6.485	59.533
Distance(100s)	3971	11.9084	8.17667	1.473	3.475
MarketPower	3971	4921.7283	2349.226	.756	-.434
Resource	3971	10357.71	13947.63	.988	-.659
Str.Fit	3971	15.2753	25.1554	1.896	2.728
MarketGrowth	3971	.1138	.62225	15.059	319.622
MarBarriers	3971	1.64477	1.23204	.988	.819
FirmBarriers	3971	1.9071	1.22286	-.138	-.935

Diagnostic checks suggested that several of the variables should be transformed before further analysis are performed. This is expected for indicators of Strategic Assessment (i.e., resource, fit, and market growth) variables which were to be converted into a composite variable. Figure E1 below shows that the dependent variable violates the normality assumption. Following Figures show that the same variable satisfies the condition for normality after the transformation $y^* = -\frac{1}{\sqrt{y}}$ (Cohen and Cohen 1983).

Raw yields

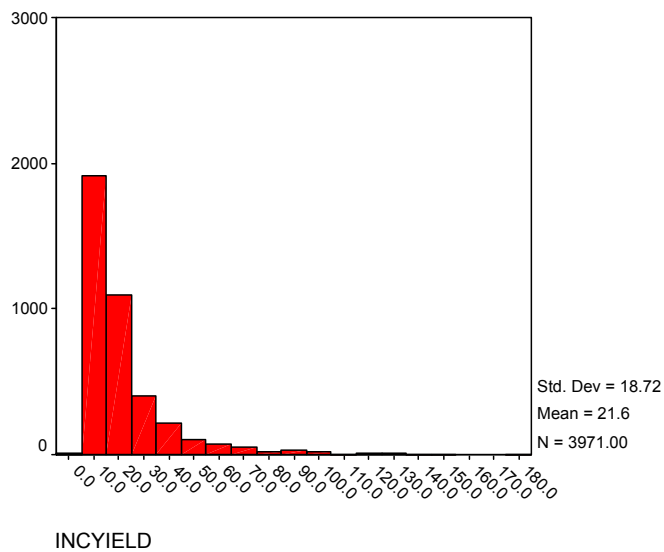


Figure E1: Histogram for Raw Yield Data

standard log (ln) transformation produced much better results...

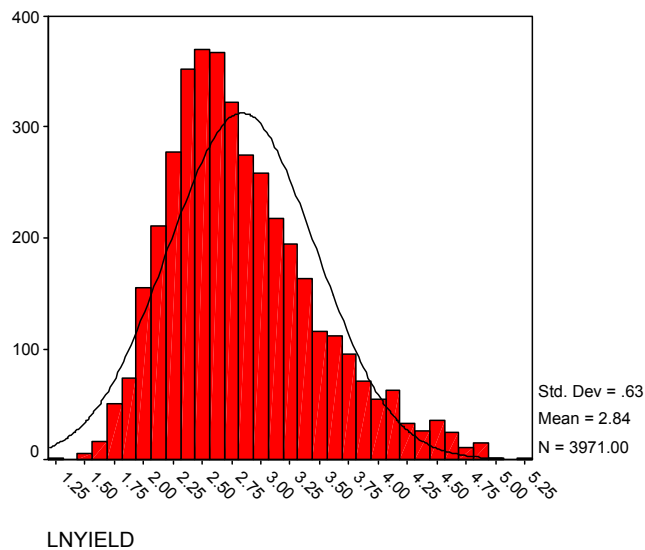


Figure E2: Histogram after Ln Transformation on Yield

Log 10 transformation produces smaller deviation and comparable results

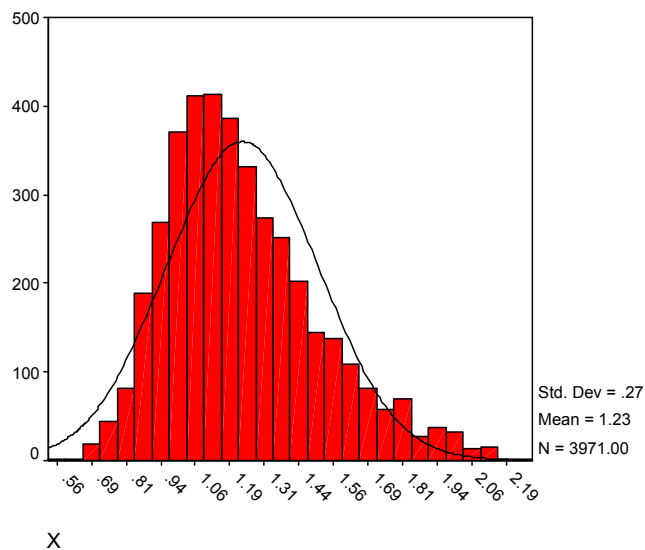
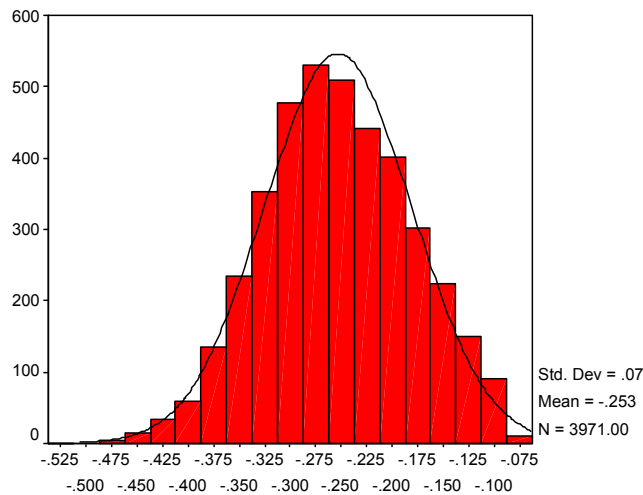


Figure E3: Histogram after Log10 Transformation on Yield

However best results are obtained with $y^* = -\frac{1}{\sqrt{y}}$ (minus sign ensures that the direction for interpretation does not change).



X2

Figure E4: Histogram after final transformation

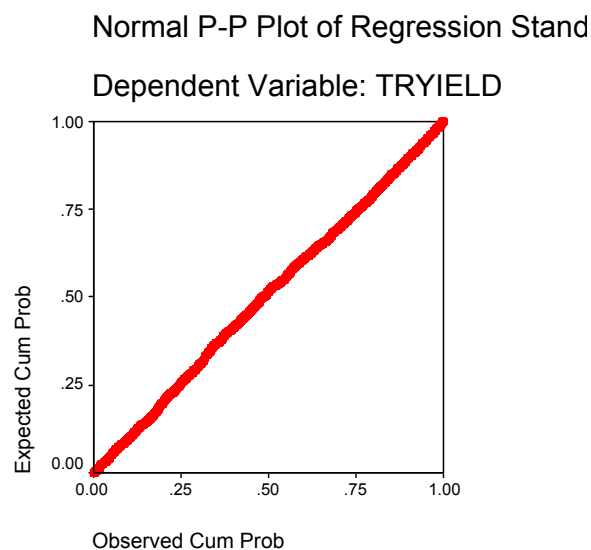


Figure E5: Normal Probability Plot for Yield

Similar diagnostic checks are undertaken for the other variables. Natural log transformations were performed on Distance and Market size. Other variables (total fit,

aggregate resources, market growth were collapsed into categorical variables and summed to form the variable Strategic Assessment. The variables were then centered. The resulting correlation matrix between the variables is presented below:

Table E2: Correlation Table

	Yield	MP	FB	MB	FB	SA	SAxMP	FBxMP	MS	D
Yield	1									
MarketPower(MP)	.46	1								
FirmBarriers(FB)	.006	-.22	1							
MarBarriers(MB)	.121	.02	.19	1						
Str.Asessment(SA)	-.33	-.24	-.19	.00	1					
SAxMP	.09	-.02	.01	-.05	-.28	1				
FBxMP	.04	.09	-.34	-.01	.01	-.21	1			
MBxMP	-.04	-.02	-.02	-.38	-.05	-.03	.17	1		
MarketSize(MS)	.04	-.01	.00	.41	.25	-.05	-.02	-.30	1	
Distance (D)	-.79	-.49	.26	-.02	.07	-.03	-.11	.03	-.15	1

Note: Significant correlations are bold.

Please note that the highest correlation between the incumbent's yield is with market power (0.46). In order to inquire the generalizability of the findings further, the correlations between market power and average market yields for the top 1000 markets with incumbents were obtained for twelve quarters (1997-1999). The bivariate correlations over time were very consistent (minimum was 0.46, maximum was 0.48 and the average correlation was 0.47). Therefore, I conclude that the results are robust and the model is applicable for this context.

Hypothesis 5:

Following the procedure by Neter et al. (1996), The model was run with full sample first.

MLR Results

R	R2	AdjR2	Std. Error	F
.858	.736	.736	.03478	1659.38

Table E3: MLR Model results with full sample

DV: Incumbent's Yield	Beta	t
Constant		43.368
Distance	-.805	-78.599
MarketSize	-.066	-6.568
MarketPower	.044	4.279
FirmBarriers	.167	17.548
MarketBarriers	.097	10.029
StrategicAssessment	-.209	-21.982

Note: All coefficients significant for $p < 0.001$

and then the reduced model:

Reduced Model

R	R²	AdjR²	Std. Error	F
.857	.734	.734	.03488	1974.61

Table E6: Reduced MLR Model Results

DV: Incumbent's Yield	Beta	t
Constant		42.974
Distance	-.800	-78.248
MarketSize	-.079	-8.142
MarketPower	.037	3.573
StrategicAssessment	-.215	-22.692
BarrierstoEntry	.205	21.703

Note: All coefficients significant for $p < 0.001$

F^* is $1974.610 - 1659.843 = 314.767$

$314.77 \gg F_{\alpha/2(1, n-7)}$ Thus, we reject equal betas and conclude that the coefficient for firm specific barriers are higher.

Double cross-sample validation results revealed correlations of 0.82 and 0.84 between the dependent variable and the predicted dependent variable for the calibration and hold out sample. These compare well with the R-value of 0.83 for the total sample (Mosier 1951). Accordingly, the R-square values for \hat{y} (i.e., total variation explained by the models) are very similar for both samples.

APPENDIX F

HLM Analysis Supplements HLM Empty Model

The descriptive statistics for the full raw sample were as follows:

LEVEL-1 DESCRIPTIVE STATISTICS

VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
MSIZE	2024	720.34	1537.74	1.00	28284.00
INCYIELD	2024	23.53	20.07	4.87	136.97
MGROWTHCent.	2024	-0.01	0.54	-0.79	12.40
MPOWER	2024	5225.62	2423.55	1499.13	10000.00
DIST	2024	11.21	7.68	0.38	51.94
FIRMBAR	2024	1.97	1.15	0.00	6.00
FIRMBARX	2024	9444.54	6605.39	0.00	35136.21

LEVEL-2 DESCRIPTIVE STATISTICS

VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
HPREM	36	14.41	3.90	7.62	24.04
HRESOURC	36	34418.36	15063.66	9911.00	53709.00
HBARR	36	1.47	0.84	1.00	4.00

The empty model results were as follows:

Summary of the model specified (in equation format)

Level-1 Model

$$Y = B0 + R$$

Level-2 Model

$$B0 = G00 + U0$$

Random level-1 coefficient	Reliability estimate
INTRCPT1, B0	0.936

The value of the likelihood function at iteration 3 = 3.370939E+003

The outcome variable is TRYIELD

Final estimation of fixed effects:

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	-0.251107	0.006325	-39.699	35	0.000

The outcome variable is TRYIELD

Final estimation of fixed effects
(with robust standard errors)

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	-0.251107	0.006237	-40.260	35	0.000

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1, U0		0.03672	0.00135	35	802.33494	0.000
level-1, R		0.06521	0.00425			

ICC is calculated as $(.00135+.00425)/0.00425 = 24\%$

Variance Components for the two split samples:

Split Sample 1

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1, U0		0.18034	0.03252	32	214.87036	0.000
level-1, R		0.36005	0.12963			

Split Sample 2

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1, U0		0.15097	0.02279	32	187.38061	0.000
level-1, R		0.34439	0.11861			

APPENDIX G

Logit Analysis Statistics

Correlations for the variables for Hypotheses tests for 8-9

	Entry	Distance	Market Size	Str.Assessment	PricingStrategy
Entry	1				
Distance	-.45	1			
Market Size	.54	-.18	1		
Str.Assessment	.11	.30	.27	1	
PricingStrategy	.43	-.73	.15	-.31	1

Note: Significant correlations (p<0.05) are bold

The model was run with dummy variables to denote quarters and PSxSA interaction but these were not significant:

Table G1: Results with Dummy Variables

DP: Entry	Beta	Std. Error	Wald	Significance	Exp (Beta)
Distance	-1.78	.596	8.952	.01	.168
Market Size	1.155	.229	25.356	.001	3.173
DummyQ1	-1.169	.682	2.937	.09	.311
DummyQ2	-.354	.705	.253	.62	.702
DummyQ3	.057	.740	.006	.94	1.059
Str. Asses.	.400	.156	6.588	.01	1.492
PricingStrategy	1.735	.654	8.2	.01	5.669
PSXSA	-.473	.268	3.104	n.s.	.623
Constant	4.755	4.104	1.342	n.s.	116.144

Retaliation Hypothesis 10:

Correlation matrix for H10

	Retaliation	Epricecut	EYield	PS	MS	D
Retaliation	1					
Entrantpricecut	.30	1				
EntrantYield	.07	.073	1			
PricingStrategy	.32	.76	.60	1		
MarketSize	-.38	-.15	-.18	-.16	1	
Distance	-.23	-.64	-.68	-.84	.26	1

Note: Significant correlations (p<0.05) are bold

Due to high correlations between independent variables several runs were undertaken rotating the variables to ensure that the observed effects are robust. The results verify that the most influential variable in predicting the retaliation of the incumbent is its pre-entry pricing strategy

Alternative Model 1

DV: Retaliation	Beta	t-statistic
Constant		4.392
MarketSize	-.332	-3.193
PricingStrategy	.266	2.557

Note: All variables significant for $p < 0.02$

Alternative Model 2

DV: Retaliation	Beta	t
Constant		4.392
Distance	.507	2.862
MarketSize	-.400	-4.059
PricingStrategy	.758	4.362

Note: All variables (except the constant) significant at $p < 0.01$

Alternative Model 3

DV: Retaliation	Beta	t
Constant		-1.344
Distance	.502	2.586
MarketSize	-.399	-4.032
Entrant's Yield	-.010	-.076 (n.s.)
PricingStrategy	.759	4.324

Note: All variables (except the constant and entrant's yield) significant at $p < 0.02$

Alternative Model 4

DV: Retaliation	Beta	t
Constant		1.031
Distance	.027	.198
MarketSize	-.367	-3.410
PriceCut	.255	1.894

Note: Only market size significant at $p < 0.05$

Alternative Model 5

DV: Retaliation	Beta	t
Constant		1.832
Distance	-.113	-.767
MarketSize	-.360	-3.271
Entrant's Yield	.036	.246

Note: Only market size significant at $p < 0.05$

APPENDIX H

Event-History Analysis Supplements

Exit Hypothesis 11-12:

The Correlation matrix for the variables in the binary logit model was as follows:

Correlation Matrix for H11-12

	Exit	Distance	MarketSize	Str.Asessment	Retaliation
Exit	1				
Distance	-.10	1			
Market Size	-.52	.02	1		
Str.Asessment	-.52	.19	.29	1	
Retaliation	.49	-.17	-.40	-.20	1

Note: Significant correlations ($p < 0.01$) are bold

Life table analysis

Comparison of survival experience using the Wilcoxon (Gehan) statistic

Survival Variable TIME
grouped by EXIT Quarters

Overall comparison statistic 8.285 D.F. 1 Prob. .0040

Group	label	Total N	Uncen	Cen	Pct Cen	Mean Score
0	No	8	1	7	87.50	25.6250
1	Yes	40	33	7	17.50	-5.1250

Intrvl Start Time	Number Entrng this Intrvl	Number Wdrawn During Intrvl	Number Exposd to Risk	Number of Termnl Events	Propn Termin- ating	Propn Surv- viving	Cumul Propn Surv at End	Proba- bility Densy	Hazard Rate
.0	40.0	.0	40.0	.0	.0000	1.0000	1.0000	.0000	.0000
1.0	40.0	.0	40.0	.0	.0000	1.0000	1.0000	.0000	.0000
2.0	40.0	.0	40.0	.0	.0000	1.0000	1.0000	.0000	.0000
3.0	40.0	.0	40.0	5.0	.1250	.8750	.8750	.1250	.1333
4.0	35.0	.0	35.0	4.0	.1143	.8857	.7750	.1000	.1212
5.0	31.0	.0	31.0	4.0	.1290	.8710	.6750	.1000	.1379
6.0	27.0	.0	27.0	3.0	.1111	.8889	.6000	.0750	.1176
7.0	24.0	.0	24.0	2.0	.0833	.9167	.5500	.0500	.0870
8.0	22.0	.0	22.0	1.0	.0455	.9545	.5250	.0250	.0465
9.0	21.0	.0	21.0	4.0	.1905	.8095	.4250	.1000	.2105
10.0	17.0	.0	17.0	5.0	.2941	.7059	.3000	.1250	.3448
11.0	12.0	.0	12.0	3.0	.2500	.7500	.2250	.0750	.2857
12.0	9.0	.0	9.0	.0	.0000	1.0000	.2250	.0000	.0000
13.0	9.0	.0	9.0	1.0	.1111	.8889	.2000	.0250	.1176
14.0	8.0	.0	8.0	.0	.0000	1.0000	.2000	.0000	.0000
15.0	8.0	.0	8.0	1.0	.1250	.8750	.1750	.0250	.1333
16.0	7.0	.0	7.0	.0	.0000	1.0000	.1750	.0000	.0000

17.0	7.0	1.0	6.5	.0	.0000	1.0000	.1750	.0000	.0000
18.0	6.0	2.0	5.0	.0	.0000	1.0000	.1750	.0000	.0000
19.0	4.0	1.0	3.5	.0	.0000	1.0000	.1750	.0000	.0000
20.0+	3.0	3.0	1.5	.0	.0000	1.0000	.1750	**	**

** These calculations for the last interval are meaningless.

The median survival time for these data is 9.25

Intrvl Start Time	SE of Cumul Sur- viving	SE of Proba- bility Densty	SE of Hazard Rate
-----	-----	-----	-----
.0	.0000	.0000	.0000
1.0	.0000	.0000	.0000
2.0	.0000	.0000	.0000
3.0	.0523	.0523	.0595
4.0	.0660	.0474	.0605
5.0	.0741	.0474	.0688
6.0	.0775	.0416	.0678
7.0	.0787	.0345	.0614
8.0	.0790	.0247	.0465
9.0	.0782	.0474	.1047
10.0	.0725	.0523	.1519
11.0	.0660	.0416	.1633
12.0	.0660	.0000	.0000
13.0	.0632	.0247	.1174
14.0	.0632	.0000	.0000
15.0	.0601	.0247	.1330
16.0	.0601	.0000	.0000
17.0	.0601	.0000	.0000
18.0	.0601	.0000	.0000
19.0	.0601	.0000	.0000
20.0+	.0601	**	**

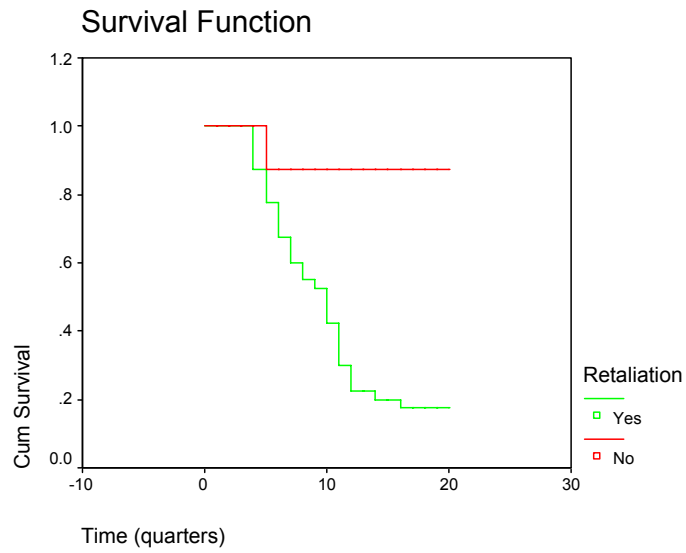


Figure H1: Survival Function

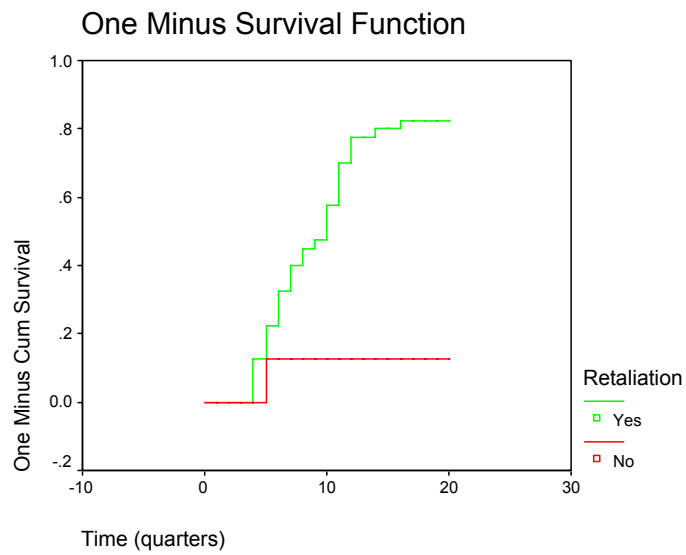


Figure H2: One Minus Survival Function

Event-History Analysis with continuous variables:

A model with Market Size and Distance was also run but these variables were not significant.

Table H2: Event-History Analysis

	Beta	Std. Error	Significance	Exp (Beta)
Distance	.245	.443	n.s.	1.278
MarketSize	.000	.176	n.s.	1
Retaliation	3.024	1.687	.073	20.573
Str. Asses.	-.446	9.916	.002	.640

With control variables the results are similar; only retaliation is significant at 10% at this time but still has the highest beta coefficient.

Note: For the purposes of this analysis, Strategic Assessment consisted of: Resource (employee) growth: number of full-time employees during entry vs. those during exit (annual); Fit growth (entrant's share at city 1 + city 2) at entry versus Qexit-1; market growth (market size at Qentry-1 versus. market size at Qexit-1)

APPENDIX I

Table I1: Overview of Relevant Empirical Research in the Airline Industry

	Author and Year	Title	Publication	Abstract/Major Findings	Data Source
1.	(Abunassar 1994)	A Reestimation of the Air Transport Association Study of Airline Fares and Study of Airline Fares and Concentration	Logistics	Fares and market concentration are positively related.	DOT data Regression analysis
2.	(Baker and Pratt 1989)	Experience as a Barrier to Contestability in Airline Markets	The Review of Economics and Statistics	Former intrastate airlines have larger impact on price than do newly established firms –a result consistent with these markets being imperfectly competitive because of an industry experience barrier to entry. Unlike actual competition, a measure of potential competition has no effect in constraining price.	363 inter-state routes between California and Texas in 1984.
3.	(Baum and Korn 1996)	Competitive Dynamics of Interfirm Rivalry	Academy of Management Journal	Multi-market contact and its interaction with spheres of influence are related significantly to lower entry and exit. The interaction of multi-market contact and concentration was insignificant.	Data regarding California based commuter air carriers between January 1979 and December 1984. DV: Rate of Market entry and exit IV: Market domain overlap, multi-market contact, concentration, spheres of influence
4.	(Baum and Korn 1999)	Dynamics of Dyadic	Strategic Management	Multimarket contact has an inverted-U relationship with rate of entry and exit. Relative multimarket	Data regarding California based commuter air carriers between

Table I1 (continued)

		Competitive Interaction	Journal	contact and the interaction of multimarket contact with firm size have significant effects on entry and exit. The rate of entry and exit were considered the aggregate measure of interfirm rivalry. Increase in multicontact is chance rather than strategy oriented.	January 1979 and December 1984. DV: Rate of Market entry and exit IV: Multimarket contact, multimarket contact with a rival relative to the multimarket contact with other competitors, size of competitor Controls: Focal airline characteristics, competitor airline characteristics, aggregate environmental characteristics
5.	(Borenstein 1989)	Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry	RAND Journal of Economics	Two different approaches are presented for analyzing the effects of route and airport dominance on the prices that an airline charges. The first is a cross section estimation of a carrier's markup over cost; the 2 nd is a cross section estimation of the ratio of 2 observed airlines' prices on a route as a function of the ratios of the airlines' costs, service qualities, and shares of traffic on the route and at the endpoints. The results indicate that an airline's share of passengers on a route and at the endpoints significantly influences its ability to mark up price above cost.	
Table I1 (continued)					
6.	(Borenstein and Rose 1994)	Competition and Price Dispersion in the U.S. Airline Industry	Journal of Political Economy	The expected absolute difference in fares between two passengers on a route is 36% of the airline's average ticket price. The pattern of observed price dispersion cannot easily be explained by cost differences alone. Dispersion increases on routes with more competition or lower flight density, consistent with discrimination based on consumers' willingness to switch to alternative airlines or flights. The data supports models of price discrimination in monopolistically	Data: DOT Q2 1986 17 variables are used.

Table II (continued)

				competitive markets.	
7.	(Carpenter and Hanssens 1994)	Market expansion, cannibalization, and international airline pricing strategy	International Journal of Forecasting	The impact of price on the overall size of the market is measured and the nature, pattern, and extent of cannibalization is examined using a set of econometric models for overall passenger volume and for each fare class share. The analysis shows that: 1. only one class of fares expands the market, 2. cannibalization is very significant and highly asymmetric, and 3. even small deviations from optimal prices substantially reduce profit. Based on these estimated models, demand is forecasted for air travel and optimal fares are calculated.	Market response and pricing of air travel on the Paris-Abidjan, Ivory Coast route operated by a French airline, Union des Transports Aeriens (UTA) is analyzed.
8.	(Chen and MacMillan 1992)	Nonresponse and Delayed Response to Competitive Moves: The Roles of Competitor Dependence and Action Irreversibility	Academy of Management Journal	Nonresponse and response lag to strategic and tactical moves. Competitor dependence leads more often to cautious response, and increases response delay, and likelihood of reciprocal response. A highly irreversible competitive attack has opposite effect.	
9.	(Chen et al. 1991)	Action Characteristics as Predictors of Competitive Responses	Management Science	Nonresponse and response lag to strategic and tactical moves. The number of competitors affected by an action and the strategic importance of the markets under attack increase the number of responses; strategic actions reduce the number of responses and delay competitive retaliation.	
10.	(Evans and Kessides 1993)	Localized Market Power in the U.S.	Review of Economics and Statistics	Airport Dominance as measured by share of total airport passenger traffic, confers substantial pricing power upon the carrier on its routes connecting to the	DOT 1988 Data Fixed effects estimation

Table I1 (continued)

		Airline Industry		airport. In addition, no significant correlation is found between route market share and price. The effect of route concentration, while statistically significant, is quantitatively unimportant.	
11.	(Evans and Kessides 1994)	Living by the 'Golden Rule': Multimarket Contact in the U.S. Airline Industry	The Quarterly Journal of Economics	Multimarket contact has a strong positive effect on prices. Major Airlines set higher fares on routes where multimarket contact among competitors is higher	1000 largest routes in U.S. airline industry between 1984 -1988 DV: Log of average price IV: Direct flight, round-trip ticket, distance, route market share, concentration (route and airport), airport market share, multi-market contact
12.	(Gatignon et al. 1989)	Competitive Reactions to Market Entry: Explaining Interfirm Differences	Journal of Marketing Research	Variation in marketing mix in response to entry of a new competitor was examined. Firms retaliate with their most effective marketing mix parameters and deemphasize use of less effective submixes. Effectiveness was measured in terms of elasticities.	Data from the over-the counter drug market and airline industry
13.	(Gimeno 1999)	Reciprocal Threats in Multimarket Rivalry: Staking Out 'Spheres of Influence' in the U.S. Airline Industry	Strategic Management Journal	Reciprocal multimarket contacts decrease rivalry and increase market share sustainability more than nonreciprocal multimarket contacts	DOT data on 48 airlines across 2897 markets. DV: Yield, market share IV: Reciprocal and nonreciprocal multimarket contact Controls: Service attributes, cost position, market structure, firm dominance
14.	(Gimeno and Woo 1996)	Hypercompetition in a Multimarket	Organization Science	Multimarket contact strongly decreases rivalry. Strategic similarity moderately increases rivalry. Higher yields on routes where average multimarket	DOT data on 48 airlines across 3171 markets for Q4 from 1984 through 1988

Table II (continued)

		Environment: The Role of Strategic Similarity and Multimarket Contact on Competitive De-Escalation		with competitors is higher.	DV: Yield IV: Multimarket contact, Strategic similarity Controls: Service attributes, exogenous market characteristics, cost position, market structure
15.	(Gimeno and Woo 1999)	Multimarket Contact, Economies of Scope, and Firm Performance	Academy of Management Journal	Multimarket contact is correlated with economies of scope. Multimarket contacts have a greater effect on prices and performance when they occur in markets that share scope economies.	DOT data on 28 airlines across 3008 markets from 1984 to 1988 DV: Cost, price, margin IV: multimarket contact, economies of scope, interactions
16.	(Hanssens 1980)	Market Response, Competitive Behavior, and Time Series Analysis	Journal of Marketing Research	A framework is presented for market analysis that specifically models primary demand, competitive reaction, and feedback effects of the market variables. This approach is an extension of earlier work on the relationship among the elasticities of the marketing variables. The model makes several useful marketing theoretical contributions, particularly in that it makes a sharp distinction between market-expansive and competitive effects of the marketing mix variables. The principles of the model were applied empirically to the case of a city pair of the US domestic air travel market, where 3 major airlines compete on the basis of flight scheduling and advertising. The analysis showed that flight scheduling has a market-expansive or a competitive effect, depending on the competitor, and that advertising does not have a significant impact on performance.	

Table II (continued)

	(Hurdle et al. 1989)	Concentration, Potential Entry, And Performance In The Airlines Industry	Journal of Industrial Economics	The effect of potential entry on performance in airline markets is explored empirically. Hypothesis testing using regression indicates that structure matters, but it is unable to distinguish among 3 alternative hypotheses about the particular relationship between structure and performance. Perfect contestability is rejected by the data. Nonparametric regression trees show a similar situation. How structure matters is revealed by the regression trees to an extent not possible in regression. The most powerful market structure explanatory variables are measures of concentration that incorporate the number and size distribution of incumbents, as well as the number of potential entrants that are not significantly deterred by economies of scale or scope.	DOT data. 867 significant nonstop city pairs in 1985
17.	(Jayachandran et al. 1999)	The Theory of Multimarket Competition: A Synthesis and Implications for Marketing Strategy	Journal of Marketing	Mutual forbearance, a form of tacit collusion in which firms avoid competitive attacks against those rivals they meet in multiple markets, is proposed to occur because multi-market competition increases the familiarity between firms and their ability to deter each other. The authors examine how multi-market contact increases familiarity and deterrence. They provide an extension of the theory of multi-market competition by developing a conceptual model that identifies competitive and market factors that moderate the relationship between the degree of multi-market contact and the intensity of competition. The emphasis is on product line rivalry and entry strategy.	Non-empirical but central work
18.	(Joesch and Zick 1990)	Growing Market	Journal of Consumer	Using a counterfactual research design, changes in passenger welfare are determined for 19 US	

Table I1 (continued)

		Concentration and Changes in Consumer Welfare: The Case of the U.S. Commercial Airline Market	Policy	destination cities for the years 1979, 1983, 1987 on the basis of Hicks' equivalent variation measure. The results suggest that travelers to large, long standing hub cities were generally insulated from large post-1979 welfare changes. Travelers to new hubs experienced substantial welfare declines between 1979 and 1987, although their post-1983 welfare changes were uniformly positive. Travelers to non-hub airports had the greatest variances, with both the relatively largest welfare gains and the relatively largest losses.	
19.	(Kim and Singal 1993)	Mergers and Market Power: Evidence from the Airline Industry	American Economic Review	The results show that prices increased on routes served by the merging firms relative to a control group of routes unaffected by the merger. Mergers may lead to more efficient operations, but on the whole, the impact of efficiency gains on airfares is more than offset by exercise of increased market power.	Examines price changes associated with 14 mergers during 1985-88 Variables: domestic economy-class airfares and number of passengers by routes and carriers. Ordinary least squares and weighed least squares regression was used.
20.	(Mayer et al. 1993)	Consumer Views of the Need for Government Intervention in the Airline Market	Journal of Consumer Affairs	Integrates economic studies and public opinion research by examining consumer opinion (and its correlates) in three markets that vary in terms of level and kind of concentration in their local markets. Majority of respondents across all 3 counties were opposed to increased government involvement in both airline fares (53.4%) and airline routes (60%). Opinions about industry performance and the need for government intervention were clearly related to perceived and actual conditions.	Analyses are based on 1685 respondents.
21.	(Morrison 2001)	Actual, Adjacent and Potential	Journal of Transport Economics	Estimates the extent of consumer savings due to Southwest for 1998 (\$12.8 billion). Southwest's low fares were directly responsible for \$3.4 billion of the	DOT data

Table II (continued)

		Competition	and Policy	savings to passengers. The remaining \$9.5 billion represents the effect that actual, adjacent and potential competition from Southwest had on other carriers' fares. The savings amount to 20% of the airline industry's 1998 domestic scheduled passenger revenue and slightly more than half the fare reductions attributed to airline deregulation.	
22.	(Morrison and Winston 1990)	The Dynamics of Airline Pricing and Competition	American Economic Review	The operation of market forces in fare determination is examined. Yields were calculated for the period, and fares and yields were calculated using the same methods as during regulation to determine what fares would have been if they still were regulated. Industry entry and exit rates were studied to determine competition levels. Results indicates that fares were consistently lower during the past decade of deregulation than they would have been under continued regulation. Fares fall with increased competition, but this effect was limited to slot-controlled airports. It is suggested that public policy should focus on enhancing the effect of competition on fares and on increasing the number of competitors in markets.	DOT data
23.	(Sandler 1988)	Market Share Instability in Commercial Airline Markets and the Impact of Deregulation	Journal of Industrial Economics	Multimarket contact is related positively to rivalry. Market share variation was used as a measure of (price and non-price) rivalry. It is shown that instability, and hence the degree of rivalry, was significantly higher after deregulation. Deregulation had a positive effect in all but the very concentrated airline markets.	123 Airline markets during 1974-1976 and 1978-1980. DV: Log of relative market share instability IV: Concentration, slot constraints (dummy), multi-market contacts, new entry(dummy), labor strike(dummy), deregulation (dummy)

Table I1 (continued)

24.	(Strassman n 1990)	Potential Competition in the Deregulated Airlines	The Review of Economics and Statistics	Potential Competition, prices and entry relations in the airline industry is studied. Consistent with limit pricing models, future entry is directly influenced by current prices. Current prices thus appear to provide an important signal to potential entrants about the probability of profitable entry. The results indicate the existence of barriers to entry but these barriers appear to have no independent effect on price beyond their effect on actual competition through increases in concentration.	
25.	(Windle and Dresner 1993)	Competition at 'Duopoly' Airline Hubs in the U.S.	Transportatio n Journal	Hub competition contributes directly to increases in the number of route competitors and indirectly to lower yields on routes. Duopoly hubs are more beneficial to consumers than monopoly hubs.	Regression Analysis

Note: A review of empirical work in the Airline Industry was provided by Dixit (2000). This Appendix is complementary to his review

APPENDIX J

Graphical Representation of Inter-Type Competition

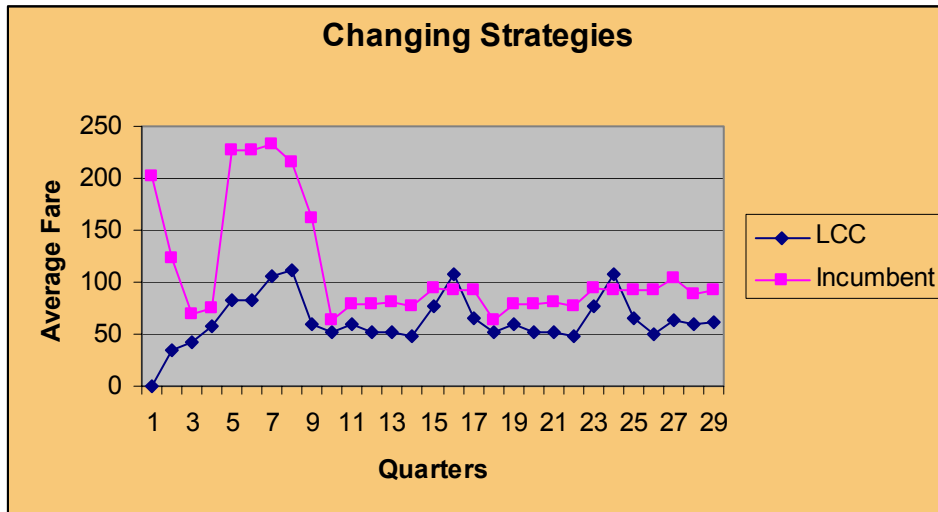


Figure J1: Incumbent: Northwest; Route MSP-MCI; Entry: 1995 Q2
Source: DBP O&D Plus Database

DD: markets dominated by discounters; MD: markets with inter-type competition;
MM: markets dominated by majors

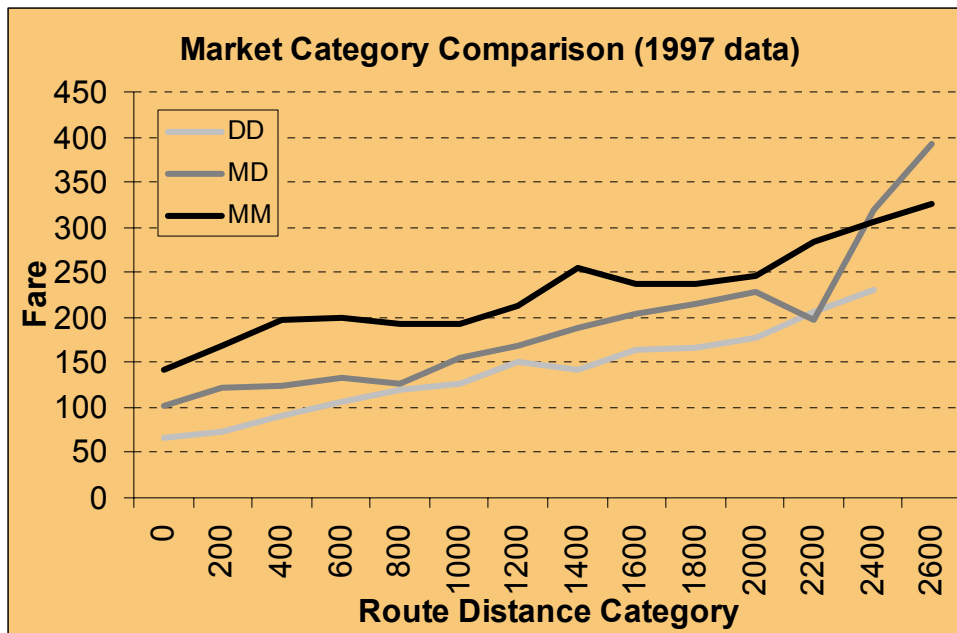


Figure J2: Market Category comparison (1997)

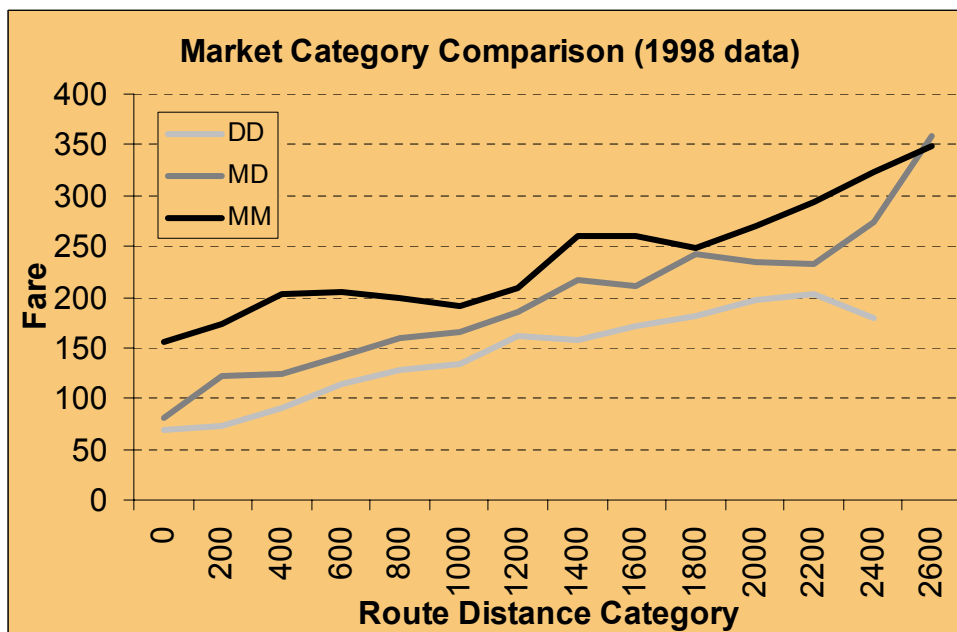


Figure J3: Market Category comparison (1998)

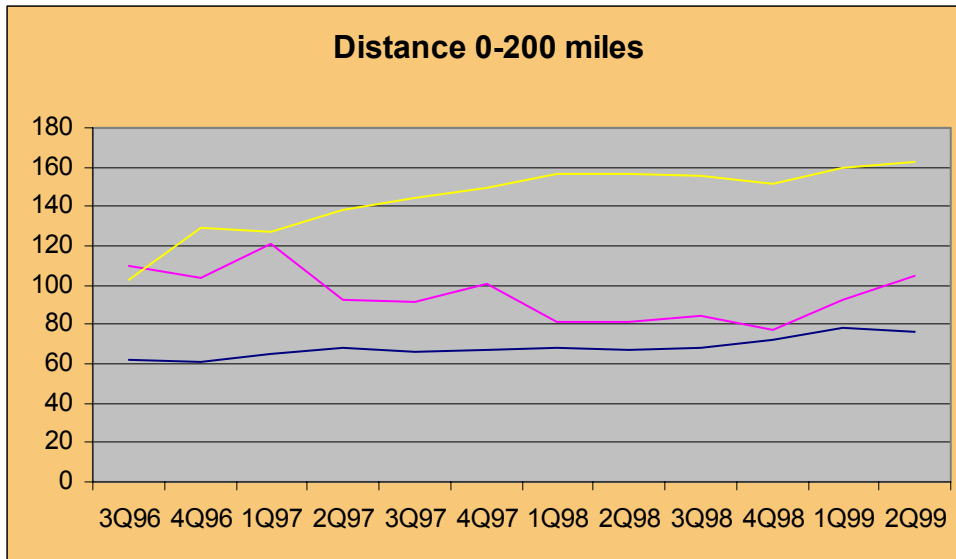


Figure J4: Market Category comparison over time (0-200 miles)

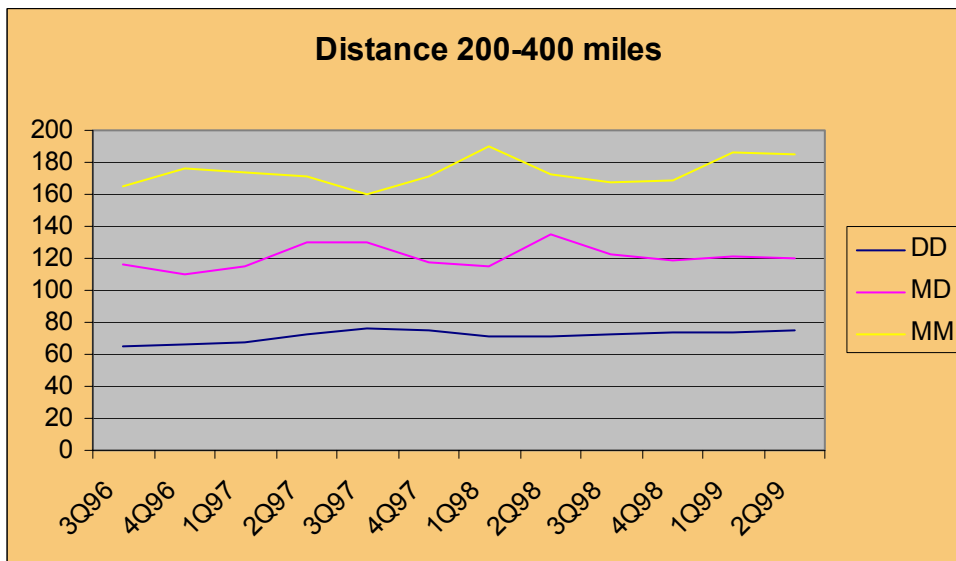


Figure J5: Market Category comparison over time (200-400 miles)

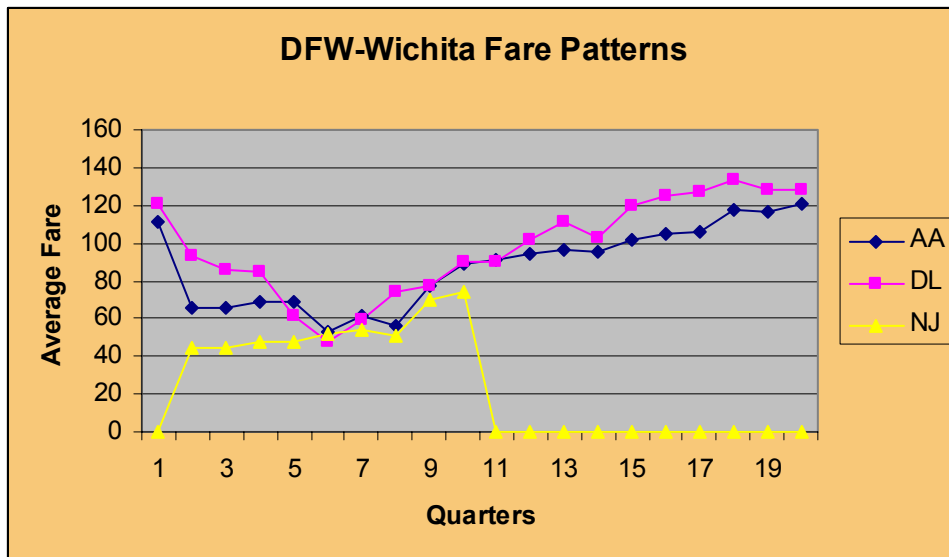


Figure J6: DFW-Wichita Fare Patterns

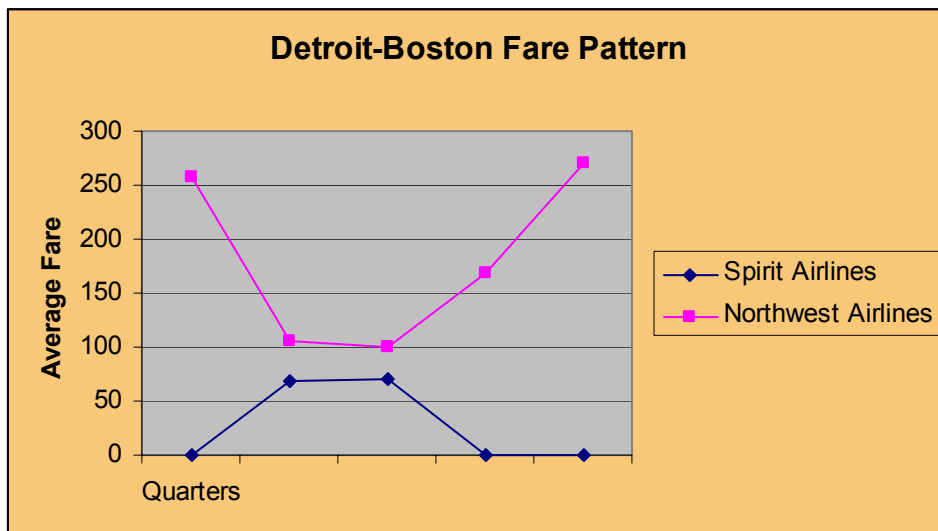


Figure J7: Detroit –Boston 1996 Q1- 1997 Q1

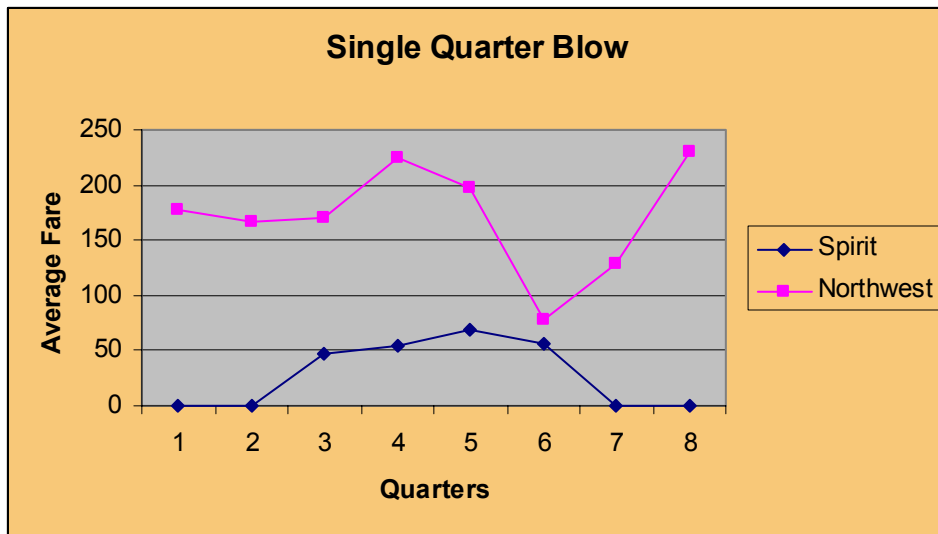


Figure J8: Detroit –Philadelphia 1996 Q1 – 1997 Q

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