

The Problem of Predatory Pricing
The Air Canada Case

by

Name: Ying Zhang

(Student Number: 3007828)

Major Paper presented to the

Department of Economics of the University of Ottawa

in partial fulfillment of the requirements of the M.A. Degree

Supervisor: Professor Rose Anne Devlin

Eco 7997

Ottawa, Ontario

December 7, 2003

Table of Contents

Abstract	2
1.0 Introduction	3
2.0 The Background of the Case	5
3.0 An Analysis of Predatory Pricing	8
4.0 Is Predation Feasible and Rational?	9
4.1 Complete versus Incomplete Information	9
4.1.1 The “Chain Store Paradox”	9
4.1.2 Predation with Information Asymmetries	13
4.2 Cost Disadvantage	15
4.3 Financial Reserves for Predation-----“Long Purse”	17
5.0 The Test of Predatory Pricing	18
5.1. Areeda-Turner’s Price below AVC Approach	19
5.1.1 Learning by Doing	20
5.1.2 Pricing in Systems Markets	21
5.1.3 Penetration Pricing in Network Industries	21
5.2 “Rule of Reason “Approach	23
5.3 Simplified Rule of Reason	24
5.3.1 Barriers to Entry	24
5.3.2 Profit Sacrifice	27
6.0 Conclusions and Recommendations	32
References	36

ABSTRACT

Since the 1960s, a great deal has been written about predatory price cutting, and continuing right up to the present, cost-based rules for deciding whether prices are predatory have been evolving in the courts. The subject of predatory pricing has been around for a long time and is still very much alive.

This paper provides a comparison and critical appraisal of the current tests to detect predatory pricing. It proposes a "Simplified Rule of Reason" approach and applies this approach to the Air Canada case.

For a long period, the prevailing view was that predatory conduct is rarely rational and rarely observed (e.g. McGee, 1958). More recently, economic theories have emerged that suggest predation can be a rational long term strategy, and casual observation suggests it is a conduct quite often engaged in (e.g. Milgrom and Roberts, 1982). The paper also addresses the question as to whether predatory behavior is credible.

1.0 Introduction

The problem of how to distinguish between legitimate competition and anticompetitive predatory conduct has troubled antitrust experts for many decades, and promises to continue to perplex for many more. A vast literature already exists on predation behavior. The traditional theory of predatory pricing is straightforward. The predator, already a dominant firm, sets its prices so low for a sufficient period of time that its competitors leave the market and others are deterred from entering. For predation to be rational there must be some expectation that these present losses, like any investment, will be made up by future gains (Meyer, 1962). The traditional view was later supplemented by an argument provided by Scherer (1976) that the potential benefits to the predator were not limited to future gains in the market where it preyed. Predatory behavior could be seen as an investment in reputation which could pay dividends in other geographic or product markets by deterring entry or disciplining rivals.

The traditional theory of predation came under strong attack by McGee (1958, 1980). McGee (1958) argues that predation is more costly to the predator than the victim, given the predator's larger market share, and that as the market share increases, so too do the costs. Against these large and certain costs are future profits which must be discounted to reduce them to present value terms. He then gives reasons why the future monopoly profits might not be realized: the prey might enter into long-term contracts with customers, find financing to ride out the price cutting or shut down and wait for prices to rise. Even if the victim does go out of business, new entry is possible in the post-predation period. Most important is that the threat of predation is not credible because it would not pay to carry it out; the dominant firm would lose more by predating than by co-existing with a rival. McGee (1980) further argues that better monopolizing strategies exist. He finds that mergers to monopolize the market, where legal,

would make more sense to the dominant firm, as mergers would avoid the large losses to the latter of a predatory campaign. Given these losses, he doubts that a predatory campaign could lower acquisition costs sufficiently, believing that the losses to the predator will be even greater than the savings generated.

McGee's criticism of predation follows from the work by Selten (1978), who uses game theory to demonstrate how rational players could clear up threats of predation. Selten (1978) called the result of this reasoning the "Chain Store Paradox" because people seem to believe intuitively that predation should pay while the logic of game theory says that it should not.

Later, Milgrom and Roberts (1982) resolved Selten's paradox by showing that the logic of his game theory holds only for multiple markets with perfect information. They present a model showing that with imperfect information, entrants will base their expectations about future predation on past conduct, giving the established firm an incentive to build a reputation as predator. They point out that it can lead to predation in equilibrium.

Lindsey, West (2003, 590) extended the discussion of this problem by the envelope theorem in differentiated products retail markets. According to the envelope theorem the cost to the predator in foregone short-run profits per dollar of profits loss inflicted on a victim the direct cost to a predator of a marginal price cut is second-order small.

This paper critically analyzes the academic debate over the rationality of predatory behavior as applied to the airline industry. I show that the rationality of predatory behavior crucially depends on some key assumptions, in particular asymmetric information between the incumbent and the potential entrant.

The debate over the rationality and thus the frequency of predation is reflected in a parallel debate over the form of the best legal rule to control it. Broadly speaking, there are two types of

rules to detect predation. The first is the "Bright-Lines" approach, which indicates specific rules as to what does and what does not constitute predatory action. The best-known of these is the Areeda-Turner rule (1975). The difficulty with such rules has been that it has proved impossible to devise watertight rules that divide anti-competitive responses from competitive ones. The alternative approach, which is the one advocated by Scherer (1976), and by myself in the present paper, is to employ a form of "Rule of Reason" approach to consider each case on its merits within a more general framework of considerations relevant to determining whether action has been anti-competitive or not. However, such a broad-based inquiry is costly. As the Commission of the European Communities (1991, 14) stated: "The costs of litigation and the costs which arise because firms act in fear of being accused of predation are likely to be substantial with this approach."

The present debate over appropriate pricing is reflected in several approaches. However, it is possible to find considerable common ground among these approaches. Using these common elements, I propose my "Simplified Rule of Reason" approach and then apply this approach to the Air Canada case to evaluate its potential for predatory behavior.

The organization of the paper is as follows: Section 2 provides the background of the Air Canada case. Section 3 presents a mathematical analysis of predatory pricing. Section 4 discusses the rationality of predatory pricing in the Air Canada case. Section 5 considers different rules to detect predation and proposes my "Simplified Rule of Reason" approach. Finally, Section 6 presents some recommendations to resolve Air Canada's present difficulties.

2.0 Air Canada and Predatory Pricing: The Background of the Case

Until December, 1999, Canada had two full-service network carriers that offered domestic and international services: Air Canada and Canadian Airlines. In December 1999, Air Canada

acquired Canadian Airlines Corporation and Canadian Airlines International Ltd (which operated Canadian Airlines) (Competition Tribunal, 2001, 14). Prior to the acquisition of Canadian Airlines in December 1999, Air Canada had approximately 55% of the Canadian airline industry market. Post-acquisition, it became the dominant domestic carrier with more than 80% of passenger traffic and 90% of passenger revenues (Competition Tribunal, 2001, 16-18).

The remainder of the domestic air carrier market is left mostly to WestJet and Canada 3000. Sky service Airlines, which operated Roots Air for six brief weeks, was acquired by Air Canada. Similarly, Canada 3000 acquired two other airlines, CanJet and Royal Airlines (Competition Tribunal, 2001, 9-11).

The Competition Tribunal (2001, 8) argued, that despite the growth of WestJet and Canada 3000, Air Canada's domestic passenger revenues were 13 times those of its next competitor. Air Canada has virtually no competition for business travel, and is a virtual monopoly for most local and regional markets.

In 2001, the Competition Tribunal (2001, 5-6) claimed that Air Canada matched the entrants' (West jet, Can jet, Royal and Canada 3000) low fares in 2000. As the Tribunal pointed out:

Air Canada has engaged in and continues to engage in practices of anti-competitive acts within the meaning of s. 78 of the Act and the Airline Regulations. These anti-competitive acts consist of,

- a) Operating capacity on the Affected Routes at fares that do not cover the avoidable cost of providing the service;
- b) Increasing capacity on the Affected Routes at fares that do not cover the avoidable cost of providing the service;
- c) Engaging in a policy of "matching" fares offered by low cost carriers on the Affected Routes and operating capacity at those fares:
 - i) Without regard for the effect of such fares on Air Canada's profitability;
 - ii) Without regard to the additional benefits associated with the service offered by Air Canada;
 - iii) With the foreseeable effect of significantly diluting revenues of low

cost carriers, Air Canada renders their operations unprofitable.

Furthermore, the Competition Tribunal pointed out that Air Canada's practice of anti-competitive acts created a significant reputation barrier to entry for other potential new entrants (Competition Tribunal, 2001, 36-38). In the Canadian aviation market, the costs and barriers to sustainable entry which new entrants providing passenger airline services in Canada need to face are:

- a) Requirements in the Canada Transportation Act that domestic carriers, including new entrants, must be Canadian owned and "controlled in fact". This imposes restrictions on the financing and contractual relationships that Canadian carriers can have with foreign carriers;
- b) Lack of feed traffic at both ends of their routes;
- c) Lack of an effective frequent flyer program;
- d) Lack of business class airport lounges;
- e) Lack of an established brand and reputation for reliability and safety;
- f) Costs of leasing or purchasing aircraft;
- g) Costs of hiring flight crew (pilots) and cabin crew;
- h) Obtaining access to certain airport facilities, including gates, loading bridges, ticket counters and baggage systems;
- i) Costs of committing to a schedule in order to establish a reputation for reliability;
- j) Advertising, travel agent familiarization costs, and other marketing costs
- k) Scarcity of peak time slots.

However, Air Canada (2001, 8) argued that the Competition Tribunal 's own actions in issuing and threatening to issue temporary 'cease and desist' orders have significantly constrained both Air Canada's ability to compete and its economic performance on certain of the Affected Routes.

Air Canada also argued that the Competition Tribunal ignored the elements of an abuse of dominance analysis and a predatory pricing analysis (including the absence of any evidence of predatory intent and recoupment), instead it focused on the narrow issue of 'avoidable costs' and 'matching fares' which it construed entirely inconsistently with business reality. The Competition Tribunal ignores the fact that frequency of service is part of Air Canada's product as

a “Major Network Carrier”. Product and schedule integrity are crucial to a network carrier and can result in unprofitable flights on a route in order for other flights on the same route to be profitable.

Air Canada’s response to WestJet’s, Royal and CanJet’s entry into the affected routes¹ signals to potential new entrants the type of response they would face if they attempted to enter domestic markets. The low fare carriers failed to establish themselves as a durable market presence, and eventually moved their operations, or ceased to exist (Competition Tribunal, 2001, 23-39). Rational potential new entrants will factor in such a response to their business plans, making new entry unlikely. If Air Canada is successful in forcing WestJet, CanJet, or Royal from any of the Affected Routes, this reputation barrier will be raised even higher.

3.0 An Analysis of Predatory Pricing

Before analyzing the rationality of predatory behavior, I would like to introduce a formal analysis which was provided by the Commission of the European Communities (1991) to make it clear in which circumstances predatory behavior is rational. Generally, predation involves the use or threat of the use of one or more of the incumbent’s choice variables (price, or output, or product specification) so that entry becomes unprofitable. It is clear that, assuming that the normal competitive equilibrium profit is the maximum profit that can be obtained if entry occurs, predation or the threat of predation must involve the sacrifice of some short-run profit by the incumbent in order to prevent entry. Of course, for predation to be a rational strategy, the incumbent’s total anticipated long-run profits from using this strategy must be higher than what they would be if the incumbent and the entrant shared the market. To clarify this, the Commission of the European Communities (1991, 10-12) presented this formal analysis. First, it

¹ “Affected Routes” means routes flown between the city pairs, in both directions. See, Competition Tribunal, ‘ The Commission of Competition and Air Canada’, available at <http://www.ct-tc.gc.ca/english/cases/ct-2001-002/0001.pdf>

defined the notation

Π_e = incumbent's total profit per period in normal equilibrium when entry is allowed.

Π_p = incumbent's total profit per period when he predares in at least one of his victims

Π_n = incumbent's total profit per period where there is no entry threat. This is just the monopoly profit if there is a single incumbent or if incumbents' choice of strategies generates a collusive outcome.

Clearly, it can be expected that $\Pi_n > \Pi_e$ and $\Pi_n > \Pi_p$, that is competition or predation lowers profits. Suppose that, in order to eliminate entry, predation has to be practiced for T periods, after which there is no entry threat. Thus if predation is practiced the incumbents will get Π_p until T and Π_n thereafter. If there is no predation, entry will occur and the incumbent's profit will always be Π_e . So we let,

Π_0 = present value of $(\Pi_n - \Pi_e)$ That is, Π_0 is the present value of the difference between the total profits from eliminating the entrant (and facing no entry threat) and those if the entrant is accommodated, Then we let Π_1 = present value of $(\Pi_e - \Pi_p)$ That is, Π_1 is the present value of the difference between total profits when the entrant is accommodated and those under predation. Predation will be rationally preferred to accommodating the entrant if and only if $\Pi_0 > \Pi_1$. Moreover, it is important to note that the present values of Π_0 and Π_1 are calculated by discounting over different time periods.

4.0 Is Predation Feasible and Rational?

Is predation rational? This is a long debated question. Predatory behavior is usually thought of as a subcategory of the theory of anticompetitive strategic behavior that takes place in response to entry. Some economists (e.g. McGee (1958, 1980)) believe it does not and cannot

exist, except in cases of irrational behavior. However, recently other economists (e.g. Milgrom and Roberts (1982)) point out that the threat of the use of predatory behavior could be credible and rationally used to prevent entry.

4.1 Complete Information versus Incomplete Information

4.1.1 The “Chain Store Paradox” in Complete Information Circumstance

Selten’s (1978, 127-159) “Chain Store Paradox” gives a game theoretic treatment of multi-market monopoly under complete information to show that predation cannot occur in equilibrium. As long as both the potential predator and the potential prey know each other’s situation (in terms of foregone profits) and each other’s moves, and as long as it is clear to both that the issue is one of predatory pricing, the potential prey will enter without fear and the established firm will prefer normal competition, that is, a non-cooperative and non-aggressive equilibrium market sharing at a competitive price.

To show that predation is logically impossible from a game theoretic point of view, Selten (1978, 127-159) imagines the following game in which a firm operates in a number of identical markets. For concreteness, he supposes it is a chain store, also called player A, which has branches in 20 towns. The game is played over a sequence of 20 consecutive periods. In each of the towns there is a small businessman k , who might raise money to establish a shop of the same kind or start other business, who can be called new entrant. At the beginning of period k , player k must decide between in and out. Player k ’s decision is immediately known to all players. Incumbent A can react in two ways in each market. It either decides to “cooperate”, that is, to share the market, or to be “aggressive”, that is to prey on the entrant. Incumbent A enjoys its monopoly position without further threat if player k , at time k , decides not to enter.

The numbers in the following payoff matrix represent the potential predator's immediate payoffs (in the upper left corner) and the payoffs of player k (in the lower right corner). These numbers are known to all players, so the information is complete.

TABLE 1

	IN	OUT
COOPERATIVE	20 10	30 0
AGGRESSIVE	-20 -5	60 0

Source: Seleton, R. (1978,132)

What is the incumbent's best policy? The incumbent wants to maximize his profits. If he keeps potential entrants out without any aggression, he can make a total profit of $20 \times 60 = 1200$. The incumbent gets 60 dollars profit in each period when he monopolies the market. However, monopoly is impossible without at least one aggression which implies that at least one entry has occurred, leaving a profit of at most $-20 + 19 \times 60 = 1120$. The incumbent loses 20 at the first period, and then he keeps entrants out of the market and gets the monopolistic profits of 60 for the next 19 period. At best, this one predation in period 1 might create such a reputation of aggressiveness that players 2 to 20 prefer to stay out. Perhaps a sequence of 2 or more predatory acts might be necessary to build up such a reputation. But even then, why should the remaining players be afraid? They know the rules of the game as well as player A. They therefore realize that the best policy for A is never to prey at all and to share all markets with the local entrants, since the profit maximizing for each potential entrant actually enters is $20 \times 20 = 400$. Furthermore, McGee (1958) pointed out that when the incumbent monopolizes the market at period k, this high profit will also attract new entrants to the market.

To see this, consider what must happen in market 20 in the last period. Selten (1978, 31) writes the following:

If in period 20 player 20 selects IN, then the best choice for player A is the cooperative response. The cooperative response yields a higher payoff. Long run considerations do not come in, since after period 20 the game is over. This shows that it is best for player 20 to choose IN. Obviously the strategic situation of period 20 does not depend on the players' decisions in periods 1.....19. Now consider period 19. The decisions in period 19 have no influence on the strategic situation in period 20. If player 19 selects IN, the cooperative response is best for player A. The aggressive response would not deter player 20.

It is clear that in this way we can go on to conclude by induction that each player k should choose IN. In each time player A should use the cooperative response. The strategic situation in the remainder of the game does not depend on the decisions up to period k . If it is already known that in periods $k+1.....20$, player $k+1.....20$, will choose IN, then player A will always select the cooperative choice.

The theory comes to the conclusion that each of the players 1.....20 should choose IN, and player A should always react with his cooperative response to the choice of IN.

The logic of this reasoning is that in equilibrium, predation cannot occur, because the equilibrium strategies of the game (over 20 periods) must also be equilibrium strategies for every sub-game (a game starting at any period k and ending at period 20).

The entire assumption is that all players know everything: they know all possible strategies and all possible outcomes. So when their information is "complete", they also are immediately informed about all decisions. If the incumbent wants past predation to impress potential entrants, it is necessary to admit some incompleteness or imperfectness of the available information. Only then could something like a reputation of aggressiveness effectively deter entry.

Finally, let me quote a passage in which McGee (1989,296) hints at the role of incomplete information and suggests that if the game is played under complete and perfect information, then predation is impossible for the simple reason that the new entrants will not give up-so that there is no point in even trying to kill it. He wrote:

The predator will be disappointed, if for no other reason than that it will pay the victim to stick it out. If things go back to where they were before the predatory price cut, it would pay both the predator and victim to replace their plants. Of course, if prices were somehow raised even more. It only seems paradoxical, therefore, that if a victim were sure this is a predatory campaign, rather than normal competition or a response to a collapsing market, and he would surely want to stick it out.

4.1.2 Predation with Information Asymmetries

There is another group of economists (e.g. Milgrom and Roberts 1982, Kreps and Wilson 1982, Roth 1996) who think that predatory behavior can exist in equilibrium. When there is imperfect information, Milgrom and Roberts (1982) point out that it can lead to predation in equilibrium. They indicate that when the established firm operates in several markets, it can conceivably compensate the foregone profits in one market by larger profits in other markets. If, in addition, the potential victim cannot evaluate this compensation and is in doubt about whether predation could occur, then its entry can meet a predatory response in equilibrium. This is the basic principle established by Milgrom and Roberts. In their analysis, the entrant has the possibility that the established firm may be a fanatic predator or a fanatic pacifist. The established firm may then wish to prey in order to establish a reputation, since if it ever fails to prey the entrant will conclude that it will never prey. The drawback of this approach is that it relies on pathological aggressiveness and implies that predation, once begun, continues for ever.

In the Air Canada case, I consider that both the incumbent and new entrants can obtain complete information. In the aviation industry today, the computer reservations systems² allow people to obtain immediate information, such as flight fares, schedules, and available seats of all the aviation companies between any two points on the computer screen. So it is easy for the incumbent to know the fares charged by new entrants and plan a response. So too can the new

² Many books discuss the importance of the computer reserve systems, e.g., Williams (1995).

entrant. Therefore, we can consider that in the aviation market, there is “perfect” information, which means, according to theory that it is irrational for Air Canada to predate in this market. And it is not likely that a price war would sufficiently deter the entrants, since everybody knows that the low price cannot be permanent. The new entrants would shut down operations temporarily, letting the predator take all the business and all the losses, and resume operations when he raises prices again.

Table 2

Air Canada’s Income Statement (In Millions)

	2001	2000	1999
Operating Revenues	4,908	9,283	6,443
Operating Expenses	5,272	9,019	6,066
Operating income	-364	86	377
Non-operating income	-77	-213	-116
Income (loss) before income taxes	-441	-127	261
Income (loss) for the year	-714	-82	140

Source: Maheu and Balanger (2001, 28)

Furthermore, we can analyze this behavior using financial data from Air Canada. From the table above, we can see that before 2000, when the two major airline companies, Air Canada and Canadian Airlines, shared the market, Air Canada’s operating income was 377 million dollars and its total income was 140 million dollars in 1999. Since 2000, Air Canada merged with Canadian Airlines and started to lower its fare in the market, the operating income dropped to 86 million dollars in 2000, -364 million dollars in 2001; the total loss was 82 million dollars in 2000 and 14 million dollars in 2001. We can see from the table that Air Canada gets higher profit

when it shares the market. The result is consistent with Selten (1980)'s chain store paradox model.

4.2. Cost Disadvantage

Usually, we think that the incumbent has more of a cost advantage than the new entrants. As the Director of Investigation and Research of the Competition Act (1992) notes, incumbent firms can gain important cost advantages relative to potential entrants through a variety of sources. While McGee (1958, 140) points out that foregone profits or financial costs must be larger for the incumbent than for the entrant. As McGee (1958, 140) notes:

If the monopolist seeks to depress the price below the competitive level he must be prepared to sell increasing quantities, since the mechanism of forcing a lower price compels him to lure customers away from his rivals, making them meet his price or go without customers. To lure customers away from somebody, he must be prepared to serve them himself. The monopolizer thus finds himself in the position of selling more and therefore losing more than his competitors. Standard's market share was often 75 per cent or more in the 75 per cent case the monopolizer would sell three times as much as all competitors taken together, and, on the assumption of equal unit costs, would lose roughly three times as much as all of them taken together.

How about Air Canada's costs against those of other small entrants? In order to analyze and compare the three major players in the Canadian airline industry it is important to define some specific financial indicators in this industry. The most significant of these are described in the 2000 Annual Report for WestJet (International Air and Sea Freight Commission, 2001, 27) and are set out in Table 3 .

Some observations can be made about the three companies through these specific measurements. Although Air Canada is the dominant carrier, its load factor is the smallest with only 72.4% of available seats occupied on average, while Canada 3000 occupied 83.7%. Even with the dominant market position, Air Canada has higher costs per flight or per available seat-mile (ASM). In 2000,

Air Canada's cost per ASM was 0.163 dollar; while Canada 3000's comparable cost was 0.114 dollar. We can see from the table that Air Canada has a cost disadvantage compared to Canada 3000 and WestJet.

Table 3 Performance of Three Major Airline Company in 2000

	Air Canada	Canada3000	Westjet
Revenue Passenger Miles ³	35.7 M ⁴	6.8M	1.5M
Available Seat Miles ⁵	49.2M	8.2M	1.9M
Load Factor ⁶	72.4%	83.7%	76.2%
Yield per RPM (cents) ⁷	0.195	0.141	0,229
Operating Expenses per ASM	0.163	0,114	0,146

Source: International Air and Sea Freight Commission (2001, 27)

From table 3, we can see that Air Canada continues to lose money since 2000, while Westjet has reportedly gained profit. As CBC (2003) reported, WestJet gained higher third quarter profits in 2003– the 27th consecutive quarter in which it made money – even though its load factor slipped.⁸ We can see that Air Canada has cost disadvantages compared to Westjet, so Air Canada loses money selling tickets at the same price as Westjet. However, Westjet makes profit at this price due to its low cost system.

As LeBlanc (1992, 504) argued when the incumbent is strong relative to the entrant, predatory pricing is a better choice, whereas when the incumbent is weak relative to the entrant, limit-pricing is chosen. From table 3, it can be seen that Air Canada has cost disadvantages

³ Revenue Passenger Miles is a measure of passenger traffic, calculated as the number of revenue passengers multiplied by the total distance flown.

⁴ M stands for million dollars.

⁵ Available Seat Miles is a measure of total passenger capacity, calculated by multiplying the total number of seats available for sale by the total distance flown.

⁶ Load Factor is a measure of total capacity utilization, calculated as the proportion of total available seat miles occupied by revenue passengers.

⁷ Yield per RPM is a measure of unit revenue, calculated as the gross revenue generated per revenue passenger mile.

⁸ <http://www.cbc.ca/stories/2003/10/20/westjet201003>

compared to Westjet, so predatory pricing is not a wise choice.

Furthermore, as McGee (1980) said, an incumbent has to sell more to lure the customers at higher costs. This explains why Air Canada continues to lose money since it needs to lure more customers to expel Westjet out of the market. We can conclude that if Air Canada wants to predate, it would lose more than entrants would.

4.3 Financial Reserves for Predation-----“Long Purse”

It could be rational and credible for an incumbent to predate for a finite period of time if it has larger financial reserves-- a “long purse”-- and thus be able to sustain larger losses and sustain them longer. McGee (1958, 297) points out:

Military analogies are not apt. Among other differences, business lacks pipes, drums, and flags, and it does not have conscription. A firm plotting a predatory campaign would require disproportionately greater liquid reserves, and, in one way or another, it will have to pay for them. Liquid reserves are costly, and disproportionately large reserves are disproportionately costly. Reserves are a cost, not an inherent advantage. No one has yet demonstrated why predators could acquire the reserves they will need, while victims cannot. In any case, if this is predation, the present value of assets in this trade is positive. Why not stick it out, since the long-run returns are there?

Kate and Niels (2002, 23) draw a similar conclusion to McGee’s long purse theory by arguing that the uncertainty of rivals about the strength of the incumbent is essential. Without this uncertainty, the staying out by rivals and preying by the incumbent are irrational.”

From table 4, we can see that Air Canada’s net assets in 2000 were -180 million dollars. However, only 49 millions dollars were liquid assets. At this time, it seems that Air Canada has limited financial resources to withstand the losses incurred if a predatory price war ensued. It does not appear to have enough financial reserves to force the entrants to exit because of the impossibilities of renewing capital or financing new projects. If the entrants (Westjet,

Canada3000) stick it out, then Air Canada's cash will run out quickly and it will have to declare bankruptcy. These suggest that it is not rational for Air Canada to predate.

Table 4 Air Canada's Balance Sheet at June 30th 2000 (In millions)

Assets		Liabilities	
Cash	\$49	Accounts payable	\$787
Account receivable	\$450	Bank indebtedness	\$110
Spare parts and supplies	\$101	Restructuring cost	\$279
Prepaid expense	\$15	Advance ticket sale	\$364
Future income taxes	\$453	Long-term debt	\$875
Property and equipment	\$827	Deferred credit	\$19
Pension	\$19		
Other assets	\$98		
Good will	\$502		
Total assets	\$2614	Total Liabilities	\$2434
Net assets			\$180

Source: International Air and Sea Freight Commission (2001, 46 -47)

5.0 The Test for Predatory Pricing

One of the major difficulties in regulating predatory action is in distinguishing predatory behaviors from proper responses to competition. In discussing these proposals we will follow the convention in the literature. As indicated by the Commission of the European Communities

(1991), mistaking predation for competitive pricing is called a “false negative”; the mistake of taking competitive pricing for predation is called “false positive”. Both errors pose serious problems for competition policy. This is because competition is expected to lead firms to reduce prices and improve service quality. Predatory action is that which leads to reductions in prices or increases in quality only in the short-term to deter other firms. The problem is to determine what profit-maximizing firms would do, in the face of incomplete knowledge of cost and demand conditions, so as to determine whether the threshold beyond which a response is no longer competitive has been breached. The alternative dangers, which are discussed by Scherer (1976), are that existing firms might be prevented from reacting competitively to entry or entry threats, for fear of being accused of anticompetitive behavior, or those predatory firms might claim that they were only acting competitively in the face of entry. Thus, the risks of both types of errors should be considered in evaluating the rules for analyzing pricing that have been suggested below.

5.1. Areeda-Turner’s Price below AVC Approach

There are two broad types of policy approaches that try to deal with predatory behavior. The first is the “bright-lines” approach, which means specific rules as to what does and what does not constitute predatory action. The best-known of these is the Areeda-Turner (1975, 697-733) approach, which proposed that a price below “reasonably anticipated” average variable costs should be conclusively presumed unlawful, while a price at or above such costs should be conclusively presumed lawful. Areeda and Turner take average variable costs (AVC) as their standard as a proxy for marginal costs because of the difficulty of measuring marginal costs in practice; the two are equal if marginal costs are constant. The AVC test is itself far from perfect for several reasons as described by the Commission of the European Communities (1991, 18):

1. There are many arguments that can be made as to why a price below AVC, even for sustained periods, may be legitimately competitive;

2. Sometimes a price above AVC may preclude efficient entry and thereby diminish social welfare, while the AVC test fails to detect such predation.

3. Areeda and Turner focus on short-run rather than long-run efficiency, even though they recognize that “strategic” long-run considerations may be important to the predator, because they find evaluating long-run efficiency too speculative.

Some deficiencies are discussed further below. The discussion suggests that courts should apply the AVC test carefully, limited to circumstances where these deficiencies are not obviously present. There are many reasonable, pro-competitive reasons for pricing below AVC.

5.1.1. Learning by doing⁹

If production involves learning by doing, a company early in its history may have higher AVC than in the future when it has learned how to produce products more efficiently. A price below AVC in the short term may permit the company to stay competitive in the market during its initial phase and make a large number of sales, thereby advancing its learning, and in turn recovering its early losses over the longer term when the company’s AVC has fallen. The low price in the short term should properly be seen as an investment in a company’s knowledge base improving efficiency, rather than as a predatory strategy.

Carlton and Perloff (1994, 392) also make a similar observation. They write:

The short-run marginal cost of production that ignores future cost savings is not the relevant cost measure when a firm is involved in dynamic learning over time. Instead, one should look at the marginal production cost today plus (the present discounted value of) the change in production cost in the future that results from increased production today.

However, Cabral and Riordan (1994,1126-1129) argues that once a firm reaches the bottom of learning curve, there is no explanation for below marginal cost pricing, which should be considered as predatory behavior.

⁹ This subsection is drawn from Arrow (1962, 155-173)

5.1.2 Pricing in systems markets¹⁰

Where two or more products are tied together in a system, a firm may choose to price one product low and another high in order to price discriminate among customers. For example, a car manufacturer may price the car below cost and recover the losses through above average cost prices for tires. This allows the manufacturer to extract greater revenues from those customers who use the car more often and therefore obtain a higher value on it. Price discrimination has ambiguous effects on social welfare. Since it cannot be easily said whether it is harmful or beneficial, we tend to assume that the firm is not doing anything harmful and encourage it to extract as much of the potential gains from trade as possible. A price below AVC on one product in a systems¹¹ market might therefore be part of a reasonable and pro-competitive pricing structure, and should not be considered predatory. Indeed, even where customers are poorly informed about the life-cycle costs of a system, systems competition will tend to prevent manufacturers from earning monopoly profits. Competition forces manufacturers to sacrifice as much profit on the fixed component (the car in our example) as they can hope to regain on sales of the variable components (the tires).

5.1.3 Penetration pricing in network industries¹²

Penetration pricing strategies in industries characterized by significant network effects may involve pricing below AVC in the short term to encourage customers to try a product, recouping the early losses by gains over the longer term when the firm has captured a larger share of the market and can enjoy network effects. Pricing below cost during the initial phase might be

¹⁰ This subsection is drawn from Katz and Shapiro (1994,93-103)

¹¹ Systems refer to collections of two or more components together with an interface that allows the components to work together. They are strongly complementary, although they not need not to be consumed in fixed proportion
See, Katz and Shapiro (1994, 93)

¹² This subsection is drawn from Katz and Shapiro (1994, 103-115)

rational conduct, profit maximizing and socially desirable over the long term. The nature of competition in such an industry often takes the form of competition for the market rather than the more familiar competition between firms in a market. While some (e.g. Mastutes and Regibeau, 1988) may argue that the result of penetration pricing in network industries is the establishment of a monopoly in the product that, due to network effects, becomes difficult to displace, a strong argument to the contrary is that market competition delivers consumers all its benefits, since firms are willing to sacrifice as much profit in the initial period as they expect to be able to later recoup. Nevertheless, there is an opportunity that such behavior will lead to the elimination of a more efficient competitor. As Katz and Shapiro (1994,112-113) note, predatory conduct is a particular concern in software markets where the opportunity of ex post recoupment is strong due to the entry barriers afforded by network effects, but the AVC test is not properly suited to detect predation, since even very low prices can remain above AVC. In such markets, zero, or even negative prices can be justified by arguments of fair competitive pricing.

In the aviation industry, this short-run AVC test is especially troublesome due to the specific cost structure of this industry. This is because the marginal costs of carrying extra passengers, such as the cost of extra meals, the extra fuel required because of the increase in weight and extra expenditure on ticketing, are relatively low (e.g. O'Conner, 2001, 5-7). An incumbent could set the price above the average variable costs since the marginal costs are relatively low. Therefore the Areeda-Turner rule is particularly inappropriate for the aviation industry.

One of the central debates concerning the Areeda and Turner test was whether or not it gave sufficient attention to the dynamic and strategic character of predatory pricing. Klevorick (1993,163) contended that "Areeda and Turner's reliance on a static model of a dominant-firm

behavior to derive their test to reflect their doubt that a sound legal rule could be fashioned to cope with the inherently “speculative and indeterminate” assessment of long-run consideration.”

These criticisms also apply to other such “rules” that have been proposed. This includes rules that recommend that courts should find it illegal for a dominant firm to (1) set price below short-run marginal cost (Posner, 1976); (2) set price between average variable cost and average total cost (Zerbe and Mumford, 1996) (3) increase price after exit has taken place (Baumol, 1979); and (4) increase output when experiencing entry (Williamson, 1977). The advantage of such “bright line” rules is that they let firms know exactly what they are not permitted to do so that the fear of violating the law by mistake does not have a chilling effect on all activity.

5.2. “Rule of Reason” Approach

The other approach takes each case on its merits, and is called the “Rule of Reason”. This approach was proposed by Scherer (1976), and has been recommended to the European Commission by Philips (1987). In response to the Areeda-Turner rule, Scherer (1976) proposed a wide-ranging examination of many factors surrounding the predator’s conduct, including the predator’s intent and the consequences of its conduct. Scherer’s goal is long-run efficiency, which a simple short-run cost-based test will miss. Philips (1987) proposed a modified rule of reason standard to establish predation with all available evidence at hand. The advantage of this approach is that costs from Type 1 errors (condemning competitive price as predatory, false positive) and Type 2 errors (allowing predatory pricing to escape condemnation, false negative) are more likely to be avoided. The ideal approach to detect predatory intent, as recommended by Philips (1987), may be to use an economic modeling approach based on oligopoly theory to determine whether the incumbent’s actual profits are significant below normal equilibrium

profits. In practice, this is likely to be difficult because of data limitations. Furthermore, such a broad-based inquiry is costly. As the Commission of the European Communities (1991, 14) states: "The costs of litigation and the costs which arise because firms act in fear of being accused of predation are likely to be substantial with this approach."

In this paper, I develop a "Rule of Reason" approach, and call it the **Simplified Rule of Reason** approach, which is established by using common grounds across a number of proposals. It is designed to minimize the costs of the rule of reason approach while maintaining its philosophy that there should be no ruling before a thorough examination of the actual circumstances. We will use the relevant information required to assess whether predation has occurred in a particular circumstance, when normal equilibrium profits cannot be estimated.

5.3. Simplified Rule of Reason

Several main points need to be highlighted in the simplified rule of reason approach. Two sorts of considerations are discussed here: (1) barriers to entry, (2) sacrifice of profit. Furthermore, I will relate these two points to the Air Canada case and analyze them according to the general conditions of the aviation industry.

5.3.1. Barriers to Entry

As the Director of Investigation and Research of the Competition Act (1992, 12) points out:

In the context of a predatory pricing complaint, it is necessary to determine whether or not the alleged predator appears to have the power to recoup its initial losses by raising prices to above-normal levels once its rival has been driven from the market. This determination depends, to a considerable extent, on an assessment of the conditions surrounding effective entry to the industry, including potential for re-entry by any rivals forced out by the alleged predatory pricing behavior, or expansion by existing firms.

Demsetz (1981, 2) in his paper on barriers to entry, stated that whether market shares are

reflective of market power depends on barriers to entry. The barriers to entry concern any absolute advantages that incumbents may have relative to potential entrants which means that entrants have higher costs for any given output and thus may not be able to compete with incumbent. These advantages could arise from patents, trade marks or advertising affecting brand loyalty, or discounts on input prices and so on. The barriers to entry also concerns the size of sunk costs involved in entering the market. This in turn will depend on the nature of the product and the efficiency of the second-hand capital goods markets. Finally the barriers to entry concerns the extent to which entrants can foresee some abnormal profit upon entry due to the delayed response of incumbents and the time taken to establish equilibrium.

Other things equal, the entry of potential rivals will be more difficult, the greater the absolute cost advantages enjoyed by incumbents and the more substantial the sunk entry costs. Where the entry barriers are low, predation will be unlikely because it will not deter subsequent entry.

In the airline industry, entry means that a brand new airline company enters the airline market. Why does an airline company wish to enter the market? The obvious reason is to seek profit, but this can be deterred by significant entry barriers. Thus, entry barriers are one of the key points to the analysis of the predatory behavior. The Competition Tribunal (2001, 19-20) indicates the costs and barriers to sustainable entry which new entrants providing passenger airline services in Canada need to face including the high costs of purchasing aircraft, hiring flight crew and cabin crew and the hub-and-spoke flight system¹³. Over the past twenty years, the major airlines have increasingly emphasized the development of hub-and-spoke systems. O'Connor (2001, 23) writes:

The basic notion of a hub and spoke system is that flights from many

¹³ Many authors (e.g., O'Connor 2001 and William 1995) describe how such systems work.

different cities coverage on a single airport—the hub—at approximately the same time, and after giving the passenger sufficient time to make connections, all then leave the hub airport for different cities. Such a convergence of flights on a hub is often called a “connecting bank.” or “connecting complex.”

Furthermore, O'Connor (2001, 23-24) indicates how the development of hub-and spoke operations makes entry more difficult. Many economists (e.g. Gesell and Farris, 1992 and O'Connor 2001) believe that the motive of an airline to develop hub-and-spoke systems is to increase the number of passengers on its flights, so as to earn higher profits. If the carrier has a stronger hub, it makes it possible to offer the complete travel without transferring to another airline. For example, if an airline has a route from Vancouver to Toronto, it will be inconvenient for a passenger transferring to another airline for onward flights to Halifax, when acquiring a Toronto to Halifax. Thus, we can conclude that an airline with a strong hub-and spoke system can protect its traffic from being diverted to another airline. The need to be able to implement a strong hub-and spoke system may pose a serious financial burden to new entrants.

Demsetz (1981, 10) emphasizes the competitive advantages possessed by establish firms. He points out that a large firm and a long history convey information about a firm's ability to weather unforeseen risks and about its willingness to accept high risks. Larger, older firms generally will be able to borrow more cheaply than smaller, younger firms. Not only will new entrants be charged with a higher interest rate on debt than an established carrier, but also they may not have ready access to debt capital.

Here, I can conclude that if the barriers to entry are relatively high and the incumbent firm is either larger or older or in good financial situation, the incumbent has the potential ability to predate. Since the high barriers to entry can deter the entrants into the market after the incumbent predate one or several periods, the incumbent has the possibility to enjoy its high profit in the future.

In this case, from the report of the Competition Tribunal (2001, 15), Air Canada has an extensive domestic and international network and is affiliated with a number of international carriers through its participation in the Star Alliance of carriers. We can see that Air Canada has a better hub-and-spoke system and since it has longer history than other airlines, it is easier for it to obtain the debt capital to expand the systems in the Canadian aviation industry.

Air Canada has a 90% share of Canadian travel agency sales for domestic markets and at least a 75% share based on seat capacity, which means it has quite strong market power (Competition Tribunal, 2001, 8). And it also has a better hub-and-spoke system than other airlines. The evidence that Air Canada dominates the Canadian aviation market is overwhelming.

So we can see that as long as Air Canada eliminates the few entrants in the Canadian airline industry, it will have enough power to monopolize the whole Canadian aviation market and get high recoupment of profit in the future. The high barriers to entry in the Canadian aviation market now will add the possibility to deter the new entrants, which may make Air Canada have the intention to predate. However, it seems that Air Canada now does not have enough financial reserves to force the entrants to exit. If the entrants stick it out, then Air Canada's cash will run out quickly and it will have to declare bankruptcy.

5.3.2 Profit Sacrifice

Profit sacrifice is a key point for determining predatory pricing. Many economists have discussed this issue. Some argue from the sacrifice point of view, others argue from the recoupment point of view. However, profit sacrifice might indicate that it compares profit recoupment in the future. They are linked together.

Bork (1978) in his book "The Antitrust Paradox" pointed out that conscious voluntary

sacrifice may indicate that the firm thinks that it can thereby eliminate competition, and thus that harm is indeed a possibility. Bork (1978, 145) calls sacrifice "an investment in monopoly profits." A firm might need to sacrifice short-term profits, but not always. A firm may have good reasons to sacrifice short-run profits. For example, production today may lower future costs in an industry with learning-by-doing, as Carlton and Perloff (1994) describe above.

On the other hand, "sacrifice" in one product can be immediately recouped because it boosts profits in a complementary product. Thus sacrifice of short-run profits is neither necessary nor sufficient for harm (Gesell and Farris, 1992). They argue that without a prospect of recoupment, a profit sacrificing predation strategy makes no business sense at all and is clearly not rational. If recoupment is implausible, it casts doubt on any theory of rational predatory sacrifice. In other words, if we think the firm could not have expected to recoup its sacrifice, we should rethink whether there was a sacrifice at all.

In the Air Canada case, whether or not there was a short run profit sacrifice should be used to determine if Air Canada acted predatorily or not. Air Canada engaged in matching fares offered by low cost carriers without regard for profitability, and thus Air Canada could have been trying to eliminate low cost carriers to the extent that customers prefer to fly with them. So the dispute is thus: relative to what profit benchmark must Air Canada show losses or sacrifice in order to be considered to have acted in a predatory fashion?

The major problem in allocating revenue to routes is that a substantial proportion of airline passengers are traveling over many routes, but are charged an inclusive fare for the different parts of their journey. For example, Air Canada's passengers travel on tickets where the revenue has to be divided between different routes or between Air Canada and another airline. Air Canada then divides the revenue which it earns from tickets to embrace two or more of their

routes by the method which is used to divide income between airlines, namely in proportion to mileage.

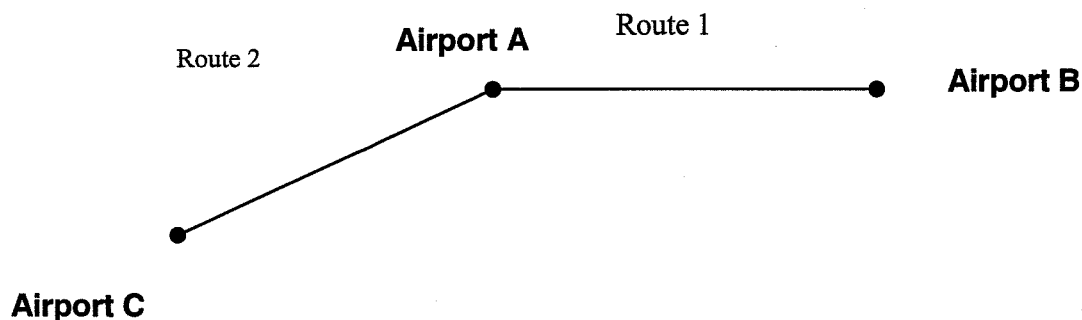
This is a commonsense approach to dividing revenues, but it does have limitations. These became apparent in an important American case in 1980 where an Administrative Law Judge and the Civil Aeronautics Board (1980) had to decide whether the fares charged by American carriers in international markets were unfair and unreasonable. Nile and Kate (2000, 807) considered that there is a growing convergence of predatory pricing standard in some countries, especially in Canada and the USA. The standards are based on the similar market structure in some cases, i.e. high market share for the alleged predator, high entry barriers, since complaints of predatory pricing are a lot. We can see the Air Canada case is similar to the American case in 1980 based on the similar market structure.

The Civil Aeronautics Board (1980, 21) points out that it is hard to determine which level of price is the competitive price level. In the airline industry, it is easy to define the short-run marginal cost to be very low once capacity is provided. Since by adding extra passenger into a flight, the cost might include relatively small items such as the cost of extra meals, the extra fuel required because of the increase in all-up weight, travel agency's commissions and extra expenditure on ticketing and passenger handling. Because these extra costs are low, a carrier which was making losses in order to prey could have an average yield above marginal costs defined in this way. The specific cost structure of this industry is such that cost-based rules, such as the one developed by Areeda-Turner (1975), are difficult to apply to it, at least as the key criterion. Since it is hard to calculate the marginal cost of carrying individual passengers in the airline industry, non-cost-based indicators may be vital for assessing predatory behavior within this industry. So it is not desirable that an airline should base its fare on marginal cost.

There are many books describing how the revenues and costs are divided between different airlines and/or routes, for example the Commission of the European Communities (1991) and Civil Aeronautics Board (1980). They argue that it will be advisable to consider the relationship between costs and revenue at the level of the individual route to see whether the incumbent airline is making losses on the particular route where predation is alleged. First, let us see how the airline companies try to defend themselves from predatory behavior; **Figure 1** illustrates this problem.

Suppose an airline operates a major route between airports A and B (route 1) and a branch route from airport C to A (route 2). If the airline is accused of predation on route 2, (which means that an allocation of costs and revenues to route 2 shows costs exceed revenues). An airline might argue that route 2 feeds traffic into route 1, and thereby increased the profits on route 1, so that the airline's total profits on its network would be reduced if capacity on route 2 were to be reduced or fares increased. Hence route 2 contributes "excess profit" to route 1, then route 2 might show a profit and as long as route 1 remains profitable when the "excess profit" is transferred. In such circumstances, there is no evidence of losses which can be judged as a sign of predator.

Figure 1 Network and Contributory Profits



Source: Civil Aeronautics Board, 1980, 25

One regulatory authority which constructed its own fare model was the U.S. Civil Aeronautics Board. The model was constructed during the Domestic Passenger Fare Investigation (Civil Aeronautics Board, 1980). It demonstrates that it will be for those airlines charging predatory pricing to show that the losses from the route 2 (on which predation is alleged) are more than offset by the consequent “excess profit” on the route 1 (from which traffic is fed). So route 1 cannot be debited with any losses that are incurred on route 2. Airlines which decide to use such “system effects” as a defense will have to provide a full and convincing analysis of the financial consequences of operating the route that is under investigation at a loss and show that the overall effect on profits is favorable.

Table 5

Air Canada’s Income Statement (In Millions)

	2001	2000	1999
Operating Revenues	4,908	9,283	6,443
Operating Expenses	5,272	9,019	6,066
Operating income	-364	86	377
Non-operating income	-77	-213	-116
Income (loss) before income taxes	-441	-127	261
Income (loss) for the year	-714	-82	140

Source: Maheu and Balanger (2001, 28)

In this case, the Competition Tribunal (2001) stated that Air Canada substantially lowered its average fares to match the entrants’ fare without regard to the effects of these fares on its profitability. While Air Canada (Competition Tribunal, 2001, 6) pointed out that the Competition

Tribunal ignores the fact that frequency of service is part of Air Canada's product as a "Major Network Carrier" while only focusing on the "matching fares". Product and schedule integrity are crucial to a network carrier and can result in unprofitable flights on a route in order for other flights on the same route to be profitable.

From table 5, we can see that the overall profits of Air Canada since 2000 (which is also the period of time that the Competition Tribunal asserts that Air Canada predated) are negative. However, Air Canada cannot provide a full and convincing analysis of the financial consequences of operating the routes that shows that effect on profits and operating income were positive. It is thus not clear why Air Canada undertook these pricing measures except but to predate. This is similar to the "Domestic Passenger Fare Investigation" case described by the Civil Aeronautics Board (1980). According to Civil Aeronautics Board's model, it certainly suggests that Air Canada predated. Furthermore, Edlin (2002) draws the similar conclusion that monopolies cut price dramatically in response to entry *and* are exclusionary because their behavior discourages entry even if they are only matching the rival's prices, which also supports my conclusions.

6.0 Conclusions and Recommendations

Predatory behavior has long been a contentious problem. This paper has considered two major issues, the feasibility of predatory pricing and the tests of predatory pricing arising out of the Air Canada case.

Selten's (1978) "Chain Store Paradox" gives a game theoretic treatment of multi-market monopoly under complete information to show that predation cannot occur in equilibrium.

However, with imperfect information, Milgrom and Roberts (1982) point out that it can lead to predation. In the Air Canada case, I consider that both the incumbent and new entrants can obtain complete information. In the aviation industry today, the computer reservations systems allow agents to obtain immediate information, which can be considered as "perfect" information. It is not likely that a price war would sufficiently deter the entrants, since everybody knows that the low price cannot be permanent. So it would be irrational for Air Canada to predate in this market.

Another important point that needs to be considered to determine the feasibility of predation is comparative costs. Usually, we think that the incumbent has more of a cost advantage than the new entrants. While McGee (1958) points out that foregone profits or financial costs must be larger for the incumbent than for the entrant. From the financial data, we can see that Air Canada has the cost disadvantage compared to the entrants (e.g. Westjet), so Air Canada lost money to sell the tickets at the same price as the Westjet did. It explains why Air Canada is reported continuing losing money while Westjet gains profit at that price due to its low cost system.

It could be rational and credible for an incumbent to predate for a finite period of time if it has larger financial reserves -- a "long purse"-- and thus be able to sustain larger losses and sustain them longer. In this case, it seems that Air Canada has limited financial resources to withstand the losses incurred if a predatory price war incurred. If the entrants (Westjet, Canada3000) persist, then Air Canada's cash will run out quickly and it will have to declare bankruptcy.

In assessing whether predation is taking place, I have developed a "Simplified Rule of Reason" based on the literature (e.g. Scherer, 1976 and Philips, 1987). It consists of two stages:

the first stage involves the investigation of barriers to entry, which can show whether the incumbent has the ability to predate. If the barriers of entry are relatively high and the incumbent firm is either larger or older or in good financial situation, the incumbent has the ability to predate to get higher profits in the future. Moreover, the predatory pricing may itself operate as an effective hindrance to new entry. In this respect predatory pricing should be given a place in the analysis of barriers to entry. If these conditions are satisfied, the second stage deals with the issue of detecting whether predation has actually taken place.

Predation in the airline industry might take the form of action to increase capacity by scheduling more services by the incumbent after entry, as well as action in cutting prices. In this case, price-matching by a high-cost incumbent (Air Canada) could be a predatory behavior response to the entry of low-cost firms when there are high barriers.

In the second stage, we need to look through the evidence of the incumbent's sacrifice of present profits to detect whether predation has actually taken place. Bork (1978, 145) calls sacrifice "an investment in monopoly profits". However, industries should be examined on a case-by-case basis since they have different economic conditions. This could involve the use of an economic modeling approach (e.g. the Philips approach, 1987). If the data do not permit this, other relevant information can be considered.

Allocation of revenues and costs by route presents some problems in the airline industry. But previous studies of revenue and cost allocation in the airline industry show that it will be desirable for the incumbent airlines to demonstrate convincingly that unprofitable routes do contribute to the airline's overall profitability by feeding traffic into other routes. In this case, Air Canada has failed to provide a convincing analysis of the financial consequences of operating the routes so that the overall effects on profits and operating income are positive.

Regarding Air Canada's financial problems, a few suggestions can be provided. First, predation is not the only way to raise barriers to entry and to competition. For a firm which wishes to prevent competition, the costs of predation must be lower than the cost of alternative means of strategic entry deterrence. However, predation is likely to be a less effective means of deterring entry in the airline industry than other methods. In particular, predation may be less effective than the acquisition of the entrant by the incumbent (McGee, 1958). Although, according to Air Canada's poor financial performance, it may not have sufficient funds to acquire the new entrants.

Overall, we find that predatory pricing continues to be a complicated and difficult subject to study. Certain aspects of Air Canada's behavior appear to support the view that it predated, like its pricing policy after new entry. However, it is difficult to be conclusive on that front. Furthermore, Air Canada's financial situation is rather precarious; it is not clear how it would be able to sustain losses over the short to median term in order to drive out competitors. While Air Canada is likely to remain a dominant carrier in Canada, it seems clear that it will have to contest with some competitors, especially on the more lucrative routes.

References

Areeda, P. and D.F. Turner (1975) 'Predatory Pricing and Related Practices', *Harvard Law Review*, 88, 697-733

Arrow, K. J. (1962), 'The Economic Implications of Learning by Doing', *Review of Economic Studies*, 29, 155-173

Baumol, W.J. (1979) 'Quasi-permanence of Price Reductions: Policy for Prevention of Predatory', *Yale Law Journal*, 89, 1-26

Bork, R. H. (1978) '*The Antitrust Paradox*', New York : Basic Books

Cabral, Luis MB; Riordan, Michael H. (1994), 'The Learning Curve, Market Dominance, and Predatory Pricing', *Econometrica* , 62, 1150-1140

Carlton, D. and J. Perloff (1994), '*Modern Industrial Organization*', Harper Collins, New York

CBC news (2003) 'WestJet Profits and Revenue Climb', available at <http://www.cbc.ca/stories/2003/10/20/westjet201003>

Civil Aeronautics Board (1980), '*Costing Methodology: Domestic Fare Structure*', CAB, Washington DC.

Commission of the European Communities (1991), '*Predatory Behavior in Aviation*', Office for Official Publications of the European Communities

Competition Tribunal (2001), 'The Commission of Competition and Air Canada', available at <http://www.ct-tc.gc.ca/engalish/cases/ct-2001-002/0001.pdf>

Competition Tribunal (2001), 'The Commission of Competition and Air Canada response', available at <http://www.ct-tc.gc.ca/engalish/cases/ct-2001-002/0002.pdf>

Demsetz, H. (1981), '*Barriers to Entry*', University of Toronto

Director of Investigation and Research, Competition Act (1992) '*Predatory Pricing Enforcement Guideline*', Supply and Services Canada

Edlin, Aaron S. (2002), 'Stopping Above-Cost Predatory Pricing', *The Yale Law Journal*, 111, 941-991

Gesell, L. E. and M.T. Farris (1992) 'Airline Deregulation: An Evaluation of Goals and objectives', *Transportation Law Journal*, 21, 116

Katz, M. and C. Shapiro (1994), 'Systems Competition and Network Effects', *The Journal of*

Economic Perspectives, 8, 93-115

Klevorick, Alvin K. (1993), 'The Current State of the Law and Economics of Predatory Pricing', *American Economic Review*, 83, 162-167

International Air and Sea Freight Commission (2001) "World Airline Report 2001", *Air Transport World*

International Air and Sea Freight Commission (2001) "Annual Report 2002 for Westjet", *Air Transport World*

LeBlanc, Greg. (1992), 'Signalling Strength: Limit Pricing and Predatory Pricing', *Rand Journal of Economics*, 23, 493-506,

Lindsey, Robin; West, Douglas S. (2003), 'Predatory Pricing in Differentiated Products Retail Markets', *International Journal of Industrial Organization*, 24, 551-592

Maheu, S. and M. Balanger (2002), '*Air Canada, Good Intentions are Not Enough!*', Canada Parliament 2001

Mastutes, C. and P. Regibeau (1988) 'Mix and Match: Product Compatibility without Network Externalities', *Rand Journal of Economics*, 221-234

McGee, J.S. (1958) 'Predatory Price Cutting: The Standard Oil Case', *Journal of Law and Economics* 1958, 137-169

McGee, J.S. (1980) 'Predatory Pricing Revisited', *Journal of Law and Economics*, 289-331

Meyer, J. R. (1962) 'Regulation, Competition, and Rationality for Canadian Transportation', *Canadian Journal of Economics and Political Science*, 599-605.

Milgrom, P. and J. Roberts (1982) 'Predation and Entry Deterrence', *Journal of Economic Theory*, 27, 280-312

Niels, Gunnar; ten Kate, Adriaan (2000), 'Predatory Pricing Standards: Is There a Growing International Consensus?', *The Antitrust Bulletin*, 45, 787-809

O'Connor, William E. (2001) "*An introduction to Airline Economics*", Westport, Praeger

Philips, L. (1987), 'Predatory Pricing', Commission of the European Communities

Posner, R.A. (1976) 'Antitrust Law, an Economic Perspective', *University of Chicago Press, Chicago*, 27

Roth, David (1996), 'Rationalizable Predatory Pricing', *Journal of Economic Theory*, 68, 380-396

Scherer, F. (1976) 'Predatory Pricing and the Sherman Act: A Comment', *Harvard Law Review*, 89,869-890

Seleton, R. (1978) 'The *Chain Store Paradox, Theory and Decision*', Industry Canada, 127-159.

ten Kate, Adriaan; Niles, Gunnar (2002), 'On the Rationality of Predatory Pricing: The Debate between Chicago and Post -Chicago', *The Antitrust Bulletin*, 47, 1-24

Williams, G. (1995), '*Airline Industry and the Impact of Deregulation*', Ashgate Aviation

Williamson, O. (1977) "Predatory Pricing: A Strategic and Welfare Analysis" *Yale Law Journal*, 77, 284 - 295

Zerbe, Richard O, Jr; Mumford, Michael T. (1996), 'Does Predatory Pricing Exist? Economic Theory and the Courts after Brooke Group', *The Antitrust Bulletin*, 41, 949-985