

Economics at 35,000 Feet:
A Look at the Economic Implications of Frequent Flyer
Programs

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1 Introduction

On the surface, all airplane seats are equal. A passenger can fly between Chicago O'Hare and Los Angeles' LAX on many different carriers, and all will transport him the 1,744 miles in roughly the same amount of time. Because of safety regulations imposed by the government, all carriers on this route should have the same level of safety, so there is no reason to expect that a carrier is intrinsically safer just because its ticket prices are more expensive. It could be expected, then, that airlines should follow a pretty uniform pricing strategy (at least for identical routes) and that all passengers should pay the same price.

Airlines, however, have invented a complicated pricing scheme that is designed to price discriminate as much as possible. Airlines charge just about everyone on an aircraft different prices. Prices vary based on how far out the ticket was booked, the number of days spent at the destination, the final destination, etc. Even on an identical route, there are many different prices available for the customer to choose from. A search on seatcounter.com shows that travelers between Madison, WI and LAX on the morning of May 9, 2009 have a choice between five airlines (US Airways, American, United, Northwest, and Delta), three connecting hubs (Denver, O'Hare, and Minneapolis/St. Paul), and 20 booking classes¹ spread over the five airlines. That means that travelers have 20 different prices available to them for a single trip. Since usually two to three of these indicate first class², that leaves about 18 different fares for identical coach seats.

Airlines also use programs like frequent flyer miles to encourage passengers to think of other airlines' flights as non-substitutable alternatives. In this paper, I seek to examine how the airlines price their product and how they use price discrimination to maximize their profits. To achieve this, I will present some of the previous literature on airlines

¹These are not class of service class (coach vs. first class); they indicate the price paid. See <http://www.travelterminal.com/whatsinafare.shtml> for more information.

²Different airlines use different codes for each class. Most use F for full price first class and Y for full price coach. After that, there is usually a discounted first class code, two business class codes and the rest are left for different classes in coach

and frequent flyer programs in section 2 and then provide analysis from class in section 3.³ I start with a brief introduction to frequent flyer programs.

1.1 Frequent Flyer Programs

According to the website frequentflyer.com (a magazine geared toward frequent flyers), two key events sparked the advent of frequent flyer programs (FFP). First, the airline industry was deregulated in 1978. Deregulation forced the airlines to compete outside of a strictly regulated market, and with increased competition, airlines needed to differentiate themselves. Second, computerization allowed the airlines to easily keep track of each passenger's accumulated miles, an essential part of a FFP.

American Airlines introduced AAdvantage, the first FFP, in 1981. By keeping track of the number of miles each passenger flies, American is able to reward the best customers with free flights and class of service upgrades. This keeps passengers loyal to a particular airline, and is still the goal of current FFPs. There are currently more than 70 FFPs world-wide, with more than 100 million enrolled members (with considerable overlap between programs). Frequentflyer.com reports that 10 million awards are redeemed each year, with the most popular award routes being from the US mainland to Hawaii and London.

Many airlines also grant frequent flyers higher "status" as they earn more miles. For example, Northwest grants customers silver, gold, or platinum status after they have flown 25,000, 50,000, or 75,000 miles respectively in a given year. Some programs offer a fourth level at 100,000 miles. These elite status programs give extra benefits to the most frequent frequent flyers, including free upgrades to first class, bonus miles and quicker service. Because of reward tickets and elite status, travelers who fly with any regularity have an incentive to pick an airline and stick with it instead of always taking

³I should state upfront that I will only consider airlines for the purposes of this paper. While it shouldn't change the analysis much to consider alternatives such as Amtrak or Grayhound, these modes of transportation are beyond the scope of this paper

the lowest priced ticket.

Delta sums up the rationale behind having a FFP in its 2008 annual report:

“Delta and NWA both have frequent flyer programs, which are designed to retain and increase traveler loyalty by offering incentives to customers to increase travel on each airline” (p. 5).

By allowing customers to earn credit toward free travel, an airline encourages customers to do all their travel in one place. This idea is expanded on extensively in the next section where I review previous FFP literature.

2 Literature Review

In 1990, Robert Cairns and John Galbraith of McGill University published *Artificial Compatibility, Barriers to Entry, and Frequent-Flyer Programs*. In this paper, Cairns and Galbraith argue that FFPs create a barrier to entry even if the existing firms have no real cost advantage. If a particular airline dominates an airport, there is a good chance that a large percentage of flyers from that airport are members of that airline’s FFP. Cairns and Galbraith argue that this causes flyers flying out of the airport more likely to choose other flights from that airline instead of shopping around. They label this “artificial compatibility” because it links two products - or routes in this case - that are otherwise unrelated. A flight between two cities is unrelated to a flight between two other cities, but frequent flyer programs cause flyers to think of them as related because they both build points toward an award flight. If a traveler uses two different airlines for the two flights, miles will be credited to two different accounts. This extends the time it takes to get an award.

The more points flyers build with any one particular airline, the more costly it is for them to fly with another carrier (at least until the points are redeemed). It is not more costly in the sense that they pay more out of pocket - in fact it may be cheaper - but they give up the ability to earn miles with all in one place. Cairns and Galbraith

suggest that this creates a principle-agent problem where employees of companies have a different incentive than the company paying for the flight. The company would like the employee to take the cheapest flight whereas the employee does not care so much about the monetary cost, but wants to earn miles with the carrier of his choice. This cost to the traveler can also be thought of as a cost that an entering airline must overcome. While the entering firm may have identical (explicit) costs as the incumbent, it must deal with customers who view it as very costly to switch. This allows the incumbent firm to effectively price-discriminate against customers who view it as too costly to switch to a lower-cost alternative.

In a report to competition authorities in Denmark, Finland, Norway and Sweden, Norwegian School of Economics and Business Management economists Frode Steen and Lars Sørsgard analyze three different ways that airlines price discriminate. First, they look at what they call “versioning”, a form of second-degree price discrimination where customers can pick a high cost, high service ticket (first or business class, for example) or a low cost, low service ticket (coach or economy class). Second, they discuss a form of third degree price discrimination where the airlines give large customers (usually businesses) discounts that are not available to other customers. Third, the authors discuss frequent flyer programs, which they label as a form of second degree price discrimination.

Steen and Sørsgard argue that, if output increases as an effect of versioning, total welfare will improve. Even though there is price discrimination taking place, the authors argue that welfare increases because people are able to purchase the good - air travel in this case - who would otherwise be unable to. Conversely, the authors explain that discounts to large firms causes a drop in welfare due to these discounts falling apart under competition. When comparing welfare under competition and under monopoly, welfare will always be higher under competition.

Steen and Sørsgard then turn their attention to frequent flyer programs. They argue that FFPs increase a consumer’s willingness to pay for a flight because of the promise

of a future free trip. The airline knows this, and can thus charge a higher price. This means that FFPs are welfare-increasing if the extra value earned by the consumer is greater than the loss of surplus from the higher ticket price. When the market is a competitive one instead of a monopoly, Steen and Sørsgard argue that FFPs are harmful to the amount of surplus consumers earn. The reason for this parallels with Cairns and Galbraith's work. FFPs cause consumers to be loyal to a particular firm, which makes it harder for other firms to enter. This reduces the amount of competition in the market place and keeps prices high.

The previous two papers have presented a theoretical look at the airline industry and the effects of FFPs. The next three papers take an analytical approach to quantify the effects of these programs. In 2008 Mara Lederman published *Do Enhancements to Loyalty Programs Affect Demand? The Impact of International Frequent Flyer Partnerships on Domestic Airline Demand*. In this paper, Lederman is able to model the effect talked about in both of the theoretical papers, that FFPs encourage consumers to build up miles with one airline thereby making it harder for entering firms to gain market share. Because it is very hard to quantify the impact of FFPs on travelers' decisions, Lederman uses FFP enhancements to capture this effect. She measures demand changes resulting from changes to an airport's dominant airline's FFP. The intuition here is that if Northwest makes an agreement with KLM allowing Northwest's passengers to use WorldPerks Miles on KLM flights Northwest miles become more valuable without changing anything about Northwest's domestic flights. In other words, consumers (particularly those flying out of Northwest's hubs) are now going to be more loyal to Northwest not because Northwest's actual product is now more valuable but because the miles earned on Northwest can now be used for a valuable international trip. On the other hand, travelers flying out of Chicago, where Northwest has a very small presence, should see very little value in a partnership between Northwest and KLM.

To estimate this effect, Lederman uses a model where the number of passengers on a

particular flight is a function of the fare, extensiveness of the airline’s FFP and dummy variables indicating if the flight is departing from a hub and if it is a direct flight. It also includes fixed effects for airline-specific and quarter-specific impacts on demand. The key component of the model is an interaction term between the extensiveness of the FFP (measured as the number of flights where the miles can be redeemed or the number of destinations travelers can use miles to reach) and a dummy variable indicating if the flight originates from a hub, $\beta_3 FFP_j^t * DEP_HUB_{jo}$ where j indicates the airline and o is the airport of origin. If the estimate for β_3 is positive, the airline’s enhancement to their FFP increased demand more than demand would have increased without the enhancement. Because the fare may be correlated with the error term, Lederman instruments for the fare with a dummy variable indicating whether or not the flight is a direct flight and a continuous variable indicating the number of routes available between two cities besides the direct route.

Lederman estimates her model using both measures of FFP extensiveness. When Lederman measures the extensiveness of FFPs by using the number of flights miles can be redeemed on and does not instrument for fares, she finds that the fare has a small, but significant coefficient. She also finds that the estimate for β_3 is negative but not all that significant (meaning enhancements reduce the number of passengers). After instrumenting for fare as described above, the coefficient on fare becomes larger and more significant and β_3 becomes positive and highly significant. She finds that an increase in the number of flights that an airline’s miles can be used on by 1,000 increases demand for flights departing from that airline’s hub by 2.2 percent on top of all other demand changes. When Lederman uses the number of destinations reachable using miles as the measure of extensiveness, she finds that each additional destination increases demand by 0.24 percent. It makes sense that this is smaller than the other measure as multiple flights can reach the same destination.

Another paper from Mara Lederman sets out to analyze whether or not FFPs are a cause of a “hub premium,” a phenomenon where airlines are able to charge more for

flights originate or arrive at one of their hubs. Published in 2007, *Are Frequent Flyer Programs a Cause of the “Hub Premium”* expands on previous literature that found the existence of a hub premium by trying to explain where it comes from. Whereas she uses international partnerships in the previous paper, Lederman uses domestic partnerships in her analysis here. Basically, she wants to know what happens to an airline’s prices for flights originating at a new partner’s hub. For example, what happened to Delta’s prices for flights out of Denver after they made a deal with United? In the late 1990s, six airlines formed three partnerships allowing their customers to earn and use miles on the other airline as well as their own. This effectively expands the benefits of flying with an airline without any actual change to the in-flight product. Lederman explains two different effects of these partnerships. First, it will encourage already loyal flyers to stick with their airline because the miles that they are earning, and already have banked, are now more valuable because they can be used more widely. Second, and the effect of interest for this paper, is that members of the other airline’s FFP will now view the first airline’s flights as suitable alternatives.

Lederman uses this second effect to measure how enhancements affect prices. She compares price changes for an airline’s flights from their partner’s hub to price changes on their flights between two non-hub airports. To do this, Lederman presents a model where the average passenger-weighted fare is a function of the number of weekly trips on this route, the distance of the route, and a series of dummy variables indicating if there is a partnership in effect, if the flight is coming from a hub of various sizes and if the flight is coming from a partner’s hub of various sizes. Marginal effects of a partnership program are measured in the model for both flights from an airline’s hub and from an airline’s partner’s hub. She finds that there is no statistically significant increase in fares for flights originating at a partner’s small hub while there is a statistically significant increase in prices for flights originating from a partner’s large hub. This indicates that FFPs do, indeed, contribute to higher prices for flights originating or terminating at an airline’s hub.

Finally, Lederman repeats the estimates only using fares from the 80th or 20th percentile. The idea behind this is that the 20th percentile captures leisure travelers who are very price-responsive. Because they probably don't travel much, they also probably don't value FFP miles very much. The 80th percentile of fares captures primarily business travelers who are probably not very price-responsive and place a large value on FFP miles (see above for a discussion of a possible principle-agent problem here). The results confirm what seems logical. Enhancements to an airline's FFP have no statistically significant impact on lowest level prices. The most expensive fares, however, are shown to rise by seven percent after a partnership takes effect. Lederman says that her results show that about 25 percent of the hub premium may come from FFPs.

In 1992, Steven Nako published *Frequent Flyer Programs and Business Travelers: An Empirical Investigation* where he investigates how business travelers make decisions about which airline to use when FFPs are in effect. Using data from three companies (two in Philadelphia and one in Baltimore), Nako estimates how a traveler's valuation of a plane ticket changes when they are members of a FFP. The explanatory variables include the number of flights the traveler could have taken, the length of the flight in minutes, the fare paid and a dummy variable indicating membership in a specific airline's FFP. The left hand variable used is a traveler's utility. Because he never clearly states how he derives this, I can not figure out how he reaches his estimations as utility is not directly measurable and fare is included as an explanatory variable.

Nako's results show that FFPs have a significant impact on the value a traveler places on a particular flight. The estimate for the FFP dummy variable is 0.96, which he divides by the fare coefficient (0.024 in absolute value) to get that travelers value FFPs at \$40. Also, he finds that the value customers place on the FFP for any airline grows by \$4.16 for every 10 percent the airline's market share grows at the departing airport. Nako's results show that FFP members are slightly less price-responsive than non-members. Finally, it is also shown that the value traveler's place on a large airline's

FFP is reduced as smaller competitors build up more of a presence in a city.

3 Economic Analysis

In the previous section, I provided a brief review of the literature focusing on Frequent Flyer Programs. Most of these papers conclude that airlines are able to effectively price discriminate against certain passengers based on membership to FFPs. Lederman concludes that FFPs increase demand and increase prices. Nako reaches similar conclusions. In this section, I tie together the themes from the literature cited above with the topics covered in class.

A common theme among the papers presented here is that the first airline to set up a hub in a particular city has an automatic advantage. Northwest is the dominant airline in Minneapolis/St. Paul and Detroit while United is the dominant airline in Denver. This is not because people in Detroit have some emotional attachment to Northwest. The reason travelers flying out of Detroit fly Northwest more frequently is because that is the airline that has a hub there. By being the first airline to set up a hub in Detroit, Northwest gained an advantage not enjoyed by any other airlines in that city. This is clearly a first-mover advantage. Other airlines wanting to fly out of Detroit must work harder to gain market share than Northwest must work to keep market share. In their discussion on barriers to entry, Carlton and Perloff state that an incumbent firm can maintain high prices even after a second firm enters if the new firm must spend a lot of money on marketing (p. 80). A new airline trying to take market share away from an established airline must fight much harder for passengers than the original airline had to do when it entered. This means that the first airline to establish a hub in a city gains an advantage that no other, subsequent, airline can enjoy. Without FFPs in place, there would be a much lower hurdle for an entrant to clear in order to gain market share at another airline's hub. As I mentioned in the introduction, without FFPs, all airlines should be pretty good substitutes for one another. But if an airline

can keep passengers at its hub loyal due to their stockpile of FFP miles, it does not need to fight nearly as hard to keep passengers from going to a competing airline.

Time Magazine reported in March 2009 that, in an attempt to make their programs even more enticing, American, United and Continental have all made it easier to reach elite status. All three FFPs now give travelers double the elite-qualifying miles. This means that a 500 mile flight will earn 1,000 miles toward the 25,000 miles required for the entry-level elite tier. If base members are loyal to an airline, elite members tend to be even more loyal. Many times elite members gain special privileges such as first-class upgrades or free exit row seats. If an elite flyer can fly the airline he or she has elite status on or another, cheaper, airline, it takes a fairly substantial price difference to make up for the benefits received on the more expensive option. Promotions such as the ones talked about in *Time* make it even more difficult for travelers to switch loyalties. If an airline can find policies to make customers more loyal in an economic climate where prices matter even more than normal, it has a major incentive to enact those policies. American, United and Continental all seem to be doing just that.

Steen and Sørsgard argue that FFPs are a form of second degree price discrimination. I think that these programs are more of a combination of second and third degree price discrimination. FFPs are clearly a form of second degree price discrimination because they are essentially a volume discount. If a traveler flies 25,000 miles, he or she earns a free flight. These miles are worthless, however, if that threshold is not met. A person with ten thousand miles get nothing more than a person with no miles,⁴ except that they are closer to a free flight. If a free flight “costs” 25,000 miles and the average flight a customer takes is 1,000 miles it take the customer 25 flights to earn a free flight. If all flights cost the same amount, the airline could give the passenger 4% off on each flight for an equivalent benefit. Airlines do not do this, however, because they only want to

⁴Some FFPs allow people to cash in miles for magazine subscriptions or the like. I am ignoring this because no one builds up miles to get a free subscription to *People Magazine*. This is mostly offered for customers who have switched to a different airline.

give the discount to people who consolidate their travel with one airline.

Frequent Flyer Programs are also a form of third degree price discrimination because they allow airlines to charge different groups of people different prices. Nako finds that FFP members are less price responsive than non-members. This means that airlines can offer lower prices to non-members and higher prices to members. This has become easier to do with the advent of website such as Priceline.com and Expedia.com. Websites that give travelers a list of the cheapest flights are catering to travelers who are quite price responsive and are willing to travel any airline to get the cheapest flight. If cost is the most important factor, these people probably place a very low value on the miles that can be earned. However, people who look for a specific airline's flights (though the airline's website or call center or a travel agent) are probably less price responsive and place a high value on the frequent flyer miles that they will earn. If airlines believe that these two different types of consumers tend to buy their tickets in two different ways, they can easily offer different prices to different people. This is, of course, made easier by the fact that people can not resell their ticket. A people who places a low value on FFP miles can not buy a cheap ticket from Priceline and sell it to a person who places a high value on FFP miles because the ticket comes with the buyer's name on it. The government prevents resale by checking drivers licenses at security checkpoints. If the name on the license does not match the name on the ticket, the passenger may not be allowed to fly. The airlines are able to use the government to enforce their desire that people buy the ticket at the price geared toward them.

Another way that price discrimination can be implemented is by selling two versions of a product with different quality levels but having a price difference greater than the cost difference. There is no question that a quality difference between first class and coach exists. Does that quality difference justify the (sometimes much) higher price? Searching on Northwest's website, a flight (NW311) between Minneapolis/St. Paul and Los Angeles departing on June 5, 2009 and returning on June 8, 2009 costs \$1,030.70 for first class and \$249.20 for coach. While the first class price says that it includes

breakfast, it is highly unlikely that the breakfast costs \$781.50. Even if free alcohol, more attention, wider seats, and the lost opportunity to earn money from selling more coach tickets (there are usually fewer first class seats than the number of coach seats that could fit in the same area) are included in the cost, it is still unlikely that the cost difference is that high. If it is true that airlines raise the price for first class more than the cost difference, they are price discriminating against first class passengers. All seats on the plane get passengers to the same destination, but different classes of service are a great way to charge some customers a lot more than others for two products that are not greatly differentiated.

4 Conclusion

This paper has taken a look at the effects that frequent flyer programs have on demand for air travel. The consensus of the papers reviewed is that members of FFPs place a larger value on the airline of travel than flyers who are not members. It has been shown in empirical work that this allows airlines to charge a higher price for flights where a large percentage of travelers are members of the airline's FFP (particularly flights from or to hubs). FFPs also allow airlines to price discriminate by charging higher prices in the most expensive parts of their fare structure, which are usually the tickets bought by business travelers who value FFP miles. FFPs may or may not be good for society's welfare, but they are an effective way for airlines to charge different prices to different people for the same product.

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