

# The Effects of Deregulation on the U.S. Airline Industry

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## Abstract

*This paper investigates the financial performance of the U.S. airline industry, especially the industry's sensitivity to business cycles, since the 1978 passage of the Airline Deregulation Act. The industry's potential return to profitability through restructuring, particularly through its advocacy and pursuit of globalized markets, is explored. Altman's Z-score model, which reflects 22 financial items (obtained from the Industrial Compustat) for each airline company, is applied to illustrate the stability of the industry during the 1982-1989 period and its deterioration since 1989.*

## Introduction

When Congress passed the Airline Deregulation Act (ADA) in 1978, the controlling idea was to encourage competition to promote lower fares and better service. However, in the wake of deregulation, the tidal wave of bankruptcies in the airline industry has raised serious concerns as to whether the financial conditions in the industry are more unstable than anyone suspected in 1978.

The central theme in this study is the fundamental soundness of the 1978 Act. In short, were the assumptions behind this legislation appropriate? Did deregulation promote better service to the consumer? Finally, did it result in profit for airline companies in the long run?

## Evolution of the U.S. Airline Industry

Before 1938, the U.S. airline industry operated in a laissez-faire environment. "During the great depression, Congress concluded that the economic condition of the airline industry was unstable and that a continuation of its anemic condition could imperil its tremendous potential to satisfy national needs for growth and development (Dempsey & Goetz, 1992)." In 1938, Congress added airlines to the regulatory scheme and pro-

claimed the Civil Aeronautics Act of 1938.

During the 1960s and 1970s, the industry's mediocre performance under Civil Aeronautics Board (CAB) regulation was highlighted by the performance of unregulated carriers in intrastate markets. These intrastate carriers managed to provide service at lower fares and yet earn higher profits than the regulated carriers. Consequently, many industry critics began to question the efficiency of the Board's regulation.

In the mid-1970s, the Senate Judiciary Committee and the CAB concluded that more relaxed regulation became necessary. By 1976, the CAB began to liberalize its policies, and in the fall of 1978, Congress passed the Airline Deregulation Act. The act mandated a gradual elimination of government control over entry, exit, route structures, and fares. Since then, the industry has been battered by a wave of new entries and mass exits.

During the past 14 years, some 80 new airlines have cropped up, each providing scheduled passenger service. In February, 1984, at the peak of this expansion, the total number of carriers (if one counts charter and cargo carriers) rose to 123

(FAA Forecast, 1989).

Today, more than half these carriers no longer exist. Some have become commuter airlines; others have gone into bankruptcy protection; and still others have been lost to acquisitions, mergers, and buyouts. The consolidation phase began in 1979 with the merger of Southern and North Central Airlines to form Republic Airlines. At present, eight major carriers dominate 94 percent of the domestic passenger market (Dempsey & Goetz, 1992).

### Globalization

In 1985, with United's acquisition of Pan Am's Pacific routes, another phase of the deregulation process began--the process of globalization. From 1985 to 1989, major American carriers were in an "Offensive Stage." With comfortable balance sheets and a favorable economic environment, these carriers launched ambitious expansion plans by acquiring overseas markets.

However, from 1990 to 1992, a "Defensive Stage" ensued. Battered by economic recession and fare wars, American carriers suffered huge losses. At the same time, foreign carriers, especially European and Canadian carriers, were anxiously looking for opportunities to access the U.S. air-traffic market. They searched for weak American carriers for acquisition. Consider, for example, Dutch Royal Airlines' takeover of Northwest Airlines and Air Canada's acquisition of Continental. Despite opposition from other American carriers, targeted U.S. airlines had no other choice but to accept these acquisitions; they needed an infusion of cash in order to stay alive.

Because of unfair competition from airlines enjoying bankruptcy protection, most major U.S. airlines have not only suffered big losses but also have incurred huge debts. Moreover, if foreign airlines can access the U.S. markets by acquiring weak American carriers, while other American carriers cannot penetrate overseas markets to compete with foreign carriers on "a level playing field," then it appears that many major U.S. airline companies will soon be either acquired

by foreign competitors or forced into bankruptcy protection.

Recognizing the airlines' critical position, the Clinton administration is aggressively pursuing an "open-sky" policy. Under an air-traffic policy of reciprocity, the U.S. allows foreign carriers access to the U.S. domestic market. In return, the governments of these privileged carriers are expected to open their markets to American carriers.

Open-sky policies are an inevitability, and represent the future of international air transportation. However, this type of policy is not easily resolved. Because it is multinational in scope, the U.K. and U.S. cannot solve the problem alone. Even if the U.K. opens its skies to American carriers so that BA-USAir Airlines can fly from New York to Paris via one stop in London, other U.S. airlines would not enjoy the same advantage. In order for American Airlines, for instance, to fly from London to Paris, permission from the French authorities would be necessary.

Bear in mind that airlines in Europe are wary of deregulation. Jurgen Weber, Chairman of Lufthansa Airlines, has vowed over and over again not to repeat the mistakes made by U.S. carriers in the wake of deregulation (*The Economist*, 1993). This could mean that the effects of deregulation in Europe may not be as extensive as in the U.S. Consequently, Europe's air travelers may not enjoy the benefits of deregulation.

### The Effects of Airline Deregulation

The consequences of legislative deregulation have been profound. As mentioned previously, the increase in the number of new airlines, the expansion of already existing airlines, ferocious competition in the form of fare wars and a high percentage of bankruptcy are among the radical changes airlines have faced in recent years as a result of deregulation. The effects of deregulation have been puzzling to the industry. The movement towards stability has been slow, partly because the actual structure of the new equilibrium has not been clear.

Nevertheless, empirical studies point to the positive effects of deregulation on the economic welfare of society. According to Morrison and Winston, increased competition arising from airline deregulation has resulted in a savings for travelers of at least \$6 billion annually in reduced fares (Morrison & Winston, 1986). Morrison further points to the continually improving safety record of airlines in the deregulation era (Morrison, 1993). Donald Pickrell examined the ten-year performance of the airline industry after passage of the ADA. Pickrell concluded that because of implementation of airline deregulation, the airline industry succeeded in (1) increasing productivity, (2) reducing average fare, and (3) increasing the frequency of airline service to most cities (Pickrell, 1991).

### Major Problems Facing a Deregulated U.S. Airline Industry

Today the U.S. airline industry faces a number of serious problems. These include overcapacity because of easy entry, higher leverage and huge interest payments, fare wars, higher fixed cost due to new marketing strategies and sensitivity to business cycles. Together, these problems pose a significant threat to the integrity of the U.S. airline industry. This paper focuses on the problem of the U.S. airline industry's sensitivity to business cycles.

#### *Sensitivity to Business Cycles*

The airline industry is capital intensive and highly leveraged. Aircraft, the airlines' only money making equipment, are among the most expensive machines in the world. (Boeing's new 777 costs \$130 million per aircraft), and a substantial amount of money is needed to start a major airline. Therefore, an airline company borrows heavily to support its operation. According to one Solomon Brother's study, the ratio of long-term debt to total capitalization of the airline industry is more than 50 percent. With this kind of capital structure, the financial strength and wealth of the industry is closely related to the performance of the national economy.

The relationship between national domestic product (GDP) and the financial strength of the airline industry can be demonstrated using Altman's z-score bankruptcy prediction model (Altman, 1983). This model shows not only the profitability of the airlines, but also their overall financial picture.

Altman's z-score is obtained by using multiple discriminant analysis to calculate 22 financial variables from financial statements of each company. Table 1 shows the z-scores for seven major U.S. airline companies (American, Alaska, Delta, Hawaii, Southwest, United and U.S. Air) for the period 1982 - 1991.<sup>1</sup> Companies with z-scores below 1.81 are classified as failures; those with z-scores above 2.67 are considered healthy. Z-scores between 1.81 and 2.67 represent a "gray" area.

Total score is the sum of the z-scores of the seven airline companies for a particular year; for example, 12.85 in 1982. Mean score is the average z-score of all seven scores for a particular year. For example, in 1982, mean z-score is 1.84. These seven carriers account for more than 70 percent of total revenue-passenger-miles in the industry (FAA Forecast, 1992). We make the assumption that the mean-score is the score of the U.S. airline industry in that year.

The data in Table 1 show the following:

- (a) All z-scores are below 2.67. This leads us to conclude that the financial status of all seven airlines in our analysis is unhealthy and, in turn, that the U.S. airline industry as a whole has been in financial straits since 1989.
- (b) All airlines have two common peak periods, close to 1984 and to 1988.
- (c) For five of 10 years, Southwest Airlines' z-score has been higher than that of any other airline.
- (d) The Figure shows the financial trend of the U.S. airline industry from 1982 to 1991. From 1982 to 1988, the financial picture of the industry appears relatively stable. After 1989, however, extreme instability and marked financial deterioration are observed.
- (e) While all seven airlines suffer substantial financial deterioration after 1989, the decline is especially marked for Hawaiian Air-

**Table 1**  
**Z-Scores of Major U.S. Airline Companies**  
**from 1982-1991**

U.S. Airline	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
American	1.48	1.88	2.01	1.95	1.64	1.64	1.81	1.74	1.24	1.06
Alaska	2.27	2.27	2.18	1.82	1.35	1.88	2.17	2.09	1.61	1.52
Delta	2.11	1.43	2.20	2.38	1.92	2.01	2.33	2.42	1.97	1.39
Hawaii	0.41	0.97	1.56	1.75	2.19	1.80	2.03	0.79	-2.30	-3.01
Southwest	2.50	2.50	2.52	1.86	2.02	2.05	1.91	1.92	1.87	1.62
United	1.63	1.82	2.33	1.31	1.69	1.61	2.21	2.09	1.80	1.23
USAir	2.45	2.37	2.46	2.37	2.28	1.36	1.89	1.52	0.98	0.98
Total Score	12.85	13.24	15.26	13.44	13.09	12.35	14.35	12.57	7.17	4.79
Mean Score	1.84	1.89	2.18	1.92	1.87	1.76	2.05	1.80	1.02	0.68

lines and USAir. (f) The Figure underscores the gloomy financial outlook for the U.S. airline industry. Some fundamental changes are needed to avoid a steady decline in the industry. (g) Since the financial deterioration of the airline industry as a whole conforms to the decline of individual companies, we may fairly conclude that the cause of the overall deterioration may stem from not only mismanagement of individual companies but also the immature structure of the industry itself as it has evolved in the era of deregulation.

#### Financial Forecasting Model of the U.S. Airline Industry

The airline industry is very sensitive to the state of the national economy. A strong economy encourages leisure and business travel; a weak economy discourages such travel. Therefore, any forecasting model of airline business must consider the impact of the economy, say, GDP, on the industry.

Altman's z-score is a good financial indicator for the airline industry at large and can be used as a forecasting model. The authors used a linear regression technique to detect the relationship between z-score and GDP (the dependent and independent variables). Table 2 shows the z-score of the airline industry and the growth rate of GDP for each year during the period 1982 to 1991. (The z-scores in Table 2 are the mean scores from Table 1; the GDP percentages were obtained from

figures published by the Department of Commerce). Growth rate in a particular year is compared to that of the previous year. For example, GDP is 103.9 percent in 1983, as compared with 100 + 3.9 percent in 1982. In 1991, GDP had a negative growth rate.

Equation-A is a linear regression derived from the data in Table 2. It expresses the relationship between z-score and percentage of GDP, that is, z-score as a function of GDP. The equation shows that every one percentage point of growth contributes 0.18 to the z-score.

$$Z\text{-score} = f(\text{GDP}).$$

$$Z = -16.52 + 0.18 (\text{GDP}) \dots \dots \dots (\text{A})(\text{Chang, 1993})$$

Table 3 is a summary of the regression analysis. Note that the  $t$  statistic for the significance of the slope is 0.18, which, with  $10 - 2 = 8$  degrees of freedom, is clearly significant even at the 0.01 level ( $3.84 > 3.3554$ ).

Furthermore, the R-squared value of the linear regression is 0.648, or 64.8 percent. Thus, 64.8 percent of the variation in the z-score can be explained by the variation in the growth rate of GDP.

#### Implementation of the Forecasting Model

In order to interpret the relationship between the financial outlook of the airline industry and the growth rate of the economy, GDP, a defi-

**Table 2**  
**Z-score and GDP from 1982-1991**

Year	Z-score	Growth rate of GDP. (%) Year 1982 = 100
1982	1.84	100.0
1983	1.89	103.9
1984	2.18	106.2
1985	1.92	103.2
1986	1.87	102.9
1987	1.76	103.1
1988	2.05	103.9
1989	1.80	102.5
1990	1.02	100.9
1991	0.68	98.8

**Table 3**  
**Summary of Regression Analysis**

Regression Techniques	Est. Coef.	T-test	R <sup>2</sup>
Simple Linear Regression	(GDP): 0.18 Constant: -16.52	3.84 -3.48	0.64 8

**Table 4**  
**Projected Z-score from 1993-1996**

% of GDP Year : Index	2.2	2.5	2.5	2.5	2.5
1992	1.88	--	--	--	--
1993	--	2.14	--	--	--
1994	--	--	2.18	--	--
1995	--	--	--	2.23	--
1996	--	--	--	--	2.27

Notes: (1) In 1992, actual GDP is 2.2 percent. (2) From 1993, 2.5 percent of GDP is projected for each of the next four years.

and the growth rate of the economy, GDP, a definition of the measurement of financial outlook is needed.

In the Figure, note that 1984 and 1989 represent two peak years for the airline industry. The z-scores for 1982 and 1989 are 2.18 and 2.05,

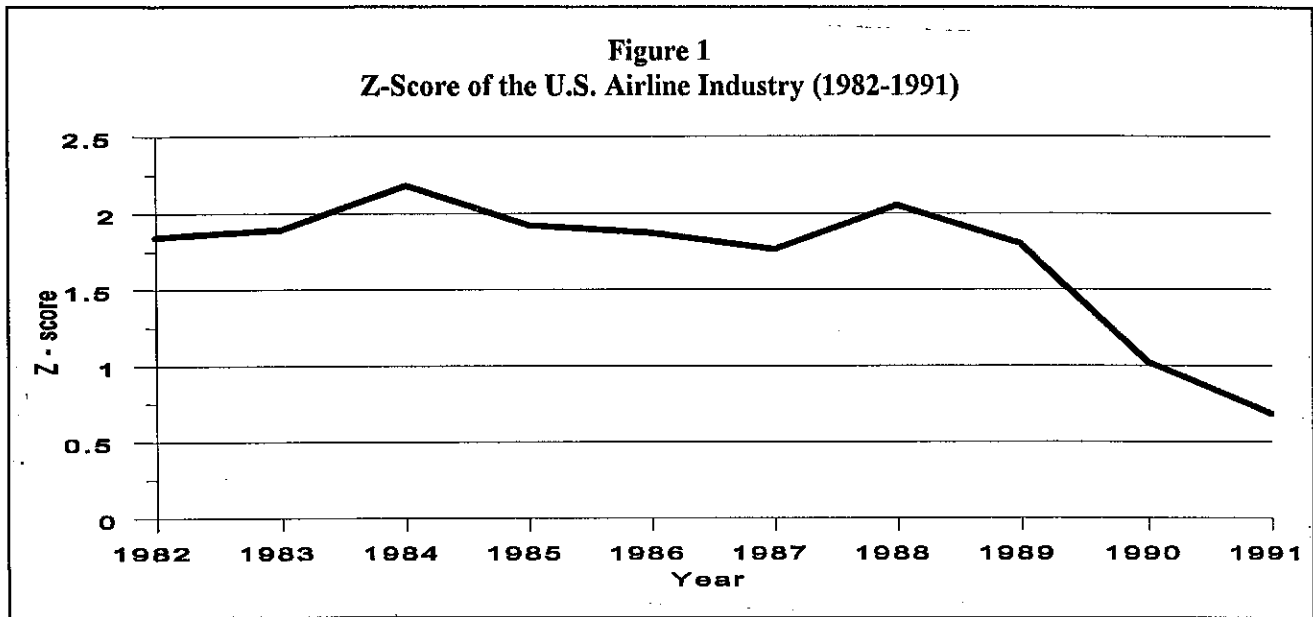
respectively. From this we may assume that the z-score of a healthy year for the airline industry must be higher than 2.18. In addition, two critical points for the z-score model are 1.81 and 2.67. As defined by Altman, a z-score below 1.81 indicates failure; one above 2.67 indicates non-failure. To simplify this model, we choose the mid-point of 2.24 ( $1.81 + 2.67/2$ ) as a critical point. Given that 2.24 is bigger than 2.18, we may further assume that, in this model, a z-score for a particular year greater or equal to 2.24 suggests a healthy year for the airline industry. Conversely, a z-score of less than 2.24 points to a poor year for the airline industry.

Next, let us use the concept of equation-A to calculate the z-score for 1992-1996 at 2.5 percent rate of GDP. Table 4 shows the projection of z-scores for the airline industry at various rates of GDP, if other conditions are constant. For example, in 1993 if the growth rate of GDP is 2.5 percent, then the z-score of the airline industry is 2.14. If the economy grows continuously at the rate of 2.5 percent of GDP, the z-score continues to increase.

According to the model, the z-score will reach 2.23 in 1995 and 2.27 in 1996. As mentioned earlier, the cutoff point for determining the financial outlook of the airline industry is 2.24. Therefore, to improve the financial picture of the airline industry, a moderate GDP growth rate of 2.5 percent is needed for three more years. This rate of growth is likely to be seen under current economic conditions.

### Future Prospectives

Heavy losses over the past four years and over-capacity in the domestic market will force most major airlines to gradually sell their assets to foreign airlines in order to raise sufficient cash flow, or else to organize with foreign airlines in order to expand their markets. Accordingly, these major airlines will become globalized either in capital venture or in marketing coordination. Globalization, of one variety or another, will cer-



**Table 5**  
**Actual Z-scores from 1982-1991 and Projected Z-scores from 1992-1996**

No.	Year	Actual Z-score	Projected Z-Score	Actual GDP 1982-1992	Projected GDP 1993-1996
1	1982	1.84	--	100.0	--
2	1983	1.89	--	103.9	--
3	1984	2.18	--	106.2	--
4	1985	1.92	--	103.2	--
5	1986	1.87	--	102.9	--
6	1987	1.76	--	103.1	--
7	1988	2.05	--	103.9	--
8	1989	1.80	--	102.5	--
9	1990	1.02	--	100.9	--
10	1991	0.68	--	98.8	--
11	1992	--	1.88	102.2	--
12	1993	--	2.14	--	102.5
13	1994	--	2.18	--	102.5
14	1995	--	2.23	--	102.5
15	1996	--	2.27	--	102.5

tainly take place in the very near future.

At the same time, because of uneconomic services on short-haul routes and aggressive expansion on international routes, most U.S. global carriers will gradually scale down short-haul operations and concentrate on long-haul and international routes. The short-haul market will be occu-

pied by many budget airlines. Indeed, the budget airline is certain to be the trend of the future U.S. airline industry.

Unlike other major airlines, the budget airline, such as Southwest Airlines, provides no fancy terminals, no costly hub-and-spoke operations, and no amenities. Southwest provides only

the basic and most important service to passengers, that is, efficient transportation from one place to another place at a lower fare.

Southwest Airlines' successful concept has inspired many start-ups, such as Kiwi International Air Lines, Reno Airlines, American Dreams, Atlantic Southeast Airlines, Mesa Airlines, and many others. Some are operating independently; others are mainly providing feeder services for major airlines.

Indeed, Southwest and its imitators have learned a lesson from the major airlines, namely, that big is not necessarily better, and that over expansion is always painful. Accordingly, they try to keep costs under control. They focus on the routes that are unprofitable for major airlines in order to avoid a fare war. They provide low-fare flights. Because of the uncomfortable economic climate in recent years, many passengers, including leisure passengers, have learned to search for travel services offering lower fares; thus, the demand for budget service is fairly strong. However, no one can guarantee budget airlines a competition-free environment.

In short, the U.S. airline industry has evolved into a two-tier market system in order to survive in a deregulated competitive environment. One tier is made up of major global airlines; the other, of budget airlines. The former are mainly providing long-haul service; the latter are concentrating on short-haul service.

Traditionally, short-haul service has had higher operating costs than long-haul service. Indeed, global airlines are gradually withdrawing from those high-cost short hauls, and these will be taken up by low-cost budget airlines. The global airlines are unlikely to squeeze these budget airlines as long as they limit themselves to the short-haul markets. This development will improve the financial status of the airline industry and usher in the necessary adjustments for the industry as well.

## Conclusion

The passage of the Airline Deregulation

Act of 1978 has actually cost the airline industry more than \$10 billion in losses over the past five years. However, deregulation has generated big savings, some \$6 billion annually (or \$30 billion for the same five year period), for travelers. Simple arithmetic here suggests that airline deregulation has had a net positive effect on the economy.

The causes of the industry's financial straits are perfectly understandable. The arduous transition from a regulated to an unregulated industry is not yet completed. The airline industry is simply moving through a deregulation transition period.

A careful examination of changes in the industry's structure during the period under discussion (1985-1993) reveals a persistent development toward two main types of airline services: budget airlines and global airlines. The budget airlines, which specialize in no-frills service and concentrate on one or two geographical regions, experienced remarkable growth. But this has not in any way led to the collapse of the major airlines.

On the contrary, the global airlines (six of the major airlines) merely experienced substantial reductions in unprofitable short-haul routes, routes which were, or soon will be, occupied by the budget airlines. Thus, the market will gradually evolve into a two-tier market system. Furthermore, a stable growing economy, say, 2.5 percent of GDP for three or more years, will raise the airline industry to a healthy state. This is the long-term equilibrium. All of this tends to validate our belief that the financial problems of the airline industry can be corrected by the industry itself, without government intervention in the form of re-regulation.

All in all, the U.S. airline industry is undergoing a process of fundamental restructuring, both in its micro and macro aspects. This restructuring will not only strengthen the balance sheets, but also lead to market equilibrium. Accordingly, it is our conclusion that current airline deregulation policy is appropriate and that re-regulation is unnecessary.

In our view, the real problem for the U.S. airline industry is unfair competition from foreign competitors. In fact, the U.S. airline industry ranks among the lowest in operating costs worldwide. As long as all carriers are competing with one another on a level playing field, namely, open-sky policy, U.S. carriers should have opportunities to defeat any inefficient foreign carriers.

### Suggestions for Future Research

The transformation of the airline industry, as the industry moves toward long-run equilibrium, would certainly benefit from the study of both pricing and marketing arrangements, as well as the "code-sharing" that has recently emerged between American and foreign airlines. Also, further improvements could be introduced by exploring the privatization of airports, which is common in Britain, and efficient pricing of runway takeoffs and landings based on peak and off-peak usage. An interdisciplinary project worthy of research would be to investigate the process of cultural change by which this regulated industry evolved into a non-regulated and more competitive one. □□

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### Endnotes

1. The z-scores in Table 1 were derived by retrieving variables from Compustat, calculating 70 z-scores using Altman's z-model, and then calculating the mean score of major airlines for each year. The Figure is a graphic representation of these mean scores.

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