



## School of Economics and Management

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# MASTER THESIS

*(To fulfill the thesis requirement for the degree of Master in Finance)*

## Mergers and Acquisitions of North American and European Airline

### Industry: An Event Study Evidence on Value Creation

Presented by:

**Ya Xu**

E-mail: [yaya\\_jessilin@hotmail.com](mailto:yaya_jessilin@hotmail.com)

**Yuntan Sun**

E-mail: [ysun225@gmail.com](mailto:ysun225@gmail.com)

Thesis supervisor:

**Hossein Asgharian**

E-mail: [hossein.asgharian@nek.lu.se](mailto:hossein.asgharian@nek.lu.se)

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**ABSTRACT**

With the development of international markets and the globalization of economic activities, mergers and acquisitions (M&A) as a strategy for both internal and external growth become more and more important. A representative case is the M&A transactions in North American and European airline industry. This paper investigates the impact of mergers and acquisitions on value creation for the bidding firms. Using data on 32 mergers and acquisitions between 2000 and 2008 and employing the well-established event study methodology, the paper concludes that M&A transactions in North American and European airline industry create a statistically significant value for the shareholders of the acquiring firms. Then the factors of M&A-success are analyzed by applying cross-sectional regression. The results in this paper would supply guidelines for the shareholders, managers and investors when they consider acquisitions decisions.

**Key Words: M&As, Airline Industry, Event Study, Value Creation.**

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## **1. Introduction**

In recent decades, one of the most distinct developments has been the ever-increasing globalization of markets and economic activities. Under this background, the mergers and acquisitions (M&As) as an important strategy give firms a good opportunity for internal or external growth. Airline industry is a global and mature industry, M&As frequently take place in this industry. Unlike the businesses of large firms in other industries which are diversified, the airline industry is more focused on airline business. Thus the effects of horizontal M&A in this kind of industry are more prominent. A typical case is the recent transactions in North American and European airline industry. Since airline firms in North American and European areas have taken most market shares in the world airline industry, this paper only focuses on this.

Deregulation is the original factor to simulate the M&As of airline industry. It has had profound effect on the structure of whole industry. In 1978, The United States was the first country which deregulated their airline industry, and then more than 200 US airlines have merged. Later other countries also deregulated their airline industry gradually, such as Australia, Canada and Japan. Deregulation of the European Union airspace happened in the early 1990s (Myron 2002). The final stage of EU's deregulation took effect in April 1997, allowing an airline from one member state to fly passengers within another member's domestic market (The Airline Industry, 2008).

Moreover, the deregulation environment has paved the way for the emergence of low costs carriers because entry barriers for new airlines are lower in a deregulated market. This has produced far greater competition than before deregulation in most markets, and average fares tend to drop 20% or more. Toward the end of the last century, a new style of low cost airline emerged, offering a no-frills product at a lower price. Southwest Airlines, JetBlue and other low-cost carriers began to represent a serious challenge to traditional airlines, as did their low-cost counterparts in many other countries. Airlines such as EasyJet and Ryanair have grown at the expense of the traditional national airlines too (Myron 2002).

There has also been a trend for these national airlines themselves to be privatized such as British Airways. The added competition, together with pricing freedom, means that new entrants often take market share with highly reduced rates that, to a limited degree, full service airlines must match. This is a major constraint on profitability for established carriers, which tend to have a higher cost base. As a result, profitability in a deregulated market is uneven for most airlines (Myron 2002).

In a word, due to low growth rates on domestic markets and growing competitive pressures in airline industry, M&As are becoming more and more important strategy for achieving international market shares. However, the debates about the value creation for the bidder or target firm in airline industry still exist. Knapp (1990) tested the US horizontal airline merges in the year 1986 and found that the abnormal returns for bidders were positive and significant around merger announcement. Bidders earned an excess return between 6% and 12% depending on event period (Knapp 1990). Kyle et al. (1992) examined 24 US airline merges which undertook announcement date in the time interval of 1978 and 1989. For three-day event window around first announcement, an abnormal return increased 3.72% on bidder's stock price (Kyle, Strickland et al. 1992). Singal (1996) analyzed 14 successful horizontal US airline merges from 1985 to 1988 under 4 different event window and documented that the acquiring firms earned between 2.51% and 0.55% (Signal 1996). Zhang and Aldridge (1997) investigated the merge in the Canadian airline industry for the 1992-1993 period and they found that news that affected the merger possibilities had a significant impact on the stock prices of the two major Canadian airlines (Zhang and Aldridge 1997). Friesen (2005) applied event study based on 19 announcements concerning the friendly merger process of Air France and KLM between September 2003 and June 2004 and found that the shareholder of acquiring firm gained insignificant abnormal returns (Friesen 2005).

In this paper we apply event study to determine whether M&A activity generates a significantly positive value for the acquiring firm. The sample period is from 2000 to 2008. Since the target firms' data are not available after M&As, this paper only focuses on the change of shareholder's return on the bidding firm. Here event study is applied to announcements of 32 M&As in North American and European airline

industry. We apply cross-sectional regression analysis to examine the factors of M&As further.

While there are a few such studies regarding to M&As related events in airline industry, most are focused on U.S. airline. So this paper contributes to the existing literature in three ways. First of all, it broadens the regional scope of the literature on event study methodology in M&As issues beyond the United States. On the other hand, the data is updated to assess the most recent M&As' effects. Secondly, most of the previous literature employs market model to measure the normal returns in the event window, while this paper applies both market model and multifactor model to get more accurate normal return estimates. Finally, this paper examines the factors explaining M&A further by applying a cross-sectional regression method.

Section 2 provides the overview of the event study methodology. Section 3 includes the data selection and sample design. Section 4 contains our empirical results and presents the analysis of the empirical results and then compares them according to different specification. Section 5 outlines the summary of this research and managerial implication.



## **2. Methodology**

This paper aims at explaining the value creation for bidders in mergers and acquisitions in North American and European airline industry. In order to differentiate between the value-creating and the value-destroying M&As, we use event study methodology to measure abnormal changes in the stock prices of publicly traded companies that occur in conjunction with an “event” (Brown Stephen and Warner Jerold 1985; Wells William 2004). The researcher observes the actual stock returns over the period of interest and computes the differences between the actual returns and the expected returns and then tests whether the results are statistically significant different from zero.

It should be noted that there are two assumptions for applying event study. The first one is the market efficient hypothesis. Fama (1991) divided the efficient market hypothesis (EMH) into three categories. They are weak-form, semistrong-form and strong-form efficient markets. We pay more attentions to the semistrong form since event studies methodology is employed to test it. The semistrong form of the EMH holds that security prices rapidly adjust to the arrival of all new public information. As such, current security prices fully reflect all publicly available information (Eugene 1991). Under market efficient hypothesis, investors should not be able to earn positive abnormal returns by buying or selling based on types of firm events.

Second, the events should be unanticipated. Abnormal returns can be assumed to be the result of the stock market’s reacting to new information. The announcement effect is hard to test when the event has been anticipated by traders or information disclosed to the market before the announcement date (McWilliams and Siegel 1997).

In the following section, we will describe event study methodology briefly, which is based on Campbell, Lo and Mackinlay Chapter 4 (MacKinlay 1997). Before

modeling normal return, some notations are introduced. We define 0 as the announcement date,  $T_0$  to  $T_1$  as the estimation window, which contains  $L_1$  return observations and  $T_1$  to  $T_2$  as the event window containing  $L_2$  return observations.  $T_2$  to  $T_3$  as the post event window.

## **2.1 Modeling Normal Returns**

Before modeling normal return, daily stock returns should be calculated. Wells (2004) has shown that the natural logarithmic daily stock price is better than simple percentage changes of daily price. The reason is the latter measurement can bring about arithmetic anomaly problem and thus biased results (Wells William 2004). The rate of return on security i for day t is defined by  $R_{it}$

$$R_{it} = \ln \left[ \frac{P_{i,t}}{P_{i,t-1}} \right]$$

where  $R_{it}$  = rate of return on security i for day t

$P_{i,t}$  = daily stock price for security i for day t

$P_{i,t-1}$  = daily stock price for security i for day t-1

The normal return is defined as the expected return if the event does not happen. There are three most commonly used models to estimate the normal return. (1) Constant mean return model, (2) Market model, a one factor model which is based on i.e. CAPM and (3) Multifactor model. The last two models will be applied to this study and will be explained in more detail in the below sections.

The market model assumes a stable relation between the market return and the security return as follows.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

where  $R_{it}$  and  $R_{mt}$  are the rate of returns on security  $i$  and the market portfolio over the estimation window, respectively, and  $\varepsilon_{it}$  is the zero mean disturbance term. In our case, the S&P 500 Index is used as the proxy for the market portfolio. Using the estimation window,  $\alpha_i$  and  $\beta_i$  are achieved by applying OLS.

Factor models are motivated by the benefits of reducing the variance of the abnormal return by explaining more of the variation in the normal return. The variance reduction will typically be greatest in cases where the sample firms have a common characteristic, for example they are all members of one industry (MacKinlay 1997).

The multifactor model in our study includes the return on the US airline industry index  $R_{kt}$  in addition to the market portfolio S&P 500.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_i R_{kt} + \varepsilon_{it}$$

When conducting the multifactor model, besides US airline industry index, other factors, such as the European airline industry index and the oil price are also examined. But the explaining power of using those factors is quite small and hence the reduction of variance of these abnormal returns is very little.

In our study, both two models are applied. But generally,  $R^2$  of the multifactor model is much greater than that of the market model. The higher the  $R^2$ , the greater the variance reduction of the abnormal return and the larger is the gains. Thus the multifactor model will give us more accurate normal return.

## 2.2 Measuring Abnormal Returns

The market model and multifactor model used to estimate the normal returns can be also expressed as a regression system,

$$R_i = X_i \theta_i + \varepsilon_{it}$$

In our case, where  $R_i = [R_{iT_0+1} \dots R_{iT_1}]'$  is an  $(L_1 \times 1)$  vector of estimation window returns  $X_i$  is an  $(L_1 \times K + 1)$  matrix of  $K$  explanatory variables of the model in addition to a vector of ones in the first column for the intercept and  $\theta_i$  is a  $(K + 1 \times 1)$  parameter vector. For the market model  $X_i = [1 \ R_m]$  where  $R_m = [R_{mT_0+1} \dots R_{mT_1}]'$  and  $\theta_i = [\alpha_i \ \beta_i]'$ . For the multifactor model,  $X_i = [1 \ R_m \ R_k]$  and  $\theta_i = [\alpha_i \ \beta_i \ \gamma_i]'$ . The OLS estimator can be estimated below.

$$\hat{\theta}_i = (X_i' X_i)^{-1} X_i' R_i$$

$$\hat{\sigma}_{\varepsilon_i}^2 = \frac{1}{L_1 - 2} \varepsilon_i' \varepsilon_i$$

The abnormal return is the difference between the actual return and the expected normal return

$$\hat{\varepsilon}_i^* = R_i^* - X_i^* \hat{\theta}_i$$

where  $R_i^* = [R_{iT_1+1} \dots R_{iT_2}]'$  is an  $(L_2 \times 1)$  vector of event window returns,  $X_i^*$  is an  $(L_2 \times K + 1)$  matrix with the vector of ones in the first column and the vector of the explanatory variables in the other columns. The abnormal return vector will be jointly normally distributed with a zero conditional mean and conditional covariance matrix  $V_i$ . That is,

$$E[\hat{\varepsilon}_i^* | X_i^*] \sim N(0, V_i)$$

where  $V_i = I\hat{\sigma}_{\varepsilon_i}^2 + X_i^*(X_i'X_i)^{-1}X_i'^*\hat{\sigma}_{\varepsilon_i}^2$  and  $I$  is  $L_2 \times L_2$  identity matrix.

### 2.3 Testing Abnormal Returns

To draw the overall inferences for the event analysis, the abnormal returns should be aggregated through time and across securities.

The cumulative abnormal return for security  $i$  is the sum of abnormal returns in a given time period. Define  $CAR_i(s_1, s_2)$  as the cumulative abnormal return for security  $i$  from  $s_1$  to  $s_2$ , where  $T_1 < s_1 \leq s_2 \leq T_2$ . Following equation is used to test if the abnormal returns of individual security through time are significantly different from zero. If they are not significant, it means the unanticipated event has no effect on the cumulative abnormal returns.

$$SCAR(s_1, s_2) = \frac{\widehat{CAR}_i(s_1, s_2)}{\sigma_i^2(s_1, s_2)} \sim t_{(L_1-2)}$$

where  $\widehat{CAR}_i(s_1, s_2) \equiv \gamma' \hat{\varepsilon}_i^*$  and  $VAR[\widehat{CAR}_i(s_1, s_2)] = \sigma_i^2(s_1, s_2) = \gamma' V_i \gamma$

and  $\gamma$  is an  $(L_2 \times 1)$  vector of ones in positions  $s_1 - T_1$  to  $s_2 - T_1$  and zeroes elsewhere

The equation below is used to test the null hypothesis that aggregation abnormal returns across securities and through time are significantly different from zero.

$$J = \left( \frac{N(L_1 - 4)}{L_1 - K} \right)^{1/2} \overline{SCAR(s_1, s_2)}^a \sim N(0, 1)$$

$K$  is the number of parameters, i.e.  $K=2$  for market model and  $K=3$  for multifactor model.

## **2.4 Cross-sectional Approach to Explain $CAR_i$**

Theoretical insights can result from examining the association between the magnitude of the abnormal return and characteristics specific to the event observation. So a cross-sectional regression model is an appropriate tool to investigate this association. The basic approach is to run a cross-sectional regression of the abnormal returns on the characteristics of interest (MacKinlay 1997). To analyze this relation we can estimate the following regression model with OLS

$$y = ZB + \eta$$

where  $y$  is an  $(N \times 1)$  vector of cumulative abnormal returns  $CAR_i(s_1, s_2)$ ,  $Z$  is an  $(N \times K)$  matrix of characteristics with first column consisting of ones and  $B$  is a  $(K \times 1)$  parameter vector.

## **3. Sample Data and Design**

### **3.1 Sample Data**

The primary data employed in this paper are the daily stocks of bidders. Both daily stock prices and M&As' announcement dates in the airline industry were obtained from Lund University Financial DataStream—LINC. The data of the variables used in the cross-sectional regression, such as total revenue and total assets, were obtained from each firm's annual report. They were based on the fiscal year-end data preceding the event.

In fact, more than 32 M&As happened in the North American and European airline industry during this period. The chosen airlines must meet the following criteria (Kusnadi and Sohrabian 1999; Cybo-Ottone and Murgia 2000):

- (1) The transaction was announced between January 1, 2000 and October 31, 2008.
- (2) The acquiring firm's stock is publicly traded.
- (3) The bidder is North American or European airline companies which include both international airline and regional airline firm.
- (4) The targets should be airline firms too, but not limited for the targets' regions.
- (5) Daily returns for the acquiring firms' securities and for the corresponding local market index must be available from Datastream for at least the 90-trading-day prior to the announcement date.
- (6) The information related to the M&A, such as the type of transaction, trade value and announcement date was publicly disclosed.
- (7) All the M&A transactions were complete. The pending or cancelled M&As were not included.

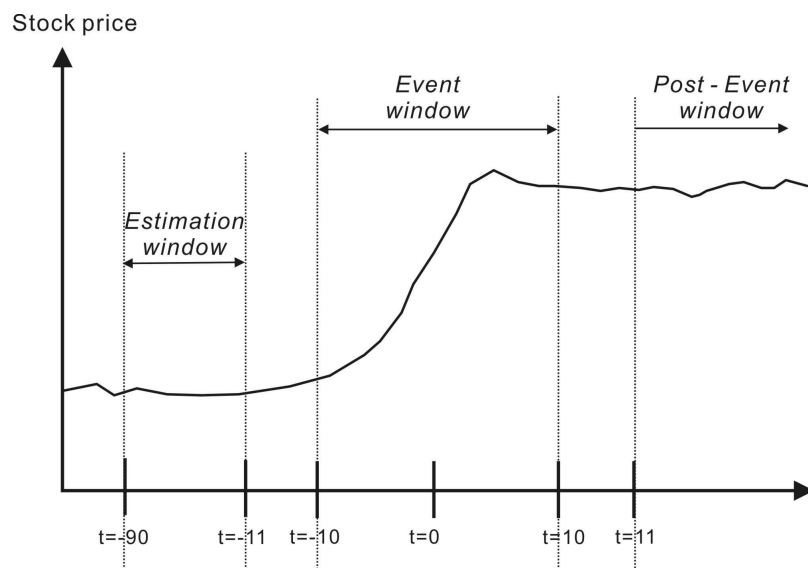
The event date is defined by the first announcement of the transactions. Actually, more than one event happened in the same event window, in order to avoid overlapping problem, we chose the first announcement date as the event of interest and deleted the other events' data. Thus the final sample (Table 1) just consists of 32 events. According to the different methods of payment, the sample of 32 M&As transactions included 9 of them which used equity to finance the acquisition and 23 cash payments transactions. From the geographical prospective, there were 15 domestic transactions and 17 cross-border transactions in the whole sample. In addition, 17 transactions took place under bull market and the rest experienced the bear market.

### **3.2 Sample Design**

The initial task of conducting an event study was to define the event of interest, and in our case was M&As in North American and European Airlines from 2000 to 2008. Then the length of the estimation window should be determined. Our estimation window is the 90-day period (-100 to -11) preceding the event date. Afterwards the

period had to be identified over which the stock prices of the firms involved in this event would be examined (event window). And it was customary to define the event window as larger than the specific period of interest, especially in cases where the event was an announcement of an acquisition, (McWilliams and Siegel, 1997).

Three event windows with different lengths were used: a relatively long event window (from  $t = -10$  to  $+10$ ), medium event window (from  $t = -5$  to  $+5$ ); and the usual three-day event window (from  $t = -1$  to  $+1$ ). The  $(-10, +10)$  event window can capture uncertainty about information exactly revealed. The three-day event window (from  $t = -1$  to  $+1$ ) permitted us to investigate the market efficiency assumptions. The following figure will present intuitive idea about the cycle of the event study.



**Figure 1. Illustration of Event Study**



### 3.3 Cross-sectional Regression

In this study, the dependent variable was Cumulative abnormal returns for all security in 3-day time window, which was defined as  $CAR_i(-1,+1)$ .  $CAR_i(-1,+1)$  were regressed on the logarithm value of the total revenue, the logarithm value of the total assets and other three dummy variables. The total revenue represented the operational ability of bidding firm, while total asset could be a proxy for the firm size. Three dummy variables were used to examine geographic focus, means of payment and business cycles respectively. The domestic deals were defined as 1 and 0 stood for the cross-border mergers. The payment method was a dummy variable with the value 1 if the method of payment was cash and 0 if stock-stock. If the M&A activities happened under the bull market, we set 1 and 0 otherwise. It is noted that the classification of the stock market situation based on the following figure which was obtained from the yahoo finance website. The bear markets have two periods: one was from Jan 3<sup>rd</sup> 2000 to Mar 3<sup>rd</sup> 2003; the other was from Oct 5<sup>th</sup> 2007 until now. The bull market was from Mar 4<sup>th</sup> 2003 to Oct 15<sup>th</sup> 2007.



**Figure 2. Dow Jones Industrial Average** Source: YAHOO! FINANCE, <http://finance.yahoo.com/q?s=%5EDJI>

Table 1. 32 Merge and Acquisition Events

Date	Acquirer	Target	Country of Acquirer	Country of target	Transaction Value At Announcement (USD)
20-Apr-01	SAS AB	SAS Norge ASA	Sweden	Sweden	stocks
1-Nov-01	Scandinavian Airlines System AB	Air Baltic	Sweden	Latvia	8943105.6
22-Nov-03	Scandinavian Airlines System AB	Spanair SA	Sweden	Spain	87564225
26-Jun-07	SAS AB	Spanair SA	Sweden	Spain	stocks
14-Feb-08	SAS AB	Go Now AS	Sweden	Norway	stocks
23-Jan-01	Lufthansa AG	Composite International Inc	Germany	United States	stocks
11-Nov-02	Deutsche Lufthansa AG	British midland Airways Ltd	Germany	United Kingdom	stocks
10-Feb-05	Deutsche Lufthansa AG	Amadeus Global Travel Distribution SA	Germany	Spain	5182053300
21-Jun-07	Deutsche Lufthansa AG	Swiss International Air Lines Ltd	Germany	Switzerland	stocks
29-Oct-08	Deutsche Lufthansa AG	Eurowings Luftverkehrs AG	Germany	Germany	stocks
1-Nov-04	Transat AT Inc	Air Consultants Europe	Canada	Netherlands	862.03
13-Mar-06	Transat AT Inc	Thomas Cook Travel Ltd	Canada	Canada	6372992.29
13-Jul-07	Transat AT Inc	L'Europeenne de Tourisme SARL	Canada	France	4781257.47
1-Jan-00	British Airways PLC	Comair	United Kingdom	South Africa	27507700
2-Jul-08	British Airways PLC	Elysair SAS	United Kingdom	France	55855800
16-May-02	EasyJet PLC	Newgo 1 Ltd	United Kingdom	United Kingdom	546414000
25-Oct-07	EasyJet PLC	GB Airways Ltd	United Kingdom	Gibraltar	212133600
11-Oct-06	Air Partner PLC	Gold Air International Ltd	United Kingdom	United Kingdom	8160460
6-Sep-07	Air Partner PLC	Air Partner International SAS	United Kingdom	France	1883700
25-May-07	Riverhawk Aviation Inc	Profile Aviation Center Inc	United States	United States	5500000

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**Continued**

19-Mar-08	Riverhawk Aviation Inc	Carolina Air Charter Inc	United States	United States	425000
9-Oct-00	Continental Airlines Inc	DC Air	United States	United States	215000000
9-Sep-02	JetBlue Airways	Live LLC	United States	United States	80000000
31-Jan-03	Ryanair Holdings Plc	buzz	Ireland	United Kingdom	21753225
10-Dec-04	Southwest Airlines Inc	Certain assets of ATA Airlines Inc	United States	United States	117000000
1-Aug-05	Republic Airways Holdings Inc	US Airways' 10 Embraer 170s and Other Assets	United States	United States	100000000
15-Aug-05	Skywest Inc	Atlantic Southeast Airlines Inc	United States	United States	425000000
18-Jan-07	Pinnacle Airlines Corp	Colgan Air Inc	United States	United States	20000000
24-Apr-07	Norwegian Air Shuttle ASA	FlyNordic AB	Norway	Sweden	stocks
20-Jun-07	Discovery Air Inc	Top Aces Inc	Canada	Canada	62302950.45
21-Jun-07	Air France-KLM	Martinair Holland NV	France	Netherlands	stocks
14-Apr-08	Delta Air Lines Inc	Northwest Airlines Corp	United States	United States	3100000000

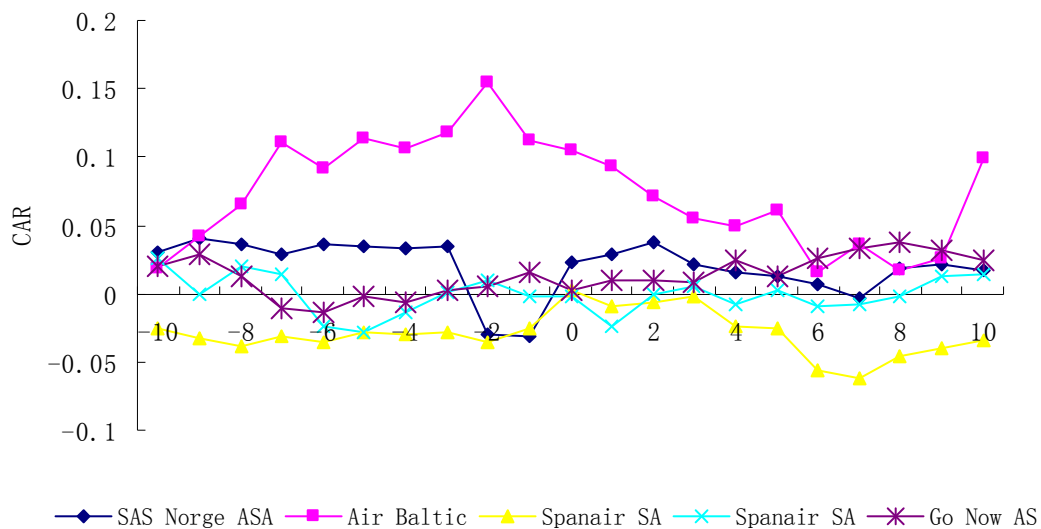
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## 4. Empirical Results

We employed both market model and multifactor model to measure normal returns. Although multifactor model produces only marginal benefits over a standard market model in predicting event day normal returns, it generates less skewed abnormal returns that are better suited for statistical tests (Ahern 2009). So the following results are based on the multifactor model. The results from market model are mostly as similar as the results of multifactor model and are shown in the appendix.

### 4.1 Individual Security Analysis under The 21-day Event Window

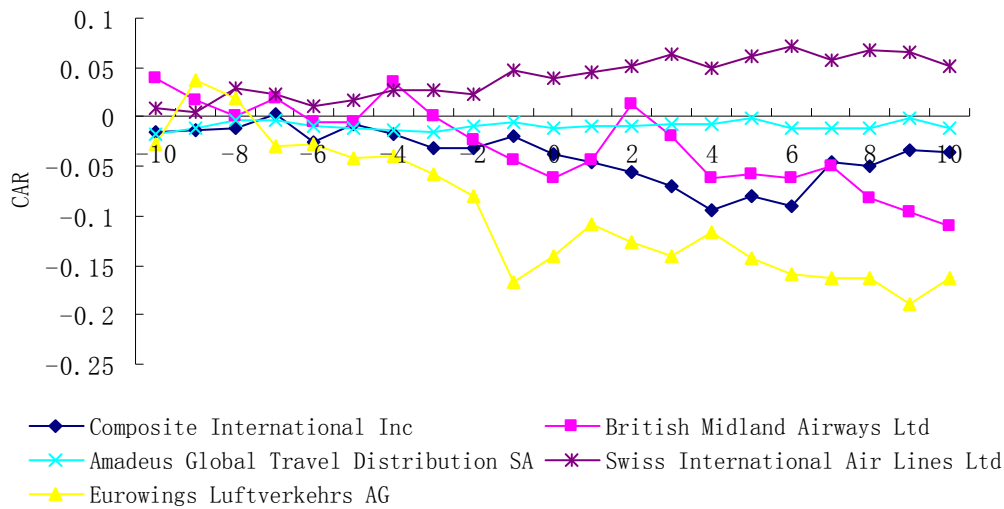
Our study is based on 32 M&As in European and North American airline industry between 2000 and 2008. CARs are calculated for the individual M&A event. The empirical results of individual security are analyzed one by one.



**Figure 3. SAS AB-Cumulative Abnormal Return (-10, +10)**

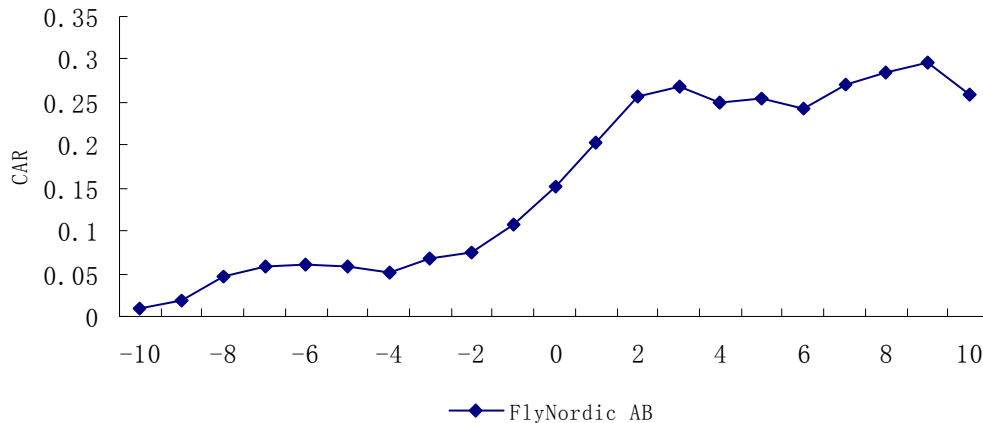
We start by discussing Scandinavian Airlines System AB (SAS) five mergers and acquisitions during 2000-2008. The SAS Norge ASA deal transacted in April, 2001. CARs were positive except CAR (-10,-2) and CAR (-10,-1), which were about -3%. Air Baltic deal took place in November, 2001 perceived positively cumulative abnormal returns during the 21-day event window. The takeover of Spanair SA in November, 2003 resulted in all cumulative negatively abnormal returns during the

21-day event window. But on the announcement date, CAR reverted to zero. Although the cumulative abnormal returns fluctuated when SAS took the second deal with Spanair SA, the volatility of CAR (-10, +10) was not large. The cumulative abnormal returns for transactions of Go Now AS also fluctuated around zero during the 21-day event window. However, CAR (-10, +10) of SAS AB five transactions were all insignificant.



**Figure 4. Deutsche Lufthansa AG-Cumulative Abnormal Return (-10, +10)**

For Deutsche Lufthansa AG, there were five M&A activities. Except Swiss International Air Lines deal, others were negatively absorbed by the capital market. Specially, the Eurowings Luftverkehrs AG deal cumulated about 19% negative abnormal returns during the 21-day event window. This result was statistically significant at the 10% confidence level. While the results for other deals are statistically insignificant.



**Figure 5. Norwegian Air Shuttle ASA-Cumulative Abnormal Return (-10, +10)**

For Norwegian Air, the complete takeover of Fly Nordic AB airline in April 2007, first cumulated 15% positive abnormal returns near the announcement day, then increased stock prices faster than before, and finally led to 30% gains for shareholders of Norwegian Air Shuttle ASA. The result was significant at 10% confidence level.

Three groups could be classified for the rest M&A activities according to different trends of cumulative abnormal returns near the announcement day. Group one is that CAR (-10, +10) has an increasing trend. It includes the first deal of Air Partner and Riverhawk Aviation, the second deal of British Airways, EasyJet PLC, Republic Airways, JetBlue and SkyWest. The maximum CAR (-10, +10) comes from Riverhawk Aviation Inc's first deal. The acquisition of Carolina Air Charter Inc in May 2007 led to a 94% increase in the stock price of Riverhawk. Group two is that there is a decreasing trend on CAR (-10, +10) such as Southwest Airlines and Pinnacle Airline. And the deal of Colgan Air Inc decreased the stock price of Pinnacle Airline by 15%. Group three is that CAR (-10, +10) fluctuates around zero frequently, the transactions just had positive CARs near the announcement date, like Continental Airline, Delta Air Line, Ryanair Holdings and Air France-KLM. However none of the acquisitions above shows statistically significant CARs in the 21-day event window. The insignificant Cumulative Abnormal Return (-10, +10) graphs are shown in the appendix.

## **4.2 Individual Security Analysis under Other Event Windows**

Since there are just two M&A transactions which are statistically significant under the 21-day event window, we test another two relative short event windows to investigate the effect of M&A further. All the statistic results under three different event windows are shown in table 2.

For the 11-day event window, there are six M&A events with statistically significant results. These are shown below: the deal that Deutsche Lufthansa AG acquired Eurowings, the transaction that EasyJet acquired Newgo, the deal that Riverhawk acquired Profile Aviation Center, as well as three single transactions including JetBlue, Norwegian, and SkyWest. Except Deutsche Lufthansa's M&A which had a 12% negative CAR with the statistical significance at the 5%, all other M&A activities created value for the bidding firm. Specially, the first transaction of Riverhawk, Profile Aviation Center, cumulated 116% positive abnormal returns at the 10% significant level, and EasyJet's first deal increased the stock price by 24%, statistically significant at the 1% level.

For the event window (from  $t = -1$  to  $+1$ ), the number of significant results is almost the same as that of the 11-day event window, seven M&A transactions have significant results. Compared with the previous results, two M&A transactions become significant and one M&A turns to be insignificant. For those two significant deals, one is that the acquisition of SAS Norge ASA has a slightly positive 6% cumulative abnormal return at the 10% significant level. The other is that the second deal of Riverhawk leads to a 67% increase on its stock price at the 10% level. The transaction of Eurowings Luftverkehrs has a negatively cumulative abnormal return, but this result becomes insignificant when the event window changes from 11 days to 3 days. In a word, all the significant transactions have positive cumulative abnormal returns under the 3-day event window.

Table 2 Significant Test for Individual Event- Multifactor Model

	<b>Acquirer</b>	<b>Target</b>	<b>CAR(-10,+10)</b>	<b>CAR(-5,+5)</b>	<b>CAR(-1,+1)</b>
20-Apr-01	SAS AB	SAS Norge ASA	0.0173	-0.0221	0.0589*
1-Nov-01	Scandinavian Airlines System AB	Air Baltic	0.0994	-0.0312	-0.0623
22-Nov-03	Scandinavian Airlines System AB	Spanair SA	-0.0348	0.0109	0.0263
26-Jun-07	SAS AB	Spanair SA	0.0138	0.0260	-0.0329
14-Feb-08	SAS AB	Go Now AS	0.0247	0.0260	0.0044
23-Jan-01	Lufthansa AG	Composite International Inc	-0.0347	-0.0544	-0.0140
11-Nov-02	Deutsche Lufthansa AG	British midland Airways Ltd	-0.1099	-0.0522	-0.0202
10-Feb-05	Deutsche Lufthansa AG	Amadeus Global Travel Distribution SA	-0.0121	0.0081	0.0010
21-Jun-07	Deutsche Lufthansa AG	Swiss International Air Lines Ltd	0.0522	0.0521	0.0220
29-Oct-08	Deutsche Lufthansa AG	Eurowings Luftverkehrs AG	-0.1629**	-0.1153**	-0.0280
1-Nov-04	Transat AT Inc	Air Consultants Europe	0.0076	0.0213	0.0003
13-Mar-06	Transat AT Inc	Thomas Cook Travel Ltd	0.0954	0.0643	-0.0061
13-Jul-07	Transat AT Inc	L'Europeenne de Tourisme SARL	-0.0191	0.0334	-0.0141
1-Jan-00	British Airways PLC	Comair	-0.0935	-0.0600	-0.0173
2-Jul-08	British Airways PLC	Elysair SAS	0.1625	0.1320	0.0473
16-May-02	EasyJet PLC	Newgo 1 Ltd	0.1136	0.2352***	0.0939**
25-Oct-07	EasyJet PLC	GB Airways Ltd	0.0493	0.0814	0.0385
11-Oct-06	Air Partner PLC	Gold Air International Ltd	0.1309	0.1183	0.0307
6-Sep-07	Air Partner PLC	Air Partner International SAS	-0.0464	-0.0361	0.0002
25-May-07	Riverhawk Aviation Inc	Profile Aviation Center Inc	0.9453	1.1566*	0.8900***
19-Mar-08	Riverhawk Aviation Inc	Carolina Air Charter Inc	-0.7261	-0.1116	0.6693*
9-Oct-00	Continental Airlines Inc	DC Air	0.0300	-0.0319	-0.0076
9-Sep-02	JetBlue Airways	Live LLC	0.2238	0.2073**	0.1140**
31-Jan-03	Ryanair Holdings Plc	buzz	-0.0209	0.0127	0.0432
10-Dec-04	Southwest Airlines Inc	Certain assets of ATA Airlines Inc	-0.0572	-0.0296	0.0019
1-Aug-05	Republic Airways Holdings Inc	US Airways' 10 Embraer 170s and Other Assets	0.0200	0.0325	0.0208



**Continued**

15-Aug-05	Skywest Inc	Atlantic Southeast Airlines Inc	0.1456	0.1966***	0.1545***
18-Jan-07	Pinnacle Airlines Corp	Colgan Air Inc	-0.1527	-0.1095	-0.0341
24-Apr-07	Norwegian Air Shuttle ASA	FlyNordic AB	0.2590***	0.1925***	0.1288***
20-Jun-07	Discovery Air Inc	Top Aces Inc	-0.1089	-0.0549	-0.0621
21-Jun-07	Air France-KLM	Martinair Holland NV	-0.0124	-0.0370	-0.0200
14-Apr-08	Delta Air Lines Inc	Northwest Airlines Corp	-0.1470	-0.0217	-0.0186

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Source: Author's calculation

\*, \*\* and \*\*\* indicate significance at the 10% level, 5% level and 1%, respectively.

The individual results from different event windows validate the two assumptions made in the methodology section.

First of all, these results are inconsistent with market efficiency hypothesis. As many management studies use quite long event windows, this means that some researchers don't think the effects of events are quickly incorporated into stock prices (McWilliams and Siegel 1997). They believe the stock market is inefficient at least during short-term. Especially in the cases of mergers and acquisitions, information about the number of potential acquirers and their evaluation of the target may be revealed over a relatively long period (Ebneht and Theuvsen 2007). Our results are very interesting: the shorter the length of the event window, the more the number of the significant results. Specially, all significant results under the 3-day event window show the positive cumulative abnormal returns. This indicates investors could earn positive abnormal returns directly by buying or selling based on the announcement of M&A transactions. In other words, the stock prices don't incorporate all new publicly available information during the short term. Thus the empirical results are consistent with previous studies. The stock market is inefficient at least in the short run.

Secondly, before the announcement date of M&As, most investors don't have any information about M&As. Then abnormal returns can be regarded as the result of the stock market's reaction to new information about the unanticipated events. The empirical results show that the M&A transactions result in significant changes on the stock price of the acquiring firms after announcement date. Our results also prove the unanticipated events assumption.

Besides the significant results are coincident with those two assumptions, the total results propose an important and interesting question. If bidder's cumulative abnormal returns are not positive significantly or even negative, why do the bidding firms still make acquisitions? Like SAS or Deutsche Lufthansa AG, both of them have five M&A transactions from 2000 to 2008. But few deals create a statistically significant positive value for the bidding firm. There are just two significant results and one of them even has a negative CAR, leading to destroy the bidder's value. There are several possible answers to this question. First of all, the zero returns to bidders are

consistent with a competitive corporate control market in which firms earn normal returns in their operations (Weston, Siu et al. 2001). Secondly, for many M&A activities, the bidder probably has already had some share ownership of the target firm before mergers and acquisition. So any gains from M&A may have already been reflected in the acquiring firm's stock price when the prior share ownership was obtained (Mei and Sun 2008). Finally, the difference of firm size between bidders and target firms also could cause the insignificance of bidders' returns. Even though there is a good deal, M&As could still have little impact on the bidder's stock price since the size of targets may be small relative to the bidder.

### 4.3 Aggregation of Abnormal Returns

Although some individual M&A transactions cumulate a significantly positive abnormal return for the shareholders of bidding firms, we don't know if the abnormal returns over the whole sample are still positive. So we aggregate the abnormal returns both across securities and through time. Table 3 represents all the results of the average cumulative abnormal return under different event windows.

**Table 3. The Cumulative Average Abnormal Returns**

Event window	Multifactor Model			Market Model		
	CAAR 21	CAAR 11	CAAR 3	CAAR 21	CAAR 11	CAAR 3
Minimum	-0.7261	-0.1153	-0.0623	-0.1569	-0.1793	-0.0661
Maximum	0.9453	1.1566	0.8900	1.0627	1.1465	0.8800
Median	0.0107	0.0118	0.0015	-0.0019	0.0121	0.0044
Average	0.0204	<b>0.0575**</b>	<b>0.0628***</b>	0.0412	<b>0.0573**</b>	<b>0.0655***</b>
Test Statistics	1.1865	2.4703	3.6752	1.4427	2.6830	4.1440

Source: Author's calculations

\*, \*\* and \*\*\* indicate significance at the 10% level, 5% level and 1%, respectively.

No matter which event window is used, all the average cumulative abnormal returns are positive. Except the 21-day event window, CAAR11 increases the stock returns of bidding firms by 5.7% over the whole sample at the 5% confidence level, and CAAR

3 even creates about 6% returns for bidders' shareholders. These results strongly prove the previous studies that shareholders of some bidding firms realize significant gains at a merger announcement period (Knapp, 1990; Kyle *et al*, 1992; Singal, 1996).

#### 4.4 Comparative Statics

Although M&A transactions could create value for the bidding firms, the factors explaining M&A-success are still unknown. According to the characteristics of M&A transactions, we choose the following three factors: the geographic factors (domestic or cross-border); the payment factors (stock or cash); the situation of stock market (bull market or bear market). We use comparative statics to test whether an identified driver of M&A-success has explanatory power. Table 4 summarizes the results from different factors.

**Table 4. Comparative Statics under Different Event Windows**

		CAAR 21	CAAR 11	CAAR 3
Factor 1	Home group	0.0245	<b>0.1009 *</b>	0.1252
	Cross-border group	0.0168	0.0191	0.0077
Factor 2	Stock payment group	0.0052	0.0017	<b>0.0110 *</b>
	Cash payment group	0.0263	<b>0.0793 ***</b>	<b>0.0830 ***</b>
Factor 3	Bull market group	0.0721	<b>0.0968 **</b>	<b>0.0651 ***</b>
	Bear market group	-0.0383	0.0129	<b>0.0601 ***</b>

Source: Author's calculations

\*, \*\* and \*\*\* indicate significance at the 10% level, 5% level and 1%, respectively.

The geographical factor only has one significant CAAR at the 10% level. This result probably means that domestic transactions provide for a higher potential synergy, such as more cost savings, than cross-border transactions (Patrick, Dirk *et al*. 2004). Shareholders of both airlines preferred a merger between the two domestic carriers (Zhang and Aldridge 1997). However, the geographical factor in our empirical results doesn't affect the entire CAAR significantly.

For the payments factor, the results are consistent with the previous research that bidder's shareholders prefer cash payments (Myers and Majluf 1984). When the management of the acquiring firms believes their stocks are undervalued by the stock market, they want to pay cash to the targets instead of stock. Compared with stock transactions, M&As create more wealth for bidder's shareholder in cash transactions (Becher 2000). On the other hand, the choice of method of payment shows that evaluation of the bidder management about their stocks.

For the situation of stock market, the transactions under the bull market can create value for the acquiring firms. On the one hand, the potential acquiring firms probably have higher stock prices to facilitate an acquisition. On the other hand, a bidding firm's stock price increases more when recent mergers had positive responses from the market. The market also rewards firms whose previous mergers it has liked. Further, a hot stock market leads to better announcement returns (Rosen Richard 2006).

#### **4.5 Cross-sectional Regression Analysis**

The comparative statics can only test one factor of M&A-success at the same time. In order to investigate the association between the magnitude of the abnormal returns and the characteristics specific to the event observations, we run the cross-sectional regressions. Besides those three factors as dummy variables, two additional numerical variables are included: total assets and total revenue. Since the coefficients for all the variables are insignificant when we employ cross-sectional regression regarding CAR (-10, + 10) or CAR (-5, +5) as the dependent variable. We just show the significant one—CAR (-1, +1). The results are shown in Table 5.

**Table 5. Cross-sectional Regression Analysis for CAR (-1, +1)**

Variable	Coefficient	t-Statistic	Probability
Total assets	0.000147	0.006900	0.9945
Total revenue	<b>-0.058564</b>	-2.532983	0.0177
Bull market	<b>-0.104941</b>	-2.057007	0.0498

Domestic transaction	0.021292	0.365499	0.7177
Cash payment	-0.059295	-0.977778	0.3372
Constant term	0.575175	5.460461	0.0000
R-squared	<b>0.595325</b>	Adjusted R-squared	0.517503
F-statistic	7.649818	Probability (F-statistic)	0.000156

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Source: Author's calculations

In table 5, only two variables have significant values. As a result that the coefficient of total assets is strongly insignificant, the firm size of the bidding firm has no effect on the cumulative abnormal return. The sign of the coefficient of total revenue is also different from our expectation. An increase in the total revenue of bidding firms will decrease the cumulative abnormal returns of the M&A transactions by 5.9% at the 5% confidence level. With the growth of the total revenue, the management of the acquiring firms probably wants to smooth the earnings through paying dividends for the shareholders. The dividend payments reduce the operating cash flow, leading to a negative signal for the investors. So the cumulative abnormal returns decrease as the stock price decreases during the M&A period. For the rest of dummy variables, domestic transactions do not show any relationship with the cumulative abnormal returns. Though cash payments have a negative sign, it is insignificant. However, the sign of bull market is statistically negative at the 5% significant level. That means the cumulative abnormal returns under bull market will be less 10.5% than those in the bear market. The two potential reasons can explain this result. On the one hand, a bidder may find a target to be more attractive in the bear market. Despite the stock performance for both bidder and targets firm is poor under bear market, it is a good opportunity for bidder to acquire target firm. Because the stock price of the target has a poor performance, the cost of acquisition for bidding firm is relatively low. On the other hand, by avoiding cluster when identifying M&As, the residual term is assumed to be cross-sectionally uncorrelated and homoskedastic (MacKinlay 1997). However, this assumption of cross-sectional regression may be not suitable for the actual cases. So we may get the opposite result for the market situation factors.

## **5. Summary and Managerial Implications**

This paper used event study methodology to test whether the mergers and acquisitions (M&As) transactions could create value for the acquiring firm as a result of the data limited. We selected 32 M&A activities from 2000 to 2008 in order to analyze the announcement effects of North American and European Airline firms. Compared with the previous researches, our empirical results proved that there were significant differences about the M&A impacts on bidder's financial performance, expressed in increasing or decreasing stock prices. Most literatures documented that the target firms could gain significantly from M&A transactions, while the announcement effects for acquiring firms were usually negative, or the bidding firms earned little positive returns. But our study demonstrates that M&A transactions can create a significant positive value for the acquiring firm by both quantitative and qualitative analysis.

First of all, we analyzed M&As' effects on individual bidding firms by calculating the cumulative abnormal returns under different event windows. The individual security analysis addressed that most of significant results in the M&As transactions had a positive impact on the acquiring firm's stock price. Then we examined the entire effects of the M&As announcements over the whole sample. The average cumulative abnormal returns still increased the performance of bidders' stock in the financial market significantly. Both these two quantitative analysis proved that M&A transactions created value for the bidding firm in the North American and European airline industry. Qualitative analysis was necessary to investigate the factors of M&A-success. The results from comparative statics indicated that domestic transaction, cash payment in transaction and bull markets had a positive effect on the cumulative abnormal returns under event window (-5, +5; -1, +1), while stock payment and bear market also positively affected the cumulative abnormal return only in the 3-day event window. Finally, we ran the cross-sectional regression to assess the effects of the variables explaining M&A-success at the same time. The results were almost similar to that of comparative statics. The significant difference was the CAR in bull market was less than that in bear market. The potential explanation was the low transaction cost of M&A under bear market led to a higher cumulative abnormal return for bidders compared with bull market situation. The growth in total revenue of

bidding firm resulted in a decrease in CARs since dividend payment to smooth earning may lower the stock price during the event window. There was no significant relationship between the bidding firm's size and value creation.

The empirical results of this paper could be of great importance for shareholders, investors and management. Shareholders and investors pay attention to the market reaction to the important strategic decisions such as deciding on M&As since these decisions have a large impact on airline companies' future competitive positions and wealth. Management may obtain efficient information from stock market to help acquisition decisions (Ebneith and Theuvsen 2007). The results of event studies don't only illustrate the efficiency of M&A which creates value for bidders in airline industry, but also the influence of the method of transaction payment and the timing of the announcement (Panayides and Gong 2002). The empirical evidence gives the management of bidding firm some guidelines for the future M&A activities.



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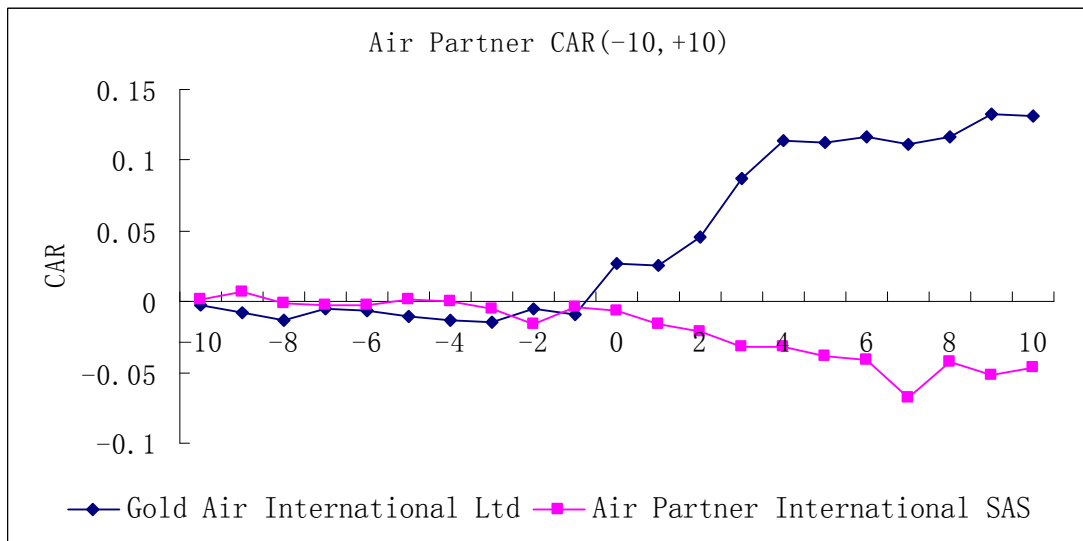
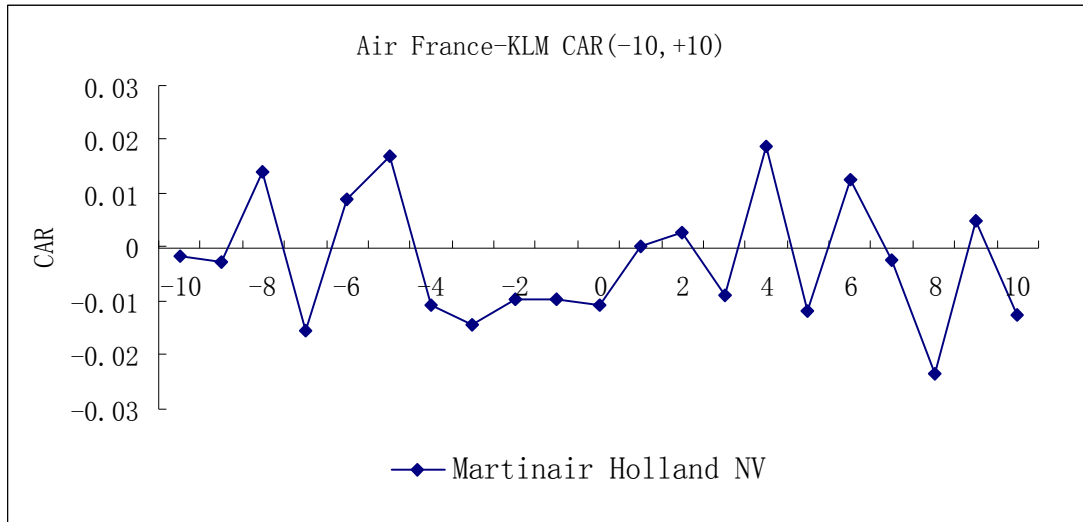
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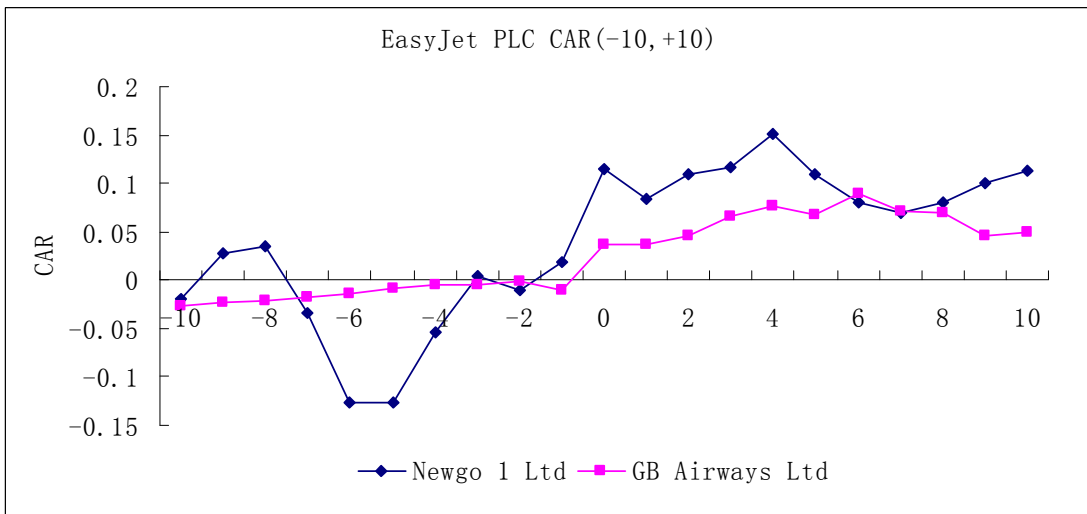
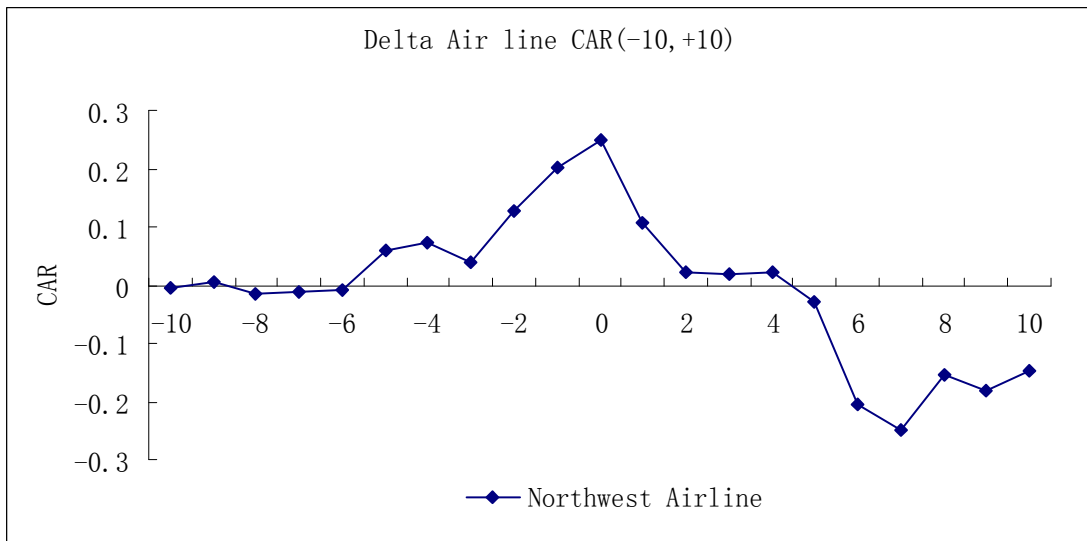
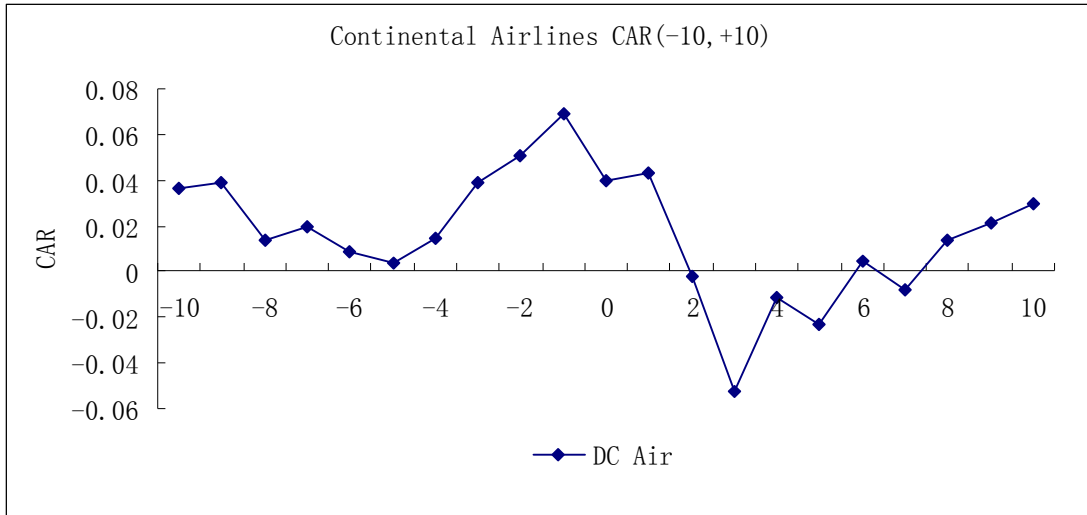
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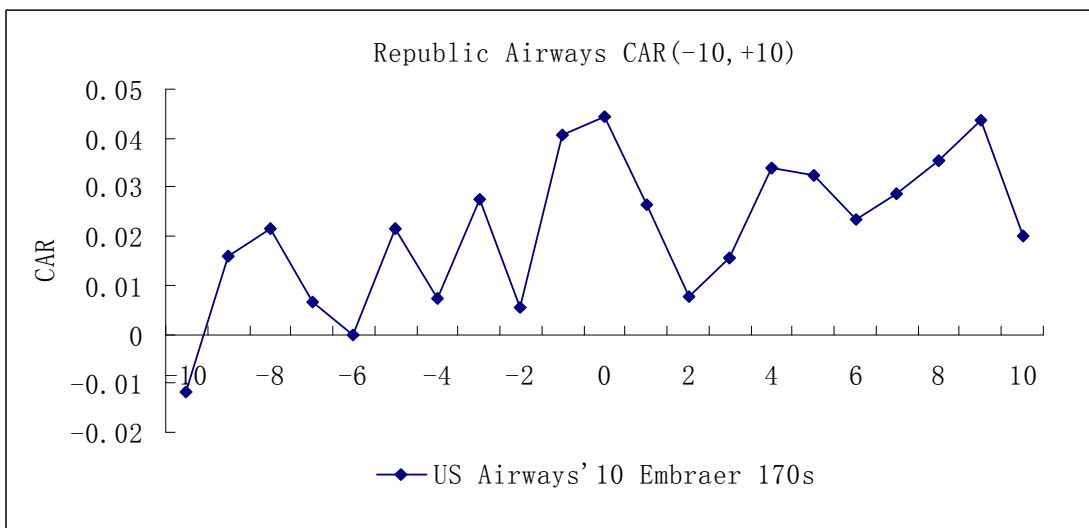
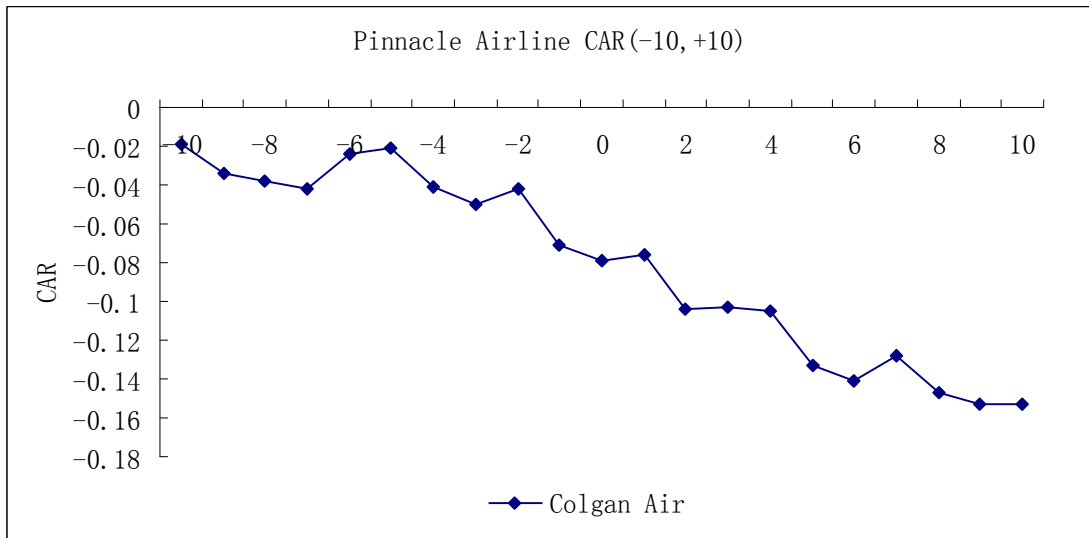
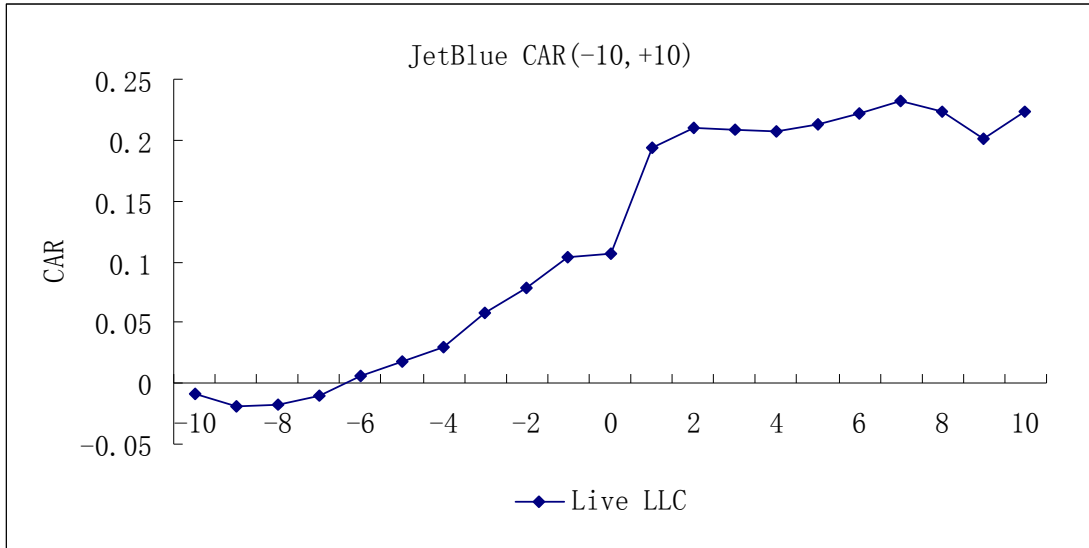
## 7. Appendix

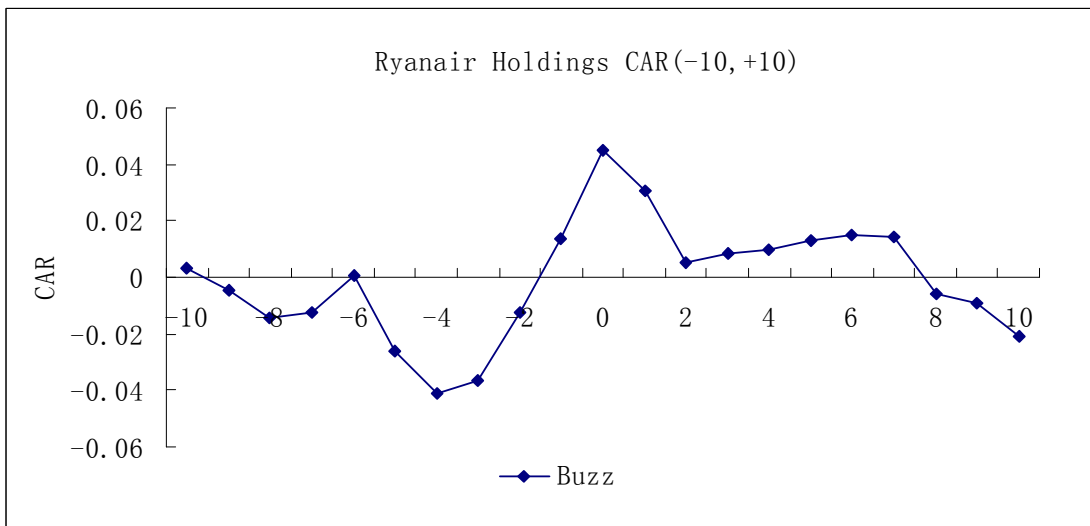
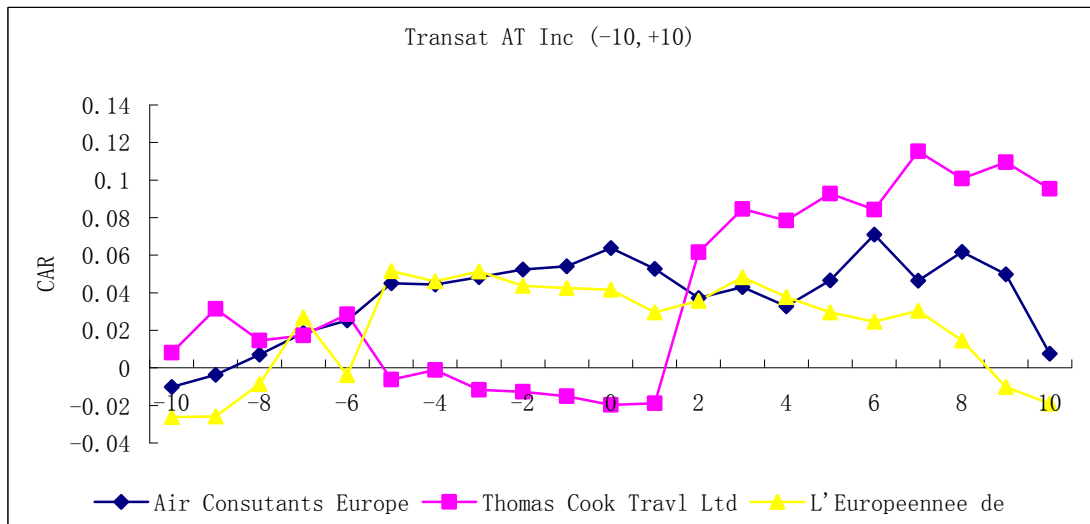
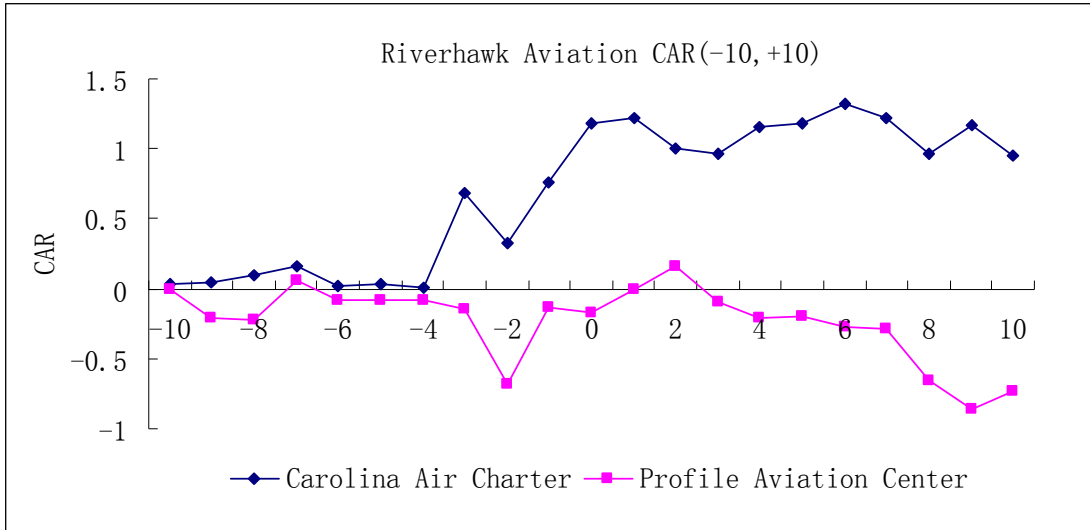
### 7.1 Appendix I

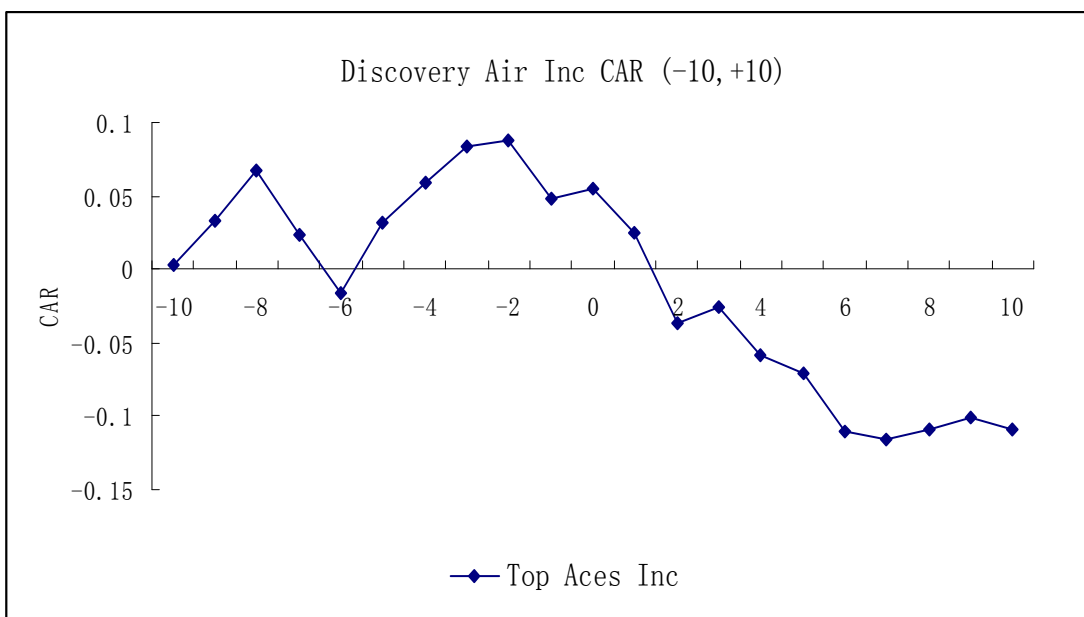
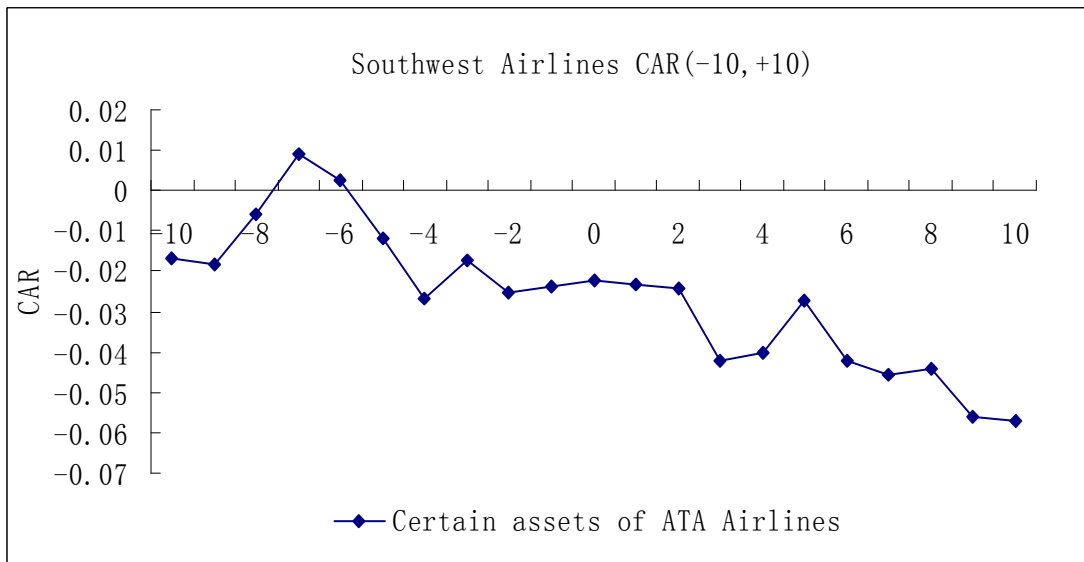
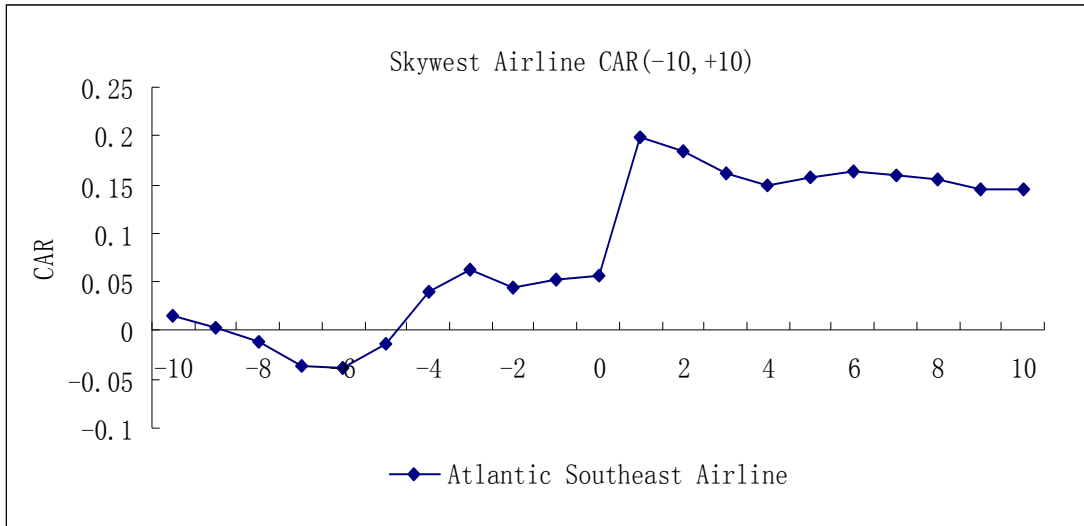
**CAR (-10, 10) of Each Event -Multifactor Model**











## 7.2 Appendix II

Table 1. Individual CAR Significant Test- Market Model

Event date	Target	Acquiror	CAR(-10,+10)	CAR(-5,+5)	CAR(-1,+1)
20-Apr-01	SAS Norge ASA	SAS AB	0.0820	0.0188	<b>0.0948***</b>
1-Nov-01	Air Baltic	Scandinavian Airlines System AB	0.2718	-0.0043	-0.0514
22-Nov-03	Spanair SA	Scandinavian Airlines System AB	-0.0800	-0.0301	0.0266
26-Jun-07	Spanair SA	SAS AB	0.0502	0.0241	-0.0437
14-Feb-08	Go Now AS	SAS AB	0.0341	0.0313	0.0030
23-Jan-01	Composite International Inc	Lufthansa AG	-0.0883	-0.0576	-0.0209
11-Nov-02	British midland Airways Ltd	Deutsche Lufthansa AG	0.0257	0.0063	-0.0331
10-Feb-05	Amadeus Global Travel Distribution SA	Deutsche Lufthansa AG	-0.0089	-0.0042	-0.0026
21-Jun-07	Swiss International Air Lines Ltd	Deutsche Lufthansa AG	0.0640	0.0639	0.0324
29-Oct-08	Eurowings Luftverkehrs AG	Deutsche Lufthansa AG	-0.1542	-0.0989	0.0181
1-Nov-04	Air Consultants Europe	Transat AT Inc	0.0655	0.0683	0.0177
13-Mar-06	Thomas Cook Travel Ltd	Transat AT Inc	-0.0146	0.0611	-0.0079
13-Jul-07	L'Europeenne de Tourisme SARL	Transat AT Inc	-0.0123	0.0328	-0.0141
1-Jan-00	Comair	British Airways PLC	-0.0990	-0.0306	0.0117
2-Jul-08	Elysair SAS	British Airways PLC	-0.0935	0.1628	-0.0079
16-May-02	Newgo 1 Ltd	EasyJet PLC	0.0699	<b>0.2212***</b>	<b>0.1099***</b>
25-Oct-07	GB Airways Ltd	EasyJet PLC	0.0051	0.1090	0.0643
11-Oct-06	Gold Air International Ltd	Air Partner PLC	0.1353	0.1200	0.0315
6-Sep-07	Air Partner International SAS	Air Partner PLC	-0.0299	-0.0367	-0.0151
25-May-07	Profile Aviation Center Inc	Riverhawk Aviation Inc	1.0627	<b>1.1465 *</b>	<b>0.8800***</b>
19-Mar-08	Carolina Air Charter Inc	Riverhawk Aviation Inc	0.1164	-0.1793	<b>0.6509*</b>
9-Oct-00	DC Air	Continental Airlines Inc	0.0345	-0.0486	<b>-0.0143</b>
9-Sep-02	LiveTV LLC	JetBlue Airways	0.1156	0.1237	<b>0.1043**</b>
31-Jan-03	buzz	Ryanair Holdings Plc	-0.0798	-0.0034	<b>0.0911**</b>



**Continued**

10-Dec-04	Certain assets of ATA Airlines Inc	Southwest Airlines Inc	-0.0520	-0.0370	-0.0012
1-Aug-05	US Airways' 10 Embraer 170s and Other Assets	Republic Airways Holdings Inc	-0.0175	0.0180	0.0059
15-Aug-05	Atlantic Southeast Airlines Inc	Skywest Inc	<b>0.1460*</b>	<b>0.1979***</b>	<b>0.1545***</b>
18-Jan-07	Colgan Air Inc	Pinnacle Airlines Corp	-0.1569	-0.1176	-0.0320
24-Apr-07	FlyNordic AB	Norwegian Air Shuttle ASA	<b>0.2160***</b>	<b>0.1687***</b>	<b>0.1227***</b>
20-Jun-07	Top Aces Inc	Discovery Air Inc	-0.1069	-0.0569	-0.0661
21-Jun-07	Martinair Holland NV	Air France-KLM	-0.0370	-0.0193	-0.0044
14-Apr-08	Northwest Airlines Corp	Delta Air Lines Inc	-0.1462	-0.0152	-0.0094

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Source: Author's calculation

\*, \*\* and \*\*\* indicate significance at the 10% level, 5% level and 1%, respectively.

**Table 2. Cross- sectional Analysis Results of CAR (-5, +5) - Multifactor Model**

Independent Variable	Coefficient	t-Statistic	Probability
Total assets	-0.023091	-0.707941	0.4853
Total revenue	-0.013953	-0.394440	0.6965
Bull	-0.124060	-1.589417	0.1241
Domestic	-0.002484	-0.027875	0.9780
Cash	0.017550	0.189157	0.8514
Constant term	0.389524	2.417009	0.0230
R-squared	0.247752	Adjusted R-squared	0.103088
F-statistic	1.712610	Probability (F-statistic)	0.167037

Source: Author's calculation

**Table 3. Cross-sectional Analysis Results of CAR (-10, +10) - Multifactor Model**

Independent Variable	Coefficient	t-Statistic	Probability
Total assets	-0.031453	-0.811437	0.4245
Total revenue	0.023087	0.549173	0.5876
Bull	-0.103764	-1.118629	0.2735
Domestic	-0.007252	-0.068466	0.9459
Cash	0.039001	0.353704	0.7264
Constant term	0.122693	0.640609	0.5274
R-squared	0.078031	Adjusted R-squared	0.440105
F-statistic	-0.099270	Probability (F-statistic)	0.816375

Source: Author's calculation