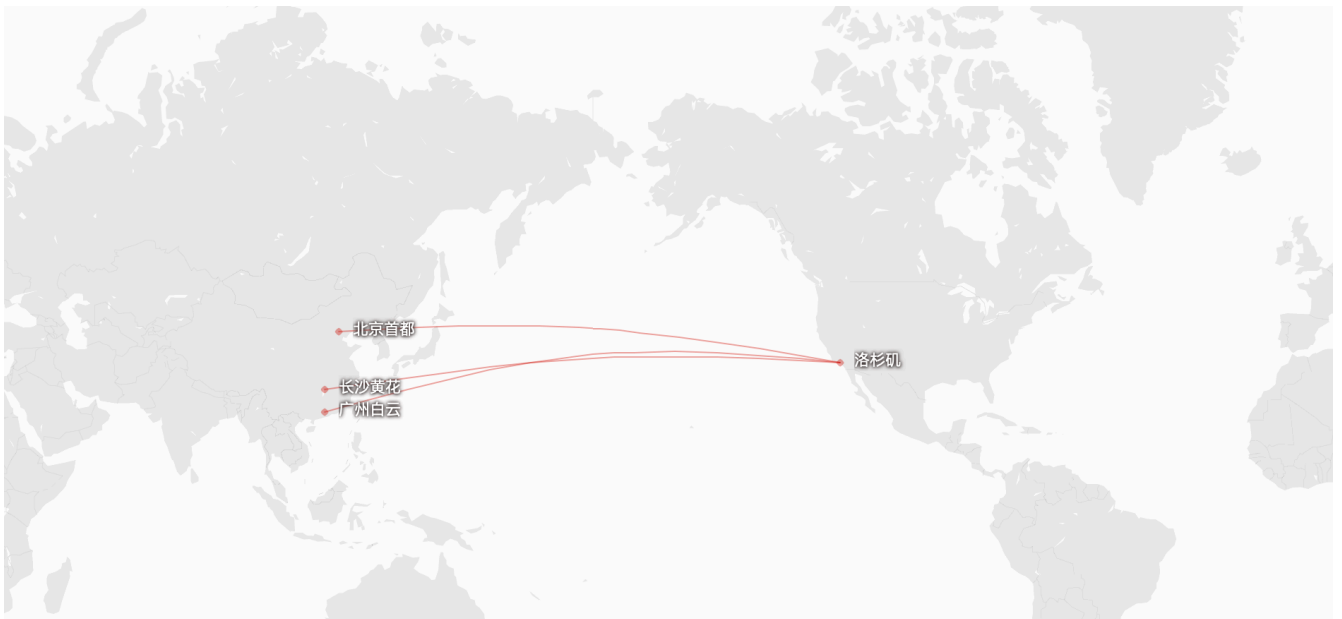


# STATISTICS 68

## PROJECT REPORT

### WHAT INFLUENCES THE PRICE OF FLIGHTS TICKETS?



**SUBMITTED TO**  
PROF. YAMING YU

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# Introduction

## **Background: (The reason why we chose this topic)**

As international students, we always spend a lot of money on flight tickets every year. If you ask your friends “When do flight prices drop?”, and you might be confused when you get widely different answers. It may be difficult to answer this question. The flight tickets’ prices drop and rise regularly. The prices of flight tickets would probably be one of the world’s great mysteries. When you want to buy a flight ticket one day, it might cost \$500; but when you want to buy that exact same ticket a few days later, it could cost much more. Many people might wonder why, since there are only several days in difference. To save money, we are curious about the factors that could influence the flight tickets price. For example, buying flight tickets at midnight can save you a small amount of money, but it’s not worth to stay up late just to book a flight. There are other factors that affect the flight fares. We have several questions, such as “How airplanes figure out their flight fares?”, “What are the factors that make the flight prices drop?” and we want to know the answers to these questions. This is one problem that we can solve by using statistical methods. Below we will explain what changes the flight prices.

## **How we got the data set**

We recorded data from the travel website Expedia. We randomly chose around eight days from each month to record one way flights from three cities in China, Beijing, Changsha, and Guangzhou to Los Angeles, and we collected 100 flights information in total from Expedia.com. Flights were randomly chosen from PEK(Beijing Capital International Airport) to LAX(Los Angeles International Airport), from CSX(Changsha Huanghua International Airport) to LAX, and from CAN(Guangzhou Baiyun International Airport) to LAX. Since there are many flights available per day, we need to make decisions on which price to choose. Instead of choosing the flights with lowest price, we choose the flights whose prices are around the middle among all the flights tickets’ prices on that day. Lowest prices can not give us enough information about the factors that could influence flight tickets’ price, and we believe the average price can best presents the overall flight ticket prices level of the specific day.

## **Goal:**

The flight prices change depending on several factors. According to the data we collected, we have found some pricing patterns that will find you the cheapest tickets.

The purpose of this project is to find the factors that influence flight tickets price thus we can make better choices in the future about how to buy flight tickets wisely.

## **Environment factors:**

Due to the trade conflict between China and the United States, the exchange rate is getting higher and higher. To save money, we need to buy flight tickets wisely. we need to make better choices on how to buy flight tickets wisely.

### **Flight Distance factor:**

Beijing-LA: The air travel shortest distance between Beijing and Los Angeles is 10,084 km= 6,266 miles.

Changsha-LA: The air travel shortest distance between Changsha and Los Angeles is 11,229 km= 6,977 miles.

Guangzhou-LA: The air travel shortest distance between Guangzhou and Los Angeles is 11,638 km= 7231 miles.

### **Competition factor:**

More airlines cause lower prices.

### **Timing of Purchase factor:**

Different carriers offer different deals on different days at different times.

### **Timing of Flight factor:**

Because of low demand, there exists the cheapest days to fly. Expensive periods include holidays such as Thanksgiving and Christmas, and other must-fly periods such as summer vacation.

## **Types of Variables Used**

We chose the variables that we think could have some effects on the flight tickets price. We have both categorical variables and quantitative variables.

Variables used are as follows:

### **Response variable**

Stops: how many stops the flights transfer

Flight time: the total flight time of the flights

### **Categorical variable**

Date: the departure date

Departure location: where the flights from from(Peking, Guangzhou, Changsha)

Class: the class of the flights(Economy/Business)

Air company: the air company of the flights

Flight number: the flight number of the flights

### **Quantitative variable**

Stops: how many stops the flights transfer

Flight time: the total flight time of the flights

Free checked bags: how many bags are checked already

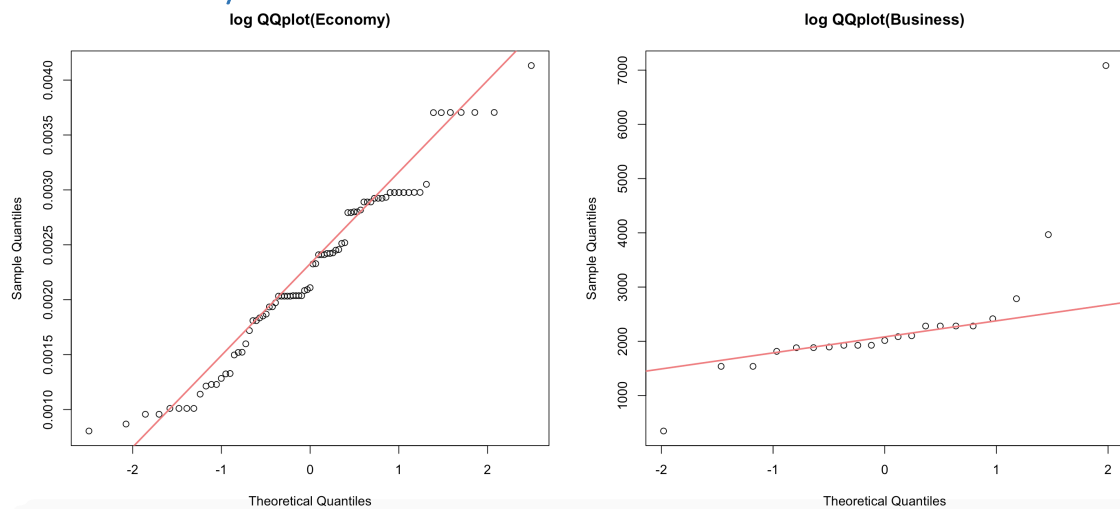
## Methodology

The data were sourced from the internet:

[https://www.expedia.com/?semcid=US.B.BING.BT-c-EN.GENERIC&semdtl=a1268772546.b11284229742615078.r1.g1kwd-80264469159311.i1.d180264401306251.e1c.j178557.k1.fl.n1.l1o.h1e.m1be&msclkid=163e3050f295180fad436cabd3e7c68d&utm\\_source=bing&utm\\_medium=cpc&utm\\_campaign=USA%3AENG%3AX%3ABT%3AX%3AX%3AE%3AX%3ACore%3A&utm\\_term=expedia%20us&utm\\_content=USA%3AENG%3AX%3ABT%3AX%3AXX%3AX%3AX%3AX%3AX%3AE%3AX%3Ausa%3A](https://www.expedia.com/?semcid=US.B.BING.BT-c-EN.GENERIC&semdtl=a1268772546.b11284229742615078.r1.g1kwd-80264469159311.i1.d180264401306251.e1c.j178557.k1.fl.n1.l1o.h1e.m1be&msclkid=163e3050f295180fad436cabd3e7c68d&utm_source=bing&utm_medium=cpc&utm_campaign=USA%3AENG%3AX%3ABT%3AX%3AX%3AE%3AX%3ACore%3A&utm_term=expedia%20us&utm_content=USA%3AENG%3AX%3ABT%3AX%3AXX%3AX%3AX%3AX%3AX%3AE%3AX%3Ausa%3A)

All the data were secondary. Our basic focus is on what influence the price of the flights tickets, and we will mainly focus on the vacation effect(Month).

## Check Normality



If we check the data we can find it is roughly normally distributed.

## Explore Holiday Effect

### Pair Plot of Price vs. Month



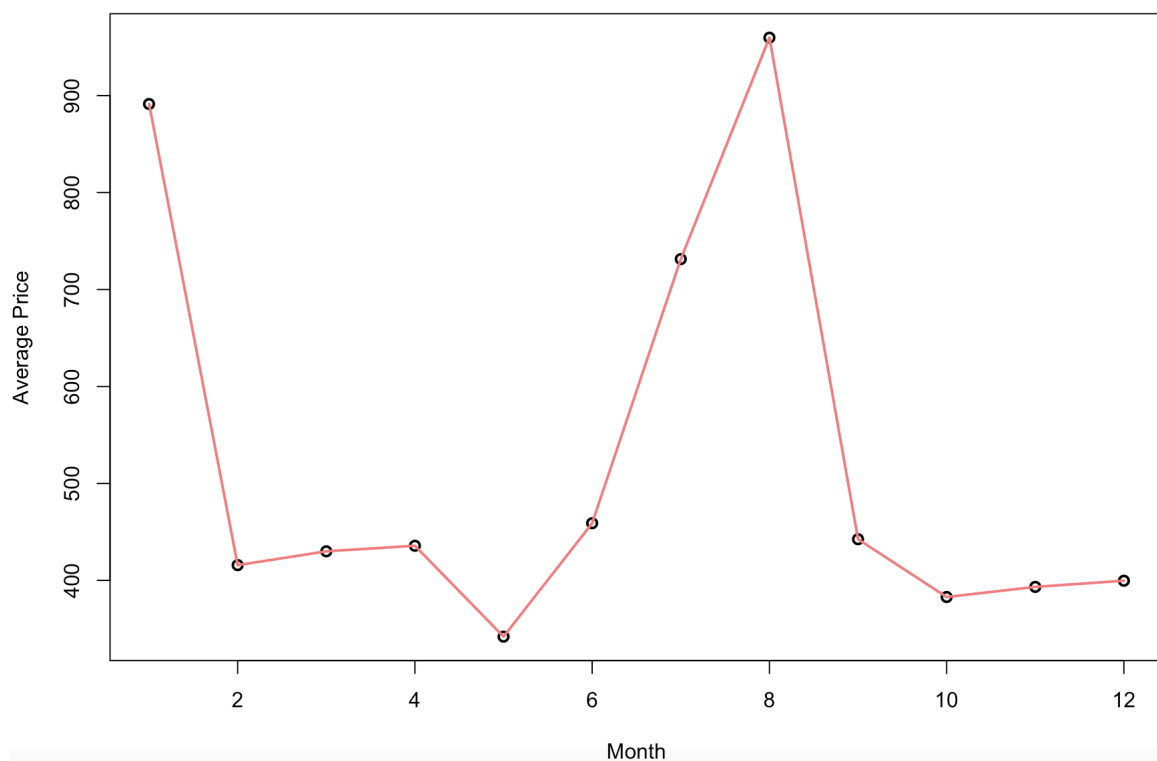
This is a pairs plot that can show the relationship between the flights ticket prices and the month. This plot combined both the flight ticket prices for business class and economy class. Triangle symbol represents the business class and the circles represents the economy class. From the plot above, we can see that the flights tickets are generally lower for economy class. The business class's price is always much higher than the prices for economy class. The prices for economy class varies in a \$2000 range. The prices for business class varies in around a \$5000 range. The variation for the price for economy class is not that large compare to the business class. The largest economy prices are around \$2000 for one year, and it is similar to the lowest tickets price for business class for one year. Economic class and business class have simultaneous price flow during one year.

## Average Price vs. Month

### QUARTER ACTIVITY

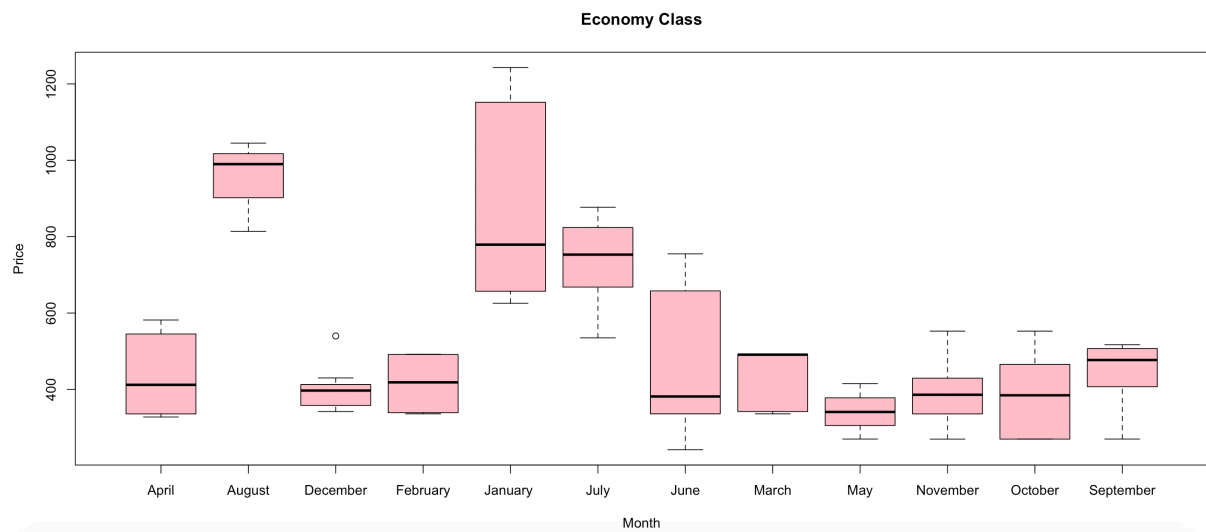
	Fall 2019	Winter 2020	Spring 2020
<b>Quarter begins</b>	Sep 23	Jan 2	Mar 25
<b>Instruction begins</b>	Sep 26	Jan 6	Mar 30
<b>Instruction ends</b>	Dec 6	Mar 13	Jun 5
<b>Final examinations*</b>	Dec 7–13	Mar 14–20	Jun 6–11
<b>Quarter Ends</b>	Dec 13	Mar 20	Jun 12

Average Price for Economy Class of Each Month



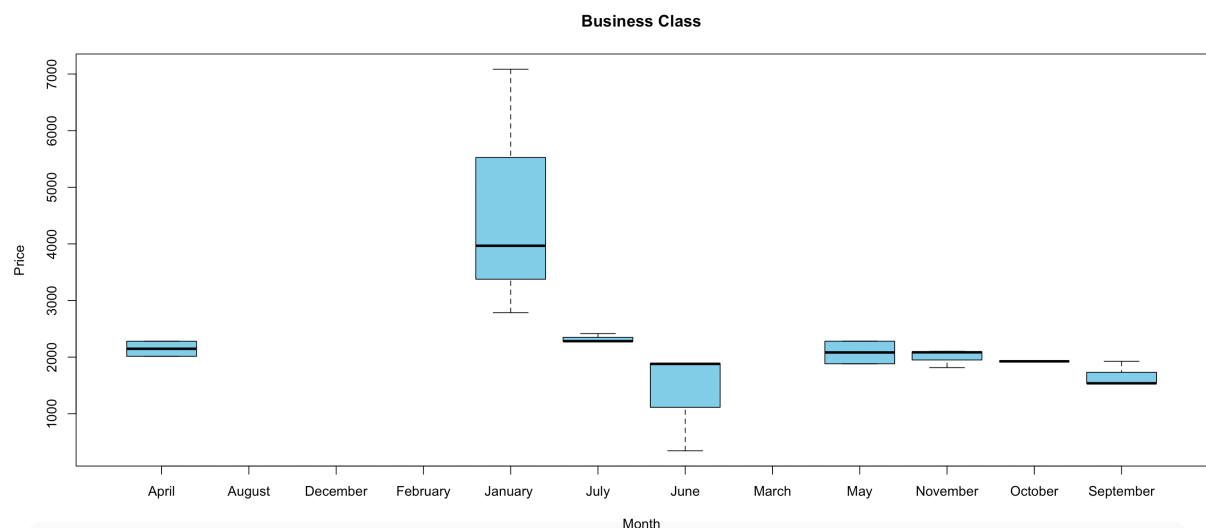
From the average price of Economy class plot, we can see a significant holiday effect on the price of the flight tickets. Take our university as an example, from the quarter activity table, summer vacation begins in the middle of June and ends in late September and winter break begins in the middle of December and ends in early January. Correspondingly, there is a huge increase of the tickets price during these two periods. Especially, the climax of the price is around August. Also, since there is a short spring break in late March, there is a slightly increase in March. Besides that, the price is roughly the same.

## Boxplot of Price vs. Month



### Economy:

The boxplot on the left side is a side-by-side boxplot that shows the trend of the flight tickets price for the economy class over the year. From the plot, we can see that the prices varies the most in January, and varies the least in December. Except for January, July, August other months roughly has the same average ticket price, and they roughly have the same range of variance. Even though June has similar average price as month other than January, July, and August, it does not have similar variance. The flight ticket price of June has very large range. It can be as low as around \$200 dollars and as high as \$800.



### Business:

The boxplot on the right side is a side-by-side boxplot that shows the trend of flight tickets' price for the business class over one year. From the plot, we can see that the price varies the most for January. June is the month that has the second largest variance for ticket prices. Other than these two months, all other month has similar average price and variance. (The flight ticket price for business class changes during the year as well.



## Explore Flight Time Effect



### Economy:

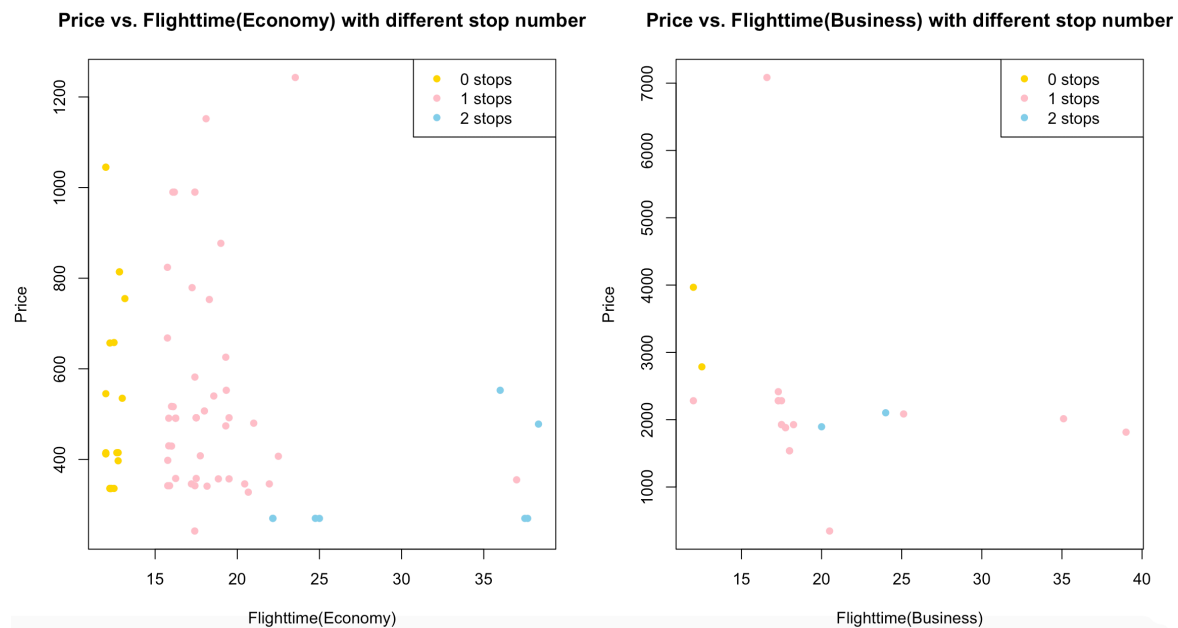
According to the plot, when the flight time is bigger, the probability of that the price is cheaper than 400 dollars is bigger, and we have the lowest proportion to buy a ticket within 400 dollars when the flight time is 15-18 hours. At the same time, there are less tickets over 1000 dollars with higher flight time. When the flight time is bigger than 21 hours, no ticket is higher than 600 dollars.



### Business:

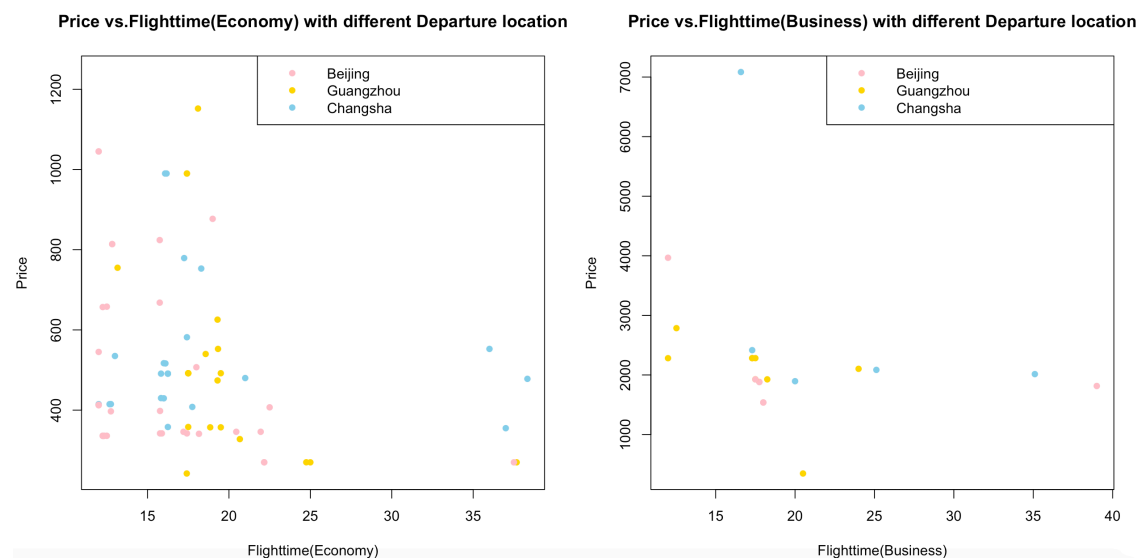
According to the plot we can see that no matter the flight time how to change, the price of Business class always keeps in the range from 1500 to 3000 dollars. But when the flight time is bigger than 15 hours and less than 18 hours, the price may be super high, which may be resulted by the longer service time or the holiday effect.

## Explore Stop Number Effect



## Explore Departure Location Effect

### Plot of Price vs. Flight time with different Departure location



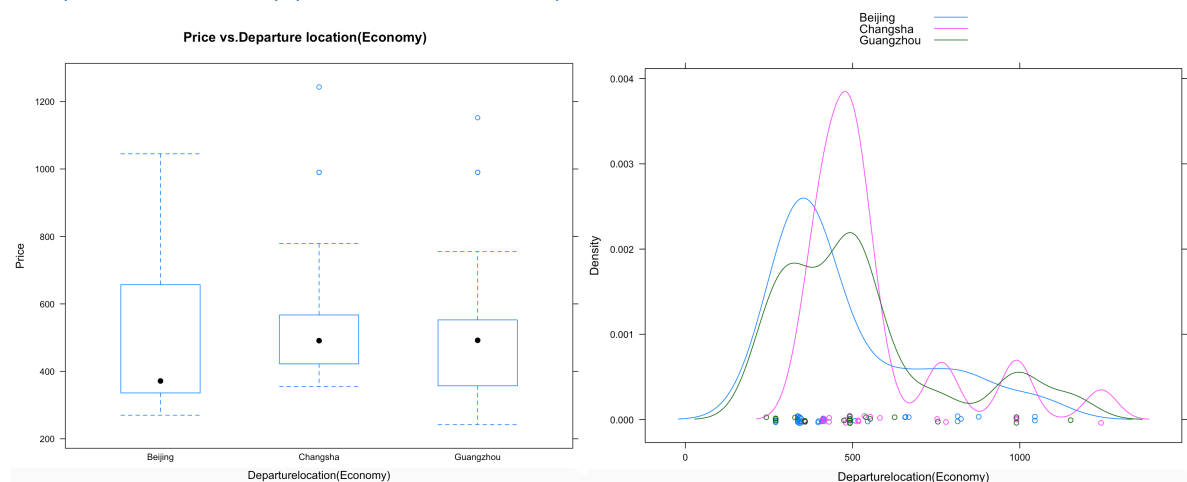
#### Economy:

From the graph above, in general, we can see that the flight time is the longest if the departure location is Guangzhou. Changsha tends to have the second longest flight time, and Beijing tends to have the shortest flight time. The flight ticket prices for flights with Beijing as departure location are not that expensive even though they tend to have the shortest flight time.

#### Business:

There is no obvious trend.

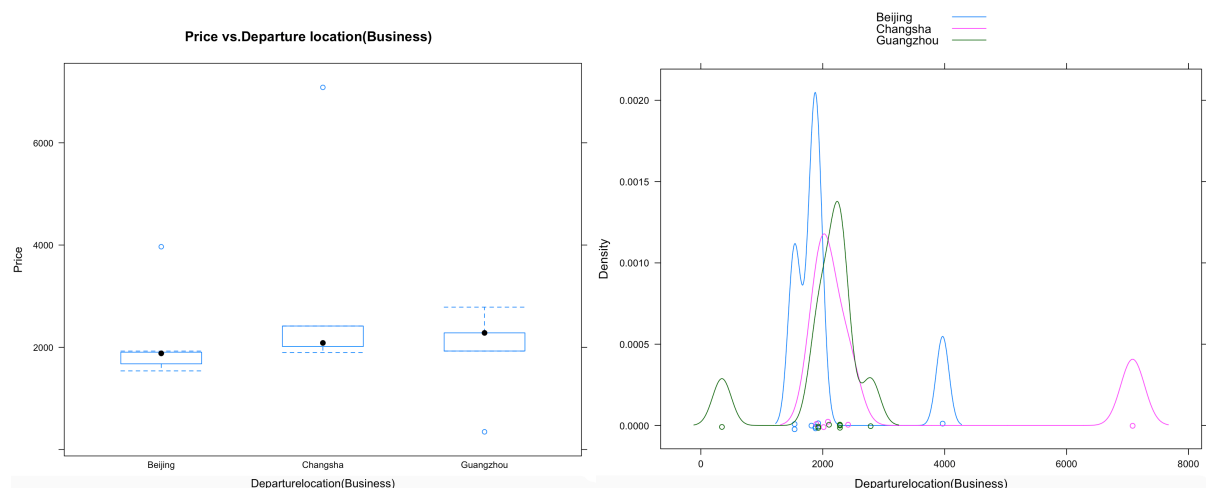
## Boxplot and density plot of Price vs. Departure Location



### Economy:

According to the left plot, Beijing has the largest inter-quartile range. Beijing is the largest city among the three cities above, and Beijing has the largest spread among three cities. Guangzhou have the lowest price to buy the tickets of economy class. The prices of tickets in Changsha are higher than that of Beijing in average. For Economy class, large cities tend to have a lower average price than that of other cities.

Looking at the right graph, we can see the variability of departure location for each city. Beijing appears to locate between 0-1500. Changsha tends to locate between 200-1500. Guangzhou tends to locate between 20-1500.

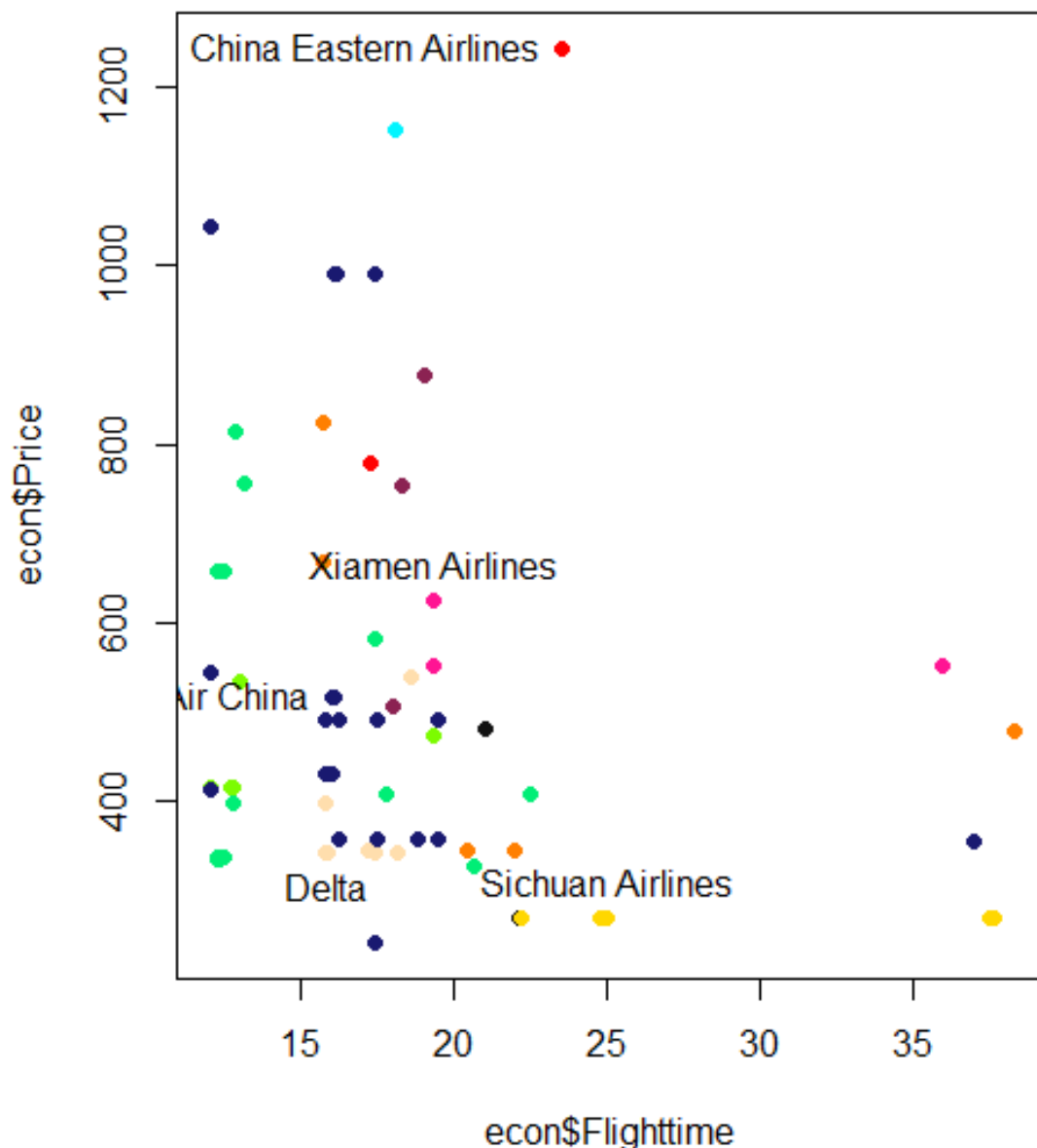


### Business:

According to the left plot, three cities have similar inter-quartile range of price to buy the tickets of business class. Beijing has the lowest price of buying tickets of the business class. Guangzhou has the highest price of buying tickets of the business class. Changsha is somewhere in between. For Business class, the prices of tickets are always expensive no matter in which city.

Looking at the right graph, we can see the variability of departure location for each city. Beijing tends to locate between 1000-3000. Changsha tends to locate between 1000-4500. Guangzhou tends to locate between 0-3000.

## Explore Air Company Effect



This is a plot showing the flights ticket price of the economy class for different air companies. It shows that Sichuan Airlines(yellow points) always has the lowest ticket price. The prices for Delta airlines(navajo white points) are a little bit higher, around \$400 dollars. Air China(dark blue points) has flight ticket prices that are slightly higher than Delta Airlines, which is always around \$500. The flight ticket prices for Xiamen Airlines are always around \$600 dollars. The ticket prices for China Eastern Airlines(red points) are generally higher than other air flight companies.

## Fit a linear model

Call:

```
lm(formula = econ$Price ~ econ$Month + econ$Stop + econ$Departurelocation +
    econ$FreeCheckedbags + econ$Flighttime)
```

Residuals:

Min	1Q	Median	3Q	Max
-268.23	-58.99	-7.09	45.77	333.64

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	134.045	194.932	0.688	0.494238
econ\$MonthAugust	525.732	66.613	7.892	6.09e-11 ***
econ\$MonthDecember	-32.711	64.465	-0.507	0.613653
econ\$MonthFebruary	-19.998	65.825	-0.304	0.762296
econ\$MonthJanuary	440.711	73.794	5.972	1.24e-07 ***
econ\$MonthJuly	296.365	74.082	4.001	0.000171 ***
econ\$MonthJune	19.424	71.271	0.273	0.786112
econ\$MonthMarch	-8.402	64.943	-0.129	0.897478
econ\$MonthMay	-43.844	89.829	-0.488	0.627213
econ\$MonthNovember	-26.424	71.458	-0.370	0.712806
econ\$MonthOctober	-14.919	70.961	-0.210	0.834166
econ\$MonthSeptember	-4.155	70.486	-0.059	0.953178
econ\$Stop	12.927	45.255	0.286	0.776099
econ\$DeparturelocationChangsha	61.540	37.307	1.650	0.104090
econ\$DeparturelocationGuangzhou	42.564	39.337	1.082	0.283435
econ\$FreeCheckedbags	139.740	83.438	1.675	0.099014 .
econ\$Flighttime	-0.822	3.995	-0.206	0.837641

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 120.2 on 62 degrees of freedom

Multiple R-squared: 0.7884, Adjusted R-squared: 0.7338

F-statistic: 14.44 on 16 and 62 DF, p-value: 3.131e-15

This is the summary table given by the model that the response variable is the price of Economy class and the covariates are month, the number of stops, departure location, the number of free checked bags, and the flight time.

The model is:  $\text{Price} = \beta_0 + \beta_1 \cdot \text{Month}_i + \beta_2 \cdot \text{Stop} + \beta_3 \cdot \text{Departurelocation}_i + \beta_4 \cdot \text{FreeCheckedbags} + \beta_5 \cdot \text{Flighttime}$

↓↓

Price = 134.045 + 525.732\*MonthAugust - 32.711\*MonthDecember - 19.998\*MonthFebruary + 440.711\*MonthJanuary + 296.365\*MonthJuly + 19.424\*MonthJune - 8.402\*MonthMarch - 43.844\*MonthMay - 26.424\*MonthNovember - 14.919\*MonthOctober - 4.155\*MonthSeptember + 12.927\*Stop + 61.540\*DeparturelocationChangsha + 42.564\*DeparturelocationGuangzhou + 139.740\*FreeCheckedbags - 0.822\*Flighttime

## ANOVA

```
> anova(fit)
```

Analysis of Variance Table

Response: econ\$Price

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
econ\$Month	11	3192925	290266	20.0869	< 2e-16 ***
econ\$Stop	1	410	410	0.0284	0.86682
econ\$Departurelocation	2	102448	51224	3.5448	0.03486 *
econ\$FreeCheckedbags	1	41635	41635	2.8812	0.09463 .
econ\$Flighttime	1	612	612	0.0423	0.83764
Residuals	62	895933	14451		

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

**Analysis of variance (ANOVA)** is a collection of statistical models and their associated estimation procedures (such as the "variation" among and between groups) used to analyze the differences among group means in a sample. ANOVA was developed by statistician and evolutionary biologist Ronald Fisher. The ANOVA is based on the law of total variance, where the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether two or more population means are equal, and therefore generalizes the t-test beyond two means.

According to the ANOVA table, we can see that only two covariates have the p-value that is smaller than the significance level of 0.05. This means that Month and Departure location are covariates that are supposed to add in the model.

So the better model is:

$$\begin{aligned} \text{Price} = & 134.045 + 525.732 * \text{MonthAugust} - 32.711 * \text{MonthDecember} - \\ & 19.998 * \text{MonthFebruary} + 440.711 * \text{MonthJanuary} + 296.365 * \text{MonthJuly} + \\ & 19.424 * \text{MonthJune} - 8.402 * \text{MonthMarch} - 43.844 * \text{MonthMay} - 26.424 * \text{MonthNovember} - \\ & 14.919 * \text{MonthOctober} - 4.155 * \text{MonthSeptember} + 61.540 * \text{DeparturelocationChangsha} + \\ & 42.564 * \text{DeparturelocationGuangzhou} \end{aligned}$$

## AIC

Start: AIC=771.56

Price ~ Month + Stop + Departurelocation + FreeCheckedbags +  
Flighttime

	Df	Sum of Sq	RSS	AIC
- Flighttime	1	612	896545	769.61
- Stop	1	1179	897112	769.66
- Departurelocation	2	40239	936171	771.03
<none>			895933	771.56
- FreeCheckedbags	1	40532	936465	773.05
- Month	11	2918666	3814599	864.01

Step: AIC=769.61

Price ~ Month + Stop + Departurelocation + FreeCheckedbags

	Df	Sum of Sq	RSS	AIC
- Stop	1	569	897114	767.66
- Departurelocation	2	40307	936851	769.09
<none>			896545	769.61
- FreeCheckedbags	1	41635	938179	771.20
- Month	11	2930739	3827284	862.27

Step: AIC=767.66

Price ~ Month + Departurelocation + FreeCheckedbags

	Df	Sum of Sq	RSS	AIC
<none>			897114	767.66
- Departurelocation	2	59316	956430	768.72
- FreeCheckedbags	1	54934	952048	770.36
- Month	11	2949313	3846427	860.66

The **Akaike information criterion (AIC)** is an estimator of the relative quality of statistical models for a given set of data. Given a collection of models for the data, AIC estimates the quality of each model, relative to each of the other models. Thus, AIC provides a means for model selection.

The model with the lowest AIC is the best model. In this situation, the model with the covariate Month, Departurelocation, and FreeCheckedbags is the best model, since its AIC=767.66 is the lowest. The model with the lowest AIC gives us this summary plot. We can see the coefficients of different month, different departure locations, and the number of free checked bags.



Call:  
lm(formula = Price ~ Month + Departurelocation + FreeCheckedbags,  
data = econ)

Coefficients:

(Intercept)	MonthAugust	MonthDecember	MonthFebruary
143.383	525.491	-31.493	-18.509
MonthJanuary	MonthJuly	MonthJune	MonthMarch
440.360	299.144	15.445	-6.364
MonthMay	MonthNovember	MonthOctober	MonthSeptember
-42.111	-28.326	-16.034	-1.055
DeparturelocationChangsha	DeparturelocationGuangzhou	FreeCheckedbags	
64.717	46.840	131.493	

The model with the lowest AIC:

Price = 143.383 + 525.491\*MonthAugust - 31.493\*MonthDecember-18.509\*MonthFebruary  
+ 440.360\*MonthJanuary + 299.144\*MonthJuly + 15.445\*MonthJune-6.364\*MonthMarch  
- 42.112\*MonthMay - 28.326\*MonthDecember - 16.034\*MonthOctober-  
1.055\*MonthSeptember + 64.717\*DepartureChangsha + 46.840DepartureGuangzhou +  
131.493\*FreeCheckedbags

## Conclusion

### Goal

To find factors that affect the flight tickets prices

### Summarizing main findings

#### -Holiday effect

Because of low demand, there exists the cheapest days to fly. Expensive periods include holidays such as Thanksgiving and Christmas, and other must-fly periods such as summer vacation.

#### - Departure location

Departure locations matters when we want to purchase a cheap air ticket. It's obvious to see that more airlines cause lower prices. Large cities such as Beijing tend to have a lower price to buy air tickets because of competition among airlines in Beijing.

#### - Free checked bags

The number of free checked bags can influence the flight ticket price as well. Flights with fewer number of free checked bags tend to have lower ticket price. However, the relationship is not as strong as the previous two factors, since only the AIC method give us this conclusion. A possible reason is that the need of labor force will be less if only one free checked bag is allowed. Less free checked bags could make the flight to cost less engine oil. Thus, the flight ticket price will be less because the cost is less for one trip.

### Possible critique of our own analysis

-Data set is small, so some trend for business class is not clear

-We choose the flight whose price is at an average level among all the flights of that day for avoiding extreme situation(outliers), so our data choices are not randomly enough.

## \*Data Set

Flightnumber	Price	Month	Date	Stop	Departurelocation	Class	FreeCheckedbags	Flighttime	AirCompany
CZ 3379/327	7084	January	01/01	1	Changsha	Business	2	16.59	China Southern Airlines
MU 5368/ MU 583	779.13	January	01/17	1	Changsha	Economy	2	17.25	China Eastern Airlines
MU 5368/ DL 8883	1243	January	01/01	1	Changsha	Economy	2	23.53	China Eastern Airlines
CA 522/CA 8	1152	January	01/03	1	Guangzhou	Economy	2	18.1	China Airlines
MF 8374/MF 857	625.63	January	01/22	1	Guangzhou	Economy	2	19.3	Xiamen Airlines
CZ 7048	2785.55	January	01/22	0	Guangzhou	Business	2	12.53	Air China
CA 887	3967	January	01/08	0	Beijing	Business	2	12	Air China
AA 180	657	January	01/10	0	Beijing	Economy	2	12.25	American Airlines
AA180	336	February	02/01	0	Beijing	Economy	2	12.25	American Airlines
AA180	336	February	02/03	0	Beijing	Economy	2	12.25	American Airlines
DL128	342	February	02/05	1	Beijing	Economy	2	17.42	Delta
UA889/UA1294	346	February	02/07	1	Beijing	Economy	2	21.95	United
CA1374/CA983	491	February	02/09	1	Changsha	Economy	2	16.25	Air China
CA1374/CA983	491	February	02/11	1	Changsha	Economy	2	16.25	Air China
CA1316/CA983	492	February	02/13	1	Guangzhou	Economy	2	17.5	Air China
CA1316/CA983	492	February	02/15	1	Guangzhou	Economy	2	17.5	Air China
AA180	336	March	03/01	0	Beijing	Economy	2	12.33	American Airlines
AA180	336	March	03/03	0	Beijing	Economy	2	12.33	American Airlines
DL128	342	March	03/05	1	Beijing	Economy	2	15.77	Delta
DL128	398	March	03/07	1	Beijing	Economy	2	15.77	Delta
CA1344/CA987	491	March	03/09	1	Changsha	Economy	2	15.83	Air China
CA1374/CA983	491	March	03/11	1	Changsha	Economy	2	16.25	Air China
CA1316/CA983	492	March	03/13	1	Guangzhou	Economy	2	17.5	Air China
CA1322/CA983	492	March	03/15	1	Guangzhou	Economy	2	19.5	Air China
CA1316/CA983	492	March	03/17	1	Guangzhou	Economy	2	17.5	Air China
AA 180	335.88	April	04/01	0	Beijing	Economy	2	12.3	American Airlines
CA 887	545.11	April	04/03	0	Beijing	Economy	2	12	Air China
DL 128 / DL 1721	345.98	April	04/21	1	Beijing	Economy	2	17.21	Delta
AA 7130/AA180	327.76	April	04/13	1	Guangzhou	Economy	2	20.67	American Airlines
AA 1316/ AA983	2281.38	April	04/02	1	Guangzhou	Business	2	12	Air China
DL 6363/DL 88	2014.36	April	04/11	1	Changsha	Business	2	35.1	Delta
UA 7581/UA 889/UA504	478	April	04/11	2	Changsha	Economy	2	38.33	United
AA7069/AA182	581.76	April	04/23	1	Changsha	Economy	2	17.42	American Airlines
SA8548	270	May	05/12	2	Beijing	Economy	1	22.16	Sichuan
D128	341	May	05/30	1	Beijing	Economy	2	18.16	Delta
HA7923	415	May	05/30	0	Changsha	Economy	2	12.75	Hainan Airlines
CP6101	1883	May	05/31	1	Beijing	Business	2	17.75	Air China
AC1316	2282	May	05/31	1	Guangzhou	Business	2	17.5	Air China
CP5781	1881	June	06/18	1	Beijing	Business	2	17.75	Cathay Pacific

AC1328	242	June	06/10	1	Guangzhou	Economy	2	17.41	Air China
AA7101	755	June	06/07	0	Guangzhou	Economy	2	13.16	American Airlines
AA7069	408	June	06/20	1	Changsha	Economy	2	17.75	American Airlines
AA180	336	June	06/13	0	Beijing	Economy	2	12.5	American Airlines
AA180	658	June	06/30	0	Beijing	Economy	2	12.5	American Airlines
D128	346	June	06/06	1	Guangzhou	Business	2	20.5	Delta
SC8998	1895	June	06/26	2	Changsha	Business	2	20	Sichuan Airlines
AC1364	355	June	06/15	1	Changsha	Economy	2	37	Air China
U889	824	July	07/30	1	Beijing	Economy	2	15.75	United
HA7923	535	July	07/01	0	Changsha	Economy	2	13	Hainan Airlines
U889	668	July	07/15	1	Beijing	Economy	2	15.75	United
CP5993	877	July	07/28	1	Beijing	Economy	2	19	Cathay Pacific
AC1380	2282	July	07/07	1	Guangzhou	Business	2	17.3	Air China
CS3130	2416	July	07/20	1	Changsha	Business	2	17.3	China Southern Airlines
CP5721	753	July	07/17	1	Changsha	Economy	2	18.3	Cathay Pacific
AC1380	2282	July	07/22	1	Guangzhou	Business	2	17.3	Air China
AA180	814	August	08/01	0	Beijing	Economy	2	12.83	American Airlines
CA983	1045	August	08/03	0	Beijing	Economy	2	12	Air China
CA987	1045	August	08/05	0	Beijing	Economy	2	12	Air China
AA180	814	August	08/07	0	Beijing	Economy	2	12.83	American Airlines
CA1344/CA987	990	August	08/09	1	Changsha	Economy	2	16.08	Air China
CA1374/CA983	990	August	08/11	1	Changsha	Economy	2	16.17	Air China
CA1380/CA987	990	August	08/13	1	Guangzhou	Economy	2	17.42	Air China
CA1380/CA987	990	August	08/15	1	Guangzhou	Economy	2	17.42	Air China
SA8998	480	September	09/23	1	Changsha	Economy	2	21	Sichuan
AC1344	517	September	09/27	1	Changsha	Economy	2	16	Air China
AA7078	407	September	09/11	1	Beijing	Economy	2	22.5	American Airlines
CP5905	507	September	09/24	1	Beijing	Economy	2	18	Cathay Pacific
CP6101	1538	September	09/25	1	Beijing	Business	2	18	Cathay Pacific
CP5905	1538	September	09/01	1	Beijing	Business	2	18	Cathay Pacific
SA8738	270	September	09/05	2	Guangzhou	Economy	2	24.75	Sichuan Airlines
HA7351	474	September	09/15	1	Guangzhou	Economy	2	19.3	Hainan Airlines
CE9302	1927	September	09/18	1	Guangzhou	Business	2	17.5	China Eastern Airlines
CA1344/CA987	516.48	October	10/01	1	Changsha	Economy	2	16.1	Air China
MF8226/MF857/MF857	552.63	October	10/01	2	Changsha	Economy	2	36	Xiamen Airlines
HA7923	414.88	October	10/24	0	Changsha	Economy	2	12.67	Hainan Airlines
CA 987	412.11	October	10/26	0	Beijing	Economy	2	12	Air China
si chuan 8884	269.88	October	10/05	2	Beijing	Economy	1	22.17	Sichuan Airlines
MU 5193/MU583	1926.13	October	10/16	1	Beijing	Business	2	17.5	China Eastern Airlines
MU2818/MU2855	1926.13	October	10/01	1	Guangzhou	Business	2	18.25	China Eastern Airlines
sichuan 8736/8699	269.88	October	10/18	2	Guangzhou	Economy	1	37.67	Sichuan Airlines

CA 1310/CA 987	357.13	October	10/31	1	Guangzhou	Economy	2	18.85	Air China
sichuan 8738/8699/8699	269.88	October	10/09	2	Guangzhou	Economy	1	25	Sichuan Airlines
AA180	335.88	November	11/01	0	Beijing	Economy	2	12.25	American Airlines
sichuan 8892/8699/8699	269.88	November	11/12	2	Beijing	Economy	1	37.5	Sichuan Airlines
MF8106/MF829	1814.63	November	11/30	1	Beijing	Business	2	39	Xiamen Airlines
sichuan 8732/86998699	2102.88	November	11/30	2	Guangzhou	Business	1	24	Sichuan Airlines
CA1322/CA983	357.13	November	11/14	1	Guangzhou	Economy	2	19.5	Air China
MF8374/MF829	552.63	November	11/03	1	Guangzhou	Economy	2	19.33	Xiamen Airlines
HA7923	414.88	November	11/04	0	Changsha	Economy	2	12	Hainan Airlines
CA 1344/CA987	429.48	November	11/21	1	Changsha	Economy	2	16	Air China
MU 5368/MU577	2085.13	November	11/29	1	Changsha	Business	2	25.12	China Eastern Airlines
AA180	397	December	12/01	0	Beijing	Economy	2	12.75	American Airlines
DL128	342	December	12/03	1	Beijing	Economy	2	15.88	Delta
UA889/UA1200	346	December	12/05	1	Beijing	Economy	2	20.45	United
CA983	413	December	12/07	0	Beijing	Economy	2	12	Air China
CA987	413	December	12/09	0	Beijing	Economy	2	12	Air China
CA1374/CA983	358	December	12/11	1	Changsha	Economy	2	16.25	Air China
CA1344/CA987	430	December	12/13	1	Changsha	Economy	2	15.83	Air China
CA1316/CA983	358	December	12/15	1	Guangzhou	Economy	2	17.5	Air China
DL6730/DL88	540	December	12/17	1	Guangzhou	Economy	2	18.57	Delta