Statistical Assignment

BACKGROUND

The current report quantitatively analyzes three variables – load factors, revenue passenger mile, and available seat miles between American Airlines and U.S. major carriers (cumulatively). The data retrieved for the analysis was extracted from the Bureau of Transportation Statistics focusing on domestic flights from January 2006 to December 2012. The quantitative analysis focused on finding critical statistical values like, mean, median, mode, standard deviation, variance, and minimum/maximum of the variables. These values were calculated in Microsoft Excel 2013 in order to compare American Airlines' performance to the entire domestic industry. The comparison was completed using summary statistics and scatter plots of the information that are further presented below.

SUMMARY STATISTICS

Below are summary statistics for each of the data sets which had eighty-four (84) number of values in the entire sample. The arithmetic mean was calculated using the following formula; $x\_bar = (\Sigma x_i)/n$. All major U.S. carriers had a load factor mean of 81% (see Table 1), while American Airlines had a load factor mean of 82.934% (see Table 2). Passenger load factor is used to measure the capacity utilization of airlines often times used to examine the effectiveness of

airline carriers to fill up their seats and generate fare revenue (GAIP, 2017b). Based on the average that was obtained American Airlines has a higher load factor that is above the industry mean. The measures of central tendency – mode and median are also close to the average for all major US carriers as they both equal 81.43%. While American Airlines has a median and mode of 83.355% and 84.56% respectively. Again performing above industry average. However, this may indicate that American Airlines is creeping closer to crush loading which is being witnessed on various flights around the country (GAIP, 2017a).

Table 1- Summary Statistics of All Major U.S. Carriers (Domestic)

Summary Statistics					
Load Factors		**Revenue Passenger Miles**		**Available Seat Miles**	
Mean	81	Mean	48,629,156	Mean	58,077,063
Median	81.43	Median	47,904,518	Median	58,227,952
Mode	81.43	Mode	NONE	Mode	NONE
Minimum	72.29	Minimum	36,997,641	Minimum	47,817,552
Maximum	87.15	Maximum	62,915,780	Maximum	65,566,709
Standard Dev	3.9091975	Standard Dev	5,477,877	Standard Dev	3,929,729
Variance	15.281825	Variance	30,007,131,936,823	Variance	15,442,771,170,173

Table 2- Summary Statistics of American Airlines (Domestic)

Summary Statistics					
Load Factors		**Revenue Passenger Miles**		**Available Seat Miles**	
Mean	82.934	Mean	6,624,897	Mean	7,984,735
Median	83.355	Median	6,522,230	Median	7,753,372
Mode	84.56	Mode	NONE	Mode	NONE
Minimum	74.91	Minimum	5,208,159	Minimum	6,734,620
Maximum	89.94	Maximum	8,277,155	Maximum	9,424,489
Standard Deviation	3.972	Standard Deviation	720,158.571	Standard Deviation	744,469.8849
Variance	15.762	Variance	518,628,367,282.42	Variance	554,235,409,510.06

On the other hand, revenue passenger mile measures traffic for an airline and is considered the basic amount of production that an airline carrier is able to create (GAIP, 2017b). Looking at the averages in both tables above cumulative major airliners produced the most revenue passenger miles with $48 million USD while American Airlines produced 6.7 million USD. Lastly, available seat miles are a measurement for airlines flight passenger capacity. Cumulatively, the industry holds 58miilion of these seats while American Airlines has about 8 million in available seat miles. Once again, those in cumulative industry is outperforming American Airlines domestically.

On the measurements - variance, it is used in a data set to measure how far apart they or how each of the number pulled is considered the set or the mean. What this means is that variance can be used to see how individual numbers may relate to each other within a data set instead of arranging the data in quartiles. Both the variance of cumulative data and American airlines of load factors is approximately the same estimated to about 15% and 16% respectively. There is not much difference in the variance between American Airlines and all other major carriers flying domestically based on load factor. However, variance differs greatly between the two when it comes to revenue passenger miles. Overall, the cumulative industry is outperforming American Airlines in all variables, although American Airlines has a greater load factor.
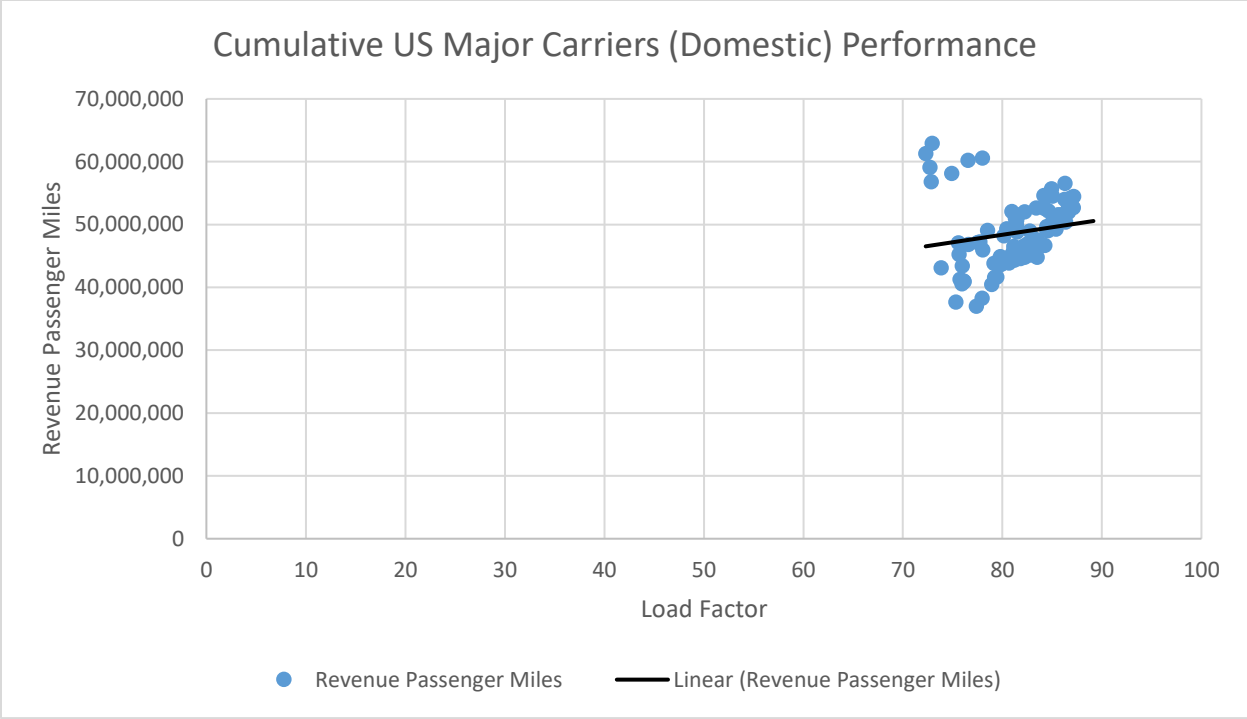
Figure 1- Cumulative US Major Carriers (Domestic) Performance

To better analyze the two variables of significance: load factor and revenue passenger miles, scatter plots were made and illustrate the relationship between the two variables in the figures below. Both figures produce a positive correlation between the two variables. This suggests that both variables are moving in tandem to each other with increasing load factor resulting in increasing revenue passenger miles. However, Fig.1 also presents itself with a few outliers in the data which are not following the positive trend. The data does not provide a reason for this, but, it can be interpreted that specific carriers may not be performing in tandem with the overall other carriers. On the other hand, American Airlines (see Fig.2) shows uniformity in their correlation with a steep upward rising gradient and also represents a positive correlation between the two values.
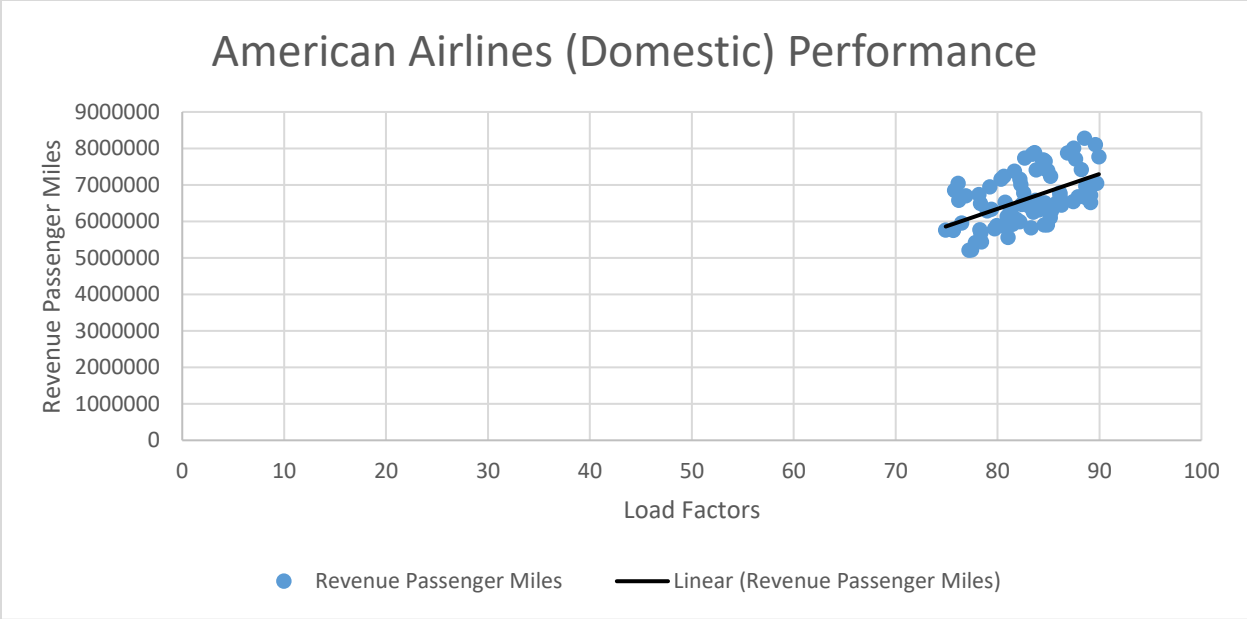
Figure 2- American Airlines (Domestic) Performance

References

Bureau of Transportation Statistics (BTS). (2017). Load factor, All Carriers- All Airports. Retrieved from https://www.transtats.bts.gov/Data_Elements.aspx?Data=5, on July 5th, 2017.

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