LCC vs Non-LCC Delay Time: Executive Summary

Airlines and passengers face extensive financial losses, totaling billions of dollars each year due to delayed flights, impacting expenses, productivity, and public perception. The FAA/Nextor's 2018 report highlighted a $28 billion annual cost from delays, affecting airlines' reputations. Our investigation seeks to assess if significant differences exist in delay durations between Low Cost Carrier (LCC) and non-LCC airlines, categorizing them based on delay types. This analysis holds importance in uncovering trends in flight delays, enabling predictions that could shape consumer choices and operational approaches for airlines.

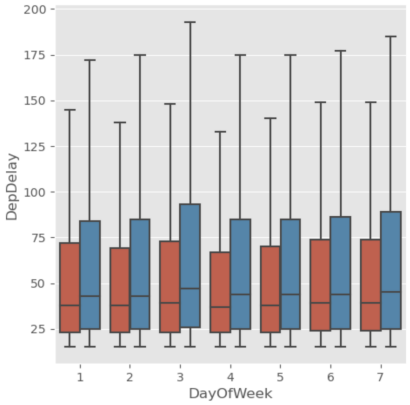
Our Hypothesis & the Multiplicity of Outcomes

The value of a data-driven approach can uncover trends in delays for different carrier types, facilitating predictions about several potential outcomes. These might include: (a) LCCs facing more delays owing to reduced profit margins, possibly leading to less efficient staff training and operational delays; (b) similar delay times for both LCCs and non-LCCs, indicating that the cost of flights does not significantly impact delay durations; or (c) LCCs experiencing fewer delays, perhaps due to minimizing time spent on activities like cleaning planes and passenger boarding to reduce expenses. We conducted a one-sided test and our null hypothesis being that departure delay times for high-cost airlines is less than that for low-cost airlines and our alternate hypothesis being that departure delay times for high-cost airlines are greater than that for low-cost airlines.

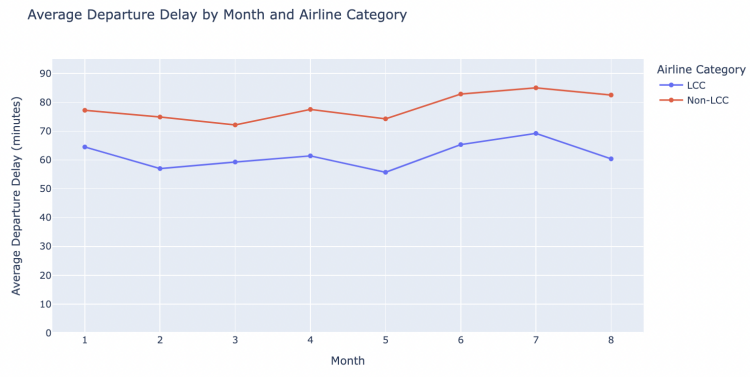
Ideal Experiment

To effectively study flight delays, an ideal experiment would control key factors: Firstly, using identical aircraft models across all airlines, considering that different sizes and boarding configurations can impact delay times. Secondly, standardizing the timing and frequency of flights, as airlines operating during peak times may face more delays. Finally, considering the plane's capacity, airlines with lower booking rates and fewer passengers might experience fewer boarding delays.

Our Dataset



The dataset covers a comprehensive range of America flight-related information from January to August 2023 provided by US Bureau Transportation Statistics , focusing predominantly on delays during departure and arrival rather than cancellations or diversions. It contains various columns, detailing specifics such as the year, quarter, day of the month, day of the week, flight dates, unique marketing carrier codes, origin and destination airports with city names, scheduled and actual departure and arrival times, as well as elapsed flight times, airtime, distances between airports, and distance groups. Additionally, it meticulously delineates delays due to carriers, weather, national air system, security issues, and late aircraft, providing a detailed breakdown of the causes contributing to flight disruptions. This dataset offers a comprehensive view of flight delays across multiple airlines and time frames, making it a valuable resource for analyzing



punctuality, identifying patterns, and potentially improving airline operations and passenger experiences.

Regression

We subsequently ran a logarithmic regression analysis in order to account for the total length of flight and its relative delay time. We controlled for multiple variables looking at airport size (which we grouped into 3 categories), day of the week, and delay type. When specifically looking at our LCC dummy variable within the regression our relative coefficient difference is at -0.043 compared to Non-LCC with a p-value at 0. This suggests that LCC flights have a very slightly lower delay rate and it is a significant one because the p-value is so low. When aggregated by route the mean delay for our lowest quartile of flight delay at 56 minutes would result in a 2.3 minute lower delay time for LCC flights. Next we wanted to create a regression that reflected only the Non-LCC correlation to certain variables. By analyzing p-values and coefficient levels we uncovered that Wednesday (coefficient of 0.045) has the longest delay times and Larger Airports have the lowest impact on delay times (with a coefficient of -0.0091).

Business Recommendations

After our analysis, we have condensed our findings to a couple recommendation strategies specific to both the airlines and the consumers.

To enhance travel experiences and operational efficiency, we advise airlines to focus on three key areas. Firstly, we found that longer distance flights are more prone to delay times, and therefore we recommend that airlines should allocate more staff to these specific flights to ensure robust customer service and operational readiness. Secondly, we uncovered a clear relationship between

delay times and the day of the week that a flight is scheduled. To minimize potential delays, businesses should engage in low-risk schedule planning such that their flights can leave on time. Lastly, a strategic allocation of additional resources to smaller airports can significantly improve delay times in those locations.

For consumers, our recommendations are designed to optimize their travel experience. We suggest considering LCCs for shorter flights as they tend to have less delays than non-LCC for these routes. Additionally, we advise travelers to expect greater delay times if choosing flights on Wednesdays since it is often busier. Finally, opting for larger airports can significantly diminish the delay times that customers will experience.

These strategies are aimed at providing a balanced framework for both entities within the travel ecosystem to reduce their respective experienced delay times.

Conclusion

Overall we concluded that the difference in delay times between LCC and Non-LCC airlines on similar routes despite being statistically significant is insubstantial, suggesting that cost-saving measures do not compromise punctuality. From a consumer perspective, this indicates that the sensitivity of time and the necessity for transit flights can be equally met by both cost categories of airlines. On the business front, the delay time of non-LCC airlines is shown to have a negative correlation with both distance and airport size, which can impact operational efficiency and costs, as well as operational flexibility. These findings suggest that both types of airlines can be competitive in terms of timeliness, and the choice between them can be made based on other factors such as price, comfort, and amenities, without significant compromise on reliability.