Profit Maximizing Allocation of Wheelchairs in a Multi-Concourse Airport

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Summary

To minimize Epsilon Airlines’ cost of providing wheelchair assistance to its passengers, we examine the trade-off between explicit costs (chairs and personnel) and implicit costs (losses in market share). Our *Multi-Concourse Airport Model* simulates the interactions between escorts, wheelchairs, and passengers. Our *Airline Competition Model* takes a game-theoretic perspective in representing the profit-seeking behavior of airline companies. To ground these models in reality, we incorporate extensive demographic data and run a case study on 2005 Southwest Airlines flight data from Midland TX, Columbus OH, and St. Louis MO. We conclude that Epsilon Airlines should employ a “hub and spokes” strategy that uses “wheelchair depots” in each concourse to consolidate the movement of chairs. Across different airport sizes and strategies, we find that two escorts per concourse and two wheelchairs per escort are optimal.

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