The Impact of Airline Flight Schedules on Flight Delays

Vinayak Deshpande, Ph.D.
Associate Professor, Operations Management
Krannert School of Management, Purdue University

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Abstract: Airline flight delays have come under increased scrutiny lately in the popular press, with FAA data revealing that airline on-time performance was at its worst level in 13 years in 2007. Flight delays have been attributed to several causes such as weather conditions, airport congestion, air-space congestion, use of smaller aircraft by airlines, etc. In this paper, we examine the impact of the scheduled block-time allocated for a flight, a factor controlled by the airlines, on on-time arrival performance. We analyze empirical flight data published by the Bureau of Transportation Statistics (BTS) to estimate the scheduled on-time arrival probability of each commercial domestic flight flown in the US in 2007 by a major carrier. The structural estimation approach from econometrics is then used to impute the underage to underage cost ratio of the newsvendor model for each flight. Our results show that airlines systematically “under-emphasize” flight delays, i.e., the flight delay costs implied by the newsvendor model are less than the implied costs of early arrivals for a large fraction of flights. Our results indicate that revenue drivers such as average fare and competitive measures such as market share have a significant impact on the scheduled on-time arrival probability. Additionally, full service airlines put a higher weight on the cost of late arrivals than do low cost carriers, and flying on the lowest fare flight on a route results in a drop in the scheduled on-time arrival probability.

Bio: Professor Deshpande holds a Ph.D. in Operations Management from the Wharton School, University of Pennsylvania. Prof. Deshpande was awarded with the Dantzig Dissertation award for his Ph.D. dissertation. He also holds a M.S. in Operations Research from Columbia University, New York, and a B.Tech. in Mechanical Engineering from I.I.T., Mumbai. His research interests are in the area of Supply Chain Collaboration, Service Parts Management, integrating maintenance information in inventory planning, and in addressing security and privacy issues in supply chains. His research has been motivated by contexts from various industry sectors such as defense, aviation, airlines, computers, and automobiles. He also has consulting experience with a variety of companies including Motorola and MCA Solutions. His work with the US Coast Guard was selected as a finalist for the Edelman award and he was honored as an Edelman Award Laureate for an outstanding example of management science and operations research practice.

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