



O papel das estatísticas da ANAC sob o ponto de vista da academia

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Academia?
Que Academia?

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Brasil despenca em ranking de competitividade

Sim, a Academia no Brasil.

O Brasil que inova faz parceria entre
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**Empresas têm valorizado
mais mestres e doutores**

Academia: o que faz

- Entender o mundo
- Antecipar o futuro, inovar
- Produzir conhecimento
- Qualificar

Academia na prática

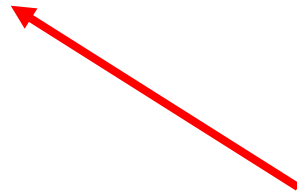
- Razão de ser na atualidade:
 - Produtividade em Pesquisa
 - Inserção internacional

Pesquisa se faz com

- Abstração-Inspiração-Transpiração
- Capital humano
- Financiamento
- Insumos

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**Estatísticas
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- FATOS:
 - Pesquisa em transporte aéreo: só teoria? Impossível.
 - A pesquisa é empírica: dados, evidências
 - Sem os melhores dados, os mais confiáveis, trabalhos produzidos: baixa qualidade

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- FATOS:
 - Pesquisa em transporte aéreo: só teoria? Impossível.
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 - Sem os melhores dados, os mais confiáveis, trabalhos produzidos: baixa qualidade
 - **Trabalhos de baixa qualidade...**
 - **Minam a Produtividade em Pesquisa**
 - **Detonam a Inserção internacional**
 - **Academia brasileira perde a razão de ser (Inovação zero)**

Vantagens da Academia

- “Verdade científica”, Independência
- Transparência, Publicidade
 - como a ANAC
 - divulgação científica
- *Spillover* 1: formação de RH
 - Poder de raciocínio, de abstração, de pesquisar, de buscar o desconhecido, de se auto-qualificar, etc
- *Spillover* 2: estudos!

Academia como usuário de dados

- “pires na mão”
- “recortes”
- “mau uso dos dados”
- Quanto mais online melhor. Parcerias?

Alguns exemplos de pesquisas

2015

Solving airport gate assignment problem using Genetic Algorithms approach

Because of the rapid growth of air traffic, optimizing airport management is becoming necessary in order to improve airport's capacity and better align its resources to the received traffic. In this paper we study the assignment of the arriving aircrafts to the available gates using the fixed daily schedule. We introduce a new approach based on Genetic Algorithms (GA) to solve the gate assignment problem (GAP). The encoding strategy consists in representing the chromosome by a vector of integers. The index of each gene represents the flight number and its value represents the gate to which the flight will be assigned. The method used to generate the initial population is based on three different heuristics and a random sorting of the gates. The selection method is the "In fitness proportionate selection" known as "roulette wheel selection". In addition to one point and two point Crossover operators, we designed a Greedy procedure Crossover (GPX) operator. The experimentation is based on the use of fictive scenarios generated in accordance with the physical characteristics of the Tunis Carthage Airport and using different flight schedules. The comparison between deterministic approach, simple heuristics and the GA has shown the efficiency of the last approach in terms of solution's quality when we aim at solving the problems of large size. In order to determine the best configuration of the GA, we compared the different crossover operators and we noticed that the use of GPX improves the speed of convergence of the algorithm towards better solutions.

Published in:

[Advanced Logistics and Transport \(ICALT\), 2015 4th International Conference on](#)

Article

Review of Industrial Organization

March 2015, Volume 46, Issue 2, pp 95-125

First online: 27 August 2014

Competitive Effects of Exchanges or Sales of Airport Landing Slots

[James D. Reitzes](#)  , [Brendan McVeigh](#), [Nicholas Powers](#), [Samuel Moy](#)

Abstract

We investigate the competitive effects of exchanges or sales of airport landing slots, using a model where airlines allocate their slot endowments across routes consistent with a Cournot–Nash equilibrium. With symmetric endowments, an increase in the number of slot-holding airlines raises social welfare and consumer surplus. Under asymmetric slot endowments, larger slot holders serve “thin” demand routes that are not served by smaller slot holders. Transfers of slots from larger to smaller slot holders increase social welfare and consumer surplus; however, fewer routes may be served. These results may be reversed if airlines face substantial route-level fixed costs.

Research on face recognition method of Airport security with Certificate Inspection

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Advances in Computer Science Research

978-94-62520-47-9

2352-538x

doi:10.2991/iccset-14.2015.4 (*how to use a DOI*)

Ning Zhang, Jin-fu Zhu

Ning Zhang

January 2015

airport; certificates inspection; relevant probability

In the civil aviation airport, how to ensure the security of passenger travel is the focus of the work. Therefore, we need to inspect the certificates of passenger for travel security, and the face recognition method is researched. An improved face recognition method and inspection of certificate method are proposed for passenger travel security based on relevant rules algorithm. The facial features of people need to be inspected are extracted, and the relevant probability of facial features are calculated. The disadvantages of traditional algorithm are overcome. The experimental results show that can improve the airport security certificate inspection efficiency, the face recognition efficiency is improved, and the satisfying results are obtained.



An alternative methodology for planning baggage carousel capacity expansion: A case study of Incheon International Airport

Sung Wook Yoon, Suk Jae Jeong  

Abstract

Intensifying competition for air transportation passengers has led airports to research optimal designs and determine the infrastructure expansion capacities of their terminals. As a result, many researchers have studied this subject from a variety of perspectives. In this study, we propose an alternative methodology of determining the expansion of baggage carousel capacity over a series of steps that includes both a simulation and a cost-benefit analysis. The methodology consists of three stages. In the first stage, we forecast the volume of arriving passengers (excluding transfer passengers) and aircraft traffic with an autoregressive integrated moving average (ARIMA) model. Next, we conduct an elaborate analysis to estimate passenger delay using a discrete event simulation model in which we consider the conveyor load and the baggage carousel allocation to aircraft rates. Finally, we determine a plan to expand baggage carousel capacity that accounts for expansion costs and passenger benefits. Construction and conveyor costs were applied to expansion costs, and capacity expansion leads to passenger benefits due to reduced waiting time. Using a real case with 23 candidate baggage carousels at Incheon International Airport during 2013–2015, our experiments demonstrate the strength of the proposed methodology in planning appropriate capacity expansion that reflect the operational flow of passengers within the airport based on the future trend of passenger demand. In particular, our results show that carousel no. 18 should be expanded during the first quarter of 2013, carousels no. 17 and no. 19 should be expanded in 2014, and carousel no. 5 should be expanded in 2015 to obtain optimal benefit-cost ratios of 1.65, 1.79, and 1.76 for each year, respectively.

Punctuality as KPI for Performance Based Airport Management

Steffen Loth¹ and Stefanie Helm²

German Aerospace Center, Braunschweig, Germany, 38108

The paper addresses the approach of taking punctuality as a driver for Performance Based Airport Management (PBAM). The overall concept of PBAM is characterized by highly complex dependencies between stakeholders, processes and performance indicators, with difficulties arising if all aspects are taken into account at the same time. Hence, as a first step in the description of the PBAM concept, only one Key Performance Indicator (KPI) will be used as a driver. For this task, punctuality was chosen, as it is one of the most important indicators for all stakeholders. The paper describes the concept of a stepwise approach for the coordination of airport operations based on defined punctuality values. This includes the basic definition, measurement and calculation of the KPI punctuality, as well as respective accountabilities. Furthermore, presentation and interpretation of data, collaborative setting of performance targets, tactical implementations and control of success are introduced.



An incentive pricing mechanism for efficient airport slot allocation in Europe

Alessandro Avenali, Tiziana D'Alfonso, Claudio Leporelli, Giorgio Matteucci, Alberto Nastasi, Pierfrancesco Reverberi  

Abstract

We define a supervised market mechanism to deal with the airport slot allocation problem. This mechanism is based on the principles underlying the AIP model for regulation of radio spectrum. Incentive prices for airport slots should reflect an estimate of the marginal value of each slot to end users. We compute this value by assessing the downgrade in the provision of the air transport service, both in terms of quantity (i.e. number of transported passengers) and quality (i.e. passenger travel times), should access to any given slot be denied. Incentive prices consider interdependencies among slots at different airports. We argue that, in principle, incentive prices may better align private and social decisions over the use of slots compared with the outcomes of pure market interactions (such as auctions and trading).

Date: 07 April 2015

Allocation of Airport Check-in Counters Using a Simulation-Optimization Approach

Miguel Mujica Mota  , Catya Zuniga Alcaraz 

Abstract

The aviation industry is expected to grow at a pace of 4 % per annum in the coming years, therefore it is necessary to have techniques that support the management of the resources at hand in the best possible way so that facility expansion is delayed as much as possible with the corresponding capital savings. This chapter presents a methodology that combines evolutionary algorithms and simulation for performing the allocation of the check-in desks in such a way that the different stochastic and deterministic variables are taken into account for a more robust solution. The evolutionary algorithm is developed to satisfy the different mandatory restrictions for the allocation problem such as minimum and maximum number of check-in desks per flight, load balance at the counters, opening times of check-in desks, and other restrictions imposed by the level of service agreement. Once the solutions are obtained, a second evaluation is performed using a simulation model of the terminal that takes into account the stochastic aspects of the problem such as passenger arrival profiles, passenger profile, layout of the facility, among others, with the purpose of determining an airport terminal's check-in area which allocation is the most efficient in real situations to keep the quality indicators at the desired level. The example presented is for an airport terminal's check-in area, but the methodology can be used for similar allocation problems in the aviation industry and in other industries such as logistics or manufacturing.

Approach to Forecast Air-Traffic Movements at Capacity-Constrained Airports

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Air Travel Consumer Protection: Metric for Passenger On-Time Performance

Lance Sherry , Danyi Wang , George Donohue 

DOI: <http://dx.doi.org/10.3141/2007-03>

Abstract

References

Cited by

PDF

Abstract

The raison d'être for the national air transportation system (ATS) is the movement of passengers and cargo. Thus, passenger trip time performance is positively correlated with passenger satisfaction, airfare elasticity, and airline profits. Regulatory consumer information available to airline passengers provides measures of trip performance by using the percentage of on-time flights or on-time percentage (OTP) (e.g., 15-OTP metric). Researchers have shown that these flight-based metrics are poor proxies for passenger trip time performance. First, these metrics do not include the trip delays accrued by passengers rebooked because of canceled flights (which account for 40% of the overall passenger trip delays). Second, the metrics do not quantify the magnitude of the delay (only the likelihood) and thus fail to provide the consumer with a useful assessment of the impact of a delay (such as missed connections on next mode of transportation). A new consumer protection metric, expected value of passenger trip delay (EV-PTD), is described; it accounts for (a) canceled flights and (b) both the probability of delay and the magnitude of the delay. The EV-PTD for all 1,030 routes between 35 Operational Evolution Plan airports in 2005 ranged from 11.5 min (best) to 155 min (worst). The average route EV-PTD was 35 min. By treating passenger trip delay as a random variable it can be shown that the transportation process is not a fair game and that passengers and service providers (e.g., airlines, air traffic control, airports) cannot beat the system until the variance is significantly reduced. The implications of these results and the use of the EV-PTD metric by consumers for purchasing tickets and for consumer protection are discussed.

Bayesian Estimation of Air Ticket Cancellation Behavior

01550112

Component

<http://amonline.trb.org/> 

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In the airline industry, cancellation and no-show models are used to determine the number of extra seats an airline should sell for a plane to account for the fact that some passengers either cancel their tickets prior to departure, or fail to appear on the departure day. In order to understand a passenger's reasons for changing his flight, it is necessary to analyze his behavior. Since the 1980s, attempts have been made to integrate behavior and choice models into revenue management models; however, computational difficulties often reduced these efforts to simpler probabilistic models which held strong assumptions. In recent years, much work has been made in this area, and especially in integrating behavior models with cancellation models. This study uses Bayesian methods of estimation to investigate the probabilities of business travelers canceling their air travel tickets. In particular, the authors demonstrate how the discrete time proportional odds cancellation model can be rewritten into that of a discrete choice model formulation while maintaining the original model assumptions. In addition, the authors also show how the ability to partition ticket purchases according to the individual purchaser allows for a more robust estimation of the model. The authors incorporate taste variations into the cancellation model and show that these variations are statistically significant. Finally, the Bayesian method allows for the calculation and building of credible intervals about the individual likelihood of an event occurring.



An analysis of the relationship between service failure, service recovery and loyalty for Low Cost Carrier travelers

Pin-Fenn Chou

Abstract

The purpose of this study is to analyze the relationship between service failure, service recovery, and loyalty for Low Cost Carrier travelers. This study also examines the mediating effects of service recovery between service failure and loyalty through travelers' perceived satisfaction. The study reveals that service recovery has a positive effect on attitude and behavior loyalty, while service failure has a positive effect on service recovery. The empirical analysis shows that both apology and compensation have only a partial mediating effect between delivery failure, and attitude loyalty and behavior loyalty separately. Practical implications of the findings for Low Cost Carrier services are discussed.

Why Do Airline Pilots and Flight Crews Have an Increased Incidence of Melanoma? FREE

Erica Shantha, MD¹; Chris Lewis, BS¹; Paul Nghiem, MD, PhD¹

[\[+\] Author Affiliations](#)

JAMA Oncol. 2015;1(6):829-830. doi:10.1001/jamaoncol.2015.0933.

Text Size: **A** A A

Article

References

Comments

JAMA Dermatology

The Risk of Melanoma in Airline Pilots and Cabin Crew: A Meta-analysis

Martina Sanlorenzo, MD, Mackenzie R. Wehner, MPhil, Eleni Linos, MD, DrPH, et al

Importance Airline pilots and cabin crew are occupationally exposed to higher levels of cosmic and UV radiation than the general population, but their risk of developing melanoma is not yet established.

Objective To assess the risk of melanoma in pilots and airline crew.

Cruise Fuel Reduction Potential from Altitude and Speed Optimization in Global Airline Operations*

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This paper examines the potential fuel efficiency benefits of cruise altitude and speed optimization using historical flight path records. Results are presented for a subset of domestic US flights in 2012 as well as for long haul flights tracked by the European IAGOS atmospheric research program between 2010 and 2013. For a given lateral flight route, there exists an optimal combination of altitude and speed. Analysis of 217,000 flights in domestic US airspace has shown average potential savings of up to 1.96% for altitude optimization or 1.93% for speed optimization. International flights may be subject to different airline and/or air traffic management procedures and constraints. Examination of 3,478 long-haul flights, representing three airlines and a single aircraft type over a four-year period, indicates average potential savings of up to 0.87% for altitude optimization or 1.81% for speed optimization. This is equivalent to a mean fuel savings of 905 pounds and 1981 pounds per flight, respectively. Due to the limited sample set for long haul flight records, conclusions from this stage of the international study are limited to the specific airlines and aircraft types included in the IAGOS measurement program.



Transportation Research Part B: Methodological

Volume 77, July 2015, Pages 103–122



The reliable hub-and-spoke design problem: Models and algorithms

Yu An^a, Yu Zhang^b,  , Bo Zeng^a

Abstract

Hub-and-spoke structure is widely adopted in industry, especially in transportation and telecommunications applications. Although hub-and-spoke paradigm demonstrates significant advantages in improving network connectivity with less number of routes and saving operating cost, the failure of hubs and reactive disruption management could lead to substantial recovery cost to the operators. Thus, we propose a set of reliable hub-and-spoke network design models, where the selection of backup hubs and alternative routes are taken into consideration to proactively handle hub disruptions. To solve these nonlinear mixed integer formulations for reliable network design problems, Lagrangian relaxation and Branch-and-Bound methods are developed to efficiently obtain optimal solutions. Numerical experiments are conducted with respect to real data to demonstrate algorithm performance and to show that the resulting hub-and-spoke networks are more resilient to hub unavailability.



Applications

Robust gate assignment procedures from an airport management perspective ☆

Mercedes E. Narciso  , Miquel A. Piera 

Abstract

The assignment of aircraft arriving out of schedule to available stands at the terminal is a major issue with feasible solutions when stands are placed in the same zone, but it is very difficult to solve when candidate alternative stands are placed in different zones due to passenger movement through the terminal. In order to tackle arrival delays while preserving quality factor services to passengers and protecting turnaround aircraft times, most airports have modified their infrastructure by increasing the number of stands at the terminal. In this paper a simulation-based experimental approach that evaluates the minimum amount of stands at the terminal necessary to cope with arrival/departure pattern traffic under a time delay limit is presented. Emergent dynamics are analyzed when the number of stands is increased and a causal model to evaluate shortages and benefits of different policies and strategies for gate assignment to mitigate undesirable consequences is introduced.

Airport partial and full privatization in a multi-airport region: Focus on pricing and capacity

Mohamadhossein Noruzoliaee^a, , Bo Zou^a, , , Anming Zhang^{b, c}, 

Abstract

This paper studies the capacity and pricing choice of two congestible airports in a multi-airport metropolitan region, under transition from a pure public, centralized airport system to partial or full privatization. We develop analytical models to investigate three privatization scenarios: public–private duopoly, private–private duopoly, and private monopoly. We find that, airports follow the same capacity investment rule as prior to privatization when capacity and pricing decisions are made simultaneously. Pricing rule after privatization becomes more complicated, with additional factors having an upward effect on the privatized airport(s) and a downward effect on the remaining public airport.



Transportation Research Part A: Policy and Practice

Volume 71, January 2015, Pages 77–95



How to mix per-flight and per-passenger based airport charges

Achim I. Czerny^a,  , Anming Zhang^{b, c}, 

Abstract

This paper investigates the questions of why carriers advocate for higher per-passenger airport charges and lower per-flight charges, and whether and when this proposal is welfare-enhancing. Specifically, the paper compares the optimal mix of per-flight and per-passenger based airport charges from both a monopoly carriers' and the social viewpoints conditional on airport cost recovery. It focuses on the trade-off between price and frequency (i.e., schedule delays) when time valuations are uniform, or differ, between business and leisure passengers. We identify an easy test for the evaluation of the mix of per-passenger and per-flight based airport charges by policy makers, which is simply to check whether the carrier's preferred per-flight charge is zero. Our analysis suggests that there is no need for immediate regulatory corrections of the current trend towards the strong use of per-passenger based airport charges.

The effects of service quality dimensions and passenger characteristics on passenger's overall satisfaction with an airport

George C.L. Bezerra^a,  , Carlos F. Gomes^b, 

Abstract

The objective of this paper is twofold. First, to identify service quality dimensions related to airports. Second, to examine the effects of those dimensions on passenger's overall satisfaction with an airport together with variables related to passenger characteristics. Data from an extensive survey applied in a main Brazilian international airport were used. Exploratory factor analysis was applied to extract dimensions of airport service quality as perceived by the passengers. The effects on the overall satisfaction level were estimated using a probabilistic approach. Findings underline implications regarding the use of meaningful service dimensions instead of a large set of variables as predictors of passenger satisfaction. Moreover, the study stresses the need for considering how passenger characteristics may be related to different perceived levels of service quality.



Transportation Research Part A: Policy and Practice

Volume 79, September 2015, Pages 42–54

Selected papers from the Air Transport Research Society World Conference, Bergamo (Italy) and World Conference on Transport Research, Rio de Janeiro (Brazil), 2013



The effect of code-share agreements on the temporal profile of airline fares ☆

Marco Alderighi^{a, 1}, ✉, Alberto A. Gaggero^b, 👤, ✉, Claudio A. Piga^c, ✉

Abstract

This paper aims at investigating how the pricing strategy of European airlines is affected by code-share agreements on international routes. Our data cover several routes linking the main UK airports to many European destinations and includes posted fares collected at different days before departure. By analyzing the temporal profile of airline fares, we identify three main results. First, code-share increases fares especially for early bookers. Second, the higher prices in code-shared flights are offered by marketing carriers. Finally, in single operator code-shared flights (unilateral code-share), the pricing profile is flatter than under parallel code-share.



An empirical analysis of airline business model convergence

Jost Daft^a, , , Sascha Albers^b, 

Abstract

Based on a sample of 26 European passenger airlines, this study analyzes the development of airline business models over time. We used various distance measures to calculate concrete differentiation levels among these airlines between 2004 and 2012. The results indicate increasing similarity among these airlines, which lends support to the generally assumed convergence trend. The present paper complements the mostly qualitative and anecdotal literature on convergence in the airline industry, empirically shows actual adaptations in airlines' business models, and provides a platform for further research in the fields of empirical convergence analysis and corresponding strategic airline management.


Chapter

Game Theoretic Analysis of Congestion, Safety and Security

Part of the series Springer Series in Reliability Engineering pp 173-217

Date: 01 January 2015

The Price of Airline Frequency Competition

Vikrant Vaze  , Cynthia Barnhart

Abstract

Competition based on service frequency influences capacity decisions in airline markets and has important implications for airline profitability and airport congestion. The market share of a competing airline is a function of its frequency share. This relationship is pivotal for understanding the impacts of frequency competition on airport congestion and on the airline business in general. Additionally, airport congestion is closely related to several aspects of runway, taxiway, and airborne safety. Based on the most popular form of the relationship between market share and frequency share, we propose a game-theoretic model of frequency competition. We characterize the conditions for Nash equilibrium's existence and uniqueness for the two-player case. We analyze myopic learning dynamics for the non-equilibrium situations and prove their convergence to Nash equilibrium under mild conditions. For the N-player symmetric game, we characterize all the pure strategy equilibria and identify the worst-case equilibrium, i.e., the equilibrium with maximum total cost. We provide a measure of the congestion level, based on the concept of price of anarchy and investigate its dependence on game parameters.



Airline Network Competition with New Brand Subsidiaries

Author: Lin, Ming Hsin

Source: [Journal of Transport Economics and Policy \(JTEP\)](#), Volume 49, Number 1, January 2015, pp. 58-78(21)

Publisher: [Journal of Transport Economics and Policy](#)

Abstract:

This paper investigates airline network competition where two (identical) hub carriers aim to establish new subsidiaries offering differentiated non-stop services on their rim-routes. Each of them may retain a hub or shift to a mix (or point-to-point) network cooperating with its subsidiary. We find that each chooses a mix (hub) network when passengers' product differentiation is large (small). We also find that one carrier chooses a hub and the other chooses a mix network when the differentiation is intermediate. Our welfare analysis shows that each network pair competition *worsens* welfare compared with a monopoly hub or mix network.



Mitigation of airspace congestion impact on airline networks

Bo Vaaben^{a, b}, , , , Jesper Larsen^b, 

Abstract

In recent years European airspace has become increasingly congested and airlines can now observe that en-route capacity constraints are the fastest growing source of flight delays. In 2010 this source of delay accounted for 19% of all flight delays in Europe and has been increasing with an average yearly rate of 17% from 2005 to 2010. This paper suggests and evaluates an approach to how disruption management can be combined with flight planning in order to create more proactive handling of the kind of disruptions, which are caused by congested airspace. The approach is evaluated using data from a medium size European carrier and estimates a lower bound saving of several million USD.



Fleet Standardisation and Airline Performance

Authors: Zou, Li; Yu, Chunyan; Dresner, Martin

Source: [Journal of Transport Economics and Policy \(JTEP\)](#), Volume 49, Number 1, January 2015, pp. 149-166(18)

Abstract:

We develop three fleet standardisation measurements to estimate their impacts on airline costs and profitability. Using panel data for a group of US airlines from 1999 to 2009, we find that fleet standardisation, as expected, leads to lower unit costs. However, after controlling for its cost-reducing effects, fleet standardisation is negatively related to profit margin. Our findings provide quantitative evidence of the trade-off between the costs and benefits from fleet commonality. Although airlines can benefit from cost savings in flight operations and maintenance with a more standardised fleet, the potential negative revenue impacts from fleet standardisation have generally been overlooked.

Investigating airline customers' premium coach seat purchases and implications for optimal pricing strategies

Stacey Mumbower , Laurie A. Garrow  , Jeffrey P. Newman 

Abstract

We investigate factors that influence airline customers' purchases of premium coach seats using a database of online prices and seat map displays collected from JetBlue's website. Results show that multiple factors influence purchasing behavior; these factors include the amount of the seat fee, how far in advance the ticket is purchased, the number of passengers traveling together, and load factors (as revealed through seat map displays). We find that customers are between 2 and 3.3 times more likely to purchase premium coach seats (with extra legroom and early boarding privileges) when there are no regular coach window or aisle seats that can be reserved for free. In addition, we find that customers who purchase tickets closer to the departure date are less price-sensitive and are willing to pay higher seat fees. We use these model results to show that JetBlue's seat fees are currently underpriced in many markets; an optimal static fee would increase revenues by 8% whereas optimal time-dependent fees would increase revenues by 10.2%. In addition, if JetBlue were to leave their seat fees unchanged and instead reserve certain rows of seats for premier customers, they could potentially increase revenues by 12.8%.

Airline Consolidation and Hub Abandonment: The Impact on Regional Economies

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Since the United States' 1978 Airline Deregulation Act, the legacy commercial air transport industry followed two significant and interdependent trends: hub-and-spoke network operations and air carrier consolidation. However, as airlines merge operations through consolidation, they rationalize routes, aircraft fleet and facilities to maximize efficiency and reduce costs. This includes abandoning redundant hub airports. This paper develops research to examine the question; What is the regional impact of hub abandonment due to airline consolidation? This paper utilizes a case study analysis of two abandoned airlines hubs, Pittsburgh International Airport and Lambert-Saint Louis International Airport, contrasted with two viable airline hubs, Minneapolis-Saint Paul International Airport and Charlotte/Douglas International Airport. Due to data availability covering a period of legacy airline consolidation the analysis includes 2000 through 2012 and utilizes three methods: input-output model, fixed-effects panel analysis and econometric comparison. A unique dataset is created from sources including airline passengers, air carrier flights, airport operations, air transport employment and regional gross domestic product. Further, the paper develops recommendations for airport operators and regional planners to understand and predict the economic impact of hub abandonment and develop policies to mitigate or leverage the regional impact.

Purchasing Decision Rules of Airline Passengers Under Revenue Management Circumstances

Chen Zhang, Lan Chen, Hui Yang 

Abstract

In this paper, we present an empirical study on behavior characteristics of airline passengers based on prospect theory framework and Chinese market data. The goal is to find out the decision rule and utility measurement method of the passengers under revenue management circumstances. By analyzing the relationship between passengers' utility and their purchasing decision behaviors based on both expected utility theory and prospect theory, we find that prospect theory shows much more rationality than expected utility theory in explaining passengers' purchasing decision behaviors. By discussing different attitudes-to-risk settings, we verify that utility measurement for passengers with common risk attitudes is more consistent with the actual purchasing decision behaviors.

Research Article

Optimization Model and Algorithm Design for Airline Fleet Planning in a Multiairline Competitive Environment

Yu Wang,^{1,2} Hong Sun,² Jinfu Zhu,¹ and Bo Zhu¹

Abstract

This paper presents a multiobjective mathematical programming model to optimize airline fleet size and structure with consideration of several critical factors severely affecting the fleet planning process. The main purpose of this paper is to reveal how multiairline competitive behaviors impact airline fleet size and structure by enhancing the existing route-based fleet planning model with consideration of the interaction between market share and flight frequency and also by applying the concept of equilibrium optimum to design heuristic algorithm for solving the model. Through case study and comparison, the heuristic algorithm is proved to be effective. By using the algorithm presented in this paper, the fleet operational profit is significantly increased compared with the use of the existing route-based model. Sensitivity analysis suggests that the fleet size and structure are more sensitive to the increase of fare price than to the increase of passenger demand.



1-Hub, 2-hub or fully connected network? A theoretical analysis of the optimality of airline network structure

[Xiyan\(Jamie\) Wang](#)

Abstract

Multi-hub network structures are an increasingly important phenomenon in today's airline networks. With current theoretical arguments for the single-hub solution leaving little room for the kind of multi-hub networks that exist nowadays, this paper sets up a formal model to explore the optimality of multi-hub networks, with or without competition. It is shown that a single-hub or a fully connected network may not be the optimal network configuration, while a 2-hub configuration may be favored under certain circumstances. In addition, the paper shows that competition can also affect an airline's optimal choice of network: a 2-hub network can be preferable if a competitor enters the market.



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Three-stage airline fleet planning model

Slavica Dožić  , Milica Kalić

Selected papers from the Air Transport Research Society

Abstract

One of the main factors affecting airline success is bringing supply and demand as closely together as possible. In order to achieve this goal, an airline needs to adopt an appropriate methodological approach for the fleet planning process. Selection of an aircraft for operating a defined route network is a key element which has a direct impact on the increase of an airline's profitability and on the reduction of an airline's costs. The objective of this paper is to develop a robust model for fleet planning that deals with both fleet size and fleet composition problems for airlines operating on short haul and medium haul routes. The three-stage model for fleet planning involves approximate fleet composition, fleet sizing and aircraft type selection based on fuzzy logic, heuristic and analytic approaches, and multi-criteria decision making, respectively. This model is exemplified with a hypothetical airline based at Belgrade Airport.

Data-driven class closure method for airline revenue management

Gert-Willem Hartmans¹

^aKLM N.V., Schiphol, The Netherlands

Abstract

▲ [Top](#)

This article describes a practical data-driven approach to increase revenue, identifying *inelastic* and *elastic* demand segments used to decide when to close classes. The method proposed defines class closure policies that will close the lower fares a specific number of days before the departure. By identifying the remaining inelastic and elastic demand, choice can be made when to close lower classes. This approach maximizes revenue from inelastic demand, when customers are forced to book at a higher fare, to exceed the loss of revenue from the rejected elastic demand. These class closure policies are defined at the detailed level of: (i) Origin/Destination, (ii) Point-of-sale, (iii) Date, (iv) Departure time, (v) Number of days before departure. This process reflects the function analysts perform manually, or via rules as determined in the revenue management system. Closer to departure, and as the share of inelastic demand increases, lower classes will close to create sell-up by inelastic demand. Generally analysts work by rule of thumb or based on *ad hoc* data analysis. The purpose of this article is to use data to define the class closure settings at a more detailed level than could be expected from a manual approach.

A welfare analysis of subsidies for airports ☆

Benjamin I. Miller^a,  , James F. Dewey^b, , David Denslow Jr.^a, , Edward B. Miller^c, 

Abstract

The welfare of residents and profitability of business in many medium-sized MSAs would be improved if their airports had a higher level of service, for example reflected by more frequent flights serving more destinations. The level of service at such airports may rise with the number of enplanements, making total enplanements and the level of service subject to a positive feedback effect. Using a new annual data set put together by combining five sources for the years 2002 through 2012, we find evidence for such a positive feedback effect. We argue that subsidies at smaller airports may be welfare-enhancing in the presence of such an effect.

Modeling Joint Choice of Airline Itinerary and Fare Product: Implications for Airline Pricing Strategies

Emmanuel Carrier 

DOI: <http://dx.doi.org/10.3141/2007-06>

Abstract

References

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Abstract

The rapid expansion of low-cost airlines and the development of online distribution of airline tickets have put pressure on the pricing and revenue management strategy of network airlines and have substantially modified the airline passenger choice environment, especially in short-haul markets. To analyze the choice behavior of airline passengers, a unique data set is being developed. Passenger booking data are combined with fare class availability data collected daily for a 90-day booking period, and fare rules are applied to reconstruct the passenger choice set and determine which fare products were available at the time of the booking on nonstop itineraries in select business-oriented European short-haul markets. Estimation results from a multinomial logit model of the joint choice of airline itinerary and fare product show that outbound passengers tend to prefer early morning and late afternoon flight departures that allow them to conduct their business activities either before or after their trips. In addition, a significant proportion of passengers traveling during the week tends to prefer higher-priced fully flexible fare products to cheaper nonflexible options; this preference shows the revenue potential of a multiproduct pricing strategy in markets affected by the presence of low-cost competition. This study illustrates how such models may be used to support airline decision making in scheduling, pricing, and revenue management.

Quality Disclosure Programs and Internal Organizational Practices: Evidence from Airline Flight Delays

Authors: Forbes, Silke J.; Lederman, Mara; Tombe, Trevor

Source: [American Economic Journal: Microeconomics](#), Volume 7, Number 2, May 2015, pp. 1-26(26)

Abstract:

Disclosure programs exist in many industries in which consumers are poorly informed about product quality. We study a disclosure program for airline on-time performance, which ranks airlines based on the fraction of their flights that arrive less than 15 minutes late. The program creates incentives for airlines to focus their efforts on flights close to this threshold. We find that firms in this industry are heterogeneous in how they respond to these incentives. Moreover, this heterogeneity correlates with internal firm characteristics. Our findings highlight the importance of interactions between incentives created by a disclosure program and firms' internal organizational practices.

Air deregulation in China and its impact on airline competition 1994–2012

Jiaoe Wang^{a, b}, , , David Bonilla^{b, c}, David Banister^b

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Abstract

China's air transportation has experienced rapid growth and major reforms in the past three decades, some of which have been partially successful and are still ongoing today. The paper aims to analyze China's air deregulation experience over the last two decades and its impact on airline competition from a geographical perspective. After the establishment of the "Big Three" in 2002, the paper reveals that there has been a trade-off between the extent of deregulation and airline competition in China because the central government has tended to strengthen the "Big Three" rather than totally open the market to private and locally owned airlines. The paper uses each airline group as the basic unit of analysis and reveals that (1) the air market has been more concentrated in the "Big Three" as a result of the process of air deregulation; (2) airline competition in over two thirds of the airports and one half of the routes has increased in the last 18 years, but the core airports and trunk routes are chiefly dominated by the "Big Three". The peripheral airports and thin routes have been operated by private and locally owned airlines; and (3) regionally, airline competition has occurred in most airports of the eastern region, and it is more intense than in the central and western regions. But even here, competition in the eastern region has however decreased in 1994–2012. The three main contributions of the paper are: (1) the use of two measures of competition in the airline market; (2) the analysis of the historical evolution of competition; and (3) an understanding the role of the geography of competition in the Chinese airline market.



Optimization of multi-fleet aircraft routing considering passenger transiting under airline disruption ☆

Yuzhen Hu^{a, c}, Baoguang Xu^a,  , Jonathan F. Bard^b, Hong Chi^a, Min'gang Gao^a

Abstract

This paper proposes a new methodology for addressing the joint problems of aircraft and passenger recovery after a schedule disruption. An integrated integer programming model is presented which is based on an approximate reduced time-band network and a passenger transiting relationship. The objective is to minimize the total cost associated with reassigning aircraft and passengers to flights. A feasibility analysis for the problem is conducted to obtain the necessary conditions under which aircraft and passenger recovery is possible. Solutions are obtained to the network model with CPLEX and then, if necessary, adjusted to more accurately reflect actual costs. The effectiveness of the proposed approach is demonstrated by analyzing several scenarios that were developed using data from a big airline in China.

Respiratory viruses in airline travellers with influenza symptoms: Results of an airport screening study

Lance C. Jennings^a,  , Patricia C. Priest^b, Rebecca A. Psutka^{b, 1}, Alasdair R. Duncan^c, Trevor Anderson^d, Patalee Mahagamasekera^d, Andrew Strathdee^d, Michael G. Baker^e

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Abstract

Background

There is very little known about the prevalence and distribution of respiratory viruses, other than influenza, in international air travellers and whether symptom screening would aid in the prediction of which travellers are more likely to be infected with specific respiratory viruses.

Objectives

In this study, we investigate whether, the use of a respiratory symptom screening tool at the border would aid in predicting which travellers are more likely to be infected with specific respiratory viruses.



Mapping potential airplane hazards and risks using airline traffic data

Ali Asgary^a, , Saad Ansari^a, Robert Duncan^a, Sushan Pradhan^a

Abstract

Each year aviation disasters occur around the world, leading to significant human and economic losses, environmental damage, and property destruction. Consequently, airplane crash hazards are often taken into consideration when developing disaster and emergency management plans. This is particularly the case in urban areas. Unlike other types of hazards in urban areas such as flooding, earthquake, rail and roads, there is no hazard and risk maps for air transportation. This paper presents the results of a study conducted to develop the basis for a simple and new airplane hazard and risk mapping approach that utilizes flight path data to produce airplane hazard maps at local, regional, and national scales. We have applied this method to develop hazard maps for the Greater Toronto Area (GTA), Canada using flight paths to and from Pearson International Airport.

Regulating inter-firm agreements: The case of airline codesharing

Nicole Adler and Eran Hanany*

September 2015

Abstract

We compare aviation markets under conditions of competition, codesharing contracts and anti-trust immune alliances, assuming that demand for flights depends on both fares and the level of frequency offered. Using a hybrid competitive/cooperative game theoretic framework, we show that the stronger the inter-airline agreement, the higher the producer surplus. On the other hand, consumer surplus and overall social welfare are maximized under limited codesharing agreements. Partial mergers appear preferable to no agreement in ‘thin’ markets, in which both demand and profit margins are relatively low. Inter-governmental agreements are also analyzed and we show that bilaterals create the least favorable market outcomes for consumers and producers. Finally, a realistic case study demonstrates that under asymmetric and uncertain demand, codesharing on parallel links may be preferable to competitive outcomes for multiple consumer types.

Keywords: codesharing agreements, competition and contracts, anti-trust regulation



Note

A framework for evaluating the European airline costs of disabled persons and persons with reduced mobility

Deborah Ancell  , Anne Graham

Abstract

In recent years, airlines have been servicing a greater variety, and increasing numbers, of disabled persons and persons with reduced mobility (PRMs), particularly associated with ageing, obesity and medical needs. With the quantity of PRMs likely to increase in the future, there will be a growing impact on the airlines' associated actual and opportunity costs, about which there is minimal literature and data. Therefore the aim of this paper is to identify standard functional key factors (FKFs) with which airlines could audit their PRMs costs, and which could be used by other interested bodies, such as governments, when considering relevant aviation policy. These FKFs are related to nine areas, namely PRMs' transfers; mobility aids; aircraft delays/diversions costs; staff training costs; staff health, safety and welfare; aircraft fixtures and equipment costs; airport costs; transaction costs; and opportunity costs. Further research is needed to obtain the data for these FKFs.



The effect of de-hubbing on airfares

Kerry M. Tan  , Andrew Samuel 

Abstract

This paper studies the price effect of de-hubbing, which occurs when an airline ceases hub operations at an airport. We develop a simple theoretical model to study the impact of de-hubbing on prices and quantities of direct flights at the hub airport. Using an event study of seven cases of de-hubbing between 1993 and 2009, we analyze how average airfares change following de-hubbing. Consistent with the theoretical implications, the empirical results suggest that airfares decrease when there is a low-cost carrier presence at the de-hubbed airport, whereas airfares increase when the de-hubbed airport is not serviced by a low-cost carrier.

International standardization compliance in aviation

Tyler B. Spence^a,  , Richard O. Fanjoy^a, Chien-tsung Lu^a, Stewart W. Schreckengast^b

Abstract

The commercial aviation industry is global in the sense that passengers travel around the world from destination to destination. It is also global in that the states of the world (countries) regulate the industry domestically and internationally. There is a unique stage where the world comes together to promote aviation, discuss ideas and establish international standards. This stage is the International Civil Aviation Organization (ICAO). The 191 current member states signed treaties acknowledging their commitment to abiding by the standards and practices established by ICAO. No state is 100 percent compliant with international standards, however, and the purpose of this paper was to explore the relationship between the fulfillment of compliance by individual member states and the safety of the commercial aviation industry in terms of fatality rates. Using a Negative Binomial regression, the results suggested that there was a relationship between compliance with international safety standards and fatalities, as well as associations between fatality rates and member states levels of GDP and population. Implications of this research apply to all ICAO member states as the concerns grow over growing air travel and airspace congestion over the next several decades.



Processing passengers efficiently: An analysis of airport processing times for international passengers

Jegar Pitchforth  , Paul Wu, Clinton Fookes, Kerrie Mengersen

Highlights

- A Bayesian hierarchical model to sequentially process airport data is presented.
- Exploratory models are applied to select informative variables.
- A set of regression models is tested for fit to data.
- The results of a Bayesian hierarchical regression model are explored for insights.



The effects of experience in the A380 duty free showcase on customer behaviors

Ji-Hyeon Park^a, , Jin-Woo Park^b, , 

Abstract

This study analyzes, from an experiential marketing perspective, the showcasing of duty-free products onboard the A380 aircraft, a service area that Korean Air introduced for the first time in the industry. Through the analysis the study seeks to identify the effects that customers' experience of the duty free showcase area has on their emotional response, impulse buying intention and word-of-mouth intention. For this testing, structural equation modeling was applied to data collected from passengers who had used the duty free exhibition space on Korean Air's A380. The results revealed that FEEL and ACT marketing experience in the duty free area were each found to have a positive effect on emotional response, and this factor was found to have a positive effect on impulse buying intention and word-of-mouth intention.

Cost and revenue synergies in airline mergers – Examining geographical differences

Maximilian Schosser^a, , Andreas Wittmer^b, , 

Highlights

- Cost and revenue synergies in airline mergers in Europe, North America and South America are compared.
- Cross boarder airline merger synergy is analyzed.
- Realized synergies in the first year after the merger are 31% in Europe, 50% in North America, 31% in South America.
- Synergies in the second year are 75% in Europe, 114% in North America, 74% in South America.

A non-additive multiple criteria analysis method for evaluation of airline service quality

Ling Zhang^{a, b},  , Luping Zhang^{a, b}, Peng Zhou^{a, b}, Dequn Zhou^{a, b}

Abstract

Subjective preferences with interactive property are often involved in the evaluation of airline service quality. It may not be possible, however, to correctly evaluate service quality using conventional additive measures. The fuzzy measure, which is a non-additive measure, is more suitable for this situation. Given the presence of arduousness in current fuzzy measure identification and in the calculation of the comprehensive performance values of alternatives in terms of the Choquet integral, this paper proposes the λ_k fuzzy measure and introduces Marichal entropy of the λ_k fuzzy measure to reach a solution. This paper also presents the aggregator Choquet integral with respect to the λ_k fuzzy measure. To verify the method's effectiveness, an application study of the comprehensive performance of 15 US airlines was conducted, using data collected over a 10-year period. Our results show that the proposed method is a suitable multi-criteria analysis method, which can be used to evaluate the performance of airline service quality when man-made interaction phenomena are not existent.

An analysis of the greenhouse gas emissions profile of airlines flying the Australian international market

Kwong-sang Yin  , Paul Dargusch , Anthony Halog 

Highlights

- We developed a CO₂ profile calculator that used airlines' aircraft characteristics and actual passenger and cargo load.
- We analysed the CO₂ emissions profile of airlines flying the Australian international market.
- Traditional network airlines matched the carbon efficiency of low-cost airlines by carrying more cargo.
- Foreign airlines exercising their 5th freedom rights were carbon inefficient and suffered from low load factors.
- The carbon efficiency can be improved by selecting the “right” aircraft, increasing seat density, load factors and cargo.



Is increasing aircraft size common practice of airlines at congested airports?

Peter Berster, Marc C. Gelhausen  , Dieter Wilken

Abstract

If the overall demand for air transport grows, but additional airport capacity is not available at congested airports, we could assume that airlines will offer flights with more seats in order to cope with the demand. An analysis of frequency and average seat capacity developments at congested, and not yet congested airports, has shown that the hypothesis of bigger aircraft being used in congested situations is valid in most instances, although not at all airports. The objective of this paper is to report on an analysis of the development of average seat capacity at congested airports, in contrast to the situation at not yet congested airports, and to find out the reasons for airlines increasing the number of seats at congested airports, by means of a statistical model using variables including the degree of airport congestion and average flight distance.

On finite sample performance of confidence intervals methods for willingness to pay measures

Valerio Gatta^a,  , Edoardo Marcucci^a,  , Luisa Scaccia^b,  

Abstract

This paper systematically compares finite sample performances of methods to build confidence intervals for willingness to pay measures in a choice modeling context. It contributes to the field by also considering methods developed in other research fields. Various scenarios are evaluated under an extensive Monte Carlo study. Results show that the commonly used Delta method, producing symmetric intervals around the point estimate, often fails to account for skewness in the estimated willingness to pay distribution. Both the Fieller method and the likelihood ratio test inversion method produce more realistic confidence intervals for small samples. Some bootstrap methods also perform reasonably well, in terms of effective coverage. Finally, empirical data are used to illustrate an application of the methods considered.

Latent air travel preferences: Understanding the role of frequent flyer programs on itinerary choice

Michael Seelhorst^a, , , Yi Liu^b

Abstract

Many studies have used air itinerary choice data to identify preferences and tradeoffs of various flight service attributes, such as travel time, number of connections, and fare. Little has been done, however, to estimate the effect Frequent Flyer Programs (FFPs) have on itinerary choice. The goal of this paper is to quantify the impact of FFP membership on itinerary choice and identify discrete patterns of unobserved preference heterogeneity. For this purpose, we apply two modeling techniques using a set of stated preference data collected on 830 individuals. A Multinomial Logit Model (MNL) is first estimated and Willingness-To-Pay (WTP) values are calculated for the choice of flying an airline with which the individual has FFP membership compared with another airline where the individual has no FFP membership. These WTP estimates vary across different trip purposes and levels of FFP status. Our results indicate that FFP membership plays a strong role in airline choice, particularly for individuals with elite membership. We then capture random heterogeneity through the use of latent class models, using sociodemographic variables as class-membership covariates. The latent class model results indicate three groups of individuals with very different sets of preferences, particularly for FFP membership. The discrete segmentation indicates one class with very low WTP, one class with average WTP, and one class with extremely large WTP values. These results provide evidence that latent class models capture preference heterogeneity much better than the MNL model for air itinerary choice, particularly when considering the effects of FFP membership.

Determinants of air cargo traffic in California ☆

Paulos Ashebir Lakew  , Yeow Chern Andre Tok

Abstract

Studies on the economic impacts of air cargo traffic have been gaining traction in recent years. The slowed growth of air cargo traffic at California's airports, however, has raised pressing questions about the determinants of air cargo traffic. Specifically, it would be useful to know how California's air cargo traffic is affected by urban economic characteristics. Accordingly, this study estimates the socioeconomic determinants of air cargo traffic across cities in California. We construct a 7-year panel (2003–2009) using quarterly employment, wage, population, and traffic data for metro areas in the state. Our results reveal that the concentrations of both service and manufacturing employment impact the volume of outbound air cargo. Total air cargo traffic is found to grow faster than population, while the corresponding domestic traffic grows less than proportionally to city size. Wages play a significant role in determining both total and domestic air cargo movement. We provide point estimates for traffic diversion between cities, showing that 80% of air cargo traffic is diverted away from a small city located within 100 miles of a large one. Using socioeconomic and demographic forecasts prepared for California's Department of Transportation, we also forecast metro-level total and domestic air cargo tonnage for the years 2010–2040. Our forecasts for this period indicate that California's total (domestic) air cargo traffic will increase at an average rate of 5.9% (4.4%) per year.



Transportation Research Part A: Policy and Practice

Volume 79, September 2015, Pages 31–41

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The impact of Gulf carrier competition on U.S. airlines

Martin Dresner^a, Cuneyt Eroglu^b, Christian Hofer^c,  , Fabio Mendez^d, Kerry Tan^d

Abstract

Gulf carriers, such as Emirates Airline, Etihad Airways, and Qatar Airways, have expanded aggressively and are creating an increasingly dense global network. These carriers' future growth prospects, however, hinge on their ability to gain access to markets in Europe and America, for example. Existing bilateral agreements stifle the Gulf carriers' ambitious expansion plans in some instances, and incumbent carriers lobby to restrict further market access. To contribute to this debate, the objective of this research is to empirically examine the effects of Gulf carrier competition on U.S. carriers' passenger volumes and fares in international route markets. Based on data obtained from the U.S. Department of Transportation, the empirical results suggest that greater competition by Gulf carriers in U.S. international markets is associated with (1) significant growth in U.S.–Middle East traffic volumes and (2) small but statistically significant traffic losses and fare reductions for U.S. carriers in route markets connecting the U.S. with Africa, Asia, Australia and Europe.



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Effects of corruption on efficiency of the European airports

Laingo Manitra Randrianarisoa^a,  Denis Bolduc^a, Yap Yin Choo^b, Tae Hoon Oum^c, Jia Yan^d

Abstract

The effect of corruption on airport productive efficiency is analyzed using an unbalanced panel data of major European airports from 2003 to 2009. We first compute the residual (or net) variable factor productivity using the multilateral index number method and then apply robust cluster random effects model in order to evaluate the importance of corruption. We find strong evidence that corruption has negative impacts on airport operating efficiency; and the effects depend on the ownership form of the airport. The results suggest that airports under mixed public–private ownership with private majority achieve lower levels of efficiency when located in more corrupt countries. They even operate less efficiently than fully and/or majority government owned airports in high corruption environment. We control for economic regulation, competition level and other airports' characteristics. Our empirical results survive several robustness checks including different control variables, three alternative corruption measures: International Country Risk Guide (ICRG) corruption index, Corruption Perception Index (CPI) and Control of Corruption Index (CCI). The empirical findings have important policy implications for management and ownership structuring of airports operating in countries that suffer from higher levels of corruption.

Price effects of airlines frequent flyer programs: The case of the dominant firm in Chile ☆

Claudio A. Agostini^a,  , Diego Inostroza^b,  , Manuel Willington^a, 

Abstract

Frequent flyer programs create a switching cost for the consumer and allow firms to obtain rents, for example, by exploiting the principal agent problem existing between the employee who travel and purchases the ticket and the employer paying for that ticket. In Chile LAN is the dominant airline in domestic markets and the only one that has a frequent flyer program (FFP); it faces some competition from two small carriers. Using a unique dataset for Chile, collected by ourselves from airlines websites in 2011 and 2012, we estimate the impact of the dominant airline FFP. For this purpose, we compare for each route the fares between airlines and between weekday trips (that accumulate full miles and are mainly for business purposes) and weekend trips (that accumulate less than full miles and are mainly for leisure purposes). The results show that the differential premium LAN is able to charge for weekday trips due to the FFP is around 35%. Three particularities of the Chilean market help the econometric identification: there is only one hub for all airlines (the capital city of Santiago), there is no business class in domestic flights, and none of the airlines is a low-cost carrier.

Check-in allocation improvements through the use of a simulation–optimization approach

Miguel Mujica Mota 

Abstract

The aeronautical industry is still under expansion in spite of the problems it is facing due to the increase in oil prices, limited capacity, and novel regulations. The expansion trends translate into problems at different locations within an airport system and are more evident when the resources to cope with the demand are limited or are reaching to their limits. In the check-in areas they are appreciated as excessive waiting times which in turn are appreciated by the customers as bad service levels. The article presents a novel methodology that combines an evolutionary algorithm and simulation in order to give the best results taking into account not only the mandatory hard and soft rules determined by the internal policies of an airport terminal but also the quality indicators which are very difficult to include using an abstract representation. The evolutionary algorithm is developed to satisfy the different mandatory restrictions for the allocation problem such as minimum and maximum number of check-in desks per flight, load balance in the check-in islands, opening times of check-in desks and other restrictions imposed by the level of service agreement. Once the solutions are obtained, a second evaluation is performed using a simulation model of the terminal that takes into account the stochastic aspects of the problem such as arriving profiles of the passengers, opening times physical configurations of the facility among other with the objective to determine which allocation is the most efficient in real situations in order to maintain the quality indicators at the desired level.

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