ITEA ANNUAL CONFERENCE AND SCHOOL ON TRANSPORTATION ECONOMICS

HONG KONG 2018

School: 25-27 Jun • Conference: 27-29 Jun

The Hong Kong Polytechnic University

We are pleased to announce that the 2018 Annual School and

The conference and school will be hosted by the Department of Logistics and Maritime Studies at the Faculty of Business of The Hong Kong Polytechnic University. The two and a half-day

Airport City-center Rivalry

Achim I. Czerny and Hanxiang Zhang
(Both) Hong Kong Polytechnic University
Department of Logistics and Maritime Studies

Brookings Tsinghua Center Conference 2017
Tsinghua University, 15-16 Sept 2017
"Air Transportation Issues in China and Other Countries"

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Introduction

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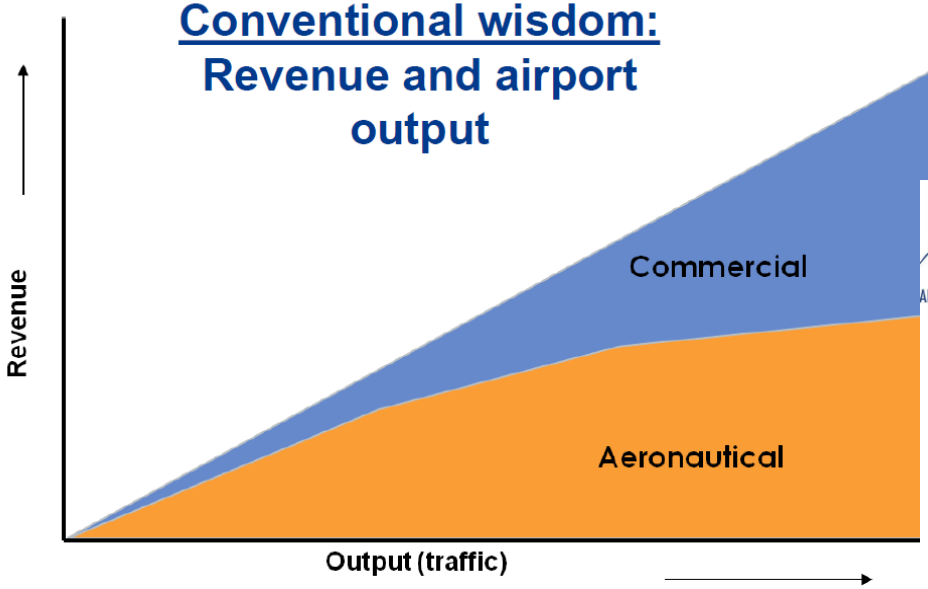
Source: 2017 ACI Economics Report

AIRPORTS COUNCIL INTERNATIONAL

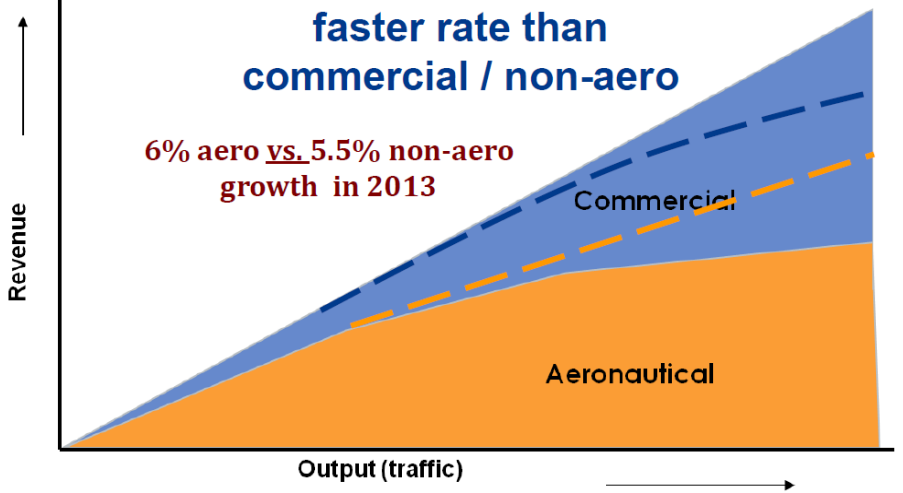
Conventional wisdom:
Revenue and airport output



AIRPORTS COUNCIL INTERNATIONAL

Reality:
Aero is growing at a faster rate than commercial / non-aero

6% aero vs. 5.5% non-aero growth in 2013



Source: Lucas and Lioutov, ACI World

Table 2: Regional distribution of non-aeronotical revenues (% of total non-aeronotical revenue, 2013)

Region	Retail conces-sions	Food and beverage	Car parking*	Rental car con-cessions	Adver-tising	Fuel and oil	Aviation catering services	Utility recharges	Property and real estate revenue or rent	Other
Africa	37.1%	1.3%	15.1%	3.9%	7.1%	3.2%	0.3%	4.4%	14.9%	12.6%
Asia-Pacific	39.7%	3.4%	9.2%	1.2%	4.5%	1.7%	0.5%	4.1%	27.9%	7.9%
Europe	34.6%	4.8%	15.1%	2.2%	2.2%	0.8%	0.3%	5.6%	18.7%	15.7%
Latin America-Caribb.	25.3%	6.0%	8.9%	2.6%	4.7%	3.6%	0.4%	1.8%	13.1%	33.6%
Middle East	48.6%	4.9%	7.7%	2.2%	3.0%	7.0%	1.4%	2.7%	10.7%	11.9%
North America	8.3%	7.1%	39.3%	16.6%	5.7%	N/A	N/A	N/A	13.5%	9.4%
World	27.7%	5.2%	20.3%	6.2%	3.9%	1.1%	0.3%	3.4%	18.3%	13.7%

*: Car parking revenue includes revenue from airport-operated parking lots and car parking concession revenue.

***Source**: **ACI** (ACI Airport Economics Survey – 2014)*


JCDecaux
SAVE
UP TO
30%
COMPARED
TO
DOWNTOWN
PRICES
CHANE
CHIVAS REGA
18
GOLD SIGNATURE
Hennes
V.S.O
AIRPORT HOT PICKS
SAVE
UP TO
30%

mellowish
UK

Level 4 Contributor
24 posts
16 reviews

vs city centre.
20 June 2016, 00:34

Hi,

I have a 2 day layover in Singapore & wanted to ask if there was much difference in cosmetics shopping between the airport & the city centre? As in Korean brands like Laneige etc as it's harder to buy this where I'm from.

Thank u:).

Report inappropriate content

Travellers interested in this topic also viewed... Hide ✕

Marina Bay Sands ★★★★★
#38 of 316 hotels in Singapore
22,337 reviews
"An enjoyable stay"
CGL_17 9 September 2017

Show Prices

See all 316 hotels in Singapore

1-7 of 7 replies Sorted by Oldest first 1

1. **Re: Cosmetics shopping in Changi Airport vs city centre.**
20 June 2016, 06:10

Save Reply

IL3n3
Singapore, Singapore

Level 2 Contributor
24 posts
2 reviews

Hi,

Based on my experience on SK-II and other cosmetics that I had bought from duty free changi airport cosmetic much cheaper compare to city.

Report inappropriate content

2. **Re: Cosmetics shopping in Changi Airport vs city centre.**
20 June 2016, 20:25

Save Reply

omega123
Singapore, Singapore

It is much cheaper than in the city

4,637 Reviews
Singapore, Singapore

All hotels in Singapore (316)

Top questions about Singapore

- >>> Show Top Questions about Singapore <<<

Singapore Destination Experts

ddiggs2015
5,713 forum posts

Members who are extremely knowledgeable about this destination and answer travellers' questions frequently.

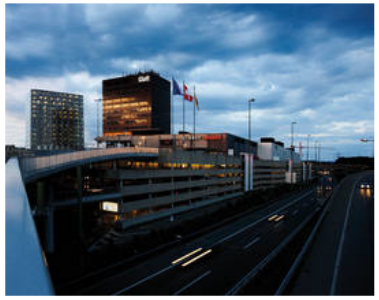
Beyond destination forums

- Air Travel

See all »

Book a tour

Associated venues



Glatt - Your First Shopping Destination

MALLS & SHOPPING CENTRES

Neue Winterthurerstrasse 99, Wallisellen

This is Switzerland's most popular shopping mall. There are typical Swiss shops as well as international brands, watches and jewellery shops and...

see more

FEATURED

Shopping in the Airside Center at Zurich Airport

MALLS & SHOPPING CENTRES

Zurich Airport

Zurich airport's passenger area is a shopping centre too! And quite a large one, in fact: more than 60 shops are located in the Airside Center...

see more

FEATURED

Bahnhof Stadelhofen

MALLS & SHOPPING CENTRES

Stadelhoferstrasse 8

22 shops in the underground of the Stadelhofen railway station, built by famous Spanish architect Santiago Calatrava. Big grocery store as well as...

see more

Europaallee Passage

MALLS & SHOPPING CENTRES

Other examples

- Vancouver airport: city-center prices upper limit
- Atlanta airport: city-center price plus 10 percent upper limit

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Literature, research objectives, agenda

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Literature

- Zhang and Zhang, 1997: Social max (myopic)
- Starkie, 2001: Profit max, graphical analysis
- Zhang and Zhang, 2003 and 2009: Profit max ≠ social max (myopic)
- Czerny, 2006: Non-aero business increase profit-max aero charge (foresigh)
- Czerny, 2009 and 2013: Inside and outside airport area supply
- D'Alfonso, Jiang, Wan, 2013: congestion effects on non-aero demand
- Czerny and Lindsey, 2014: Profit-max non-aero price can be zero (foresigh)
- Flores-Fillol, Iozzi, Valetti, 2015: Unifying framework (myopic/foresigh)
- D'Alfonso, Bracaglia, Wan, 2016: Non-travelers' demand for non-aero supply
- Kidokoro, Lin, Zhang, 2016: Endogenous non-aero capacity, self-financing
- Zhang and Czerny, 2012, D'Alfonso and Bracaglia, 2017: Recent survey papers on aero- and non-aero businesses

Research Objectives

- Characterize equilibrium airport pricing when airports and city-center companies have market power
- Evaluate equilibrium pricing behavior from the social viewpoint

Agenda

- Basic model (unit demands, myopic passengers)
- Myopic passengers
- Foresighted passengers
- Extensions
  - Downward sloping individual demands for “the good” (revised… error in first paper version)
  - Price-regulation (new… important to relate results to real world)
  - Preference for ancillary relative to city-center goods (revised… to make it more realistic)
  - Airline market power
- Conclusions and avenues for future research

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Basic model (myopic)

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Features

- r: airport charge
- p_a: ancillary charge
- p_c: city-center price
- T: travel cost to airport from city center
- $p+T$: generalized price (myopic pax, ancillary and city-center prices don't enter)
- q: passenger quantity
- $\bar{B} = B + qT$: Strictly concave passenger benefits from traveling
- u with $u < T$: Good's utility
- Q: city-center population

Demands and profits

- D with D(r): Passenger demand determined by B'=r

$$d_a(r,p_a,p_c)=\begin{cases}0 & \text{for} \quad p_a>p_c \cup p_a>u \\ D & \text{for} \quad (p_c>u \cap u \geq p_a>u-T) \cup (u \geq p_c \geq p_a \cap u \geq p_a \geq p_c-T) \\ Q & \text{for} \quad (p_c>u \cap u-T \geq p_a) \cup (u \geq p_c>p_a+T).\end{cases} \tag{1}$$

$$d_c(r,p_a,p_c)=\begin{cases}0 & \text{for} \quad p_c>u \cup u \geq p_c>p_a+T \\ Q-d_a & \text{for} \quad u \geq p_c \geq p_a \cap u \geq p_a \geq p_c-T \\ Q & \text{for} \quad u \geq p_c \cap p_a>p_c\end{cases} \tag{2}$$

$$\Pi_a(r,p_a,p_c)=rD(r)+p_a d_a(r,p_a,p_c). \tag{3}$$

$$\Pi_c(r,p_a,p_c)=p_c d_c(r,p_a,p_c). \tag{4}$$

Best responses

- Airport

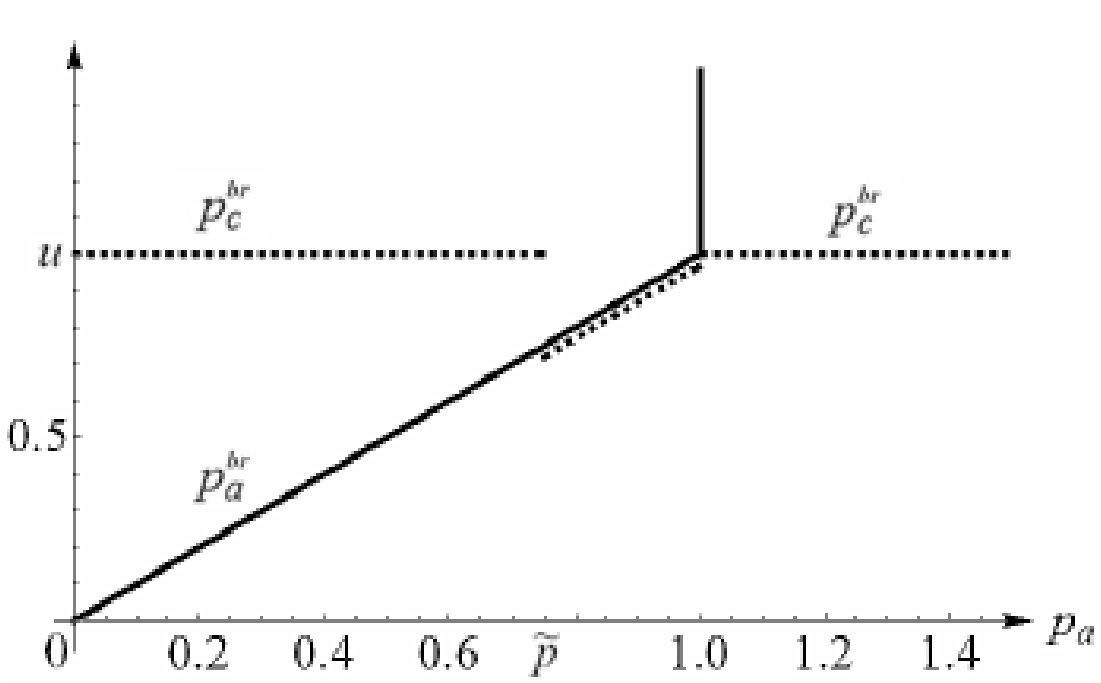
$$(r(p_c), p_a(p_c))^{br} = \left(-D/D' - \min\{u, p_c\}, \min\{u, p_c\}\right) \tag{8}$$

- City-center

$$\tilde{p} = u\frac{(Q-D)}{Q}, \tag{9}$$

$$p_c^{br}(r, p_a) = \begin{cases} p_c \geq 0 & \text{for} \quad p_a < u - T \\ u & \text{for} \quad \begin{cases} p_a > u \\ \cup\, (u - T \leq p_a \leq \tilde{p}) \end{cases} \\ p_a - \varepsilon & \text{for} \quad \tilde{p} < p_a \leq u. \end{cases} \tag{10}$$

Missing equilibrium in pure pricing strategies and restoring assumption



Assumption 1 *The city population is large enough in the sense that* $Q \geq uD/\varepsilon$ *for* $\varepsilon \to 0$.

Results for myopic passengers

Proposition 1 *For myopic passengers and given Assumption 1, an equilibrium in pure pricing strategies exists where the ancillary price and the city-center price are determined by the good's utility, u, that is, $p_a^N = p_c^N = u$, and the airport charge is reduced by an amount that is equal to the good's utility relative to a situation where ancillary businesses are absent, $r^N = -D/D' - u$.*

$$W(q, q_a, q_c) = B(q) + (q_a + q_c)\, u \tag{18}$$

Proposition 2 *For myopic passengers and given Assumption 1, airport and city-center prices maximize welfare if $u = -D/D'$ in equilibrium, while passenger quantities are excessive or too low from the social viewpoint if $u > -D/D'$ or $u < -D/D'$ in equilibrium, respectively.*

Intuition

- Profit-max ancillary price depends on u
- Welfare-max ancillary price equal to marginal costs and independent of u
- u can be such that profit-max airport charge is socially optimal

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Foresighted

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Generalized price

$$\eta(r, p_a, p_c) = \begin{cases} r + T & \text{for} \quad p_a > u \\ r - (u - p_a) + T & \text{for} \quad p_a \leq u, p_c > u \\ r + (p_a - p_c) + T & \text{for} \quad p_a \leq p_c \leq u. \end{cases} \tag{19}$$

Airport best responses

$$(r(p_c), p_a(p_c))^{br} = \left\{(r, p_a) : (\min\{u, p_c\} \geq p_a > \min\{u, p_c\} - T) \cap \left(r + p_a = -D/D'\right)\right\} \tag{21}$$

Results for foresighted passengers

Proposition 3 *For foresighted passengers and given Assumption 1, there exists a set of equilibria in pure pricing strategies, which can be described by* $\left\{(r^N, p_a^N) : r + p_a = -D/D', u - T \leq p_a \leq u\right\}$ *and* $p_c^N = u$.

welfare-maximization requires $\overline{\eta}(r^N, p_a^N, u) = r^N + p_a^N - u = 0$ with $\overline{\eta} = \eta - T$

Proposition 4 *For foresighted passengers and given Assumption 1, equilibrium airport and city-center prices maximize welfare if* $u = -D/D'$ *in equilibrium, while passengers quantities are excessive or too low from the social viewpoint if* $u > -D/D'$ *or* $u < -D/D'$ *in equilibrium, respectively.*

Intuition

- Profit-max sum of airport charge and ancillary price independent of u
- Welfare-max generalized price depends on u
- u can be such that profit-max airport charge is socially optimal

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Extensions

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Downward sloping demands

New (adjusted) generalized price of traveling

Error in the 1st paper version

$$\overline{\eta}(r, p_a, p_c) = r - (cs(p_a) - cs(p_c)) \tag{23}$$

$$W(q, q_a, q_c) = W(q, q\delta(0), (Q - q_a)\delta(\widehat{p})) = B(q) + qb(\delta(0)) + (Q - q)\, b(\delta(\widehat{p})). \tag{24}$$

Proposition 5 *Consider downward sloping individual demands for the good, $\delta(p_i)$. With myopic and foresighted passengers, it holds that the welfare-maximizing airport charge can be achieved when the absolute value of the inverse semi-price elasticity of passenger demand, $-D/D'$, is equal to the profit per customer, $-\delta^2(\widehat{p})/\delta'(\widehat{p})$, in equilibrium, while the equilibrium ancillary and city-center prices are excessive from the social viewpoint only if passengers are myopic because profit-maximizing ancillary prices are welfare-maximizing in equilibrium if passengers are foresighted.*

Price regulation

- Airports worldwide generate more than 20 percent of their non-aeronautical revenues by car parking (Airports Council International, 2015).
- Consider an upper limit on aeronautical charges

$$r \leq \overline{r}.$$

- Results on the previous slides change.

Preference for ancillary good

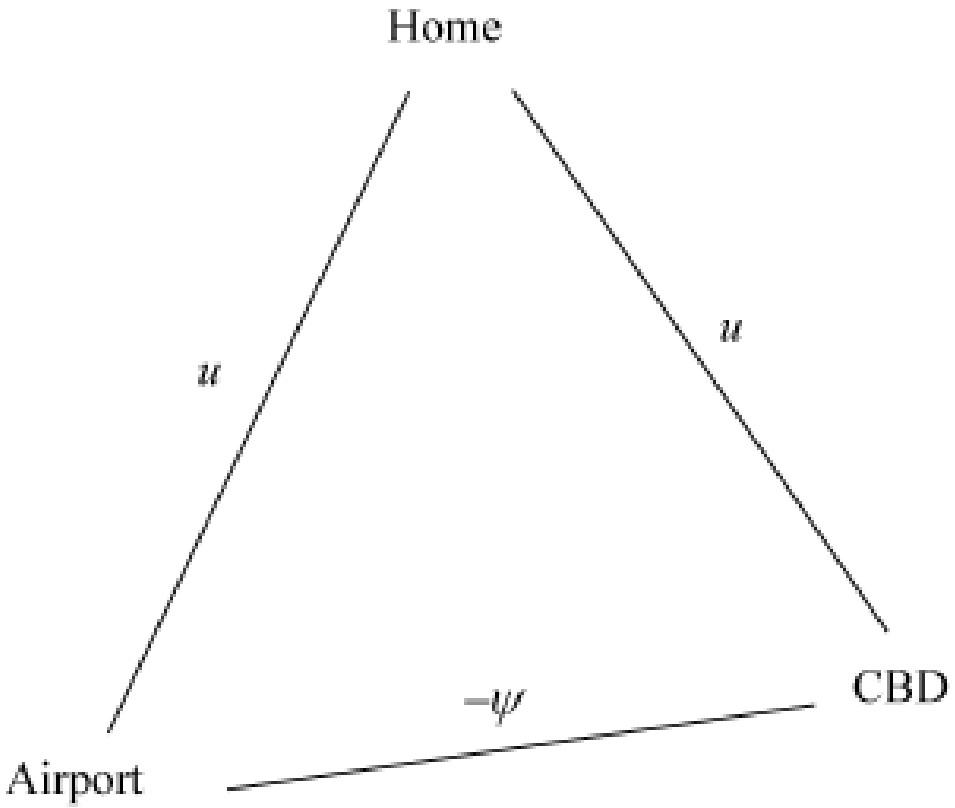

Figure 4: Airport versus city-center utilities

Airline market power

- Airline market power: Socially optimal airport charge tends to be reduced and (most likely) negative

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Conclusions

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Conclusions

- Equilibrium airport pricing is not per se excessive
- Welfare evaluation of equilibrium profit-maximizing airport tends to be improved by passenger foresightedness

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