Assessing the Non-Aviation Performance of Selected US Airports[1]

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Abstract

This paper applies econometric analysis to identify the determinants of non-aeronautical revenues and rent payments at selected US airports, based on a panel data set from 2000 to 2008. The focus of the study is on Specialty Retail and Food & Beverage (F&B) services, which are the major non-aviation activities at US airports, in addition to parking and rental car services. The performance of Specialty Retail and F&B is influenced by characteristics such as concession space, number and characteristics of passengers – in particular, domestic vs. international, leisure vs. business, and origin & destination (O&D) vs. connecting passengers. The paper illustrates how different passenger types contribute to Specialty Retail and F&B revenue, and how Specialty Retail and F&B revenues differ in their contributions to rent payments to airports. We also show how non-aviation performance differs for terminals serving only Low Cost Carriers (LCC) and terminals that serve full service airlines.

Key words: Airports, Commercial revenues, Panel data analysis, Specialty Retail, Food & Beverage (F&B)

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1. Introduction

Significant transformations occurred in the airport industry over the last decades, including changes in the ownership structure, the understanding of an airport's mission, and the influence of new market players like Low Cost Carriers (LCC), which shifted the focus of airport management and led to increased attention on non-aeronautical revenue. Some airports have already successfully integrated non-aviation activities into their overall revenue generation strategy and others are now following suit (Graham 2009). As the contemporary airport environment is highly competitive, airports need to be attractive and effective to survive. Thus, while management has to pay attention to all activities of an airport, non-aviation activities have become extremely important for airports to stay competitive on airports charges and still remain financially sustainable. There are many publications dealing with airport efficiency and the role of non-aeronautical revenue, but most of them are of a descriptive character.[3] Due to data limitations, there has been very little modeling of the underlying relationships that affect non-aviation revenue. In this paper, we focus on the empirical estimation of factors that influence non-aeronautical revenue. We were fortunate to overcome the problem of data availability by having access to data from a large sample of US airports.[4] This paper examines airport characteristics that determine Specialty Retail and Food & Beverage (F&B) revenues, such as number and characteristics of passengers, concession space, and presence of LCCs. Finally, we want to understand how revenues are reflected in the rent payments airports receive from non-aviation activities. We will first review the literature on this topic, then describe our data set, and ultimately carry out an econometric analysis of the main drivers of retail revenue.

2. Review of the literature

The literature identifies the volume of passenger traffic, retail and concession locations, passenger type influences, passenger dwell times, and rental contract types as the main variables affecting revenue generation from non-aviation activities.

2.1 Volume of passenger traffic

Non-aviation revenue should increase greater than proportional with increases in passenger volumes, because large airports' greater retail spaces support increased specialization. This allows specialty shops to reach critical volumes due to their higher margins than simpler travel value stores. Using airport data from the United Kingdom (U.K.), Italy, and Germany, Graham's (2006) study showed that at airports with less than 4 million passengers, non-aeronautical revenues represented 44, 33, and 31 percent (U.K., Italy, and Germany respectively) of total airport revenues, compared to 57, 46, and 39 percent (U.K., Italy, and Germany respectively) at airports with more than 10 million passengers. Graham (2009) concluded that large airports offer a wider range of services, including specialty shops and Food & Beverage (F&B) outlets, whereas smaller airports do not reach the critical mass needed to sustain such shops. Large airports also have more international traffic that spends more money at airports.

2.2 Retail concessions planning

In addition to airport size, a store's location also plays an important role in the process of the retail revenue generation. Hernandez et al. (1998) stated that location is now recognized much more as a potential source of competitive advantage. The competition's intensity in a number of markets, including saturation in some sectors, has led retailers to place far greater emphasis on effectively managing their store portfolios and to plan them more systematically in order to maximize their business' aggregate returns. Several models are used to explain retail location planning. Brueckner (1993) shows that a shopping center's design can be seen as a two-stage problem. First, the developer decides on the store types and numbers the center will contain. Then, he or she decides on the space allocated to each store. Analytically, the first stage involves a discrete choice problem, and the second stage has continuous choice variables. A given store's sales rise as other stores grow because the shopping center becomes more attractive to customers and receives greater foot traffic. Hernandez (1998) grouped the location planning techniques into three broad groups: comparative, simple benchmarking against already established stores; predictive, multivariate statistical techniques using cumulative data on past store performances to ascertain future ones; and knowledge based, statistical data combined with programmed intelligence.

2.3 Passenger characteristics

Along with retail location planning, researchers have analyzed how different passenger types contribute to non-aviation revenue. In a study using data from Spanish airports, Tovar and Rendeiro (2009) observed that non-aviation commercial revenue increases with growing international passenger volume, and that hubs and large tourist airports are expected to attract more international passengers than small airports. Papatheodorou and Lei (2006) indicate that LCC passengers' contribution to non-aeronautical revenue is smaller for large airports (greater than 3 million passengers) than for small airports (less than 3 million passengers). In small airports, the contribution of charter and full-service passengers are comparable with LCC travelers. Castillo-Manzano (2010) concludes from a survey of seven Spanish regional airports that for making a purchase or consuming food and beverages before a flight there is no statistically significant difference between LCC and traditional full-service airline passengers. However, once passengers decide to spend money, LCC passengers spend 7 percent less than those who fly with a traditional airline. Torres et al (2005), who interviewed Asturias Airport travelers, suggested the average business traveler spends less than vacation travelers. However, if the dwell time is less than 45 minutes, business travelers will consume more than vacation travelers. Thus, the likelihood of a passenger making a purchase is also affected by the time the potential shopper has available. Kasarda (2008) suggested that it is not solely air passengers who comprise the non-aviation business of airports. With the growing number of airport-linked businesses, airport employees also use some of the airports' services such as housing, recreation, food services, retail, health, and child day care. Similarly, meet and greeters, who pick people up from the airport, are also important.

2.4 Types of contracts

By type of contracts, we refer to how retail and restaurant concessions' rents are structured and the effect it has on performance. Kim and Shin (2001) revealed that mixed contracts of MGR (Minimum Guaranteed Rate) and percentage of annual sales (paying either MGR or percentage of sales depending on which is greater) are effective for duty-free, retail, and convenience shops, whereas the percentage of sales method might be more appropriate for F&B catering services. Tovar and Rendeiro (2009) illustrated that among Spanish airports, ones that have an above average technical efficiency rating also outsource a larger level of non-aviation activities and have higher non-aviation commercial revenues. Consequently, they argue that outsourcing non-aviation activities to specialists active at more than one location enables airports to pay more attention to their core services and thus improve their competence. The literature suggests a number of areas, where detailed empirical studies could help to quantify some of the influences we discussed. This concerns not only the importance of size and the composition of passengers, especially with the growing importance of low-cost carriers, but also the type of contracts and the degree of vertical integration used to best organize the value chain of airport activities.

3. Data

A detailed data set of US airports and a sufficient sample size allowed not only a descriptive, but also an econometric analysis of non-aviation performance in airports, which sheds light on questions discussed in the previous literature on airport's non-aeronautical performance.

The analysis uses data from ARN Fact Book, which is published by the Airport Revenue

News. The sample consists of 74 US airports during the years 2000 and 2008. All data are on a terminal-by-terminal basis and cover 191 terminals. The data include Duty Free, Specialty Retail, News/Gifts, and Food & Beverage (F&B) sales and space. Passenger data are divided into different categories: enplaning, deplaning, international, domestic, Origin & Destination (O&D), transfer, business and leisure passenger volumes. The data also indicates which airlines operated in the specific terminals.

3.1 US non-aeronautical revenue composition

In our sample, car rental and car parking revenues comprise the majority of US non-aeronautical revenue. The composition of other types of revenue (excluding car rental and car parking) is presented on Fig.1. <Figure 1> Duty free sales are one of the main sources of non-aeronautical revenue in Europe, whereas it is a less important source in the US. The potential for increasing Duty Free revenue is quite limited in the US because of the dominance of domestic traffic; however, the potential of Specialty Retail could be expanded in the US as Specialty Retail revenue is lower in the American airports than in the European ones. Revenue from Food & Beverage (F&B) accounts for the largest part of non-aeronautical revenue in the US (car rental and car parking revenue were not considered).

3.2 LCC terminal performance

Low cost carriers' influence on traditional airlines and airports is becoming an increasingly discussed topic. It is reasonable to assume that the introduction and increased role of LCC influences traffic volumes and passenger behavior. Fig. 2 and Fig. 3 illustrate terminal performance differences with only LCC[5] and terminals with only full service airlines (FSA) or a mix of full service and LCC. Even though low cost airlines do not offer food on board (during the period under analysis FSA started the transformation of in-flight catering services), F&B revenue per passenger is still lower in LCC terminals than in terminals serving only full service airlines or a mix of LCC and full service airlines (Fig.2). <Figure 2> Since F&B have less square footage per thousand enplaning passengers in LCC terminals, F&B revenue per square foot is higher in LCC terminals than in terminals that serve only FSA or where LCC are present but not dominant. Specialty Retail shops in fully LCC terminals generated less revenue both per square foot and per enplaning passenger and consequently paid less rent payments to the airport (Fig.3). <Figure 3> More precise numbers from the 2008 sample are the following: terminals dominated by LCC generated 11% less revenue from each square foot, 34% less revenue per each enplaning passenger and 7% less in rent payments than other terminals. Even though Specialty Retail performs the worst in LCC terminals, it only paid 7% less in rent payments compared to other terminals where specialty retailers generate higher revenue. For F&B this situation is different. F&B from terminals dominated by LCC generated 2% higher revenue from each square foot and only 2% less revenue per each enplaning passenger, but also 17% less in rent payments than terminals which serve full service airlines or where LCC are present but do not dominate. The cause of the inequitable revenue conversion into rent payments for F&B in LCC terminals could be related to the higher fixed part and lower variable part of the lease contracts typical for F&B operators. If this is the case, the correction of the typical lease contract structure to a more incentive compatible contract could increase LCC terminals' revenue from F&B activities.

4. Empirical results

In the econometrical analysis, we will first try to explain the revenue performance of the airports' Specialty retail and F&B (i.e. revenues which were generated by airports' concessionaires). We will next look at rent payments from Specialty retail and F&B, i.e. rents concessionaires pay to the airport (is usually referred to as airport income). Panel data techniques will be used to estimate the model because the available data includes airport sample observations over a specified time period. Based on the literature review, the following model was specified to estimate Specialty retail and F&B revenue drivers (model will be estimated separately for Specialty retail and F&B revenue):

Model A $(Ln(Revenue\ per\ square\ foot))_{it} = \alpha_0 + \alpha_1*(Ln(Square\ Footage))_{it} + \alpha_2*(Ln(Pax))_{it} + \alpha_3*(Int\ pax\ share)_{it} + \alpha_4*(O\&D\ pax\ share)_{it} + \alpha_5*(Business\ pax\ share)_{it} + \alpha_6*(\ Dummy\ only\ LCC)_{it} + u_i + \varepsilon_{it}$,

where the dependent variable is Ln(Revenue per square foot) – the natural log of Specialty Retail/F&B gross revenue per square foot; α_0 – is a constant term; α_1, α_2, α_3, α_4, α_5, α_6 – coefficients; u_i – the time-constant unobserved effect; ε_{it} – error term; $t \in [2000;2008]$ – refers to the time period; i – indicates the terminal. As previously discussed in the literature review, non-aeronautical revenue depends on airport size and passenger volumes. This is why Ln(Square Footage) – natural log of total Specialty Retail/F&B square footage in the terminal and Ln(Pax) – natural log of departing passenger numbers were chosen as independent variables to control for size and passenger volumes. The positive relation between total non-aeronautical revenue and total square footage and passenger numbers is quite straightforward. In Model A, revenue per square foot is used as a dependent variable. We expect positive relation between Specialty Retail/F&B revenue per square foot and number of departing passengers. More passengers passing through Specialty Retail and F&B facilities leads to higher purchase probability, and increased revenue per square foot generated all else equal. For Specialty Retail/F&B revenue per square foot and Specialty Retail/F&B square footage we expect a negative relation. After controlling for passengers numbers with increase in Specialty Retail/F&B square footage, Specialty Retail/F&B revenue per square foot generated from this increased square footage should fall. We used natural logarithms of these variables in the model because of the nonlinear relationship between the dependent variable and square footage and passengers numbers. Not only terminal size or the total number of passengers matters for explaining the development of non-aeronautical revenue. Different passenger groups also matter because they have different spending patterns. To distinguish between the different passenger groups' spending patterns, the following independent variables were added to the model:

– share of international passengers out of the total number of departure passengers (*Int pax share*),

– share of Origin and Destination (O&D) passengers out of the total number of departure passengers (*O&D pax share*),

– share of business passengers vs. leisure passengers out of the total number of departure passengers (*Business pax share*).

We expect a positive relationship between international passengers share and Specialty Retail/F&B revenue per square foot. International passengers usually arrive earlier at the airport and have more time for shopping as well. Greater dwelling times should also lead to increased consumption of F&B. International passengers also spend more money for their tickets and likely belong to a wealthier socioeconomic group. International terminals also offer a more extensive variety of Specialty Retail and F&Bs because of their larger size. We expect a negative relationship between O&D passenger share and F&B revenue per square foot, as transfer passengers spend more on Specialty Retail and F&B because of their longer journey times. However, transit passengers' layover lengths may be limited and may not be enough for both shopping and consuming F&B. Therefore estimating models for Specialty retail and F&B separately will help us better understand transit passengers' preferences in the US. This will be shown by significance of the O&D pax share coefficient in both (or only one) of the models.

The study by Torres et al (2005), based on survey results at Austrian airports, suggested that on average, business travelers spend less than leisure travelers. We will check this relationship for the US airports and will test if this relationship is different between Specialty Retail and F&B. Since LCCs have emerged in the US, they have permanently increased their market share. A categorization of travelers as LCC or legacy passenger is therefore relevant. Unfortunately, data for the share of LCC passengers were not available per terminal. We will therefore attempt to catch the effect of possible differences in spending patterns of LCC and legacy passengers by using the dummy variable that equals one if a terminal's dominant airline is LCC and zero otherwise (*Dummy only LCC*) as a proxy for LCC passenger share. We expect a negative coefficient in front of the *Dummy only LCC* variable. But not only airport size, variety of offer, location and different passenger characteristic influence non-aeronautical revenue, but also the different types of contracts matter, that transform these revenue streams to an airport´s income (rent payments to the airport). In the sample used for the analysis, the data only showed aggregate airport income. The lack of a breakdown of income between fixed and variable parts prevents a more detailed analysis of the underlying contract structure.

To understand how non-aeronautical revenue is reflected in airport income, the following model was estimated (the model will be estimated separately for Specialty retail and F&B rent payments to the airport):

Model B $$(\text{Ln(Rent per square foot)})_{it}=\delta_0 + \delta_1*(\text{Ln(Revenue per square foot)})_{it} + u_i + \varepsilon_{it}$$

where Ln(Rent per square foot) – natural log of Specialty Retail/F&B rent payments per square foot received by the airport;

Ln(Revenue per square foot) – natural log of Specialty Retail/F&B gross revenue per square foot;

δ_0– is a constant term; δ_1– coefficient; u_i – the time-constant unobserved effect; ε_{it} – error term; $t \in [2000;2008]$ – refers to the time period; i – indicates the terminal.

Models in natural logarithms can better explain rent payments to the airport because of the non-linaear relationship between rent payments and Specialty Retail/F&B revenue. The descriptive statistics for the dependent and independent variables are shown in the Table 1. All analysis and descriptive statistic were performed at the terminal level. Table 1 reveals the data's unbalanced structure as not all the airports provided detailed data. <Table 1>

Next the results of model estimations for Specialty retail and F&B revenue drivers will be presented, following by models which analyze Specialty retail and F&B rent payments to the airport.

4.1 Specialty retail revenue drivers

The empirical estimations' results for Specialty Retail revenue drivers are presented in Table 2. <Table 2>

Table 2 shows Model A's estimation for specialty retail under different assumptions about individual terminal or time effects: Polled, Fixed, and Random Effect models. The mean VIF (variance inflation factor) is equal to 1.37, which confirms the absence of multi-co-linearity between the independent variables. The value of the F-test statistic that all terminal specific effects (u_i) equal to zero is 2.59 with p-value=0. This supports the preference to Fixed effect model rather than Pool model. Breusch and Pagan's Lagrangian multiplier test with test statistic equal to 21.78 and p-value=0 supports the preference for the Random Effect model rather than for the Pooled model. Finally the Hausman test shows that on the 5% level of significance, the Fixed Effect model is more appropriate than the Random Effect model.

Based on results of the F-test, Breusch-Pagan and Hausman tests the interpretation of the coefficient will be based on the results from the Fixed Effect model. Specialty Retail total square footage and departure passenger numbers in the terminal are Specialty Retail revenue's basic determinants. Revenue per square foot decreases with square footage[6] and increases with the passenger numbers. Specialty Retail's square footage coefficient's low significance could be explained by the fact that a negative relationship between Specialty Retail revenue per square foot and square footage is not so obvious. With increases in Specialty Retail square footage, "specialization" and "variety of goods" effects also increase, which is key for Specialty Retail. Increased specialization lead to increased passenger spending and results in an increase of revenue per square foot.

The most important passengers for Specialty Retail are international passengers. The Specialty Retail revenue per square foot increases with international passenger share. Business passengers purchase less from Specialty Retail at airports on the contrary. The higher the business passenger share, the lower a terminal's Specialty Retail revenue per square foot[7]. The reason for this could be the fact that frequent flying business passengers arrive at the airport later due to their familiarity with the airport environment and their fast lane privileges given by the airlines have no time for shopping. Whether a passenger is a transfer or O&D passenger does not affect spending on Specialty Retail. The dummy variable for terminals with dominant LCC airlines was insignificant in the model.

4.2 F&B revenue drivers

The results for F&B revenue drivers are presented in Table 3. <Table 3> Similar to the Specialty Retail revenue drivers model based on results F-test, Breusch-Pagan and Hausman test for F&B revenue (per square foot) drivers, our model preference will be given to the Fixed effect model.

Total square footage for F&B and departing passenger numbers in the terminal are F&B revenue's basic determinants. Transfer passengers spend more than O&D passengers on F&B.

Higher O&D passenger shares result in lower F&B revenue per square foot. Similarly for Specialty Retail models, we find that increases in business passenger share results in F&B revenue per square foot decreases. This can be because business passengers frequently fly in First Class, where meals are served, and also hold memberships to their airline's lounge.

F&B performance is different for LCC terminals dominated compared to legacy airline terminals or mixed terminals. In LCC terminals, F&B revenue per square foot is on average higher. In the US there is a tendency of abandonment of food services for domestic flights between legacy carriers. However, our sample includes data starting from 2000 when this tendency wasn't dominant. For example the major US legacy carrier Continental airlines stopped providing snacks for domestic flight only at the beginner of 2011[8]. This is why the result of lower F&B revenue per square foot in LCC terminals most probably could be explained by the absence of free meals on board LCCs.

4.3 Specialty Retail and F&B rent payments to the airport

Table 4 shows how rent payments from Specialty Retail and F&B depend on the revenue generated by these activities.

<Table 4>

Based on the Hausman test results for Specialty Retail rent payments model, the Fixed Effect model was chosen. For the F&B airport income model, the Random Effect model is more suitable. The choice of Fixed Effect model for airport income from Specialty Retail means that any deviation in contract structure from the average tendency is explained by individuality and each terminal's specific characteristics. For F&B, any deviation from average tendency is explained by random factors on the contrary. 67% of the variance in Specialty Retail rent payments to the airport is due to differences across terminals (rho in the Table 4).

5. Conclusion

This study's purpose was to understand non-aeronautical revenue's main drivers and rent payments from non-aviation activities of US airports. After car rental and car parking revenue, Food & Beverage accounts for the largest part of non-aeronautical revenue in our sample of US airports, followed by News/Gifts, Specialty Retail, and lastly Duty Free. However, our empirical research's focus was mainly on Specialty Retail and Food & Beverage revenue.

Considering the passenger demographics' influence on non-aviation revenue, our empirical results were the following: International passengers are the most important group for Specialty Retail, while transfer passengers spend more on F&B. With increases in the share of business passengers, both Specialty Retail and F&B revenue per square foot decreases.

F&B performances differ for LCC terminals. The average F&B revenue per square foot is lower in these terminals. Finally, we analyze how these revenues are transformed into rent payments the airports receive from non-aviation activities. Our empirical results show that 67% of the variance in Specialty Retail's airport rent payments is due to differences across terminals. The deviations from the average tendency for airport income from Specialty Retail are explained by individuality and each terminal's unique characteristics. For F&B, any deviation from average tendency can be explained by random factors on the contrary. The better an airport understands how revenue from non-aeronautical activities like Specialty Retail and F&B are generated in its terminals, the better the airport can reflect these determinants through providing space at optimal locations and to implement more profitable lease contracts.

Obviously short-term and long-term strategies differ, as new or refurbished terminals have a different layout and therefore, provide more attractive shopping and restaurant options than the older terminals. This is also an area were further research is needed, to show how to translate the lessons from this kind of research into profitable business strategies in the short and medium terms. We also need to better understand how to consider these revenue drivers' effects when benchmarking airport performances.

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Endnotes (indicated by superscript numerals in the text)

1. This paper originates from the GAP (German Airport Performance) research project, which is supported by the Federal Ministry of Research and Technology and coordinated by Juergen Mueller in Berlin, see www.gap-projekt.de for further details.
2. Corresponding author. Tel.: +49 15776458956. E-mail address : Volkova.Nadezda@googlemail.com, jmueller@hwr-berlin.de
3. See for example Freathy and O'Connell (1999), or The Moodie report:The Airport Retail Study2006/2007.
4. The analysis uses data from ARN Fact Book, which is published by the Airport Revenue News. The sample consists of 74 US airports during the years 2000 and 2008.
5. AirTran, Frontier, JetBlue, Midwest and Southwest were treated as low cost carriers
6. Specialty retail square footage is significant only on the 10% level in the Fixed effect model
7. The share of Business passengers is significant only on the 10% level in the Fixed effect model.
8. No more free pretzels on Continental by Danielle Paquette, Special to CNN March 4, 2011

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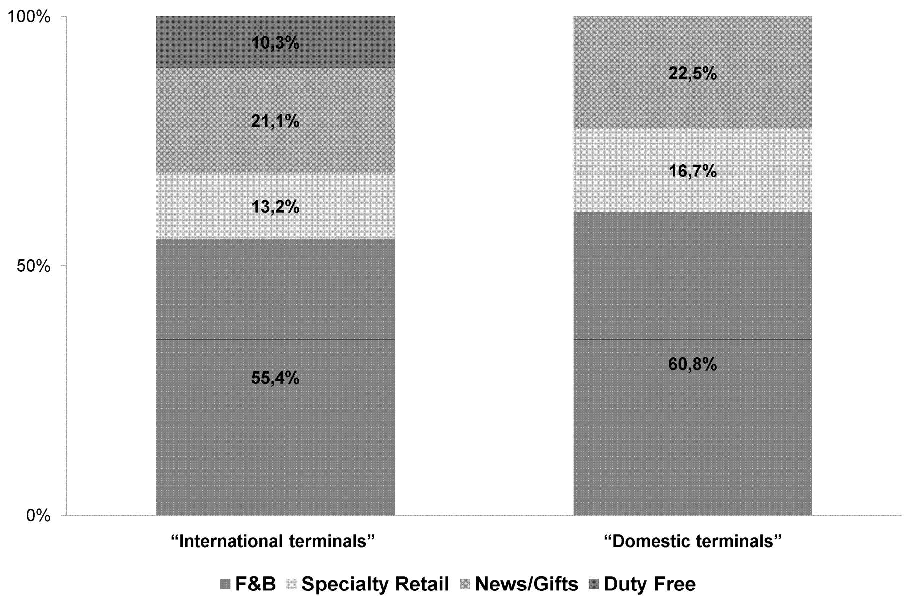

Fig.1. Non-aeronautical revenue composition in selected US airports (averages for 142 terminals in 2008, car rental and car parking revenue were not considered)

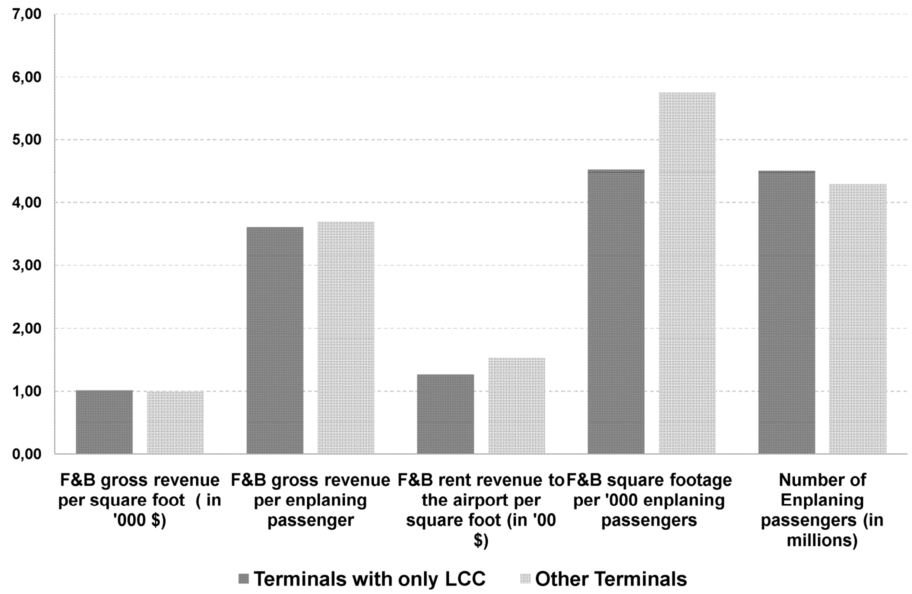

Fig. 2. F&B in LCC terminals and terminals with a mixed presence of airlines (averages for 142 terminals in 2008)

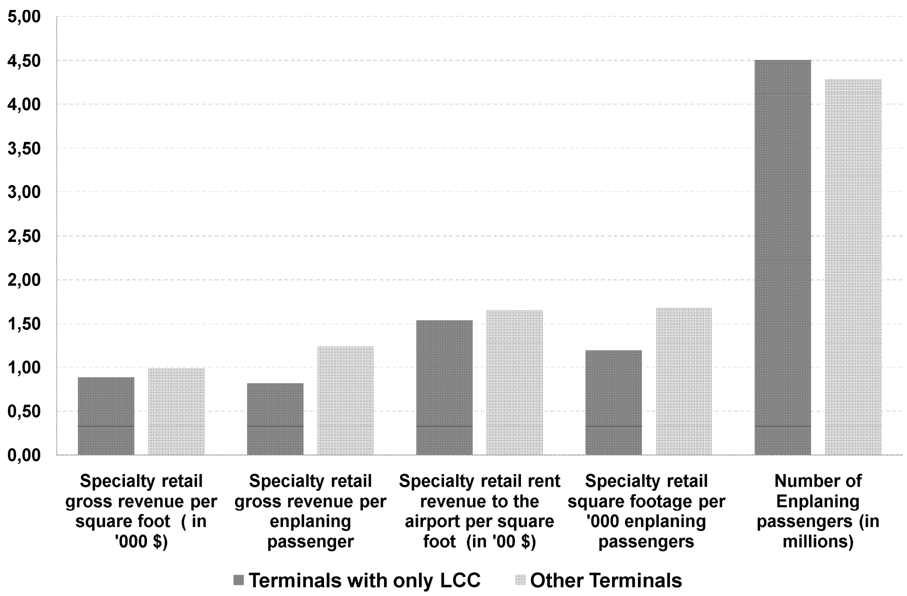

Fig. 3. Specialty Retail in LCC terminals and terminals with mixed presence of airlines (averages for 142 terminals in 2008)

Table 1. Descriptive statistics (terminal level data)

	# Obs	Mean	St.Dev.	Min	Max
Specialty retail revenue per square foot	1020	980.28	816.26	5.80	6 573.22
F&B revenue per square foot	1019	1 002.55	642.95	31.42	4 635.04
Specialty retail rent per square foot	577	164.18	212.33	1.14	3 659.92
F&B rent per square foot	541	138.08	204.04	6.04	4 068.10
Specialty retail Square Footage	1020	6 103.85	7 905.34	9.00	66 224.00
F&B Square Footage	1020	18 321.93	17 104.09	200.00	142 300.00
Number of Enplaning passengers	1020	4 309 803.69	3 803 208.70	93 051.00	23 885 974.00
Int pax share	837	0.14	0.25	0.00	1.00
O&D pax share	610	0.74	0.21	0.08	1.00
Business pax share	659	0.17	0.24	0.00	0.98
Dummy only LCC	764	0.14	0.35	0.00	1.00

Table 2. Specialty Retail revenue (per square foot) drivers

	Pooled model Ln(Specialty retail revenue per square foot)	Fixed effect Ln(Specialty retail revenue per square foot)	Random effect Ln(Specialty retail revenue per square foot)
Ln(Specialty retail Square Footage)	-0.261***	-0.156*	-0.238***
	(0.0441)	(0.0918)	(0.0536)
Ln(Pax)	0.621***	1.025***	0.574***
	(0.0621)	(0.307)	(0.0827)
Int pax share	0.848***	1.484**	0.860***
	(0.168)	(0.641)	(0.248)
O&D pax share	0.466**	0.369	0.451*
	(0.220)	(0.457)	(0.267)
Business pax share	-0.134	-0.355*	-0.285*
	(0.192)	(0.200)	(0.175)
Dummy only LCC	-0.199*	0.0478	-0.131
	(0.120)	(0.285)	(0.151)
_cons	-0.924	-7.843*	-0.355
	(0.873)	(4.687)	(1.184)
Mean VIF	1.37		
Adj. R-sq	0.264		
R-sq overall		0.225	0.275
F test that all $u_i = 0$	2.59***		
Breusch and Pagan Lagrangian multiplier test statistic	21.78***		
Hausman test statistic		13.07**	
N	305	305	305

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3. F&B revenue (per square foot) drivers

	Pooled model Ln(F&B revenue per square foot)	Fixed effect Ln(F&B revenue per square foot)	Random effect Ln(F&B revenue per square foot)
Ln(F&B Square Footage)	-0.596*** (0.0383)	-0.902*** (0.0418)	-0.779*** (0.0362)
Ln(Pax)	0.840*** (0.0389)	0.980*** (0.0777)	0.914*** (0.0486)
Int pax share	0.372*** (0.0952)	0.120 (0.162)	0.259* (0.133)
O&D pax share	0.189 (0.129)	-0.315** (0.121)	-0.155 (0.113)
Business pax share	-0.411*** (0.112)	-0.324*** (0.0497)	-0.340*** (0.0508)
Dummy only LCC	0.0153 (0.0691)	0.144** (0.0724)	0.0873 (0.0657)
_cons	-0.239 (0.501)	0.960 (1.210)	0.606 (0.704)
Mean VIF	1.42		
Adj. R-sq	0.656		
R-sq overall		0.615	0.641
F test that all u_i *=0*	21.71***		
Breusch and Pagan Lagrangian multiplier test statistic	89.31***		
Hausman test statistic		55.33***	
N	304	304	304

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Specialty Retail and F&B rent (per square foot) drivers

	Fixed effect Ln(Specialty retail Rent per square foot)	Random effect Ln(Specialty retail Rent per square foot)	Fixed effect Ln(F&B Rent per square foot)	Random effect Ln(F&B Rent per square foot)
Ln(Specialty retail revenue per square foot)	0.802***	0.850***		
	(0.0262)	(0.0233)		
Ln(F&B revenue per square foot)			1.098***	1.059***
			(0.0490)	(0.0334)
_cons	-0.570***	-0.901***	-2.705***	-2.439***
	(0.173)	(0.158)	(0.326)	(0.223)
R-sq overall	0.78	0.78	0.80	0.80
Hausman test statistic	16.76***		1.14	
rho	0.67	0.57	0.58	0.49
N	577	577	542	542

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$