

An Empirical Study of Catering Costs in an Emerging Airline Market



This study presents an empirical model of airline catering costs for the Brazilian domestic airline industry since the late nineties. Airline passengers, used to the aviation's golden years of high-quality on-board services, have faced severely reduced and, in some cases, charged catering. The study analyzes panel data from statistical yearbooks published by the Brazilian National Aviation Agency in order to investigate this issue. We employ a fixed effects estimator of the determinants of catering costs. Important factors influencing catering costs such as the airline business model, demand and input prices, are pinpointed and analyzed in light of the economic characteristics of air transportation. Our final results show that the entry of a low cost carrier had a downwards impact in overall catering costs, producing a forty percent decrease on average.

by: João Luiz de Castro Fortes and Alessandro V. M. Oliveira

Background

Air transportation was in the past marked by excellent standards regarding inflight services, with catering being one of the best attributes of airlines. Major carriers used to offer outstanding service beyond the average passenger expectation. Brazil was not an exception, with legacy airlines such as VARIG and TRANSBRASIL, along with the then regional TAM, being the most noticeable in terms of catering standards. However, due to the huge difficulties faced by the Brazilian air transportation sector over the past decade – with the 9/11 crisis, the bankruptcy of major airlines, the Brazilian deregulation act, among others –, cuts in catering costs has become a commonly observed practice in the market. Aware of need of lowering costs to attract new clients, Low Cost Carriers (LCC) emerged in the Brazilian transportation market – a trend also observed all over the world. One of the most notable characteristics of the business model of these airlines is to suppress items considered superfluous in the airline service – the “no frills” classic approach of LCCs. The first Brazilian (and Latin American) LCC was GOL Airlines, which entered the domestic market in 2001. GOL Airlines’ low-cost philosophy was completely opposed to VARIG, which was the major airline by that time and considered by many, until nowadays, as the best standard ever with respect to in-flight services quality.

According to International Air Transport Association (IATA), catering costs normally account to approximately 2 or 3 % of an airline’s total cost. Besides the production costs, other expenses strictly related to catering are those involving regulations and

standards of aeronautical legislation and logistics costs. Additionally, each kilogram associated with meals means extra aviation fuel burnt. Therefore, the elimination this “extra weight” may make the difference between profit and loss for the operator. Recently, one alternative to the complete elimination of in-flight catering has been the practice of charging an extra fee, i.e., a charged catering. Table 1 shows how prices vary for extra items in some airlines over the world.

Table 1: Price comparison for products sold inside by main low-cost airlines.

	Values in US\$ ¹				
	GOL	Webjet	Spirit	Air Asia	Ryanair
Country	Brazil	Brazil	United States	Asian Countries	European Countries
Beverage	1.71	unavailable	5.29	2.7	1.6 (150ml)
Mineral Water (300ml)	1.71	unavailable	5.29	2.7	2.43 (150ml) 3.39 (500ml)
Beer	5.71	unavailable	10.54	unavailable	5.22
Sandwich	unavailable	6.85	unavailable	3.8	6.57
Hot Meal	8.57	unavailable	unavailable	4.9	unavailable
Combo(sandwich or hot meal + non alcoholic beverage + candy)	8.57	10.28	unavailable	10.3	10.6
Salted Peanuts	1.71	1.71	unavailable	2.17	2.61

Adapted from site www.aquelapassagem.com.br, Dec-2010

According to An e Noh (2009), passengers tend to be more sensible to the quality of services as it interacts directly with them. Moreover, from the passenger perspective, overall the airline image may be directly associated to the quality of in-flight services. Although the definition of quality may be subjective in most cases, one important characteristic perceived by the passenger is the standard of meals served by the airlines.

This study briefly evaluates the conditions of catering in the Brazilian airline industry. We use panel data collected from the Statistical Yearbooks of the National Aviation Agency (ANAC), covering the period of 1997 to 2008. We use unit cost of catering by airline as a proxy for assessing “catering quality”. Unit costs are total catering costs divided by total enplanements. We employ an econometric model of unit catering cost to uncover some of its most important drivers. We also analyze how these expenses evolved within a ten-year period along. Others metrics for catering quality, such as passenger opinions on airline catering quality could also be obtained from surveys, and would be probably more adequate for this kind of analysis. However, this kind of information is typically hard to get from airlines and would not cover a long period suitable for econometric investigation.

Data Analysis

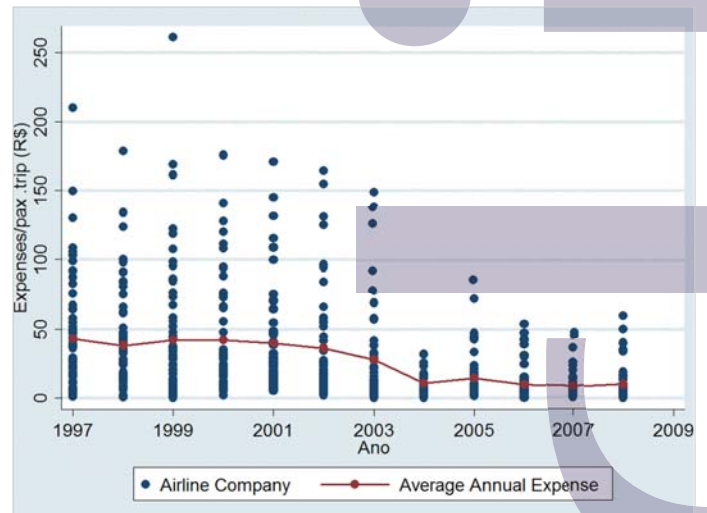
The data used in the modeling of problems were obtained from the Statistical Yearbook of Air Transport, Volume II, published by the airline regulator ANAC. The yearbook comprehends 1997 to 2008 data from all regular air transport Brazilian airlines.

Some important facts occurred during these years in Brazilian civil aviation and have to be brought up to the reader for a full understanding of possible data oscillations. The first main fact is the deregulation act stated in 2001 and represented a regulatory landmark for the aviation sector. This regulatory reform created a harsher competition among airlines. Some of them could not cope up with the new environment and exited the market, while new entrants emerged in the air transport market with new ideas and business models. Another fact that it is important to mention is the bankruptcy of many airlines. Among the ones that entered a period of poor financial condition, VARIG was the most important. As mentioned before, it was considered by passengers as a benchmark in terms of catering quality.

Catering Services Costs

The first analysis performed was the study of how airline average catering expenses per passenger in a trip have evolved during the investigated years. Also, an analysis regarding catering revenue would be interesting for the full understanding of how the quality of that service is varying. However, this data is not available due to the fact that charging for this kind of services onboard is a novelty in the Brazilian air transport industry. However, in the near future it is expected that the ANAC will be more interested in studying this new phenomenon and will request airlines to disclose this information. We strongly recommend the regulator to embrace this idea.

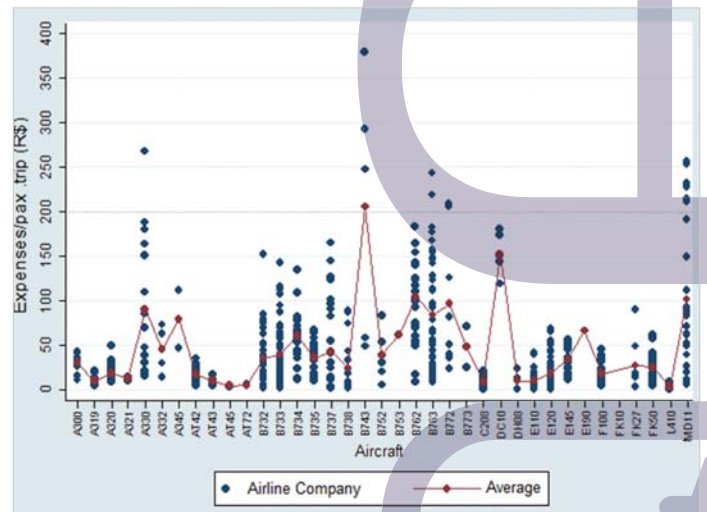
Initially, Graph 1 shows that the observations are somewhat disperse, meaning a high variability of expenses with catering service. However, it can be seen that the average value and its variability had been decreasing along the years. This fact can be caused by the entering of the low-cost philosophy in the air transport market along bankruptcy of the major high-cost airlines.



Graph 1: *Heterogeneity of catering services expenses.*

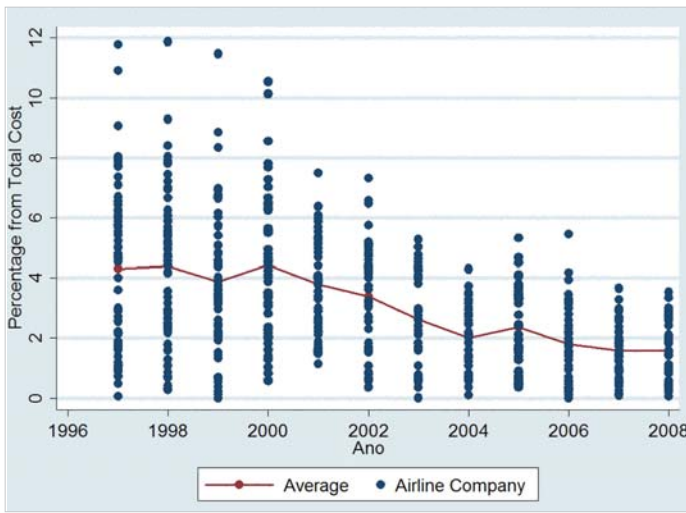
Another market dynamic that has to be evaluated here is the kind of equipment which the airline is operating. It is expected that the higher the number of carried passengers per flight is, the lower the average catering expenses are. This fact is caused by economies of density that the airline may obtain from fulfilling its aircraft more efficiently. Note that some of the catering costs may be considered fixed, such as logistic costs and regulation-related costs. Contrary to this expectation, we have Graph 2 which shows that the average catering cost of aircraft such as the ATR-42 and the Fokker F-50 – both with less the a hundred seats, is almost the same as of an Airbus A320. We believe that further investigation of the presence of economies of density in catering costs is necessary however.

The type of flight may affect in-flight services’ expenses as well. Of course, we have notified that transatlantic international flights last longer and have more meals served domestic flights. This fact makes the unit cost of catering in aircraft operating in international routes to be higher – for example, Boeing 747-300 and DC-10 -, as we can see in Graph 2.



Graph 2: *Heterogeneity of catering service expenses for different kind of aircrafts.*

Graph 3 shows the representativeness of in-flight expenses in airline total costs along the studied years. It is possible to see the diminishing of dispersion among airlines across the years, meaning that cost convergence has become a reality in the industry.



Graph 3: Impact of catering services expense in airlines' total cost.

The Econometric Model

Initially, observing Graph 3, it is possible to see a trend of diminishing cost for the airlines for the last years. Therefore, a trend variable (IND_T) was included in the empirical model. Along with that fact, the demand for air transport has been increasing in the last years. Many of the “new passengers” (passengers who are using air transport for the first time) are strongly price-sensitive. For those passengers, although the quality of onboard service is important, the ticket’s final price is the main attribute that determines his or her choice. Therefore, we expect that along with the increasing demand in air transport, there will be a decrease in prices in order to make it economically more attractive to this type of consumer. It is reasonable therefore to assume that one of the core variables would be demand for air transport. However, demand is a variable which depends on other factors, with gross domestic product (GDP) being one of the most important.



Tuna Sandwich and Soft Drink on sale on board low cost Air Asia

Source: www.airlinemeals.net Lachlan Burnet

Another variable of the empirical model is aircraft average stage length (AVST). We believe that longer trips are associated with higher catering costs. Also, we expect that the exchange rate (USD expressed in local currency, BRL) would affect catering costs, particularly in international trips when international catering contracts may have values quoted in American dollars. In other words, fluctuations in the exchange rate may affect directly these costs. International trips have another fact to be observed: since they are typically longer and use wide-body aircrafts, these costs are higher in most cases. Moreover, with bigger aircrafts, airlines offer other classes than economy class, which increases catering costs. Concluding: we expect that the type of segment (either international or domestic) will directly influence catering costs. We use a dummy variable SEGMENT1 to represent the kind of segment in the model.

Finally, the entry of GOL in the market is essential in order to explain the evolution of catering costs in Brazil. GOL’s entry notably influenced other airlines to become more competitive. A dummy variable ENT_GOL represents this period. Ultimately, this dummy variable also accounts for the effects of airline deregulation in Brazil.

We have then,

$$\text{LNEXPPERPAX} = f(\text{IND_T, GDP, RPAX, AVST, USD, SEGMENT1, ENT_GOL}, [1])$$

Where:

LNEXPERPAX is the natural logarithm of average expense, in local currency (BRL), for each passenger for each trip, IND_T is the trend variable, GDP is Gross Domestic Product, in billions of BRL, LNRPAX is the natural logarithm of the number of revenue passengers, AVST the average trip length, USD is the exchange American Dollar – Real (BRL/USD), SEGMENT1 is the dummy variable dummy which means domestic or international trip, ENT_GOL is the dummy variable which represents the period before and after GOL’s entry.

We employ a fixed-effects estimator to account for the strong heterogeneity observed across airlines/aircrafts/periods in the data. Estimation results with airline fixed effects are presented by Table 3. We have all variables statistically significant at a 10% level. Most of them are statistically significant at 1% level.

All coefficient signs corroborate the initial hypothesis. We have considerable evidence that the increase of number of passengers onboard, the unceasing depreciation of Brazilian Real and the increasing average stage length will result in increasing costs. On the other hand, the increase of GDP results in more people travelling and therefore a greater number of passengers. This scenario would lead to a more competitive air transport market for airlines and, meaning the necessity of cutting off catering services.

Moreover, it is possible to identify that GOL’s entry had a statistically significant coefficient. The estimated impact amounts to approximately 40% on average. This means that its entry into the air transport market (along with its low-cost-operation idea) caused the lowering catering costs (coefficient’s negative sign) in a general way for all Brazilian airlines.

Table 3: Results for regression with fixed effect of Airline

Inexperpax	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]
lnrpax	0.0554	0.0146	3.8000	0.0000	0.0269 0.0840
usd	0.1534	0.0322	4.7600	0.0000	0.0902 0.2166
gdp	-0.8788	0.1391	-6.3200	0.0000	-1.1514 -0.6062
segment1	0.3001	0.0736	4.0800	0.0000	0.1559 0.4443
ent_gol	-0.4182	0.0961	-4.3500	0.0000	-0.6066 -0.2297
ind_t	0.0155	0.0091	1.7000	0.0900	-0.0024 0.0334
avst	0.0003	0.0000	12.7900	0.0000	0.0002 0.0003

The next table shows a regression of fixed effect of equipment – that is, the kind of aircraft. The obtained result is similar to the first regression. All coefficients are significant, except for the coefficient IND_T. This is probably due to a correlation of this variable with another one which would cause this effect.

Table 4: Results for regression with fixed effects of equipment.

Inexp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Inrpax	0.0560	0.0210	2.6600	0.0080	0.0148 0.0972
usd	0.1716	0.0450	3.8100	0.0000	0.0834 0.2598
gdp	-1.0289	0.1972	-5.2200	0.0000	-1.4154 -0.6424
segment1	0.2739	0.1109	2.4700	0.0130	0.0566 0.4912
ent_gol	-0.3808	0.1353	-2.8100	0.0050	-0.6461 -0.1156
ind_t	0.0047	0.0125	0.3700	0.7080	-0.0199 0.0293
avst	0.0003	0.0000	6.9700	0.0000	0.0002 0.0004

Final Remarks

With the harsh competition in the air transport sector, airlines have reached a point by which reducing costs means survival in the market. Among the cost items commonly considered as “redundant” by airlines, catering service is usually the most perceived by consumers because as it has a direct airline/passenger interface. This study showed that the usual passengers’ complaints about the quality of new airlines’ in-flight services are justified, compared to older airlines. Airlines like VARIG, for example, used to spend almost twice the average spent by airlines

nowadays. A dramatic reduction has occurred in the last 10 years with airlines practically matching catering costs, probably due to a fierce competition in the market. We conclude that, using the metric adopted in this work (unit catering costs), it is possible to observe that catering quality has probably diminished in the market and has become fairly similar among all airlines.

combineer & profiteer

Combi 1 € 4,00
 Warme drank naar keuze
 • De Lekkerste Gebakke
 • Koffie of Thee naar
 • Jumbo ontbijtsausjes

Combi 2 € 6,00
 Sandwich naar keuze*
 • Cup of Soup naar keuze

Combi 3 € 5,00
 Heerlijke
 • Diverse Boreknoten

Combi 4 € 7,50
 Kies je eigen lunchmenu
 • Eetling Theesetbox met
 • vingeropstapjes
 • Drink naar keuze
 • vingeropstapjes
 • Muts, Taak of Cheese Dippers

Combination Specials on board Transavia.com
 Source: www.transavia.com

This article addressed catering services as a proxy for catering quality. We suggest extensions of this research towards also considering the development of catering revenues. In particular, an assessment of the possible correlation between catering costs and revenues would be a useful exercise, especially in case of a poor correlation between catering costs and passenger quality perceptions. We believe that there exists an unobserved cost threshold above which costs and perceptions are positively correlated, however. Another possible extension would be to investigate which other factors - next to catering costs as a proxy for quality - drive catering revenues. And also to what extent catering revenues contribute to the overall revenues of airlines.[2]

About the Authors

João Luiz de Castro Fortes is an MSc Student of Air Transportation and Airports at the Aeronautics Institute of Technology, São José dos Campos, Brazil.

Alessandro V. M. Oliveira is a professor of Air Transportation and Airports at the Aeronautics Institute of Technology, São José dos Campos, Brazil.

References

An, M. and Noh, Y. (2009). Airline customer satisfaction and loyalty: impact of in-flight service quality. *Serv. Bus.*, vol 3 pp.293-307.

Agência Nacional de Aviação Civil – ANAC (2009). RESOLUÇÃO Nº135, DE 9 DE MARÇO DE 2010 que Institui o Programa de Avaliação Dimensional – Selo ANAC. Available at www.anac.gov.br. Accessed at November, 30th 2010.

Domanico, F. (2007). The European airline industry: law and economics of low cost. *European Journal of Economics*, vol. 23. pp.199-221.

Grönroos, C. (1984). A service quality model and its marketing implication. *European Journal Marketing*. 18(4). pp. 36–44.

International Aviation Transport Association – IATA. www.iata.org/pressroom/airlines-international/february-2010/Pages/06.aspx. Accessed at September 15th, 2010.

International Monetary Fund – IMF. <http://www.imf.org/external/index.htm>. Accessed at July 25th, 2011.

Endnotes

- Exchange rates for July 2010:
 1 US\$= R\$ 1,75,
 1 EURO = R\$ 2,28,
 10 BATHS =R\$ 0,54.
- As in this paper we do not have information concerning the revenue part of catering services, we are not able to address these relevant issues.

We thank the editor Bram Kaashoek for these suggestions and other very useful comments.



Catering Trolley for full hot meal service on long haul Martinair flight